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LUWU - SOUTH SULAWESI

May 1975

LOAN 038

UNCLASSIFIED

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 - LUWU AGRICULTURE DEVELOPMENT LOAN

AID-DLC/P-2092

UNCLASSIFIED

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

UNCLASSIFIED

AID-DLC/P-2092

May 27, 1975

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: Indonesia - Luwu Agriculture Development Loan

Attached for your review are the recommendations for authroization of a loan to the Government of the Republic of Indonesia in an amount not to exceed fifteen million United States dollars ($15,000,000) to assist in financing the United States dollar and local currency costs of an agricultural development project for Kabupaten Luwu in Indonesia.

This loan proposal is scheduled for consideration by the Development Loan Staff Committee on Friday, May 30, 1975; please note your concurrence or objection is requested by close of business on Wednesday, June 4, 1975. If you are a voting member a poll sheet has been enclosed for your response.

Development Loan Committee
Office of Development
Program Review

Attachments:

Summary and Recommendations
Project Analysis
ANNEXES A - M

LUWU AGRICULTURAL DEVELOPMENT PROJECT
-INDONESIA-

CAPITAL ASSISTANCE COMMITTEE:

USAID/Indonesia

Chairman/Loan Officer	:	Steven P. Mintz
Highway Engineer	:	Carl M. Fisher
Irrigation Engineer	:	John B. Smith
Agriculture	:	David R. Brooks
Economist	:	Ronald G. Trostle
Technical Advisor/Rural Development	:	Charles J. Gill
Technical Advisor/Rural Development	:	Thomas O. Brennan
Controller	:	Alan Gordon
Legal Advisor	:	William A. Clark

AID/Washington

Chairman	:	Alexander R. Love
Loan Officer	:	Laurance W. Bond
Legal Advisor	:	Charles W. T. Stephenson
Desk Officer	:	Alexis Rieffel
Engineer	:	Joseph G. Howe
Engineer	:	John P. Zedalis
Agriculture Advisor	:	Donald R. Yeaman

LUWU AGRICULTURAL DEVELOPMENT PROJECT
-INDONESIA-

ABBREVIATIONS/ACRONYMS USED:

1. AAETE - Agency For Agriculture Education, Training and Extension
2. ADB - Asian Development Bank
3. BAPPENAS - National Development Planning Board
4. BIMAS - Crop intensification program - production inputs supplied on credit basis
5. BINA MARGA - The Directorate General for Highways
6. DGT - Directorate General for Transmigration
7. DGWRD - Directorate General of Water Resources Development
8. DMP - Department of Manpower, Transmigration and Cooperatives
9. FAR - Fixed Amount Reimbursement
10. GOI - Government of Indonesia
11. IBRD - International Bank for Reconstruction and Development
12. IFY - Indonesian Fiscal Year - 1 April to 31 March
13. IGGI - Inter-Governmental Group on Indonesia
14. IRR - Internal rate of economic return
15. LADP - Luwu Agricultural Development Project
16. O and M - Operation and Maintenance
17. Repelita - Five-Year Plan
18. Repelita I - IFY 1970-IFY 1974
19. Repelita II - IFY 1975-IFY 1979
20. UNDP - United Nations Development Program
21. MOH - Ministry of Health

LOCAL GOVERNMENT ORGANIZATION:

1. Province of South Sulawesi - Headed by Governor,Capital - Ujung Pandang
2. Kabupaten Luwu - District - Headed by Bupati,Headquarters - Palopo
3. Kecamatan - Subdistrict - Headed by Camat
4. Village - Headed by Lurah (village chief)

LUWU AGRICULTURAL DEVELOPMENT PROJECT - INDONESIA

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Part III ANNEXES

Part III ANNEXES

LUWU AGRICULTURAL DEVELOPMENT PROJECT

- Indonesia -

PART I. SUMMARY AND RECOMMENDATIONS

1. Borrower and Executing Agency.

The borrower is the Government of Indonesia. The executing agencies are the Directorate General for Highways (Bina Marga) and the Directorate General of Water Resources Development within the Ministry of Public Works and Electric Power; the Agency for Agriculture Education, Training and Extension within the Ministry of Agriculture; and the Directorate General for Transmigration within the Ministry of Manpower, Transmigration and Cooperatives. Responsibility for overall coordination rests with the Directorate General for Transmigration.

2. Loan.

A. Total Project Cost.

The estimated cost of the Luwu Agricultural Development Project is $42.9 million. Of this amount $3.7 million (9%) is foreign exchange and $39.2 million (91%) is local currency. The costs associated with individual subprojects are as follows: the Luwu irrigation rehabilitation and extension program (including O&M and land clearing) - $11.5 million; the farm service centers - $2.6 million; the road betterment subproject - $25 million; the transmigration program -$2.4 million; and the organization, technical assistance, training and evaluation programs - $1.3 million. A detailed summary of project costs may be found in Section 2 F(1).

B. AID Assistance.

It is proposed that AID finance $15.0 million or 35% of total Luwu Agricultural Development Project costs. Included in this amount is all foreign exchange requirements for the Project ($3.7 million) and $11.3 million in local currency (or 29% of total local costs). The foreign exchange element would be financed using traditional direct procurement while the local currency requirements would be financed by means of

Fixed Amount Reimbursement (FAR). Broken down by subproject, AID would finance $4.8 million (or 42%) of the Luwu irrigation program; $1.1 million (or 45%) of the farm service center activity; $8.2 million (or 33%) of the road betterment subproject; $.3 million (or 11%) of the transmigration program; and $.6 million (or 42%) of the project management costs.

Disbursements from the AID Loan are estimated at $5.4 million (36%) in U.S. fiscal year 1976, $4.7 million (31%) in FY 1977, $4.1 million (27%) in FY 1978, and $.8 million (5%) in FY 1979. A detailed AID loan disbursement schedule is contained in Annex M-2.

The proposed terms of the AID Loan are:

a) Maturity: Forty years including a ten-year grace period.

b) Interest: Two percent per annum during the grace period and three percent per annum thereafter.

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

C. GOI Contribution.

The total GOI contribution is $27.9 million all in local currency or 65% of total Project costs. Broken down by subproject, the GOI will finance $6.7 million (or 58%) of the irrigation program, $1.4 million (or 55%) of the farm service center activity; $16.8 million (or 67%) of the road betterment subproject; $2.2 million (or 89%) for the movement of farm families to Luwu; and $.8 million (or 58%) for project management costs and related local support costs for advisory services.

D. Other Donor Support.

The Government of the Netherlands is grant-financing a team of irrigation advisors to assist the Directorate General of Water Resources Development with the design of irrigation systems in Luwu for two of which AID will finance a portion of the construction costs as part of the Luwu irrigation program. The United Nations Development Program (UNDP) is providing technical assistance and training to the Directorate General for Transmigration for the overall Indonesian transmigration program. Although not specifically addressed to the Luwu Agricultural Development Project, this assistance should have a favorable influence on the entire Project.

3. Description and Justification of Project.

A. Description.

The Luwu Agricultural Development Project (LADP) includes five separate activities, each having its own purpose but all of which are closely interrelated. The specific subprojects comprising the LADP include: (i) upgrading the main trunk road through Kabupaten Luwu from Palopo to Malili; (ii) rehabilitation and extension of and establishment of an operations and maintenance program for the Bone-Bone and Kalaena irrigation systems, which border the Palopo-Malili road; (iii) establishment of four pilot Farm Service Centers serving, but not limited to, the proposed irrigation schemes; (iv) creation of a project organization supported by short-term training and foreign technical assistance along with an annual evaluation to assess the impact of the package and its individual components and point towards follow-on activities; and (v) a transmigration program to transfer 3,550 families to farm the newly irrigated areas over a four-year period.

These subprojects are complementary and their execution as a package will intensify the total Project's impact upon the sector goal which is to improve the well-being of small farmers in the Project area (and in other select outer-island areas by implication of the LADP's institution-building features) by raising agricultural productivity sufficiently to increase both per capita consumption and movement of marketable surpluses to nearby food deficit areas.

Annex C, the Logical Framework Matrix, summarizes the detailed qualitative and quantitative targets of the LADP as well as the important assumptions for achieving those targets.

The purposes of the Project lie in three interrelated areas: (1) agricultural productivity; (2) well-being of the rural poor; and (3) institution-building. Increased agricultural productivity by the rural poor is the primary focus of the Project. It is anticipated that the successful implementation of the various subprojects will lead directly to increased productivity and production. Increased labor productivity, employment opportunities and improved access to markets are expected to increase the real income levels of the target group, the rural poor. The establishment of an inter-ministerial project organization with its supporting technical assistance, training and evaluation programs, as integral parts of the Project, are expected to improve the planning and execution of the LADP as well as provide a model of improved inter-ministerial coordination for similar projects in other areas.

Among important assumptions for achieving the Project's agricultural productivity objectives are: (1) agricultural input/output price relationships are kept at current levels that provide small farmers incentives to use more advanced crop production technology and that the BIMAS (GOI crop intensification program) production input package is provided to farmers as scheduled in the socio-economic section of this Project Paper; (2) the transmigration program continues its movement of families into Luwu at its present levels to provide labor required to utilize the irrigation works; (3) a favorable land tenure situation is maintained; (4) appropriate crop production technology is effectively extended to combat plant diseases and pests as programmed for at the Farm Service Centers; and (5) effective water management takes place in irrigation projects as a result of the irrigation operations and maintenance program.

Key assumptions for achieving the objective of improving the well-being of the rural poor include: (1) implementation of subprojects is carried out in a labor-intensive way as planned; (2) reduced transportation and marketing costs make the rural poor in Luwu more competitive with other regions; (3) the GOI does not preempt increased rice production from its domestic farmers by importing large amounts of rice nor are there inhibiting domestic marketing forces for rice or other commodities (see policy analysis discussions); and (4) the average farm size is maintained.

One important assumption for achieving the institution-building objective of the LADP is that an adequate number of technical personnel are available to implement the Project and, through experience and evaluation of the Project's efforts, the GOI's organization for the planning and execution of area development programs will be improved. It is also assumed that the motivation of the various GOI agencies to coordinate their activities in Kabupaten Luwu (and elsewhere) will continue.

To achieve the sector goal of improving the well-being of small farmers through increases in productivity, per capita consumption, and marketable surpluses, it is assumed that: (1) present conditions of political stability will continue to prevail; (2) population growth in the Project area will not surpass production increases; (3) all of the production increase will not be absorbed by increased local consumption; (4) markets identified for Luwu's marketable surplus will be utilized; (5) the transportation and marketing system will be capable of moving rapidly increasing marketable surpluses from production areas to consumers in deficit areas. For a fuller discussion of these assumptions, see the socio-economic analysis.

The Project's inputs include equipment, materials, construction contractor services, technical assistance and local manpower to (a) rehabilitate, extend, and establish an operations and maintenance program for, two irrigation systems over a four-year

period, (b) clear associated land, level and shape rice paddies, (c) upgrade 176 kilometers of trunk road and 1,317 meters of bridges during three years, and (d) construct four farm service centers. Skilled Indonesian technicians will be required to form water user associations; carry out extension work; transfer several thousand families into the area; coordinate the entire area development package; and carry out a systematic evaluation program. Training in rural development planning and program management and advisors and consultants are also necessary inputs. A summary of estimated costs for each subproject is found in Section 2 F(1). Detailed breakdowns of these cost estimates are found in the technical analysis (Section 2 A).

The important assumptions for achieving input targets are that appropriate, realistic organization, implementation and budget plans are developed, and that the GOI makes budget provision for and provides its inputs on a timely basis.

Key assumptions for achieving the Project's outputs are: (1) adequate contractor capability and manpower is available for construction works; (2) access to the Luwu area is not a serious problem for logistical support and communication; (3) adequate financing is provided for road and irrigation O&M activities; and (4) the project management and the evaluation program are staffed by trained and dedicated people.

The Project is technically, administratively and economically sound. If LADP inputs are provided on schedule, it is anticipated that associated outputs can be produced on schedule. Since the input schedule is reasonable, it is expected that the output schedule will be met. The LADP's internal rate of economic return of 19% is an acceptable one for Indonesia. The Project's distributive and employment effects are expected to be strongly positive.

It is expected that achievement of Project outputs will result in attainment of the desired end-of-project conditions and, hence, the LADP purposes. It is anticipated that the achievement of the purposes of the Project will make a significant direct contribution to realizing the sector goal.

B. Justification.

Current U.S. assistance strategy in Indonesia is to support the economic development strategy of the GOI as set

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 rural poor. The LADP 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 income growth, employment creation, and income redistribution.

Basic programs for increasing agricultural production during Repelita II include (1) extensification by bringing new dry land into production, and (2) intensification through the continued rehabilitation and improvement of existing irrigation networks and the construction of new irrigation systems.

The Project clearly falls within AID's priority area of rural development. Not only will the AID Loan support the provision of infrastructure in rural areas; it will also provide assistance in the development of water user associations and farmer association complexes, both local institutions through which farmers directly participate in development.

The Project will also improve the well-being of the rural poor in the Project area. One of three interrelated purposes of the Project is to increase the well-being of the rural poor through increasing farmer incomes and employment opportunities in the north Luwu Plain.

PART II. THE PROJECT PAPER

Section 1. PROJECT BACKGROUND

A. Description of Project Area

Luwu Kabupaten (district), located in the Province of South Sulawesi on the island of Sulawesi, is divided into 16 kecamatans (sub-districts). Nine of the kecamatan are located in the "North Luwu Plain." This area is bounded on the south by the Bay of Bone; on the north by a mountain range; on the west by Palopo, a market town and the kabupaten administrative center; and Malili, a nickel mining area on the east (see Map Annex H). Nearly all of the proposed Luwu Agricultural Development Project activities will be in this North Luwu Plain. Some of the Project's benefits are anticipated to spill over into surrounding areas.

Except for the two population centers of Palopo and Malili, the area's 233,400 residents are located in numerous small villages, principally along the trunk road. The average population density is 12 people per sq. km. This compares with 80 per sq. km. for the Province of South Sulawesi, 60 for all of Indonesia, and nearly 600 for Java. The North Luwu Plain's population growth rate of 4.4% during the last five years is significantly higher than the national 2.6% average. This reflects the impact of transmigrants placed in the area by the national transmigration program.

North Luwu was identified as a transmigration area in the 1930's. The Dutch began road and irrigation works and coconut and rubber plantations in the late 1930's. The area had been in a state of political turmoil from World War II through to the rebellions which ended in 1966.

There are over 18,000 farms in North Luwu. The average farm size is 1.7 hectares or almost three times as large as the average for Java. However, the North Luwu economy is one of subsistence food production agriculture with little utilization of modern agricultural technology such as high yielding variety seeds and fertilizers.

The primary beneficiaries of the Luwu Agricultural Development Project will be the people currently owning and working the 18,000 existing farms, and the transmigrants scheduled to come to Luwu from Java, Madura, Lombok and Bali to settle new land during the next 10 years. The average per capita income of North Luwu is approximately $75 per year, considerably below the national average of $125 but about the same as the national average per capita income for the agricultural sector.

Luwu is an "Indonesian Frontier." It is one of the GOI's 100 designated growth centers. It is also representative of a number of areas within Indonesia, which when compared to the rest of the country, are greatly underdeveloped relative to their productive capacity. For much of the population of Luwu the "quality of life" is a subsistence existence.

Per capita food consumption may be somewhat higher than for the average Indonesian but non-food consumption (e.g., durable and non-durable commodities as well as the availability of public goods and services such as education and health) is considerably lower. Inadequate transportation and communication facilities contribute to social and economic isolation and to lagging economic development.

B. Description of Problems Facing Small Farmers in Luwu.

The economic and agricultural problems encountered by the Indonesian small farmer living on the overcrowded central islands (i.e. Java, Bali, Madura and Lombok) differ in many respects from the problems his counterpart experiences on the relatively more sparsely populated outer island areas (e.g. Kabupaten Luwu). While land certainly becomes less of a constraint to increasing the income of the outer island farm family, other problems become more pronounced.

The extremely poor condition of the physical infrastructure is a major obstacle to the small farmer in Luwu. Roads and bridges, where existing, are inadequate and unsafe, thus making the physical transportation aspects of marketing the farmers' crops a major problem. The sheer difficulty of getting their goods to the market often discourages the farmers from expanding their output or improving its quality.

Small farmers in Luwu also have not had much introduction to or experience with modern agricultural technology. In the past, the allocation of agricultural extension workers in Indonesia has favored the heavily populated, major agricultural production areas (i.e. the central islands), thereby ignoring the potential of select outer island areas and the small farmers operating there at subsistence levels. Existing conditions for increasing agricultural productivity are clearly unfavorable. For example, there are very few government agricultural extension workers in Luwu; less than 10% of the hectares planted to rice utilize either high yielding varieties or fertilizer; although Tunggro

disease-resistant varieties of rice are available they are not used in most of Luwu's widespread Tunggro infected areas; and rodents destroy a significant percentage of harvested grains although rodent control programs could lessen the damage appreciably.

Another problem facing small producers in Luwu has been the inability to get together with neighboring farmers to establish a cooperative effort which will provide them with more information concerning market prices for their produce; improve their bargaining position to obtain a higher price for their products; assist them in obtaining the means of production at a lower price; and establish processing and storage facilities that will bring them more cash income for what they sell.

Inadequate water management and the absence of irrigation and drainage facilities for most areas in Kabupaten Luwu have not been viewed as the critical constraint to increasing small farmer income in the past; the reason being that even if properly operating irrigation systems had existed, the poor conditions on the road and bridge transport network, the inaccessability of improved agricultural technology, and the inadequate marketing institutions would have discouraged farmers from producing much more than they could consume. However, with the planned improvements in the physical transport infrastructure, the introduction of advanced agricultural technology and the development of marketing institutions, it is expected that the construction and rehabilitation of irrigation facilities will appreciably increase the real income of small farmers in Luwu.

C. History and Development of the Proposal

USAID involvement and interest in Kabupaten Luwu began in September 1973 when Charles Gill, USAID/Jakarta, was invited to participate in an appraisal of a World Food Program Project Proposal to assist with transmigration efforts in Luwu. Following the field trip, USAID was formally requested by the Director General for Transmigration to provide technical and capital assistance for area development in the Kabupaten; a meeting was held with the Minister of Manpower, Transmigration and Cooperatives; and a full scale USAID field trip was undertaken in late January/early February 1974 to survey the Kabupaten.

Since that time the concept of the Project has narrowed from a multi-sector, all-inclusive area development scheme to an agricultural development activity which would directly impact on the existing and future small farmers in the area and serve as

the foundation for future development efforts. Within the agricultural sector, it was decided to concentrate on the most immediate needs in Luwu and proceed with a first-phase of priority activities as long as the package of agricultural subprojects was self-contained and consistent with later stage efforts.

It was recognized during the earliest stages of project preparation that the greatest challenge to and most significant contribution of this area development endeavor would be the establishment and subsequent experience gained from a GOI interdepartmental mechanism to: (a) promote outer island economic growth in select transmigration-designated areas; (b) coordinate and orchestrate the activities of the various functional, technical departments involved on the outer islands; and (c) allow for the involvement and participation of the lower administrative government levels in the design and execution of the subprojects directly affecting them. An important step in this direction was taken in May 1974 with the issuance of Presidential Decree No. 29 entitled "The Formation of a Body for the Expansion of Development in Transmigration Areas" which established national, provincial and kabupaten-level committees to achieve these objectives.

The Directorate General for Transmigration assumes a key role in the promotion and coordination of area development activities in select outer-island areas as a result of Presidential Decree No. 29 and USAID has worked closely with this agency in the development of the Luwu Project. A grant-financed advisor was contracted to assist the Directorate General for Transmigration with the final planning involved in the Luwu Project and additional technical assistance and training will be supplied during the implementation of the Loan.

It has always been obvious that one of the greatest barriers to agricultural development in Luwu is the inadequacy of its road transport network and that upgrading the trunk road through the Kabupaten (i.e. the Palopo-Malili road link) would reduce total transportation costs, improve access to both input and output markets, and provide incentives for surplus production. The Directorate General for Highways has also identified the Palopo-Malili road link as a high priority road link in its comparative analysis of the entire Sulawesi road transport network. The upgrading of this trunk road is expected to contribute to the development of an area (Luwu) with important economic potential which is presently barely accessible and virtually impassable due to the condition of this main road.

Of approximately 100,000 hectares of irrigable land (comprising nine future irrigation systems) in Kabupaten Luwu, the Government of Indonesia requested USAID to provide financial assistance for the construction of five on-going irrigation schemes. Of these, three were identified tentatively as being appropriate for AID financing. A hydraulic design engineer and an irrigation engineer planner were contracted to review the existing plans and designs for these three systems. Based on their technical report, economic analyses of each of the contemplated subprojects, and discussions with the Directorate General of Water Resources Development, it was decided to include in the first phase Luwu irrigation program only two of these systems, viz. the rehabilitation and extension of the Bone-Bone irrigation system and the partial development of the Kalaena irrigation scheme, covering some 10,760 hectares of land.

Early in the formulation of the Luwu Agricultural Development Project problems were identified with agricultural production in Luwu in general and specifically within the irrigation systems USAID was reviewing. It was also noted that given the remoteness of the area, its frontier status, and the movement of many new farm families into the area, special action programs should be designed to increase agricultural production and to improve the position of existing and future small farmers in the area. The Farm Service Center subproject was designed, jointly by the GOI and USAID (along with the assistance of a grant-financed agricultural economist) to begin to fill the void in efforts to introduce and expand the use of more productive technology into those areas of Luwu where current population and agricultural production are the greatest. It was also designed to provide other essential supporting services to small farmers. The farm service center proposal is considered an integral part of the entire Luwu Agricultural Development Project; it will serve as a model for experimentation and possible duplication as Luwu grows in importance as an agricultural development area.

D. Studies.

Annex M (3) provides a partial listing of studies, reports, and assessments made of Kabupaten Luwu. As can be seen, quite a few groups have taken an interest in the obvious potential of the area. Most noteworthy of mention in terms of its implications for future agricultural development is the Luwu Microeconomic Study, grant-financed by AID and being executed by

Bogor Institute of Agriculture. The purpose of this endeavor is to assess the agricultural resources of Luwu, formulate a development strategy, and identify top priority development activities which complement the LADP. Greatest attention in this study is being given to the Bone-Bone, Kalaena and Lamasi areas. Presently two project ideas are being considered, both in Kecamatan Bone-Bone: intensification of dry land crops and small holder coconuts.

E. Other Donor Support.

The Government of the Netherlands will supply during their initial phase 170 man-months of technical assistance to the Directorate General of Water Resources Development for the detailed design of 50,000 hectares of primary/secondary canal systems and 14,000 hectares of tertiary/quaternary canal networks for Luwu irrigation subprojects. Included in this grant is the design of transmigrant resettlement villages located in the irrigation areas and the upgrading of the DGWRD office in Ujung Pandang. Agreement has been reached between all parties that the Dutch assistance will begin with those irrigation subprojects for which USAID will provide construction financing. The first Dutch team member, to assist with aerial mapping for irrigation design purposes, is expected to arrive in Indonesia by the end of May 1975.

The United Nations Development Program has provided technical assistance to the Directorate General for Transmigration over the past 2-3 years with a rural development expert, an agricultural economist, a logistics/transportation specialist and various short-term consultancies in credit, cooperatives, village planning, land tenure, marketing, etc. Over the next three years, the UNDP will continue its technical assistance but at a greatly expanded level. An estimated 350 man-months of expertise and short-term consultancies will be provided to the transmigration agency in order to keep up with the increased role of transmigration as a national program. Although this expertise will focus on the transmigration operational program and will not focus directly on area-specific projects (e.g. Luwu Agricultural Development), the existence of this rather large pool of expertise does much to ensure that transmigration efforts scheduled to take place in the Kabupaten of Luwu will be realized.

Two other donor agencies either have existing or planned foreign assistance projects which would directly benefit Kabupaten Luwu. The Canadian Government has a bridge design and construction program for the Province of South Sulawesi which includes several

bridges on the coastal road link connecting Ujung Pandang and Palopo. When these bridges are completed and the associated road segments are upgraded by South Sulawesi Provincial Government, Kabupaten Luwu will have much better access to markets in Pare-Pare and Ujung Pandang than they now have. The Asian Development Bank also has an interest in Luwu and has made two preliminary appraisals of a small-holder oil-palm cultivation/transmigration project (including processing facilities) for the Kabupaten. The ADB has expressed strong interest in this project but is awaiting Provincial approval of the proposal and the allocation of a sufficiently large tract of land (at least 5,000 ha.) to make such a project viable.

F. Private Voluntary Organization Involvement in Luwu.

With the assistance of operational program grant and cofinancing funds, USAID is promoting the long-term involvement of private voluntary organizations with grass-root level economic and social development activities in Kabupaten Luwu which will complement and support the Luwu Agricultural Development Project. Among the proposals being considered for FY 1975 and/or FY 1976 financing are: (1) a motivation and education program for credit union cooperatives to be executed by the Credit Union Counseling Office; (2) a rodent control program under the auspices of CARE; (3) a vocational training program proposed by the YMCA; (4) a teacher training school rehabilitation project to be run by Muhammadiyah, an indigenous religious organization; and (5) a scholarship program for the study of agronomy at select agricultural technical high schools. All proposals will be reviewed and modified by both the Directorate General for Transmigration and USAID for their consistency with the larger development plans for Luwu and for the involvement of the local population in the development process.

G. GOI Experience with Transmigration and Outer Island Area Development Projects.

Until relatively recently, the main objective of Indonesian transmigration was to balance the increase in population in the core islands. In the period from 1950 to 1970, some 100,000 families were transmigrated and provided with an average of two hectares of land per household. From 1971 to 1975, 40,667 families, representing 82% of target figures for that period, were resettled.

At the same time, Indonesian efforts at promoting outer island economic growth have, in the past, followed narrow sectoral lines: transmigration programs have merely concentrated on

moving families from overcrowded Java, Bali, Madura and Lombok to more sparsely populated, transmigration-designated areas while all infrastructure, social, agricultural and government development activities have followed their own separate plans. There has been little coordination of concerned government agencies at either the national or provincial levels to plan and execute integrated area development schemes. In addition, the functional, technical government departments have been reluctant in the past to allocate sufficient resources to relatively under-populated areas with little economic activity (i.e. outer-island transmigration-designated locations), thus making it even more difficult for these areas to realize their potential. The resulting agricultural development, area development and transmigration programs have been less than successful.

The situation in Kabupaten Luwu is typical of many outer-island areas. There has been, in the past, little communication observed between the various government agencies concerning programs in Luwu. A good case in point has been the apparent lack of communication between the Directorate General of Water Resources Development and the Directorate General for Transmigration in the design of irrigation systems and the location of associated transmigrant villages. Also technical departments have not always allocated sufficient funds to the Kabupaten. As an example, the Department of Agriculture has very few agricultural extension workers active in Luwu, thus inhibiting the spread of new production technology and consequently thwarting the realization of Luwu's agricultural potential.

There are indications, however, that many of the above-mentioned inhibitors to outer-island economic development are being rectified. Firstly, the GOI has recently established the national, provincial and district level committees mentioned above. Secondly, the philosophy behind the transmigration program in Indonesia is evolving from the objective of a demographic program of alleviating core island population pressures to the belief that transmigration is but one of several important ingredients in the development of outer-island areas having considerable development potential. Thirdly, the GOI's second five-year plan has placed special emphasis on regional/rural development in terms of priorities and financing.

H. Opinion of Other Donors.

USAID has been working closely with both the UNDP and the Dutch Government in the design of the Luwu Agricultural Development Project. The leader of the United Nations technical

assistance group has, as an advisor to the Directorate General for Transmigration, contributed much time and effort to the Luwu Project and actively supports the USAID proposal. USAID has also established close contact with the Dutch Embassy to assure that the Dutch technical assistance program for the design of Luwu irrigation systems, including the Bone-Bone and Kalaena irrigation schemes, corresponds with and complements the USAID irrigation construction program in both scope and scheduling of activities. The Government of the Netherlands is most eager for the execution of the Luwu Agricultural Development Project.

Several meetings have also been held with the IBRD and the ADB to discuss the Project. Both international organizations support the USAID effort with the latter being particularly interested in the USAID proposal since any betterment of the main trunk road through Kabupaten Luwu and the establishment of farm service centers makes the proposed ADB financed oil palm project that much more attractive.

Section 2. PROJECT ANALYSIS

A. Technical Analysis

As noted earlier, the Luwu Agricultural Development Project consists of a package of separate but interrelated first-phase development activities designed to overcome existing obstacles to development, generate immediate benefits, and lay the groundwork for future development endeavors. Each of these activities or subprojects is analyzed in detail in the following sections.

1. The Palopo - Malili Road

a. Description. This subproject will consist of the construction of 176 kilometers of road, 79 bridges, and 4,224 linear meters of culvert drainage structures located along an existing alignment between the towns of Palopo, Masamba, Wotu, Tarengge and Malili. See Annex I-1 location map. Roads and bridges to be constructed are as follows:

Section	Location	Classification	Road (Kms.)	Bridges (Meters)
I	Palopo-Masamba	National	63	370
II	Masamba-Wotu	National	64	510
III	Wotu-Tarengge	National	4	30
IV	Tarengge-Malili	District	45	407
		Totals	176	1317

Bridges to be constructed will include the following types:

Type Structure	Linear Meters		
	Section I	Section II	Section III/IV
Timber	128	138	120
Steel Girder Timber Deck	138	176	61
Concrete/Steel Truss	104	196	256
Totals	370	510	437

The road to be constructed will result in the improvement of an existing road which generally follows along the upper reaches of the Luwu plain located north of the Bay of Bone and south of the foothills of the mountain chain to the north in Luwu Kabupaten. The existing

road alignment is evaluated as fair to good and grades are generally flat to rolling and less than 8%. About 50% of the road will need raising an average 50 centimeters between Palopo and Tarengge and about one meter for 30% of the Tarengge-Malili section. The existing road is from 5-6 meters wide, including shoulders, and surfacing consists of cobblestones in rough condition with driving time by jeep between Palopo and Wotu (127 kms.) more than five hours. The section between Tarengge and Malili is unsurfaced earth road except for the last six kilometers and is impassable even by jeep during wet weather. Of the 104 existing bridges 77 will need replacement and two new steel truss bridges will replace canoe ferries presently used for river crossings between Tarengge and Malili. All existing culverts are undersized and in deteriorated condition and will be replaced with new structures.

b. Design Standards

(i) Roads. Although 131 kilometers (Palopo to Tarengge) are a part of the national road system the need for a two-lane road based on traffic projection studies is not justified until after 1985 and would be contingent upon achieving a reasonable degree of economic development as planned for the area. Accordingly, the Palopo-Malili road will be constructed as a single-lane asphalt penetration surfaced travelway with crushed stone shoulders to accommodate the passing of two-way traffic. See Annex I-2 for typical road sections. The typical roadbed on a tangent section will consist of a travelway three meters wide surfaced with a granular subbase, crushed stone base, and paved with a 5-centimeter thickness of asphalt penetration macadam type pavement. The shoulders, one meter wide, will consist of the extended pavement structure without asphalt surfacing supported laterally by an earth berm 0.5 meter wide. Thickness of subbase will be variable according to soil support as determined by procedures of design presented in the AASHO Interim Guide for Design of Pavement Structures and published under a Directorate General for Highways (Bina Marga) guide No. 04/PD/BM/1974. The base will consist of a 20-meter thickness of crushed and graded stone. Curves will be superelevated.

(ii) Bridges. Bridges will be constructed six meters wide when the total length is ten meters or less. For lengths (total spans) of more than ten meters bridges will be constructed four meters wide. Three types of bridges will be constructed according to soil conditions and length of center span required. Timber bridges will be constructed for center spans of 10 meters or less. For spans longer than 10 meters Bina Marga proposes to use steel girders and

timber decks. Reinforced concrete bridges and spread footings will be designed where more economical than the use of deep pile foundations. For the longer center spans required over rivers carrying timber debris during flood stage steel truss bridges will be constructed. Each structure design will consider optimum combinations to result in the most economical design to meet the foundation and span requirements. See Annex I-3 - Typical Bridge Sections. All bridges will be designed for 70% of the Bina Marga standard loading specifications for highway bridges (document No. 12/1970) which will be for a 14-ton axle load. A maximum axle load of 7 tons will be posted for control. Although Bina Marga is investigating the possibility of using treated timber, experience in Indonesia indicates that untreated hardwood timber piles have a useful life in excess of 10 years and timber superstructures up to 25 years or more. Thus, treated timber piles as a minimum are planned for construction and treatment of all timber for bridge construction is under investigation.

(iii) Culverts and Drainage. Culverts will consist of reinforced concrete pipes with headwalls, wingwalls and aprons. A requirement of more than 4,000 linear meters ranging in diameter from 60-150 centimeters has been identified. Side ditches with slopes in excess of 5% are designed for mortared rubble lining to control erosion and review of Bina Marga standard drawings shows several variations of design which provide for adequate side drainage. No requirement for subdrains has been identified but this will be investigated during final design.

(iv) Alignment. The existing vertical and horizontal alignment of the road generally meets the Bina Marga requirements for a Class III road since the alignment follows low-lying to gently rolling terrain. Horizontal alignment changes will in general result from the necessity to raise the road to provide drainage where shifting the centerline will minimize excavation or fill work.

(v) Documentation of Standards. Bina Marga has published some fifteen manuals covering design criteria which adopt American Association of State Highway Officials guides in general as modified by Bina Marga to conform with conditions in Indonesia. Construction guides are published which have been adopted from AASHO and other well known publications used in the Netherlands and Australia.

c. Design Status of the Road. At the present time Bina Marga's design office with the assistance of an Indonesian consulting firm is making the final designs for the Palopo-Malili trunk road through Kabupaten Luwu and is preparing construction drawings and contract documents which are scheduled for completion by July 1975. A.I.D. has been asked to assist with the financing of the construction phase of this subproject, including the engineering supervision of construction.

Bina Marga maintains a list of prequalified Indonesian consulting firms and has employed these firms in recent years to perform technical services as Bina Marga's workload has increased. The firm of P.T. Indah Karya with main offices in Bandung was retained to assist the Bina Marga design division prepare the above-mentioned designs and construction plans for the Palopo-Malili road. It is noted from the review of Indah Karya's monthly report that the personnel used on the reconnaissance survey included nine graduate engineers, three with advanced degrees, and two TDY expatriate Japanese soils and drainage experts from the Nippon Koei Company, Ltd., both graduate civil engineers with impressive curriculum vitae.

d. Engineering Supervision of Construction. Bina Marga advises that the firm of Indah Karya will probably be retained for the engineering supervision of the construction phase of the Palopo-Malili road, and it is planned that this firm employ two expatriates with experience in engineering administration of construction projects. Bina Marga has agreed that any expatriate employed by the consultant would originate from a country under geographic code 941. With this arrangement the cost of engineering supervision has been included in total local costs to be eligible for A.I.D. partial financing under the FAR method of payment for a completed unit of work. P.T. Indah Karya presently employs 23 engineers, 32 assistant engineers, 25 surveyors, 60 draftsmen, and 18 soils and materials technicians. In addition the firm is associated with nine professional domestic firms and six professional foreign firms. Since 1972 Indah Karya has been retained as consultants and performed design and inspection for 53 Indoresian major projects in the civil engineering field.

On a similar project, USAID has completed reviewing the construction plans and specifications for the U.S. loan-financed Aceh Road Betterment Project and found these documents to be well organized and complete in detail. It was noted that the Indonesian consulting firm of BIEC International, Inc. was retained by Bina Marga to assist in preparing the construction documents for the Aceh loan. From USAID's review of the work produced by Bina Marga, as assisted by its

Indonesian consultants, it is concluded that these firms are capable of managing all phases of engineering design particularly with the policy of the consultant employing specialized expatriate expertise where required. Such qualified consulting firms have also been retained by Bina Marga to perform inspection services as well as all phases of designs and preparation of cost estimates, bidding and tender documents. Given all of the above, there is no reason known to USAID that such firms and P.T. Indah Karya in particular would not qualify to perform engineering supervision of construction for the Palopo-Malili road. See Annex I-4 for the proposed engineering organization to perform engineering supervision for construction of the Palopo-Malili road.

e. Construction. Bina Marga maintains a list of prequalified construction contractors. Traditionally these contractors have been performing limited work such as bridge construction and hauling of construction materials while Bina Marga has used its own forces to maintain and rehabilitate the existing road system in Indonesia. On occasion, however, some five or six Java-based contractors have been employed to construct new asphalt surfacing on important roads carrying heavy traffic. One arrangement of this kind presently in force is for resurfacing the Jakarta port road.

Pursuant to the recent government policy to expand the use of Indonesian construction contractors, in order to keep pace with rapid development, the Ministry of Public Works has authorized Bina Marga to negotiate construction contracts with contractors on an approved (prequalified) government list. It is recognized that these contractors will need government assistance in the form of advanced funding for mobilization expenses and letters of guarantee from the government to Indonesian banks. The latter form of assistance, which has been utilized in the past, enables the contractors to obtain the financing necessary to purchase any additional equipment needed.

Bina Marga has agreed that any new equipment purchased for use on the project will have its origin from geographic code 935 sources. However, in order to eliminate any possible source-origin problems of A.I.D. financing code 935 source equipment, it is understood between USAID and Bina Marga that the amortization or depreciation costs for equipment will be estimated and deducted from total project construction and engineering costs before determining the base cost estimate used for fixing the amount to be financed by A.I.D.

(i) Prequalification Requirements. Bina Marga has prequalified four Indonesian contractors and has decided to select one state-owned and one private contracting firm for the job. (See Annex I-5 for the names and other information concerning the selections.) According to Bina Marga, prequalification requirements are necessarily lenient and based on a requirement for the contractor to own certain minimum equipment and to have satisfactorily performed work for Bina Marga such as bridge construction and hauling of materials. Present policy has been to assist these contractors in acquiring additional equipment and through furnishing construction materials such as steel and cement. Such a policy will be followed in negotiating the contracts for construction of Luwu roads.

(ii) Contract Negotiation. Bina Marga feels that competitive bidding procedures for the Palopo-Malili road subproject are not appropriate because competitive bidding for the scope of work to be performed in the Luwu subproject requires the benefit of additional organizational experience and equipment fleet which Indonesian construction contractors currently lack. Thus, two contractors will be selected and the contracts scheduled as noted at Annex I-9. As presently planned by Bina Marga, the road sections will be subdivided into smaller segments of 25-35 kilometers with estimated contract completion times of approximately 12 months. These segments will serve as the units of work for purposes of the Fixed Amount Reimbursement Method of AID financing. Employing the services to two contractors the project of 176 kilometers is scheduled to be completed in three years. Bina Marga will reserve the right under terms of the contract to terminate the contract in the event of malperformance or default and take over contractor assets to complete the work.

(iii) Construction Methods. Although Indonesian contractors traditionally employ from two to three times the labor employed by international construction firms, the recent trend is towards more machinery-intensive construction methods. This trend follows government policy to accelerate its civil infrastructure development where for construction of its more important roads, shortened construction time and development of a more advanced construction industry are considered important in achieving overall development goals. This is also true for Kabupaten Luwu and the outer islands in general where labor is relatively scarce. However, due to traditional use of greater labor-intensive methods of

construction (e.g., excavation of culvert foundations and side ditches, primary rock fracturing, loading materials for mixing concrete, and spreading of aggregates for asphalt surfacing), a relatively large labor component will be involved on the subproject. The road contractors will be free to work out their own mix of labor-machinery applications. A tentative list of equipment requirements is given in Annex I-5, along with lists of equipment held by the four preselected road contractors.

Annex I-10 presents the proposed phasing of construction operations for the three year road and bridge betterment program.

f. Technical Assistance & Training. As already discussed, both construction and engineering phases of the road subproject will be performed by Indonesian firms with supplemental expatriate expertise as deemed appropriate by the firms and Bina Marga. It should be noted that Bina Marga has already established the precedent of approving higher salaries for expatriate experts employed by Indonesian consultants as was done for the firm of BIEC during the Aceh design phase. Expatriate salaries are paid in local currency. The number of expatriate experts to be employed directly by the engineering supervision consultant will be determined during contract negotiation and agreed to by Bina Marga and its consultant as being in the best interest of the project. The same procedure applies to the construction contractors where one or more expatriates with road construction or equipment maintenance management experience may be needed. Bina Marga has indicated that advisory services in narrow technical fields is not considered essential for this job but that expatriate services which would heighten capabilities in improved management and administration would be sought.

g. Maintenance. Provincial Public Works Departments have responsibility for annual maintenance of all roads in Indonesia classified as provincial or national. The Ministry of Finance allots maintenance funds annually based on kilometerage of provincial and national road classifications. The most recent government action approved Rp. 300,000 per kilometer for annual maintenance of national roads.

The project road from Palopo to Tarengge is classified as a national road. The road from Tarengge to Malili is presently classified as a district or kabupaten road but will be reclassified as a provincial road after construction to the same standards as the Palopo-Tarengge section. In the past due to the higher priorities for maintaining

roads nearer the more developed areas and the long standing need for reconstruction of many roads on the outer islands, only emergency repairs to keep the Palopo-Wotu section of road open has been undertaken by Bina Marga. However, the Bina Marga Provincial Public Works Department of South Sulawesi has established a district office in Palopo, will assume responsibility for maintenance of the entire Palopo-Malili road after its improvement, and plans to build improved maintenance facilities there. There will be a special borrower covenant in the loan agreement requiring an effective O&M program for the Palopo-Malili road.

h. Technical Viability. The relatively low standards designed for the Palopo-Malili road are considered to be compatible with the present organization and capabilities of both the Indonesian consultants and construction contractors as discussed previously. Funds will be available from the GOI and the loan to complete the project. The construction directorate of Bina Marga has the engineering and administrative experience and capacity to manage the construction work. The GOI considers the subproject to be of high priority in the overall development plan for South Sulawesi. The construction of the Palopo-Malili road is believed to be technically viable and there is reasonable expectation that construction can be carried through to successful and timely completion.

i. Cost Estimate and Financial Plan. Annex I-6 presents the estimated construction cost for road and bridge betterment on the Palopo-Masamba, Masamba-Wotu and Wotu-Malili road sections in Kabupaten Luwu. The unit prices are based on current costs and the volume of work quantity estimates are based on a detailed reconnaissance survey. The financial analysis is displayed in Annex I-8 tables. This Bina Marga cost estimate is in 1975 prices and allows for engineering supervision, contingencies, escalation, mobilization, and overhead and profit cost factors. The total subproject cost is $25,034,000. Of this amount, $1,500,000 represents the cost of steel to be utilized on the job, $8,687,000 (See Annex I-7) represents equipment ownership costs, and $14,847,000 represents all other cost involved. In an attempt to reduce costs further, USAID and the GOI will re-evaluate the economic analysis of lower cost road betterment options (such as postponing investment for two steel truss bridges while improving ferry service across two rivers) prior to final USAID technical approval of final designs for the road.

AID will finance the foreign exchange for the direct procurement of steel along with 45% of the local costs (exclusive of equipment ownership costs) associated with the road ($6,743,000) under FAR. The toal AID contribution of $8,243,000 represents 33% of the total cost of the road. USAID believes it advisable not to finance any costs associated with the equipment amortization on this subproject both for reasons of source-origin and high government handling charges levied on equipment in Indonesia (see Annex I-8 for a full discussion of this matter). The GOI contribution to the road would be $16,791,000.

2. The Luwu Irrigation Program.

An integral component of the Luwu Agricultural Development Project is the rehabilitation and extension of the Bone-Bone and Kalaena irrigation systems, which together will service 10,760 hectares of net irrigable area in the north Luwu plain. In addition to financing costs associated with the actual physical construction work involved, the Loan includes provision for an irrigation operations and maintenance program and land clearing for 7420 hectares of forests lying on the irrigation systems. As explained earlier, the Government of the Netherlands is also involved with the irrigation program with its provision of technical expertise for the design of the entire Luwu irrigation sector, beginning with the Bone-Bone and Kalaena schemes.

a. Rehabilitation and Extension of the Bone-Bone and Kalaena Irrigation Systems

(i) Technical Description

Bone-Bone Irrigation System. The Bone-Bone irrigation system encompasses about 5,000 hectares of land which varies in topography from undulating foothill areas in the north to quite flat plains only a few feet above sea level in the south. The canals are steep in the upper areas, constructed in erodable soils and carry a bedload with a high mica content. The soils are reasonably fertile and as the erosion problems are solved within the system by the work planned under rehabilitation, it is unlikely that mica laden sediments will be a serious problem.

Roughly, the subproject is bounded on the north by a line through the present diversion dam continuing along the base of the foothills from the Kanjiro River on the west to the Patila River on the east. The Kanjiro and Patila rivers, respectively, form the western and eastern boundaries. The southern boundary is considered as an arbitrary line from the west boundary going northeastward roughly parallel to the coast line until it intersects the eastern boundary, located just far enough south to include to its north the present farm lands of three established transmigration settlements. See Luwu irrigation project map, Annex J-1. The boundaries herein described include irrigation area classification, estimated as shown below:

Estimated Areas		Presently Irrigated	
Gross Areas = 5,000 ha		Village irrigation =	400 ha
Maximum net irrigation =	3,700 ha	Right bank =	650 ha
Village irrigation =	400 ha	Left bank =	200 ha
Non-irrigated area =	100 ha	Total =	1300 ha

Net technical irrigation area = 3,200 ha

Climatology, hydrology, soils and water quality have been examined and found to be satisfactory for the subproject. Annexes Nos. J-2, 3, 4 and 5 show data on the above.

The Bone-Bone system was first constructed by the Dutch as part of their colonization effort in Luwu. The original system, completed in 1939, consisted of a diversion weir with a 25 meter long crest, canal headworks structure located on the right bank, right and left bank main canals each about 2 kilometers long and two secondary canals on the end of each main canal. The total irrigated area may have been 600 hectares. From its war period deteriorated condition, the system was partially rehabilitated in 1969 and extended by the GOI during their 1972/73 fiscal year, although the extended area has not yet been put into use.

The irrigation subproject is essentially one of rehabilitation and betterment. Betterment construction consists of protecting canals and structures from erosion, providing some additional control structures and a complete tertiary and quaternary system, with adequate access and inspection roads and bridges. The system will be extended to permit irrigation on the entire 3200 hectares.

The rehabilitation work required on the Bone-Bone system will extend throughout the entire scheme, including the diversion dam. The floor of the spilway apron on the diversion dam contains a hole which will be repaired. The hoist mechanism will be repaired, and major control gates or parts replaced. Wooden parts will be replaced. Banks of the main canals require armoring to protect them from damage due to high velocity flows and abuse by animal and human traffic misuse. Many sections are in very poor condition. Most of the secondary canals are in condition similar to that of the primaries and require similar protective measures. The channels will be repaired and reshaped. Many of the present turnout structures do not have gates. Turnouts will be constructed in many locations where makeshift means are used to remove water from the canals and

ditches for farmers' use. Some reaches of ditch having excessive seepage losses will be lined. Nearly all of the secondary canals have been built but sections of them need to be completely rebuilt. Breeches in the right main canal will be repaired. All-weather inspection roads will be constructed along the right main canal and much of the secondaries. Tertiary and quaternary systems will have to be designed and constructed. The drainage system requires considerable work on the outlet areas. Brush and debris will have to be cleared to increase drainage capacity in the two areas of the left bank system. A number of farm bridges are required to improve access to the cropped area and reduce animal damage to the banks, etc. Land clearing on 1300 hectares is required (see discussion below).

Kalaena Irrigation System. The Kalaena irrigation system encompasses about 30,000 hectares of land extending from the foothills near Laimbo southward for some twenty kilometers to low coastal plains below Wotu. Of the 30,000 hectares gross area, 10,000 hectares of irrigable area are on the left bank. This area is not in the present GOI plans for Kalaena irrigation system development. Of the 20,000 gross hectares under the right bank system 12,500 hectares are irrigable. GOI plans are to develop at the present time 7,560 hectares of this area closest to the headworks (areas A, B, and C) by rehabilitating and extending the existing system. U.S. loan financing has been requested to assist with the rehabilitation and extension construction and agricultural development aspects.

Boundaries applicable to the Kalaena system begin at a northern apex of the triangular subproject area, located just downstream from Laimbo at the diversion weir. The eastern side of the area is the Kalaena River. The western boundary roughly follows the road from Laimbo to Wotu. The southern boundary is an east-west line just south of Wotu. (See map attached, Annex J-1.) Within the 7,560 hectares to be rehabilitated, the system extends for approximately 13 kilometers through areas of varying characteristics and conditions of soils, water-table, geology and cover.

Kalaena	Gross Area (ha)	Max. Net Irrig. (ha)	Net Irrig. Area (ha)
A	3,000	2,240	1,740
B	6,500	4,580	3,700
C	3,200	2,400	2,120
C(1)	2,400	1,800	1,800
D	4,900	3,580	3,140
	20,000	14,600	12,500

Hydrologic records for Kalaena are extremely limited. The available hydrology records are kept at Bandung, where the Institute of Hydraulic Engineering is located. The Institute has an hydrology section where hydrologic considerations and investigation determinations are made for public works in all of Indonesia. Records kept between 1937-1940 show a recorded low and high flow for Kalaena near the project site of 14.3 m^3/sec., and 1,590 m^3/sec., respectively. Water quality has been checked and found to be suitable for irrigation. See Annex J-5.

The Kalaena irrigation system was designed and some construction undertaken by the Dutch before the outbreak of World War II. The main canal sand sluice gate structure was completed while the diversion dam and main canal were just started by 1939. The same period of deterioration and neglect was experienced at this site as was the case with the Bone-Bone system. Since 1970, a temporary headworks has been built for run of the river diversions along with a channel connecting it with the main canal. The main canal is presently being extended to its full length, although construction is not yet complete. One of two major syphons has been completed while the second is about to be built. A large number of secondary canals have also been constructed during the last few years.

The subproject, as originally envisioned, included construction of a permanent diversion dam and appurtenances along with complete system rehabilitation and extension to the net irrigable 12,500 hectares on the right bank of the Kalaena. However, an investigation of the project site by Engineering Consultants Incorporated irrigation engineers under contract with AID has determined that: (1) construction costs during the past few years have risen to the point that the original plan is no longer economically attractive; and (2) there may be an alternative diversion dam site which would reduce costs substantially.

The Kalaena system lends itself to staged construction. It is therefore now proposed to postpone construction of a permanent weir and instead rehabilitate and enlarge the present intake structure and link canal, including the installation of gates, while rehabilitating the gabion weir built in 1969. The right bank of the Kalaena system would be rehabilitated and extended to provide 7,560 hectares of net irrigable land. This proposed partial development of the Kalaena irrigation subproject provides immediate benefits to the project

area, is economically very attractive, and does not preclude further development of the total system at a later date should a less expensive dam site be identified. The only costs which would have been lost would be the costs involved with the intake structure and gabion weir improvement and these costs have been determined to be minimal compared with the immediate payoffs. All investments made into main and secondary canal rehabilitation and extension, tertiary and quaternary system development, inspection roads, land clearing for 6,120 hectares, etc, would be utilized on any future system.

Similar to the Bone-Bone network, the Kalaena irrigation project is one of rehabilitation, betterment and extension. The gabion diversion structure will be repaired, improved in section and extended across the Kalaena River. Headgates and sluice gates will be repaired or replaced. The quantity of flow into the main canal will be controlled by a method compatible with the extreme fluctuations of the river stages.

The main canal requires additional excavation in many places to restore its original capacity and the connecting channel to the headworks is to be completed permitting the conveyance of about 12 m^3/sec. flow.

The secondary systems need to be rehabilitated and inspection roads should be constructed. Most structures will require gates, and additional turnouts will be required. Essentially all secondary canal turnouts require that gates be installed. Additional foot and animal bridges must be constructed. All tertiary, quaternary and drainage work needs to be designed and constructed.

There are a considerable number of natural drainage ways either crossing the service area or starting therein which must be cleaned and kept open. Capacities will have to be checked and enlargements made where necessary. The natural drains coming into the service area will have to be watched and closely inspected for sediment conveyance, especially in the lower reaches where the slopes flatten and part of the silt load will drop out. Cross drainage facilities require a more detailed study.

The inspection road along the main canal must have an all weather surface, as well as being extended to the full length of the canal. A new access road near the Lopi and Tomino syphon may be required since it may not be feasible to bridge these streams. Either heavy duty bridges and a second inspection road or a number of foot

bridges will have to be built in Area A on the left bank to allow access to the secondary canals and their inspection roads.

(ii) Final Design of the Irrigation Subprojects. As mentioned previously, the Dutch Government is providing technical expertise to the Directorate General of Water Resources Development for the design of the entire irrigation sector in Kabupaten Luwu with first priority being placed on the mapping, survey, planning and final design of the Bone-Bone and Kalaena irrigation systems. An initial 170 man-months of technical expertise is scheduled over 32 calendar months to begin in May 1975. See Annex J-6 for a tentative schedule for the provision of this assistance.

It may be seen from the timetable that the Dutch have scheduled a topographer to be the first team member to arrive on the job to assist with aerial mapping scheduled to begin in May 1975. He will spend one year assisting with implementation of the mapping program. An hydrologist is to arrive in the third month (July 1975), and two design engineers within eight months (December 1975). The irrigation design engineers will remain until the end of the assistance program, 20 months after the starting date. Furthermore another irrigation engineer will be provided for two years, beginning at the start of the sixth month.

This irrigation team will be especially helpful to the AID construction program and their technical skills and scheduling fit in well with the Luwu irrigation construction program to be financed by the United States. Since (1) the first year of construction will be devoted to rehabilitation solely with extension work to begin in year two of project operations (or September 1976) and (2) representatives of both the Dutch group and the Directorate General of Water Resources Development have agreed that first priority will be given to the Bone-Bone and Kalaena systems, it appears as if the design phase of the development of the Bone-Bone and Kalaena irrigation systems is well taken care of and should not cause any delays in the proposed construction scheduling.

(iii) Construction Down Through Secondary Canals. It is routine policy that the DGWRD/Department of Public Works assumes responsibility for the design and construction of diversion structures and irrigation systems down through and including secondary canals. Construction is normally performed under contract in one year segments. This procedure will be followed on both the Bone-Bone and Kalaena irrigation systems. Such contracts will also serve as the units of work for purposes of the Fixed Amount Reimbursement Method of AID financing.

Private Indonesian contractors will be selected from a list of prequalified firms to rehabiliate the existing weirs on the Bone-Bone and Kalaena Rivers and to rehabilitate, improve and extend the associated primary and secondary canals. Presently, the GOI is thinking of awarding most, if not all, of this construction to Class A contractors, of which there are now two operating in South Sulawesi, P.T. Bumi Karsa and P.T. Hutama Karya. See Annex J-7 for a presentation of minimum qualifications for class A irrigation construction contractors, and Annex J-8 for a comparison of the actual staff and equipment in South Sulawesi of these two firms with these minimum criteria. A review of their experience indicates that P.T. Hutama Karya has been associated with construction activities costing over $16 million (in South Sulawesi alone) and P.T. Bumi Karsa with over $3 million worth of contracts. Annex J-9 lists the type of equipment required to accomplish the necessary construction associated with the rehabilitation and extension of the Bone-Bone and Kalaena irrigation systems down through the secondary canals (as determined by the DGWRD) and compares the listing with equipment held by the two prequalified construction contractors.

In terms of available equipment, equipment which may be leased or purchased using the arrangements contemplated for the Palopo-Malili road subproject, qualified staff and previous experience, these two contractors unquestionably have the means and capability to execute construction activities relating to the development of the Bone-Bone and Kalaena irrigation systems. It should also be noted that other Class A contractors in Indonesia may begin operations in South Sulawesi as the number of construction contracts being awarded increases. Furthermore, although the DGWRD has been thinking of awarding these contracts to only class A contractors, it is likely that large portions of the work involved are of a nature which class B contractors (of which there are presently two in South Sulawesi) have the capability to execute (e.g. excavation of secondary canals and rehabilitation operations). Given all of the above and the provision of a full-time expatriate construction advisor to assist with contract administration there seems to be no question that contractors in South Sulawesi have the capability to rehabilitate and extend the subject irrigation subprojects and that the Provincial Public Works Office can administer the rehabilitation and extension program.

Rehabilitation and extension of the irrigation subprojects down through the secondary networks is scheduled for completion within three years, as is seen in the Luwu irrigation program construction schedule at Annex J-10.

(iv) Construction of Tertiary/Quaternary Canals. It is GOI policy that farmers assume responsibility for building tertiary and quaternary canal systems. The DGWRD as a standard practice, will design the lower irrigation systems for the farmer-beneficiaries, assist with the construction of any major works, and provide some supervisory assistance with the actual digging: however, the actual physical work is viewed as a farmer contribution to irrigation system development.

This policy has not worked out well in the past throughout Indonesia and appears to be even more of a problem in a more sparsely populated area like Luwu. USAID has raised this as a serious concern with DGWRD officials who agree that this is a problem, yet insist that farmers must participate in any irrigation program for them to have a feeling of ownership and responsibility. After many discussions, an approach was agreed to by the DGWRD which AID believes will ensure that the tertiary and quaternary canals associated with the Kalaena and Bone-Bone irrigation systems are built in a timely manner and yet ensure that an element of farmer self-help is designed into the program. AID will finance the purchase of a limited amount of equipment to be held by the Provincial Department of Public Works which would actually dig these canals through force-account while requiring the beneficiary farmers to shape their own ditches. Equipment involved would include four D-50 size dozers, seven backhoes and four 3/4 ton trucks. The stated procedure will result in the complete development of both the Bone-Bone and Kalaena irrigation networks in a three-year period, beginning in the second year of project operations. (See Annex J-10 for a breakdown of this schedule by subproject and year). This procedure is considered feasible particularly since the Provincial Public Works Department has considerable experience using and maintaining such equipment and has an equipment-operating training center outside of Ujung Pandang.

(v) Construction Advisor. In order to carry out both elements of the Bone-Bone and Kalaena irrigation construction program, the DGWRD has requested that AID furnish an expatriate advisor for a three year period beginning in year one of the program to assist the GOI with both supervision of construction and contract administration. Such an individual would contribute to the timely execution and success of the program and therefore USAID proposes financing the foreign exchange costs of the advisor ($169,000) while leaving local support costs (approximately $36,000) as a GOI contribution.

(vi) Land Tenure Situation. There are no significant large land holdings in either the Bone-Bone or the Kalaena irrigation subproject areas. The breakdown in size of land holdings by farm family on the two areas is as follows:

Size of Land Holding	Percent of Farm Families
No land	4
Less than .5 ha	14
.51 - 1.0 ha	30
1.1 - 2.0 ha	42
2.1 or more ha	10
	100

Survey work done to date by the Luwu Microeconomic Study has not encountered any farms with land holdings greater than five hectares in the irrigation areas.

(vii) Luwu Irrigation Rehabilitation and Extension Subproject Costs and Financial Plan. Annex J-11 presents a cost estimate for the rehabilitation and extension of the Bone-Bone and Kalaena irrigation systems, including tertiary canals and farm ditches, in 1975 prices. Annex J-12 breaks this estimate down into annual costs associated with (1) rehabilitation and extension through the secondary canals and (2) construction of the tertiary and quaternary systems.

The total cost, including escalation, for the rehabilitation of the diversion weirs and rehabilitation and extension of the primary/secondary canal systems for the Bone-Bone and Kalaena irrigation systems is $6,498,000. After deducting costs associated with equipment depreciation for the same reasons given in the financial analysis of the Palopo-Malili road and bridge betterment subproject (i.e. source-origin problems plus government handling charges & taxes), there remains $3,889,000 in eligible local costs for financing under FAR of which AID would reimburse $1,945,000 or 50% of eligible local costs.

The total cost, including escalation for the construction of tertiary and quaternary canals for the Bone-Bone and Kalaena irrigation systems, is $2,675,000. Seventy-eight percent (78%) of this amount represents the GOI contribution (i.e. digging the ditches) while twenty-two percent (22%) is contributed by the farmer-beneficiaries (i.e. shaping of ditches). Since AID will procure directly equipment to be used for digging these systems, equipment depreciation costs are deducted from the GOI contribution leaving $1,407,000 of eligible local costs of which USAID proposes to reimburse 50% of completed units of work ($704,000). To this must be added the foreign exchange element for the procurement of equipment estimated as $701,000 (see Annex J-13). The procurement of equipment will be limited as to source as required by AID regulations.

b. Land Clearing Operations. It has been estimated that there are 7420 hectares of land within the Bone-Bone and Kalaena irrigation systems in need of land clearing: Bone-Bone with 1300 hectares and Kalaena areas A, B, and C with 300, 3700 and 2120 hectares respectively. The great majority of this land is either occupied by transmigrant families transferred to Luwu during Repelita I or vacant land targeted for transmigrants. The predominant types of forests covering these lands include: (1) equatorial rain forests with medium to large-sized trees and little underbrush; (2) wet/swampy forests with erratic drainage, dense small to medium-sized trees, and thick underbrush; (3) dense jungle land with heavy underbrush and small trees, with some grassland patches; (4) some savanna grassland with alang-alang; and (5) other swampy forests with nipah and mangrove-type vegetation.

The Directorate General for Transmigration, as part of its routine program clears one hectare of land for every transmigrant family: one-quarter (1/4) hectare for house and garden; and three-quarters (3/4) hectare for field crops or rice cultivation. In Luwu, as elsewhere, the work is handed over to local contractors who use traditional, manual approaches: no mechanized equipment of any kind is utilized. Trees are cut to approximately one meter above the ground. Ideally the contractors are responsible also for removing the cut timber, brush and remaining debris but this is seldom accomplished.

The transmigrant family takes over at this point. If the contractor removed most of the fallen growth, the transmigrant family begins some cultivation around the remaining stumps and logs while allowing larger stumps and logs to rot out or be consumed by termites -- a three to five-year process. If the contractor, for one reason or another, had only felled the trees and had not removed branches and underbrush, the transmigrant family faces a much more substantial task before cultivation on any scale can begin. This is the more usual situation.

In addition, the transmigrant family assumes responsibility for clearing the second hectare of land. It has been observed in Kabupaten Luwu that these farmers rarely if ever get around to clearing their second hectare and the land therefore remains completely idle and unproductive.

USAID has given the matter of land clearing considerable thought and believes it must be viewed and included as a facet of the extension of the Bone-Bone and Kalaena irrigation systems in order

to assure that the land will be cleared for cultivation in a timely manner and to reasonable specifications. USAID has also concluded that clearing of land would be most appropriately executed using labor-intensive means (versus use of heavy and/or intermediate equipment). This approach will ensure that manpower is utilized as much as possible thereby opening up employment opportunities and also increasing the likelihood that the Luwu Agricultural Development Project will be replicable by the Government of Indonesia in other areas without depending on U. S. aid or technology.

The Directorate General for Transmigration will be responsible for clearing all 7420 hectares of land within the Bone-Bone and Kalaena irrigation areas. The land clearing will be contracted out and undertaken by local contractors using mostly, but not exclusively, hand methods. It will include: (1) cutting down larger trees (greater than 1 foot in diameter) to not higher than 1 meter above ground; (2) cutting smaller trees to 1 foot off the ground; (3) cutting all limbs and branches so that they rest flat upon the ground; (4) removing all underbrush; (5) collecting and piling all branches, limbs and brush against the larger tree sections and stumps; (6) burning when the leaves and branches have dried sufficiently to produce a hot, complete fire; (7) repiling all movable unburned branches and logs against unconsumed tree stumps; and (8) reburning the remaining debris.

The existing situation for clearing land as described above will be improved by: (1) determining a more realistic price for clearing land (now set between $60 to $96 per hectare depending on ground conditions); (b) improving the current technical specifications used by the Directorate General for Transmigration; (c) setting up improved procedures for inspecting and supervising the work of the local contractors; and (d) stimulating greater competition among interested contracting firms. One of the responsibilities of the full-time advisor to the Directorate General for Transmigration will be to assist in this endeavor.

Using current prices, it is felt that a more realistic unit cost for clearing land would be $133 per hectare. Allowing for inflation and phasing the land clearing operations in with the construction of the tertiary and quaternary canals (see Annex J-10), the total cost for this activity is projected at $1,704,000 of which USAID would, under FAR, reimburse the GOI for 50% of predetermined costs for land cleared according to specifications, or $852,000.

c. Operation and Maintenance Program for Irrigation in Luwu. Adequate operation and maintenance (O&M) initiated even before construction is completed is necessary for the success of the Luwu irrigation program. Furthermore, during the initial operation of the irrigation systems, heavy O&M expenses may be required to correct any inadequacies or "bugs" that may occur. The inclusion of a temporary gabion weir in the partial development of the Kalaena irrigation system requires substantial annual expenditures to keep it functioning and makes the O&M program even more important.

(i) Responsibilities for Operation and Maintenance. O&M of the completed Luwu irrigation subprojects will be the responsibility of the Governor of South Sulawesi. Indonesian Government Regulation No. 18 of 1953 and other related laws give him this responsibility within his province. In turn, the Governor has assigned the responsibility of primary and secondary system O&M to his Public Works Department. In the past the combined functions of O&M have received less than adequate attention in Luwu. A lack of Provincial budgeting and technical support has contributed to this situation. However, this has changed somewhat recently. In October 1974 money was released for primary and secondary canal maintenance on the Bone-Bone system for the first time.

O&M on the tertiary and quaternary systems is the responsibility of the farmer water users with assistance from the Governor. Technical design, surveys and supervision-related maintenance are provided through the Public Works' Kabupaten Office. Exceptionally difficult maintenance or construction work is handled by the Public Works Office. Farmers may also receive financial assistance for expenses through Impres, loans, taxes, Ipeda (provincial land tax), etc. Budget estimates for O&M on tertiary canal networks are based on a general requirement experienced over past years; an expenditure of approximately thirty kilograms of rice value per hectare for functioning irrigation systems is considered adequate. Until the Luwu Project is completed, including construction of the tertiary system, responsibility for all O&M remains with the South Sulawesi Public Works Office.

As sections of the Bone-Bone and Kalaena irrigation systems are rehabilitated, extended and become independently operable for purposes of irrigating agriculture (such as one portion of a secondary system where a segment of upstream works is completed)

that segment must be operated and maintained. The Public Works Office of South Sulawesi will then provide funds within the subproject budget for the purpose of operating and maintaining these operable segments which can be operated independently.

Regarding water charges, it should be noted that the Governor of South Sulawesi has determined that each farmer will pay two percent of his crop (i.e. 40 kg for a 2-ton crop, 80 kg for a 4-ton crop, 120 kg for a 6-ton crop) and industry will pay one rupiah per square meter area occupied on an area of functional irrigation. This should cover the costs associated with maintaining and operating the lower end systems.

(ii) An Operations and Maintenance Program for Kabupaten Luwu. Given the rather unorganized approach to O&M of irrigation systems in Kabupaten Luwu in the past and given the need to have a strong and effective program in the future, not only for the Bone-Bone and Kalaena subprojects but for all future irrigation systems (there are 100,000 hectares of potentially irrigable land in Luwu), AID has agreed to assist the Province with setting up a viable operations and maintenance program. Included in the AID program will be (1) technical assistance, (2) equipment and (3) on-the-job training of Public Works staff.

Technical Assistance. One expatriate advisor will be recruited for a period of two years, beginning in the third year of the Luwu irrigation program to assist with the establishment of an O&M program for primary and secondary canal systems which are the responsibility of the Provincial Public Works Office and the establishment of a similar program for tertiary and quaternary systems, a responsibility of water-user associations. He will provide advice and assistance concerning all technical and managerial activities associated with the irrigation O&M program including, but not limited to, planning, organization, motivation, training and coordination.

Furthermore, he will assist and advise host government officials at the national, provincial, and kabupaten levels, whose primary concern involves the implementation of an operation, maintenance, and management program for the irrigation facilities in Luwu. The advisor will receive support and administrative direction from the project manager of the Luwu Agricultural Development Project Organization; and technical direction, respective to disciplines, from the various action agencies involved. Specifically, he will deal with: (a) the Directorate General of Water Resources

Development and Provincial and Kabupaten Public Works Offices which are responsible for the construction of the irrigation systems and subsequent operation and maintenance of the main and secondary systems; (b) the Agency for Agriculture Education, Training and Extension within the Ministry of Agriculture regarding the formation of irrigation water-user associations and water management demonstration programs; (c) the Directorate General for Food Crops and the Rural Irrigation Service within the Ministry of Agriculture which assists the water-user associations with operation and maintenance of tertiary canals and on-farm irrigation programs; (d) the Directorate General for Rural Community Development within the Ministry of Interior whose activities include community development efforts, such as village associations and village irrigation programs; and (e) the Directorate General of Land Affairs also in the Ministry of Interior which is responsible for land surveys and land ownership certificates.

Aside from working with the above GOI agencies, he will deal with irrigation water-user associations in operation, maintenance, and project management and assist and advise in formulating and developing a training program to upgrade the O&M personnel of the irrigation water-user associations.

AID, under the loan, will finance the foreign exchange associated with this advisor (estimated at $123,000) while the GOI will bear his local support costs (estimated at $24,000).

Equipment. Operations and maintenance equipment mostly consists of hand tools and transport vehicles, such as bicycles, motorcycles and small trucks. A small amount of larger equipment is needed for exceptional jobs such as repairing a broken ditch, opening a sand or gravel borrow area, building a road to or excavating for a rock quarry and cleaning sediment from a canal or drainage ditch. Small pumps, compressors, jack hammers, and welding equipment are also occasionally needed. It is felt that aside from the lack of experienced irrigation O&M personnel in South Sulawesi and a less than adequate provision of required funds for O&M, the absence of such equipment to carry out an effective program has been a constraint in the past. Therefore, AID will allow the equipment to be purchased for the digging of the tertiary and quaternary canals on the Bone-Bone and Kalaena irrigation systems (see Annex J-13) to be turned over to the Provincial Public Works office for utilization for operations and maintenance purposes upon completion of the tertiary and quaternary

systems. Furthermore, it has been determined that additional equipment, in the quantities and with the costs displayed in Annex J-14, is also necessary for a Luwu O&M program. The foreign exchange for this equipment pool (which would be procured in the first year of Luwu irrigation program operations) shall be financed by AID under the Loan and purchased from eligible geographic code 941 sources. It is estimated that the cost of this equipment is $288,200 CIF Jakarta.

3. The Farm Service Centers.

a. The Concept. The Farm Service Center concept was conceived specifically for the Luwu Agricultural Development Project (1) to provide special agro-education and agro-business programs for transmigrant and indigenous subsistence farmers and (2) to encourage more rapid implementation of improved cultural practices, disease-resistant seed varieties, and production technology which would translate into more rapid economic development of the Luwu area. Consequently, it is expected that the introduction of these facilities to the Project area will substantially increase the benefits to be derived from all other components of the agricultural development package.

There is no question that Luwu has significant potential for production expansion. However, as this production capability is developed, and increased productivity realized, greater pressure will be placed upon the existing education, research, and marketing systems. As farmers in the Luwu area shift from a subsistence to a surplus-producing, commercial agriculture, the need for improved rural educational and marketing institutions will be great.

Four Farm Service Centers will be constructed in Kabupaten Luwu and would be designed to attack the problems illustrated above. Each Farm Service Center will consist of a Rural Extension Center and a Farmer Association Complex (see schematic description, Annex K-1) and will serve an extremely beneficial role in developing the full potential of the Luwu production areas. The Rural Extension Centers will be government facilities serving farmer education needs, while the Farmer Association Complexes will be semi-autonomous organizations serving the cooperative milling, storage, and marketing functions demanded by the developing Luwu economy. Both units are viewed as innovative for Indonesia and pilot in nature with potential for emulation in other locations in Luwu and in other select outer-island areas.

The Farm Service Centers will maintain strong ties with the University of Hasanuddin at the Provincial Capital of Ujung Pandang (through the Provincial Agriculture Office), the Bogor Institute of Agriculture (through the Department of Agriculture), the private business sector, and other technical agencies and organizations that are necessary to enhance and promote the Center's programs.

(i) Rural Extension Centers. There are now 355 Rural Extension Centers throughout Indonesia that provide informal education for farm families in rural areas. Their programs comprise: disseminating current agricultural information, conducting field trials, implementing good farming practices, holding training sessions and developing farmer groups. They are all operated by the Agency for Agriculture Education, Training, and Extension (AAETE) within the Department of Agriculture. The Extension Centers are managed by a technical staff of five, with three farm workers for the demonstration plots, and 10 to 15 field extension technicians.

Under the Farm Service Center concept, the Rural Extension Centers will be modified and expanded to emphasize both improved rice production and dry-land agricultural production. Four such centers are proposed: one at Padangappa (Kecamatan Bupon), special emphasis estate crops; one at Batusitanduk (Kecamatan Walenrang), special emphasis fisheries; one at Bone-Bone (Kecamatan Bone-Bone), special emphasis food crops (i.e., corn, soybeans, peanuts, etc.); and one at Walili (Kecamatan Mangkutana), special emphasis animal husbandry. (See map, Annex H). The special emphasis crops have been specifically assigned to individual centers to match the second crop program practiced in those areas, e.g., fish farming is an established second crop in Kecamatan Walenrang. Each proposed Center is strategically located to assure good communications and access.

The Rural Extension Center programs will include the established extension programs previously mentioned plus additional programs with emphasis placed on second crop culture, irrigation farming, improved upland cropping, improved rice culture and varietal improvement. It will also provide an atmosphere conducive to the interaction of governmental and educational agencies assisting the Luwu program. In addition the Centers will maintain close relationships with agriculture research agencies in order to provide the most recent information on disease-resistant varieties, such as varieties which resist Tungro disease. Office facilities

will be provided at the Extension Centers for interested and assisting agencies, such as Bank Rakyat Indonesia, the Directorate Generals for Cooperatives and Transmigration and the Directorate General of Water Resources Development.

(ii) Farmer Association Complex. Adjacent to each of the four modified Rural Extension Centers will be a Farmer Association Complex that will emphasize agro-business practices and function as a grain processing and marketing institution for growers. Each Farmer Association Complex will consist of five hectares for commercial multiplication of improved varieties and certified seed, nine hectares for commercial growing of crops indigenous to the local farming areas, and one hectare for buildings, rice mills, grain storage, etc. Each Association Complex will provide agro-business services for local farmer associations augmenting the existing private agro-business in the area and serving as a model for future emulation. The Association Complex will be operated by a farmer association, with technical advice and assistance coming from the Rural Extension Center personnel. The associations will have adequate facilities to provide office space for agro-business related groups such as credit unions, village banks, and water user associations.

The activities of each Farmer Association Complex will include: producing and distributing improved varieties of rice seed to farmer members at the normal market cost; purchasing farm supplies in bulk and selling these supplies to its members at a more reasonable rate than is normally attainable by individual purchasing; milling, drying and storing rice for members of the farmer associations; and marketing and transporting of the rice production by means of combined shipments which will increase producer profit.

Although the initial capital investments to establish the Farmer Association Complexes will be financed by the Government of Indonesia, they will be operated in a business-like fashion, producing sufficient revenue for operational expenses and repayment of the capital loan. Under their proposed functional structure, the associations will derive revenues from seed multiplication, storage, rice milling, fertilizer purchase for resale, and forward contracting of grain sales. It is estimated that revenues will total $36,200 annually for each of the four units (Annex K-4). Given the budgeted capital, operational, and interest costs, the Farmer Association Complexes can be expected to repay the loan within 6 to 8 years (Annex K-5). After pay-back, revenues will be available for redistribution to the association members, for subsidization of the Rural Extension Centers, or for production

credit needs of the local farm sector. The return on investment for these Association Complexes is not sufficiently attractive to attract private capital at current market rice prices. Therefore if the Luwu production areas are ever to realize their potential production capability, initial government assistance is necessary to assure that the grain processing and marketing systems will expand commensurate with production. Long-term economic development in the Luwu production areas will likely attract the private capital needed for grain processing and marketing in the future.

b. The Management and Operation of the Farm Service Centers. The Farm Service Centers will be run administratively by the Agency for Agriculture Education, Training and Extension within the Ministry of Agriculture. Each Farm Service Center will have a project manager who will be appointed by the Chief of the Agriculture Education, Training and Extension Agency through the established national and provincial interministerial coordinating bodies, with the approval of the Governor and Bupati (see Annex K-7).

(i) Rural Extension Centers. The normal staff of existing Rural Extension Centers in Indonesia consists of one Project Manager, five technicians, and 15 extension agents assigned and stationed at the local villages. With the special emphasis discipline applied to the Farm Service Centers, five additional technicians will be required for each Center's specialty. This totals 30 agents and technicians, one Project Manager, plus laborers for each station. See Annex K-3 for the staffing pattern of a modified Rural Extension Center along with the minimum qualifications for employee classifications.

Rural Extension Center staff shall receive in-service training courses at the Bogor Institute of Agriculture and/or the University of Hasanuddin on agriculture marketing, processing, shipping, and storage, plus corollary in-service training courses on the principles and practices of modern agriculture production. In addition, the Farm Service Centers will cooperate and assist in research activities of the Agency for Agriculture Research and Development (Maros Station). The irrigation technicians of the Department of Agriculture's Rural Irrigation Service will be trained at the Institute of Technology in Bandung by a separate program, but will be available to assist the Farm Service Centers' irrigation programs. In addition, the Agency for Agriculture Education, Training, and Extension has a Training Center which will conduct in-service training. See Annex K-3 for the training program schedule for each Extension Center.

(ii) Farmer Association Complexes. Farmer associations will be established by the staff of the Rural Extension Centers. Therefore, each Farmer Association Complex will be erected one year after construction and operation of each Rural Extension Center. Prior to the physical construction of the Farmer Association Complex facilities, Rural Extension Center staff will undertake pre-association formation activities, encourage and establish association membership, establish the association's organizational charter and by-laws, assist with the election of a governing board of directors, provide training for the board, organize association activities and assist with the election of association activity committees.

Upon determination that a viable farmer organization exists and is desirous of the services to be provided by the agro-business facility, the Farmer Association Complex will be constructed. The Rural Extension Center staff will then assist the farmer association with the recruitment of and programming for a professional business manager from the private sector with experience in rice milling, marketing and storage. At the same time, three local hire employees will be selected and be given on-the-job training to assume supervisory responsibilities at the rice mill, rice warehouse and fertilizer warehouse.

The farmer associations will eventually be converted into government authorized agricultural cooperatives known as BUUDs under the jurisdiction of the Directorate General of Cooperatives. At that point in time (approximately 4-5 years after formation of the farmer association), the association would be able to borrow money from state-run banks and receive technical and financial assistance from the Directorate General of Cooperatives.

c. Design and Construction of the Farm Service Centers. The Ministry of Agriculture will provide technical expertise for the design and layout of the Farm Service Centers. Two architects have been assigned to the Agency for Agriculture Education, Training and Extension to perform similar tasks under an IBRD loan for rehabilitating and constructing 150 Rural Extension Centers throughout Indonesia. These architects will furnish designs and layouts for the Farm Service Centers in Luwu while the Provincial Public Works Department will be responsible for site plans and modifications. Site selection and preparation, architectural and engineering plans, designs, and layouts will be completed during the first six (6) months of LADP operations. No problems or constraints are anticipated in designing these Centers.

Construction will be performed by private Indonesian contractors, with supervision, field inspections, monitoring, and final certification of satisfactory completion for purposes of reimbursement undertaken by the Provincial Department of Public Works. The contractor(s) will be selected from a list of prequalified firms to construct the Farm Service Centers. It is felt that Class A, B and C contractors have the capability to construct these Centers. No problems or constraints are anticipated.

d. Operation and Maintenance Program for the Farm Service Centers. The Agency for Agriculture Education, Training and Extension will be responsible for operating and maintaining the Rural Extension Centers and providing management supervision and control to assure that the Farmer Association Complexes are operated and maintained in a businesslike manner for the duration of the LADP. It is anticipated that the associations and/or BUUD's(cooperatives) will assume complete management control, including O&M, after the completion of the Project. O&M of the Rural Extension Centers is an ongoing governmental expense that is budgeted for annually by the AAETE.

e. Farm Service Center Costs and Financial Plan. Annex K-2 provides a detailed breakdown of Farm Service Center costs at current prices. Annex K-6 breaks down the subproject costs by year and by method of financing. The total four-year cost of these four Farm Service Centers amounts to $2,561,890. AID would finance, under FAR, 50% of local construction costs of the physical plants (or $778,175), 100% of the training costs($71,340) and 100% of the foreign exchange costs for direct procurement of goods from AID Geographic Code 941 sources ($299,860). The basis for reimbursement for FAR items would be completed structures in the case of the Rural Extension Centers and Farmer Association Complexes and completed training in the case of the training program. The GOI would contribute 50% of the local construction costs and 100% of the operational costs (salaries, operations and maintenance, etc.) amounting to $1,412,515. The total AID contribution is 45% of the total subproject cost or $1,149,375.

4. Transmigration Program.

As stated earlier, Kabupaten Luwu was identified as a transmigration area by the Dutch as part of their colonization scheme in the 1930's during which time three villages were settled. There was no further transmigration activities in Luwu from that time until the GOI began their first five-year plan.

The recent transmigration experience in Luwu began in GOI FY 1969/70 at which time 500 families from Java and Bali were settled into Kecamatan Bone-Bone. During the next four fiscal years, 3,550 additional families were settled into Kecamatans Bone-Bone, Mangkutana and Wotu. Additionally, in GOI FY 1973/74, there were 500 "spontaneous" transmigrant families. Therefore, over the first five-year development plan, Pelita I, a total of 4,550 families transferred to Kabupatan Luwu. During GOI FY 1974/75, 900 more families were settled into Luwu. There has been an extremely low attrition rate of families returning to their former localities (less than 2%).

Transmigrants sponsored by the government in Luwu, as elsewhere, are given assistance in the form of basic farming tools, food and clothing for a period of 1½ years. In addition to this, the GOI provides the settlers with housing and two hectares of land, one of which is cleared as described earlier. Some public infrastructure such as village roads, schools, churches, village halls and health facilities are also included. The settlers receive a certificate of land ownership within several years of their arrival upon demonstration of their ability and willingness to work on the land they have been given.

During Repelita I, three transmigrant villages were established in the Bone-Bone irrigation subproject area covering some 2100 hectares with 700 settlers' families. Approximately 500 hectares of land are still available in the lower reaches of the system for the relocation of 250 families. The remaining lands are presently occupied by indigenous farmers and settlers transferred during the Dutch colonial era.

Almost all of the Kalaena project area has been given to the Directorate General for Transmigration for settlement. Since the beginning of the recent transmigration program in Luwu (1969/70) approximately 1400 families have been relocated on some 4400 hectares. (It should be noted that 4000 hectares of this land and 1200 families are situated in those sections of the Kalaena irrigation system (gross areas A, B, and C) which are being proposed for rehabilitation and extension.) After allowing for indigenous farmers and transmigrants from the Dutch period, an estimated 3300 additional transmigrant families will be required to farm the remaining hectarage in the subproject area.

The 3550 families necessary to meet the manpower requirements on the two irrigation subprojects should be transferred to Kabupatan Luwu over the next four project years at the rate of 700, 1100, 1400 and 350 families per year. As mentioned earlier in this paper, the Dutch irrigation design group will assume responsibility for the layout of all transmigrant settlement within the Luwu irrigation sector. This will assure efficient land use within the Bone-Bone and Kalaena irrigation subprojects.

Aside from the settlement of the two irrigation systems described above the Directorate General for Transmigration has an overall target of 20,000 families for the Kabupaten of Luwu over the second five-year plan. Settlement areas being considered include the left bank of the Kalaena River and other future irrigation systems as they develop (as Sabbang and Masamba).

B. Organization and Implementation Capability

1. Bina Marga

The Highway Department of the Ministry of Public Works and Electric Power (Bina Marga) is the central agency for highway administration in Indonesia. It is charged with planning and coordination of all highway development; road research and establishment of construction standards; construction and maintenance of national and provincial highways; and coordination of central government support of provincial highway administration. The construction and maintenance of district (or Kabupaten) roads is normally the responsibility of the local governments. However, in the case of the Tarengge - Malili road segment of the subject road betterment program, Bina Marga has agreed to assume construction responsibilities and then reclassify it as a provincial road for O&M purposes.

Bina Marga is organized into six principal units under the Director General: (1) Secretariat; (2) Planning Directorate; (3) Equipment and Supply Directorate; (4) Soils Investigation and Road Research Institute; (5) Maintenance and Rehabilitation Directorate; and (6) Construction Directorate. Annex I-11 presents organization charts of both the Ministry of Public Works and Electric Power and Bina Marga.

The Bina Marga Planning Directorate includes the Design Division located in Bandung which is responsible for all engineering designs. This division numbers more than 200 professional and subprofessional employees of which more than half are graduate engineers. The design workload of this division is presently about 1500 kilometers of roads annually and has increased to the extent that more of the work is contracted to Indonesian consultants working under direction of the Bina Marga design office. The principal work now being performed by Indonesian consultants for Bina Marga includes soils investigations, reconnaissance surveys, topographic surveys and drainage designs. In addition, Bina Marga retains a full time expatriate staff of seven advisors sponsored by the UNDP which is heavily engaged in conducting feasibility studies for establishing Bina Marga priorities.

Bina Marga also maintains a well equipped and staffed central testing laboratory in Bandung, six regional laboratories, and 32 district laboratories. A regional laboratory is located near Ujung Pandang, South Sulawesi, and is a part of the Bina Marga Provincial Public Works organization with offices in Ujung Pandang.

During the past several years, a great amount of experience has been gained by the Bina Marga design and construction directorates as well as by the private sector of Indonesian engineering consultants. USAID has every reason to believe that Bina Marga, along with the prequalified Indonesian consulting engineering and road contracting firms have the ability and means to execute and maintain the job satisfactorily.

2. The Directorate General of Water Resources Development

For the Luwu irrigation program, the Directorate General of Water Resources Development (DGWRD) within the Department of Public Works and the Provincial Department of Public Works will be responsible for: (1) final designs for the rehabilitation and extension of the Bone-Bone and Kalaena irrigation systems down through farm ditches; (2) supervision of construction and contract administration for the work involved with the diversion weirs and primary and secondary canals; (3) actual force account digging of the tertiary and quaternary canals; (4) supervising and assisting the beneficiary farmers as they shape their respective ditches; (5) operating and maintaining these systems down through the secondary canals.

The Luwu irrigation program has been given "special project" status by the DGWRD which in effect gives the activity an identity, project manager and staff of its own. This organizational set up has been used quite often in Indonesia by the Department of Public Works for large projects in the past (e.g. IBRD/PROSIDA irrigation loans) and has worked out quite well. In the case of Luwu, the Chief of the Public Works Office in South Sulawesi has been designated the manager, with responsibility for executing the entire project. The DGWRD will have the duty of technically backstopping the irrigation projects through the Provincial Public Works Office. The Organization Chart I at Annex J-15 shows the organizational structure established for the Luwu irrigation program.

Chart 2 of Annex J-15 shows the organization of the DGWRD. Within the DGWRD, under the Directorate of Irrigation, the office given the technical responsibility for the Luwu irrigation program is Construction Division I. This division generally is concerned with large construction/special projects with areas larger than 3,000 hectares. Fifteen technical staff members consisting of 7 university graduate engineers with 5 years of training, 3 college graduate engineers with four years of college training, and five technical

high school graduates work in this division. The office is broken down into three sections according to geographical area with Subdivision III responsible for all of Sulawesi. Responsibilities of the division for the Luwu program include planning, project proposal review and evaluation, preparation of budget requirements, review of the construction plans for large irrigation structures, technical backstopping of the provincial organization, and certification of subproject completion for reimbursement.

As stated above, the Chief of the Provincial Public Works Office has been appointed manager of the Luwu irrigation project. His provincial office has a water resources division and under that division an irrigation subdivision. Under the water resources office of Provincial Public Works is a water resources field engineer, located at the District (Kabupaten) office. Organization Chart 3 at Annex J-15 shows the Provincial Public Works organization and its relationship to the Luwu subproject.

Regarding the implementation capability of the Directorate General of Water Resources Development and the Department of Public Works in Ujung Pandang to carry out their various responsibilities under the Luwu irrigation program, it should be noted that: (1) although it is felt that the DGWRD has a shortage of qualified personnel to perform engineering designs for the large number of elements involved with the rehabilitation and extension irrigation program, the Dutch Government is providing ample technical expertise and training in a timely manner to overcome any deficiencies in manpower; (2) the Provincial Public Works Office has many years of experience in supervision of construction and contract administration activities and should have no particular difficulties with diversion weir rehabilitation and primary and secondary canal betterment and extension, especially with the assistance of the foreign expatriate construction advisor to be provided under the loan; (3) the Public Works Office should be able to fulfill its responsibility of force account construction of the tertiary and quaternary canals and supervision of farmer beneficiaries as they shape their respective ditches, with the assistance provided by the AID-financed construction advisor and construction equipment, and considering their experience and the unsophisticated nature of the work involved; and (5) operating and maintaining the completed works, although it has been a problem in the past, will be accomplished with the assistance of the loan-financed O&M advisor and with the equipment to be procured directly for the Luwu irrigation program.

3. The Agency for Agriculture Education, Training and Extension

The Agency for Agriculture Education, Training and Extension (AAETE) is within the Ministry of Agriculture and is responsible for construction and operation of the Farm Service Centers. Annex K-8 contains three organizational charts: Chart 1, The Ministry of Agriculture; Chart 2, the Agency for Agriculture Education, Training and Extension; and Chart 3, the Provincial Agriculture Service.

The AAETE has a total of 18,731 employees in the provinces of which 550 are university graduate technicians, 14,619 are non university technicians and 3,562 are administrative personnel. These technicians are stationed primarily at the Kabupaten and Kecamatan levels. The Kabupaten Luwu Extension Staff presently is composed of one university graduate, 20 non university technicians and 40 administrative personnel. It is expected that the staffing level proposed for the Farm Service Centers will be adequately provided by the AAETE, especially in light of the comprehensive training program for the entire staffs as described earlier.

The AAETE has considerable experience and capability in planning, designing, constructing, operating and maintaining Rural Extension Centers. (It already operates approximately 355 Rural Extension Centers throughout Indonesia.) It should be noted also that the World Bank has a loan with AAETE involving the rehabilitation and new construction of 150 centers. Adequate O&M funds have been provided for the Farm Service Centers in Luwu.

Although the AAETE also has extensive experience and capability with forming and dealing with farmer associations, it has rarely operated an agro-business enterprise of the scope and magnitude contemplated for the Farmer Association Complexes. /Note, however, that the Province of East Java, with its own funds is currently erecting a facility very similar to the Farmer Association Complex as envisioned for Luwu/. It has therefore been decided that professional Indonesian business managers with experience in rice milling, storage and marketing would be hired by the AAETE to run each farmer associations' agro-business activities until such time as the associations are able to operate by themselves.

4. Directorate General for Transmigration

The agency responsible for overall coordination of the Project as well as for the specific task of providing the necessary manpower base to maximize productivity in the Project area (and clear land

on the irrigation sites) is the Directorate General for Transmigration (DGT) of the Indonesian Department of Manpower, Transmigration, Cooperatives (DMP).

The manpower responsibilities of DMP correspond generally to those exercised by departments of labor in other governments. The Department, for example, is responsible for supervision of labor unions, enforcement of laws respecting conditions of work, maintenance of unemployment registers, manpower development and training, formulation of policy with respect to labor matters, etc. See organizational chart I for DMP at Annex M-1. The responsibility of DMP for this Project derives specifically from the Department's mandate to provide generally for a well-distributed labor base crucial to maximizing national productivity.

Within DMP the DGT is specifically assigned responsibility to address the issues involved in transmigrating small farmers and landless laborers from the heavily overpopulated core islands (Java, Bali, Madura and Lombok) to areas of sparse population and significant agricultural potential. Recently transmigration has become a very important national program not only to better distribute population within Indonesia but also to promote outer island economic development.

To accomplish this, the DGT is being reorganized to carry out the broad range of recruitment, staging, transportation, land survey and clearing, settlement, and support activities necessary to assure that transmigrants will attain full production status in the shortest time possible. See DGT organizational chart II at Annex M-1. Under the terms of reorganization, responsibilities of the directorates are as follows: (1) Directorate for Programmes Development - identification of land, land acquisition, photographic and physical surveys leading to a land capability appraisal and a recommended land use plan, and preparation of proposals for recommended land units (including agricultural, physical, and development plans, and personnel, financial, and logistical planning); (2) Directorate of Preparation - detailed site planning, construction of village roads, bridges, and buildings, land clearing and issuance of land titles; (3) Directorate for Recruitment and Placement - recruitment of transmigrants, staging, and transfer of transmigrants; and (4) Directorate for Development - agricultural, economic and social development and administration.

While the reorganization of the DGT appears particularly well-suited for the execution of the present task, the immediate and foreseeable

shortcoming is in the technical and managerial skills necessary for timely implementation of the program. In this respect the DGT has already secured technical assistance from the Lincoln Institute, primarily to support research activities and to train Indonesian officials, and from the UNDP for a small team of FAO advisors to analyze the technical needs of transmigration and build up an appropriate supporting project. The Government has recently approved a revision of the FAO project under which the UNDP will provide an additional $1.2 million in fellowships and technical expertise to assist in planning and implementing the process of transmigration and in the training of counterparts. Under the UNDP project experts in land tenure, land capability, financial planning, and farm production economics, and consultants in physical planning and budget preparation will be provided to the Directorate for Programmes Development while the Directorate for Preparation will receive a topographic surveyor, a consultant in engineering, and possibly a consultant in irrigation. Similarly, the Directorate for Development will be assisted by UNDP experts in rural development, agronomy food crops, agronomy tree crops, and consultants in marketing, agro-industry, credit services, farmer associations, fisheries, livestock and pasture development, and the processing of agricultural produce. Assistance will also be made available to the Directorate for Recruitment and Placement in the form of a consultant in transportation and logistics and possibly one in rural sociology, and to the Transmigration Training and Research Institute in the form of a rural economist to assist in assessing the performance of on-going schemes and a consultant sociologist to assist in the development of new studies. The UNDP project also includes provision for 100 manmonths of participant training abroad.

In South Sulawesi the Directorate General for Transmigration functions at three levels: at the provincial capital (Ujung Pandang); at Luwu Kabupaten Headquarters (Palopo); and at the transmigration sites. The Provincial Transmigration Office in Ujung Pandang (see organization chart III Annex M-1) is chiefly responsible for coordinating inputs by all functional, technical departments concerned with transmigration (health, agricultural, and educational personnel, for example, are assigned to transmigration sites by their respective departments at the provincial level); negotiating contracts for land clearing and house building; providing commodity support for transmigrants; and other matters of a financial and budgetary nature. Transmigration levels, the timing of transmigrant arrivals and location of settlements are determined by the Directorate General of Transmigration in Jakarta.

The transmigration office in Palopo has responsibility for the entire program in Kabupaten Luwu but differs from the provincial office in that it runs more of a logistics program (i.e. assuring that inputs arrive on schedule) rather than anything else. At the lowest administrative level, the DGT has officials stationed at the actual transmigrant sites. These officers, known as unit leaders, function as the link between the transmigrants themselves and the government.

Given its experience, past performance and the infusion of large amounts of UNDP technical assistance and training, it is felt that the DGT can operate its national program adequately. However, USAID believes that the agency is weak at the provincial and local administrative levels. Therefore, in order to have the transmigration program focus on the movement of transmigrant families into Luwu, provide necessary inputs on a timely basis, and clear land associated with the two irrigation subprojects, USAID recommends financing an expatriate advisor for the first three years of the LADP. His duties would include: (1) planning a transmigration program for Kabupaten Luwu; (2) carrying out transmigration activities for the duration of his assignment; (3) recommending managerial and administrative procedures and changes to better execute the Luwu program; and (4) training staff in all the above. Administratively, he would be assigned to the Provincial Director for Transmigration in Ujung Pandang although he would assist also in Jakarta by having the four operational directorates focus on Kabupaten Luwu and in Luwu itself with strictly operational matters. $169,000 in foreign exchange costs would be allocated under the loan for this advisor: The GOI would be responsible for local support costs (approximately $36,000).

5. Overall Luwu Project Organization

Under Presidential Decree No. 29, 1974, entitled "The Formation of a Body for the Expansion of Development in Transmigration Areas," committees at the national, provincial, and kabupaten levels of government are being established to increase operational coordination between the transmigration program and all other development activities on the outer islands. The already functioning National Steering Committee known as the Expansion Body, chaired by the Minister of Manpower, Transmigration and Cooperatives, is responsible for national policy formulation, legislation affecting transmigration, approving annual budgets of transmigration/area development projects, coordination with all Ministries and national agencies, and coordination with the provincial governments. Similar committees have been established under the Presidential Decree at both the Provincial level (Guidance Body) and the Kabupaten level (Implementation Body) which have similar responsibilities but more narrow focus. The Governor chairs the Guidance Body while the Bupati heads the Implementation Body.

It has been proposed that a Project Office be formed within the Ministry of Manpower, Transmigration and Cooperatives to administer the first-phase Luwu Agricultural Development Project. The proposed Project Office would: (1) assist Bina Marga, the Directorate General for Water Resources Development, the Ministry of Agriculture, the Directorate General for Transmigration and all other national agencies and ministries with development activities in Luwu in the execution of their individual subprojects and programs in a timely, efficient and coordinated manner; (2) recommend and execute changes in the project as deemed necessary; (3) promote, direct and coordinate the activities of grassroot level private voluntary

organizations in the Kabupaten; and (4) plan and coordinate later-stage agricultural and socio-economic development activities. It would work closely with the Expansion, Guidance and Implementation Bodies, by receiving guidance and providing advice. After five years of operation, the Office would be disbanded and all of its activities transferred to the local, kabupaten government.

The Project Office to be formed within the Ministry of Manpower, Transmigration and Cooperatives would be headed by a Project Manager who would be responsible to the Director General for Transmigration and would be staffed solely by employees of that Directorate General. The Project Manager along with a full time advisor would be expected to spend the greatest amount of their time in the field with residence in Jakarta only during Expansion Body meetings and during the annual budget submissions.

The Luwu Agricultural Development Project Office would have two divisions; one concerned with physical infrastructure and the other concerned with agricultural, economic and social development affairs. The former, the Engineering Division, would be responsible for the overall coordination and monitoring of construction activities (i.e. road betterment, irrigation rehabilitation and extension, erection of farm service centers) and the planning of future physical infrastructure development. The latter organizational unit, the Development Division, would work closely with the private voluntary organization groups in Luwu, monitor and assist the Department of Agriculture's farm service center activities, and in general promote the agricultural, social and economic development of Kabupaten Luwu. In addition to these two divisions, the Project Manager is expected to have administrative, logistics and financial assistants. A small liaison office would also be maintained in Jakarta to assist with national coordination efforts.

Annex M-1, Chart IV, presents the relationships of the proposed Project Office to the Directorate General for Transmigration and to the national, provincial and kabupaten levels of government. It also provides an organizational diagram of the Luwu Agricultural Development Project Office itself.

The costs associated with the project organization are to be borne by the GOI. The Directorate General for Transmigration has already budgetted in GOI FY 1975/76 for its initial capital costs including such items as housing and office space in the field and motor

vehicles; and for first year operating expenses including salaries, honorariums and travel. USAID has reviewed their budget submissions and finds it adequate to establish and operate the proposed agency.

In order for the Office to exercise control over the Project, it is felt that it must have some control over the money budgeted for the Luwu Agricultural Development Project. Therefore, it has been proposed that the Project Office be the central focus for the submission of budgets by the various technical departments to Bappenas for all subproject activities. The Project Manager and his staff would have, as one of their prime responsibilities, the coordination of all budget requests to Bappenas and could recommend modifications to this central budgeting agency when deemed necessary.

The Project Manager would also exert influence over the actual execution of the various LADP components. USAID would require his approval before the disbursement of any loan funds and his certification of satisfactory completion of subproject units of work before reimbursement to the GOI would be made.

Involvement of the local levels of government in the execution of the first-phase Luwu Agricultural Development Project and in the formulation of later-phase activities is considered crucial to the success of the entire scheme. To this end, the Project Office will work closely with the Guidance and Implementation Bodies at both the provincial and kabupaten levels of government in addition to consulting regularly with government officials in the sub-districts or kecamatans. Furthermore, local government officials will be brought into the technical assistance, training and evaluation programs being designed into the loan.

Although (1) a presidential decree has been issued establishing the Expansion, Guidance and Implementation Bodies while giving the Minister of Manpower, Transmigration and Cooperatives broad powers and (2) the Directorate General for Transmigration has budgeted funds for the establishment of an area development agency, the organization for the Project and its relationships with other entities, as described above, remains tentative. USAID has held several meetings with the concerned GOI agencies on this matter and agreement in principle on the overall project organization has been reached. In part, the delay in reaching a final decision on overall project organization has been due to the DGT's desire to work out the same arrangements for all area development projects, including specifically the IBRD's project in Lampung which is in the early stages of negotiation. In part, too, it is

due to the impending reorganization of the DGT. The Director General for Transmigration has recently created a working committee to make recommendations regarding project management and this group has been consulting regularly with Bappenas. Since USAID views the organization of this integrated agricultural development project as critical to its success, the Loan will contain a condition precedent to the initial disbursement of any funds which will require the GOI to submit to USAID its final decisions on project management which will be subject to AID review and approval.

C. Institutional Development and Technical Assistance, Training and Evaluation

The development of institutions and mechanisms within the Government of Indonesia to carry out integrated agricultural/area development schemes in select outer island, transmigration-designated areas is considered a most important component of the Luwu Project. The establishment of the capability within the Directorate General for Transmigration to plan, coordinate and implement the Luwu Agricultural Development Project which combines outer-island agricultural development activities with transmigration efforts in a manner which can be replicated in other outer island locations at other times should have a major impact on outer island economic growth. Technical assistance will be utilized in order to provide guidance to the Directorate General for Transmigration in their first integrated agricultural development endeavor. Short-term training will be given to key members of the Project Office and local government officials in order for them to understand the basic principles of area development and physical planning and to enable them to better perform their role in the Project. An evaluation program will be financed in order to properly assess the impact of the Project for possible emulation at other locations and in order to identify necessary modifications and later stage activities.

1. Technical Assistance

Aside from expertise for strictly transmigration matters, foreign expatriate technical assistance will be financed under the proposed loan to provide both guidance and special skills necessary to execute the first-phase agricultural development effort and plan for complementary future efforts. It is envisioned that one full-time expatriate advisor with a strong background in regional/rural

development and physical planning would be financed for the life of the project to assist with the establishment of the Project Office and its operations. His duties would include assisting the Luwu Project Manager and training the Project Office staff in: (i) reviewing the annual budget submissions from the various government agencies and making recommendations to the Directorate General for Transmigration concerning these budget requests; (ii) setting-up and operating financial disbursement and control procedures at all project levels; (iii) coordinating the provision of all project inputs (including transmigration); (iv) evaluating the success of the project and recommending modifications as deemed necessary; (v) identifying and recommending later-stage priority social and economic investments for the future development of Luwu; and (vi) detecting managerial shortcomings concerning the planning and implementation of specific subprojects along with the overall development package. These technical services would be required for three years, after which it is believed that the Project Office and interdepartmental mechanism would be completely established and functioning well. AID would finance his foreign exchange costs estimated to be $169,000. The GOI would assume responsibility for local cost support including housing, domestic travel, per diem, etc.

In January 1975 at the request of the Government of Indonesia, USAID provided a grant-financed, regional development advisor to assist the Directorate General for Transmigration for six months with its final planning of the Luwu Agricultural Development Project. Should, upon loan authorization, the GOI-designated Luwu Project Manager and USAID both find the advisor to be performing well in his role, his services would be continued for three years but would be financed under the loan. If it is decided that another individual might function more effectively as a full-time consultant to the proposed Project Office, then recruitment would begin immediately upon loan authorization.

In addition to this full-time advisor, special provision will be made for financing 24 man-months of foreign technical assistance for special studies as may be required to attack outstanding problems facing Luwu (e.g. rodent control), to assist with the execution of LADP subprojects (e.g. farm service centers), and to identify and design later-stage development activities (such as the final design of projects which may be identified from the Luwu Microeconomic Survey). The Project Office would administer this fund and determine those studies to be undertaken, subject to AID review and approval. AID would finance the foreign exchange portion of this technical assistance estimated to be $116,000 while the GOI would again assume responsibility for local cost support items as housing, domestic travel and per diem.

The Loan Agreement will be written in a manner such that additional loan funds can be diverted for short-term consultancies if required during implementation of the LADP.

2. Training

Short term training will be given to key members of the project organization and other concerned local government officials to provide them with additional skills believed necessary for the successful execution of the project. Professionals responsible for planning and implementation activities will require some training in integrated development planning but with the main emphasis placed on the practical skills of project development co-ordination and implementation management. Some of the possibilities for such training in-country include: (i) The National Training Programme in Development Planning and Management, an eight-month, two-semester development planning course, financed by the Ford Foundation and jointly organized and operated by Bappenas and the University of Indonesia with classes offered in macro and micro-development economics, development administration, project analysis and regional planning; and (ii) Courses in "Planology" given by the Technological University of Bandung which includes regional, town and physical planning.

Opportunities also exist for short-term academic training in the United States with courses offered by such institutions as the University of Connecticut in local development, area administration, project analysis and project management.

In addition to the academic training suggested above, members of the Project Office including the Project Manager and several local level government officials will visit similar land settlement and regional development schemes such as those executed by the Federal Land Development Authority in Malaysia and the Bicol Area Development Project in the Philippines.

It will be a responsibility of the full-time expatriate advisor to the Luwu Agricultural Development Project to develop and finalize a training program for the staff members of the Project Office and other local government officials along the lines suggested above. The technical advisor is also envisioned as supplementing the academic and field observation training by his presence and guidance for the trainees on the job.

It is felt that the proposed field visits to similar land settlement and regional development schemes such as found in Malaysia and the Philippines should be undertaken as soon as possible after loan authorization. Formal training will take place over the first two years of the Project to ensure that there is ample manpower for that function at any point in time.

The total estimated cost of the training described above is $122,000 all of which would be financed by AID. /Note: Included in the training budget are funds for the environmental health and sanitation training program described in Annex G/

3. Evaluation Program

The purpose of the evaluation program is to (1) monitor progress toward attainment of the Luwu Agricultural Development Project's goals; (2) assess the socio-economic impact of development efforts; (3) identify problem areas and constraints which inhibit progress; and (4) feed relevant information back into the decision-making process of continued planning, organization and implementation in Luwu, and into the development of similar projects in other locations in Indonesia. The evaluation program will emphasize the assessment of the impact of the Project's inputs rather than monitoring the execution of those inputs and will include a broad-based social sector analysis of the impact of the LADP.
Since the purpose of the evaluation program is to evaluate the impact of development activities planned for execution during the next three to four years, it is necessary that the evaluation program run for a longer duration. In order to establish a base for learning more about the development process, USAID's participation in the program will cover four years. The cost of the evaluation component of the Luwu Agricultural Development Project is estimated to be $150,000 in local currency which will be financed under the Loan. Reimbursement will be based on annual evaluation plans which will be reviewed and approved by AID prior to implementation.

The evaluation research activities of data collection, analysis and reporting will be broken down into three phases. During the initial phase information already available about Luwu will be assembled and working relationships will be established with people in Luwu who will participate in the evaluation program while at the same time the methodology of the evaluation program will be refined.

The second phase will be the execution of a broad baseline study emphasizing the collection of data which will assist in measuring the impact of the LADP, e.g., agricultural production and production technology, marketing, credit, level of well-being of residents and distribution of the Project's benefits, and organization for development. Following the baseline study, data collection, analysis and reporting will be somewhat disaggregated along subject matter lines which are closely associated with monitoring progress towards the Project's goals, assessing socio-economic impact, and in identifying problems and constraints which inhibit progress.

Implementation of the evaluation program will be the responsibility of the Directorate General for Transmigration's Institute for Training and Research and the University of Hasanuddin in Ujung Pandang. Administration will be the responsibility of a small nucleus group at UNHAS. The longer-term data collection and analysis work, which is of a periodic nature, will be done by various technically specialized groups under the direction of the nucleus.

4. Replicability of the LADP

There are sixteen outer-island provinces which have been identified for transmigration purposes in Indonesia. The institutional mechanisms established for and utilized in the LADP have significant implications for the development of the transmigration-designated areas in each one of these provinces. First of all, the inter-ministerial committees at the national, provincial and kabupaten levels of government created under Presidential Decree No. 29, 1974 for the LADP are all replicable. Secondly, the reorientation and reorganization of the Directorate General for Transmigration away from operating a demographic program towards treating transmigration in the context of integrated area development should also have far reaching results in these other select outer-island areas. And finally, the sensitivity and experience gained by other GOI agencies towards the special problems of outer-island locations should result in a significant improvement in their programs and an appreciation for an integrated inter agency approach.

It is also felt that the dialogues and experience which will be gained by various technical departments, at all levels of government, meeting to discuss one specific geographical area's potential and its associated physical, financial, social and economic requirements should have implications even outside of the context of transmigration: the planning and implementation know-how acquired with the LADP need not be restricted to transmigration-designated areas. Another agency, however, would have to take the leadership role. The Department of Agriculture, Bappenas, or the Department of the Interior could do this.

D. Socio-Economic Analysis

1. Project Costs and Benefits to the Indonesian Economy

The total cost to the Indonesian economy, in current prices, of all activities associated with the Luwu Agricultural Development Project is $28,767 million. The cost of the Project's components, in thousands of dollars are: Roads - 16,835; Irrigation - 7,860; Farm Service Centers - 1,810; Transmigration - 1,309; Project Organization - 460; Training and Technical Assistance - 394; and Evaluation - 100.

The GOI will, itself, be financially responsible for the organization of the Project, the transmigration program, and part of the engineering and administration costs of the irrigation subprojects. Those activities are costs to the Indonesian economy and were included in the internal rate of return analysis but are not included for AID financing in the proposed Project.

There are a number of benefits which are expected to arise from the package of development activities embodied in the LADP. The economic benefits include increases in agricultural productivity and production; increased trade and population mobility resulting from reduced costs for vehicle users and for marketing of agricultural and non-agricultural commodities; employment opportunities generated in the construction of the subprojects and in the increased agricultural production resulting from them; reductions in the seasonality of on-farm employment, agricultural production and pecuniary income; and reductions in the dependence on imports of essential commodities.

The Project is expected to result in increased production amounting to 40,000 MT of milled rice and 14,000 MT of other food crops by 1985. The internal rate of economic return to the Indonesian economy (IRR) of the LADP is estimated at 19%. The calculations for the IRR analysis of the total Project is summarized in Annex L-1.

a. Land Use

The current and projected land use patterns in the North Luwu Plain are set forth in the table below. The rice area is derived from the consultant irrigation engineer's estimates for the two irrigation subprojects and 4,000 ha from the rehabilitation of unused village irrigation land. It does not include other systems which may be completed in the next decade. The indicated upland crop area is only 15% of the potential area according to estimates by the Kabupaten Luwu Agriculture Office and the P.N. Waskita Karya (an

Indonesian consulting firm) report. The increase in upland crop hectarage estimate assumes each farm family will produce at 50% of its family labor capacity rather than at the approximate 30%-35% capacity which is the current average rate of utilization.

TABLE

Land use in North Luwu Plain 1974, 1985 Projected and Estimated Potential

Land use	1974	1985	Potential
		-hectares-	
Rice	18,500 1/	31,700	97,600
Non-Rice Food Crops	12,600	27,000	78,700
Other Crops	3,300	4,300	34,600
	34,400	63,000	210,900

b. Population Projections and Labor Requirements

As the name implies, the Luwu Project is an agricultural development and not a transmigration program. In assessing the obstacles to agricultural development in North Luwu, however, the availability of labor is a constraint in some areas just as capital, and physical and institutional infrastructure are constraints in other areas. It is estimated that the two irrigation areas included in the LADP will require that the existing population be supplemented by 3,550 families in order to optimize production. The total population absorbtive capacity of the North Luwu Plain, based on the potential cultivable area in the above table is about 400,000 people. It is estimated that during the next five years 6,200 families will transmigrate to Kabupaten Luwu via the official GOI program, 800 will transmigrate spontaneously, and 400 will move to Luwu from internal migration within Sulawesi. The 7,400 total is based on historical projections. The GOI's transmigration program has enjoyed increased respect in the last several years, willing candidates are plentiful, and it is expected that the transmigration program will increase significantly. The Directorate General of Transmigration is both building up its logistical capacity and is placing increasing emphasis on Luwu. As development activities get underway the rate of spontaneous transmigrants to Luwu is also expected to increase.

1/ 12,000 ha rain fed or village irrigation; 6,500 reliable irrigation. Due to double cropping, land use figures do not equal number of crop hectares produced per year.

In 1973 the population of the North Luwu Plain was 232,700. The population is projected to grow, through transmigration directly associated with the Project and the natural growth of the indigenous population, to 432,000 in 1985.

c. Assumptions and Sensitivity Analyses

In the judgment of USAID the base analysis described below 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 alternative sets of assumptions concerning the magnitude of benefits, construction costs, length of implementation period and treatment of on-farm labor.

The major subprojects were subjected to internal rates of economic return analyses. The costs and benefits of the Bone-Bone and Kalaena irrigation systems and the trunk road are shown in Annex L-2, 3 and 4 respectively. Their IRR's are: Bone-Bone irrigation -- 31%; Kalaena irrigation, 28%; and trunk road 17%. They are not analyses of independent projects in the true sense. Although the costs are those directly associated with the subproject, the benefits are those that are expected to materialize if all subprojects are implemented in the planned sequence. For example, the full benefit stream of irrigation subprojects will only materialize if there is a transportation system (the road subproject) on which to market surpluses. The calculated benefits of the road are only those directly associated with the road investment. The calculated benefits for both the road and irrigation subprojects assume levels of productivity and production that will be attainable if the farm service centers extend utilization of higher levels of crop production technology. Thus, the benefits assume an integrated agricultural development approach.

The IRR analyses include incremental production costs necessary to attain incremental benefits. The net value of production calculations reduce the gross value by the cost of inputs for each level of technology. Annex L-6 illustrates production costs and benefits per hectare. Recurrent costs for O&M, etc., were calculated separately.

(i) Agricultural Production. Agricultural production will increase substantially. The two irrigation projects will irrigate 8,960 additional hectares with an expected rice cropping intensity of 170%. The incremental annual rice area harvested of 15,200 ha will increase production by 31,000 MT of milled rice. Another 4,000 ha

of rice are expected to be produced in other areas which are in existing village irrigation systems close to the trunk road but which are now cropped at low intensity or not at all due to disease, transportation and marketing conditions. The incremental production from this area is estimated at 6,000 MT.

The hectarage of harvested non-rice food crops in the North Luwu Plain is expected to increase by 15,000 ha by 1985. One thousand additional hectares of cash crops are anticipated as well as a much fuller utilization of some existing plantations which are only partially harvested due to high transportation costs and low producer prices.

Current and future levels of crop production, value, and consumption are found in Annex L-5.

(ii) Rice Price. Although the CIF price of imported rice has exceeded $400/MT, CIF Indonesian port of entry, for two years, the LADP has been evaluated at a more conservative medium-term estimate of $260/MT for the price of imported rice. It may be assumed that the incremental rice production from the Project will substitute for imports at that price level, especially since Luwu is in close proximity to several of Indonesia's serious food deficit areas. In Indonesia the price of rice is highly correlated with the cost of labor, which is one of the major cost components in the Project. 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. It is also within the range of current prices for medium quality rice in many Indonesian urban areas. The farm gate price used in the analysis is $240/MT. This differs from the CIF Indonesian port of entry price by the transportation cost of moving to urban consuming areas that portion of the incremental production which is not consumed locally.

Due to recent erratic world commodity prices, the IRR's for the LADP package and the major subprojects were tested for their sensitivity to changes in the price of rice. The results of the base and sensitivity analyses are summarized as follows:

Rice Price Assumption	Internal Rates of Economic Return			
	Total Project	Bone-Bone Irrigation	Kalaena Irrigation	Trunk Road
$260/MT, base analysis	19	31	28	17
$200/MT, 25% reduction	17	26	23	16
$300/MT, 15% increase	21	36	33	18

(iii) Crop Production Technology. In the case of rice, it is the GOI's policy to include the major portion of areas with reliable irrigation in the BIMAS program of crop production technology which includes the provision of HYV seeds, fertilizer and insecticides. This analysis assumes that as new irrigation areas come on stream 60% of the area will receive the crop production technology embodied in the BIMAS program.

The IRR for two alternative levels of crop production technology were analyzed. 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&M is assumed. The resulting IRR's for the two irrigation subprojects are as follows:

Crop Production Technology	Bone-Bone	Kalaena
60% of area in BIMAS	31%	28%
Only traditional technology	28%	26%

The difference in the IRR's indicates the economic feasibility of including additional investment in a more advanced level of technology in the irrigation subprojects. However, the irrigation 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 subprojects are fully justified economically.

(iv) Crop Yields. Statistics from various sources produce a range of yields for different levels of production technology. The base analysis assumes yields at the lower end of the range. To estimate the incremental production resulting from the Project the yield figures shown in Annex L-5 were used. The yield for the traditional methods of crop production technology are equal to those commonly obtained throughout South Sulawesi and many other similar areas in Indonesia.

In the case of more advanced rice production technology, yield levels for IR-20 rice variety are assumed since it is resistant to the Tunggro disease which has been a rice production problem in South Sulawesi. IR-20 does not yield quite as much as other high yielding varieties in areas unaffected by Tunggro but does out-yield them in Tunggro infested areas. Thus the BIMAS rice

yields used in the base analysis are 10-20% lower than those used in IBRD estimates. It is possible that rice 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 development of the two irrigation subprojects. A 10% reduction in the assumed rice yields causes the IRRs of the Bone-Bone and Kalaena irrigation systems to drop to 28% and 26% respectively.

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 IRRs to 33% and 30% for the two irrigation subprojects.

Yield levels for non-rice food will rise somewhat as markets become more accessible over improved transportation networks and there is more incentive to carefully cultivate crops. For the various non-rice food crops, yield increases of zero to 10% were assumed in the IRR analysis. No production yield increases were assumed for the cash crops.

(v) Cropping Patterns. The base analysis assumes that the benefits of the irrigation subprojects will be derived from incremental rice production. The cropping pattern used in the base analysis assumes a rice cropping intensity of 170%, along with some continuing non-rice food crop production. An alternative cropping pattern including irrigated corn, soybeans, peanuts and a much lower level of rice production was also analyzed. An average cropping pattern, on an annual basis for the two irrigation areas, with cropping intensities of rice - 60%, corn - 60%, soybean - 40%, and peanuts - 20%, yields an IRR of 24% and 26% for the Bone-Bone and Kalaena subprojects.

(vi) 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 IRRs of Bone-Bone and Kalaena subprojects drop to 24% and 22%.

(vii) Higher Construction Costs. A 20% increase in construction costs for the entire Luwu Agricultural Development Project lowers the IRR to 17%. Again it should be noted that there is a close relationship between the price of rice and the cost of labor, two major components of the Project. It seems unlikely that the historical relationship can vary by any significant amount for more than a short period of time.

(viii) Longer Construction and Land Development Periods. If the length of time for survey, design and construction of the two irrigation subprojects' major works takes one year longer than expected, the IRRs for the Bone-Bone and Kalaena irrigation systems drop to 29% and 27%. If the survey, design and construction of major works is implemented according to schedule but land clearing, leveling and paddy forming, and construction of tertiary canals and farm service ditches is completed six years rather than four years after project initiation, the IRRs drop to 24% and 22%.

If the construction period for the road subproject takes four years rather than three, the IRR drops to 16%.

d. Complementarities

The benefits of the Luwu Agricultural Development Project arise from the investment in a combination of under-utilized resources.

Investing only in social and physical infrastructure will result in improved per capita standards of living for existing residents of Luwu but in some cases total output will be constrained by manpower availabilities and the returns to the investment will be low. On the other hand, investment in transmigration only means more people in Luwu living at subsistence levels. This approach merely transfers poverty from Java to Luwu. Per capita benefits are lost and returns to investment are still low. By combining the two investments in appropriate proportions their returns are enhanced.

Similarly, investment in infrastructure must be balanced. Analysis shows that road improvements will be under-utilized unless there is investment to increase the productive capacity of land. On the other hand, irrigation projects will not produce their potential surplus unless improvements in the transportation and institutional aspects of marketing also take place.

Probably most important of all is the investment in human skills, without which increases in knowledge will be retarded; administration in the planning, organization and execution of both private and public endeavors will be uncoordinated and ineffective; production and marketing efficiency will be reduced; and opportunities for further development will be forfeited.

The conclusion of the analysis of Luwu's development is that the benefits of an investment in a coordinated multi-sector development program are much greater than the sum of the benefits of all the activities analyzed independently. The interdependencies and interrelationships among the various development activities are the geneses of the additional benefits resulting from the multi-dimensional approach. A discussion of Luwu's long-term development potential and possibilities is found in Annex L-8.

2. Trade Analysis and Balance of Payments

Indonesia is now, and has been for many years, a net importer of rice. During each of the two preceding years Indonesia has imported 1.2 million MT of rice. These levels of imports are slightly less than 10% of Indonesia's rice consumption. During the period of 1968-1972, imports averaged slightly more than 5% of domestic rice consumption.

Luwu is in close proximity to several of Indonesia's rice deficit areas. Much of eastern Indonesia is deficit in rice even at levels of per capita consumption much lower than the national average of about 100 kg per year.

Maluku with an average per capita consumption of 20 kg annually imports 11,000 MT per year. Southeast Sulawesi Province's per capita consumption is 80 kg and it imports 15,000 MT. Central Sulawesi imports 10,000 MT per year and Nusa Tenggara 12,000 MT. Several sub-provincial areas close to Luwu are also deficit. These include Kabupaten Tanah Toraja, west of Luwu, and Kabupaten Posso to the north of Luwu in Central Sulawesi. Within Luwu itself, Malili to the east has a deficit of nearly 400 MT. Thus markets do exist for the projected 24,000 MT marketable surplus production in the project area.

The obvious impact of increased rice production in Luwu will be to reduce rice imports. The foreign exchange savings from the reduced quantity of imports made possible by this Project will be $1.7 million per year, three years after completion of the Project.

3. Income and Employment Effects

a. Income

The income generation benefits of the Luwu Agricultural Development Project will accrue to the lower portion of Indonesia's income distribution. Primary beneficiaries will be (a) small farmers concentrated in well-established relatively densely populated areas, and (b) transmigrant families in relatively sparsely populated areas who were previously either very small farmers or landless laborers.

The farm budget analysis summarized in Annex L-6 indicates per hectare income levels for various crops and average annual farm income in the project area. The income estimates do not reflect income from non-farm sources. Currently the income generated by the average-sized farm is $206 per year; $142 imputed to farmer's profit and $64 as a return to labor. Assuming an average farm family size of five persons this represents an average per capita income from farm sources of $41.

The average farm size in the North Luwu Plain is 1.7 ha. As shown in Annex L-6 the average farmer harvests only 0.82 ha of crops per year from the available 1.7 ha. The estimated labor requirement is 131 man days per year, or about 32% of available family labor (400 man days per year). Thus more than half of labor and land resources are unutilized. The combination of low productivity and unreliable and expensive transportation/marketing infrastructure provides little incentive to produce marketable surpluses. Off-farm employment is used to supplement low farm incomes.

Ten years after initiation of the LADP, the average farmer will be utilizing more of his labor and land. It is expected that the average farmer will allocate 200 man days of family labor per year to raise 1.1 ha of crops by 1985. The resulting average family income from farm sources is estimated to be $340, an increase of 65%. Although it is still small, it is a marked increase in income from farm sources from what most transmigrants realized on Java or Bali.

The average family's farm income in the irrigation areas will be about $450 per year or $100 per capita. The average farm size will be about one hectare, the area of irrigated rice that the average family can easily double-crop each year using labor-intensive crop production methods. The income estimate conservatively assumes an average rice cropping intensity of 170% rather than the common two crops per year on reliably irrigated land, and 60% utilization of BIMAS level of crop production technologies.

The above income estimates are conservative: it includes on-farm food production activities only. Average family income from non-farm sources was not included. However, the LADP can be expected to result in decreased transportation and marketing costs, increased farm gate prices, and increased output in the cash crops, fishery, forestry and industrial sectors. The incomes of those involved in the processing, transportation and marketing of the incremental production is also expected to increase. Furthermore, the impact of the LADP's construction-generated employment was not included in the on-farm income analysis.

b. Employment

The Project has a large employment generation potential. It is estimated that the labor intensive construction of the irrigation and road projects will require about 24,000 man-years of labor during four years.

The LADP will also generate a large number of employment opportunities in agricultural production. As indicated in Annex L-7, an estimated 29,200 agricultural production jobs will be generated by the irrigation works, and another 5,100 man-years annually on the existing upland crop sub-sector. The Project will also reduce the seasonal nature of agricultural employment and income in the project area.

4. Social Impact

The majority of the people in Luwu derive most of their income from farming. However, a large number of off-farm income producing activities exist. The Luwu Agricultural Development Project will have a social impact both within the agricultural sector and in other sectors. Labor productivity will increase primarily in the agricultural sector but also in other sectors. Agriculture will become more diversified and closer linkages will develop between the food crop subsector, the rest of agriculture and other non-agricultural sectors.

One of the primary social impacts on the area will be an improvement in diet. The staple food of many people in the Luwu area is now Sagu - very low in nutritive quality. The Project will result in increased productivity and production of other food crops. Much of the increased production will be marketable surpluses sold to deficit areas outside Luwu, but some will be retained for family consumption - as a substitute for Sagu. The Rural Extension

Centers will increase the awareness of the value of livestock and fish and will encourage increased production and consumption of these. The result of improved diets will be a more healthy and vigorous Luwu populace.

Another impact on the area will be a reduction in the seasonality of both agricultural labor opportunities and pecuniary income flows. The current practice of many people in Luwu is to produce food crops during the rainy season. The purpose is for family consumption and monetary incomes are low. During the dry season, off-farm income generating activities are undertaken. Employment in mining, logging, plywood processing, and in the area's market towns is common. Individuals work in the forest harvesting rattan and collecting resins. The LADP will provide incentives to produce income-generating marketable surpluses of food crops on a year around basis.

The improved transportation network will increase the mobility of people living in Luwu. This will bring an increased awareness of economic alternatives for the now relatively isolated within Luwu. The various alternatives include use of new technology and inputs to increase productivity, more effective and efficient use of existing resources, or moving out of food crop agriculture into other agriculture activities or even into non-agriculture sectors.

The social impact of the transmigration program seems to have been one of creating integrated multi-ethnic groups rather than factionalized communities as some have feared. In Luwu transmigrants are generally readily accepted by the indigenous people. The local farmers know that transmigrants bring new seeds and crop production techniques, as well as the physical infrastructure programs associated with the national transmigration programs. The transmigrants find themselves in a strange land and willingly accept advice from local farmers concerning planting seasons, cropping patterns, and marketing and employment conditions. A good example of how well the two groups get along is a transmigrant village which had been in Luwu for 10 months. Already there had been more than 20 marriages between transmigrants and local people.

The role of women will be enhanced as a result of the LADP. They will be encouraged to participate in the educational activities programmed into the Rural Extension Centers and in the agro-business functions attached to the Farmer Association Complexes. As an important part of farm families, women will share in the increased farm income resulting from the LADP. Furthermore, the number of agricultural employment opportunities available to women will increase more than proportionally, as crop production shifts from rainfed rice production where women traditionally do 35% of the work to dependably irrigated rice production (on the Bone-Bone and Kalaena irrigation systems)

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. In terms of the role of women as implementors of the LADP, every effort will be made by USAID to promote their active involvement in the execution of the Project (e.g. encouraging their participation in the training program). Detailed guidance will be developed with USAID on this project.

E. Policy Analysis

1. 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 rose rapidly in late 1972 and early 1973. The floor and ceiling support prices were raised during this period. The floor support price of rice was raised again in early 1975, this time by about 40%. At the present time the previous deterioration in the Indonesian floor price of rice relative to other domestic commodities has been reversed. However, continued effort on the part of the GOI will be required to insure that the floor price is effectively defended.

The Indonesian price of rice is significantly below the international price. Currently, the Indonesian retail rice price is between $215 and $350 per metric ton (depending on geographic area and quality). For medium quality rice, the producer floor support price is $225/MT and the off-Java ceiling price is more than $300/MT. The CIF cost of imported rice has been above $400/MT for over two years. 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.

2. 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 long-term benefits of the Luwu Agricultural Development Project could be reduced. The sensitivity of project justification to rice price reductions was discussed above.

3. Income and Employment

Employment generation and income growth and redistribution are important areas of policy emphasis in the GOI's Repelita II. 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 increase in small farmer incomes and employment opportunities generated by the Luwu Agricultural Development Project through increases in the productivity of indigenous and transmigrant rural communities makes the Project a particularly well-suited vehicle to carry out the GOI's income and employment policy.

4. Rural Development and Popular Participation

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 Minister of the Interior through the Camat, Bupati and Provincial Governor. The military represented by the Army and the Police also have representatives at the village level.

In the past, the governmental bureaucracy has acted mainly as an implementor of central government development programs at the local level and has developed little popular participation in the development process. Even feedback from the local level through the government apparatus to the Central Government has been limited.

Local participation however has been designed into the Luwu Agricultural Development Project and will contribute to meeting its objectives.

First of all, the establishment of farmer association complexes within the framework of the farm service center subproject is expected to have a significant impact on the advancement of popular participation in Luwu. These agro-business enterprises which will actually be operated by farmer groups themselves, on a commercial basis, should serve as a model of small farmer direct participation in the development process for emulation in other parts of Kabupaten Luwu and elsewhere.

The organization for the planning and execution of the entire agricultural development package may also result in payoffs of local participation particularly if the Expansion, Guidance and Implementation Bodies operating at the national, provincial and local levels of government provide a mechanism for generating and feeding information up the administrative ladder and allow for more decentralized decision-making. The evaluation program included in the Project should also assist in this process.

Local participation is even important in the irrigation subprojects. Farm level implementation including (1) organization of water user associations and extension, (2)land 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 required for the effective execution of irrigation projects. The key to farm level implementation of irrigation projects

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 Bone-Bone and Kalaena irrigation rehabilitation and extension sub-projects will provide assistance in the carrying out of farm level implementation activities in an effort to both increase the economic returns from the entire Project and popular participation of individual farmers in the development process.

5. Credit

In recent years the level, terms, composition and purposes of several Indonesian credit programs indicate that the GOI is aware of the credit needs of small farmers, traders, and entrepreneurs. Credit programs which provide investment, production, and inventory credit in small amounts to rural people are now available in many localities. In Kabupaten Luwu, there is a branch of the Bank Rakyat Indonesia (People's Bank of Indonesia) in the district headquarters of Palopo and in eight villages within the Kabupaten. Three of these eight village banks service areas where the farm service centers are planned for construction.

There are presently four credit programs administered by the GOI in Luwu: (1) the BIMAS program which provides credit in-kind and in-cash for higher levels of rice and non-rice food production technology; (2) the Small Investment Credit Program which finances loans up to $12,500 for investment purposes; (3) the Working Capital Loan Program which provides loans up to $12,500; and (4) the Mini Credit Program where individuals can obtain loans of less than $250 with 1 week to 5 year maturity dates which can be used for either investment or working capital needs and is geared towards each locality's primary development opportunities. Bank Rakyat Indonesia plans to increase the number of village banks by approximately 500 per year in Indonesia and will probably increase the budgetary allocation for each of its credit programs at the same time.

Although the total amount is not large, what is now available plus the projected expansion will satisfy many of the credit requirements in the Project area for the next two to four years. However, it is well known that as an area's level of economic activity increases its credit requirements also increase. The concern is that as the Project's infrastructure investments are completed in three to four years and productivity and economic activity begin to increase at a faster pace, credit will become a constraint to further development at the faster pace. Therefore, the Loan Agreement will contain a special covenant requiring that a credit survey be undertaken (as part of the evaluation program), that a long-term credit program be planned jointly by the GOI and AID as a result of this survey, and that the GOI provide assurances that such a credit program will be established to meet Luwu's longer term needs.

F. Financial Analysis

1. Budget Analysis. The following table presents a summary of the estimated costs associated with the Luwu Agricultural Development Project broken down by subproject. The total cost of the four-year Project is $42,788,000 of which $3,608,000 represents a foreign exchange element. It is recommended that AID contribute $14,900,000 or 35% of the LADP costs. Included in the AID contribution would be all foreign exchange costs plus $11,292,000 of local currency costs. By subproject, AID would finance: (1) Palopo-Malili road - $8,243,000 (33% of estimated cost); (2) Luwu irrigation program - $4,782,000 (42% of estimated cost); (3) farm service centers - $1,149,000 (45% of estimated cost); (4) transmigration program - $269,000 (11% of estimated cost); and overall project organization - $557,000 (42% of estimated cost).

Annex M-2 presents a financial disbursement table which displays the annual costs of each subproject component along with the AID contribution. By U.S. fiscal year, AID would finance: FY 1976 - $5,410,000; FY 1977 - $4,693,000; FY 1978 - $4,084,000; and FY 1979 - $813,000.

2. Proposed Methods of Financing and Procurement. The costs of the LADP have been divided into three financing categories: (1) traditional direct procurement; (2) Fixed Amount Reimbursement (FAR); and (3) GOI contribution.

Detailed Summary of LADP Costs[2/] ($ Thousand)

Subproject	Executing Agency	Foreign Exchange	Local Currency	Total	AID Financing Category 1/	AID Financing Amount
I. Palopo-Malili Road						
A. Steel	Bina Marga	1,500	-	1,500	DIR	1,500
B. Local Cost Construction	Bina Marga	-	23,534	23,534	FAR	6,743
TOTAL		1,500	23,534	25,034		8,243
II. Luwu Irrigation Program						
A. Rehab/Ext. Down Thru Secondary Canals	DGWRD	-	6,498	6,498	FAR	1,945
B. Tertiary/Quat. Canal Systems						
1. Equipment Costs	DGWRD	701	-	701	DIR	701
2. Local Cost Construction	DGWRD/Farmers	-	1,974	1,974	FAR	704
C. Construction Advisor	DGWRD	169	36	205	DIR	169
D. Land Clearing	DGT	-	1,704	1,704	FAR	852
E. Operations & Maintenance	DGWRD					
1. Advisor	DGWRD	123	24	147	DIR	123
2. Equipment	DGWRD	288	-	288	DIR	288
TOTAL		1,281	10,236	11,517		4,782
III. Farm Service Centers						
A. Construction/Training/Operations	AAETE	-	2,262	2,262	FAR	849
B. Vehicles/other foreign exchange goods	AAETE	300	-	300	DIR	300
TOTAL		300	2,262	2,562		1,149
IV. Transmigration Program						
A. Movement of 3550 families	DGT		2,130	2,130	GOI	
B. Foreign Advisor	DGT	169	36	205	DIR	169
C. Health Study	MOH	50	50	100	DIR/FAR	100
Total		219	2,216	2,435		269
V. Project Organization						
A. Capital/Operating Costs(4 Yrs)	DGT	-	723	723	GOI	
B. Foreign Advisory Services	DGT	285	60	345	DIR	285
C. Training	DGT	73	49	122	DIR/FAR	122
D. Evaluation	DGT	-	150	150	FAR	150
Total		358	982	1,340		557
VI. LADP TOTAL COSTS		3,658	39,230	42,888		15,000

Notes:
1/ AID Financing Category legend
i. FAR-Fixed Amount Reimbursement.
ii. DIR - Traditional Direct Procurement.
iii. GOI - Government of Indonesia Contribution.

2/Inflationary factors and other relevant information used to derive these figures are found in the technical analysis section.

It is proposed that traditional direct procurement be limited to AID Geographic Code 941 countries plus Indonesia. Major items to be procured by this financial procedure include: steel - $1,500,000; advisory services - $796,000; and light construction equipment (small backhoes, tractors, jeeps, and pickup trucks) - approximately $1,200,000. Selection of the AID financing category for materials and equipment items were generally based on (1) a preference for direct procurement whenever this would not adversely affect the implementation of the Project and (2) where the item is manufactured.

Almost all of the fixed amount reimbursement financing is related to local construction costs. It should be noted, in this regard, that AID has completely disassociated itself from reimbursing any costs related to depreciation of contractor equipment for the following reasons: (1) problems of source-origin of such equipment; and (2) construction contractors in Indonesia face a large government import tax/handling charge on their construction equipment. As a general rule, USAID has attempted to finance 50% of the predetermined remaining local construction costs except in the case of the Palopo-Malili road where the percentage is 45%.

Aside from financing a percentage of estimated local construction costs, FAR is also being utilized to provide in-country training to personnel from the Directorate General for Transmigration, Kabupaten Luwu and the Agency for Agriculture Education, Training and Extension and to undertake a wide ranged, four-year evaluation program for the LADP. In both instances, USAID recommends contributing 100% of the predetermined costs involved.

3. GOI Budgetary Procedures and GOI Contribution. GOI budget procedures applicable to the LADP will require that each technical agency involved with the Project prepare a budget submission for the National Development Planning Agency (BAPPENAS) and the Ministry of Finance by January of each year of the LADP's duration to adequately cover financial requirements anticipated for the next Indonesian fiscal year(beginning three months later in April). At that time, the Project Office will assume prime responsibility for coordinating all functional agencies' budgetary requests and assuring a consistent and sufficient annual budget plan. Furthermore, an Expansion Body meeting will be held in Jakarta prior to the budget submission deadline to discuss details of the following fiscal year's activities.

4. 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 Luwu Agricultural Development Project.

5. 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 7.6% of export earnings net of oil production costs during IFY 1974-75. This represents decreases from the level in 1973 and reflects large increases 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.

6. 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.

Section 3. Project Implementation

A. Loan Implementation Plan

1)	Loan authorized by AID/W	May 30, 1975
2)	Loan agreement negotiated and signed	July 31, 1975
3)	Conditions precedent to initial disbursement met	October 1, 1975
4)	Personal services contract signed for advisor to project management	October 15, 1975
5)	Initial commitment documents opened	November 1, 1975
6)	Conditions precedent to opening commitment documents for:	
	a) Palopo-Malili road subproject	November 1, 1975
	b) Luwu irrigation program	November 1, 1975
	c) Rural Extension Center	November 1, 1975
	d) Land clearing	November 1, 1975
	e) Farmer Association Complex Met	November 1, 1976
7)	Final reimbursement date for:	
	a) Palopo-Malili road subproject	January 31, 1979
	b) Luwu irrigation program	January 31, 1980
	c) Rural Extension Center	January 31, 1979
	d) Land clearing	January 31, 1980
	e) Farmer Association Complex	January 31, 1980

Detailed construction schedules for each subproject are found as follows: the Palopo-Malili trunk road - Annex I-10; the Luwu Irrigation Program - Annex J-10; and the Farm Service Centers - Annex K-6.

B. Justification of Four Year Disbursement Schedule (re PD-57)

It is felt that a four-year AID disbursement schedule is required for the rehabilitation and extension of the Bone-Bone and Kalaena irrigation systems (down through the quaternary canals), the associated land clearing activities and operations and maintenance program, and the establishment and construction of the four farm service centers.

The Luwu irrigation construction program has been designed as a four-year activity because of the extensive construction work involved, the remoteness of Luwu in general, and the involvement of farmer beneficiaries in the self-help element of tertiary/quaternary system development. Land clearing operations will also take four years basically because the traditional methods to be employed are both time consuming and labor absorbing. However, it is felt that the advantages of this approach (i.e., employment generation and the perceived replicability of the LADP) far outweigh the extended implementation period. The element of the irrigation O&M program extending beyond three years is the financing of the foreign advisor to assist with the establishment of an effective O&M program for Luwu. In view of the institution-building aspects and the need to schedule this subactivity near the date of irrigation system completion, USAID feels a year four disbursement to provide such technical expertise is fully justified.

The farm service center subproject is composed of the erection and operation of Rural Extension Centers and the formation and construction of adjacent Farmer Association Complexes one year later upon successful formation of farmer associations. The four Rural Extension Centers are scheduled for construction as follows: one in year one, two in year two, and one in year three. This implementation plan therefore necessitates disbursements in year four for the financing of the last Farmer Association Complex. The scheduling of the construction of the Rural Extension Centers is based on the need for training adequate staff for these Centers and, in general, on the need to proceed slowly with what is essentially an institution-building, rather than a physical infrastructure, component.

C. Project Monitoring

1. GOI Monitoring

Each government agency involved with the Luwu Agricultural Development Project will be required to monitor its respective subprojects. Therefore: (a) the Directorate General of Water Resources Development along with the Provincial Public Works Office will monitor the rehabilitation and extension of the Bone-Bone and Kalaena irrigation systems (excluding land clearing operations) down through the on-farm ditches; (b) Bina Marga along with the Provincial Public Works Office will closely follow the betterment of the Palopo-Malili road; (c) the Agency for Agriculture Education, Training and Extension will monitor the erection and operation of the four Rural Extension Centers, the formation of farmer associations, and construction of the four Farmer Association Complexes; and (d) the Directorate General for Transmigration will monitor land clearing

operations and the movement of 3,550 transmigrant families onto the Bone-Bone and Kalaena irrigation sites. The purposes of the monitoring by the functional agencies include planning budget allocations, detecting problems and providing needed assistance, approving all plans and specifications, approving construction cost estimates, assuring timely construction, and preparing and certifying requests for AID reimbursement.

In addition to the monitoring activities performed by each technical GOI agency, the LADP Project Office will also monitor the technical, financial, administrative and managerial aspects of every subproject in order to: (a) assess the adequacy of GOI agency budget requests; (b) detect problems of coordination and synchronization of activities of several departments; (c) approve plans and specifications; (d) approve construction cost estimates; (e) assure timely construction from the point of view of the overall LADP package; and (f) review and certify requests for AID reimbursement. Advice to the Project Office in performing its monitoring duties will be supplied by the full-time expatriate advisor who will set-up standard procedures for LADP monitoring as one of his prime responsibilities.

2. AID Monitoring

As with other FAR-type projects, USAID direct-hire staff will be responsible for review and approval of a large number of documents as a part of implementation and reimbursement procedures, in addition to regular monitoring activities. The LADP directly involves several GOI agencies plus provincial, kabupaten, and kecamatan officials. It will require a substantial monitoring effort on USAID's part. There are five main elements of this monitoring.

a. Project Organization - The primary contact point for AID will be through the LADP Project Office. AID will be represented by a project officer dealing directly with the GOI project organization. At this level, plans, schedules, and change orders will be reviewed and project evaluations will be made. The USAID officer will have the ultimate responsibility for direct procurement, including recruitment of technical advisors, for approval of designs and cost estimates for FAR units of work, and for verification of subprojects' completion for FAR reimbursement. It is anticipated that one-third to one-half of the time of a direct-hire staff member will be necessary for this work.

b. Irrigation Subprojects. The two irrigation systems, Bone-Bone and Kalaena, will be subdivided during the course of the Project into practical units of work, e.g., repairs to weirs, repairs to primary and secondary canals, new primaries and secondaries, tertiaries and farm ditches. A direct-hire irrigation engineer will review and approve contracts, designs, and cost estimates for all these units of work as received from Construction Division I of the DGWRD. He will assist, as necessary, in procurement of equipment and advisors for irrigation work and will make final inspections of completed work for reimbursement. It is anticipated that about one-third to one-half of the time of a USAID direct-hire engineer will be required for the subproject, plus assistance from a local-hire engineer. A direct-hire agriculture advisor will review and approve agriculturally-oriented units of work, such as water-user associations and operation and maintenance plans at the water-user level. In addition, he will assist and advise the irrigation engineer with the design of farm ditches. It is anticipated about one-fourth of the agriculture advisor's time will be spent on the project.

c. Road Construction Subproject. Design of the Palopo-Malili road is well underway by Bina Marga, and the review of prefinal design and cost estimates has been completed by the USAID highway engineer. By the time the loan agreement is signed, the final design should be approved so contracting and construction can begin. The USAID highway engineer will then be responsible for assisting in procurement of steel, approving construction and engineering supervisory contracts, and monitoring construction. The first two segments of the road to be completed, ready for reimbursement, would be inspected in about one year from start of construction, or about January of 1977. It is estimated that one-fourth to one-third of the highway engineer's time will be spent on this subproject.

d. Farm Service Centers. Implementation and construction of the four centers will require the services of both an agriculture advisor and a direct-hire engineer. The agriculture advisor will review and approve work items, such as farmer associations, site locations, project organization, training plans, and operation and maintenance of the centers. In addition, he will assist and advise the engineer with the building designs and layout. It is anticipated that about one-fourth of the agriculture advisor's time will be spent on this phase of the subproject. The direct-hire engineer will review and approve work items such as building designs, cost estimates, building construction, and field inspections. He will be responsible for final inspections for reimbursement. These services will require one-fourth of the time of a direct-hire engineer.

e. Land Clearing. In conjunction with the two irrigation subprojects, 7,420 hectares of land will be cleared of trees for agriculture crop production. The agriculture advisor will review and approve work items, such as specifications, plans, and contracts. He will be responsible for final inspections for reimbursement. These services will require one-fourth of the time of a direct-hire agriculture advisor.

As a general policy, AID will direct its monitoring efforts through the Project Organization, both as a means of strengthening its coordinative leadership role and as a means of simplifying AID's association with the LADP. However, it is recognized that coordination with the other agencies involved will also be necessary. It is further recognized by the Mission that monitoring of the LADP will require frequent field trips to Luwu. The time required to monitor the Project will be quite substantial because of the number of technical disciplines involved, the long travel time and the number of GOI agencies involved.

3. Expansion, Guidance and Implementation Body Reviews

In addition to the technical monitoring of individual subprojects by functional GOI agencies, the administrative monitoring of the Project Office, and the AID monitoring requirements, the Expansion, Guidance and Implementation Bodies at the national, provincial and kabupaten levels of government will meet periodically and not less than quarterly, to discuss general progress in implementation of the first-phase agricultural development program, to resolve any special problems that may have arisen, and to plan on future-phase development endeavors for Kabupaten Luwu. The LADP Project Office will be responsible for scheduling the meeting and providing an agenda for the discussions in the form of a quarterly progress report. USAID will attend the Expansion Body meetings and make every effort to attend the lower administrative level discussions whenever possible.

4. Evaluation Program

In addition to the monitoring requirements described above, AID will also finance a comprehensive four-year evaluation of the Luwu Agricultural Development Project, as described in Section 2C.

D. Plan of Operation for the LADP

Upon loan authorization, the first order of business will be the finalization of the overall LADP organization, including the establishment and staffing of the Luwu Project Office within the Directorate General for Transmigration, the creation of interdepartmental relationships and financial procedures for the execution of the LADP, and the drafting of a detailed plan for execution of the agricultural development project. At the same time, a training program for the project organization, the recruitment of an expatriate advisor to the Project Office, and the development of a comprehensive evaluation program will take place. The Directorate General for Transmigration, USAID, and the present grant-financed advisor to the DGT will work closely on these endeavors.

Once the organization and administrative procedures are worked out, the individual technical departments will begin to execute their respective responsibilities with guidance supplied by the LADP office. A detailed implementation plan for the entire LADP is found in Annex M-4 along with an identification of the agency responsible for each subactivity. Monitoring procedures of the various technical agencies, the Project Office, and USAID are discussed in the preceding section. Quarterly meetings will be held at the national, provincial and Kabupaten levels of government to review progress and plan for later stage development efforts.

Section 4. Condition and Covenants

A. Conditions Precedent to Initial Disbursements

1. 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.

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

3. A detailed statement, acceptable to AID, describing the overall project organization, administrative interdepartmental relationships, financial procedures, etc. to be established for the effective execution of the Project.

4. A draft contract, acceptable to AID, between the GOI and a consultant acceptable to AID to provide advisory services for the GOI management of the Project.

5. A training plan for the project management and local government officials, acceptable to AID, including on-the-job, in-country and overseas training, which will also enhance the role of women.

6. 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.

B. Conditions precedent to opening commitment documents for betterment of the Palopo-Malili road.

1. A contract or contracts for engineering or other type of consulting services for the road subproject acceptable to AID with a firm or firms acceptable to AID.

2. A written statement or statements of Bina Marga contracting and procurement procedures and criteria, and draft or form contracts which Bina Marga will enter into with Indonesian construction and engineering or other consulting firms for the performance of the construction work or the road subproject.

C. Conditions precedent to opening commitment documents for rehabilitation and extension of the Bone-Bone and Kalaena Irrigation Systems.

1. A draft contract, acceptable to AID, between the DGWRD and a consultant acceptable to AID to provide construction advisory services to the GOI for the irrigation subprojects.

2. A written statement or statements of DGWRD contracting and procurement procedures and criteria, and draft or form contracts which the DGWRD will enter into with Indonesian construction and engineering or other consulting firms for the performance of the construction work on the irrigation subprojects, down through the secondary canals.

D. Conditions precedent to opening commitment documents for construction of the Farm Service Centers.

1. Site location boundary survey maps and ownership documentation.

2. A staffing pattern acceptable to AID, for the operation of the Center including the number of employees involved, their qualifications, and a timetable for the provision of such employees.

3. A detailed plan and schedule for the training of Center employees including formal-academic, in-service and on-the-job training.

4. A written statement or statements of Ministry of Agriculture contracting and procurement procedures and criteria, and draft or form contracts which the Ministry of Agriculture will enter into with Indonesian construction and engineering or other consulting firms for the performance of the construction work on the Farm Service Centers.

E. Conditions precedent to opening commitment documents for construction of each Farmer Association Complex.

1. A determination, acceptable to AID, of the formation and operation of the farmer association.

2. A plan for operation and management of the complex.

F. Conditions precedent to opening commitment documents for land clearing.

1. A written statement or statements of the Directorate General for Transmigration contracting and procurement procedures and criteria, and draft or form contracts which the Directorate General for Transmigration will enter into with Indonesian contracting firms for the performance of land clearing operations.

Upon satisfaction of the initial conditions precedent and the conditions precedent to opening commitment documents for any subproject, and prior to the start of construction of any subproject for which reimbursement will be requested under the AID loan, AID will require the executing agency to submit for AID approval, all plans, specifications and cost estimates.

G. Borrower covenants.

1. Make available to the executing agencies 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.

2. Cause the executing agencies 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.

3. Ensure that unoccupied lands in Kabupaten Luwu and within the Bone-Bone and Kalaena irrigation systems are made available for the settlement of transmigrant families.

4. Ensure that new transmigrant families, required to settle lands in Kabupaten Luwu, particularly within the Bone-Bone and Kalaena irrigation systems, are provided on a timely basis.

5. Ensure that an effective program of operation, maintenance and repair, including necessary funding therefore, is provided for all completed subprojects and equipment provided under the loan.

6. Make available all plans, specifications and construction schedules related to the Project, and any modifications thereof to AID for approval, prior to their implementation.

7. Undertake a survey of the longer-term, small-farmer agricultural credit requirements of Kabupaten Luwu, plan a credit program jointly with AID to meet these needs, and ensure that such a credit program be executed in Luwu on a timely basis.

8. A detailed plan of operation will be developed by the borrower no later than the first annual loan review to be held within one year of the signing of the Loan Agreement.

STATUTORY CHECKLIST

I. FULFILLMENT OF STATUTORY OBJECTIVES

A. Needs Which the Loan is Addressing

1. FAA Section 103. Discuss the extent to which the loan will alleviate starvation, hunger and malnutrition, and will provide basic services to poor people enhancing their capacity for self-help.

The broad objective of this loan is to raise the income of existing small farmers in Luwu and landless laborers and small farmers from the overcrowded central islands (e.g. Java and Bali) who will migrate to Luwu over the next few years by improving their productivity (and thereby enhancing their capacity for self-help) sufficiently to increase (1) their per capita consumption (thereby eliminating malnutrition and hunger in the project area) and (2) the movement of marketable surpluses to nearby food deficit areas (alleviating hunger outside the project area).

2. FAA Section 104. Discuss the extent to which the loan will increase the opportunities and motivation for family planning; will reduce the rate of population growth; will prevent and combat disease; and will help provide health services for the great majority of the population.

Although the loan is not directly related to reducing the rate of population growth, by assisting a sparsely populated, outer island area to realize its potential, it will provide opportunities for the movement of families from the overcrowded central islands thereby easing population pressures in Indonesia.

3. FAA Section 105. Discuss the extent to which the loan will reduce illiteracy, extend basic education, and increase manpower training in skills related to development.

The four farm service centers to be constructed and operated in Luwu under the loan will provide basic training to farmers in skills related to agricultural development.

4. FAA Section 106. Discuss the extent to which the loan will help solve economic and social development problems in fields such as transportation, power, industry, urban development, and export development.

By the betterment of the 176 Km trunk road through Kabupaten Luwu, the loan will provide a commercially economical land transportation route to serve this potentially important food production center.

5. FAA Section 107. Discuss the extent to which the loan will support the general economy of the recipient country; or will support development programs conducted by private or international organizations.

Although not to be supported with loan funds, a private voluntary organization program to complement the Luwu Agricultural Development Loan is being considered for grant financing.

B. Use of Loan Funds

1. FAA Section 110. What assurances have been made or will be made that the recipient country will provide at least 25% of the costs of the entire program, project or activity with respect to which such assistance is to be furnished under Sections 103-107 of the FAA?

The GOI will give its assurances by signing a loan agreement with such a provision therein. The GOI will contribute $27.9 million of the estimated $42.8 million total cost of the Project which constitutes 65% of the entire project cost.

2. FAA Section 111. Discuss the extent to which the loan will strengthen the participation of the urban and rural poor in their country's development, and will assist in the development of cooperatives which will enable and encourage greater numbers of poor people to help themselves toward a better life.

One of the key components of the loan is the creation and operation of four farmer association complexes which are essentially cooperative agrobusiness enterprises to serve as models for future emulation in other areas of Luwu and elsewhere. It is expected that these cooperatives will enable and encourage many small farmers in Luwu to better participate in and reap the benefits of the development process. The Project will also provide assistance in the establishment of water user associations for small farmers in the Bone-Bone and Kalaena irrigation subproject areas, another local institution in which small farmers will participate in the development of Luwu.

3. FAA Section 660. Will arrangements preclude use of funds for police training or other law enforcement assistance?	Yes
4. FAA Section 113. Describe the extent to which the programs, projects or activities to be financed under the loan give particular attention to the integration of women into the national economy of the recipient country.	As an important part of farm families, women will share in Project benefits. Since women do a larger percentage of the work involved in dependably irrigated rice production than in rainfed rice production, agricultural employment opportunities for women will increase more than proportionally in the Bone-Bone and Kalaena subproject areas. Furthermore the four farm service centers will pay particular attention to the involvement of women in their programs.
5. FAA Section 114. Will any part of the loan be used to pay for the performance of abortions as a method of family planning or to motivate or coerce any person to practice abortions?	No.

II. COUNTRY PERFORMANCE

A. Progress Towards Country Goals

1. FAA §§ 201(b)(5), 201(b)(7), 201(b)(8), 208. Discuss the extent to which the country is:

(a) Making appropriate efforts to increase food production and improve means for food storage and distribution.	Indonesia is giving priority attention to projects which aim at increasing food production, particularly rice. There are currently 100-110 donor-supported technical and capital assistance projects in support of food production. The majority of the above projects are directly concerned with increasing food production, and improved food storage, distribution and marketing.
(b) Creating a favorable climate for foreign and domestic private enterprise and investment.	The GOI enacted a comprehensive law with built-in incentives for encouraging foreign capital investment and has concluded an Investment Guaranty Agreement with the US. Under the foreign investment law tax credits of up to 5 years may be obtained for new investment in plant and facilities, subject to negotiation.
(c) Increasing the people's role in the development process.	Although the Government owns a majority of the large enterprises in the country, it is actively encouraging private domestic investment. Officials of State Enterprises are receiving more freedom in management and some State Enterprises are being converted to semi-private corporations. National elections were carried out in July 1971 and Parliament has a part in the budgetary process inasmuch as the annual budget must be authorized by Parliament and expenditures reported in the "Annual Report of Budgetary Accounts".

(d) Allocating expenditures to development rather than to unnecessary military purposes or to intervention in other free countries' affairs.	With the ending of confrontation with Malaysia in 1966, the Soeharto Administration reversed the foreign intervention policy of the Sukarno regime. Military expenditures have been sharply reduced as the Government has concentrated the nation's domestic resources - and foreign aid receipts - on achieving economic stability and pursuing an ambitious development program.
(e) Willing to contribute funds to the project or program.	The GOI will contribute up to $27.9 million (equivalent) in local currency to meet a major part of the local expenditure requirements of the Project.
(f) Making economic, social, and political reforms such as tax collection improvements and changes in land tenure arrangements; and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of individual freedom, initiative, and private enterprise.	Major economic reforms have been instituted with IMF/IBRD assistance including incentives to growth of individual initiative and private enterprise. Effective December 9, 1970 the GOI established one uniform exchange rate for all types of foreign exchange. On August 9, 1971, to reduce the trade gap, the Rupiah was devalued by about 10% to Rp.415/US $1. Further devaluations in December 1971 and early 1973 were pegged to devaluations of the dollar; the Rupiah has remained stable since then. The rate of inflation was reduced from 636.8 percent per annum in CY 1966 to about 10% in CY 1971. Inflation was about 26% in 1972, largely due to rice price increases; and continued at a level of about 30% during 1973 and 1974, although due principally to general price increases, not just rice alone. GOI revenues from the oil sector have grown rapidly since 1967 - equalling Rp.48 billion in 1969/70, Rp.345 billion in 1973/74, and a projected Rp. 1.5 trillion in 1975/76 (2/3 of projected government revenues). Non-oil revenues have grown with the economy during the same period.
(g) Responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures.	

Approximately 12 percent of the development budget is devoted to the social field which includes education, health, family planning, housing, manpower, social welfare, drinking water supply, culture and religion. The cooperating Government has encouraged self-help projects such as Food for Work and other irrigation and road building projects carried out through its Department of Manpower. A substantial low cost housing program will be implemented in the Second Five Year Plan which began in April 1974.

B. Relations with the United States

1. FAA §§ 620(c). If assistance is to a government, is the Government indebted to any U.S. citizen for goods or services furnished or ordered where: (a) such citizen has exhausted available legal remedies, including arbitration, or (b) the debt is not denied or contested by the government, or (c) the indebtedness arises under such government's or a predecessor's unconditional guarantee?

We are not aware of any cases that make Indonesia ineligible under this Section.

2. FAA § 620(d). If the loan is intended for construction or operation of any productive enterprise that will compete with U.S. enterprise, has the country agreed that it will establish appropriate procedures to prevent export to the U.S. of more than 20% of its enterprise's annual production during the life of the loan?

Not applicable.

3. FAA § 620(e)(1). If assistance is to a government, has the country's government, or any agency or subdivision thereof, (a) nationalized or expropriated property owned by U.S. citizens or by any business entity not less than 50% beneficially owned by U.S. citizens, (b) taken steps to repudiate or nullify existing contracts or agreements with such citizens or entity, or (c) imposed or enforced discriminatory taxes or other exactions, or operation conditions? If so, and more than six months has elapsed since such occurrence, identify the document indicating that the government, or appropriate agency or subdivision thereof, has taken appropriate steps to discharge its obligations under international law toward such citizen or entity? If less than six months has elapsed, what steps if any has it taken to discharge its obligations?	The majority of business and property owned by U.S. citizens which was nationalized during the Sukarno regime (principally in 1964 and early 1965) has been returned to U.S. owners or mutually acceptable settlement negotiated. The Government of Indonesia in a Presidential Decree dated December 14, 1966 indicated its willingness to return nationalized assets.
4. FAA § 620(i). Has the country permitted, or failed to take adequate measures to prevent the damage or destruction by mob action of U.S. property, and failed to take appropriate measures to prevent a recurrence and to provide adequate compensation for such damage or destruction?	The country has not so permitted nor has it failed to take adequate measures.
5. FAA § 620(l). Has the government instituted an investment guaranty program under FAA § 234 (a)(1) for the specific risks of inconvertibility and expropriation or confiscation?	Yes.

6. FAA § 620(o). Fisherman's Protective Act of 1954, as amended, Section 5. Has the country seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters? If, as a result of a seizure, the USG has made reimbursement under the provisions of the Fisherman's Protective Act and such amount has not been paid in full by the seizing country, identify the documentation which describes how the withholding of assistance under the FAA has been or will be accomplished.

No. Remainder of question therefore not applicable.

7. FAA § 620(q). Has the country been in default, during a period in excess of six months, in payment to the U.S. on any FAA loan?

No; however, repayment of one FAA loan has been rescheduled by bilateral agreement dated March 16, 1971 in accordance with terms of the Paris Agreed Minutes of April 24, 1970.

8. FAA § 620(t). Have diplomatic relations between the country and the U.S. been severed? If so, have they been renewed?

No. Remainder of question therefore not applicable.

C. Relations with Other Nations and the U.N.

1. FAA § 620(i). Has the country been officially represented at any international conference when that representation included planning activities involving insurrection, or subversion directed against the U.S. or countries receiving U.S. assistance?

We have no information as to any such representational activity.

2. FAA §§ 620(a), 620(n). Has the country sold, furnished or permitted ships or aircraft under its registry to carry to Cuba or North Viet-Nam items of economic, military, or other assistance?

We have no information of any such action by Indonesia.

3. FAA § 620(u); App. § 107. What is the status of the country's U.N. dues, assessments, or other obligations? Does the loan agreement bar any use of funds to pay U.N. assessments, dues, or arrearages?

Indonesia is not delinquent with respect to U.N. obligations. The loan agreement limits the use of loan proceeds to procurement of goods and services from A.I.D. Geographic Code 941 (Selected Free World) countries plus Indonesia.

D. Military Situation

1. FAA § 620(i). Has the country engaged in or prepared for aggressive military efforts directed against the U.S. or countries receiving U.S. assistance?

No.

2. FAA § 620(s). (1) What is (a) the percentage of the country's budget devoted to military purposes, and (b) the amount of the country's foreign exchange resources used to acquire military equipment, and (c) has the country spent money for sophisticated weapons systems purchased since the statutory limitations became effective? (2) Is the country diverting U.S. development assistance or PL-480 sales to military expenditures? (3) Is the country directing its own resources to unnecessary military expenditures? (Findings on these questions are to be made for each country at least once each fiscal year and, in addition, as often as may be required by a material change in relevant information).

(1)(a) The Department of Defense portion of the Operating and Development State Budget has ranged from a high of 33% in CY 1967 to a low of 22% in the FY 1973/74 budget. Defense and national security expenditures equal 4.8% of the 1974/75 development budget. (b) We have no knowledge of any significant expenditures of foreign exchange for the military. Less than 10% of the military budget is allocated for foreign exchange purchases. Moreover, the Department of Defense budget includes substantial amounts for construction of roads, bridges and other civil works projects. (c) No, the Government is placing primary emphasis on economic development and not diverting its own resources for unnecessary military expenditures.
(2) No. (3) No.

III. CONDITIONS OF THE LOAN

A. General Soundness

Interest and Repayment

1. FAA §§ 201(d), 201(b)(2). Is the rate of interest excessive or unreasonable for the borrower?

Although Indonesia's debt burden was heavy in the past, there has been very rapid growth in real

Are there reasonable prospects for repayment? What is the grace period interest rate? Is the rate of interest higher than the country's applicable legal rate of interest?	Government revenues and favorable economic performance. With the high current level of foreign exchange export earnings, it is considered that future debt payments will be easily manageable. The various donors agree Indonesia has a debt burden for which the prospects of repayment are reasonable. Country terms of a 40-year loan, 10-year grace period, 2% interest during the grace period, 3% thereafter, pertain. The rate of interest is not higher than the country's applicable legal rate of interest.
Financing	
1. FAA § 201(b)(1). To what extent can financing on reasonable terms be obtained from other freeworld sources, including private sources within the U.S.?	Loan assistance to Indonesia is provided within the framework of the Inter-Governmental Group on Indonesia (IGGI), advised by the IBRD and the IMF. This loan has been selected by AID as part of the U.S. Government contribution to the IGGI consortium and as such is supported by the IBRD resident mission. The Exim Bank has expressed no interest in financing any portion of this Project.
Economic and Technical Soundness	
1. FAA §§ 201(b)(2), 201(e). The activity's economic and technical soundness to undertake loan; does the loan application, together with information and assurances, indicate that funds will be used in an economically and technically sound manner?	Yes. See the Technical Analysis and Socio-economic Analysis sections of the Project Paper.

2. FAA § 611 (a)(1). Have engineering, financial, and other plans necessary to carry out assistance, and a reasonably firm estimate of the cost of assistance to the U.S., been completed?	Necessary planning and a reasonably firm cost estimate for the Project have been completed (see the Technical and Financial Analysis Sections of the Project Paper).
3. FAA § 611(b): App. § 101. If the loan or grant is for a water or related land-resource construction project or program, do plans include a cost-benefit computation? Does the project or program meet the relevant U.S. construction standards and criteria used in determining feasibility?	An internal rate of return analysis has been performed on the Luwu irrigation subprojects. Yes, the Luwu irrigation program meets the relevant U.S. construction standards and criteria used in determining feasibility.
4. FAA § 611(e). If this is a Capital Assistance Project with U.S. financing in excess of $1 million, has the principal AID officer in the country certified as to the country's capability effectively to maintain and utilize the project?	Yes, the Mission Director has so certified. See Annex D.

B. **Relation to Achievement of Country and Regional Goals**

Country Goals:

1. FAA §§ 207, 281 (a). Describe this loan's relation to:

(a) Institutions needed for a democratic society and to assure maximum participation on the part of the people in the task of economic development.

One of the basic purposes of the Project is to establish an inter-ministerial mechanism for planning, executing and evaluating integrated rural development activities in select, outer island areas of Indonesia. Furthermore, the Project will assist in the development of farmer associations which will undertake cooperative agro-business enterprise endeavors and water user associations which will also result in the participation of small farmers in economic development.

(b) Enabling the country to meet its food needs, both from its own resources and through development, with U.S. help, of infrastructure to support increased agricultural productivity.

The Project will assist an underdeveloped, outer island area realize its potential as a surplus food production center through the betterment of its basic transportation network, development of irrigation systems and provision of supporting services for small farmers (at the farm service centers).

(c) Meeting increasing need for trained manpower.

The Project includes on-the-job, in country and overseas training for staff of the project office which will assume overall responsibility for execution of the entire agricultural development scheme. Furthermore, the staff of all involved GOI technical department will receive training of some sort for the life of the Project. It should also be noted that farmers will receive basic and specialized training through the four farm service centers.

(d) Developing programs to meet public health needs.	The increase in small farmer income and improved income distribution resulting from the Project should result in greater access to health services.
(e) Assisting other important economic, political, and social development activities, including industrial development; growth of free labor unions; cooperatives and voluntary agencies; improvement of transportation and communication systems; capabilities for planning and public administration; urban development and modernization of existing laws.	By raising incomes and improving income distribution among the population and thereby the ability of the rural people to play a greater role in the activities of the country, this Project is an essential precondition to economic, political and social development. Furthermore, the Project will promote the establishment of four agrobusiness cooperatives to serve as models for emulation in other parts of Luwu and elsewhere; improve the basic transportation network through the Kabupaten; and perhaps most importantly establish the capability within the GOI for interministerial planning, coordination and execution of integrated area development schemes in select, outer island locations.
2. FAA § 201(b)(4). Describe the activity's consistency with and relationship to other development activities, and its contribution to realizable long-range objectives.	The Project is consistant with other development activities and will make a substantial contribution to the long-range objectives of (1) decreasing Indonesia's dependence on food imports, particularly rice, needed to feed its growing population and (2) expanding and broadening Indonesia's production base.
3. FAA § 201(b)(9). How will the activity to be financed contribute to the achievement of self-sustaining growth?	By improving Kabupaten Luwu's rural transportation network, increasing its irrigated hectarage, and providing supporting services for its small farmers, the loan will increase the agricultural productiveness of its farmers thereby contributing to self-sustaining growth.

4. FAA § 201(f). If this is a project loan, describe how such project will promote the country's economic development, taking into account the country's human and material resource requirements and the relationship between ultimate objectives of the project and overall economic development.	The Project will promote the country's economic development through improving rural infrastructure, increasing agricultural productivity, increasing rural incomes, improving income distribution and generating employment opportunities.
5. FAA § 201(b)(3). In what way does the activity give reasonable promise of contributing to development of economic resources, or to increase of productive capacities?	The Project will contribute to the development and increase the productive capacity of Indonesia's land resources through opening up new land for production, improving rural infrastructure, and providing support services to small farmers.
6. FAA § 281(b). How does the program under which assistance is provided recognize the particular needs, desires, and capacities of the country's people; utilize the country's intellectual resources to encourage institutional development; and support civic education and training in skills required for effective participation in political processes?	The Project will meet the needs and desires of Indonesia's rural people for increased incomes, better income distribution and expanded employment opportunities. Through the establishment of an interdepartment mechanism to promote area development in select, outer-island areas, the Project will utilize the country's intellectual resources to encourage institutional development. Civic education and training in skills required for effective participation in political processes will be gained by the formation of farmer associations and water user associations.

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

(a) Some of the increased secondary crop production resulting from the Project may be exported.

(b) The Project will foster the development of small, privately-owned farms.

(c) The loan includes provision of funds for the establishment of farmer association complexes which will encourage agrobusiness enterprise activities by farmer cooperatives in the Project area. Furthermore, increased rural incomes, improved income distribution, greater employment opportunities and the existence of viable water user associations will also improve the climate for the development of other types of cooperatives, credit unions and savings and loan associations.

(d) Not applicable.

(e) The Project will increase the technical efficiency of agricultural production in subproject areas through the provision of irrigable land and establishment of farm service centers.

(f) Increased rural incomes, improved income distribution and greater employment opportunities may have the effect of strengthening free labor unions.

8. FAA § 202(a). Indicate the amount of money under the loan which is: going directly to private enterprise; going to intermediate credit institutions or other borrowers for use by private enterprise; being used to finance imports from private sources; or otherwise being used to finance procurements from private sources.	Commodities to be procured for the Project using foreign exchange will be purchased from private enterprise. Commodities to be procured for the Project using local currency will be purchased from Indonesian suppliers, most of them privately-owned. Construction of most works will be contracted to Indonesian firms, many of them privately-owned, wherever possible. The integrated area development scheme is designed to benefit small, privately-owned farms directly and the economy indirectly.
9. FAA § 611(a)(2). What legislative action is required within the recipient country? What is the basis for a reasonable anticipation that such action will be completed in time to permit orderly accomplishment of purposes of loan?	None.
Regional Goals	
1. FAA § 619. If this loan is assisting a newly independent country, to what extent do the circumstances permit such assistance to be furnished through multilateral organizations or plans?	Not applicable.
2. FAA § 209. If this loan is directed at a problem or an opportunity that is regional in nature, how does assistance under this loan encourage a regional development program? What multilateral assistance is presently being furnished to the country?	The Project is directed to the agricultural development of Kabupaten Luwu through provision of rural infrastructure and supporting services for small farmers. The framework for regional development throughout Indonesia will also be enchanced through the interministerial mechanism for designing and promoting regional development being

created for this Project. The loan is being furnished in the context of multilateral aid to Indonesia by a consortium of donor countries (IGGI). The assistance is being coordinated with the advice of the IBRD.

C. Relation to U.S. Economy

Employment, Balance of Payments, Private Enterprises.

1. FAA § § 201(b)(6): 102. Fifth. What are the possible effects of this loan on U.S. economy, with special reference to areas of substantial labor surplus? Describe the extent to which assistance is constituted of U.S. commodities and services, furnished in a manner consistent with improving the U.S. balance of payments position.

Since traditional direct procurement finance by the Loan will be limited to AID Geographic Code 941 (Selected Free World) countries plus Indonesia and reimbursement to the GOI for Fixed Amount Reimbursement (FAR) items will be made via a special Letter of Credit (SLC) against evidence of the export of goods and services from the U.S., there will be a minimal adverse effect on the U.S. balance of payments.

2. FAA § § 612(b), 636(h). What steps have been taken to assure that, to the maximum extent possible, foreign currencies contributed by the country are utilized to meet the cost of contractual and other services, and that U.S. foreign-owned currencies are utilized in lieu of dollars?

Services requiring foreign exchange financing will be procured from AID Geographic Code 941 countries plus Indonesia. U.S. owned local currency is not available in Indonesia.

3. FAA § 601(d); App. § 108. If this loan is for a capital project, to what extent has the Agency encourage utilization of engineering and professional services of U.S. firms and their affiliates? If the loan is to be used to finance direct costs for construction, will any of the contractors be persons other than qualified nationals of the country or qualified citizens of the U.S.? If so, has the required waiver been obtained?

Advisory services required to implement the Project will be procured from AID Geographic Code 941 countries plus Indonesia. All construction contractors will be qualified Indonesian nationals or firms.

4. FAA § 608(a). Provide information on measures to be taken to utilize U.S. Government excess personal property in lieu of the procurement of new items.	U.S. Government excess property will be used for this Project to the extent feasible.
5. FAA § 602. What efforts have been made to assist U.S. small business to participate equitably in the furnishing of commodities and services financed by this loan?	The loan agreement will contain a provision to ensure that opportunity for such participation will be provided and appropriate notices published.
6. FAA § 621. If the loan provides technical assistance, how is private enterprise on a contract basis utilized? If the facilities of other Federal agencies will be utilized, in what ways are they competitive with private enterprise (if so, explain); and how can they be made available without undue interference with domestic programs?	It is anticipated that the advisory services required to implement the Project will be provided through contracts with consultants from AID Geographic Code 941 sources plus Indonesia. The utilization of other Federal agencies is not envisioned for this Project.
7. FAA § 611(c). If this loan involves a contract for construction that obligates in excess of $100,000, will it be on a competitive basis? If not, are there factors which make it impracticable?	The loan agreement will cover this requirement.
8. FAA § 601(b). Describe the efforts made in connection with this loan to encourage and facilitate participation of private enterprise in achieving the purposes of the Act.	Commodities to be procured for the Project using foreign exchange will be purchased from private enterprise. Commodities to be procured for the Project using local currency will be purchased from Indonesian suppliers, most of them privately-owned. Construction of most physical works will be contracted to Indonesian firms, many of them privately-owned, wherever possible.

Procurement

1. FAA § 604(a). Will commodity procurement be restricted to U.S. except as otherwise determined by the President?	Yes, procurement is limited to AID Geographic Code 941 countries plus Indonesia.
2. FAA § 604(b). Will any part of this loan be used for bulk commodity procurement at adjusted prices higher than the market price prevailing in the U.S. at time of purchase?	No.
3. FAA § 604(e). Will any part of this loan be used for procurement of any agricultural commodity or product thereof outside the U.S. when the domestic price of such commodity is less than parity?	No.
4. FAA § 604(f). Will the agency receive the necessary pre-payment certifications from suppliers under a commodity import program agreement as to description and condition of commodities, and on the basis of such, determine eligibility and suitability for financing?	Not applicable. This is a project loan and not a commodity import program assistance loan.

D. Other Requirements

1. FAA § 201(b). Is the country among those countries in which development loan funds may be used to make loans in this fiscal year?	Yes.
2. App. § 105. Does the loan agreement provide, with respect to capital projects, for U.S. approval of contract terms and firms?	The loan agreement will cover this requirement.
3. FAA § 620(k). If the loan is for construction of a production enterprise, with respect to which the aggregate value of assistance to be furnished will exceed $100 million, what preparation has been made to obtain the express approval of the Congress?	Not applicable.

4. FAA § 620(b), 620(f). Has the President determined that the country is not dominated or controlled by the International Communist movement? If the Country is a Communist country (including, but not limited to, the countries listed in FAA § 620(f)) and the loan is intended for economic assistance, have the findings required by FAA § 620(f) been made and reported to the Congress?	Yes, the required determination has been made. Remainder of question is, therefore, not applicable.
5. FAA § 620(h). What steps have been taken to insure that the loan will not be used in a manner which, contrary to the best interest of the United States, promotes or assists the foreign aid projects of the Communist-bloc countries?	The loan agreement will cover this requirement.
6. App. § 109. Will any funds be used to finance procurement of iron and steel products for use in Viet-Nam other than as contemplated by § 109?	No.
7. FAA § 636(i). Will any part of this loan be used in financing non-U.S. manufactured automobiles? If so, has the required waiver been obtained?	No. The remainder of the question is therefore not applicable.
8. FAA § 620(a)(1) and (2) Will any assistance be furnished or funds made available to the government of Cuba?	No.
9. FAA § 620(g). Will any part of this loan be used to compensate owners for expropriated or nationalized property? If any assistance has been used for such purpose in the past, has appropriate reimbursement been made to the U.S. for sums diverted?	No. No assistance has been used for such purposes in the past.

10. FAA §§ 201(f). If this is a project loan, what provisions have been made for appropriate participation by the recipient country's private enterprise?	Commodities to be procured for the Project using local currency will be purchased from Indonesian suppliers, most of them privately-owned. Construction of most works will be contracted to Indonesian firms, many of them privately-owned, wherever possible.
11. App. § 103. Will any funds under the loan be used to pay pensions, etc., for persons who are serving or who have served in the recipient country's armed forces?	No.
12. MMA §§ 901.b. Does the loan agreement provide, for compliance with U.S. shipping requirements, that at least 50% of the gross tonnage of all commodities financed with funds made available under this loan (computed separately by geographic area for dry bulk carriers, dry cargo liners, and tankers) be transported on privately owned U.S.-flag commercial vessels to the extent such vessels are available at fair and reasonable rates for U.S. flag vessels. Does the loan agreement also provide for compliance with U.S. shipping requirements, that at least 50% of the gross freight revenues of goods shipped under this loan must be earned by privately owned U.S. flag commercial vessels to the extent such vessels are available at fair and reasonable rates for U.S. vessels?	Yes to both questions. These requirements will be applicable only to traditional direct procurement financed by the loan. The loan agreement will contain a provision covering these requirements.
13. FAA § 481. Has the President determined that the recipient country has failed to take adequate steps to prevent narcotic drugs produced or procured in, or transported through such country from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents or from entering the United States unlawfully?	No.

14. App. § 110. Is the loan being used to transfer funds to world lending institutions under FAA §§ 209(d) and 251(h)?

No.

15. App. § 501. Are any of these funds being used for publicity or propaganda within the United States?

No.

16. FAA § 612(d) and Section 40 of PL 93-189 (FAA of 1973). Does the United States own excess foreign currency and, if so, what arrangements have been made for its release in compliance with Section 40 (FAA of 1973)?

U.S. owned excess local currency is not available in Indonesia.

17. FAA § 604(d). Will provision be made for placing marine insurance in the U.S. if the recipient country discriminates against any marine insurance company authorized to do business in the U.S.?

Yes. This requirement will be applicable only to traditional direct procurement financed by the Loan. The loan agreement will contain a provision covering this requirement.

18. FAA § 659. Is there a military base located in the recipient country which base was constructed or is being maintained or operated with funds furnished by the U.S., and in which U.S. personnel carry our military operations? If so, has a determination been made that the government of such recipient country has, consistent with security, authorized access, on a regular basis to bona-fide news media correspondents of the U.S. to such military base?

No. Remainder of question therefore not applicable.

19. Sections 30 and 31 of PL 93-189 (FAA of 1973). Will any part of the loan be used to finance directly or indirectly military or paramilitary operations by the U.S. or by foreign forces in or over Laos, Cambodia, North Vietnam, South VietNam, or Thailand?

No.

20. App. § 111. Will any part of this loan be used to provide assistance to North Vietnam?	No.
21. FAA Section 640(c). Will a grant be made to the recipient country to pay all or part of such shipping differential as is determined by the Secretary of Commerce to exist between U.S. and foreign flag vessel charter or freight rates?	No.
22. App. § 112. Will any of the funds appropriated or local currencies generated as a result of AID assistance be used for support of police or prison construction and administration in South Vietnam or for support of police training of South Vietnamese?	No.
23. App. § 113. Have the House and Senate Committees on Appropriations been notified fifteen days in advance of the availability of funds for the purposes of this project?	Appropriate steps are being taken to satisfy this requirement.
24. App. § 504. Will any of the funds appropriated for this project be used to furnish petroleum fuels produced in the continental United States to South east Asia for use by non-U.S. nationals?	No.

25. FAA §§ 901. Has the country denied its citizens the right or opportunity to emigrate?	No.
26. FAA §§115. Will country be furnished, in same fiscal year, either security supporting assistance, Indochina Postwar Reconstruction, or Middle East peace funds? If so, is assistance for population programs, humanitarian aid through international organizations, or regional programs?	No. Remainder of question therefore not applicable.
27. FAA §§ 653(b). Is assistance within country or international organization allocation for fiscal year reported to Congress (or not more than $1 million over that figure plus 10%)?	Yes
28. FAA §§ 662. Will arrangements preclude use of funds for CIA activities?	Yes

DEPARTMENT OF STATE

TELEGRAM

Annex B

USAID ROUTING		
TO	Act.	Info
DIR		✓
D/D		✓
L/A		✓
SA/EXO		✓
SA/RD		✓
PRO		✓
EA		✓
CONT		✓
DL/PE	✓	✓
AGR		✓
ENGR		✓
PHD		✓
VA/HA		
TRG		
ECON		
PER		
GSO		
JAO/ALM		
USIS		
AGR./A.T.		
M/POOL		
C&R		

CONTROL: 1510

RECD: FEB 4, 1000

INFO CHRON
AMB
DCM ECON POL

R 031817Z FEB 75
FM SECSTATE WASHDC
TO AMEMBASSY JAKARTA 6599
BT
UNCLAS STATE 024100

AIDAC

E.O. 11652:N/A

TAGS:

SUBJECT: LUWU AREA DEVELOPMENT PROJECT-PRP

1. SUBJECT PROJECT APPROVED FOR PREPARATION PP AT EAST ASIA PROJECT ADVISORY COMMITTEE MEETING HELD JAN. 22. ISSUES RAISED WHICH SHOULD BE ADDRESSED IN PP DISCUSSED BELOW.

2. LINK OF TRANSMIGRATION ACTIVITIES TO PROJECT: PP NEED CLEARLY DEFINE ROLE OF TRANSMIGRATION ACTIVITIES TO PROJECT DEVELOPMENT AND SUCCESS INCLUDING SUCH ITEMS AS PROVISION OF TRANSMIGRANTS FOR NEEDED POPULATION BASE, ADMINISTRATIVE SUPPORT, ETC. TO EXTENT THESE TRANSMIGRATION ACTIVITIES OF MINISTRY TO DELIVER TRANSMIGRANTS AND LIKELIHOOD OF TRANSMIGRANTS ADAPTING AND REMAINING IN AREA. BELIEV WOULD BE HELPFUL BRIEFLY INCLUDE GENERAL DESCRIPTION TRANSMIGRATION PROGRAM AND WHAT BENEFITS (LAND, SUPPORTING SERVICES, ETC.) TRANSMIGRANT RECEIVES WITH MORE SPECIFIC DESCRIPTION TRANSMIGRATION ACTIVITIES EXISTING AND PLANNED FOR LUWU AREA.

3. INSTITUTIONAL DEVELOPMENT AND TECHNICAL ASSISTANCE: ONE OF MAJOR CONCERNS RAISED WAS ABILITY OF DIFFERENT AGENCIES TO CARRY OUT VARIOUS ASPECTS OF PROJECT, RANGING FROM OVERALL RESPONSIBILITY OF DEPARTMENT OF MANPOWER, TRANSMIGRATION AND COOPERATIVES (DMTC) TO OPERATION OF FARM SERVICE CENTERS, O AND M OF IRRIGATION SYSTEMS AND MISSION STAFFING TO BACKSTOP PROJECT. GIVEN MAGNITUDE THESE TASKS, LEVEL OF TA PROPOSED IN PRP COULD FALL SHORT OF REQUIREMENTS. PP SHOULD PROVIDE COMPLETE ANALYSIS OF STAFFING AND ABILITY OF RESPONSIBLE AGENCIES, INCLUDING ANY AUTHORITY ESTABLISHED TO ADMINISTER PROJECT, TO

IMPLEMENT PROJECT COMPONENTS. WHERE DEEMED NECESSARY, THE LOAN SHOULD PROVIDE THE REQUISITE TA AND/OR INDICATE OTHER SOURCES OF ASSISTANCE TO DEVELOP CAPABILITY FOR CARRYING OUT EACH ASPECT OF PROJECT.

4. SUPPORT SERVICES FOR LUWU AREA: WHILE THIS ISSUE IS RELATED TO PARAS 2 AND 3 ABOVE, SPECIFIC QUESTIONS RAISED ON NEED FOR AND AVAILABILITY OF CREDIT, ASSISTANCE IN LAND CLEARING AND PROVISION OF FERTILIZER TOGETHER WITH DEMONSTRATION PROPER APPLICATION. ALTHOUGH THESE ISSUES RECOGNIZED IN PRP, SPECIFIC CONCERN TO BE ADDRESSED IN CONSIDERING THESE ISSUES IS WHETHER FARMER WILL HAVE ADEQUATE SUPPORT BOTH DURING AND AFTER PROJECT COMPLETION TO AID IN IMPROVING HIS FINANCIAL CONDITION. SHOULDMZE DISCUSSED IN CONTEXT ANY ONGOING AND PLANNED PROGRAMS FOR AREA SUCH AS BIMAS AND FARM SERVICE CENTER ACTIVITIES.

5. FARM SERVICE CENTERS: ALTHOUGH PP NEED DEMONSTRATE CAPABILITY OF CENTERS TO UNDERTAKE DESIGNATED TASKS, INCLUDING STAFFING AND POSSIBLE TA PER PARA 3 ABOVE, CONCEPT VERY WELL RECEIVED. QUESTION IS RAISED WHETHER PROVISIONS FOR OTHER SERVICES E.G. HEALTH, EDUCATION, TIME BY ALLOCATION OF SPACE AT THE CENTERS.

6. CIVIL WORKS: PP SHOULD INDICATE HOW CONSTRUCTION, OPERATION AND MAINTENANCE OF IRRIGATION SYSTEMS TO BE UNDERTAKEN. MOST IMPORTANT IS RESPONSIBILITY FOR TERTIARY CANAL CONSTRUCTION TOGETHER WITH PLAN FOR CONTINUED O AND M, INCLUDING POSSIBLE DEVELOPMENT AND USE FARMER ASSOCIATIONS. SINCE PALOPO-MALILI ROAD IS KEY COMPONENT OF PROJECT, PLAN ALSO REQUIRED FOR CONTINUED MAINTENANCE THIS ROAD.

7. METHODS OF CONSTRUCTION: RELATED TO PARA 6 ABOVE, DISCUSSION SHOULD INDICATE USE, WHERE PRACTICABLE, OF LABOR INTENSIVE METHODS OF CONSTRUCTION FOR ROAD AND/OR IRRIGATION SYSTEMS INCLUDING DEMONSTRATION ADEQUATE SOURCE OF MANPOWER IN AREA.

8. ENVIRONMENTAL IMPACT STATEMENT: PP MUST INCLUDE OVER-ALL ENVIRONMENTAL IMPACT ASSESSMENT INCLUDING DISCUSSION OF POTENTIAL SPREAD OF SCHISTOSOMIASIS WHICH IDENTIFIED AS POTENTIAL THREAT IN AREA

9. IN LIGHT PD 57, ANY ASPECT OF PROJECT WHERE DISBURSE-

MENTS WILL BE IN EXCESS THREE YEARS MUST BE FULLY JUSTIFIED.

10 PP SHOULD INCLUDE DISCUSSION ON REPLICABILITY OF INSTITUTIONAL ASPECT OF PROJECT FOCUSING ON INTER-MINISTERIAL CONCEPT POTENTIAL FOR USING THIS APPROACH FOR OTHER REGIONAL DEVELOPMENT PROJECTS SHOULD BE EXAMINED EVEN OUTSIDE CONTEXT OF TRANSMIGRATION ACTIVITIES.
KISSINGER
BT

LUWU AGRICULTURAL DEVELOPMENT PROJECT
LOGICAL FRAMEWORK MATRIX

A.1. Program or Sector Goal	2. Measures of Goal Achievement	3. Means of Verification	4. Assumptions for Achieving Goal (Targets)
Improve the well-being of small farmers by raising productivity sufficiently to increase both per capita consumption and the movement of marketable surpluses to food deficit areas.	a. Levels of production, over time, of specified crops equal to projections. (1) 40,000 MT incremental production of milled rice per year. (2) 14,000 MT incremental production of non-rice food crops per year. b. Marketable surpluses produced in Luwu sold for utilization in deficit areas. (1) 24,000 MT incremental rice outflow. (2) 10,000 MT incremental non-rice food outflow. c. Real income increases for small farmers. d. Increased local per capita consumption.	a. Export, inter-island, and land transportation records. b. Dept. of Agriculture (DOA) production statistics. c. Benchmark and evaluation surveys.	a. Conditions of political stability will continue. b. Population growth will not surpass production increases. c. All production increases not absorbed by increased local consumption. d. Markets exist for Luwu's surplus production. e. Transportation/marketing system capable of moving rapidly increasing marketable surpluses from production to deficit areas.
B.1. Project Purposes a. Increase in agricultural productivity.	2. Condition Indicating Achievement - End of Project Status a. Agricultural productivity. (1) Increase of 19,200 ha of rice and 15,000 ha of non-rice food crops harvested per year. (2) Projections met for utilization of more advanced crop production technology (e.g. irrigation, double cropping, fertilizer, HYV's)	3. Means of Verification a. Agricultural Productivity. (1) DGWRD & DOA statistics. (2) Observation of techniques.	4. Assumptions for Achieving Purpose a. Agricultural Productivity (1) Input/output price relationships that provide small farmers incentives to use more advanced production technology. (2) Transmigration program provides labor to utilize irrigation works.

			(3) Favorable land tenure situation. (4) Appropriate crop production technology extended to combat plant pests. (5) Effective water management in irrigation projects.
b. Well-being of Rural Poor (1) Increased incomes (2) Increased employment opportunities.	b. Well-being of Rural Poor (1) A 65% increase ($134 per year in farm income of farm families. (2) Increased employment opportunities of: a. 34,200 jobs per year in agr'l production. b. 26,500 man years in the construction of sub-projects.	b. Well-being of Rural Poor (1) Evaluation program which monitors income and consumption, marketing/transportation costs, employment, etc.	b. Well-being of Rural Poor (1) Reduced transportation and marketing costs make Luwu's production more competetive. (2) GOI does not pre-empt domestic farmer's increasing production by importing large amounts of rice. (3) No inhibiting market forces. (4) Average size of farm is maintained. (5) Projects carried out in labor intensive way.
c. Institution Building	c. Institution Building (1) Increased inter-ministerial coordination in planning, budgeting and implementing rural development project. (2) Establishment of Project Office.	c. Institution Building (1) Observation of future Luwu development activities, and similar rural development projects in other areas.	c. Institution Building (1) Adequate number of technical personnel available to implement Project. (2) Various agencies have motivation to coordinate their activities.

(3) Evaluation program functioning as integral part of Project execution and planning future development activities.

C.1. Outputs a. Construction of Bone-Bone and Kalaena Irrigation systems. b. Four farm service centers organized, built and functioning. c. Increased utilization of more advanced crop production technology. d. Palopo-Malili trunk road improved. e. Proven road/irrigation maintenance capability. f. Project Office functioning with personnel trained in areas of integrated project planning, management and evaluation. g. Systematic evaluation of project's progress and socio-economic impact.	2. Magnitude of Outputs a. 176 km of trunk road upgrade in three years. b. 10,760 ha producing irrigated crops. c. Work plan budget for road maintenance . d. Work plan budget for irrigation maintenance. e. Farm service centers operating according to work plans. f. Extension workers assigned directly to farm service centers and to Kecamatan Bone-Bone, Wotu and Mangkutana.	3. Means of Verification a. On site inspection. b. DGWRD & Bina Marga reports. c. Contractor records. d. DGWRD & Bina Marga Maintenance work-plans. e. DGWRD & Bina Marga budgets. f. Number of technology introductions. g. Training records.	4. Assumptions for Achieving Outputs a. adequate contractor capability available for construction works. b. Access to Luwu is not a serious problem for logistical support and communication. c. Adequate financing provided for road and irrigation O and M activities. d. Project Office and evaluation program are staffed by trained and dedicated people.
D.1. Inputs a. Equipment, Indonesian contractors, and man-power for construction works.	2. Implementation Target See Annex tables for detailed breakdown of inputs by quantity, cost, implementing agency, AID financing category, source of financing and time phasing.	3. Means of Verification a. Fixed Amount Reimbursement, GOI contribution, and Farmer contribution. Project Office and evaluation program reports.	4. Assumption for Providing Inputs. a. Appropriate, realistic organization, implementation and budget plans are developed. b. GOI makes budget provisions and provides its inputs on a timely basis.

b. Indonesian technicians to:
   (1) form water user associations.
   (2) carry out extension work.
   (3) undertake systematic evaluation program.
c. Training in rural development and program management.
d. Advisors and consultants.

INDONESIA - LUWU AGRICULTURAL DEVELOPMENT PROJECT

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

I, Richard M. Cashin, the principal officer of the Agency for International Development in Indonesia, having taken into account among other things:

the experience of the Government of Indonesia in association with multilateral and bilateral donors, including AID, in implementing programs directed to the construction, rehabilitation, operation and maintenance of roads, irrigation systems and rural extension centers;

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

do hereby certify that in my judgment Indonesia has the financial and human resources capability to implement, maintain and utilize effectively the Luwu Agricultural Development Project. This judgment is based on the following:

1. The Government of Indonesia will agree to the obligations to be included in the authorization for subject capital assistance project; and

2. Adequate planning for project implementation and sufficient financial support for timely and effective execution will be provided if the Government of Indonesia complies with the program set forth in the Project Paper.

R. M. Cashin

Richard M. Cashin
Director, USAID Indonesia

5/8/75

Date

LOAN AUTHORIZATION

A.I.D. Loan No.: _____

Provided under: Sec. 103: Food and Nutrition

For: Indonesia: Luwu Agricultural 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 fifteen million United States dollars ($15,000,000) to assist in financing the United States dollar and local currency costs of an agricultural development project for Kabupaten Luwu 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

Mr. Richard M. Cashin, Director
U. S. Agency for International Development
c/o American Embassy
Jl. Medan Merdeka Selatan 3
Jakarta

Dear Mr. Cashin:

The Government of Indonesia requests from the Government of the United States a loan of up to FOURTEEN MILLION NINE HUNDRED THOUSAND UNITED STATES DOLLARS ($14,900,000) for the purposes and subject to the provisions hereinafter stated.

The primary purpose of the loan is to assist the Government with the implementation of the Luwu Agricultural Development Project. The purpose of this Project is to improve the well being of existing small farmers and transmigrants in Kabupaten Luwu, South Sulawesi. The Project consists of a package of development activities designed to increase agricultural productivity in the Luwu area and to facilitate the movement of marketable surpluses to nearby food deficit areas. The specific subprojects included in the Project are: (i) upgrading the main trunk road through Kabupaten Luwu from Palopo to Malili; (ii) rehabilitation and extension of the Bone-Bone and Kalaena irrigation systems including tertiary/quaternary canal construction and associated land clearing; (iii) establishment of four pilot Farm Service Centers, each of which is to be composed of a Rural Extension Center and a Farmer Association (agro-business) Complex; (iv) an annual evaluation program to

assess the impact of the package and its individual components; (v) a transmigration program for Kabupaten Luwu which would transfer 3,500 families to farm the newly irrigated areas over a four-year period; and (vi) the creation of an effective Project Organization supported by short-term training and foreign technical assistance to coordinate the execution of the Project among the Departments concerned. These include Bina Marga and the Directorate General of Water Resources Development, in the Department of Public Works; the Agency for Agriculture, Education, Training and Extension in the Department of Agriculture; and the Directorate General of Transmigration, in the Department of Manpower, Transmigration and Cooperatives.

The estimated total cost of the Luwu Agricultural Development Project is $42.8 million. Of this amount, approximately $3.6 million represents foreign exchange goods and services to be financed by AID. Specific foreign exchange items include: steel for the betterment of the Palopo-Malili road; construction equipment for digging tertiary and quaternary canals and to establish an operations and maintenance program associated with the Bone-Bone and Kalaena irrigation systems; operational equipment for the Farm Service Centers; international training; and foreign advisory services in the form of an irrigation construction expert, an irrigation O&M expert, a consultant for the transmigration program

in Luwu, an advisor for the Project Organization, and 24 man-months of additional advisory services as required for execution of the entire Project. The remaining $39.2 million represents local currency costs which will be budgeted by the Government of Indonesia in the first instance. AID will later reimburse the Government a mutually agreed upon percentage of the predetermined eligible local costs of the following activities: betterment of the Palopo-Malili road; rehabilitation and extension of the Bone-Bone and Kalsena irrigation systems down to the tertiary and quaternary networks; land clearing operations; construction of the Farm Service Centers and associated staff training; in-country training for the staff of the Project Organization; and the evaluation program. AID reimbursement for these subprojects will not exceed $11.3 million dollars.

The Government gives very high priority to the objective of the advancement of agriculture in Indonesia, to decreasing Indonesia's dependence on imports, and to eventually becoming self-sufficient in rice production. In the agriculture and irrigation sector itself, income growth, employment creation and income redistribution are the basic objectives for Repelita II. It is felt that the Luwu Agricultural Development Project will make a significant contribution to achieving these objectives.

Other sources of financing for this project are not available to the Government of Indonesia at present nor anticipated in the future. Funds available from other donor countries have been allocated or are planned to be allocated to other priority projects within the framework of Repelita II.

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

Sincerely,

J. B. Sumarlin
Vice Chairman
National Development Planning Agency
BAPPENAS

ENVIRONMENTAL IMPACT STATEMENT

Luwu Agricultural Development

Description of Project

The Luwu Agricultural Development Project (LADP) includes five separate activities, each having its own purpose but all of which are closely interrelated. The specific subprojects comprising the LADP include: (i) upgrading the main trunk road through Kabupaten Luwu from Palopo to Malili; (ii) rehabilitation and extension of, and establishment of an operation and maintenance program, for the Bone-Bone and Kalaena irrigation systems, which border the Palopo-Malili road; (iii) clearing of 7,420 hectares of land associated with the irrigation systems; (iv) establishment of four pilot Farm Service Centers serving, but not limited to, the proposed irrigation schemes; (v) creation of a project organization supported by short-term training and foreign technical assistance along with an annual evaluation to assess the impact of the package and its individual components and point towards follow-on activities; and (vi) a transmigration program to transfer 3,550 families to farm the newly irrigated areas over a four-year period.

These subprojects are complementary and their execution as a package will intensify the total Project's impact upon the sector goal, which is to improve the well-being of small farmers in the Project area (and in other select outer-island areas by implication of the LADP's institution-building features) by raising agricultural productivity sufficiently to increase both per capita consumption and movement of marketable surpluses to nearby food deficit areas.

The estimated cost of the Luwu Agricultural Development Project is $42.9 million. Of this amount, $3.7 million (9%) is foreign exchange and $39.2 million (91%) is local currency. The costs associated with individual subprojects are as follows: the Luwu irrigation rehabilitation and extension program (including O&M and land clearing) - $11.5 million; the farm service centers - $2.6 million; the road betterment subproject - $25 million; the transmigration program - $2.4 million; and the organization, technical assistance, training and evaluation programs - $1.3 million.

It is proposed that AID finance $15.0 million or 35% of total Luwu Agricultural Development Project costs. Included in this amount are all foreign exchange requirements for the Project ($3.7 million) and $11.3 million in local currency (or 29% of total local costs). The foreign exchange element would be financed using traditional direct procurement while the local currency requirements would be financed

by means of Fixed Amount Reimbursement (FAR). Broken down by subproject, AID would finance $4.8 million (or 42%) of the Luwu irrigation program; $1.1 million (or 45%) of the farm service center activity; $8.2 million (or 33%) of the road betterment subproject; $.3 million (or 11%) of the transmigration program; and $.6 million (or 42%) of the project management costs.

The environmental effects of the above subprojects, along with programs to deal with the potentially negative effects, are discussed below.

A. Environmental Impact of the Luwu Irrigation Program

An integral component of the Luwu Agricultural Development Project is the rehabilitation and extension of the Bone-Bone and Kalaena irrigation systems, which together will service 10,760 hectares of net irrigable area in the north Luwu plain. In addition to financing costs associated with the actual physical construction work involved, the Loan includes provision for an irrigation operations and maintenance program and land clearing for 7,420 hectares of forests lying on the irrigation systems. The Government of the Netherlands is also involved with the irrigation program with its provision of technical expertise for the design of the entire Luwu irrigation sector (to include the design of settlements to accommodate transmigrants), beginning with the Bone-Bone and Kalaena schemes.

A major environmental change will result from clearing the 7,420 hectares of mostly virgin forest. The predominant types of forests to be cleared include: (1) equatorial rain forests with medium- to large sized trees and little underbrush; (2) wet/swampy forests with erratic drainage, dense small- to medium-sized trees, and thick underbrush; (3) dense jungle land with heavy underbrush and small trees, with some grassland patches; (4) some savanna grassland with alang-alang; and (5) other swampy forests with nipah and mangrove-type vegetation. (It should be noted that cleared land rapidly begins to return to its jungle state. Abandoned land quickly develops a thick vegetation cover which minimizes potentially adverse effects from flooding and reduces erosion.) The effect on wildlife inhabiting the land to be cleared has not been evaluated, but there are no known endangered species affected. The area to be cleared is only a small percentage of the total jungle area in Sulawesi so that substantial land area will still remain for native flora and fauna.

There are several potentially negative environmental effects that will result from the land clearing and subsequent conversion to agricultural use: A new ecosystem will be produced with corresponding changes in flora and fauna; physical changes will result with

potential effects on erosion, flooding, or other water-related problems, and soil changes; pesticide and sanitation-related problems; and the resulting health and social impact on the human population in the area caused by the above changes. These effects are discussed below:

1. Physical Aspects of Irrigation Program

Bone-Bone Irrigation System. The Bone-Bone irrigation system encompasses about 5,000 hectares of land which varies in topography from undulating foothill areas in the north to quite flat plains only a few feet above sea level in the south. The canals are steep in the upper areas, constructed in erodable soils, and carry a bedload with a high mica content. The soils are reasonably fertile, and as the erosion problems are solved within the system by the work planned under rehabilitation, it is unlikely that mica-laden sediments will be a serious problem.

The irrigation subproject is essentially one of rehabilitation and betterment. Betterment construction consists of protecting canals and structures from erosion, providing some additional control structures and a complete tertiary and quaternary system, with adequate access and inspection roads and bridges. The system will be extended to permit irrigation on about 3,200 hectares.

Kalaena Irrigation System. The Kalaena irrigation system encompasses about 30,000 hectares of land extending from the foothills near Laimbo southward for some twenty kilometers to low coastal plains below Wotu. Of the 30,000 hectares gross area, 10,000 hectares of irrigable area are on the left bank. This area is not in the present GOI plans for Kalaena irrigation system development. Of the 20,000 gross hectares under the right bank system, 12,500 hectares are irrigable. GOI plans are to develop at the present time 7,560 hectares of this area closest to the headworks by rehabilitating and extending the existing system. U.S. loan financing has been requested to assist with the rehabilitation and extension construction and agricultural development aspects.

Similar to the Bone-Bone network, the Kalaena irrigation project is one of rehabilitation, betterment and extension. The gabion diversion structure will be repaired, improved in section and extended across the Kalaena River. Headgates and sluice gates will be repaired or replaced. The quantity of flow into the main canal will be controlled by a method compatible with the extreme fluctuations of the river stages.

Climatology, hydrology, soils and water quality have been examined and found to be satisfactory for the irrigation projects, with no

significant negative environmental effects. Annexes Nos. 1-2, 3, 4, and 5 of the Project Paper give details on these studies.

The plans and designs for the subprojects are directed towards eliminating erosion and sedimentation and effecting control of water. Borrow areas of significant magnitude will receive care in location, pattern, and geometry. The program emphasizes clean-up and betterment. However, certain safeguards have been built into this project which will serve to monitor any unforeseen adverse effects on the physical environment. These safeguards follow:

a. All plans, specifications and construction schedules related to the project will be submitted to USAID for approval prior to their implementation (Loan Covenant). This will allow an examination of the potential negative environmental effects and introduction of protective measures to reduce ultimate damage.

b. Quarterly meetings of inter-Ministerial bodies at the national, provincial and subprovincial levels of government will be held with AID participation to the extent possible to discuss progress and problems. Any environmental problems discovered during early implementation can be discussed and action taken to resolve them at these meetings.

c. In addition to its usual monitoring program, AID is financing a comprehensive four-year evaluation program for the Luwu Agricultural Development Project which will include environmental assessments of the project.

2. Ecosystem Changes Resulting from the Irrigation Subprojects

The major environmental impact that will affect the human population in the project area will be ecosystem changes resulting from the land clearing and rehabilitation and extension of the two irrigation systems. The positive effects include improving the nutrition of the local people by allowing them to cultivate rice rather than Sagu (a staple food in Luwu which is very low in nutritional quality). The improved nutrition of the local populace should result in greater vigor and disease resistance. In addition, other food crops can be cultivated on the land when it is cleared for cultivation, and overall agricultural production should be increased significantly.

Impact on Health. The primary negative effect on the people from the ecosystem changes will be the possibility for increased pest and disease incidence. Malaria is already endemic to the area and this project is not expected to increase the incidence of the vector mosquitoes. Indeed, malaria incidence may actually decrease due to

drainage of mosquito-breeding areas resulting from the Project. (Malaria will be further discussed below under the transmigration section.) Other insect vectors, however, may increase as a result of the irrigation program.

The A. barbirostris mosquito, which is the vector for filariasis, commonly breeds in rice paddies. Converting the jungle area to rice land will expand the habitat of this mosquito. The result could be an increased incidence of filariasis, which is already common in Luwu.

Another disease existing in Sulawesi is schistosomiasis. It should be noted, however, that there is no known schistosomiasis in Kabupaten Luwu. The closest areas infected by schistosomiasis are in the highland areas of Central Sulawesi (Lake Lindu Valley) and they drain northward in an opposite direction from the Luwu irrigation systems. This area is 138 kilometers north and 70 kilometers west of the project area. Since the schistosomiasis vector snail favors currents of velocities less than those designed for good irrigation canal flow and since the project will drain existing swamps and increase water flow velocities so that they exceed the vector snail habitat, there is little chance that schistosomiasis will be a threat to Kabupaten Luwu and its present and future population.

Other parasites identified in Luwu and their incidence on Java are presented in the table below:

Parasites Prevalence per 100 Population, Indonesia**

	Luwu*	West Java	Central Java
Helminths			
Ascaris lumbricoides	88	90	85
Trichuris trichiura	82	91	91
Hookworm	59	67	52
Enterobus vermicularis	3	2	1
Hymenolepis diminuta	1	--	--
Strongyloides steracoli	--	1	--
Protozoa			
E. Histolytica	8	10	13
E. Hartmanni	2	2	4
E. Coli	19	40	36
Endolimax nana	6	10	6
Indamoeba butschilii	2	8	1
Giardia lambdia	2	5	2
Chilomastix mesnili	1	3	1
Malaria	19	2	--

*Extracted from "Intestinal Parasites and Malaria in Margolembo, Luwu Regency, South Sulawesi, Indonesia, Cross, J. H. et al. SE Asian J. Trop. Med. & Pub. Health, Vol. 3, p. 587-593, Dec. 1972

**Of 659 people sampled 97% had parasites, at least one, 80% had two or more, 60% had 3 or more.

The prevalence of these parasites is not expected to be increased by the implementation of the irrigation subproject.

In order to identify any other disease problems and combat those already known and expected to affect the project area, the following measures are being taken:

a. AID is assisting the Indonesian Government with a malaria control program which includes high priority areas on the outer islands of which Luwu is one. The incidence of malaria is already declining in the Luwu area. A $24,700,000 AID malaria control loan to Indonesia was recently signed which should further alleviate the malaria problem.

b. A one-time survey to check the parasite and disease problem in Luwu will be carried out by the Indonesian National Institute of Health. This survey will be completed before the end of 1975 to permit timely evaluation of the results.

c. The Department of Health will review irrigation plans to evaluate possible harmful effects on health.

d. $100,000 will be provided to the Ministry of Health from this loan over a three-year period to determine the health problems in the Project area and to develop an appropriate response.

e. A consultant financed by the Technical Assistance Bureau, AID/Washington, will conduct a short-term study (about two weeks) to review plans and study the extent of the filariasis problem in the Project area prior to project implementation. This consultant will recommend field studies necessary to further define and control filariasis in Luwu. Based on these recommendations, it is expected that a filariasis control project will be developed for the Luwu Project area.

In addition to the health impact caused by the diseases above, there may also be adverse effects associated with pesticide use in the newly irrigated areas and possible sanitation-related problems. Therefore, a training program is planned which is to include health, sanitation measures and pesticide control related to irrigation operations. The training is to be directed especially toward making the local population on the Project aware of health and sanitary situations within an environment created or associated with irrigated agriculture. Officials of the Project and extension agents for the Project farmers would be given the training so that both physical aspects of Project

operations and the farmer recipients and others concerned have proper consideration. This training will be financed out of the Loan.

3. Socio-Cultural Aspects of Irrigation Subprojects

The irrigation subprojects per se are not expected to have any negative socio-cultural impact. Only unpopulated areas will be cleared, and refurbishing the existing irrigation system should not cause right-of-way hardships for the indigenous populace of the area. The opportunities for economic progress available to the populace after the irrigation subproject is completed will be the primary positive social benefit. There will be a substantial reduction in the seasonality of both agricultural labor opportunities and pecuniary income flows. The current practice of many people in Luwu is to produce food crops during the rainy season. The purpose is for family consumption and monetary incomes are low. During the dry season, off-farm income-generating activities are undertaken. Employment in mining, logging, plywood processing, and in the area's market towns is common. Individuals work in the forest harvesting rattan and collecting resins. The irrigation subproject will allow production of income-generating marketable surpluses of food crops on a year-round basis. The social impact of increased population in the area is discussed below under the transmigration section.

B. The Environmental Impact of the Road Subproject

This subproject will consist of the construction of 176 kilometers of road, 79 bridges, and 4,224 linear meters of culvert drainage structures located along an existing alignment between the towns of Palopo, Masamba, Wotu, Tarengge and Malili. The road to be constructed will result in the improvement of an existing road which generally follows along the upper reaches of the Luwu plain located north of the Bay of Bone and south of the foothills of the mountain chain to the north in Luwu Kabupaten. The existing road alignment is evaluated as fair to good and grades are generally flat to rolling and less than 8%. About 50% of the road will need raising an average 50 centimeters between Palopo and Tarengge and about one meter for 30% of the Tarengge-Malili section. The existing road is from 5-6 meters wide, including shoulders, and surfacing consists of cobblestones in rough condition with driving time by jeep between Palopo and Wotu (127 kms.) more than five hours. The section between Tarengge and Malili is unsurfaced earth road except for the last six kilometers and is impassable even by jeep during wet weather. Of the 104 existing bridges 77 will need replacement and two new steel truss bridges will replace canoe ferries presently used for river crossings between Tarengge and Malili. All existing culverts are undersized and in deteriorated condition and will be replaced with new structures.

Although the Palopo-Malili road is an existing access for land travel through the potentially surplus food production area of the north Luwu plain, the effect of improving this route will be to change a barely accessible area into one which will be accessible to multiple use for encouraging both social and commercial development. Primarily, the improved route will furnish a backbone or trunk road which will serve as a route for transporting the agricultural produce of the area to present food deficit areas and port market areas of Palopo and Malili, Since there will be no change in alignment of the road, which has been in existence for more than 35 years, there should be no sudden disruption of wildlife migration routes or other detrimental effect on wildlife of the area. There are no new structures planned which would change land use patters, other than provide improved access for increased commercial and economic development as discussed under the irrigation phase of the project, and there would be no changes to navigable waterways, lakes or streams, as a result to the improved route. Since the old existing alignment is to be left unchanged there will be no destruction of existing historic, religious, archeological sites or natural landmarks which should be preserved. Thus, the principal environmental effects of the improved land route will be the benefits directly related to social and economic improvement of the area due to improved access for residents and commercial transport.

1. Physical Aspects.

Since construction materials for building the road, i.e., gravels and sands, abound in plentiful supply in the many river and stream crossings, there should be no necessity to create pit areas to mine these materials. Although some pits will be excavated to obtain select soils for raising the road to effect better drainage it is not expected that obtaining such borrow will change drainage patterns or uses of the land in the area. Provisions are planned to remove borrow from selected locations along the foothills where only the slopes will be changed and topsoils replaced.

In this relatively remote area the effects of air pollution from dust and fuel consumption of construction operations will be minimal and the improved all-weather road surface to be constructed will result in an environmental benefit from reduced dust pollution as traffic increases on the new road. The air pollution resulting from increased fuel consumption of newly generated traffic will be more than offset along the rural highway by a decrease in dust pollution due to constructinga new asphalt road surface.

2. Socio-Cultural Aspects.

The potential for strip or squatter encroachment along the road will be enhanced since improved access will generate increased traffic and the influx of greater consumer demand along the road. This problem is inherent to Indonesia and should be minimized by local governments by diverting such development to the employment benefits resulting from agriculture and other commercial development to be realized in a presently labor deficit area.

There will be no dislocation of population due to the need for minor realignment and widened right-of-way. The slight widening or changes in rights-of-way along the existing right-of-way will result in some cases where the road needs raising to provide adequate drainage and minor shifting of centerline will be designed to minimize excessive excavation or fill work. These minor realignment changes are not expected to result in appreciable reduction of farm land availability or land use patterns.

The effect on the existing populace by providing improved access to previously barely accessible land will result in multi-benefits such as access to markets for agricultural produce raised, improved drainage along the road and improved land values served by the road, better access to farm service centers as planned for the project, access to schools and health clinics to be constructed where such facilities are presently

inadequate, and closer social ties in general due to the improved communications and job opportunities which will result from the economic development of the area.

Public Health Aspects.

Since this road is a rural development road there are no outstanding requirements for consideration of other than simple traffic control provisions and safety features such as guard rails around the more dangerous curves, appropriate conventional signing and marking, and the design of safe sight distances and curve radii. The location of this road along low-lying and gently rolling terrain in general minimized the more dangerous geometrical features. Increased traffic will increase the potential for carrying human, animal and plant disease vectors which are discussed in detail under the irrigation section of this paper.

In conclusion, the assessment of environmental impact of the road indicates the project to be environmentally sound, with benefits in excess of detrimental environmental impacts, and no significant uncontrollable adverse effect. However, the safeguards discussed in the Irrigation section (approval of plans, quarterly meetings, monitoring and evaluation programs) will also apply to this section and will serve to furtherguarantee against adverse environmental effects.

C. The Environmental Impact of the Farm Service Centers

The Farm Service Center concept was conceived specifically for the Luwu Agricultural Development Project (1) to provide special agro-education and agro-business programs for transmigrant and indigenous subsistence farmers and (2) to encourage more rapid implementation of improved cultural practices, disease-resistant seed varieties, and production technology which would translate into more rapid economic development of the Luwu area. Consequently, it is expected that the introduction of these facilities to the Project area will substantially increase the benefits to be derived from all other components of the agricultural development package.

There is no question that Luwu has significant potential for production expansion. However, as this production capability is developed, and increased productivity realized, greater pressure will be placed upon the existing education, research, and marketing systems. As farmers in the Luwu area shift from a subsistence to a surplus-producing, commercial agriculture, the need for improved rural educational and marketing institutions will be great.

Four Farm Service Centers will be constructed in Kabupaten Luwu and would be designed to attack the problems illustrated above. Each Farm Service Center will consist of a Rural Extension Center and a Farmer Association Complex

, and will serve an extremely beneficial role in developing the full potential of the Luwu production area. The Rural Extension Centers will be government facilities serving farmer education needs, while the Farmer Association Complexes will be semi-autonomous organizations serving the cooperative milling, storage, and marketing functions demanded by the developing Luwu economy. Both units are viewed as innovative for Indonesia and pilot in nature with potential for emulation in other locations in Luwa and in other select outer-island areas.

The Farm Service Centers will maintain strong ties with the University of Hasanuddin at the Provincial Capital of Ujung Pandang (through the Provincial Agriculture Office,, the Bogor Institute of Agriculture (through the Department of Agriculture), the provate business sector, and other technical agencies and organizations that are necessary to enhance and promote the Center's programs.

The Ministry of Agriculture will provide technical expertise for the design and layout of the Farm Service Centers. Two architects have been assigned to the Agency for Agriculture Education, Training and Extension to perform similar tasks under an IBRD loan for rehabilitating and constructing 150 Rural Extnnsion Centers throughout Indonesia. These architects will furnish designs and layouts for the Farm Service Centers in Luwu while the Provincial Public Works Department will be responsible for site plans and modifications. Site selection and preparation, architectural and engineering plans, designs, and layouts will be completed during the first six (6) months of LADP operations. No problems or constraints are anticipated in designing these Centers.

There are no significant negative environmental effects expected from building these centers. However, the same safeguards discussed under Sections A and B will apply to this subproject.

D. Environmental Impact of the Transmigration Program

The purpose of transmigration in Indonesia is to reduce population pressures in the overcrowded core islands (Java, Bali, Madura, and Lombok) and to aid in the development of the outer islands. The recent transmigration experience in Luwu began in GOI FY 1969/70 at which time 500 families from Java and Bali were settled into Kecamatan Bone-Bone. During the next four fiscal years, 3,500 additional families were settled into Kecamatans Bone-Bone, Mangkutana and Wotu. Additionally, in GOI FY 1973/74, there were 500 "spontaneous" transmigrant families. Therefore, over the first five-year development plan, Pelita I, a total of 4,500 families transferred to Kabupatan Luwu. During GOI FY 1974/75, 900

more families were settled into Luwu. There has been an extremely low attrition rate of families returning to their former localities (less than 2%).

Transmigrants sponsored by the government in Luwu, as elsewhere, are given assistance in the form of basic farming tools, food and clothing for a period of 1 1/2 years. In addition to this, the GOI provides the settlers with housing and two hectares of land, one of which is cleared as described earlier. Some public infrastructure such as village roads, schools, churches, village halls and health facilities are also included. The settlers receive a certificate of land overship within several years of their arrival upon demonstration of their ability and willingness to work on the land they have been given.

During Repelita I, three transmigrant villages were established in the Bone-Bone irrigation subproject area covering some 2100 hectares with 700 settlers' families. Approximately 500 hectares of land are still available in the lower reaches of the system for the relocation of 250 families. The remaining lands are presently occupied by indigenous farmers and settlers transferred during the Dutch colonial era.

Almost all of the Kalaena project area has been given to the Directorate General for Transmigration for settlement. Since the beginning of the recent transmigration program in Luwu (1969/70) approximately 1400 families have been relocated on some 4400 hectares. (It should be noted that 4000 hectares of this land and 1200 families are situated in those sections of the Kalaena irrigation system which are being proposed for rehabilitation and extension.) After allowing for indigenous farmers and transmigrants from the Dutch period, an estimated 3300 additional transmigrant families will be required to farm the remaining hectarage in the subproject area.

The 3550 families necessary to meet the manpower requirements on the two irrigation subprojects should be transferred to Kabupatan Luwu over the next four project years at the rate of 700, 1100, 1400 and 350 families per year. As mentioned earlier in this paper, the Dutch irrigation design group will assume responsibility for the layout of all transmigrant settlement within the Luwu irrigation sector. This will assure efficient land use within the Bone-Bone and Kalaena irrigation subproject.

Aside from the settlement of the two irrigation systems described above the Directorate General for Transmigration has an overall target of 20,000 families for the Kabupaten of Luwu over the second five-year plan. Settlement areas being considered include the left bank of the Kalaena River and other future irrigation

systems as they develop (as Sabbang and Masamba).

1. Physical Aspects

The negative physical impact on the environment resulting from moving the 3,500 transmigrant families is expected to be minimal. The present population in the North Luwu Project area is about 233,400. The average population density in Luwu is only 12 persons per sq. Km. This compares with 600 in Java and 80 for the whole province of South Sulawesi.

There are, however, several potential problems facing the transmigrants as well as the indigenous rural population already in Luwu. The extremely poor condition of the physical infrastructure is a major obstacle to the small farmer in Luwu. Roads and bridges, where existing, are inadequate and unsafe, thus making the physical transportation aspects of marketing the farmers' crops a major problems. The sheer difficulty of getting their goods to the market often discourages the farmers from expanding their output or improving its quality.

Small farmers in Luwu also have not had much introduction to or experience with modern agricultural technology. In the past, the allocation of agricultural extension workers in Indonesia has favored the heavily populated, major agricultural production areas (i.e., the central islands), thereby ignoring the potential of select outer island areas and the small farmers operating there at subsistance levels. Existing conditions for increasing agricultural productivity are clearly unfavorable. For example, there are very few government agricultural extension workers in Luwu; less than 10% of the hectares planted to rice utilize either high yielding varieties or fertilizer; although Tunggro disease resistant varieties of rice are available they are not used in most of Luwu's widespread Tunggro infected areas; and rodents destroy a significant percentage of harvested grains although rodent control programs could lessen the damage appreciably.

Another problem facing small producers in Luwu has been the inability to get together with neighboring farmers to establish a cooperative effort which will provide them with more information concerning market prices for their produce; improve their bargaining position to obtain a higher price for their products; assist them in obtaining the means of production at a lower price; and establish processing and storage facilities that will bring them more cash income for what they sell.

Inadequate water management and the absence of irrigation and drainage facilities for most areas in Kabupaten Luwu have not been viewed as the critical constraint to increasing small farmer income in the past; the reason being that even if properly operating irrigation systems had existed, the poor conditions on the

road and bridge transport network, the inaccessability of improved agricultural technology, and the inadequate marketing institutions would have discouraged farmers from producing much more than they could consume. However, with the planned improvements in the physical transport infrastructure, the introduction of advanced agricultural technology and the development of marketing institutions, it is expected that the construction and rehabilitation of irrigation facilities will appreciably increase the real income of small farmers in Luwu.

2. Social Impact

The principal criteria for selecting transmigrants from Java, Bali, Madura and Lombok include: farmers or individuals with special skills; individuals with no connection to the communist party; married couples with no more than 2 children; heads of household between the ages of 16-45; family members, in good health, no younger than six months or older than 60 years; wives who are no more than three months pregnant; religious affiliation; good character; and clearances from local government authorities. These selection criteria are broad enough to allow a cross-section of the society to transmigrate should they choose to do so, and emphasize the selection of useful, productive, law-abiding individuals who will be able to best adjust to the new environment with a minimum of disruption to the indigeneous population,

The cultural groups migrating from Java, Bali,Madura,and Lombok differ from the predominant groups present in Luwu (i.e., the Buginese and the Torajanese). In the past this has not created any problems. The social impact of the transmigration program seems to have been one of creating integrated multi-ethnic groups rather than factionalized communities as some have feared. In Luwu transmigrants are generally readily accepted by the indigenous people. The local farmers know that transmigrants bring new seeds and crop production techniques, as well as the physical infrastructure programs associated with the national transmigration programs. The transmigrants find themselves in a strange land and willingly accept advice from local farmers concerning planting seasons, cropping patterns, and marketing and employment conditions. A good example of how well the two groups get along is a transmigrant village which has been in Luwu for 10 months. Already there have been more than 20 marriages between transmigrants and local people.

No significant negative social impact is therefore expected from introducing new transmigrants into the project area.

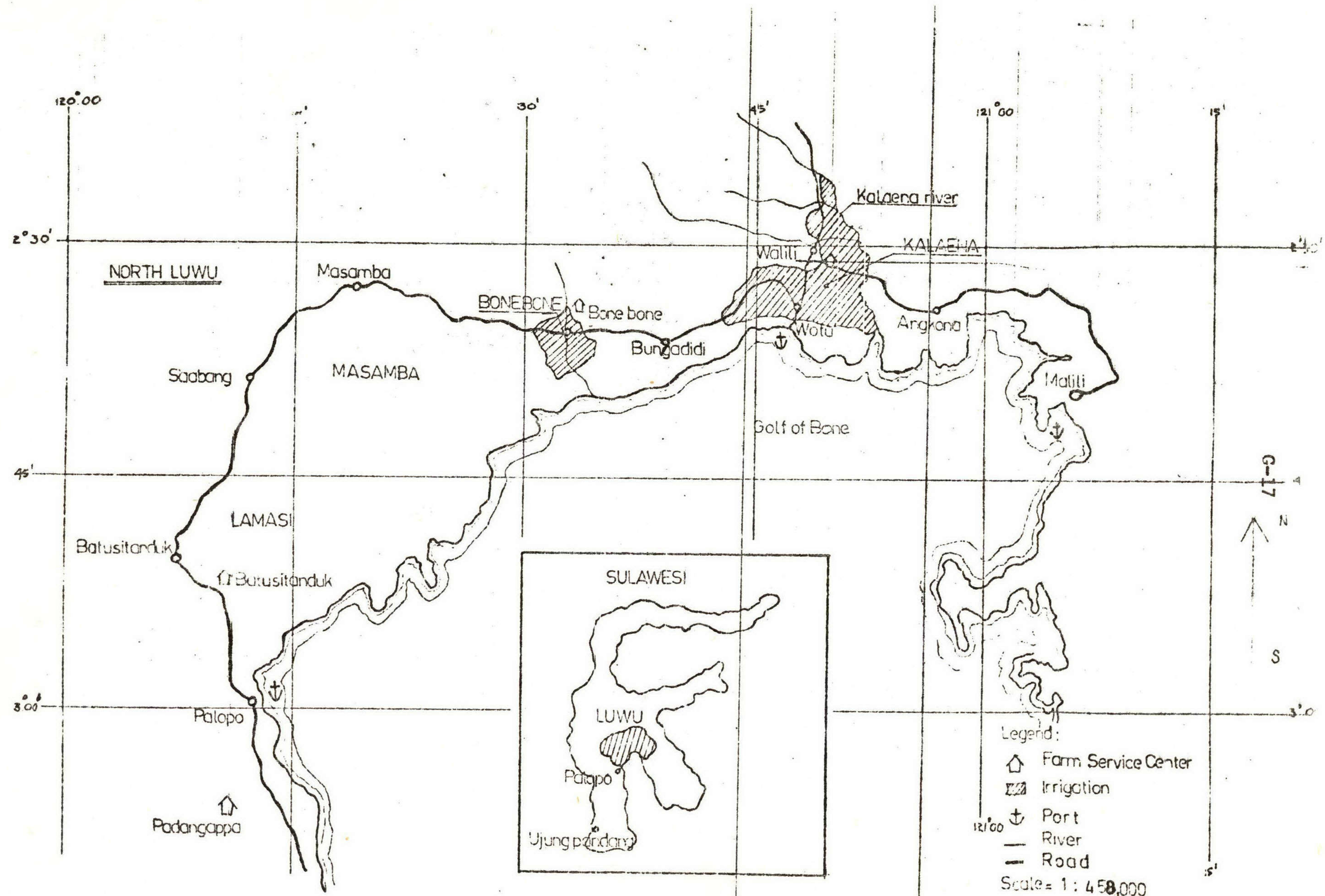
3. Health Impact

The major negative environmental effect of the transmigration program is expected to be in the health area. As discussed under

the Irrigation section, filariasis and malaria are problems in the Project area. Moreover, most of the transmigrants will be coming from areas that are relatively free of malaria and they are thus especially vulnerable. However, it is expected that the health measures discussed in the Irrigation section will substantially alleviate the problem. It has also been noted above that the incidence of malaria has already been observed to be decreasing in Luwu. The filariasis problem will be attacked when the consultant mentioned in 2(e) above develops his recommendations.

Conclusion

In conclusion, this assessment of the environmental impact of the Luwu Agricultural Development Program indicates that there are no uncontrollable adverse effects resulting from the Program and that benefits exceed the detrimental environmental results.



120°00
30'
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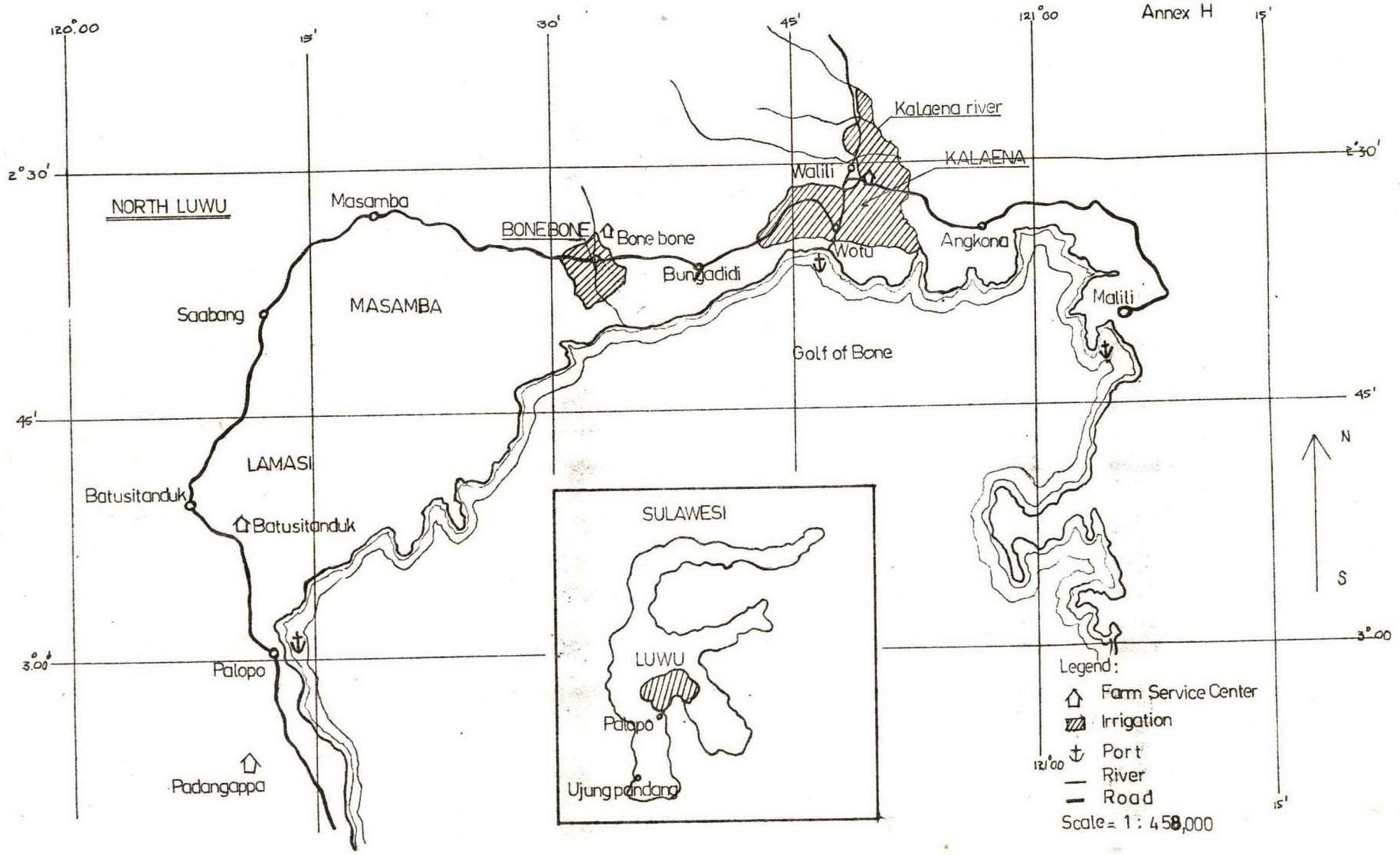
NORTH LUWU
Masamba
BONEBONE
Bone bone
Bungadidi
Kalaena river
Walili
KALAEHA
Wotu
Angkona
Malili
Saabang
MASAMBA
Golf of Bone
LAMASI
Batusitanduk
Batusitanduk
Palopo
Padangappa
SULAWESI
LUWU
Palopo
Ujung pandang
N
S
Legend:
Farm Service Center
Irrigation
Port
River
Road
Scale = 1 : 458,000

G-17

Annex H


120°00
15'
30'
45'
121°00
15'
2°30'
45'
3°00'
Kalaena river
KALAENA
Walili
NORTH LUWU
Masamba
BONEBONE
Bone bone
Wotu
Angkona
Bungadidi
Malili
Saabang
MASAMBA
Golf of Bone
LAMASI
Batusitanduk
Batusitanduk
Palopo
Padangappa
SULAWESI
LUWU
Palopo
Ujung pandang
N
S
Legend:
Farm Service Center
Irrigation
Port
River
Road
Scale = 1 : 458,000

ROAD LOCATION MAP

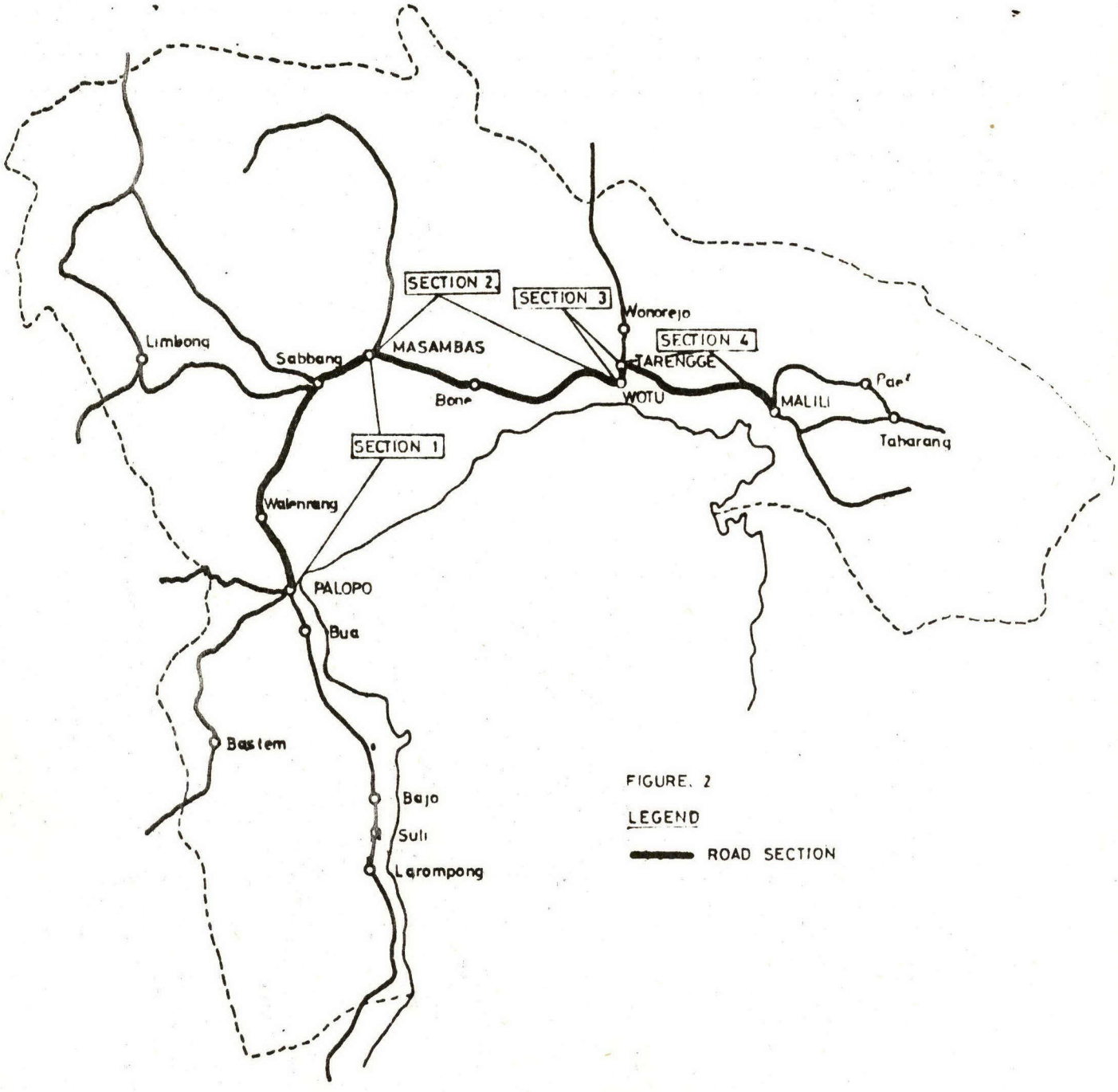
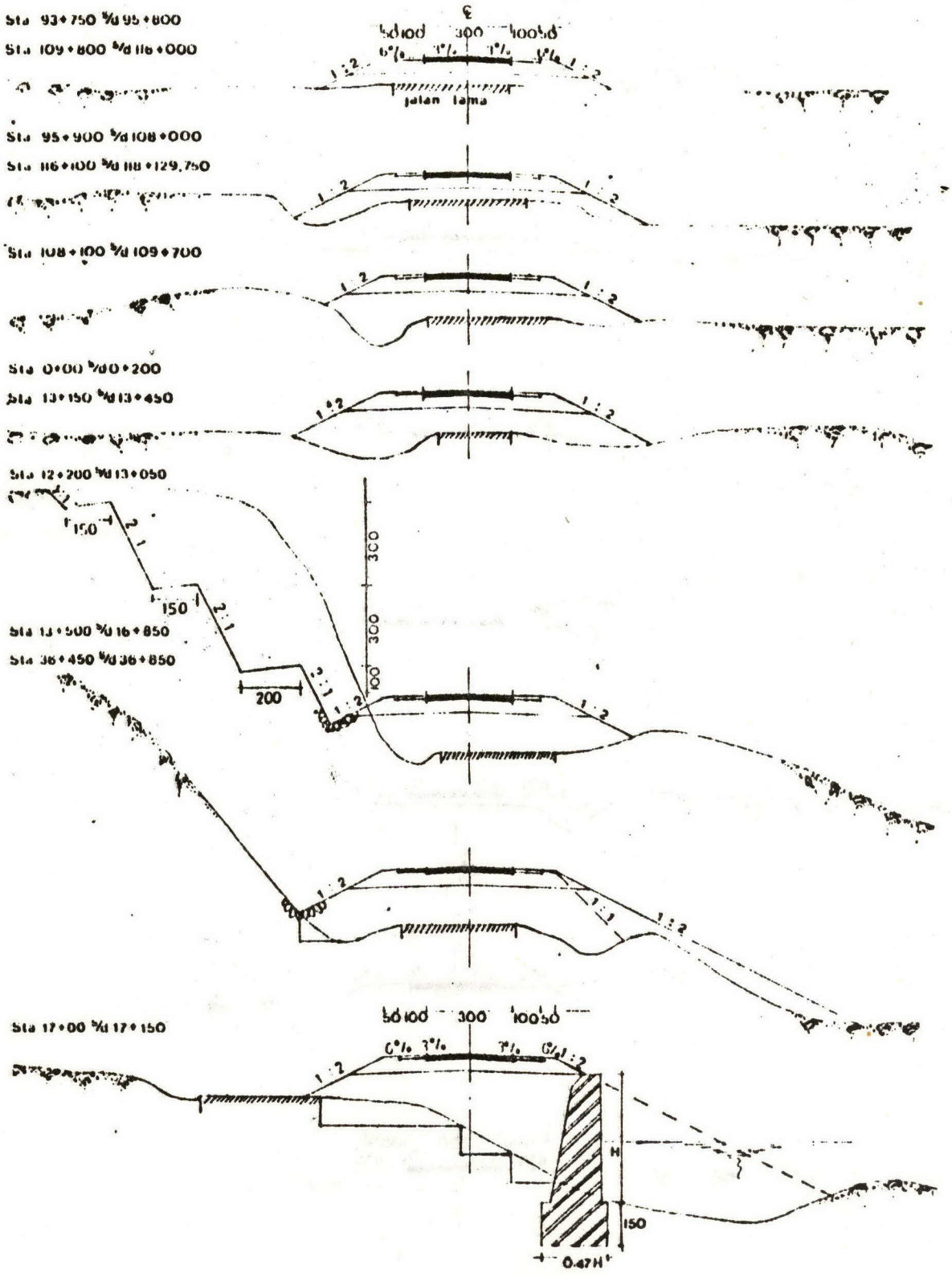


FIGURE. 2

TYPICAL CROSS SECTION
skala - 1:200

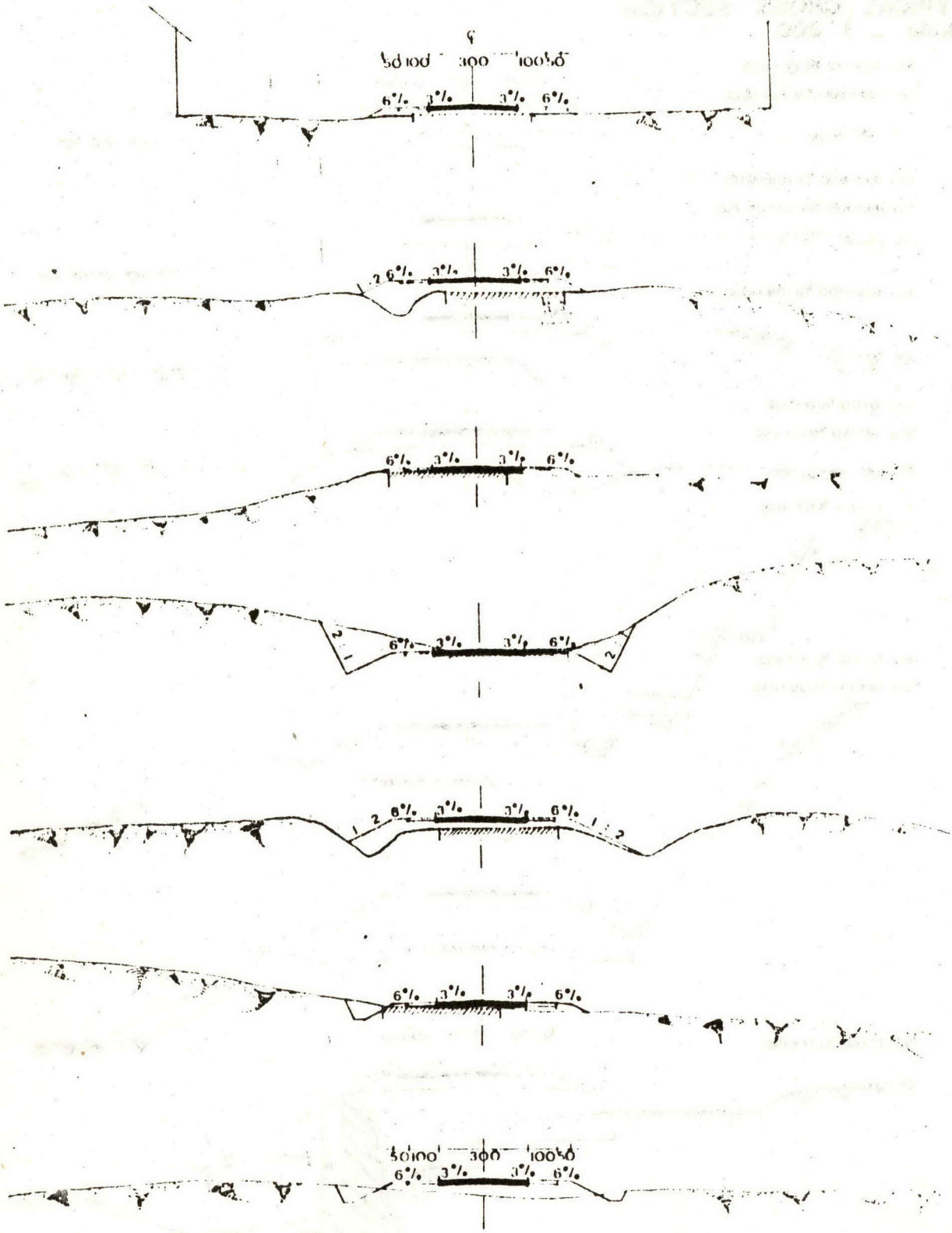


LINK : BONE - BONE - TARENGGE - MALILI

Figure 1.a

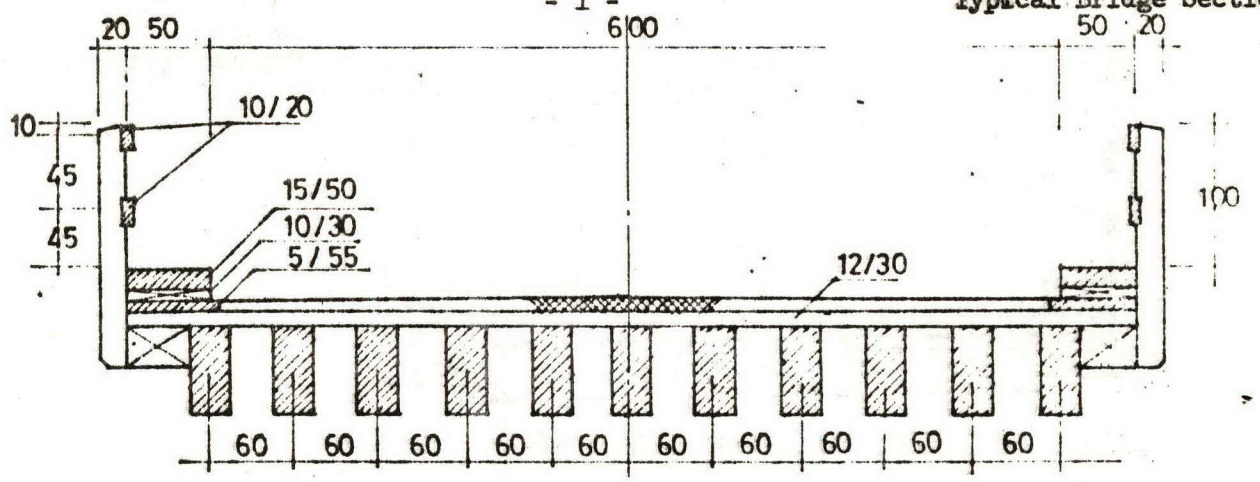
Annex
Typical Road Sections

TYPICAL CROSS SECTION
Skala – 1 : 200

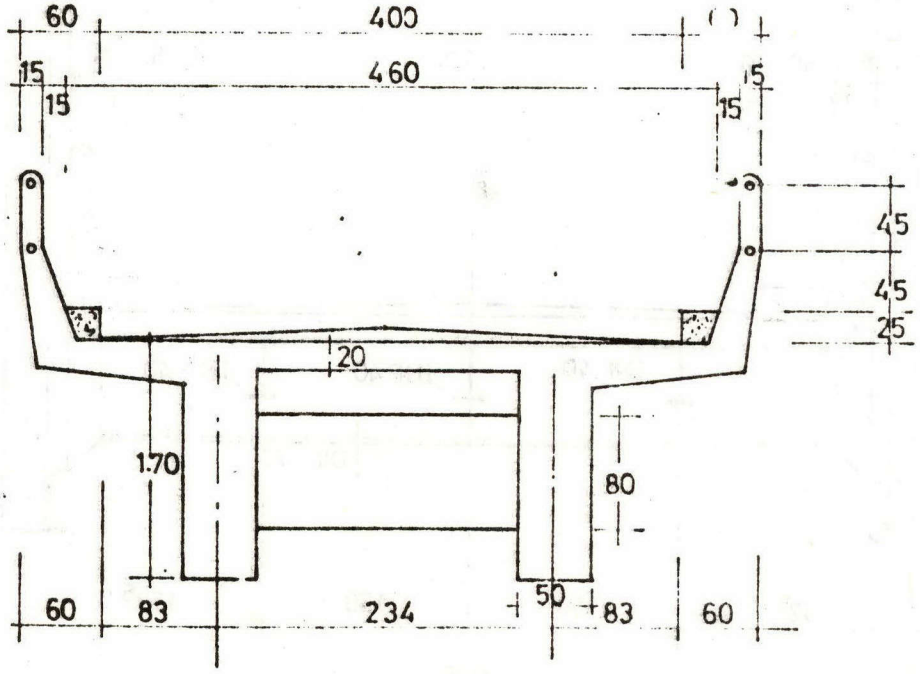


LINK : PALOPO - MASAMBA - BONE

Figure 1.b



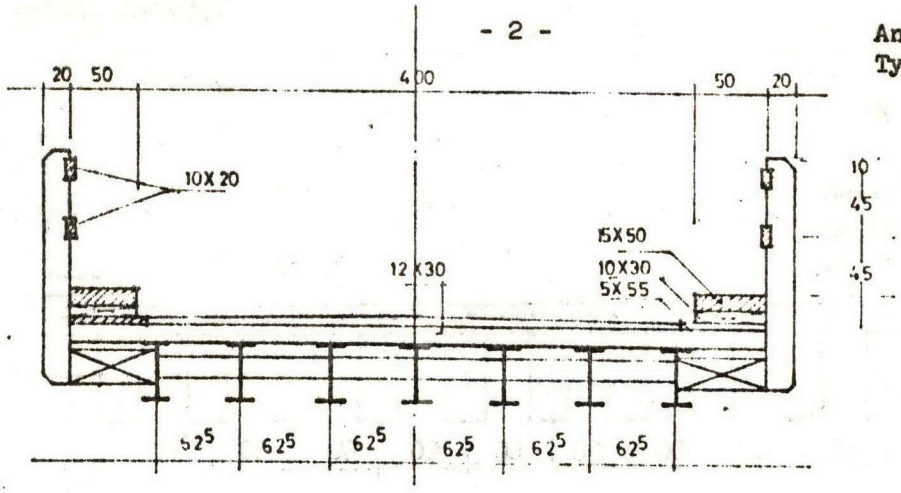
TIMBER BRIDGE



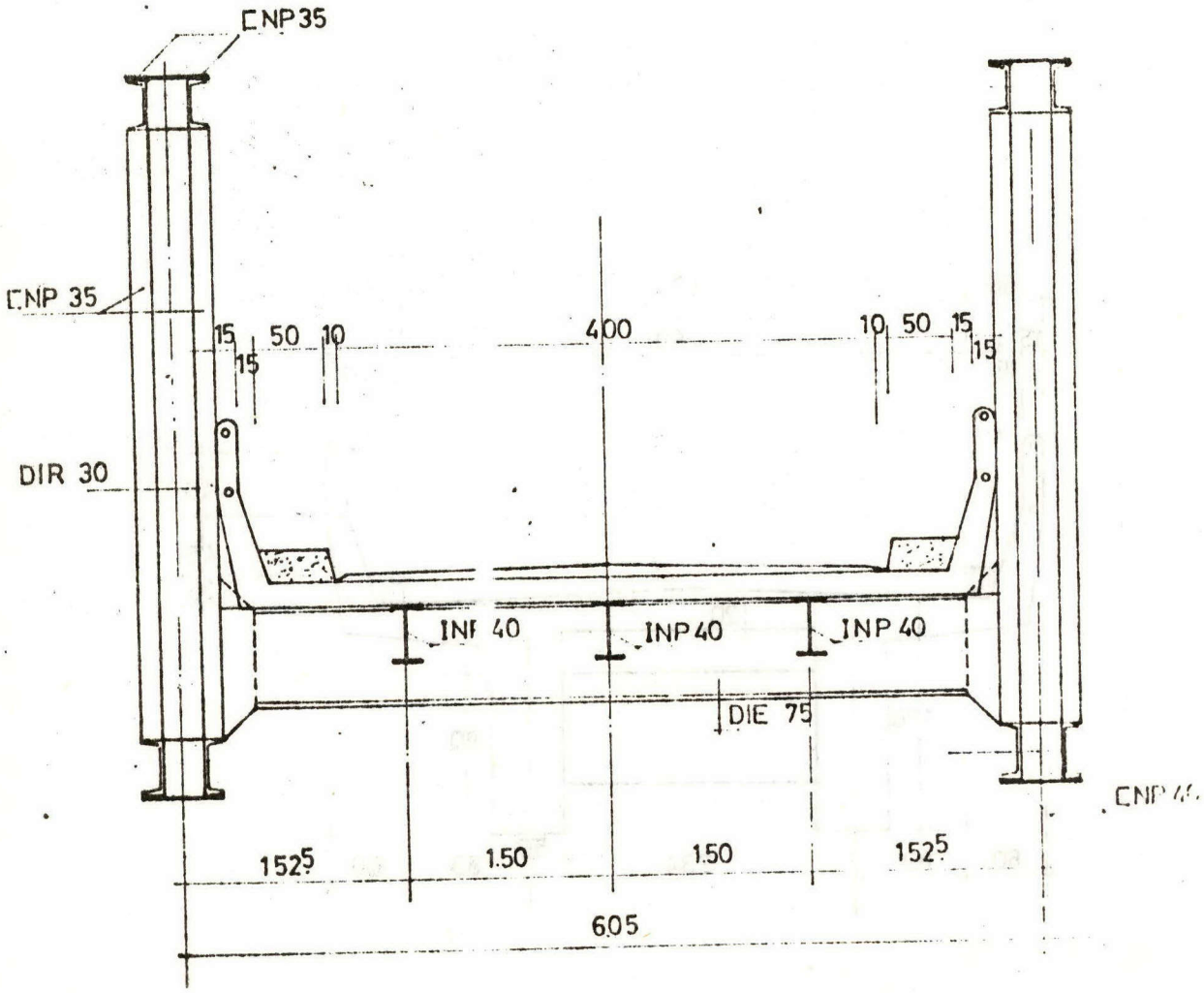
VARIANT, CONCRETE BRIDGE

FIGURE 1 C

Annex I-3
Typical Bridge Sections

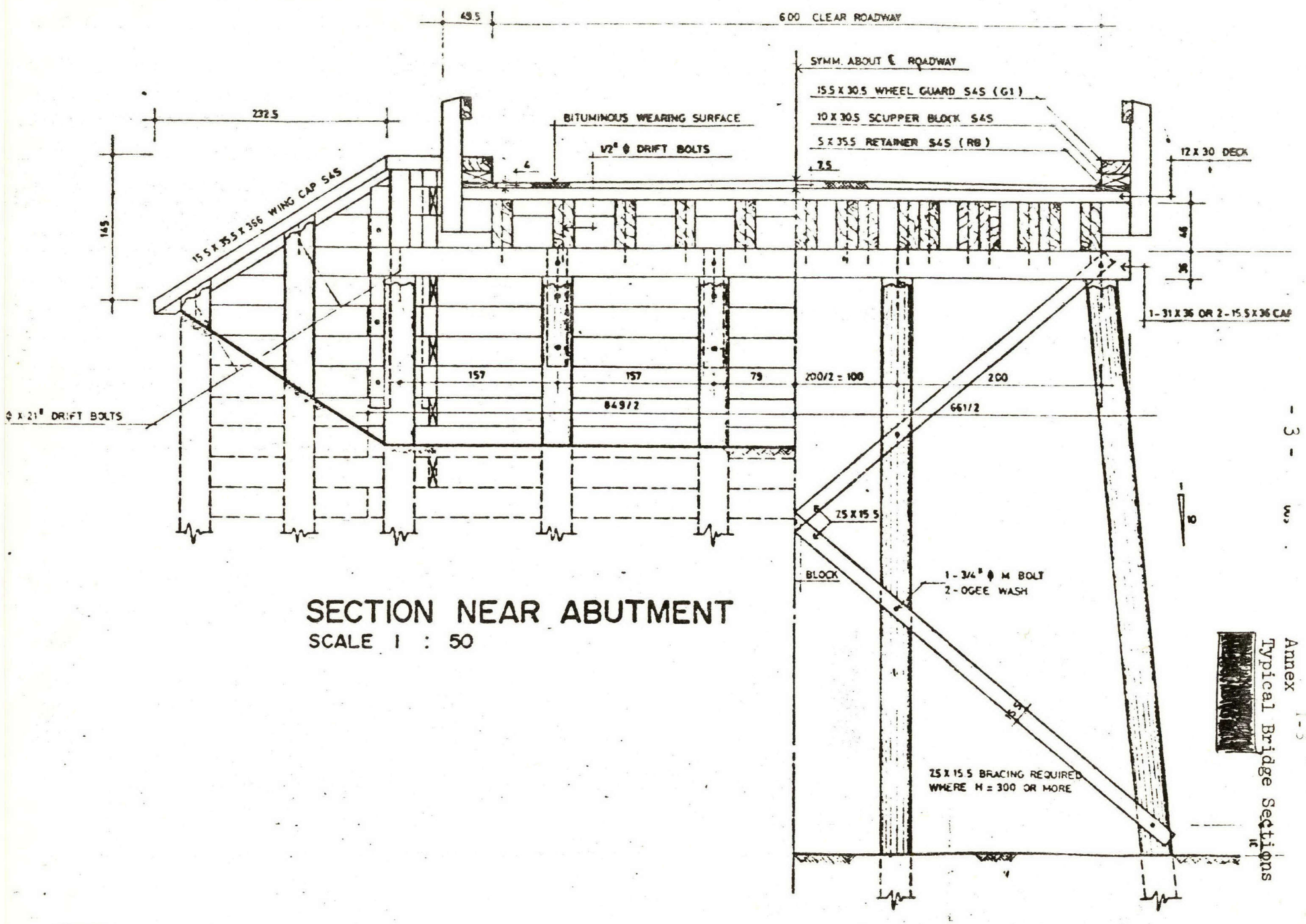


STEEL GIRDER WITH TIMBER DECK BRIDGE



VARIANT, STRUSSES BRIDGE

FIGURE 1 D



SECTION NEAR ABUTMENT

SCALE 1 : 50

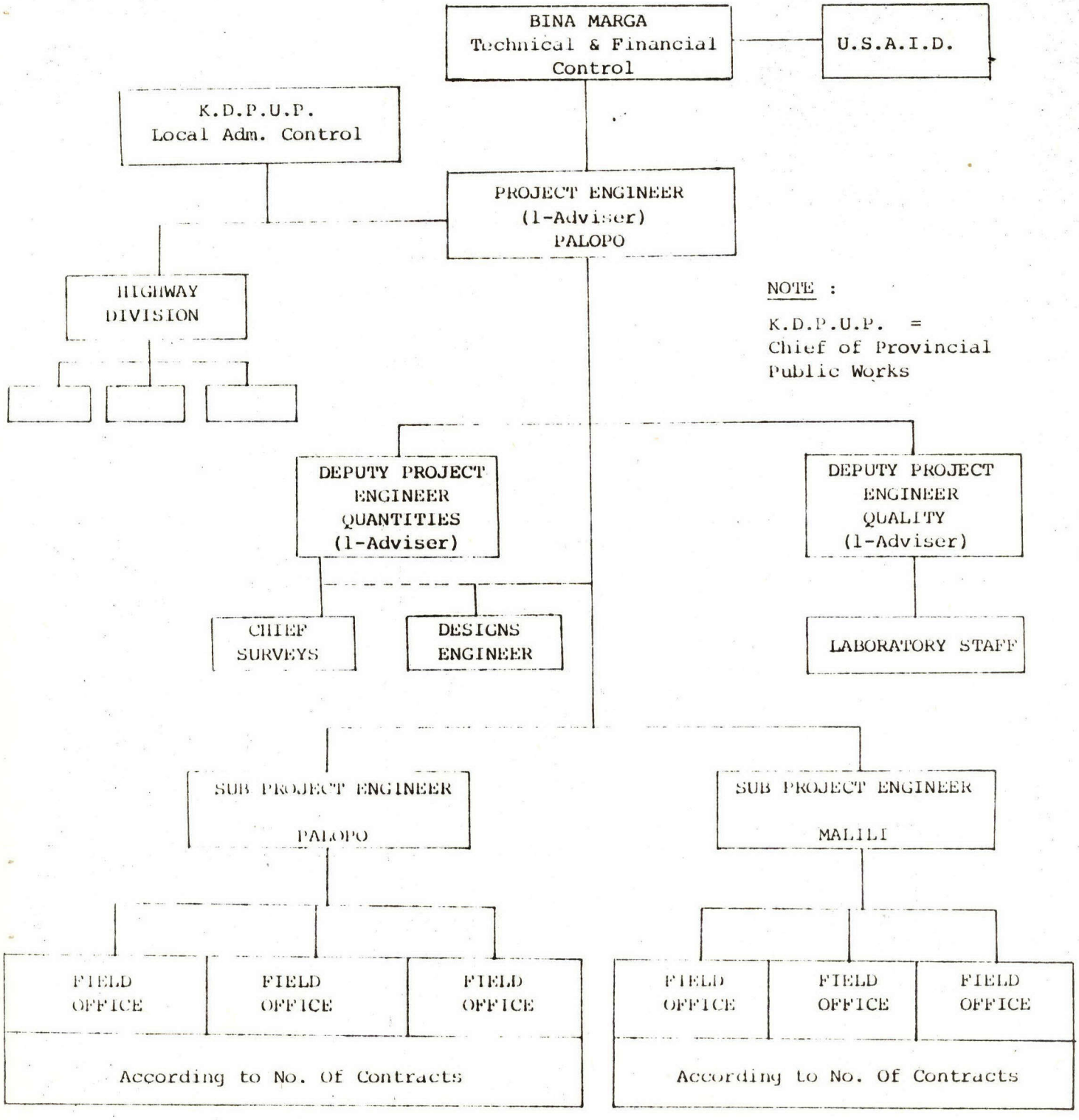
Annex 1-3
Typical Bridge Sections

Annex
Engineering Organization Chart

ORGANIZATION CHART FOR U.S.A.I.D.

LUWU BETTERMENT PROGRAMME

PHASE II



LUWU ROAD BETTERMENT PROJECT

No.	NAME & ADDRESS OF HEAD OFFICE	NAME OF PRINCIPALS	BRANCH OFFICE IN SOUTH SULAWESI	FIRM OWNED BY
	I. LIST OF RECOMENDED CONTRACTORS :			
1.	PT HUTAMA KARYA Jalan Ki S. Mangunsarkoro 55 Jakarta (Phone 51085)	1. Ir. M.Q. Masyhuri - President Director 2. Ir. Soeroso Soedjced - Director 3. Ir. Tjokorda Raka Sukawati - Director	Ujung Pandang	Government
2.	PT NINDYA KARYA Jalan Letjen Haryono MT Kav. 22 Jakarta (Phone 82817)	1. Ir. Sugeng - President Director 2. Ir. Sajidi Pringgodarsono - Director 3. Ir. Ibnu Darmawan - Director	Ujung Pandang	Government
3.	PT M A R J A Y A Jalan Kejayaan I/19 Jakarta (Phone 271491)	1. Teuku Markam - President Director	-	Private
4.	PT DELTA SARANA Jalan Suryo 15, Kebayoran Baru Jakarta (Phone 75785)	1. Ir. L. Dharmosetio - President Director 2. Ir. R.A. Jenie - Director	-	Private
	II. LIST OF RECOMENDED CONSULTANTS :			
1.	PT INDAH KARYA Jalan Ir. H. Juanda 63 Bandung (Phone 3657)	1. Ir. Abdullah Angoedi - President Director	-	Government
2.	PT B I E C Jalan Ir. H. Juanda 77 Bandung	1. Ir. Pudji Rahardjo - President Director	-	Private
3.	PT SANGKURIANG Jl.Ir.H. Juanda 90 Bandung	1. Ir. Piek Tejayadi - Manager	-	Private
4.	PT I N D E C Jl. Tampomas 19 Bandung	1. Ir. Bondan Paripurna - Manager	-	Private
5.	PT CIPTA STRADA Jl. Solo 3 Jakarta	1. Ir. Januar Hakim - 2. Ir. Thomas Rachman - Director	-	Private

L U W U R O A D B E T T E R M E N T P R O J E C T (SOUTH SULAWESI)

LIST OF TENTATIVE EQUIPMENT REQUIREMENT OF 100 KM UNIT LENGTH AND EQUIPMENT OWNED BY THE CONTRACTORS

No.	EQUIPMENT DESCRIPTION	Capacity	Power HP	QTY	PT HUTAMA KARYA Description	QTY	PT NINDIA KARYA Description	QTY	PT MARJAYA Description	QTY	PT DELTA SARANA Description	QTY
1.	Bulldozer	-	140 CatD-6C	2	Bulldozer 90-125 HP	11	Bulldozer	8	Komatzu D80A-12	4	Bulldozer 45 HP	1
2.	Motorgrader		125 Cat120G	1	Grd.100 HP	4	Grader	1	Grader GD37/6H 125 HP	2	Grader 6 Whell 30 HP	2
3.	Wheel Loader	1,25 M3	80 Cat 920	2	Loader	10	Loader	5	GM Terex,Model 72-31	1	Wheel Loader 0,6 M3	3
4a.	Stone crushing plant (portb.)	40-50 t/h	Tell-smith	1	Stone crusher 10-40 t/h	6					Stone crusher 40 t/h	1
b.	Electric generating unit	125 KVA		1	Diesel Gen set 5-95 KVA	30	Generating set	21			-------	
5.	Roller steel wheel,tandem	8-12 t	Koehring	1	Roller three wheel 8-10 t	7	Road roller	25			Three-wheelsteel -- 10-12 t	6
											-- 8-10 t	9
6.	Vibratory roller smoothdrum	9-20 t		1	Vibratory roller 1-3 t	8	Vibrating roller	10			Vibratory 2 wheel tandem	2
7.	Self propelled vibratorydrum compactor with interchangeable smooth & tamping footdrums	10 t		1								
8.	Dumptruck diesel	5 t	140	15	Dumptruck 4 t	16	Dumptruck	30	Isuzu D'truck 12 t	60	Rear dumptruck	40
									Isuzu assmb.Ind.	60		
9.	Watertanktruck (with spraybar)	4000-5000l	140	1					Watertank mounted on Isuzu truck	2		
10.	Pickup truck	1,5 t		4								
11.	Mobile crane	8 t		1	Mobilecrane 12½t	1	Crane	7				
12.	Lowbed trailer with truck tracktor	15 t		1	Trailer 40 t	1						

				P.T. HUTAMA KARYA		P.T. NINDYA KARYA		P.T. MARJAYA		P.T. DELTA SARANA	
13.	Asphalt heat-ting unit	12.ooo L	1								
14.	Concrete Mixer	300 L		Concrete Mixer	145	Concrete Mixer	49				
15.	Vibrator (concrete)	150 Kg		Vibrator 150 Kg	11	Concrete vibra-tor	14				

Additional equipments if necessary will be purchased by the Contractors
The source and origin of equipments are guaranteed to be from eligible - countries as specified by US AID.

No.	EQUIPMENT DESCRIPTION	Capacity	Power HP	PT HUTAMA KARYA Description	QTY	PT NINDYA KARYA Description	QTY	PT MARJAYA Description	QTY	PT DELTA SARANA Description	QTY
				-Asphalt Mixing Plant 25 T	1	-Excavator (backhoe + dragline)	7	-Dumper,thwartes orion 23 cwt,hydraulic	6	-Loader crawler 0,9 M3	1
				-Asphalt Finisher 40 t/h	1	-Tractor	1	-Diesel Gen.set complete with control panel 3KVA, 300RPM-220 Volt	6	-Bitumen sprayer truck mounted asphalt distributor 4000 L	1
				-Pneumatic tire Roller 8-13 T	3	-Tire roller	2			-Bit.sprayer Movable asphalt distributor 500L	1
				-Air Compressor:		-Asphalt Mixing Plant	3			-Stone crusher, impact crusher 30 t/h	2
				100-200 cfm	19	-Finisher	2			-Handvibrating Rammer	8
				201-300 cfm	18	-Pile driver	7	-Arc Welding generator type G-350-TH2 with engine	2		
				376-600	2	-Drilling machine	2				
				-Pile driver	11	-Truck	30	-Crawler tractor, GM Terex model 82-30	2		
				-Prestressed concrete	4	-Welding set	8				
				-Steelbor cutter ½-1¼"	80	-Compressor	14	-GM Terex model 82-40	1		
				-Weight Batcher	6	-Forklift	10				
				-Winch (1000 - 1500Kg) ½-1½T	35	-Concrete pump	2				
				-Truck 3½-5 T	41	-Waterpump	120				
				-Waterpump (1" - 8")	250	-Concretelift	15				
				-Stamper (50-150 Kg)	57	-Stamper	31				
				-Jack hammer	245	-Waterpas & theadolite	51				
				-Electric welding (200-400 Amp.)	50	-Concrete tester	4				
				-Surveying equipment	105						
				-Laboratory test	2						

Jakarta, 18 A p r i l 1975.

LUWU ROAD BETTERMENT PROJECT

LIST OF RECOMENDED CONTRACTORS

1. NAMES OF RECOMENDED CONTRACTORS

1.	PT HUTAMA KARYA	: Government owned
2.	PT NINDYA KARYA	: Government owned
3.	PT MARJAYA	: Private owned
4.	PT DELTA SARANA	: Private owned

2. ADDRESS OF HEAD AND BRANCH OFFICES, KEY PERSONNEL AND PERFORMANCE RECORD OF PT HUTAMA KARYA :

2.1. Address of head and Branch Offices of PT HUTAMA KARYA :

- Head Office : Jl Ki S. Mangunsarkoro 55, Jakarta
  Phone : 51085
- Branch Office
  - PT Hutama Karya IV : Bali
  - PT Hutama Karya V : Padang
  - PT Hutama Karya VI : Surabaya
  - PT Hutama Karya XII : Bandung
  - PT Hutama Karya XV : Semarang
- Representative Office
  PT Hutama Karya XV : Manado

2.2. List of key personnel of PT Hutama Karya :

- Principals of firm :
  1. Ir. M.Q. Masyhuri, 44 years - President Director / Branch Manager
  2. Ir. Soeroso Soedjoed, 42 years - Director/Branch Manager
  3. Ir. Tjokorda Raka Sukawati, 44 - Director/Branch Manager
- Staff which may be assigned to this project :
  1. Ir. Soedarmaka, Civil Engineer, 43 years - Branch Manager PT H.K.V/Padang (1964 - 1975)
  2. Ir. Surjadi, Civil Engineer, 42 years - Branch Manager PT H.K.IV/Bali (1964 - 1975)
  3. Ir. Bachtaruddin Usman, Civil Engineer, 44 years - Representative Manager PT H.K. Manado (1961-1975)
  4. Ir. M. Wahban Naim, Civil Engineer, 36 years - Branch Manager PT H.K.XII/Bandung (1964-1975)
  5. Ir. Harjadji, 46 years - Branch Manager PT H.K.XV/Semarang
  6. Ir. Soegeng Prijadi, Civil Engineer, 42 years - Branch Manager PT HK VI/Surabaya

2.3. Performance ----------

2.3. Performance record for the past of PT Hutama Karya :

- Road rehabilitation in Jambi (Muara Tabo - Muara Bungo, Pulau Tamiang-Sukarani, Road in Jambi), in South Sulawesi (Suburb of Makasar, Road Of Sadang), in Irian Jaya (Jayapura - Sentani Road, Angkasa Road, Hamadi Road Jayapura), in South East of Sulawesi (Road of Kendari).
- Rehabilitation/construction of bridges in West Sumatra (Batang Sinamar, Batang Harau), in West Java & Jakarta (Matraman, Kedep, Cisokan, Ciiet, Jatibarang), in Central Java (Sempor, Maribaya, Babakan, Gojo, Tanjung Kulon, Sungai Dare, Kali Kuto, Kluwuk, Kaliboyo), in Kalimantan (Ma - ngar Besar), in South Sulawesi (Tello), in Bali (Tukad Badung, Gilimanuk, Tukad Bubah, Selasih), in Irian Jaya (Kali Apo, Sentani).
- Construction/reconstruction of road (on hand) in Java (Ciiincing - Cakung, Bekasi - Narogong).

3. ADDRESS OF HEAD AND BRANCH OFFICES, KEY PERSONNEL AND PERFORMANCE RECORD - OF PT NINDYA KARYA :

3.1. Address of Head and Branch Office :

- Head Office	: Jalan Let Jen Haryono MT Kav 22 Jakarta Timur, Jakarta
Phone	: 82817
- Branch Office PT N.K.	: Semarang, Jalan Mataram 715
	: Surabaya, Jalan Dr Sutomo 23
	: Ujung Pandang, Jl La Madukelleng 28

3.2. List of Key Personnel of PT Nindya Karya :

- Principals of Firm :
  1. Ir. Soegeng, 44 years - President Director
  2. Ir. Sajidi Pringgodarsono, 43 y. - Director
  3. Ir. Ibnu Darmawan, 40 years - Director
- Branch Manager :
  1. Ir. Jasin Pramono, Civil Engineer 42 years - Branch Manager Semarang (9 years experience)
  2. Ir. Hartono, Civil Engineer 39 years - Branch Manager Surabaya (9 years experience)
  3. Ir. Sunarjanto, Civil Engineer 37 years - Branch Manager Ujung Pandang (9 years)

3.3. Performance record for the past of Pt Nindya Karya :

- Rehabilitation of road in Central Java (Semarang -Lasem-East Java Border, Semarang-Demak, Candiroto-Wonoboyo, urban road in Semarang/Pati, Demak - Godong), in Aceh (excavation of main drainage irrigation Krueng Jreue, inspection road), in East Java (Babad-Tuban), in Bali (Penelokan-Kadisan), in Irian Jaya (Kwawi Road).

- Rehabilitation/construction of bridges in Central Java (Sungkalan / Purwokerto, Tlatar/Magelang, Serayu, Cindaga), in East Java (Tengah and Wates/Madura, Plalangan, Borna), in Aceh (Kr. Tunpanah, Alue Bukit, Sibreh), in North Sumatra(Sei Halaban, Sei Air Hitam, Aek Parsarisan), in South Sulawesi (Waru/Bone), in West Kalimantan (Sei Singoret, Untan), in North Java(Ciwaringin, Tirwu, Sewo, Cianung, Air Lingih, Air Ubaran), in Irian Jaya.

4. ADDRESS OF HEAD AND BRANCH OFFICES, KEY PERSONNEL AND PERFORMANCE RECORD OF PT MARJAYA :

4.1. Address of Head & Branch Offices :

- Head Office : Jalan Kejayaan I/19
  Jakarta (Phone 271481)
- Branch Office : Jalan Merdeka 19
  Banda Aceh, Aceh

4.2. List of key personnel PT Marjaya :

- Principals of firm :
  1. Teuku Markam , Presiden Director
  2. Mrs. Ratna Kartika , Director I
  3. Mohammad Hanafiah , Director II
- Staff which may be assigned to the project :
  1. Frank Meyer , Civil & structural Engineer (Germany)
  2. Chew Khek Han Alec , Civil & structural - Mice (UK)
  3. Ho Eng Hean Bobby , Civil-rice (UK), Mies, rasce (USA)
  4. Max Moore , Electrical Engineer (USA)
  5. Aw Soon Sing James , Mechanical-Mies
  6. Chew Chee Sun , Architect & Town Planner

4.3. Performance record for the past of PT Marjaya (constructed by PT Karkam, previous name of PT Marjaya)

- Construction of urban road with a total length of 30 KM in Pakanbaru (Riau, 1958 - 1965)
- Construction of city Pakanbaru & Tanjung Pinang (Riau, 2958-1965).

5. ADDRESS OF HEAD & BRANCH OFFICES, KEY PERSONNEL AND PERFORMANCE RECORD OF PT DELTA SARANA :

5.1. Address of head & Branch Offices :

- Head Office : Jalan Suryo 15, Kebayoran Baru Jakarta
  Phone : 75785
- Branch Office : -

5.2. List ----------

5.2. List of key personnel of PT DELTA SARANA :

- Principals of firm :

1. Ir.L. Dharmosetyo	50 years	- President Director/ Managing Director
2. Ir. R.A. Jennie	35 years	- Director/Project Manager.

- Staff which may be assigned to the project :

1. Ir. R.A. Jennie	35 years	- Project Manager
2. Ir. Hendra Winanto	29 years	- Field Engineer
3. Ir. Enggono Goenadibrata	29 "	- Project Manager
4. Ir.Eman Adi Wibowo	36 years	- Project Manager

5.3. Performance record for the past of PT Delta Sarana :

- Road rehabilitation in South Sumatra (Prov.Road 144 KM, earth - moving/side drainage (embankment), in Bengkulu (Prov. Road 20 KM)
- Rehabilitation of existing bridges in South Sumatra (38 nos).

CONSTRUCTION COST ESTIMATION

LINK : PALOPO-MASAMBA (SECTION 1)

LENGTH: 63 KM

NO.	ITEM OF WORKS	UNIT	VOLUME	UNIT PRICE RPS	TOTAL RPS
1.	Clearing :				
	a. scattered plantation	m2	452,900	40	18,116,000
	b. rubber plantation	m2	3,745	50	187,250
	c. swampy	m2	19,110	155	2,962,050
	d. jungle	m2	309,785	82.5	25,557,200
2.	Grubbing :	m2	262,500	55	14,437,500
3.	Excavation :				
	a. clay	m3	28,500	427	12,169,500
	b. rocky	m3	4,925	565	2,782,625
	c. side ditch	m3	125,000	300	37,500,000
	d. subgrade improvement	m2	135,000	750	123,750,000
4.	Embankment	m3	408,200	1,445	589,849,000
5.	Subbase	m3	94,500	2,310	218,295,000
6.	Base	m3	63,000	3,925	247,275,000
7.	Asphalt painting	m2	194,670	385	74,947,950
8.	Penetration with 5 cm thickness on bridge's deck	m3	75	13,250	993,750
9.	Culverts	m'	1,512	35,000	52,920,000
10.	R.O.W. poles	m'	254	3,500	889,000
11.	KM stones		64	5,500	352,000
12.	Traffic device		250	3,000	750,000
13.	Timber bridges	m'	128.5	702,000	90,207,000
14.	Steel girder with deck timber bridges	m'	138	900,000	124,200,000
15.	Strusses bridges	m'	104	2,000,000	208,000,000
					1,846,140,825
				Say Rp.	1,846,140,000

(ONE BILLION EIGHT HUNDRED FORTY SIX MILLIMON ONE HUNDRED FORTY THOUSAND RUPIAHS)

CONSTRUCTION COST ESTIMATE

LINK : MASAMBA-WOTU (SECTION 2)

LENGTH : 64 KM

NO.	ITEM OF WORKS	UNIT	VOLUME	UNIT PRICE RPS	TOTAL RPS
1.	Clearing :				
	a. scattered plantation	m2	471,800	40	18,872,000
	b. rubber plantation	m2	4,025	50	201,250
	c. swampy	m2	22,840	155	3,547,900
	d. jungle	m2	322,315	82.5	26,590,988
2.	Grubbing :	m2	266,700	55	14,668,500
3.	Excavation :				
	a. clay	m3	36,200	427	15,457,400
	b. rocky	m3	5,077	565	2,868,505
	c. side ditch	m3	127,000	300	38,100,000
4.	Subgrade Improvement	m2	215,000	750	161,250,000
5.	Embankment	m3	529,300	1,445	764,838,500
6.	Subbase	m3	96,000	2,310	221,760,000
7.	Base	m3	64,000	3,925	251,200,000
8.	Asphalt painting	m2	197,760	385	76,137,600
9.	Penetration with 5 cm thickness on bridge's deck	m3	91	13,250	1,205,750
10.	Culverts	m'	1,536	35,000	53,760,000
11.	R.O.W. poles	m'	256	3,500	896,000
12.	KM stones		64	5,500	352,000
13.	Traffic device		250	3,000	750,000
14.	Timber bridge	m'	138	702,000	96,876,000
15.	Steel girder with deck timber bridges	m'	176	900,000	158,400,000
16.	Strusses Bridges	m'	196	2,000,000	392,000,000
					2,299,732,455
				Say Rp.	2,299,732,500

(TWO BILLION TWO HUNDRED NINETY NINE MILLION SEVEN HUNDRED THIRTY TWO THOUSAND FIVE HUNDRED RUPIAHS)

CONSTRUCTION COST ESTIMATION

LINK : WOTU-TARENGGE-MALILI
(SECTION 3 & 4)

LENGTH : 49 KM

NO.	ITEM OF WORKS	UNIT	VOLUME	UNIT PRICE RPS	TOTAL RPS
1.	Clearing :				
	a. scattered plantation	m2	490,000	40	19,600,000
	b. rubber plantation	m2	2,730	50	136,5[illegible]
	c. swampy	m2	176,000	155	272,800,00[illegible]
	d. jungle	m2	156,000	82.5	128,700,00[illegible]
2.	Grubbing :	m2	170,000	55	93,500,000
3.	Excavation :				
	a. Clay	m2	23,332	427	9,962,7[illegible]
	b. rocky	m2	34,998	565	19,773,87[illegible]
	c. side ditch	m3	98,000	300	29,400,000
4.	Subgrade Improvement	m2	385,000	750	288,750,000
5.	Embankment	m3	478,300	1,445	691,143,500
6.	Subbase	m3	73,500	2,310	169,785,000
7.	Base	m3	49,000	3,925	192,521,000
8.	Asphalt painting	m2	151,410	385	58,292,850
9.	Penetration with 5 cm thickness on bridge's deck	m3	82	13,250	1,086,500
10.	Culverts	m'	1,176	35,000	41,160,000
11.	R.O.W. poles	m'	198	3,500	693,000
12.	KM stones		50	5,500	275,000
13.	Traffic device		210	3,000	630,000
14.	Steel girder with deck timber bridges	m'	61	900,000	54,900,000
15.	Timber bridges	m'	120	702,000	84,240,000
16.	Strusses bridges	m'	256	2,000,000	512,000,000
					2,223,849,984
				Say Rp.	2,223,850,000

(TWO BILLION TWO HUNDRED TWENTY THREE MILLION EIGHT HUNDRED FIFTY THOUSAND RUPIAHS)

ANNUAL EQUIPMENT DEPRECIATION COSTS - PALOPO-MALILI ROAD

Description	1 Capacity/H.P.	2 No. Units	3 Unit Price CIF US$	4 Total Cost CIF US$	5 Total Cost x 1,845	6 Cost of Annual Depreciation
Tractor-Dozer	120 H.P.	6	58,000	348,000	642,060	257,081
Tractor Dozer	150 H.P.	4	70,000	280,000	516,600	206,846
Crawler Excavator	3/4 C.Y.	2	76,000	152,000	280,440	112,288
Wheel Loader	1 1/2 C.Y.	6	40,000	240,000	442,800	177,297
Crawler Loader	1 1/2 C.Y.	4	45,000	180,000	332,100	132,973
Motorgrader	115 H.P.	4	58,000	232,000	428,040	171,387
Dump Truck	8 Ton	50	13,500	675,000	1,245,375	498,648
Vibratory Compact.	14 Ton	4	40,000	160,000	295,200	118,198
Tandem Roller	10 Ton	4	35,000	140,000	258,300	103,423
3-Wheel Roller	8-12 Ton	4	27,000	108,000	199,260	79,783
Flatbed Truck	5 Ton	4	10,000	40,000	73,800	29,549
Cargo Truck	5 Ton	10	10,000	100,000	184,500	73,874
Pickup Truck	1 1/2 Ton	8	5,000	40,000	73,800	29,550
Service Truck	2 1/2 Ton	4	13,500	54,000	99,630	39,892
Water Truck	1000 Gal.	4	10,000	40,000	73,800	29,550
Mobile Crane	8-12 Ton	4	60,000	240,000	442,800	177,298
Truck Trailer	35 Ton	2	48,000	96,000	177,120	70,919
Crushing Plant	40 T/H	2	100,000	200,000	369,000	147,748
Generator	125 KW.	2	20,000	40,000	73,800	29,549
Generator	50 KW.	4	12,000	48,000	88,560	35,459
Asphalt Distr.	1000 Gal.	2	25,000	50,000	92,250	36,937
Asphalt Heater	6000 Gal.	2	20,000	40,000	73,800	29,549
Wagon Drill	350 Lb.	4	12,000	48,000	88,560	35,459
Air Compressor	500 CFM	6	15,000	90,000	166,050	66,486
Jack Drill	2 3/8 "	20	1,500	30,000	55,350	22,162
Fuel Tank Trucks	1000 Gal.	2	18,000	36,000	66,420	26,594
Concrete Mixer	500 Lt.	6	11,000	66,000	121,770	48,756
Aggregate Spreader	--	2	7,500	15,000	27,675	11,081
Pile Driver	7500 Ft./Lb.	4	21,000	84,000	154,980	62,054
Water Pump	2"-3"	12	2,000	24,000	44,280	17,730
Radio Equip.	--	2	20,000	40,000	73,800	29,550
Miscellaneous	--	2	50,000	100,000	184,500	73,874
TOTALS in US$			954,000	4,036,000	7,446,420	2,981,549

Note:

In the cost summary shown in section 2A of the project paper the owning costs (depreciation) for equipment has been computed on the same basis used in the Bina Marga cost analysis presentation and as shown on this Annex -

Financial Analysis of Palopo-Malili Road and Bridge Betterment Project (Rp. billion)

(A)	Year 1975 Direct Construction Costs	6.370	
(B)	Equipment Owning Costs (Annex I-7)	3.605	
(C)	Construction Costs Less Equip. Own. Costs	2.765	
(D)	Engineering (10% x 4.975) /1	0.498	
(E)	Contingencies (15% x 4.975) /1	0.746	
(F)	Sub total for Escalation	4.009	
(G)	Escalation (20-10-10% for 3yrs) /2	1.296	
(H)	Mobilization (7% x 4.975) /1	0.348	
(I)	Overhead & Profit (20% x (F+G+H))	1.131	
(J)	Total Costs Less (B) in rp. billions	6.784	($16,347,000)
(K)	Total Project Costs (B+J) in rp.billion	10.389	($25,034,000)

Review of the Bina Marga cost analysis shows that the owning cost for equipment purchased by Indonesian contractors must bear the high government import tax and customs handling charges of 84.5% added to the CIF Jakarta equipment prices. This factor in combination with relatively lower rates of work production compared with internationally competitive industry results in higher unit prices for contract work where the equipment owning costs becomes the dominant factor of the higher cost charged by Indonesian contractors.

In order to eliminate both the problem for equipment source-origin and high government handling charges for the purpose of AID financing, the estimated equipment owning costs are deducted from construction costs as shown in the cost summary below. Engineering and contingency costs are applied to construction costs less the 84.5% government tax and customs charges on imported equipment. See Annex I-7 for a representative equipment list and equipment owning costs.

/1 (A) less GOI tax & handling charges for imported equipment

/2 Years 1976-77 and 78

ROAD CONSTRUCTION CONTRACT IMPLEMENTATION SCHEDULE

Plans Completed Segments 1, 2 & 3

Section Malili - Bonebone . . . . . July 1, 1975

Contract Awarded

Section Malili - Bonebone . . . . . Sept. 1, 1975

Plans Completed Segments 1, 2 & 3

Section Palopo - Bonebone . . . . . Oct. 1, 1975

Contract Awarded

Section Palopo - Bonebone . . . . . Dec. 1, 1975

Contract completed segments 1,2 & 3

Section Malili - Bonebone . . . . . Sept. 1, 1978

Contract completed segments 1, 2 & 3

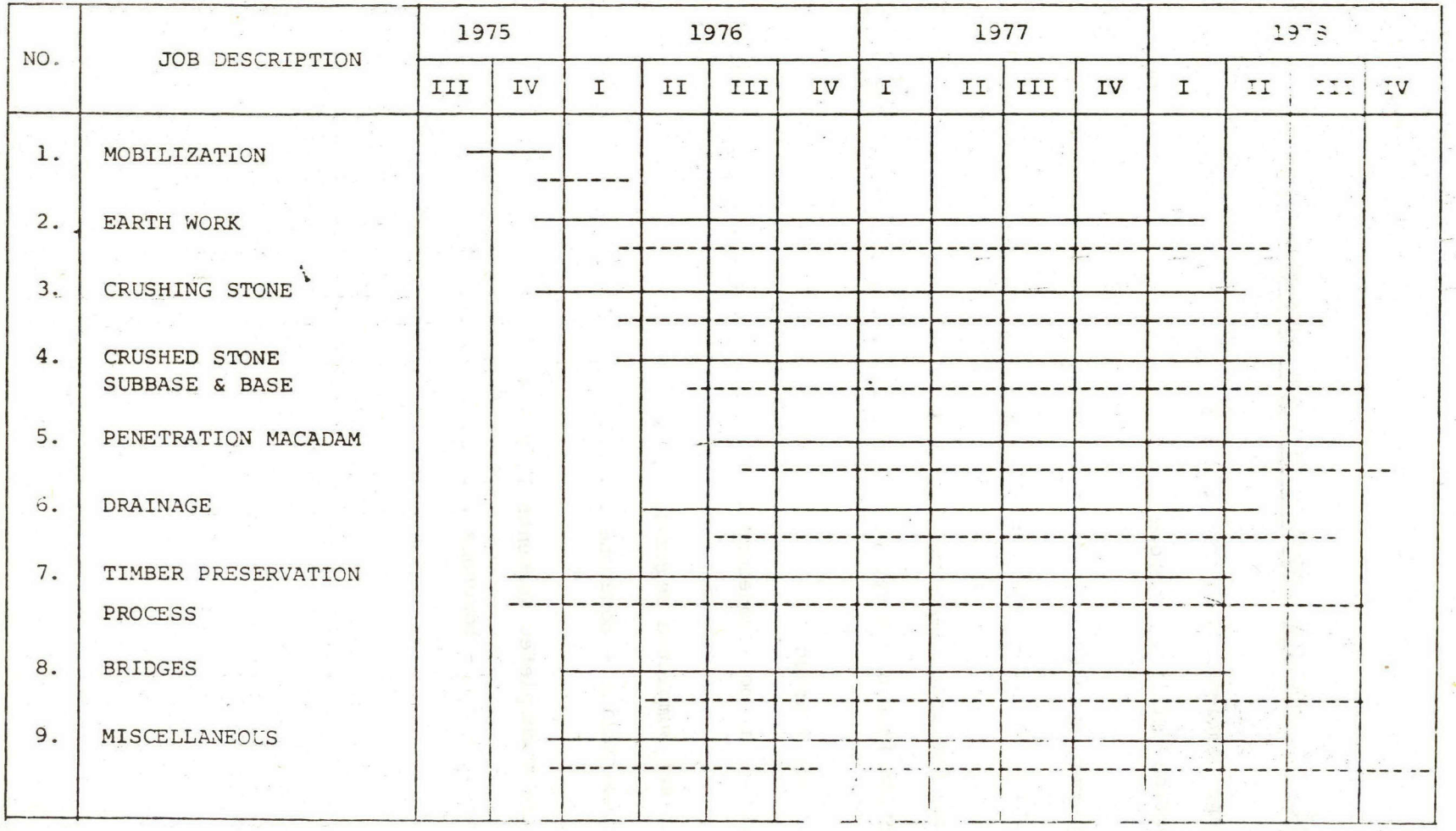
Section Palopo - Bonebone . . . . . Dec. 1, 1978

PROPOSED CONSTRUCTION SCHEDULE

KEY:

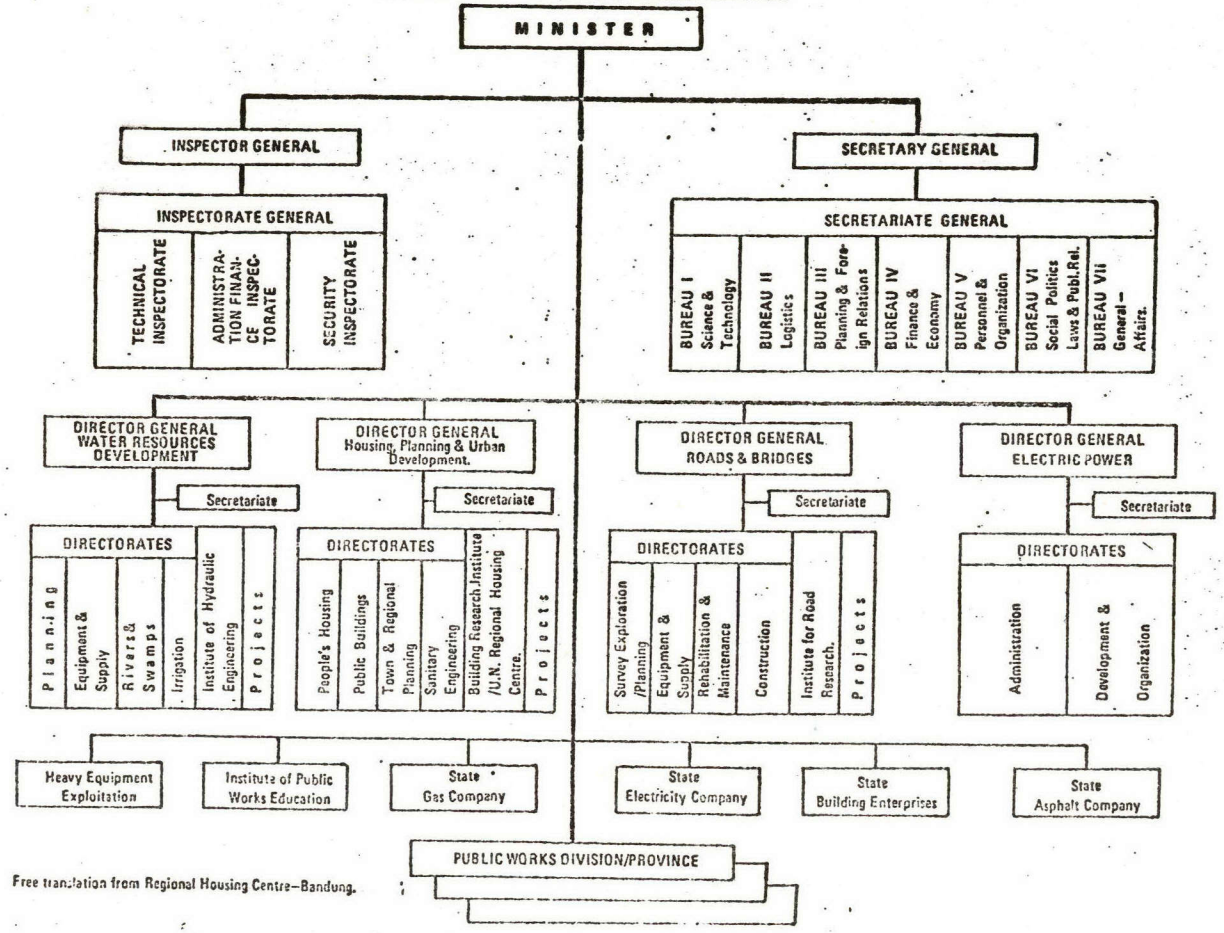
———— = CONTRACTOR A : MALILI TO BONE-BONE, 78 KILOMETERS

- - - - - = CONTRACTOR B : PALOPO TO BONE-BONE, 98 KILOMETERS



Annex
Construction Schedule

ORGANIZATION CHART
MINISTRY OF PUBLIC WORKS AND ELECTRIC POWER

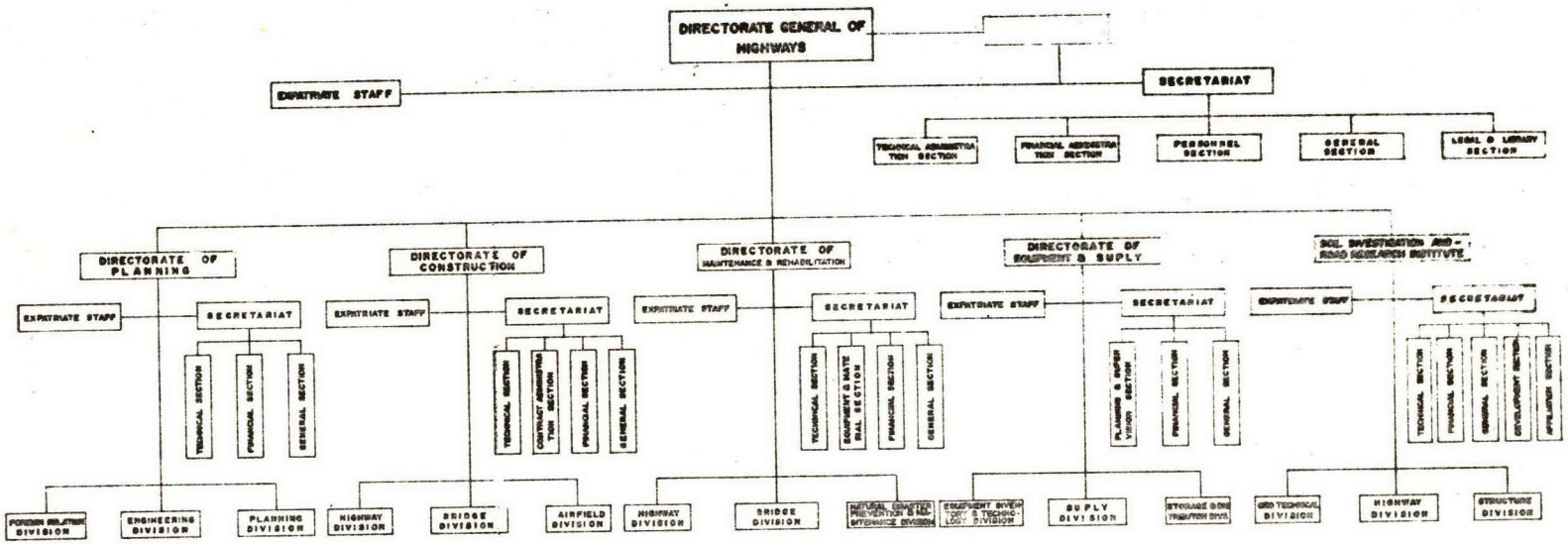


Free translation from Regional Housing Centre–Bandung.

Annex II

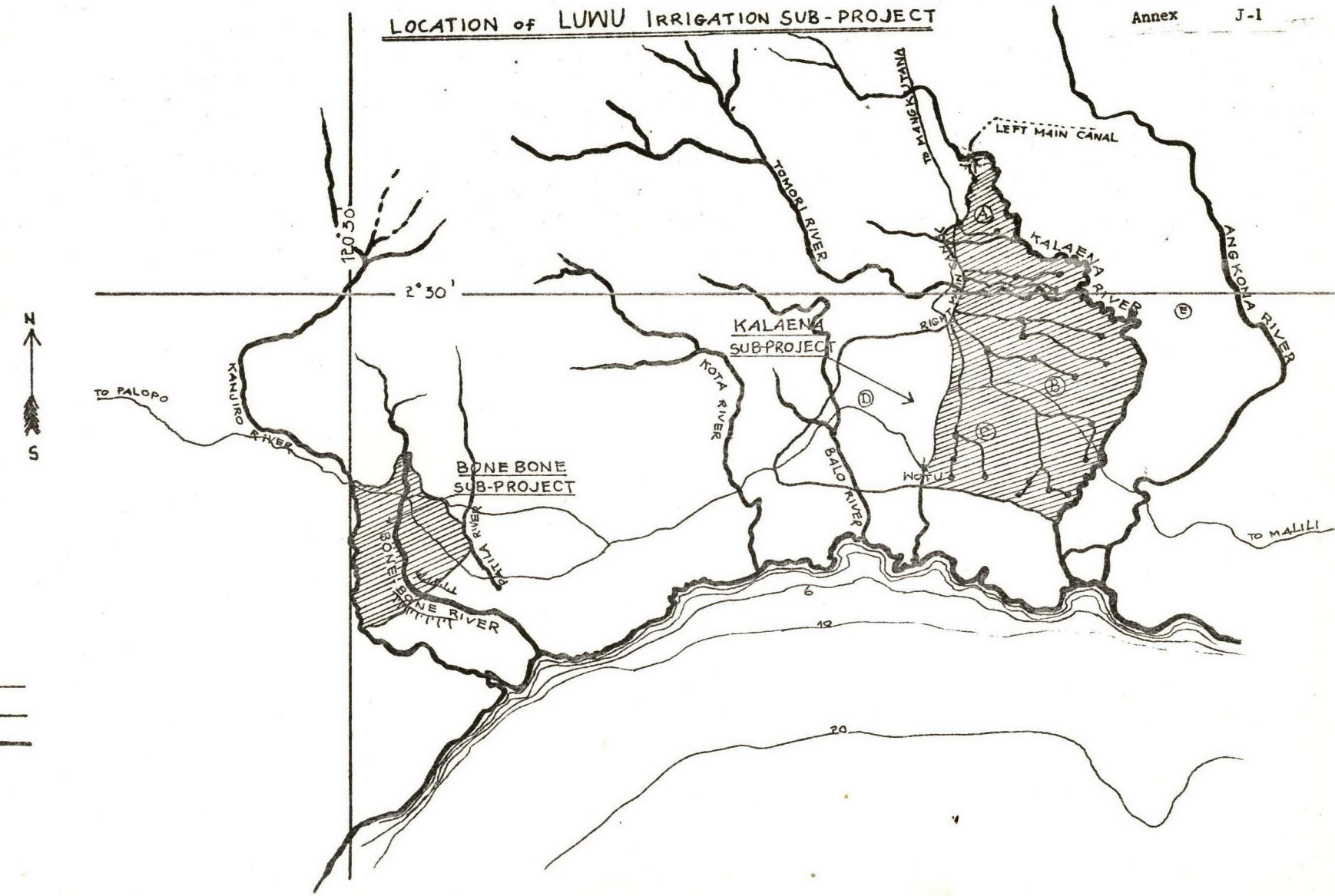
Chart 2

DIRECTORATE GENERAL OF HIGHWAYS ORGANIZATION *)



*) BASED ON : "SURAT KEPUTUSAN DIREKTUR JENDERAL BINA MARGA NO. 95 / KPTS / BM / 1972."

Annex J-1


LOCATION of LUWU IRRIGATION SUB-PROJECT
TO MANGKUTANA
LEFT MAIN CANAL
TOMORI RIVER
KALAENA RIVER
ANGKONA RIVER
120°30'
2°30'
KALAENA SUB-PROJECT
KOTA RIVER
BALO RIVER
TO PALOPO
KANJIRO RIVER
BONE BONE SUB-PROJECT
BATTIA RIVER
BONE-BONE RIVER
WOTU
TO MALILI
6
12
20
N
S
legend:
road
canal
river

Climatic Data for Kabupaten Luwu

The Luwu area has a warm, humid tropical climate. The only climatic weather station is located at Soroako northeast of Malili at an elevation of about 400 m. The records for August 1972 - July 1973 were made available from the Meteorological Services and are shown on page 3 of this Annex. Although the Bone-Bone and Kalaena areas are near sea level, some 90 kilometers to the west, the Soroako data appears to be representative for the region. The average latitute and longitude for the two subprojects is 2°30'S and 120° 40'E. Rainfall and solar radiation are probably the most variable climatic factors.

The average annual temperature is 25.6°C. Monthly variations have a total range of 2.2°C starting from a minimum of 24.4°C. The average diurnal variation is 9.5°C varying 20.9°C to 30.4°C. The absolute minimum temperature was 17.0°C and the maximum was 36.7°C. Single day variations can reach 17°C but 12°C is more normal.

Barometric pressures and relative humidity were only measured at 8:00 a.m. L.S.T. The average monthly barometric pressure was 740 mm Hg and the average relative humidity was 90.4 percent. The range of 8:00 a.m. relative humidities was small varying from 84.3 to 95.6 percent. Midday R.H. values would be considerably less averaging around 60 - 70 percent.

The average total monthly wind run was 1707 km or about 56 km/day ranging from 35.3 km/day in June to 73 km/day in October. The wind values vary somewhat from one month to the next but were higher during the period August - February than for the remaining five months.

Rainfall at Soroako averaged 2797 mm as published by the Meteorological Service. Rainfall in the mountains can average more than the 4200 mm average recorded at Pendolo. The upper watershed of the Kalaena river heads on 3016 m high Mount Balease. All area rivers maintain relatively high base flows throughout the year. The rainfall date from Bone-Bone is comprised of 16 years of records obtained during the period 1939 to 1960, as reported by the Meteorological Service, in 1971 by the Department of Agriculture, Ujung Pandang. The Station is located adjacent to the Kecamatan office.

Bone-Bone rainfal (mm) record summary is as follows:

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Ave	197	230	240	264	420	287	305	203	207	141	139	180
Min	126	141	104	156	148	149	101	84	54	65	66	108
Max	286	431	538	377	685	399	672	411	412	215	241	309

Average Annual Rainfal = 2813 mm

Maximum monthly Rainfall = 685 mm, during May

Minimum monthly Rainfall = 54 mm, during September

Attachment: Climatologic Data - Soroako

Climatologic Data - Sorcako
2031'S 121°20'E, Elev 400m

	Barometric pressure mm Hg	Temperature Degree C			Relative Humidity % 1/	Evaporation mm	Wind Km		Rainfall mm	1931-1960 Ave. Rainfall mm 3/	Temp. Ave. 2/
		0800	Max	Min			Monthly	Daily			
AUG 72	741.0	23.1	30.2	19.7	88.5	171.6	2065	66.6	64.2	149	25.0
SEP	741.6	23.9	30.2	19.3	84.3	161.9	1896	63.2	14.9	133	24.8
OCT	741.5	23.8	31.8	19.6	86.0	185.6	2263	73.0	55.6	121	25.7
NOV	740.0	24.8	32.2	21.0	88.8	173.0	1941	64.7	55.5	176	26.6
DEC 72	740.0	24.1	30.9	21.3	92.8	157.2	1967	63.5	223.9	237	26.1
JAN 73	739.6	23.5	30.1	21.4	94.3	161.7	2202	71.0	383.6	241	25.8
FEB	740.0	23.4	30.8	21.6	93.0	167.5	1874	66.9	317.7	231	26.2
MAR	739.7	23.2	30.0	21.6	95.6	139.1	1542	49.7	514.2	300	25.8
APR	739.1	24.7	30.7	21.8	91.4	153.7	1201	40.0	323.3	371	26.2
MAY	737.7	24.1	29.6	21.1	90.9	135.1	1163	37.5	301.4	314	25.4
JUN	739.6	24.0	29.3	21.3	91.1	115.7	1093	35.3	287.4	275	25.3
JUL 73	739.0	23.6	28.4	20.5	88.6	115.7	1275	41.1	155.8	249	24.4
SUM	8878.9		364.2	280.2	4085.3	1873.8	20482	672.5	2642.5	2797	307.3
AVE.	739.9		30.4	20.9	90.4	153.2	1707	56.0			25.6
MAX	741.6		32.2	21.8	95.6	185.6	2263	73.0	514.2		26.6
MIN	737.7		28.4	19.3	84.3	115.7	1093	35.3	14.9		24.4

1/ Read at 0800 Hrs LST
2/ Average daily temperature based on $(T\ max + T\ min)\frac{1}{2}$
3/ Meteorological Note No. 8 Part II, Departemen Perhubungan, Direktorat Jendral Perhubungan Udara, Lembaga Meteorologi dan Geofisika, Jakarta, Indonesia.

LUWU HYDROLOGY

Hydrologic records for the Bone-Bone river are almost nil. Records at Bandung kept between 1938-1940 show a recorded low flow of 0.67 m^3/sec. and a high of 85 m^3/sec. Discussions with local people and observations in the Bone-Bone area indicate low flows of about 6 m^3/sec. might be expected. Judgment of experts employed to examine the projects is that normal Bone-Bone supply is expected to exceed the demands.

Attachment: Minimum Flows - Luwu Area Rivers

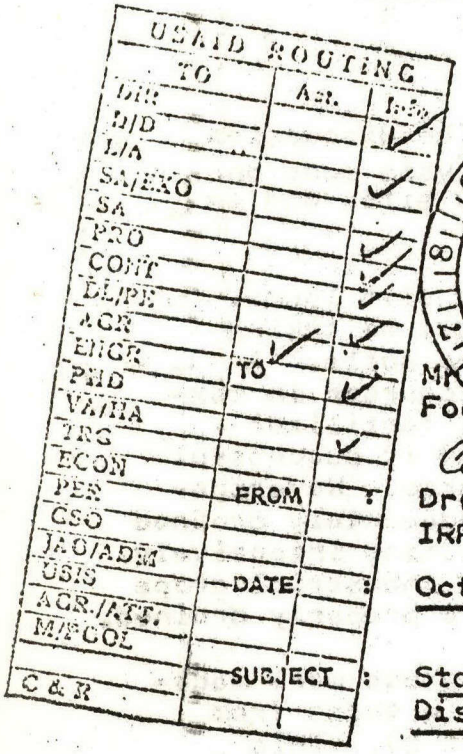
Minimum Flows - Lumu Area Rivers
(M3/Sec)

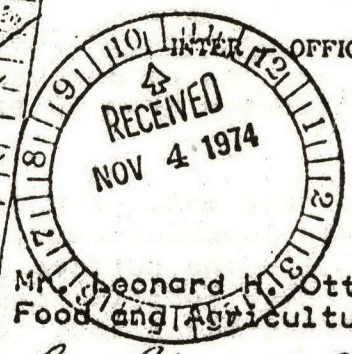
	Malaena River 1250 Km2 Mongkutunol	Tomoni River 101 Km2 Maluku	Kanjiro River 93 Km2 Pompelangit	Bone River 60 Km2
1939 SEP	19.5	5.48	3.51	1.75
OCT	16.9	3.81	3.10	1.01
NOV	14.3	3.40	3.57	0.81
DEC	17.7	4.83	3.72	0.67
1940 SEP	16.5	5.02	3.65	
OCT	18.2	4.05	3.03	
NOV	16.1	3.98	2.72	
DEC	15.4	4.23	3.30	

THE INTERNATIONAL RICE RESEARCH INSTITUTE
INTERNATIONAL PROGRAM IN INDONESIA
JLN. DR. RATULANGI 47, UJUNG PANDANG
SULAWESI SELATAN, INDONESIA

INTER-OFFICE MEMORANDUM

Annex I-1





Mr. Leonard H. Otto
Food and Agriculture Officer, USAID

Dr. C. P. Mamaril and Mr. Shagir Sama
IRRI/IPI and LPPM, respectively

October 30, 1974

Status of Soils and Incidence of Pests and Diseases in Three Kecamatans of Kabupaten Luwu.

The following is a brief report on our observations of the status of soils and pest and disease incidence in three Kecamatans of Luwu last September 25-29, 1974. The report is divided into three parts, namely; (1) soil conditions and plant growth, (2) incidence of pests and diseases, and (3) quality of irrigation water. A set of recommendations are given after each discussion on the observations made.

I. SOILS CONDITIONS AND PLANT GROWTH

There were no unsurmountable soil problems prevailing in the three areas surveyed. However, the existing minor soils problems which, if the present soil management practices were continued, may led to serious problems in the future.

A. Major soil groups. According to the soil map prepared by the Soil Research Institute, the existing soils in the areas under consideration are classified as follows:

Kanjiro	-	Gray brown alluvial Hydromorphic alluvial
Bone-Bone	-	Gray brown alluvial Hydromorphic alluvial
Kalaena	-	Hydromorphic alluvial Gray brown alluvial Latosol Brown yellow podzol

B. Physical and chemical properties. The discussion that follows is based on the results of analysis made on fourteen (14) soil samples collected from 10 sites and on field observations.

All the soils sampled, except one, were silt loams. This suggests that considerable leaching could be taking place unless a hard pan underlies the surface soils. A number of the soils, however, have subsoils coarser in texture than the surface soil. This means that fertilizer application must be properly placed and timed if successful crop production were to be attained in the area. Nevertheless, these soils, if properly managed and adequately drained during certain time of the year could be utilized intensively. A variety of crops including root as well as industrial crops like tobacco could be grown if the soils were properly drained.

The soils from the Kanjiro and Kalaena areas were moderately to strongly acidic (pH 5.55-5.00) while those from the Bone-Bone area were slightly acidic (pH 6.2). This suggests that should these soils be drained and grown to crops other than lowland rice, liming maybe necessary. The pH of these soils could also be easily changed because their cation exchange capacities are rather low. Their acidic condition could in fact be due to the ease by which the base cations are leached because of their low cation axchange capacities.

Although the organic matter content of most of the soils is relatively high except for two samples, nitrogen still appears to be deficient. Despite the claim of the farmers interviewed that as much as 100 kg urea was added, many of the rice crops observed appeared to be needing more nitrogen.

Available phosphorus was low in some of the soils especially those near the source of the Kalaena system as well as the brown yellow podzolic soil east of Wotu and the soil in Desa Banyu-urip of Bone-Bone.

Almost all the soils have low available as well as exchangeable potassium inspite of the fact that a good portion of the sand fraction was micaceous. Application of potassium fertilizers should therefore yield some benefits.

One soil problem that may require a special attention is iron toxicity. Leaf bronzing on the rice crop at two sites of Kecamatan Bone-Bone was observed. This situation could also exist in the Kalaena area were the soils are strongly acidic. Unfortunately there was no rice crop growing in the

..../

Kalaena area at the time of visit. The symptoms, i.e., leaf bronzing, was typical of iron toxicity symptoms especially on the PB 5 crop. The field where intense bronzing was observed, Desa Tulungrejo, the NH_4-acetate soluble iron was exceptionally high, 724 ppm. Among the sites sampled and analyzed, iron toxicity could exist in 5 sites especially if the fields were to remain submerged continously throughout the year. High organic matter and low potassium contents in soils, which is common among the soils sampled and analyzed, could also aggrevate iron toxicity. Under well drained conditions, however, iron toxicity will not be as severe. Besides, some upland crops could have higher tolerance to excess iron in the soil than rice.

C. Plant Growth. The various crops observed appeared to be growing normally despite the non application of fertilizers, except when infested with pests and diseases. In several sites, the rice crop was heavily infested with Tungro and rats.

There were four sites in Bone-Bone, namely; Desas Lamahabang, Tulungrejo, Sidomukti, and Banyu-urip where certain varieties of rice were suffering from certain malady other than pests and diseases, i.e., physiological disorders. In the same crops, Helminthosporium was also serious and only in varieties PB 5 and IR 20. At the latter three sites, bronzing was quite apparent while in the first site, the plants had poor tillers, stunted, and somewhat dark green. It appears that in the first site the crop could be suffering from the three major nutrient elements, N, P, and K while in the latter sites, besides these elements, iron toxicity could have contributed significantly to the poor state of the crop.

The state of the other crops growing in the areas visited were likewise fairly good. Some of the crops could be suffering from deficiency of certain nutrients but were not visually apparent. In other words some of the crops could be in the state of hidden hunger signs. Better yields could certainly be attained if new technology, including the necessary inputs, were to be applied.

D. Recommendations:

1. To provide proper fertilizer recommendations and other soil management practices, more detailed evaluation of the major soil types in the area needs to be undertaken. This should not only include soil testing and greenhouse tests but also fertilizer and liming trials in selected representative sites.

2. Some of the prevailing soil problems could be partially alleviated by occasional drainage or by aerating. the soil. Consequently the construction of drainage systems should be given careful consideration. Besides, effective water control will enable the farmers in the area to grow more variety of crops through out the year.

3. Varieties of crop which are known to be tolerant to certain adverse soil condition should be strongly recommended to the farmers. It is anticipated that in the future rice varieties suitable for certain adverse conditions will be developed by IRRI or other organization.

II. PEST AND DISEASE INCIDENCE

The prevailing pests and diseases of crops observed were similar in the different areas visited except in their degree of intensity. These will be discussed according to crop.

A. Rice. The most serious problems of the rice crop in terms of pest and disease are Tungro and rat followed by Leptocorisa acuta, Xanthomonas oryzae, Corticium sasakii, Helminthosporium oryzae, Tryporiza innotata and wild pig. Other less important pests and diseases found were Hydrella, Nymphula depunctalis, Cnaphalocrosis medinalis and Cercospora.

Observations in the field and light trap collection indicate that the most abundant vector of Tungro is Nephotettix virescens (95 %). The other insect vectors also include N.nigropictus (2 %) and Recilla dorsalis (3 %).

B.Soybean. The growth of the soybean crops observed in different places was fairly satisfactory. The common pest found includes Nezara viridula, Reptortus linearis, Aphis, Afidenta gradaria, Empoasca, and Plusia chalcides.

C. Peanut. The area planted to peanut is not very extensive. Rats are the most important pest that damage the peanut crop in the area. Cercospora was found in the older plants. Empoasca and Plusia were also found but not very significant.

D. Corn. According to the farmers interviewed the most important pests that damage their corn crop were the wild pigs and stray animals like carabao and cows.

E. Root crops. There was no serious outbreak of insect pests and disease at the time of the visit. The farmers claim that the important menace of their root crops were rats and wild pigs.

F. Performance of different rice varieties and the present rice situation. Since 1971 farmers miserably failed to produce reasonable yields from their rice crop. They have attributed this to Tungro and rat infestations. Yield reduction has been reported to be between 50-100 per cent. The widely grown rice varieties then were Dewi Tara, Dewi Ratih, PB 8, PB 5, and Pelita. According to the observations of LPPM, these varieties are susceptible to Tungro which explains the serious outbreak of the disease in the area.

Beginning 1974 dry season the hectarage covered by Tungro resistant varieties, C4-63 and IR 20, has considerably increased in Kecamatan Bone-Bone. As a result Tungro infestation has been greatly reduced compared to the past three years. There is presently a tendency for some farmers to go back to PB 8 and Pelita after observing the slight Tungro infestation because they claimed that the yield of C4-63 and IR 20 are not comparable to PB 5 and Pelita.

In two desas visited, Katulungan and Sidomukti, the performance of IR 20 was fairly good and free from Tungro despite the presence of numerous green leaf hoppers. Farmers were using a number of pesticides namely; Phosvel, Surecide, Sevin, and Zinc phosphide. On the other hand there was a site where IR 20 was not performing well and this could be attributed to over mature seedlings. They were transplanted when they were over 3 weeks old.

G. Recommendations.

1. The farmers should be advised or taught how to apply insecticides properly. Most farmers only apply insecticides when there is an obviously disease and pest outbreak. For example, applying insecticide when the insect vector of Tungro has introduced the virus into the plant may not yield any benefit at all. Often times when the spraying is not properly timed, the farmer normally blames the product as being ineffective. Theoritically the best time to control Tungro with insecticides is when the vector has not yet introduced the virus into the plants. The insecticide should be applied 3 days after transplanting, followed with 2-4 times additional applications at an intervals of 15 days when sprayed or 25 days when applied in the form of granule.

The following are the insecticides and their rates of application that may be recommended to the farmers.

Azodrin 60 EC	-	1 li./500 li. of water/ha
Sevin 85 SP	-	1 kg/500 li. of water/ha
Karphos 50 EC	-	1 li./500 li. of water/ha
Furadan 3 G	-	16 kg/ha, everytime it is applied.

2. There should be a concerted effort to control field rats. The farmers should be organized into active and effective rat control teams. Sustained baiting should be practiced through out the year even after the rice crop is harvested. The blanket control method may also undertaken occassionally when most of the farmers do not have much work to do in their fields. The effective rodenticide being used at present is Zinc phosphide.

A group of agricultural extension personnel should be trained in controlling rats effectively and subsequently supervise the farmers in carrying the necessary rat control measures.

3. The insect pests that often cause reduction in yield of soybeans are Nezara viridula and Riptortus linearis. Diazinon 60 EC is found to be less effective in controlling the above pests while Endrin 19.2 EC is quite effective. However, Endrin is no longer recommended because of its adverse residual and side effects. The other insecticides that can be used are as follows:

Dimecron 100	-	0.5 li./500 li. of water/ha
Azodrin 60 EC	-	0.5 " " " " " "
Sevin 85 SP	-	1.0 kg/500 li. of water/ha
Folidol 50 EC	-	0.5 li./500 li. of water/ha.

4. Information on the ecology of prevailing insect pests and diseases for the area is rather limited. Consequently, there is a dire need for more research to be undertaken in the area. Field demonstration plots should also be carried out so that the farmers could witness and emulate good pest and disease control measures.

III. QUALITY OF THE IRRIGATION WATER

Four water samples were obtained and none of them contained any element with concentrations that may be harmful to the crops to be irrigated. All the four sources contain rather low amounts of potassium which necessitates the ap-

plication of potassium fertilizers in many of the soils that will be irrigated by the systems under consideration. Several reports indicate that potassium is often not recommended for lowland rice because most irrigation water usually contain adequate potassium to supply the requirements of rice. Based on the water use of 120 cm per crop of rice, the irrigation water in the area will only supply 4.68 kg K per hectare. This is rather short of what is required. Moreover, the soils in these areas are generally low in available as well as exchangeable potassium as mentioned earlier. Thus, the application of potassium fertilizer should be considered.

Cc.: Prof. Dr. A. M. Satari, Director of CRIA
Dr. R. I. Jackson
Ir. E. O. Momuat

ANNEX J-5

WATER QUALITY

Water samples were taken from Luwu area rivers by a USAID team during the week of 23 September 1974. The Soils Research Institute at Bogor analyzed the water samples. The results indicated a low conductivity measurement and normal cateon and anion concentrations. The water would be all classified as excellent for irrigation purposes. A copy of the laboratory analysis is on Exhibit.

Annex J-5

CHEMICAL COMPOSITION OF WATER SAMPLES FROM LUWU

River	E.C. mmho/cm 25°C	pH	mg per liter water																
			Cations								Sum of Cations	Anions						Sum of Anions	Silt mg/l
			NH_4	K	Ca	Mg	Na	Fe	Al	Mn		NO_3	PO_4	SO_4	Cl	HCO_3	CO_3		
Tomini	0.147	8.0	0.00	0.39	24.00	2.19	1.38	0.00	0.00	0.00	28.76	0.00	0.00	4.32	0.00	73.20	0.00	77.52	37.6
Kalaena	0.177	7.8	0.00	0.39	29.40	3.89	0.69	0.00	0.00	0.00	34.37	0.19	0.00	1.44	0.00	91.50	0.00	93.13	19.8
Bone2 Karangan	0.110	7.6	0.00	0.39	15.80	2.80	2.07	0.00	0.00	0.00	21.06	0.19	0.00	0.96	0.00	57.34	0.00	58.49	20.0
Kanjiro Below Bridge	0.052	7.2	0.00	0.39	5.20	1.46	2.07	0.00	0.00	0.00	9.12	0.19	0.00	4.32	0.00	18.30	0.00	22.81	44.0

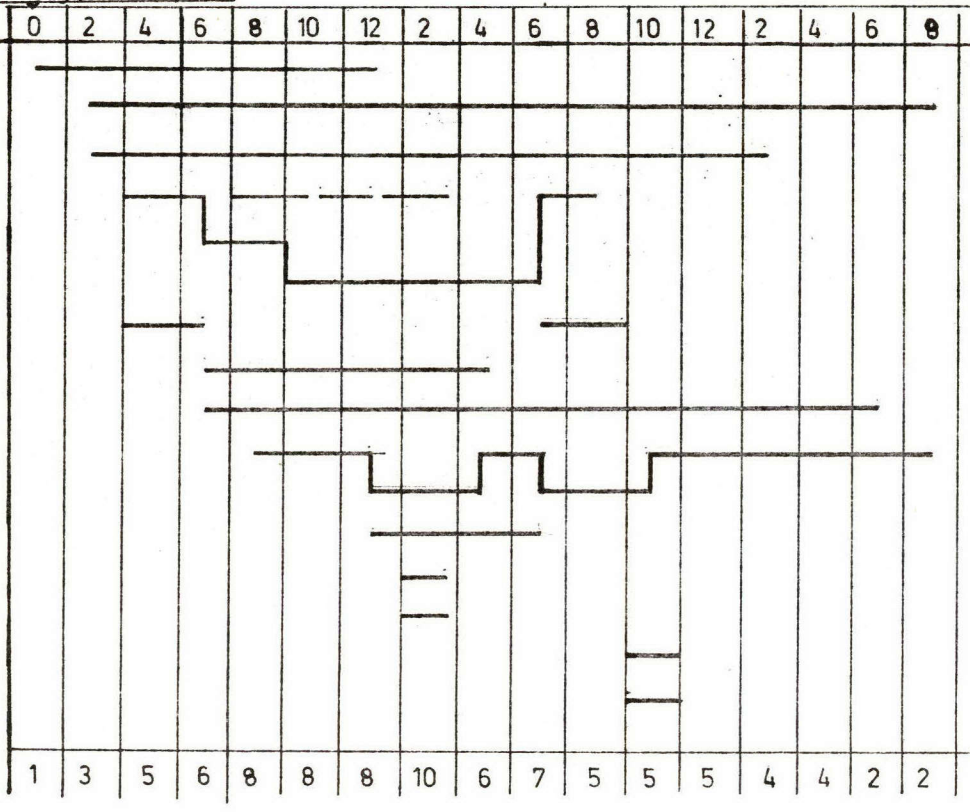
(2)

Comments

The waters can be used for irrigation purposes, without any danger of the development of salinity but [illegible] sodium [illegible] waters.

TIME CHART DUTCH LUWU TEAM

starting point May 1975



No.	Team Members	Man months
1	Topographer	12
2	Team leader	30
3	Field Supervisor	24
4	Socio-economist	12
5	Agronomist	3
6	Irrigation agrinom	9
7	Hydrologist	6
8	Soil scientist	10
9	Irrigation Engineer	24
10	Designer 1	16
11	Designer 2	8
12	Civil Engineer	6
13	Geologist	1 1/2
14	Soil Mechanic Engineer	1 1/2
15	Cost Expert	2
16	Economist	2
17	Short Terms	3
18	Total Manmonth	170

0	2	4	6	8	10	12	2	4	6	8	10	12	2	4	6	8
1	3	5	6	8	8	8	10	6	7	5	5	5	4	4	2	2

Note: combinated expertises

Public Works Office of Province of South Sulawesi

Directive For The Prequalification/Classification

Of Construction Contractors 1974

A. EVALUATION FOR PREQUALIFICATION

Prequalification is divided into two sets of conditions for would be contractors:

I. GENERAL CONDITIONS

1. The legal form of the company.
   Proven by a copy of the act ratified by the drawer; the original to be shown to the committee during a visit to the contractor's office.

2. Business permit.
   Proven by a photocopy, the original to be shown to the committee during a visit to the contractor's office.

3. Fiscal document.
   Proven by a photocopy of the latest calendar year fiscal document from the Tax Office; the original to be shown to the committee during a visit to the contractor's office.

4. Bank reference.
   Proven by a photocopy of Government Bank Reference and which is still valid; the original to be shown to the committee during a visit to the contractor's office.

5. Letter of non-involvement with G.30 S.
   Proven by a photocopy of the letter of non-involvement with G.30 S. for the Business Executive; the original to be shown to the committee during a visit to the contractor's office.

II. CONDITIONS FOR EVALUATION

1. Personnel.
   Proof of personnel can be given in the form of: Appointment Letter, List of Salary/Honorarium, or other documents which constitute valid proof of the existence of personnel. (See table I for minimum number of personnel).

   Clarifications
   Meaning of:

- Graduates : Civil Engineer, Architects, Mechanical or Bachelors with 5 years of experience in their field.

- Bachelors : Bachelors or equivalent.

- Technical High School : Graduate of technical high school (STM) with 1 year of experience in their field or graduate of technical secondary school (ST) with 5 years of experience in their field.

- Foremen : Those who can read technical drawings, are able to supervise workmen and know about the work of a foremen, for instance an overseer.

- Surveyors : Those who can read drawings, are able to use theodolite and level instruments, are able to lead a team of surveyors, possess several years of experience and produce reliable results.

- Administration/ bookkeeping : Those who are able to carry out administrative work (SMP)/can do bookkeeping well (SMEP).

2. Equipment.
Information regarding the equipment possessed by the Company which is still in good condition and can be used for the project, proven by an inventory list or a proof of ownership/purchase receipt, or the Right of Use/borrowed or rented. (See table II for the minimum equipment possessed).

3. Work Reference.
Proven by contracts/delivery documents of finished works etc., on behalf of the company. (See table III b).

4. Financial.
Proven by the ability to undertake prefinancing at the time the company accepts work.
What is the limit of the funds available for the work?

Proven by the bank balance (latest) of 1974 from a Government Bank.

Table I

Minimum Conditions for Classification of Water Resources Development Division Contractors:

Personnel.

	A	B	C	D
- Graduate Engineer:				
- Civil	2	1	-	-
- Mechanical	1	-	-	-
- Bachelor of Engineering:				
- Civil	2	1	1	-
- Mechanical	1	1	-	-
- Technical High School:				
- Irrigation Structures	(5	(3	(2	(-
- Building	(	(	(	(
- Mechanical	2	1	1	-
- Foremen	10	5	3	-
- Surveyor	4	3	2	-
- Administration	6	3	1	-
- Bookkeeper	2	1	1	-

Table II

Minimum Conditions for Classification of Water Resources Development Division Contractors:

Instruments/Equipment.

	A	B	C	D
- Concrete Mixer	2(3)	1(2)	1	-
- Transit/Theodolite	3(6)/2(4)	2(4)/1(2)	1(2)/1	-
- Truck/trailer	4(7)	2(4)	1(2)	-
- Concrete Vibrator	2(4)	1	(1)	-
- Water Pump (6"/4")	2(4)/2(5)	-/2(4)	-/1(2)	-
- Pile Driver	(1)	(1)	-	-
- Roller	(1)	(1)	-	-
- Dragline/Excavator	1(2)	(1)	-	-
- Bulldozer	(2)	(1)	-	-
- Compactor/Stamper	1(2)	(1)	-	-
- Motor Bike	5	3	2	1
- Office Condition	Good	Enough	Moderate	Simple
- Warehouse	Good	Enough	Moderate	Simple
- Typewriter	3	2	1	1
- Calculator	2	1	1	-
- Drafting Table	3	2	1	-

Table III a

Minimum Conditions for Classification of Water Resources Development Division Contractors:

Scope of Work.

A	B	C	D
- Dam weir and reservoir work.	- Excavation of secondary canal or small main canal.	- Excavation of small secondary canal.	---
- Special work (main gate, spillway and tunnel).	- Construction of irrigation structures (medium).	- Construction of small irrigation structures and repair.	
- Excavation of main canal.	- Facility work, etc.		
- Facility work.		- Facility work, etc.	

Table III b

Work Reference

5 years experience in Class B.	5 years experience in Class C.	1 year experience in trial category.	Trial category.

Public Works Office of Province of South Sulawesi
Prequalification/Classification Committee
Jalan Slamet Riady No. 1 Ujung Pandang

FORM

PREQUALIFICATION/CLASSIFICATION OF CONSTRUCTION CONTRACTORS

GENERAL CONDITIONS

1. Name and legal form of Company: .....
   a. Date of formation: .....
   b. Act of formation; enclose copy: .....
   c. Address/Phone No. of Company: .....
2. Business field of Company: .....
3. Business permit; enclose photocopy: .....
   a. From the Mayor/Bupati:
   b. From the Department of Trade:
   c. From the Department of Industry:
   d. From the Department of Communications:
4. Enclose photocopy of latest calendar year Fiscal document from the Tax Office which states that your Company has fulfilled its Fiscal obligation.
5. Enclose the latest Government Bank reference .....
6. Letter of non-involvement with G 30 S for the Management; enclose photocopy . . . . . .

CONDITIONS FOR EVALUATION

I. Personnel.

   1. General Manager/Head of Company: .....
   2. Address of Head of Company: .....
   3. Enclose list of Company's employees: .....

II. Experience; enclose photocopy of SPK/Contract .....

III. Instruments/equipment possessed; enclose list .....

IV. Financial.

1. Are you able to make prefinancing available .....
2. Enclose photocopy of latest bank balance in 1974 .....

Clarification: .....

COMPARISON OF MINIMUM EQUIPMENT REQUIRED OF CLASS A CONTRACTORS WITH PREQUALIFIED FIRMS EQUIPMENT POOL

	Minimum Qualifications	P.T. Hutama Karya*	P.T. Bumi Karsa
Concrete Mixer	2(3)	17	7
Transit/Theodolite	3(6)/2(4)	6/1	5
Truck/trailer	4(7)	11/3(2)	15
Concrete Vibrator	2(4)	1	9
Water Pump (6"/4")	2(4)/2(5)	0/32	29
Pile Driver	(1)		
Roller	(1)	2	4
Dragline/Excavator	1(2)	1	0/5
Bulldozer	(2)	3	4
Compactor/Stamper	1(2)	5	3
Motor Bike	5	37	29
Office Condition	Good	Good	Good
Warehouse	Good	Good	Good
Typewriter	3	10	5
Calculator	2	21	6
Drafting Table	3	4	2

*P.T. Hutama Karya is a state-owned contracting firm with branches throughout Indonesia. The equipment listed here is only that equipment presently in South Sulawesi: It does not, by any means, represent the equipment available to the firm, in its entirety.

COMPARISON OF MINIMUM STAFF REQUIREMENTS FOR CLASS A CONTRACTORS WITH PREQUALIFIED FIRMS

Personnel	Minimum Qualifications	P.T. Hutama Karya	P.T. Bumi Karsa
Graduate Engineer			
Civil	2	7	2
Mechanical	1	2	7
Bachelor of Engineering			
Civil	2	1	11
Mechanical	1	1	
Technical High School			
Irrigation Structures	5	20	39
Building			
Mechanical	2	4	5
Foreman	10	13	24
Surveyor	4	3	1
Administration	6	18	8
Bookkeeper	2	6	8

CONSTRUCTION EQUIPMENT FOR REHABILITATING AND EXTENDING THE BONE-BONE AND KALAENA IRRIGATION SYSTEMS DOWN THROUGH THE SECONDARY CANALS

	Piece of Equipment	Quantity Necessary	P.T.Hutama Karya*	P.T. Bumi Karsa
1.	Excavator type equipment	4	6	7
2.	Dump Truck (5 ton)	20	11	15
3.	Bulldozer (D 80 or less)	6	3	4
4.	Roller	2	3	5
5.	Motorgrader	1	1	-
6.	Well point equipment	2	1	-
7.	Water pump (6" or less)	9	32	29
8.	Vibro pile driver	1	2	-
9.	Concrete mixer	5	17	7
10.	Workshop equipment	1 set	1 set	-
11.	Maintenance car	1	2	
12.	Diesel generator	2	12	-
13.	Oil tanker	1	-	-
14.	Jeep/Inspection Car	15	17	3

*P.T. Hutama Karya is a state-owned contracting firm with branches throughout Indonesia. The equipment listed here is only that equipment presently in South Sulawesi: It does not, by any means, represent the equipment available to the firm, in its entirety.

LUWU IRRIGATION PROJECT
CONSTRUCTION SCHEDULE

BONE BONE SUB PROJECT 3,200 hectares (Rehabilitation and area development)

	1st yr.	2nd yr	3rd yr	4th yr
Expenditures (Rp million)				
Diversion dam rehabilitation	—			
Primary canal rehabilitation	—	—		
Secondary canals		—	—	
Tertiary and Quartanary system	P	—	—	—
Drains		—	—	—
Land clearing	—	—	—	—
P Purchase of equipment for Tertiary and Quartanary	—	—		
Construction Advisor	—	—	—	—
Operation and Maintenance Advisor			—	—

KALAENA SUB PROJECT 7,560 hectares (Rehabilitate existing head works, develop areas A,B,C.)

		1st yr	2nd yr	3rd yr	4th yr
Expenditures (Rp million)					
Head works rehabilitation		—	—		
Primary canals rehabilitation		—	—		
Primary canals new construction			—	—	
Secondary canals:	Area A	—	—		
	Area B		—	—	
	Area C			—	
Tertiary and Quartanary system:	Area A	P	—	—	
	Area B		—	—	—
	Area C			—	—
Drains:	Area A		—	—	
	Area B		—	—	—
	Area C			—	—
Land clearing	Area A	—	—		
	Area B		—	—	—
	Area C		—	—	—
P. Purchase of equipment for Tertiary and Quartanary		—	—		
Construction Advisor		—	—	—	—
Operation and Maintenance Advisor				—	—

BONE-BONE SUB-PROJECT COST ESTIMATE

Item	Unit	Unit Cost	Diversion Dam Rehab. Quantity	Diversion Dam Rehab. Cost Rp. 1,000	Primary Canals Rehab. Quantity	Primary Canals Rehab. Cost Rp. 1,000	Secondary Canals Rehab. & Extension Quantity	Secondary Canals Rehab. & Extension Cost Rp. 1,000	
1. Excavation, common	m^3	340	2,200	748	11,000	3,740	21,000	7,140	
2. Embankment	m^3	415	1,100	457	28,500	11,828	135,000	56,025	
3. Masonry	m^3	14,500	1,470	21,315	1,450	21,025			
4. Masonry Finish	m^2	520	2,940	1,529	5,000	2,600	23,200	12,064	
5. Plastering	m^2	560	340	190	400	224	4,040	2,262	
6. Reinforced Concrete	m^3	140,000	10	1,400	28	3,920			
7. Plain Concrete	m^3	38,400	500	19,200	10	384			
8. Measuring Gates	ea	800,000					30	24,000	
9. Sodding	m^2	350			50,000	17,780	23,000	8,050	
10. Inspection Road	m	4,000			7,130	28,520	13,800	55,200	
11. Clearing & Grubbing	m^2	58					20,000	1,160	
12. Land Acquisition	m^2	20	1,500	30	4,500	90	47,500	950	
13. Right of Way Marker	ea	5,000	4	20	144	720	480	2,400	
14. Operator's House	ea	2,160,000	1	2,160	2	4,320	1	2,160	
15. Slide Gate	ea	5,000,000	3	15,000					
16. Sluice Gate	ea	2,000,000	4	8,000					
Feature sub-total				70,049		95,151		171,411	
TOTAL DIVERSION DAM & PRIMARY & SECONDARY CANALS									336,611
Tertiary laterals	ha	13,800	3,200						44,160
Quaternary laterals	ha	9,500	3,200						30,400
Project drains	ha	3,600	3,200						11,520
Outlet Drains	m	1,000	29,700						29,700
Communication System	LS								4,000
Sub-total									456,391
Contingencies	%	20±							91,127
Field Cost									547,669
Contractor's profit, overhead and taxes	%	25±							136,917
Construction Cost									684,586
Engineering and Admin.	%	10% ±							68,458
Project Cost									753,045

KAIAENA SUB PROJECT --------- -- COST ESTIMATE

Item	Unit	Unit Cost	Diversion Weir Repair Headworkers	Primary Canal 10,700 m Quantity	Primary Canal 10,700 m Cost (Rp.1,000)	AREA A Secondary Canals 10,400 m Quantity	AREA A Secondary Canals 10,400 m Cost Rp. 1,000	AREA B Secondary Canals 22,900 m Quantity	AREA B Secondary Canals 22,900 m Cost Rp. 1,000	AREA C Secondary Canals 5 canals 8820 m Quantity	AREA C Secondary Canals 5 canals 8820 m Cost Rp. 1,000	
1. Excavation, common	m3	340		10,000	3,400			113,000	38,420	26,100	8,874	1.
2. Excavation, medium	m3	380		48,200	18,316	11,000	4,180	27,000	10,260	27,400	10,412	2.
3. Excavation, rock	m3	1,000										3.
4. Embankment	m3	415		24,200	10,043	3,880	1,610	81,000	33,615	12,800	5,312	4.
5. Embankment	m3	425										5.
6. Masonry	m3	17,000										6.
		14,500		740	10,730	17	246	1,860	26,970	864	12,528	
		20,500										
7. Masonry Finish	m2	520		1,400	728	35	18	2,820	1,466	1,540	801	7.
8. Plastering	m2	560		450	252	10	6	770	431	400	224	8.
9. Reinforced Concrete	m3	140,000		10	1,400			23	3,220	4	560	9.
		150,000										
10. Plain Concrete	m3	38,400		2	77			3	115	1	38	10.
11. Reprop	m3	2,300		50	115			50	115	20	46	11.
12. Measuring Gate	ea	800,000		10	8,000	65	52,000	55	44,000	31	24,800	12.
13. Sodding	m2	350						45,000	15,750	16,000	5,600	13.
14. Inspection Road	m	4,000		2,000	8,000	10,700	42,800	22,900	91,600	8,820	35,280	14.
15. Clearing & Grubbing	m2	58		80,000	4,640	50,000	2,900	357,000	20,706	176,000	10,208	15.
16. Land Acquisition	m2	20		80,000	1,600			357,000	7,140	176,000	3,520	16.
17. Right of Way Markers	ea	5,000		200	1,000			920	4,600	554	2,770	17.
18. Operator's House	ea	2,160,000				3	6,480	3	6,480	1	2,160	18.
19. Slide Gate	ea	5,000,000										19.
20. Sluice Gate	ea	4,000,000		6	24,000							20.
Sub total					192,301	Sub total	110,240		289,138		123,133	
Tertiary laterals	ha	13,800				1,740	24,012	3,700	51,060	2,120	29,256	
Quaternary laterals	ha	9,500				1,740	16,530	3,700	35,150	2,120	20,140	
Project Drains	ha	3,600				1,740	6,264	3,700	13,320	2,120	7,632	
Outlet Drains	m	1,000				18,000	18,000	47,500	47,500	23,000	23,000	
Communication System	LS						2,000		4,000		3,000	
Sub total					192,301	Sub total	177,046		499,832		205,839	
Contingencies	%	20+			38,699		35,409		99,966		41,168	
Field Cost					231,000		212,455		599,798		247,007	
Contr, profit, overh &taxes	%	25+			58,000		53,113		149,945		61,752	
Construction Cost					289,000		265,568		749,743		308,759	
Engineering & Admin.	%	10%			28,900		26,557		74,972		30,876	
Total Cost			40,000		317,900		292,125		824,715		339,635	

Financial Analysis of the Rehabilitation and Extension of the Bone-Bone and Kalaena Irrigation Systems (U.S. Dollars)

Activity	Year 1	Year 2	Year 3	Year 4	Totals
I. Diversion Weir/Primary/Secondary canals (current costs)					
a. Bone-Bone	483,567	529,912	340,757	0	1,354,236
b. Kalaena	854,814	1,679,696	1,412,461	0	3,946,971
c. Subtotals	1,338,381	2,209,608	1,753,218	0	5,301,207
d. Uninflated costs 1/less equipment ownership costs	682,574	1,126,900	894,141	0	2,703,615
e. Inflated costs less equipment depreciation (.25, .15, .10)	853,000	1,623,000	1,413,000	0	3,889,000
f. Total costs((e)+ equipment amortization costs)	1,512,000	2,710,000	2,276,000	0	6,498,000
II. Tertiary/Quaternary Systems (current costs)					
a. Bone-Bone	0	184,132	184,132	92,066	,460,330
b. Kalaena	0	245,747	521,754	392,923	1,160,424
c. Subtotals	0	429,879	705,886	484,989	1,620,754
d. 2/(i) farmer contribution	0	94,573	155,295	106,698	356,566
(ii) DGWRD share	0	335,306	550,591	378,291	1,264,188
e. Initial Equipment purchase (FE cost)	651,000	0	0	0	-
f. DGWRD share less 3/equipment amortization costs	(651,000)	234,714	385,414	264,804	884,932
g. Inflating DGWRD share less equipment amortization costs	(700,978) FE element	337,988	608,954	460,759	1,407,701
h. Inflating farmer contribution	0	136,185	245,366	185,655	567,206
i. Total Costs - Tertiary/ Quaternary System Development (g + h)	701,000 (FE element)	474,000	854,000	646,000	2,675,000

Footnotes

1. CIF Cost Equipment Listed Annex J-9, including government taxes and handling charges estimated at $2,911,000. Subtracting out residual value (10% of purchase price) and multiplying by an appropriate capital recovery factor (.332 (5 years to depreciate with 25% interest) x 3 years) leaves equipment depreciation at $2,609,420 or 49% of total uninflated costs.

2. It has been calculated that actual canal digging represents 78% of total tertiary /quaternary canal construction costs while shaping of these canals (i.e. the farmer contribution) represents 22% of the total costs.

3. Annex J-13 gives cost breakdown of equipment necessary to dig tertiary and quaternary canals. Subtracting out residual value (10% purchase price) and multiplying by an appropriate capital recovery factor (.211 (2.5% interest) x 3 years) leaves equipment depreciation at $376,743 or 30% of total uninflated DGWRD costs.

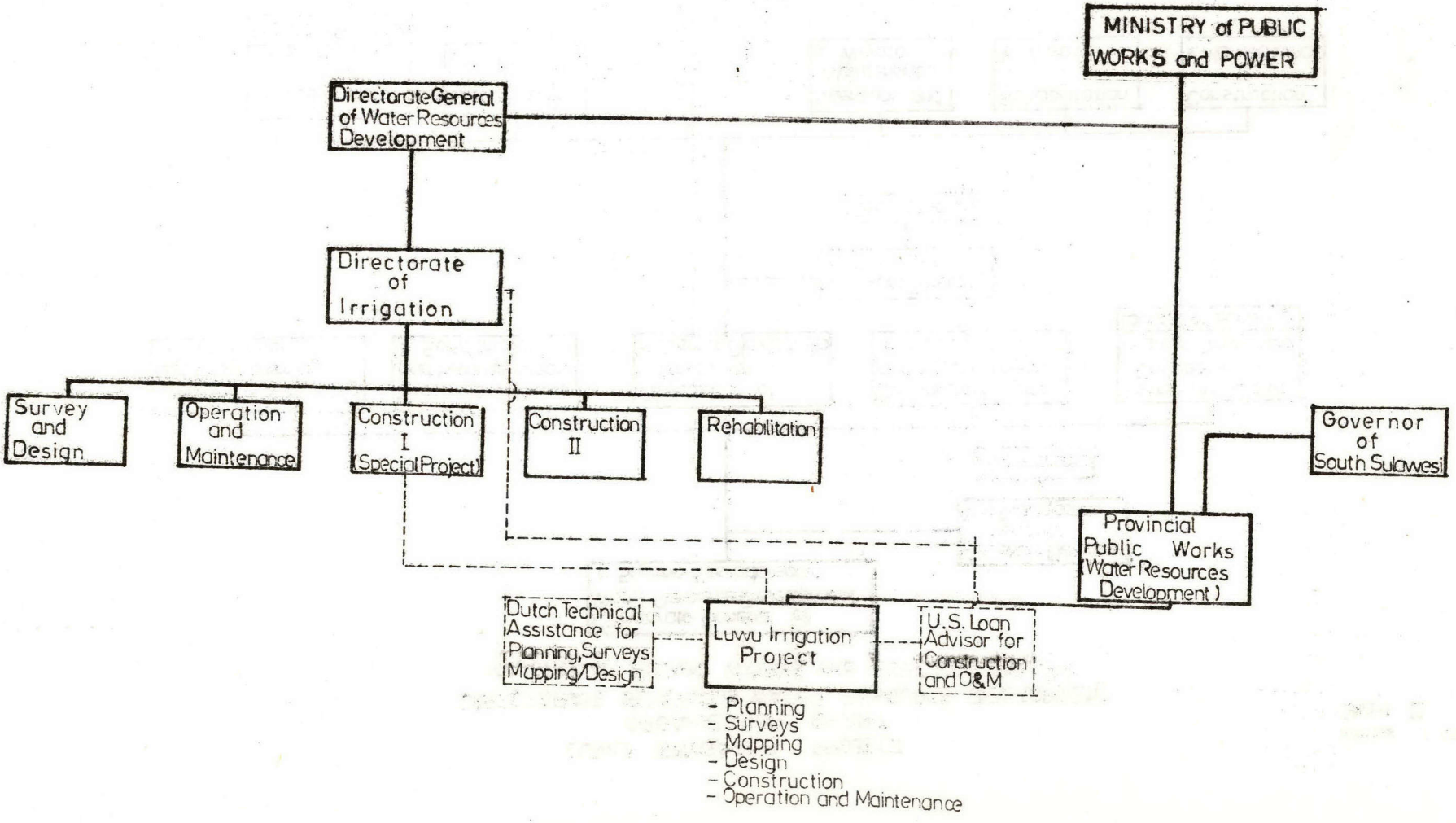
EQUIPMENT FOR CONSTRUCTION OF TERTIARY/QUATERNARY CANALS ON BONE-BONE AND KALAENA IRRIGATION SYSTEMS

Type	Quantity	Unit Cost (CIF) (U.S. $)	Total Cost (U.S. $)
D-50 dozer tractor	4	60,500	242,000
Shovel, backhoe, 1/2 cuy, diesel	6	40,000	240,000
Shovel, backhoe, 3/4 cuy, diesel	1	48,500	48,500
3/4 ton pick-up truck	4	3,000	12,000
Totals			542,500
with inflation 6%, with 20% contingency			701,000

OPERATIONS AND MAINTENANCE EQUIPMENT FOR THE BONE-BONE AND KALAENA IRRIGATION SYSTEMS

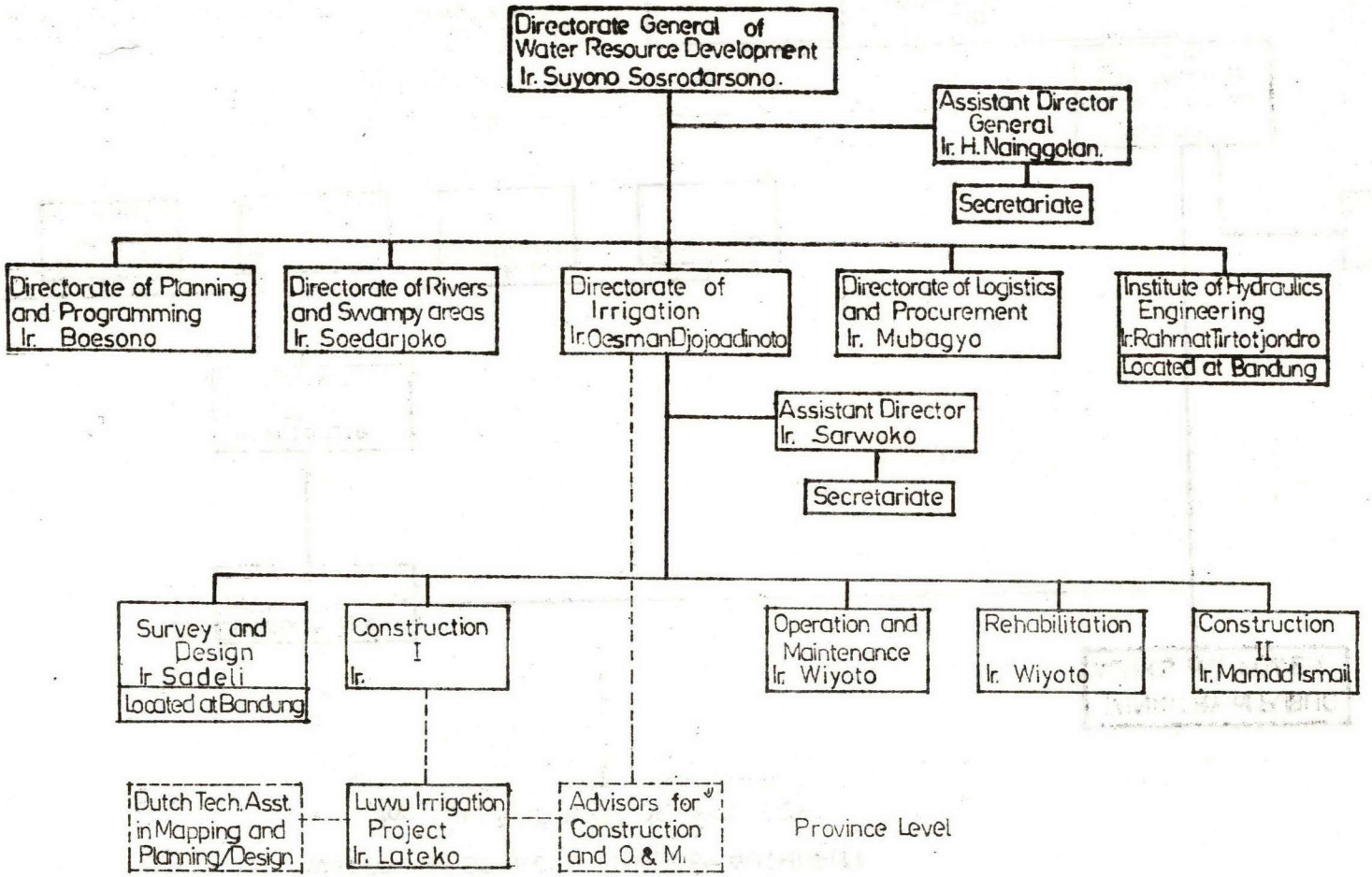
Type	Quantity	Unit Cost (CIF) (U.S. $)	Total Cost (U.S. $)
Inspection Car, 155 HP (Jeep)	2	7,100	14,200
Motor Cycle, 125 cc	5	450	2,250
Telephone set	10-100 KM	500	500
Automatic Rain Gauge	4	30	120
Rain Gauge	80	7	560
Truck, 1½ ton	2	4000	8000
Grader 155 HP	1	66,300	66,300
Dragline, rubbertire, ½ cuy	1	62,000	62,000
Tamping Roller 7.5 ton	2	13,500	27,000
Water Pump 4"	5	2,500	12,500
2"	10	1,600	16,000
Workshop	1	25,000	25,000
Hand compactor	4	500	2,000
Totals			236,430
with inflation 6%, with 15% contingency			288,200

WATER RESOURCES LINES of AUTHORITY
for LUWU IRRIGATION PROJECT



Annex J-15
Chart II.

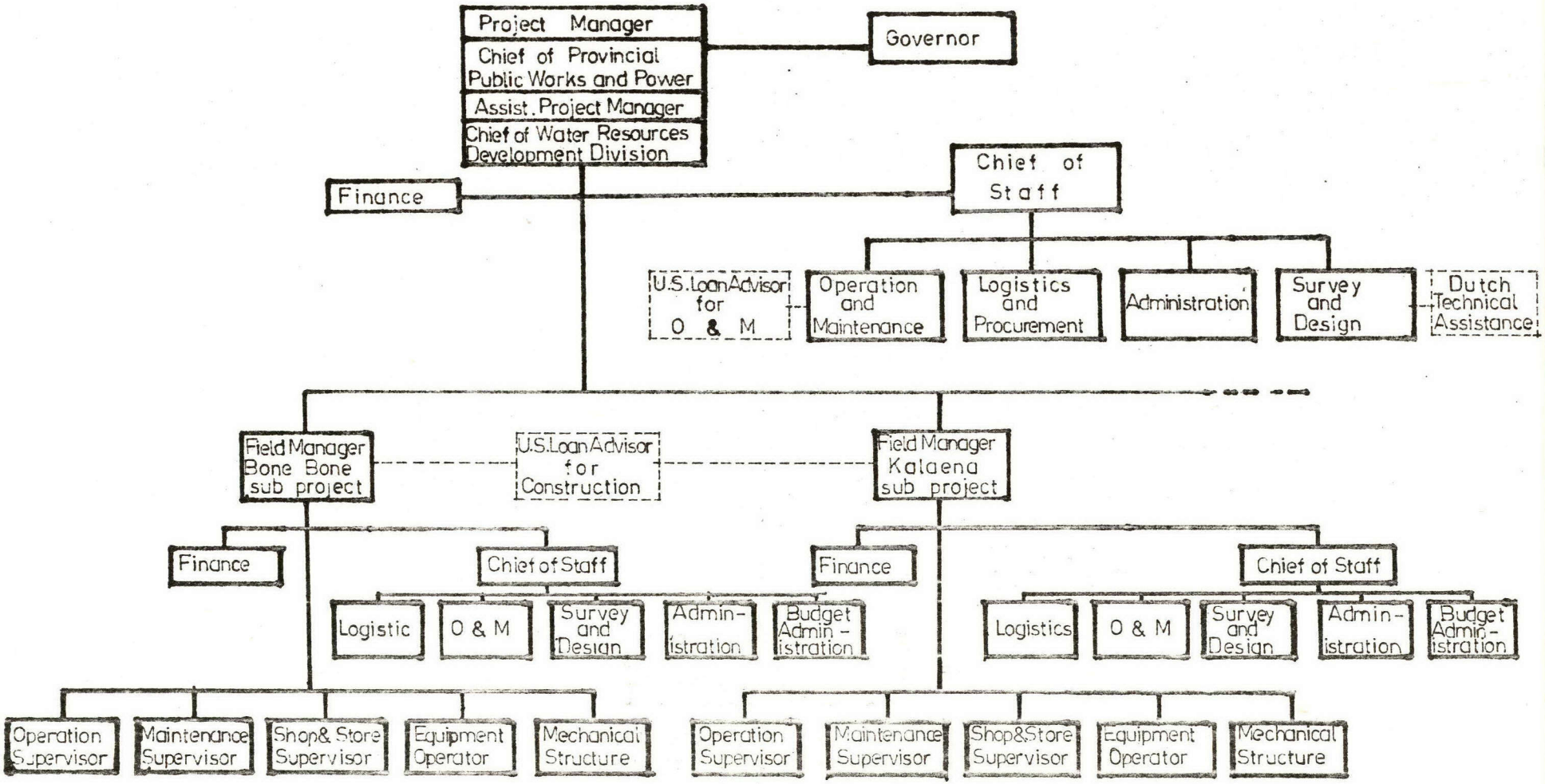
LUWU IRRIGATION PROJECT
ORGANIZATION CHART
DIRECTORATE GENERAL of WATER RESOURCE DEVELOPMENT
MINISTRY of PUBLIC WORKS and ELECTRIC POWER



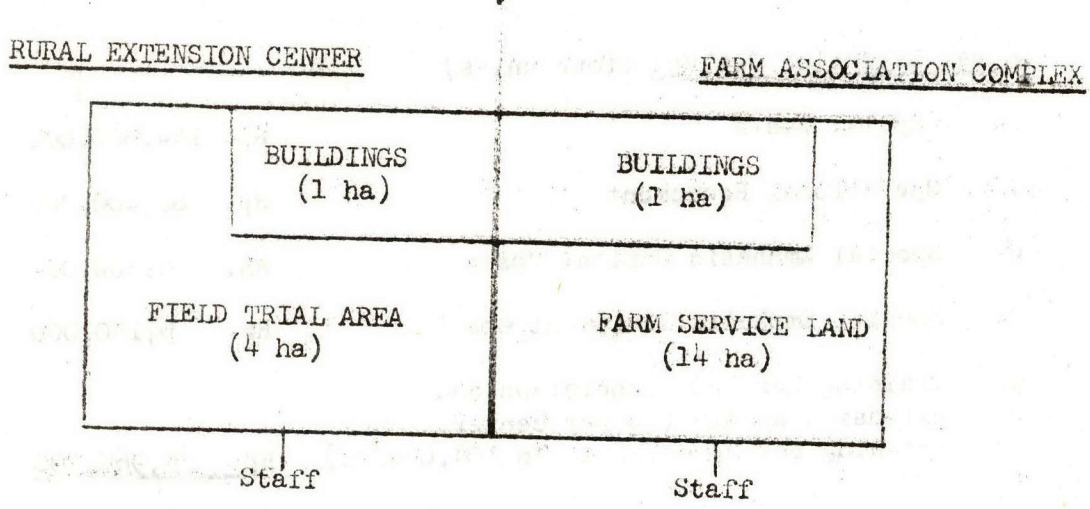
1/ This block shows working relationship of American Advisors for Construction and O&M

CHART III

A TYPICAL SPECIAL PROJECT with SUB PROJECT



FARM SERVICE CENTER



Thirty (30) Extension Service employees

Four (4) Association employees plus farm and mill laborers

OPERATION & BUDGET

Department of Agriculture Extension Service

OPERATION & BUDGET

Farm Association with assistance from the Extension Service

Annex K-2

FARM SERVICE CENTER COST DATE (current costs)

I.	Rural Extension Centers (four units)	
	A. Capital Costs	Rp. 144,600,000
	B. Operational Equipment	Rp. 62,400,000
	C. Special Emphasis Capital Costs	Rp. 8,800,000
	D. Special Emphasis Equipment Costs	Rp. 9,150,000
	E. Training for 120 technicians and extension agents (30 per center, training for 2 months at Rp 104,000/mo)	Rp. 24,960,000
	Sub Total	Rp. 249,910,000
II.	Farm Association Complex (four units)	
	A. Capital Costs	Rp. 192,012,000
	B. Operational Equipment	Rp. 89,960,000
	Sub Total	Rp. 281,972,000
	Total Costs for Farm Service Centers	Rp. 531,882,000

$ 1,221 m

$ 120,000

I. Rural Extension Center

A. Capital Costs

Buildings

1.	Meeting Room 80 M2 x Rp. 25,000/M2	Rp. 2,000,000
2.	Offices/Classrooms 100 M2 x Rp. 40,000/M2	Rp. 4,000,000
3.	Warehouse/Garage 60 M2 x Rp. 25,000/M2	Rp. 1,500,000
4.	Library/Reading Room 20 M2 x Rp. 40,000/M2	Rp. 800,000
5.	Bath/Toilet Room 20 M2 x Rp. 40,000/M2	Rp. 800,000
6.	Guest House 50 M2 x Rp. 40,000/M2	Rp. 2,000,000
7.	Manager House 50 M2 x Rp. 40,000/M2	Rp. 2,000,000
8.	Quaters for staff 120 M2 x Rp. 40,000/M2	Rp. 4,800,000
9.	Workshop 20 M2 x Rp. 40,000/M2	Rp. 800,000
10.	Farm Equipment Shed 30 M2 x Rp. 25,000/M2	Rp. 750,000
11.	Dining/Kitchen 50 M2 x Rp. 40,000/M2	Rp. 2,000,000
12.	Dormitory 80 M2 x Rp. 40,000/M2	Rp. 3,200,000
	Sub Total	Rp. 24,650,000

Grounds

1.	Land Treatment 5 ha x Rp. 60,000/ha	Rp. 300,000
2.	Drainage/Irrigational Canals	Rp. 200,000
3.	Power, Water and Sewarage	Rp. 5,000,000
4.	Fence 2000 M x Rp. 500/M	Rp. 1,000,000
5.	Driveway/Paved Areas 1000 M2 x Rp. 4,000/M2	Rp. 4,000,000
6.	Landscaping 2500 M2 x Rp. 200/M2	Rp. 500,000
	Sub Total	Rp. 11,500,000

Grounds (cont'd)

Buildings sub total	Rp. 24,650,000
Grounds sub total	Rp. 11,500,000
Total	Rp. 36,150,000

Four REC - 4 x Rp. 36,150,000 = Rp. 144,600,000

B. Operational Equipment

1.	Office Equipment (adequate for staff of 3)	Rp. 500,000
2.	Shop Equipment/Tools (carpentry, machine and mechanic tools)	Rp. 1,000,000
3.	Kitchen/Dining Room Equipment (stove, frig, sinks, tables/benches for 40)	Rp. 1,500,000
4.	Farm Equipment/Tools (small tractor plus cultivator tools etc)	Rp. 1,800,000
5.	Transportation Equipment (3 motorcycles and 1 jeep)	Rp. 5,000,000
6.	Guest House Furnishings (4 bedrooms and lounge)	Rp. 500,000
7.	Meeting Room Furnishings (chairs for 40 plus lecturers)	Rp. 200,000
8.	Office/Classroom Furnishing (2 classroom for 30 and 6 offices)	Rp. 1,000,000
9.	Library Furnishing and Books (500 technical books and chairs/tables for 12)	Rp. 1,000,000
10.	Manager House Furnishings (3 bedroom house)	Rp. 500,000
11.	Staff Quater Furnishings (10 bedrooms)	Rp. 1,200,000
12.	Dormitory Furnishings (bunks for 30 trainees)	Rp. 1,400,000
	Sub Total	Rp. 15,600,000

Equipment for four REC - 4 x Rp. 15,600,000 Rp. 62,400,000

C. Special Emphasis Facilities - Capital Costs

Fishery Program (Batusitanduk)

1.	Main and Secondary	Rp.	650,000
2.	Water box and Gates	Rp.	500,000
3.	Holding, Breeding and Siltation Pond	Rp.	400,000
4.	Fish Hatching Building 50 M2 x Rp. 25,000	Rp.	1,250,000
	Sub Total	Rp.	2,800,000

Animal Husbandry (Mangkutana)

1.	Breeding Stock		
	6 cattle (breeding stock)	Rp.	250,000
	6 sheep/swine (breeding stock)	Rp.	60,000
2.	Fence 800 M x Rp. 500/M	Rp.	400,000
3.	Barn 70 M2 x Rp. 25,000/M2	Rp.	1,750,000
4.	Grass Land Seeding 2 ha x Rp. 150,000/ha	Rp.	300,000
	Sub Total	Rp.	2,760,000

Estate Crops (Padang appa)

1.	Nursery 0.5 hectares x Rp. 80,000/ha	Rp. 40,000
2.	Nursery Building 50 M2 x Rp. 25,000/M2	Rp. 1,250,000
3.	Estate Crop Plantings 1.5 ha x Rp. 220,000	Rp. 330,000
	Sub Total	Rp. 1,620,000

Food Crops (Bone-Bone)

1.	Seed Production 0.5 ha x Rp. 80,000/ha	Rp. 40,000
2.	Seed Building 50 M2 x Rp. 25,000/M2	Rp. 1,250,000
3.	Food Crop Plantings 1.5 ha x Rp. 220,000/M	Rp. 330,000
	Sub Total	Rp. 1,620,000

Special Emphasis	Capital Cost	
Fishery Program	Sub Total	Rp. 2,800,000
Personal Husbandry	" "	Rp. 2,760,000
Estate Crops	" "	Rp. 1,620,000
Food Crops	" "	Rp. 1,620,000
	Sub Total	Rp. 8,800,000

D. Special Emphasis Facilitation - Operational Equipment

1. Fishery Program

1.	Equipment/Tools (small mower, hand tools, fishing equipment)	Rp. 400,000
2.	Fish Transport Equipment (tanks w/aerators, oxygen bottles etc)	Rp. 350,000
3.	Fishery Laboratory Equipment (glassware, tanks, dissecting kit etc)	Rp. 400,000
	Sub Total	Rp. 1,150,000

Animal Husbandry

1.	Equipment/Tools (small hand tools, hand tools, suders)	Rp.	400,000
2.	Livestock Transportation Equipment (trailer w/sideboards, water tanks etc.)	Rp.	400,000
3.	Livestock/Veterinarian Equipment (clippers, inoluclation kits, etc.)	Rp.	400,000
	Sub Total	Rp.	1,200,000

Estate Crops

1.	Equipment/Tools (small tractor plus cultivation tools)	Rp.	2,000,000
2.	Nursery Equipment (pots, thermometer, benches, water cans)	Rp.	400,000
3.	Fertilizer/Crop Equipment (sprayers, seeders, fertilizer spreaders)	Rp.	1,000,000
	Sub Total	Rp.	3,400,000

Food Crops

1.	Equipment/Tools (small tractor plus cultivation tools etc.)	Rp.	2,000,000
2.	Propagation Equipment (hand tools, seed testing equipment, thermometer etc.)	Rp.	400,000
3.	Fertilizer/Crop Equipment (sprayers, seeders, fertilizer spreaders)	Rp.	1,000,000
	Sub Total	Rp.	3,400,000

Total D : Rp. 9,150,000

CAPITAL COSTS - FARM ASSOCIATION COMPLEXES

I. Rice Milling Unit

Specifications: Self-contained rice milling unit with 750 tons storage capacity; 1.0 to 1.5 tons gabah/hour milling capacity; 3/4 ton/hour drying capacity; thresher included; steel bins; all construction, design, and engineering costs included; 260 operational days, 2300 tons/year milled rice capacity.

Total Cost: Rp. 34,619,000 per unit

II. Storage Units

Specifications: Flat type warehouse storage; all costs included; 1500 tons rice storage; 30 tons seed storage/processing; 470 tons fertilizer and inputs storage equivalent. Rp. 6692/ton equivalent cost.

Total cost: Rp. 13,384,000 per unit

III. Supporting Equipment & Facilities

Grounds:

(1.)	Land treatment @ Rp.60,000/ha	Rp. 840,000
(2.)	Drainage & irrigation canals	600,000
(3.)	Fencing 3500 m @ Rp. 500	1,750,000
(4.)	Driveway & roads 750 m2 @ Rp. 400	3,000,000
(5.)	Power, water, sewerage	4,000,000
	Sub total	Rp. 10,190,000

Buildings:

(1.)	Meeting room 40 m2 @ Rp. 25,000	Rp. 1,000,000
(2.)	Office 20 m2 @ Rp. 40,000	800,000
(3.)	Managers house 50 m2 @ Rp. 40,000	2,000,000
(4.)	Drying floor 125 m2 @ Rp. 4000	500,000
	Sub total	Rp. 4,300,000

Equipment:

(1.)	Power tiller accesories	Rp. 740,000
(2.)	Trailer for power tiller	110,000
(3.)	Pedal thresher	50,000
(4.)	Seed cleaner	70,000
(5.)	Scales (seed house)	300,000
(6.)	Centrifugal pump 4" - 10"	200,000
(7.)	Arm tools	100,000
(8.)	Hand sprayer	30,000
(9.)	Scales at mill	300,000
(10.)	Moisture tester	100,000
(11.)	Empty bags	200,000
(12.)	Furniture	300,000
(13.)	Typewriters (2)	200,000
(14.)	Calculator/adding machine	100,000
	Sub Total	Rp. 2,800,000

Miscellaneous:

(1.)	Truck	Rp. 4,000,000
(2.)	Motorcycle	400,000
(3.)	Other	800,000
	Sub Total	Rp. 5,200,000
	Total Cost:	Rp. 22,490,000

IV. Summary Costs (4 Association Complexes)

(1.)	Capital cost (I,II)	Rp.192,012,000
(2.)	Equipment/Oper. facilities (III)	89,960,000
	Total Capital Costs	Rp.281,972,000

Rural Extension Center Staff

Position	Number	University Graduate	S.P.M.A. Graduate
Manager	1	1	-
Extension Specialists (education programs	4	-	4*
Extension Agents (BIMAS & vill. assoc.)	15	-	15
Rice Specialists (seed improvement and disease prevention)	5	-	5*
Special Emphasis Specialists (fishery, animal husbandry, estate and food crops)	5	-	5*
Totals	30	1	29

* = Senior

Training Program Schedule

Position	No.	Project Management (months)	Irrig. Rice Rice Management (months)	Rice Mill Storage Transportation	Fish,Est. Crops Animal Science Food Crops	Tot. Mos. Training
Manager	(1)	1	1	2	-	4
Extension Specialists	(4)	1	1	2	-	16
Extension Agents	(15)	-	1	-	-	15
Rice Specialists	(5)	1	1	2	-	20
Special Emphasis Specialists	(5)	-	-	-	4	20
Totals	30					75

ANNUAL REVENUES - FARM ASSOCIATION COMPLEXES

I. Rice Milling

Assumptions: Specified capacities will process equivalent saleable production from 2850 ha (app. 50% of total production) and service farmers in a 6 km2 area; 3562 tons gabah, 2300 tons milled rice; 260 operational days per year.

	Rp. 90.0	/kilo retail price rice
less	74.5	equivalent gabah sale price
	15.5	
less	2.0	estimated retail margins
	13.5	
less	3.7	estimated handling taxes
	9.8	
less	7.0	estimated shipping/marketing costs
	Rp. 2.8	estimated gross margin

Therefore: 2300 tons milled rice equivalent processed and marketed by the association, at Rp.2.8 per kilo gross margin, generates Rp. 6,440,000 maximum annually.

Rp. 6,440,000

II. Improved Seed Multiplication

Assumptions: 5 ha of improved seed - with 2 plantings per year at gabah equivalent market prices; 40,000 kilo production per year.

Rp. 2,980,000

III. Bran Sales

Assumptions: 3562 tons of gabah milled; 8% bran yield per ton of gabah milled; Rp. 8 per kilo bran market price.

Rp. 2,080,000

IV. Supplemental Production

Assumptions: 9 ha. equivalents of gabah from commercial/demonstration acreage in the association complex; one rice crop per year sold at gabah equivalent market prices; no income from special emphasis production.

Rp. 3,352,500

V. Total Estimated Revenues

(1.)	Rice milling	Rp. 6,440,000
(2.)	Seed Multiplication	2,980,000
(3.)	Bran Sales	2,080,000
(4.)	Supplemental Crops	3,352,500
		Rp.14,852,500
	4 Association Complexes	Rp.59,410,000

ESTIMATED RETURN ON INVESTMENT - FARM ASSOCIATION COMPLEXES

I. Pay-back without interest and operational costs (4 complexes):

(1.)	Total capital costs	Rp. 281,972,000
(2.)	Gross revenues	59,410,000
(3.)	Pay-back (years)	4.75

II. Pay-back with interest and operational costs included (4 complexes):

(1.)	Total capital costs	Rp. 281,972,000
(2.)	Interest costs	67,669,000
(3.)	Net revenues (gross revenue less 4th year equivalent operational costs)	53,910,000
(4.)	Pay-back (years)	6.49

III. Pay-back with interest, operational costs, and escalation included (4 complexes):

(1.)	Total capital costs	Rp. 384,070,677
(2.)	Interest costs	92,176,962
(3.)	Net revenues (gross revenue less 4th equivalent operational costs)	53,910,000
(4.)	Pay-back (years)	8.83

ESTIMATED COSTS AND RETURNS OF THE FARMER ASSOCIATION COMPLEXES OVER FOUR YEAR IMPLEMENTATION PERIOD 1/

Year 1-2 2/	Costs (Rp000) Capital 3/	Interest 4/	Operational 5/	Net Returns (Rp000)	Cumulative Surplus (Deficit) (Rp000)
Year 1	Rp.94,000	Rp.33,837	Rp.3,300	(Rp.71,727)	(Rp.71,727)
Year 2	94,000	22,557	4,100	(61,247)	(132,974)
Year 3	93,972	11,278	5,250	(51,090	(184,064)
Year 4	-	-	5,500	53,910	(130,154)
Year 5	-	-	5,500	53,910	(76,244)
Year 6	-	-	5,500	53,910	(22,334)
Year 7	-	-	5,500	53,910	31,576 etc.

1/ Based upon unadjusted costs.
2/ Implementation period to 2 years possible before full scale operation is realized.
3/ One-third of Rp. 281,972,000 capital requirement.
4/ Calculated at 3 years and 12% annual interest on declining balance.
5/ Repair and maintenance costs; exclusive of labor.

LUWU AGRICULTURAL DEVELOPMENT PROJECT

FARM SERVICE CENTER ACTIVITY AND COST SCHEDULE

Fiscal Years	(FAR) Rural Extension Center		(FAR) Farm Association Center		(Four Years - GOI FY 75/76,76/77, 77/78, 78/79) Training		Direct Procurement		Operational Expenses	
	Activity	Cost - Rp (000)	Activity	Cost - Rp (000)	Activity	Cost - Rp (000)	Activity	Cost - Rp (000)	Activity	Cost - Rp (000)
75/76	---	45,078	---	---	--- (Total for 75/76)	16,962 -	--- Rp. 84,710,000	2,420	---	20,250
76/77	---	134,676	---	90,398	--- (Total for 76/77)	12,646 -	--- Rp.371,730,000	62,910	---	71,100
77/78	---	66,512	---	199,498	--- (Total for 77/78)	--- -	--- Rp.393,900,000	45,990	---	81,900
78/79	---	---	---	109,723	--- (Total for 78/79)	--- -	--- Rp.212,845,000	13,122	---	90,000
					(Total for four year program -		Rp.1,063,185,000			
TOTALS		246,266		399,619		29,608		124,442		263,250
AID Contribution		123,133		199,809		29,608		124,442		263,250
GOI share		123,133		199,810		0		0		0

LUWU AGRICULTURAL DEVELOPMENT PROJECT

FARM SERVICE CENTER ACTIVITY AND COST SCHEDULE

	(FAR) Rural Extension Center		(FAR) Farm Association Center		(1st Year - GOI FY 75/76) Training		Direct Procurement		(GOI) Operational Expenses	
	Activity	Cost - Rp (000)	Activity	Cost - Rp (000)	Activity	Cost - Rp (000)	Activity	Cost - Rp (000)	Activity	Cost - Rp (000)
1.	Buildings 1/ (Bone-Bone)	32,538	---	---	---	---	---	---	---	---
2.	Grounds 1/ (Bone-Bone)	12,540	---	---	---	---	Power-Supply 2/ (Bone-Bone)	2,420	---	---
3.	---	---	---	---	In-Country 4/ Training	16,962	---	---	---	---
4.	---	---	---	---	---	---	---	---	Operation 3/ (Wages) & O&M	20,250
	Subtotals	45,078	---	---	---	16,962	---	2,420	---	20,250

Total - Rp.84,710,000

1/ escalation estimates to be 20%, contingency 10%
2/ escalation estimated at 6% , contingency 10%
3/ escalation estimated at 25% contingency 10%
4/ contingency 10%

LUWU AGRICULTURAL DEVELOPMENT PROJECT

FARM SERVICE CENTER ACTIVITY AND COST SCHEDULE

	(FAR) Rural Extension Center		(FAR) Farm Association Center		(2nd Year - GOI FY 76/77) Training		Direct Procurement		(GOI) Operational Expenses	
	Activity	Cost - Rp (000)	Activity	Cost - Rp (000)	Activity	Cost - Rp (000)	Activity	Cost - Rp (000)	Activity	Cost - Rp (000)
1.	Buildings 1/ (Mangkutana & Batusitanduk)	71,485	---	---	---	---	---	---	---	---
2.	Grounds (@ 1/ above location)	27,550	---	---	---	---	Power Supply 2/ Mangkutana & Batusitanduk	5,320	---	---
3.	---	---	---	---	In-Country 4/ Training	12,646	---	---	---	---
4.	---	---	---	---	---	---	---	---	Operation 3/ (Wages & O&M)	71,100
5.	Operational Equipment for 3 RECs 1/	25,230	---	---	---	---	Operational Equipment for 3 RECs 2/	39,102	---	---
6.	Special Emphasis Capital Costs for 3 RECs 1/	10,411	---	---	---	---	---	---	---	---
7.	---	---	---	---	---	---	Special Emphasis Op. Equipment for 3 RECs 2/	7,648	---	---
8.	---	---	Buildings/Grounds (Bone-Bone) 1/	18,111	---	---	Power Supply (Bone-Bone) 2/	2,660	---	---
9.	---	---	Rice Mill/Storage (Bone-Bone) 1/	69,604	---	---	---	---	---	---
10.	---	---	Operational Equipment (Bone-Bone)	2,683	---	---	Operational Equipment (Bone-Bone) 2/	8,180	---	---
	Subtotals	134,676	---	90,398	--- Total	12,646 Rp.371,730,000	---	62,910	---	71,100

1/ escalation estimated at 10%, contingency 10%
2/ escalation estimated at 6%, contingency 10%
3/ escalation estimated at 15%, contingency 10%
4/ escalation 20%, contingency 10%

LUWU AGRICULTURAL DEVELOPMENT PROJECT

FARM SERVICE CENTER ACTIVITY AND COST SCHEDULE

	(FAR) Rural Extension Center		(FAR) Farm Association Center		(3rd Year - GOI FY 77/78) Training		Direct Procurement		(GOI) Operational Expenses	
	Activity	Cost - Rp (000)	Activity	Cost - Rp (000)	Activity	Cost - Rp (000)	Activity	Cost - Rp (000)	Activity	Cost - Rp (000)
1.	Buildings 1/ (Padangappa)	39,440	---	---	---	----	---	---	---	---
2.	Grounds (@ above location)	15,200	---	---	---	---	Power Supply 2/	2,920	---	---
3.	---	---	---	---	---	---	---	---	Operation (Wages & O&M) 3/	81,900
4.	Operational Equipment for IREC (above) 1/	9,280	---	---	---	---	Operational Equipment for IREC 2/	14,308	---	---
5.	Special Emphasis capital cost for IREC (above) 1/	2,592	---	---	---	---	---	---	---	---
6.	---	---	---	---	---	---	Special Emphasis Up. Equipment for IREC 2/	4,964	---	---
7.	---	---	Building/Groups for 2 FACs 1/	39,968	---	---	Power Supply for 2 FACs 2/	5,840	---	---
8.	----	---	Rice Mill/Storage for 2 FACs 1/	153,610	---	---	---	---	---	---
9.	---	---	Operational Equipment for 2 FACs	5,920	---	---	Operational Equipment for 2 FACs 2/	17,958	---	---
	Subtotals	66,512	---	199,498	---	---	---	45,990	---	81,900

Total - Rp.393,900,000

1/escalation projected as 10%, contingency 10%
2/escalation projected as 6%, contingency 10%
3/escalation projected as 15%, contingency 10%

LUWU AGRICULTURAL DEVELOPMENT PROJECT

FARM SERVICE CENTER ACTIVITY AND COST SCHEDULE

	(FAR) Rural Extension Center		(FAR) Farm Association Center		(4th Year - GOI FY 78/79) Training		Direct Procurement		(GOI) Operational Expenses	
	Activity	Cost - Rp (000)	Activity	Cost - Rp (000)	Activity	Cost - Rp (000)	Activity	Cost - Rp (000)	Activity	Cost - Rp (000)
1.	---	---	---	---	---	---	---	---	Operation (Wages & O&M) 3/	90,000
2.	---	---	Building/Grounds for 1 FAC 1/	21,982	---	---	Power Supply for 1 FAC 1/	3,220	---	---
3.	---	---	Rice Mill/Storage for 1 FAC 1/	84,485	---	---	---	---	---	---
4.	---	---	Operational Equipment for 1 FAC 1/	3,256	---	---	Operational Equipment for 1 FAC 2/	9,902	---	---
	Subtotal	---	---	109,723	---	---	---	13,122	---	90,000

Total - Rp.212,845,000

1/ escalation projected at 10%, contingency 10%
2/ escalation projected at 6%, contingency 10%
3/ escalation projected at 10%, contingency 10%

Annex K-7

MANAGEMENT and CONTROL of FARM SERVICE CENTER

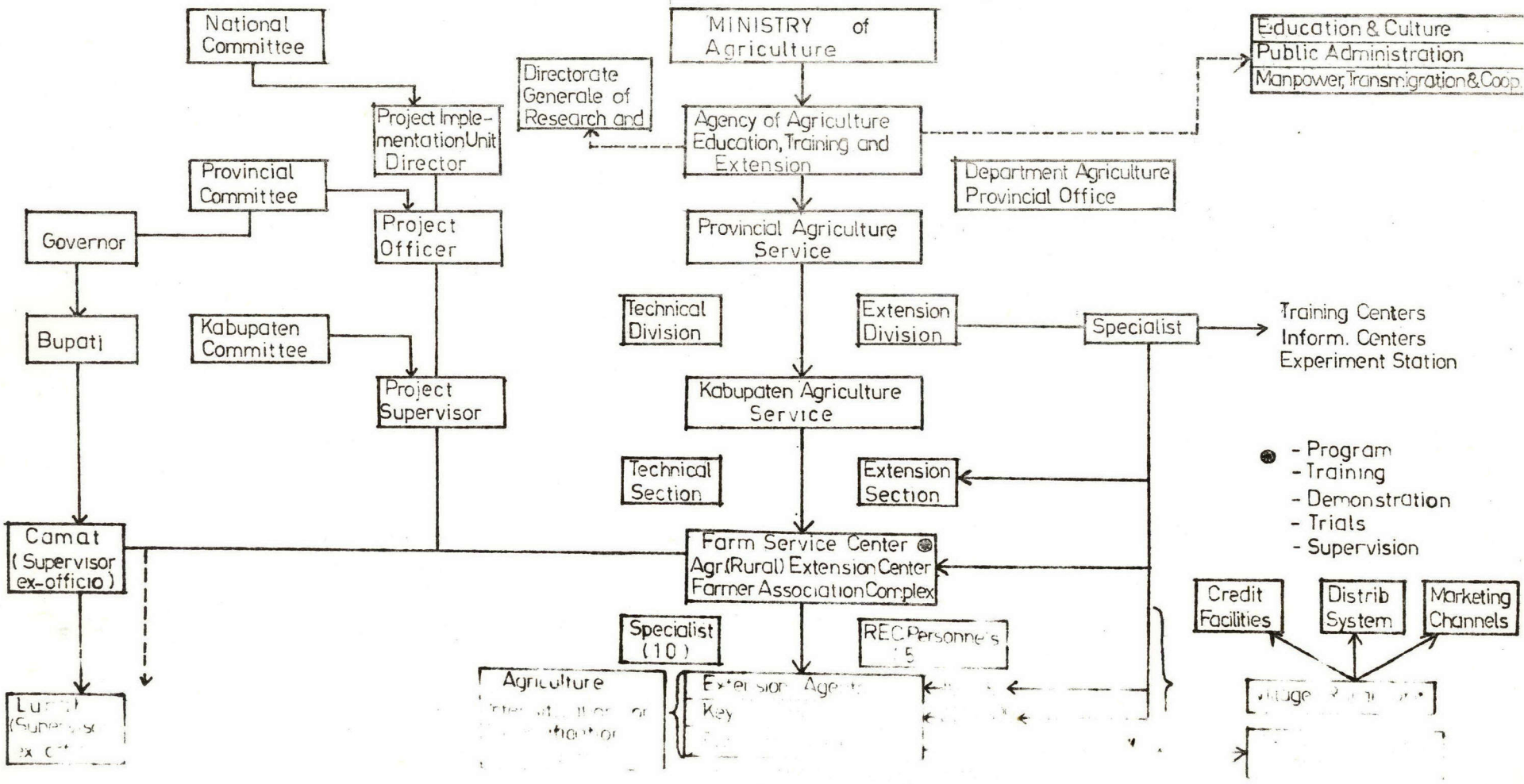
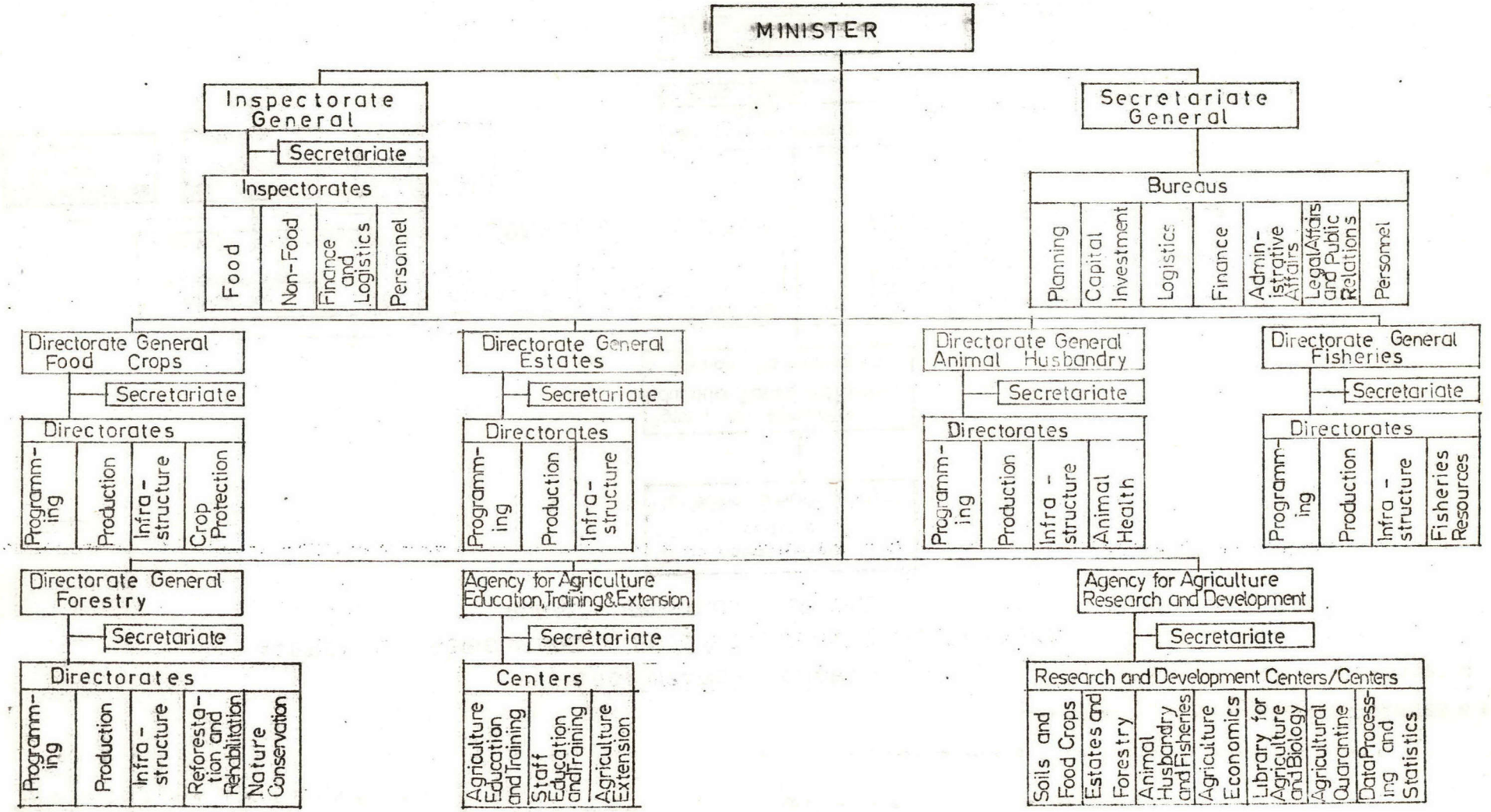


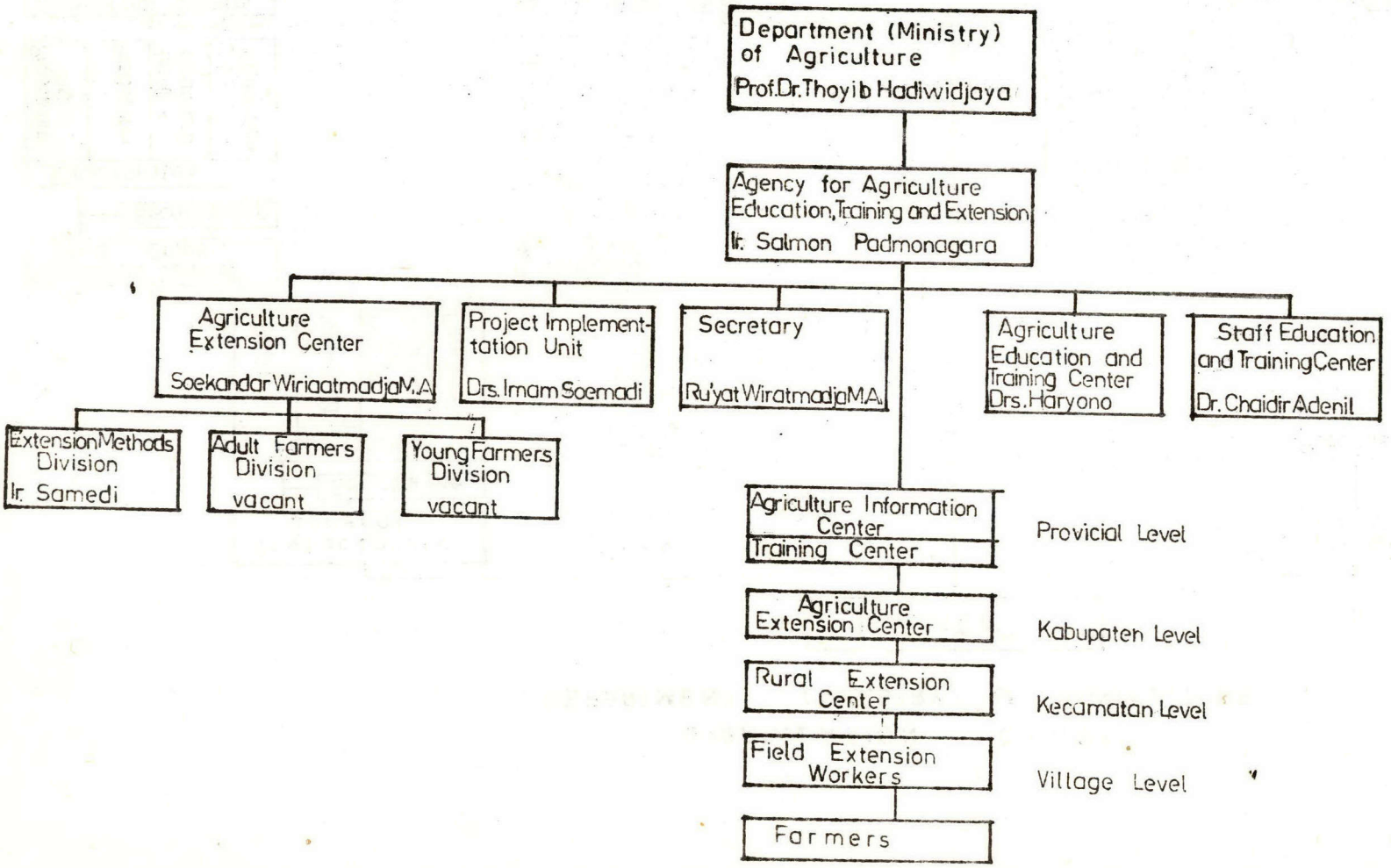
CHART I

ORGANIZATION CHART
DEPARTMENT (MINISTRY) of AGRICULTURE



ORGANIZATION CHART

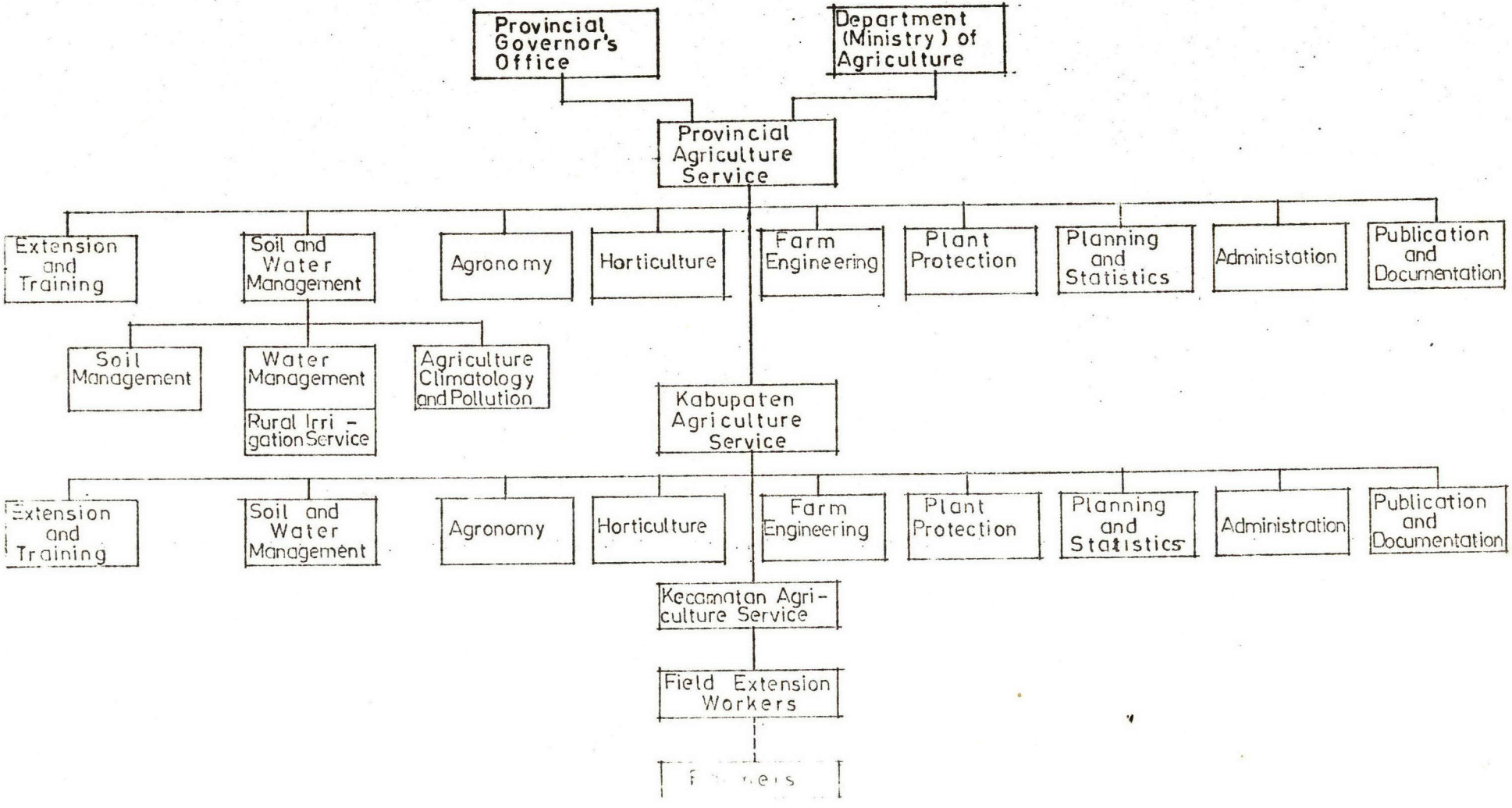
AGENCY for AGRICULTURE EDUCATION, TRAINING and EXTENSION
RURAL IRRIGATION SERVICE



ANNEX K-8

CHART III

TYPICAL ORGANIZATION CHART
PROVINCIAL AGRICULTURE SERVICE



LUWU AGRICULTURAL DEVELOPMENT PROJECT

Internal Rate of Economic Return Calculation

YEAR	COST							BENEFITS	
	Irrigation	Trunk Road	Farm Service Center	Training & Tech. Asst.	Evaluation	Transmi-gration	Project Authority	From combination of Invest. 1/	Net Benefits
1	1,385	7,522	180	149	50	327	180	0	-9,793
2	2,887	5,322	681	168	15	327	100	0	-9,500
3	2,706	3,991	643	77	15	327	100	66	-7,793
4	882	-494 2/	306	0	20	327	40	1,667	586
5	64	212	110	0	0	0	40	3,497	3,071
6	64	212	110	0	0	0	0	4,967	4,581
7	64	212	110	0	0	0	0	7,241	6,855
8	64	212	110	0	0	0	0	9,961	8,939
9	64	212	110	0	0	0	0	11,600	11,212
10	64	212	110	0	0	0	0	12,084	11,698
11	64	212	110	0	0	0	0	12,084	11,698
12	64	212	110	0	0	0	0	12,084	11,698
13	64	848	110	0	0	0	0	12,084	11,062
14	64	212	110	0	0	0	0	12,084	11,698
15	64	212	110	0	0	0	0	12,084	11,698
16	64	212	110	0	0	0	0	12,084	11,698
17	64	212	110	0	0	0	0	12,084	11,698
18	64	848	110	0	0	0	0	12,084	11,062
19	64	212	110	0	0	0	0	12,084	11,698
20	64	212	110	0	0	0	0	12,084	11,698

IRR = 19%

1/ Dissagregated benefits are shown in Annexes L-2, L-3, and L-4.

2/ Salvage value of equipment.

BONE-BONE IRRIGATION SUBPROJECT (3,200 ha.)

Internal Rate of Return (IRR) Calculation

Year	Capital 1/ Costs ($1,000)	Recurrent 2/ Costs ($1,000)	Incremental Production MT	Net Value Production ($1,000)	Net Benefits ($1,000)
1	510	0	0	0	- 510
2	766	5	0	0	- 771
3	577	13	0	0	- 590
4	131	18	616	136	- 13
5	0	19	1,300	267	248
6	0	19	2,708	562	543
7	0	19	5,644	1,170	1,151
8	0	19	7,942	1,597	1,578
9	0	19	8,446	1,664	1,645
10	0	19	8,446	1,664	1,645
11	0	19	8,446	1,664	1,645
12	0	19	8,446	1,664	1,645
13	0	19	8,446	1,664	1,645
14	0	19	8,446	1,664	1,645
15	0	19	8,446	1,664	1,645
16	0	19	8,446	1,664	1,645
17	0	19	8,446	1,664	1,645
18	0	19	8,446	1,664	1,645
19	0	19	8,446	1,664	1,645
20	0	19	8,446	1,664	1,645

Internal Rate of Return = 31%

1/ Total capital cost = $1,984,000

2/ O&M cost estimated at $6/ha/yr

KAIAENA IRRIGATION SUBPROJECT (7,760 ha.)

Internal Rate of Return (IRR) Calculation

Year	Capital Costs 1/ ($1,000)	Recurrent Costs 2/ ($1,000)	Incremental Production MT	Net Value Production ($1,000)	Net Benefits ($1,000)
1	875	0	0	0	- 875
2	2,108	8	0	0	- 2,116
3	2,220	25	300	66	- 2,179
4	692	41	1,893	407	- 326
5	0	45	3,444	702	657
6	0	45	4,324	864	819
7	0	45	7,466	1,539	1,494
8	0	45	15,670	3,252	3,207
9	0	45	22,576	4,548	4,503
10	0	45	24,136	4,756	4,711
11	0	45	24,136	4,756	4,711
12	0	45	24,136	4,756	4,711
13	0	45	24,136	4,756	4,711
14	0	45	24,136	4,756	4,711
15	0	45	24,136	4,756	4,711
16	0	45	24,136	4,756	4,711
17	0	45	24,136	4,756	4,711
18	0	45	24,136	4,756	4,711
19	0	45	24,136	4,756	4,711
20	0	45	24,136	4,756	4,711

Internal Rate of Return = 28%

1/ Total capital cost = $5,895,000

2/ O&M cost estimated at $6/ha/yr

PALOPO-MALILI TRUNK ROAD

Year	Capital Costs 3/	Recurrent Costs 1/	Net Value Production 2/	Net Benefits
		($1,000)		
1	7,522	0	0	- 7,522
2	5,322	0	0	- 5,322
3	3,991 4/	0	0	- 3,991
4	- 706 3/	212	1,134	1,890
5	0	212	2,528	2,316
6	0	212	3,541	3,329
7	0	212	4,532	4,320
8	0	848	5,112	4,264
9	0	212	5,388	5,176
10	0	212	5,664	5,452
11	0	212	5,664	5,452
12	0	212	5,664	5,452
13	0	848	5,664	4,816
14	0	212	5,664	5,452
15	0	212	5,664	5,452
16	0	212	5,664	5,452
17	0	212	5,664	5,452
18	0	848	5,664	4,816
19	0	212	5,664	5,452
20	0	212	5,664	5,452

Internal Rate of Return = 17%

1/ 1,225/km/yr maintenance cost. Bridge maintenance costs are assume to reoccur every five years.

2/ The benefits to a trunk road only project would be as follows:

3/ Total capital cost = $16,835,000

4/ Salvage value of equipment.

Between 1974 - 1985

Source of Benefits	Increase in Area	Production Increase	Net Value Production Increase
	Ha	MT	$1,000
Traditional rice	4,000	6,000	1,320
Shift of traditional to Bimas rice	2,000	1,800	240
Corn	6,000	6,000	525
Root Crops	1,200	6,000	283
Pulse Crops	3,000	3,000	600
Cash Crops a/	--	--	1,200
Fisheries b/	--	--	160
Forestry c/	--	--	94
Industry d/	--	--	1,250

a/ Assumes 20% increase in net value of production. A large proportion of increase is derived from coconut and coffee plantations already in existance but only partially harvested, due to transportation/marketing costs; and from expected increases in the area of tobacco and rubber cultivation.

b/ Assumes 25% increase fishery production during 10 year period.

c/ Assumes 10% increase in net value of forestry production. Large proportion of increase will come from Luwu's rattan and resins which now suffer a comparative disadvantage due to high transportation costs of these high volume, low value commodities.

d/ Assumes 10% increase in net value of industrial production over 10 year period.

An Analysis of the Palopo-Masamba, Masamba-Wotu, and Wotu-Malili Road Segments

A detailed economic analysis was also made of this subproject by dividing the Palopo-Malili trunk road into three links, calculating costs and assessing development benefits only. The economy of the entire north Luwu plain is characterized by self-sufficient agriculture with rural people living at subsistence levels. The outputs and beneficiaries of the road are scattered along the entire length of the road. A brief description of each link's expected generated production, surpluses and trade flows follows:

A. Link 1: Palopo-Masamba. This link services the largest population of all three links and will be the route for traffic generated from the other link's areas of influence. One farm service center specializing in rice and fisheries will border this segment. The principal benefits of this road link will be increased food and commercial crop and fisheries production. Most of the surplus will be moved by truck through Palopo to various locations within the province. The current and forecasted (1983) Average Daily Traffic (ADT) counts are 200 and 575 respectively. The internal rate of economic return (IRR) is 18%.

B. Link 2: Masamba-Wotu. This link's area of influence includes several transmigration villages a farm service center specializing in food crops and one irrigation system (Bone-Bone), although the economic analysis of the road excludes any benefits to flow from construction of the irrigation subproject. Large increases in the production and surplus of food crops, as well as forestry products and some commercial crops are expected. Some surplus will leave the area via the very small, but well located port of Wotu. However only very small boats can traverse an existing sand bar at the river's mouth and this only at high tide. Most of the area's surplus will be trucked to either Palopo's superior port for inter-island shipment or to Malili's food deficit area. Current and forecasted ADT's are 20 and 435. Both the Palopo-Masamba and Wotu-Malili links' ADT include a significant amount of traffic generated by this link's area of influence. The internal rate of economic return is 17%.

C. Link 3: Wotu-Malili. A farm service center specializing in animal husbandry and the Kalaena irrigation system are within the area of influence of this road link. Malili on the eastern end of the road, will become an increasingly food deficit area as its non-agricultural population increases rapidly. The principal benefits of the road will be derived from increases in food production near the western end of the road, commercial crops, livestock, forestry and light industry. A significant increase in the commercial trade of general merchandise, consumer items and passenger traffic are also expected. Much of the surplus will move to either Palopo or to Malili by truck. The ADT is expected to grow from a negligible amount to 245 in 1983 as reliable lower cost transport provides access to markets. The IRR is calculated at 18%.

FOOD CROP PRODUCTION

North Luwu Plain

	1974				1985			
	Ha 3/	Production MT	Total Value ($1,000)	Demand MT	Ha 3/	Production MT	Total Value ($1,000)	Demand MT
Rice 1/								
- Traditional 2/	17,000	20,000	4,345	18,600	21,000	31,000	6,930	38,900
- BIMAS	1,500	3,600	675		19,500	46,000	8,775	
Corn	7,600	6,846	800	5,300	14,500	14,450	1,520	9,800
Cassava	3,900	19,500	920	17,000	6,650	33,200	1,570	31,580
Soybeans	3,700	2,900	775	1,600	7,860	7,100	1,650	3,000
Peanuts	760	840	85	550	1,450	1,600	163	1,000
	31,100		7,600		70,900		20,608	
No. Farm Families	37,900				60,960			
Avg. Family Farm Income	206				340			
No. man-days of labor per farm	131				200			

1/ Production on milled rice basis
2/ Includes some rainfed rice
3/ Hectares harvested per year

Farmer's Production Costs and Return, and Net Value Production to Economy, Per Hectare; Per Season; for Various Crops; and for Average Farm, per annum 1/, 1973

	C R O P						
	Corn	Cassava	Soybeans	Peanuts	Irrigated Rice Traditional	Irrigated Rice BIMAS	Average Farm in project area (per year)
A. Production Costs							
1. Costs other than labor	1,500	2,000	13,100	19,400	27,800	52,900	14,570
2. Labor costs	15,000	24,500	18,750	20,000	45,000	59,300	26,440
B. Total Production Costs	16,500	26,500	31,850	39,400	72,800	112,200	41,010
C. Yield (Mt/ha)	.9	5.0	.8	1.1	1.5	2.4	-
D. Price (Rp/kg)	50	20	125	60	110	100	-
E. Gross Value of Production/ ha	45,000	100,000	100,000	66,000	165,000	240,000	100,070
F. Farmer's Net Income (E - B)	28,500	75,500	68,180	26,600	92,200	127,800	59,060
G. Net Value Production to Economy (F+A.2)	43,500	98,000	86,930	46,600	137,200	187,100	85,500 ($206)
H. Average ha per farm per year	0.2	0.1	0.1	.02	0.35	0.05	0.82
I. Production Period (months)	4	9	4	3	6	5	-
J. Total Value of Production per crop month (G÷I)	10,800	10,900	21,730	15,000	22,870	37,420	-

1/ Total annual production divided by number of farmers. In reality there are two types of "typical" farms; those emphasizing rice and those emphasizing dryland food crops.

ANNEX L-7

Additional Agricultural Production Employment Opportunities to be Generated by Luwu Agricultural Development Project

	Existing Farms Upland Crops	New Area Irrigated Rice
Additional work days per ha	85	380
Incremental area cropped (1,000)	15	19,2
Total additional work days	1,275	7,296
Work days per year, per worker	250	250
Additional work opportunities	5,100	29,184

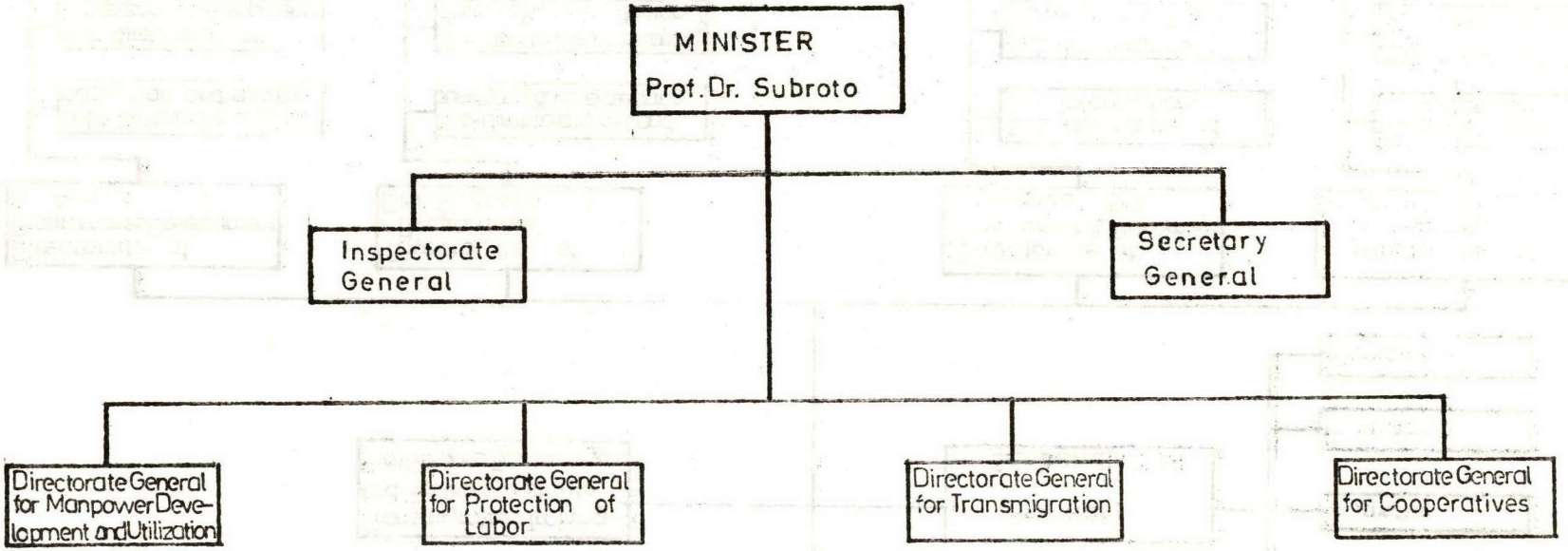
The Long-Term Potential of Kabupaten Luwu

The long-term potential for the agricultural development of Luwu is substantial. In terms of land use alone, the land utilized for rice cultivation can increase more than five-fold from 18,500 hectares to 97,600 hectares; the land being utilized for production of non-rice food crops can increase more than six-fold from 12,600 hectares to 78,700 hectares; and land allocated for other crops can increase ten-fold from 3,300 hectares to 34,600 hectares. Furthermore, as stated earlier, the level of crop production technology currently being practiced in Luwu is quite low. As more modern practices are introduced into the area, as additional families move to the Kabupaten, as access is provided to agricultural input markets, and as agricultural credit programs are expanded, the production increase will be substantial. In terms of rice alone, Luwu has the potential for producing 330,000 MT of milled rice annually, which represents over 25% of the tonnage Indonesia currently imports yearly.

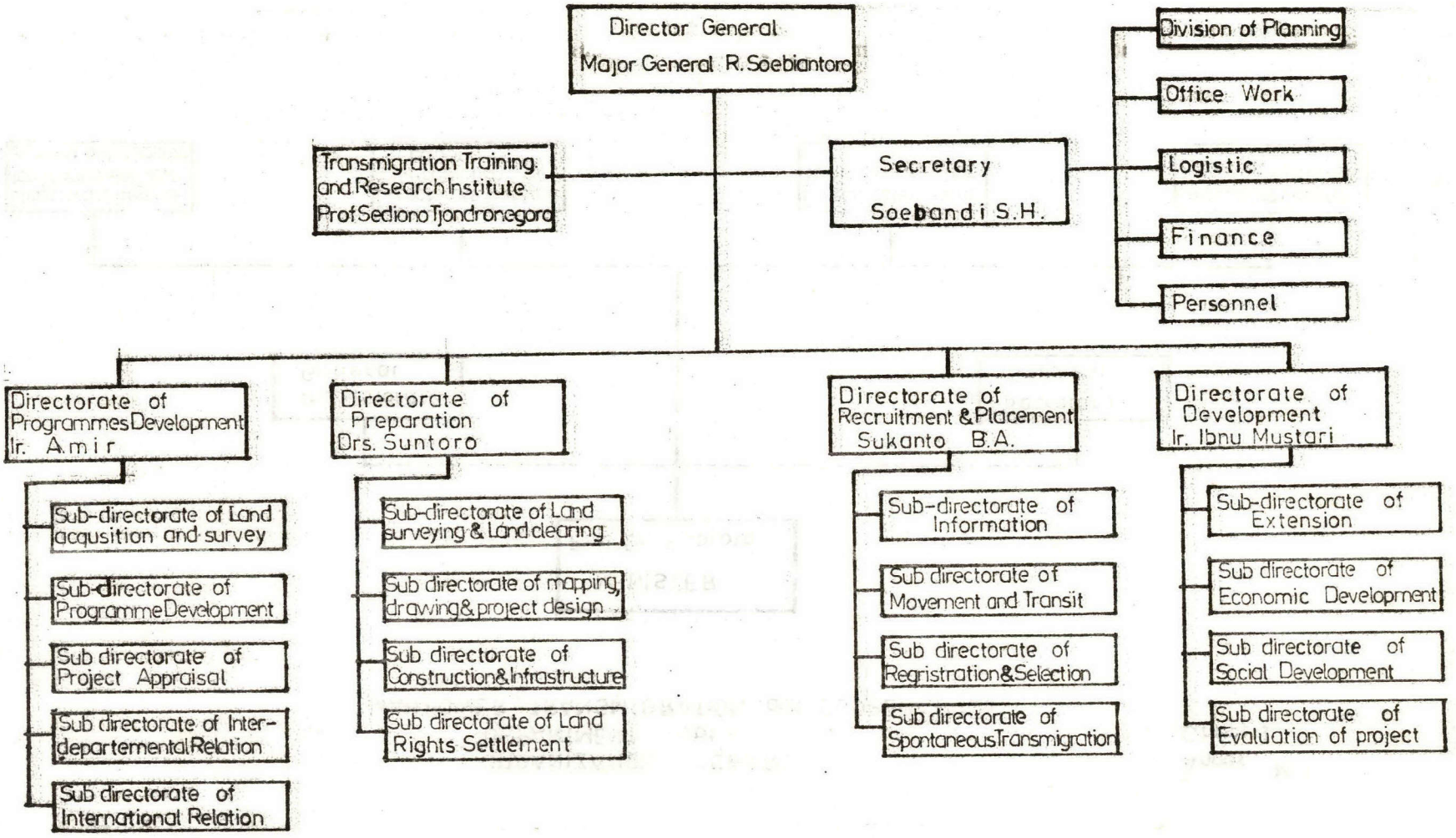
The package of investments in the Luwu Agricultural Development Project alone are not sufficient to realize the long-term potential for Luwu but are necessary first-phase activities which will lay the groundwork for future investments designed to realize this long-term development potential. For example, the betterment of the main trunk road through the north Luwu plain is considered the basic transportation investment for Luwu. Future projects in the transportation system may include such activities as feeder road construction, village road betterment, and harbour improvement: It should be noted that none of these future activities would be possible without the present investment in the Palopo-Malili main road. Regarding the cultivation of rice, the rehabilitation and extension of the Bone-Bone and Kalaena irrigation systems and establishment of four farm service centers(FSCs) are the most immediate investments to realize the rice production potential of Luwu. Future irrigation system efforts will follow the Dutch irrigation design program. The development of non-rice food crop potentials will also develop over time especially with the operation of the FSCs. It is anticipated that the results of the Luwu Microeconomic Survey, scheduled for completion in August or September 1975, will identify second stage investments in this field.

Annex M-1
Chart I

ORGANIZATION CHART
DEPARTMENT of
MANPOWER, TRANSMIGRATION and COOPERATIVES

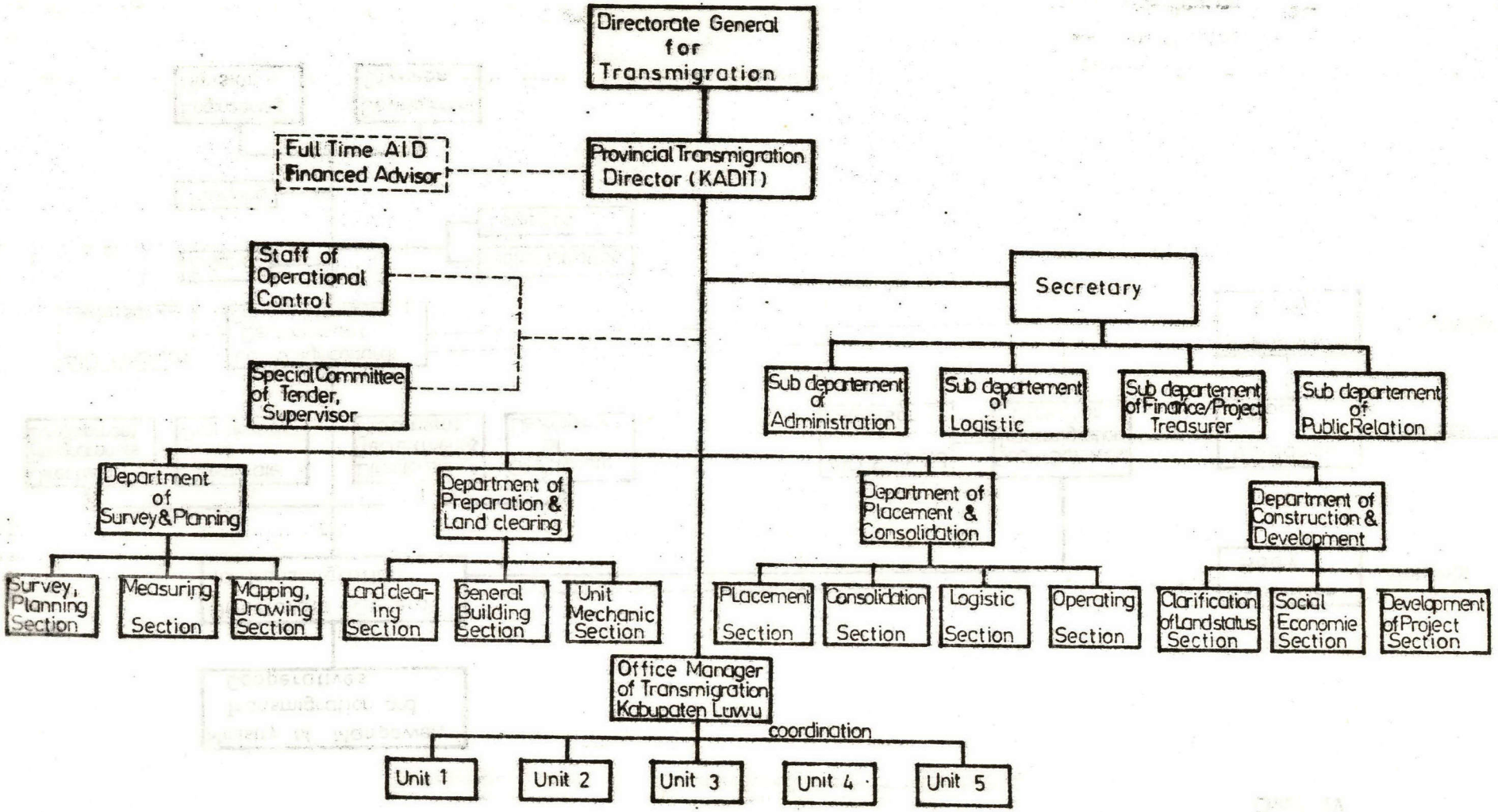


ORGANIZATION CHART
DIRECTORATE GENERAL of TRANSMIGRATION



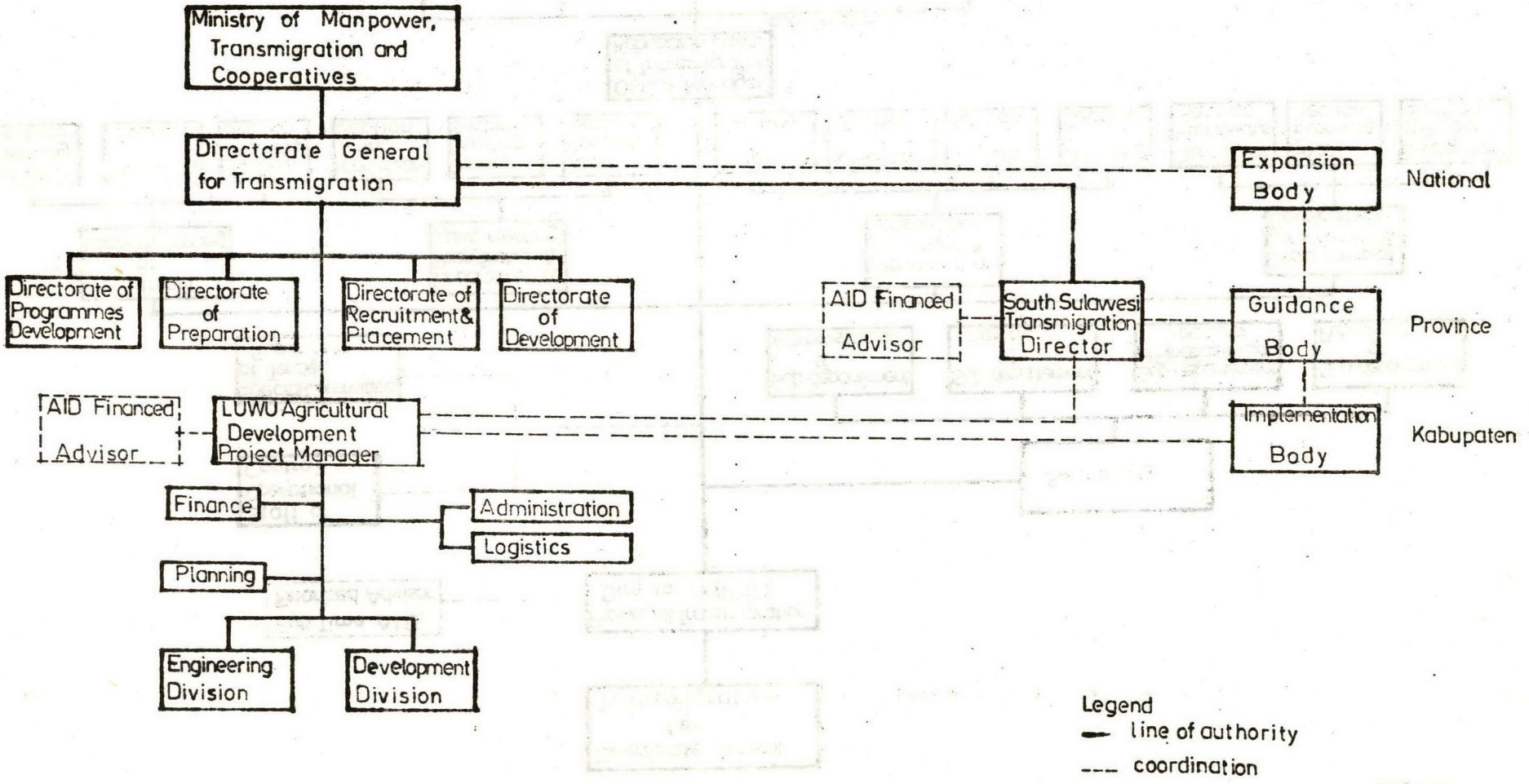
ORGANIZATION CHART of THE SOUTH SULAWESI PROVINCIAL TRANSMIGRATION OFFICE

Annex M-1
Chart III



LUWU AGRICULTURAL DEVELOPMENT PROJECT ORGANIZATION

Annex M-1
Chart IV



Luwu Agricultural Development Project Disbursement Schedule
(in thousands of U.S. dollars)

Activity	FY 1976	FY 1977	FY 1978	FY 1979	Totals
1. Betterment Palopo-Malili Road					
a. Purchase Steel	1,500	-	-	-	1,500
b. Local Cost Construction	7,060	9,414	7,060	-	23,534
c. Totals	8,560	9,414	7,060	-	25,034
d. AID Contribution	3,520	2,700	2,023	-	8,243
2. Luwu Irrigation Program					
a. Rehab/Extension Thru Secondary Canals	1,512	2,710	2,276	0	6,498
b. Tertiary/Quaternary Canal					
1. Equipment	701	-	-	-	701
2. Local cost construction	-	474	854	646	1,974
c. Construction Advisor	65	68	72	-	205
d. Land Clearing	51	451	571	631	1,704
e. Operations and Maintenance					
1. Advisor	-	-	72	75	147
2. Equipment	288	-	-	-	288
f. Totals	2,617	3,703	3,845	1,352	11,517
g. AID Contribution	1,522	1,260	1,390	610	4,782
3. Farm Service Centers					
a. Construction	109	542	641	265	1,557
b. Training	41	30	-	-	71
c. Direct Procurement	6	152	110	32	300
d. Operational Expenses	49	171	197	217	634
e. Totals	205	895	948	514	2,562
f. AID Contribution	102	453	431	163	1,149
4. Transmigration					
a. Movement of 3550 families	430	640	850	210	2,130
b. Foreign Advisor	65	68	72	-	205
c. Health Program	40	35	25		,100
d. Total	535	743	947	-210	2,435
e. AID Contribution	93	91	85		269
5. Project Organization					
a. Capital/Operating Costs	180	181	181	181	723
b. Foreign Advisory Services	65	136	144	-	345
c. Training	80	42	-	-	122
d. Evaluation	40	35	35	40	150
e. Total	365	394	360	221	1,340
f. AID Contribution	173	189	155	40	557
6. Total LADP Costs	12,282	15,149	13,160	2,297	42,888
AID Contribution	5,410	4,693	4,084	813	15,000

Listing of Luwu Studies

The following is a partial listing of information about the Luwu area:

(1) A 1969-70 series of reports written by Waskita Karya, an Indonesian consulting firm, contains some of the earlier published information about Luwu. These broad descriptions of the north Luwu plain set out in some detail the potentials for development as well as summarizing the investment projects that would be required to realize that potential.

(2) The Indonesian Directorate of Sea Communications financed an analysis of alternative port improvement possibilities for the ports of Palopo, Wotu and Malili. The study, executed by an Indonesian consultant firm in 1969, contains detailed information about trade flows.

(3) A Luwu Oil Palm Feasibility Study was carried out by the Bogor Institute of Agriculture in 1971.

(4) Soil classification and land use maps published by the Indonesian Soils Research Institute, are available for most Kabupaten Luwu. The Soils Research Institute, assisted by the UNFAO, is working on other soils classification and mapping work.

(5) Aerial photography of the eastern portion of Kabupaten Luwu has been done by the International Nickel Company.

(6) USAID has obtained ERTS imagery of the project area.

(7) In late 1974 an agricultural team including several IRRI scientists studied and reported plant disease and insect problems in the proposed irrigation areas and collected soil and river water samples for laboratory analysis.

(8) The Luwu Micro-Economic Study being done by the Bogor Institute of Agriculture and financed by USAID is analyzing alternative uses of land in various areas of Luwu. This long-term land use study is nearing completion and will be useful in planning future development activities in Luwu.

(9) In 1968 an Indonesian engineering firm developed 1:5000 scale topographical maps for several of the irrigation areas.

(10) The Irrigation Appraisal Evaluation Report, executed by a U.S. consulting firm in late 1974, evaluates the Kanjiro, Bone-Bone and Kalaena irrigation projects proposed by the GOI/DGWRD.

(11) Bina Marga has prepared two reports concerning road projects in Sulawesi and Luwu. The Highway Planning Review, 1974, set forth priorities for the rehabilitation and upgrading of sections of road in Central, South, and Southeast Sulawesi provinces. The Palopo-Masamba-Wotu-Malili Project Evaluation Report (March, 1975) is a detailed feasibility report on one of those high priority road sections.

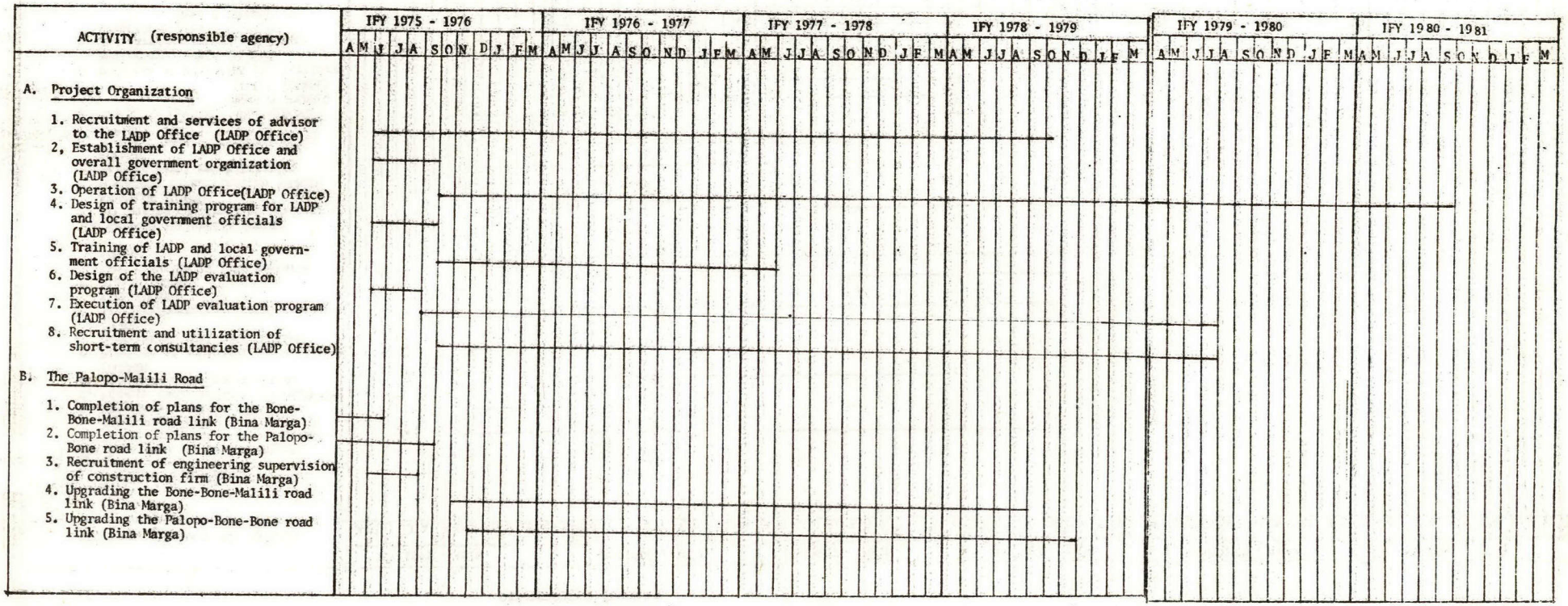
(12) The Proceedings of the Workshop Concerning Area Development in the Bone-Bone and Mangkutana Districts of Luwu, (July, 1974), includes a description of the transmigration program and its relationship with other government agencies in developing specific areas in the north Luwu plain.

(13) There have been several other project proposals which contain additional information about the Luwu area. In 1973 the WFP (U.N. World Food Program) proposed a food program to support new transmigrants in Luwu. CARE has a proposal for a rat control program. CUCO (Credit Union Counseling Office) has proposed a motivation and education program to promote the development of rural credit cooperative.

(14) Finally, there are numerous reports by USAID staff who have been to Luwu to study specific aspects of development potential and problems, and project development.

LUWU AGRICULTURE DEVELOPMENT PROJECT

IMPLEMENTATION SCHEDULE



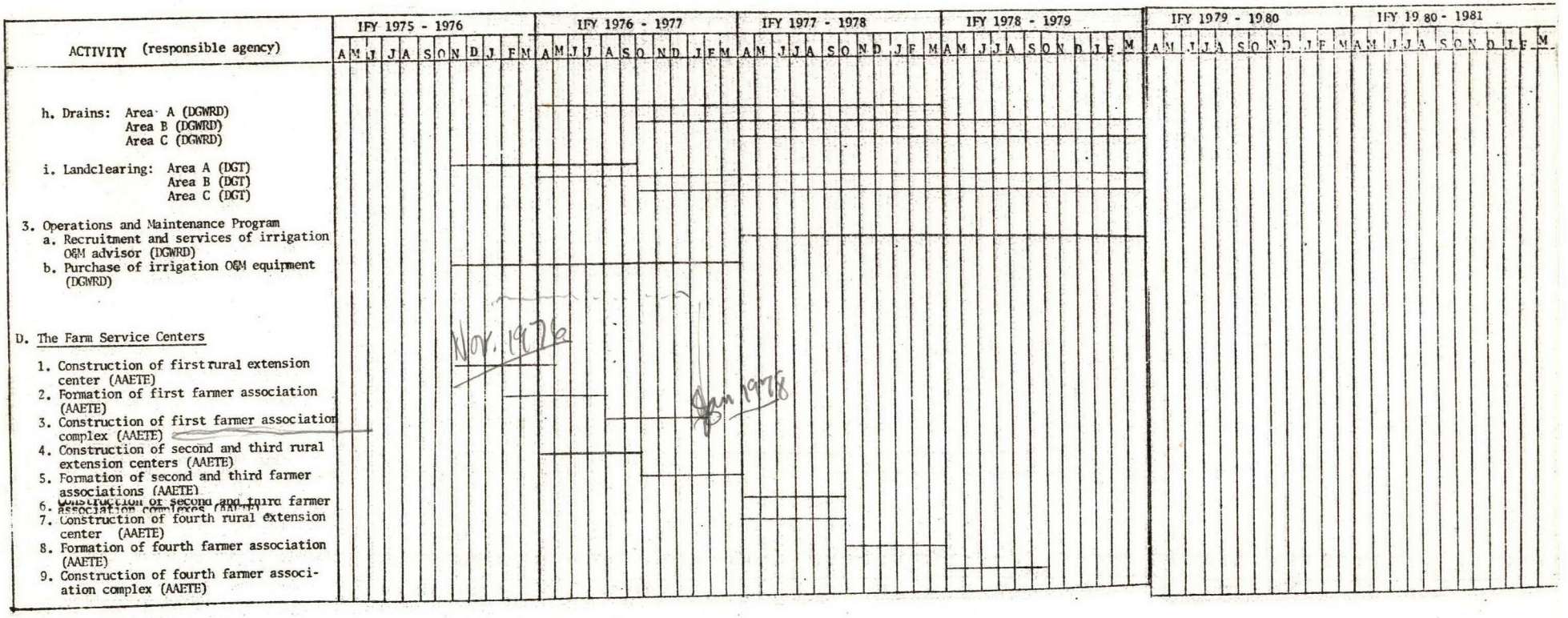
LUWU AGRICULTURE DEVELOPMENT PROJECT

IMPLEMENTATION SCHEDULE

ACTIVITY (responsible agency)	IFY 1975 - 1976	IFY 1976 - 1977	IFY 1977 - 1978	IFY 1978 - 1979	IFY 1979 - 1980	IFY 1980 - 1981
	A M J J A S O N D J F M	A M J J A S O N D J F M	A M J J A S O N D J F M	A M J J A S O N D J F M	A M J J A S O N D J F M	A M J J A S O N D J F M
C. The LUWU Irrigation Program						
1. The Bone-Bone irrigation system						
a. Irrigation construction advisory services (DGWRD)						
b. Dam rehabilitation (DGWRD)						
c. Primary canal rehabilitation (DGWRD)						
d. Secondary canal construction (DGWRD)						
e. Purchase of equipment for tertiary/ quaternary canal construction (DGWRD)						
f. Tertiary/quaternary canal construction (DGWRD)						
g. Drains (DGWRD)						
h. Land clearing on 1300 hectares (DGT)						
2. The Kalaena Irrigation System						
a. Irrigation construction advisory services (DGWRD)						
b. Headworks rehabilitation (DGWRD)						
c. Primary canal rehabilitation (DGWRD)						
d. Primary canal -new construction (DGWRD)						
e. Secondary canals: Area A (DGWRD)						
Area B (DGWRD)						
Area C (DGWRD)						
f. Purchase of equipment for tertiary/ quaternary canals (DGWRD)						
g. Tertiary/quaternary canal construction: Area A (DGWRD)						
Area B (DGWRD)						
Area C (DGWRD)						

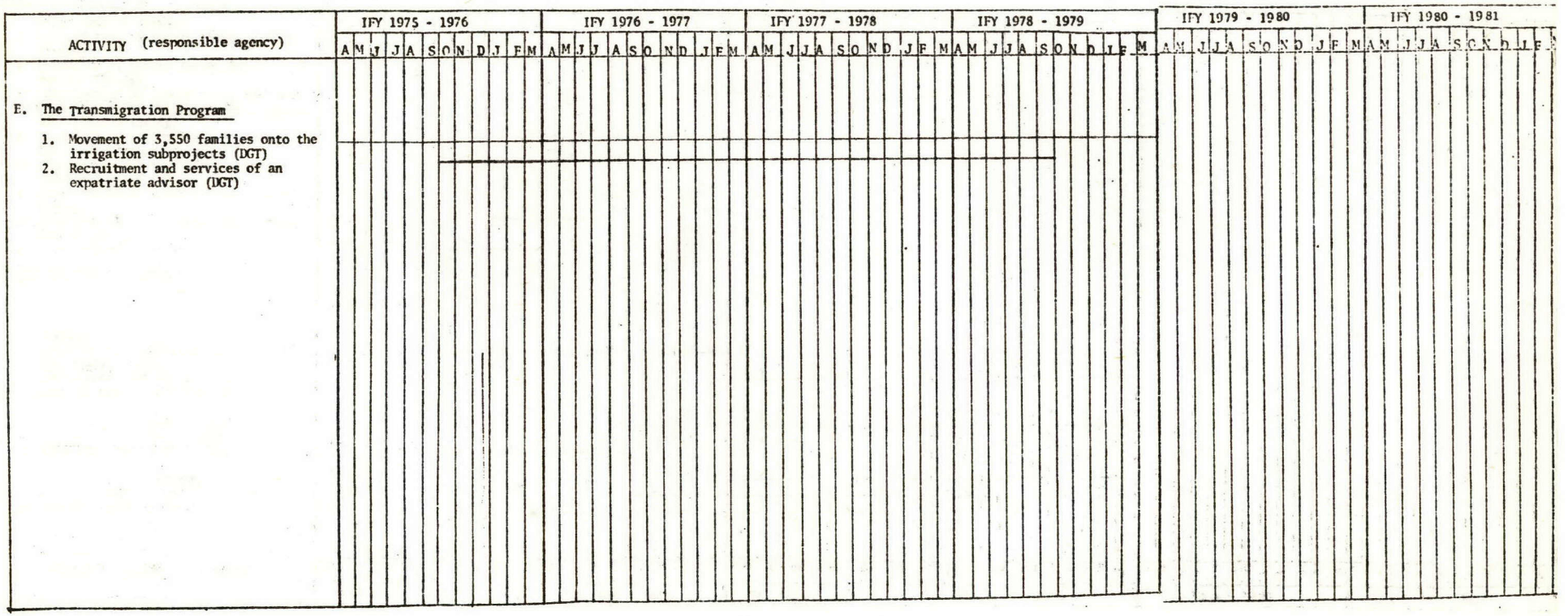
LUWU AGRICULTURE DEVELOPMENT PROJECT

IMPLEMENTATION SCHEDULE



LUMU AGRICULTURE DEVELOPMENT PROJECT

IMPLEMENTATION SCHEDULE



Luwu Village Project, A Study of Formal and Informal Leaders in Selected Transmigration Villages, Institute for Rural and Regional Studies, University of Hasanuddin, Ujung Pandang.

South Sulawesi

Villages: 1. Sidomukti 1935
2. Tepuroutara/Cendana [illegible] 1972/
3. Cendana Hitam/Kartoraharjo II 1973/3
4. Maramba 1973/4

Miscellaneous S
Villag
Main r
Feede
Kecan