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**DEPARTMENT OF TRANSMIGRATION  
PROJECT LUWU  
SOUTH - SULAWESI - INDONESIA**

**CHECCHI / D.M.J.M.  
FINAL REPORT**

**DECEMBER 1983**

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## Definition of Terms

In this report, English terms are used whenever possible. Indonesian terms are used only when no proper English equivalent can be found. These are defined below along with abbreviations and technical terms used in this report.

BAPPEDA TINGKAT II	Kabupaten Planning Office.
Baseline Data	Data gathered for the years 1970-71 to 1975-76, the years before the Project Luwu loan agreement was signed.
Benchmark	Data figures for 1975-76 defined by the curve which "best fits" the baseline data.
Bina Marga	The Directorate General of Highways under the Ministry of Public Works.
BPLPP	Agency for Agricultural Extension and Training.
BPTP	Food Crops Research Station.
Bupati	The "regent" or government executive of a "Kabupaten".
CAMAT	Head of Government for Kecamatan (Sub-District)
CAP	Capital Assistance Paper, USAID's basic planning document for the project.
Desa	A village or collection of villages, the political sub-division of a Kecamatan.
DIP Murni	GOI budget disbursed to the subprojects as the GOI share of local rupiah project costs.
DIP Supplement	Local rupiah cost budgets prefinanced by the GOI which are reimbursable by USAID under the loan agreement.

DOLOG	"Depot Logistik" - The government of Indonesia's rice purchasing and distributing agency.
DUP	Budget Request Submission.
Exports.	Goods produced in Luwu and shipped to any point outside of the Kabupaten, whether it be to other parts Sulawesi, to other Indonesian islands, or to other countries.
FAR	Fixed Amount Reimbursement - a system of reimbursement whereby USAID agrees to pay for its committed share of a project according to portions completed which were previously agreed to.
FCC	Farm Cooperatives Center.
GOI	Government of Indonesia.
Growth Rate	The average annual growth rate of data, calculated by "curve fitting".
Imports	Goods produced anywhere outside of Kabupaten Luwu and consumed in Luwu. They may come from elsewhere in Sulawesi, other Indonesian islands, or from other countries.
IRRI	International Rice Research Institute.
Kabupaten	A "regency", the political sub-division of an Indonesian province.
Kampung	Sub-Section of a Village.
Kecamatan	The political sub-division of a Kabupaten, often compared to an American country or township.
KUD	Farmer's Cooperative.
LAN	GOI Agency for the Conduct of Administrative Training.
LA'TDP	Luwu Area and Transmigration Development Project (Project Luwu).
Lebaran	Islamic New Year.

Logical Framework Matrix	A planning and evaluation aid in simple outline matrix form which describes the inputs, outputs, purpose, and goal of a development project.
LPPM	Central Research Institute for Food Crops Maros, South Sulawesi.
MOF	Ministry of Finance.
O&M	Operations and Maintenance.
P3A	Water Users Associations.
Paddy	Threshed, unmilled rice, the equivalent of the Indonesian term "gabah".
Pembinaan	Program to Guide Transmigrants in Development.
P O M	Planning, Operations and Maintenance.
PPL	Agricultural Extension Worker.
PPM	Agriculture Extension Agent.
PPS	Agricultural Extension Specialist.
Progress Data	Data gathered for the years since the Project Luwu loan agreement was signed, 1976-77 to 1979-80.
PT	Limited (Example: PT Sekayu-Sekayu Ltd).
PTPT	Directorate of Land Preparation for Transmigration Settlement.
PUSKUD	Cooperatives Center at Provincial Level.
REC	Rural Extension Center.
UDT	Transmigration Village Unit.
UNHAS	University of Hasanuddin, Ujung Pandang, South Sulawesi.
USAID	United States Agency for International Development.

## Foreword

Project Luvu is the first integrated rural development project to be completed in Indonesia. It is one of the few successful such projects world-wide. The Indonesian Project Luvu Manager, Colonel (Retired) Heru Susanto, and all the Subproject Managers are to be complimented for the dilligence and perserverance that produced a successful project.

This is the final report of the Checchi/DMJM advisory team to Project Luvu. It follows the format used in the Checchi/DMJM annual reports in examining the progress of the project's inputs, outputs, purpose and goal.

Goal progress indicators have been updated with data for fiscal year 1982-83 using the methodology which was described in the Checchi Evaluation Study of January 1980.

## 2. Summary

During the past year attention turned to the completion of the works and the longer term planning, operations, and maintenance objectives of the project. All subprojects were fully active and good outputs progress was achieved by all. The road subproject in particular showed improved progress. Outputs progress from the Irrigation Subproject was slower than expected but work was completed in December 1983.

### 1.1. Goal Progress

Measures of goal achievement for the project continue to show positive growth trends in the Project Area and significantly greater trends than were recorded during the baseline years. Population growth in Luwu is still extremely high with an increase from 513,000 persons in 1981 to over 535,500 persons in 1982.

Rice production continues to grow at an annual rate of 9.6 percent in Kabupaten Luwu and 31.8 percent in the Project Area. The value of total food production<sup>1</sup> in Luwu is increasing at a rate of 10.9 percent annually, with food production in the Project Area alone increasing at an average annual rate of 23.3 percent. These figures, remaining rather steady over the past four years, continue to indicate that the project has had a substantial impact on agricultural production and the rural poor in Kabupaten Luwu, particularly in the primary project kecamatans where the irrigation subproject is being constructed.

Food imports are increasing at a rate of only 4 percent year while food exports (interinsular trade) are increasing at an annual rate of 9.6 percent. Food consumption per capita is increasing at an annual rate of 7.3 percent compared to a baseline rate of only 0.6 percent per year.

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1. For the purposes of this report, food farm income and food farm production are calculated from the production of rice, corn, soybeans, peanuts, mung beans, sweet potatoes, cassava, green beans, fruits, vegetables, and livestock. It is not meant to be an estimate for total income or production but as an indication of development progress and the impact of the project on the people of Luwu.

Total food farm income per capita in Luwu continues to increase at an annual rate of 6.8 percent compared with the baseline rate of 0.8 percent. In the Project Area alone this indicator is increasing at a rate of 17.2 percent annually compared to a baseline rate of -9.9 percent per year.

The steady annual trends of development indicators over the past four years and the consistent positive trends of all indicators as compared to their baseline trends continue to indicate that Project Luwu has had a beneficial impact on the economy of Kabupaten Luwu and has been successful in raising the well-being of Luwu's rural poor, including transmigrant farmers, by a significant amount.

#### 1.2. Inputs Progress

As of December 1983, project documents indicate that 101 percent of total planned local costs have been expended. Ninety percent of planned foreign exchange has been expended to date. Current total project costs stand at Rp 31,710 million in local currency and \$7,758,000 in foreign exchange.

#### 1.3. Outputs Progress

Output progress indicators have improved dramatically for several of the subprojects this year. Of most importance for all sectors of Luwu's economy, the Palopo-Malili road is now paved and travel time from Palopo to Malili is now less than three hours, compared to impassable in 1979 and seven hours in 1981. The final segment of Section I was turned over to PT Pembangunan Jaya in August 1983. With a masterful effort they completed the entire road by December.

Sales of input supplies by the FCC have surpassed their final annual target by 176 percent and their marketing system reached 80 percent of their target. The ambitious target of 9900 tons of crops handled per year is expected to be surpassed next year when FCC Luwu Selatan is fully operational.

The RECs have now completed their extension activities and have participated in extension programs outside of the Project Luwu framework, most notably the Lappo Ase program. Because of an extremely high response to livestock inoculation programs, the RECs have already attained 233 percent of their goal for extension contacts with 22428 farmers contacted through extension activities.

Irrigation progress this year has not been as rapid as other subprojects but approximately 100 percent of the Bone Bone and Kalaena systems have been constructed. Only 77 percent of the areas, however, are currently under irrigation because of faulty construction on some diversion structures and lack of proper water management.

The agricultural research subproject completed its second year of trial plots and the final report of research results has been submitted.

The Kabupaten Luwu planning office (Bappeda TK II) was established in January 1982 and is undergoing training in the establishment of an input-output model for the Kabupaten's economy as a basis for planning future development programs. Regular staff training seminars were held twice weekly at the Bappeda office with 95 seminars held as of August 31, 1983. Base mapping was completed well as a Bappeda training manual resulting from the on-the-job training activities.

The past year has been the most active year for all subprojects and virtually all met their basic output goals by December 1983, the terminal date for disbursement of loan funds.

#### 1.4. Purpose Progress

This component of the project is now the most critical of all activities to ensure that necessary planning, operation, and maintenance activities for all of the subprojects are in place by the end of 1983 so that project benefits will continue to accrue for many years to come.

Decisions are being made regarding the future status of both the REC and FCC subprojects. Training for irrigation operations and maintenance was completed in late 1983, but funding and action to properly repair irrigation equipment and upgrade workshops is still required. The maintenance of the Palopo-Malili road is a question mark since only one third of the necessary budget has been planned. The Bappeda office underwent on-the-job training to take over the job of coordinating and monitoring development activities in the Kabupaten and planning future development programs.

## 2. Recommendations

Project national guidance committees at the Directorate General level should meet at least once a year to discuss the progress of the project, long term maintenance issues, and the implications of the project on development programs in other areas of Indonesia.

A workshop should be held in Palopo to discuss the future operation of the four RECs following the termination of Project Luwu. GOI funding approval arrived too late to use the DIP/S funds approved by USAID for that purpose. The funds now must come from DIP Murni.

It is recommended that a PUSKUD Kabupaten Luwu be formed to assume the management of the FCCs following Project Luwu. The FCCs are currently operating as a unit of the South Sulawesi PUSKUD although they are in reality independent in their management and finances due to the long distance from Ujung Pandang and the special nature of the Luwu FCC Subproject. The new volume of operations already handled by the FCCs and the future potential volume more than justify the establishment of a Luwu PUSKUD. This would offer the possibility of a truly cooperative management structure within the FCCs where primary cooperative members could participate in meaningful representative management and potentially receive dividends yielded by the organization.

As recommended in the past, the Irrigation Subproject must place a greater emphasis on operations and maintenance requirements. The consultants have already recommended that a budget of Rp 50 million be provided for the upgrading of irrigation equipment shops and Rp 181 million additional be provided to build up the necessary spare parts inventory for heavy equipment currently on hand. Intensive training of water users associations is still required to ensure that water is distributed throughout each of the systems in the most equitable way.

Better inspection of irrigation construction is still required at regular intervals to ensure conformance with design specifications. Rehabilitation contracts have already been tendered to rebuild some structures in Bone Bone and Kalaena which were poorly built by the original contractor, and project costs continue to rise.

Water user fees should be collected from farmers beginning with the 1983-84 planting season to ensure some income for local maintenance operations and to test the collection procedures of the P3A groups in Luwu.

### 3. Introduction

#### 3.1. Description of Kabupaten Luwu

Kabupaten Luwu is an area of 17,791<sup>1</sup> square kilometers. It is located northeast of Ujung Pandang on the island of Sulawesi in the Indonesian archipelago. The Kabupaten is situated on the northeastern littoral of the province of South Sulawesi.

Kabupaten Luwu is also an administrative region. The principal city is Palopo which is the center for the area. The Kabupaten comprises 16 Kecamatans which contain many villages located principally along the road connecting Larompong in the south and Malili to the northeast.

The northern portion of the Kabupaten or the North Luwu Plain was designated in the 1930's as an area to which migrants could move from the more populous islands of Indonesia. Work was begun in that period on construction of roads, clearing land for agriculture, and irrigation systems. The advent of World War II in the 1940's and subsequent political problems interrupted and delayed these activities.

The area was later designated as one of the Government of Indonesia's 100 growth areas. This is appropriate since it is undeveloped and sparsely populated relative to its potential. Efforts toward development of the region were begun anew in the mid-1970's. The area is relatively sparsely settled with a population of 503,742 at the time of the census of 1980. The population grew at an annual rate of 4.8 percent per year from 1970 to 1980. This high rate reflects in part the unmeasured but significant amount of government sponsored and spontaneous immigration during the period. While the greatest numerical increase in population in the decade was associated with food farms, the most marked relative increase reflected growth of the mining industry.

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<sup>1</sup>The area of the Kabupaten has recently been revised downward from 25,144 square kilometers by the Direktorat Agraria, Propinsi Sulawesi Selatan.

Historically, Luwu has been a target area for the transplantation of population from the more densely populated islands. Between 1970 and 1981, 42,744 persons arrived from other islands under government sponsorship.

The economy is primarily agricultural with rice being the principal crop grown. Agricultural land in 1980 amounted to 132,400 hectares of which 55,100 hectares were devoted to estate crops. The amount of undeveloped land with possible economic significance is large and is estimated to be 787,000 hectares.

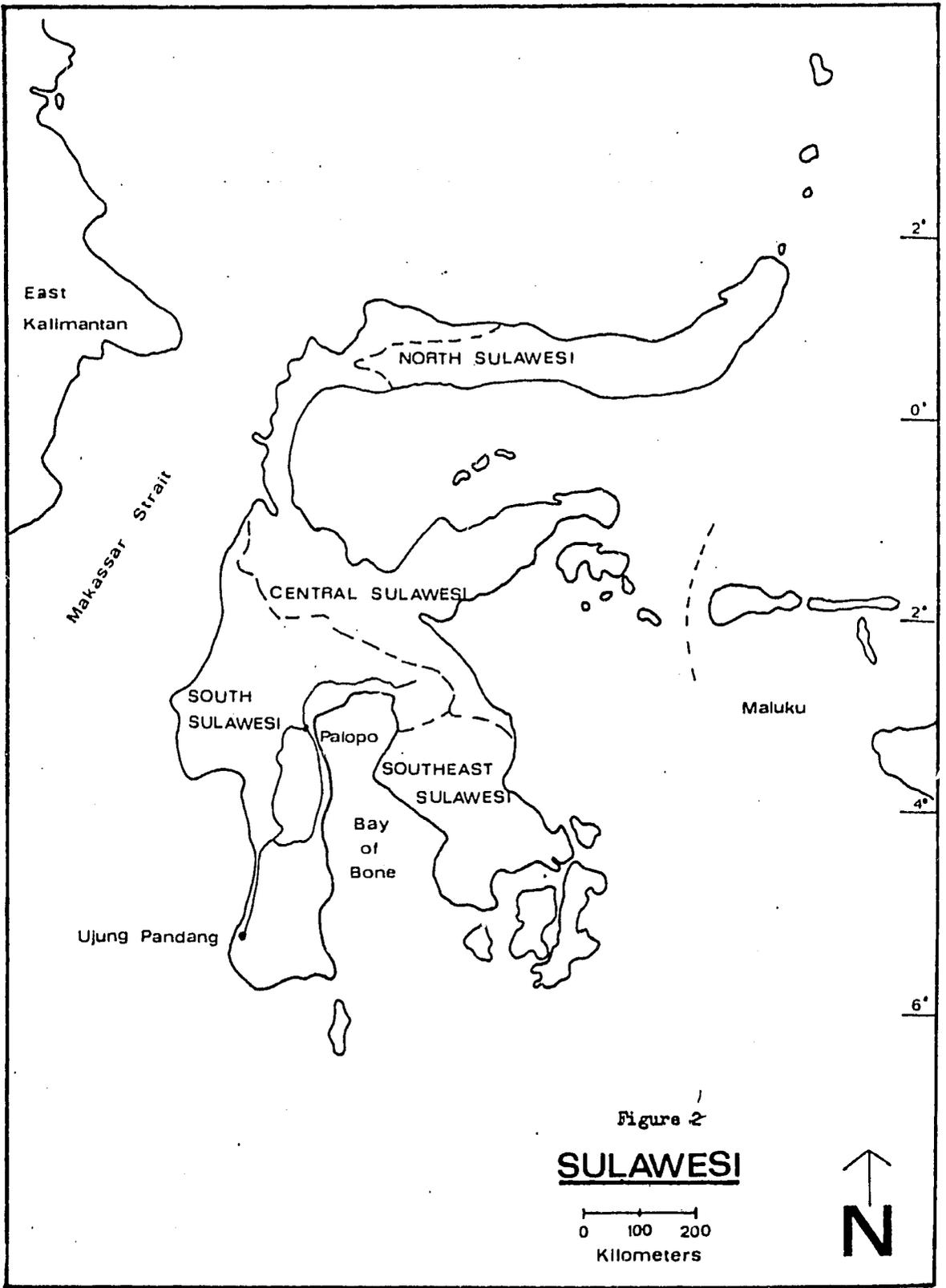


Figure 2

**SULAWESI**

0 100 200  
Kilometers



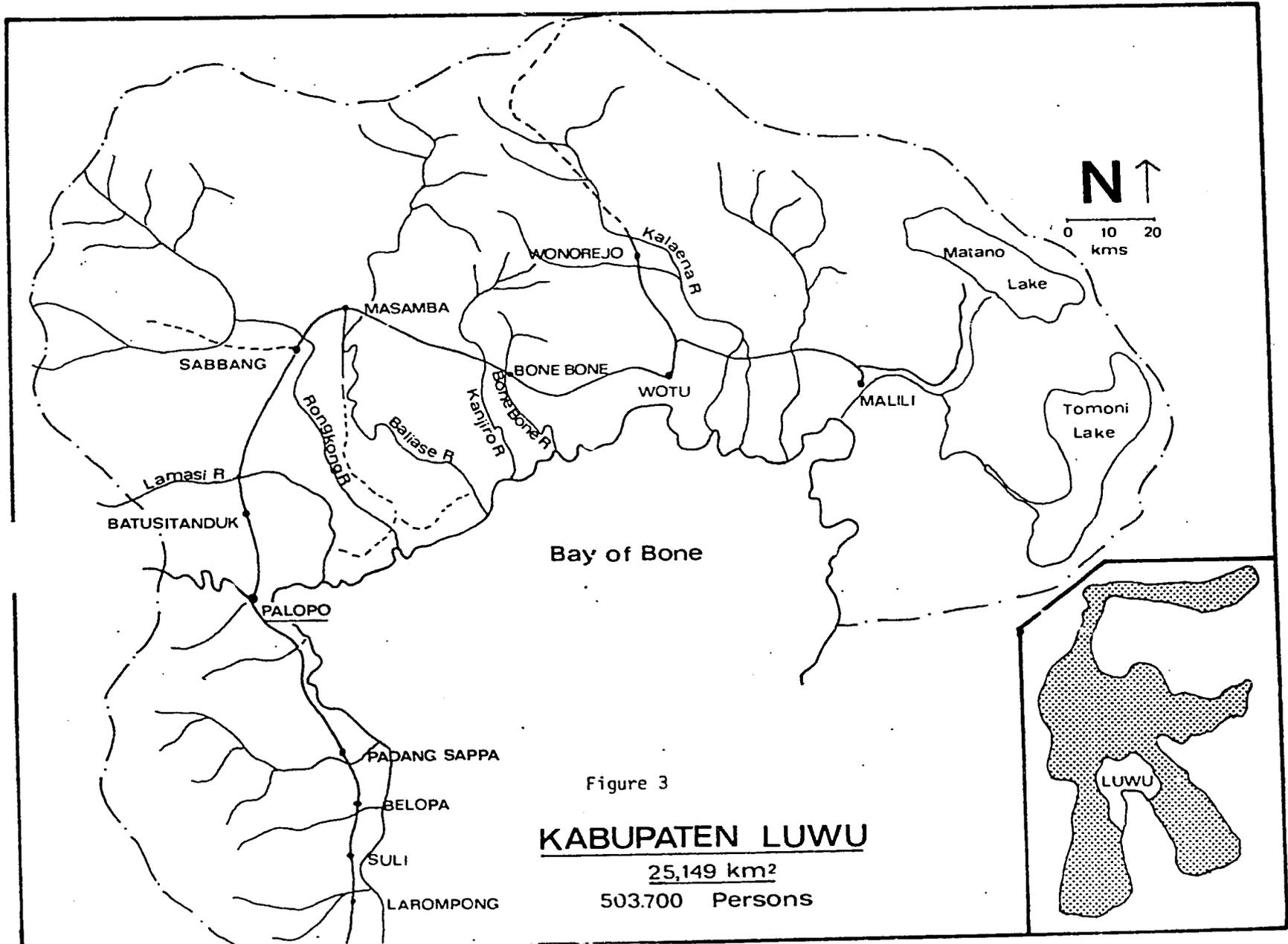


Figure 3

**KABUPATEN LUWU**

25,149 km<sup>2</sup>

503.700 Persons

#### 4. Description of Project

The Luwu Area and Transmigration Development Project is a multisectoral rural development project. The project is an effort to coordinate the planning and implementation of rural development subprojects under the jurisdiction of several ministries to create a development package that will improve the living standards of the rural poor. The basic idea of the project is that a coordinated development program of this type can achieve more at less cost than undertaking the same subprojects individually over a longer period of time.

Project Luwu consists of a project headquarters and seven subprojects which are being implemented by seven directorates general or agencies under five separate ministries. The seven project elements and their tasks are as follows:

##### I. Ministry of Transmigration

###### A. Directorate General of Transmigration

1. Headquarters - a headquarters function in Palopo with offices in Ujung Pandang and Jakarta to coordinate the activities of the project and conduct training and evaluation activities.
2. Transmigration subproject - settle transmigrant families in areas being put under irrigation as part of the Project Luwu program.

##### II. Ministry of Public Works

###### A. Directorate General of Highways

1. Road improvement subproject - improve 177 kilometers of backbone road between Palopo and Malili.

B. Directorate General of Water Resources Development

1. Irrigation subproject - rehabilitate and improve the Bone Bone and Kalaena irrigation systems to provide technical irrigation to 8,655 hectares of land.

III. Ministry of Agriculture

A. Agency for Agricultural Education, Training and Extension

1. Rural extension center subproject - establish four Rural Extension Centers (REC) to provide extension services to farmers in areas of food crops, livestock, fisheries, and estate crops production.

B. Agency for Agricultural Research

1. Agricultural research subproject - investigate and determine the most suitable and productive cropping patterns under the prevailing soil, climatic and socio-cultural conditions in the project area. Develop a non-rice technological packet in Kecamatan Bone Bone and Wotu that can be used by farmers in other areas of Luwu. Information will be disseminated through the REC extension agents.

IV. Ministry of Trade and Cooperatives

A. Directorate General of Cooperatives

1. Cooperatives subproject - establish three Farm Cooperatives Centers (FCC) in Luwu to be supported by local farm cooperatives. The FCCs sell improved farm inputs and purchase farm surpluses. The Capital Assistance Paper originally planned the RECs and FCCs to be combined into Farm Service Centers. However, they were separated into individual subprojects prior to the signing of the Loan Agreement.

V. Ministry of Home Affairs

A. Local Government

1. BAPPEDA TK subproject - develop a planning and budgetary process to prepare a medium term annual economic development plan. Formulate a comprehensive medium term development plan for Kabupaten Luwu and an annual plan for 1984-1985.

Originally the Ministry of Health was also expected to participate in the project, to create a health subproject which would combat filariasis. This subproject however was cancelled during the early stages of project implementation.

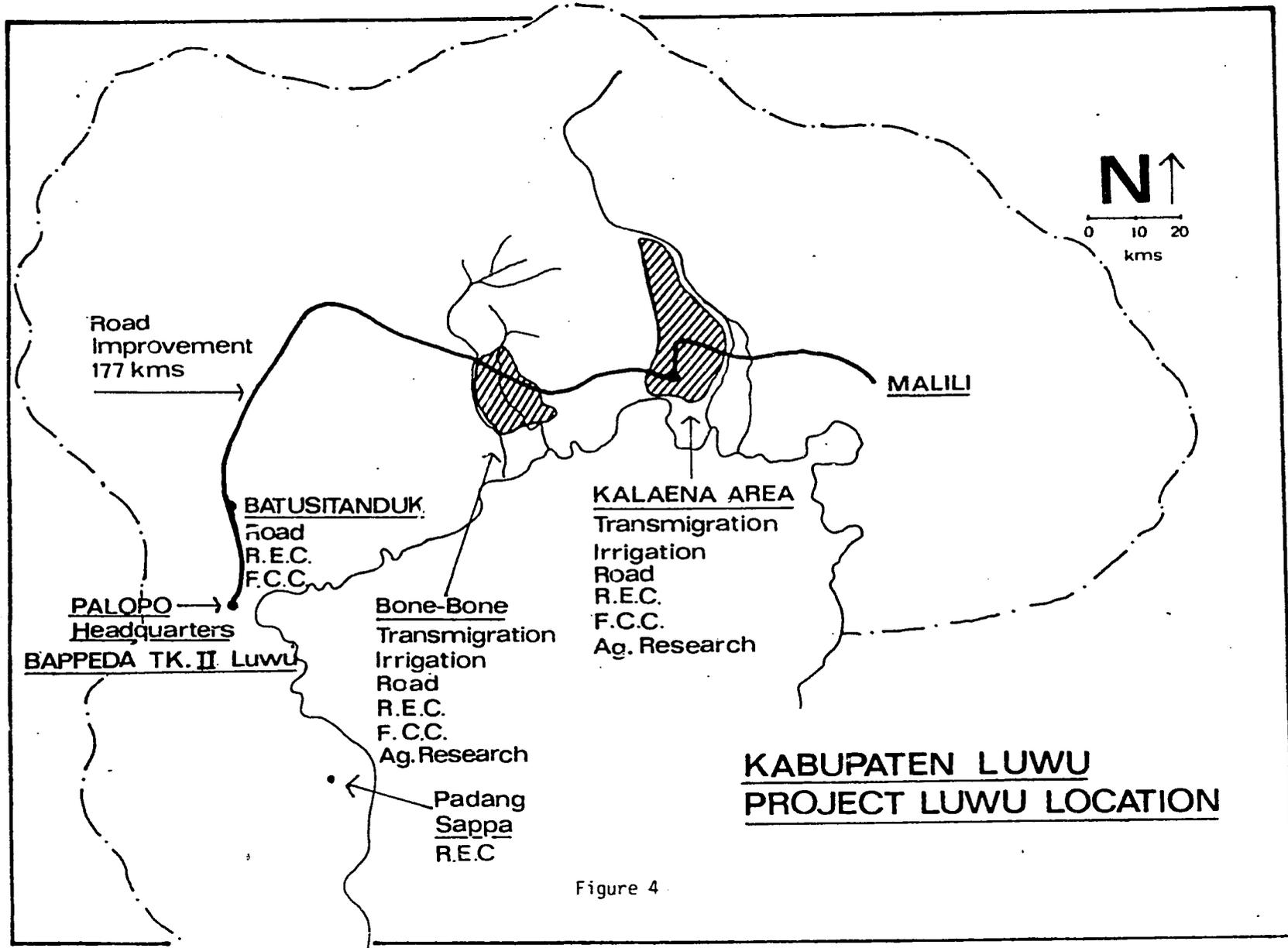


Figure 4

## 5. Objective of Project

The scope, objective and purpose of the project as stated in the "Capital Assistance Paper" of USAID, dated May 27, 1975 were:

"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) up-grading 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 toward 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 sectoral goal which is to improve the well-being of small farmers in the Project area (and in other selected 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 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, is 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".

## 6. Project Cost

### 6.1. Anticipated Costs

#### 6.1.1. USAID

At the time of project inception the estimated cost of the Luwu Agricultural Development Project was \$42.9 million. Of this amount \$3.7 million represented foreign exchange and \$39.2 million local currency. The costs associated with individual subprojects were estimated as follows: the Luwu irrigation rehabilitation and extension program (including operations and maintenance and land clearing) - \$11.5 million; the farm service centers - \$2.6 million; the road betterment subproject - \$25 million; the transmigraticn program - \$2.4 million; and the organization, technical assistance, training and evaluation programs - \$1.3 million USAID Assistance.

It was proposed that USAID finance \$15.0 million or 35 percent of total Luwu Agricultural Development Project costs. Included in this amount was all foreign exchange requirements for the project (\$3.7 million) and \$11.3 million in local currency (or 29 percent of total local total costs). The foreign exchange element was to 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 was to finance \$4.8 million (or 42 percent) of the Luwu irrigation programs; \$1.1 million (or 45 percent) of the farm service center activity; \$8.2 (or 33 percent) of the road betterment subproject; \$.3 million (or 11 percent) of the road betterment subproject; \$.55 million (or 42 percent) of the the project management costs GOI Contribution.

The total GOI contribution was to be \$27.9 million all in local currency or 65 percent of total project costs. Broken down by subproject, the GOI was to finance \$6.7 million (or 58 percent) of the irrigation program, \$1.4 million (or 55 percent) of the farm service center activity; \$16.8 million (or 67 percent) of the road betterment

subproject: \$2.2 million (or 89 percent) for the movement of farm families to Luwu; and \$8 million (or 58 percent) for project management costs and related local support costs for advisory services.

## 6.2. Other Proposed Donor Support

The Government of The Netherlands was grant-financing a team of irrigation advisors to assist the Directorate General of Water Resources Development with the design of irrigation systems in Luwu. The United Nations Development Program (UNDP) was 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 would have a favorable influence on the entire project.

## 6.3. Actual Project Cost

Total funds expended totalled Rp 31.7 billion. This figure is approximate since most subprojects will spend more DIP Murny funds prior to closing put in March 1984. The total includes reimbursed the dollar portion of the expenditures reported in rupiah. This was used over the lifetime of the project at varying exchange rates between the rupiah and the dollar. Despite these variations, the data provide a reasonably accurate indication of the relative importance of each subprojects in terms of funds expended.

Over half of the project funds were expended for the improvement of the road between Palopo and Malili. The other construction project, irrigation, represented the next highest use of funds accounting for 28 percent of total. The remainder of the sub projects used relatively minor portions of the funds.

The same general pattern of expenditure is demonstrated in the use of USAID dollar portion of the funds. Some variations were the Headquarters subproject using 19 percent

of these funds compared to 10 percent of the total and the corresponding figures for the irrigation subproject were 21 percent of USAID funds and 28 percent of total project funds. Overall, USAID funds unused totalled \$413,000 or 2 percent of total.

The foregoing is summarized in Tables 6.1 and 6.2.

Table 6.1

Total Project Expenditures by Subproject

	Million Rupiah	Percent of Total
Headquarters	3,194	10
Road improvement	16,766	53
Irrigation	8,801	28
FCC	1,375	4
REC	741	2
Transmigration	833	3
<b>Total</b>	<b>31,710</b>	<b>100</b>

a less than 0.5 percent

Table 6.2.

USAID Project Dollar Funds Expended and Unused by Subproject

	Reimbursed (000)	Direct Payment (000)	Total Funds (000)	Percent of Total	Funds Unused	Total Funds
Headquarters	1,242	1,585	2,827	19	-	2,827
Road improvement	6,731	1,092	7,823	53	-	7,823
Irrigation	2,380	843	3,223	21	31	3,254
FCC	519	179	698	5	33	731
REC	251	-	251	2	82	333
Contingency	6	-	6	a	26	32
<b>Total</b>	<b>11,129</b>	<b>3,699</b>	<b>14,828</b>	<b>100</b>	<b>172</b>	<b>15,000</b>
Grant	2,065	-	2,065	-	25	2,090
Loan Amendment No. 4	1,394	-	1,394	-	216	1,610
<b>Grand Total</b>	<b>14,588</b>	<b>3,699</b>	<b>18,287</b>	<b>-</b>	<b>413</b>	<b>18,700</b>
Percent of Total	78	20	98	-	2	100

Includes direct payments for dollar purchases abroad and the Grant and Loan Amendment No. 4 for consulting services.

## 7. Project Implementation

The contribution of the principal sponsor, USAID, was described in physical terms in the "Capital Assistance Paper" as follows:

"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".

### 7.1. Description of Proposed Work

Project Luwu was implemented with the signing of the agreement between GOI and USAID on October 23, 1975. On March 7, 1977 the GOI and Checchi and Company/Daniel, Mann, Johnson & Mendenhall, a joint venture, entered into an agreement for technical advisory services for implementation of the project.

The specific subprojects comprising the Luwu Project included: (1) upgrading the main trunk road through Kabupaten Luwu from Palopo to Malili; (2) 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; (3) establishment of four pilot Farm Service Center serving, but not limited to, the proposed irrigation schemes; (4) transigrations of approximately 1,200 families over a four-year period to farm areas to be newly irrigated as a result of the project; (5) undertaking a health problem identification

and resolution program directed towards, but not limited to, the control of human filariasis in Luwu; and (6) 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 project.

#### 7.1.1. The Palopo-Malili Road

In their formulation of the Sulawesi Road Betterment Program, the Directorate General for Highways, Bina Marga, along with UNDP highway experts identified the Palopo-Malili road segment as having a very high priority. Its upgrading would open an area of important economic potential and provide a commercially economical land communication route between the potentially important food production center of North Luwu Plain with market centers.

The road between Palopo and Wotu (127 kilometers) was originally built prior to World War II and consisted of waterbound macadam with cobblestones choked with upgraded river gravels and sand. The width of the roadbed seemed to have been constructed to between 5-6 meters. By the time of project initiation, the road was in disrepair and sometimes impassable.

The road between Wotu and Malili (49 kilometers) was an earth road, impassable to regular traffic due to swampy ground in some sections. Two ferry crossings were used for occasional jeep traffic.

The Palopo-Malili road was to be constructed as a single lane asphalt penetration surfaced travelway, with crushed stone shoulders to accommodate the passing of two-way traffic. Seventy-nine timber, steel girder, and concrete/steel truss bridges were to be erected along this road spanning over 1300 meters. Over 4,000 linear meters of culverts were also included in the betterment program. The improvement work for the road link and bridges was scheduled for completion over a period of three years.

Bina Marga's design office in Bandung with the assistance of an Indonesian consulting firm, was preparing

final designs, construction drawings and contract documents for the road at that time. An Indonesian engineering consulting firm assisted by expatriate specialists as deemed necessary to provide a full experienced staff was to be utilized in the engineering administration of construction. Two private Indonesian construction contractors were to be selected by Bina Marga.

#### 7.1.2. The Bone Bone and Kalaena Irrigation Systems

The Luwu irrigation program, which consisted of the rehabilitation and extension of the Bone Bone and Kalaena irrigation systems, was to bring 6,560 hectares of new land under cultivation for farmers or landless laborers transmigrated from the densely populated core islands. In addition more intensive production would be realized on 4,200 hectares of existing small farms in the irrigation areas. The irrigation project would complement the other subprojects comprising the Luwu Area and Transmigration Development Project.

The Bone Bone system with a net technically irrigated area of 3,200 hectares was first constructed by the Dutch as part of their colonization effort in Luwu. The original gravity fed 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 canal. The total irrigated area may have been 600 hectares. Soon after its construction, war and political unrest prevented further progress and the irrigation system deteriorated until late in the 1960's. The system was partially rehabilitated in 1969 and extended by the GOI during their 1972-1973 fiscal year although the extended area had not yet been put into use.

The rehabilitation work required on the Bone Bone system was to include repair and betterment of the entire system including the diversion dam. Land clearing for 1,300 hectares was also included as part of this subproject.

The Kalaena irrigation system with a net irrigated area of 12,500 hectares and 6,000 hectares on its right and left banks respectively was designed and some construction on the right bank undertaken by the Dutch before the outbreak of World War II. The main canals and sluice gate structure were completed while the diversion dam and main canal were started by 1939. The same period of deterioration and neglect was experienced at this site as was the case with the Bone Bone system.

The Kalaena system was adaptable to staged construction. It was planned to postpone construction of the permanent weir. Rehabilitation and enlargement of the present intake structure and link canal including the installation of gates, and rehabilitation of the gabion weir built in 1969 was proposed. The right bank of the Kalaena scheme was also to be rehabilitated and extended to the same degree as the Bone Bone irrigation system to provide 7,560 hectares of net irrigated land. The partial development of the Kalaena irrigation subproject would provide immediate benefits to the project area, was economically very attractive, and did not preclude further development of the total system at a later date should a less expensive dam site be identified.

The Directorate General of Water Resources Development (DGWRD) was fully responsible for the design and engineering supervision of construction on the Bone Bone and Kalaena irrigation systems down through the on-farm ditches.

Private construction contractors were to be selected for all rehabilitation and extension work associated with the diversion weirs and primary and secondary canals. With equipment to be procured under the loan, the DGWRD was to dig the associated tertiary/quaternary canal networks under force account with the beneficiary farmers assuming responsibility for canal shaping, land leveling and paddy forming. It should be noted that this was a significant departure from routine GOI policy which required farmers to assume responsibilities for digging tertiary and quaternary canals -- a task deemed almost impossible in relatively labor short outer island locations like Luwu.

Land clearing for approximately 7,420 hectares on the Bone Bone and Kalaena irrigation systems was to be undertaken by private contractors under supervision of the Directorate General for Transmigration. An operations and maintenance program which includes finance for an expatriate advisor for a period of two years and operations and maintenance of equipment was also included in the Luwu irrigation program.

### 7.1.3. Farm Service Centers

The Farm Service Center concept was developed specifically for the Luwu Area and Transmigration Development Project to provide special agro-education and agro-business programs for transmigrant and indigenous subsistence farmers. Each Farm Service Center was to consist of a Rural Extension Center which would serve the rural education needs of local farmers and a Farm Cooperative Center to serve the cooperative milling, storage and marketing function required by the Luwu economy.

The Farm Service Centers were to emphasize both improved rice production and other agricultural production. Four such centers were proposed.

Each center was strategically located to assure good communications and access. These Rural Extension Centers were to spearhead programs to attack particular agricultural production problems facing Luwu.

Adjacent to each of the modified Rural Extension Centers would be a Farmer Cooperative Center that emphasized agro-business practices and functions such as a grain processing and marketing for growers. Each Farm Cooperative Center was to consist of land for commercial multiplication of improved varieties and certified seed, plots for commercial growing of crops indigenous to the local farming area, and a building, rice mills, grain storage, etc. The Cooperative Centers were to provide agro-business service for local government sanctioned farmer associations (i.e., BUDs/KUDs), while serving as a model for the private agro-business sector to emulate. These agro-business

facilities were to be operated by the farmer associations themselves with guidance, technical advice and assistance coming from the Directorate General for Cooperatives.

The four Farm Service Centers would be established in Luwu over a four-year period with one year lag between the construction and operation of each individual Rural Extension Center and its adjacent Farm Cooperative Center to allow time for farmer association development and training.

#### 7.1.4. The Transmigration Program

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 activity in Luwu from that time until the GOI began its first five year plan.

The recent transmigration experience in Luwu began in 1969-1970 at which time 500 families from Java and Bali were settled into Kecamatan Bone Bone. Over the first five year development plan a total of 4,550 families transferred to Kabupten Luwu. During 1974-1975, 900 more families were settled into Luwu. Few of the transmigrant had returned to their former localities.

Transmigrants sponsored by the government in Luwu, as elsewhere, were given assistance in the form of basic farming tools, food and clothing for a period of 1.5 years. In addition to this, the GOI provided the settlers with housing and two hectares of land, one of which was cleared. Some public infrastructure such as village roads, schools, churches, village halls and health facilities were also included. The settlers received a certificate of land ownership upon demonstration of their ability and willingness to work on the land they had been given.

The entire cost of the Luwu transmigration program was to borne by the GOI. AID under the loan, however, would finance a full-time advisor for a three year period to assist with the planning and execution of their program in Luwu.

#### 7.1.5. The Health Program

The Ministry of Health was involved with the Luwu Area and Transmigration Development Project basically to ensure that there were no adverse environmental public health influences resulting from the subprojects described above.

#### 7.2. Actual Work Undertaken

##### 7.2.1. Areas Covered

The Capital Assistance Paper initially outlined five specific activities which were designated as subprojects. During coordination and development of the project Loan Agreement and during implementation of the project the number of activities evolved to eight. There were also changes in the type and size of the subprojects.

1. The five initially designated subprojects were:
  - a. Upgrading the main trunk road through Kabupaten Luwu to Malili.
  - b. Rehabilitation and extension of and establishment of an operation and maintenance program for the Bone Bone and Kalaena irrigation systems.
  - c. Establishment of four pilot Farm Service Centers.
  - d. Creation of a project organization.
  - e. Conduct a transmigration program for 3550 families.
2. By the time of the signature of the Loan Agreement the following changes had been made:
  - a. The concept of the Farm Service Centers had been dropped and two separate subprojects were specified for Rural Extension Centers and Farm Cooperatives Centers.
  - b. A Health Subproject targetted against filariasis was added.
3. During the implementation period further changes were made in the type and size of the subprojects as follows:
  - a. The Transmigration Subproject was reduced to a 700 family target because the regular transmigration program for Kabupaten Luwu had been

able to move the remaining 2850 families into the designated area before Project Luwu commenced operations.

- b. The Health Subproject was cancelled when it was determined that filariasis was not a significant problem in the Luwu area. The funds released were recommitted to the Agriculture Research Subproject for research on cropping patterns in Kabupaten Luwu.

## 8. Organization of Project

### 8.1. Institutional Coordination

Any project which includes the participation of five government ministries is a difficult affair to manage and Project Luwu is no exception. The various ministries of the GOI have traditionally operated independently of one another. Consequently the attempt by Project Luwu to create an integrated multi-sectoral development project places new demands on the management capabilities of the government.

At the time of planning of this project, the Ministry of Transmigration, with its interest in area development programs which support transmigration settlements, was designated the lead agency and would establish the project headquarters and coordinate the activities of all the subprojects. It was also decided that the headquarters would most appropriately be located in Palopo. This is several thousand kilometers from Jakarta and there is no adequate telephone or radio communication between the two points. With the built-in communications difficulties, and one ministry attempting to coordinate the activities of traditionally "equal" ministries, the management difficulties are obvious.

The framework of a management information system has evolved for the project from three documents which have been issued by the GOI and USAID. These have created a workable system for the coordination of the project. This system is illustrated in Figure 4.

The first document, Presidential Decree 26 of 1978 defines a basic organization used for all transmigration projects in the country. As a transmigration and area development project under the Ministry of Transmigration, the Project Luwu administration falls under this organization which is headed by a committee consisting of all the participating Ministers, or their representatives. A second coordinating committee which includes all the participating

# PROLU INSTITUTIONAL COORDINATION

A MANAGEMENT INFORMATION SYSTEM

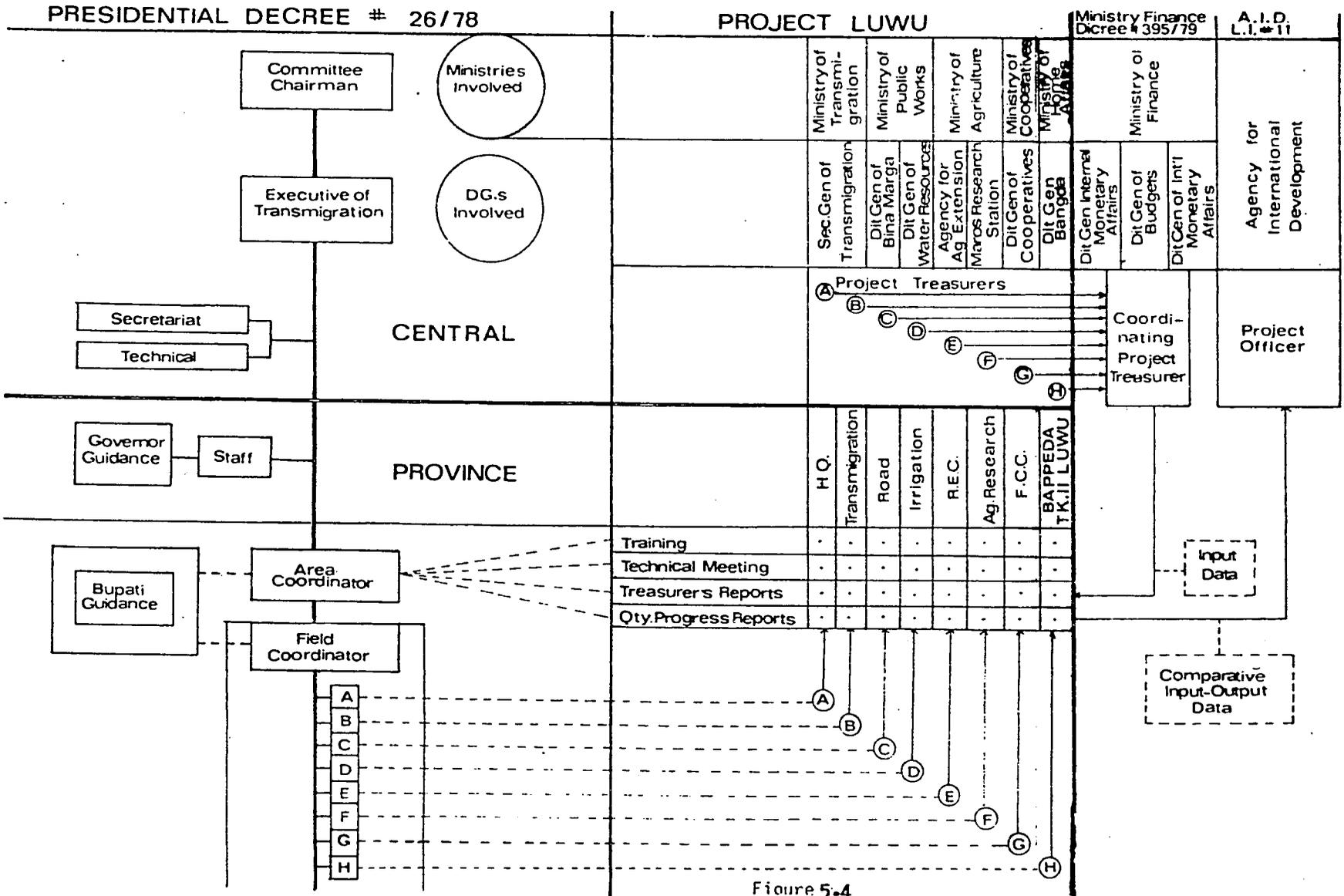


Figure 5.4

Director General is now chaired by the Secretary General of Transmigration who acts as the executive of the project. At the provincial level the governor, through his staff, offers guidance to the project. At the Kabupaten level, the area and field coordinators, with the guidance of the Bupati, coordinate and monitor the project activities. In Project Luwu, the positions of area and field coordinator are combined into one position called the Project Manager. The subproject managers (A through H on the chart) coordinate their activities with the Project Manager.

Each of the subprojects and their staffs remain an integral part of their respective ministries and directorates general and are shown in the center of the illustration under their own line agencies as comprising Project Luwu. As mentioned earlier, five ministries and seven directorates general are directly involved in the project.

The Ministry of Finance also takes part in the project by assisting with the flow of funds as outlined in the second management document, Ministry of Finance Decree 395 of 1979. This decree directs that the project treasurer from each directorate general will manage the funds, credits and expenditures of its respective subproject, particularly the processing for reimbursements from foreign donors. The project treasurers are responsible for submitting requests for pre-financing to the Directorate General of Budgets, for maintaining project assistance, crediting accounts for reimbursable funds, and for submitting monthly statements of expenditures, accountability, and other documents needed to support requests for reimbursement through the Directorate General of Budgets to the foreign donor.

In the case of Project Luwu the subproject managers shown as letters A through H are usually located in Palopo, and are responsible for managing the implementation of their respective subprojects and coordinating their efforts with the other subprojects and the Project Manager. They are responsible for their subproject budgets and usually answer directly to their provincial offices in Ujung Pandang.

A third management document is USAID Letter of Implementation No. 11 which states that the GOI Project Manager must sign or approve any request to USAID to issue Letters of Commitment, to request reimbursement, or for any request for other forms of disbursement under Sections 6.01, 6.02, or 6.03 of the Loan Agreement.

Since each subproject manager answers directly to a responsible line agency, the Project Manager must rely on four indirect methods to establish a coordinated effort among the subprojects. The first two methods are through training and through technical meetings.

The project headquarters has a training budget, 100 percent reimbursable by USAID, used to conduct staff and farmer training in support of headquarters and subproject activities. This provides the headquarters with an element of coordination over subproject training activities. Further, individual subprojects may combine their resources when appropriate to make a more efficient and meaningful training effort. The project headquarters also holds monthly coordination meetings in Palopo where the subproject managers and technicians have an opportunity to discuss problems. These meetings, along with others held as necessary, are valuable in bringing about better coordination among the subprojects.

Letter of Implementation No. 11 requires the Project Manager to approve and submit to USAID all subproject requests for reimbursement. This is the project manager's primary avenue to influence the progress of the subprojects outside of transmigration. In order that he be regularly informed of subproject activities, the project manager receives monthly treasurer's reports of fund expenditures and quantity progress reports of outputs progress from each subproject. These reports provide comparative input-output data by which the project headquarters can monitor project implementation and verify whether project activities meet conditions for reimbursement. The responsibility for monitoring the input-output data of these reports lies with

the socio-economic and technical sections of the project headquarters.

Coordination of DIP supplement reimbursements at the national level is also handled by a budget coordinator within the Directorate General of Budgets. Records are kept of all requests for reimbursements and of payments made by USAID.

This management information system has provided some effective coordination mechanisms, although in practice some of the elements of the system have been inactive. Most of the effective coordination has appropriately taken place at the project location in Palopo. Monthly coordination meetings are held with all subproject managers. The Bupati or his representative attended these meetings.

Progress reports are regularly submitted to the headquarters, and other ad hoc meetings are called when necessary.

It is at the national and provincial levels where coordination is lacking, despite the extreme importance of coordination at these levels. Basic policy for each subproject's activities are made by the area offices (Kantor Wilayah) in Ujung Pandang, and by the Directorates General in Jakarta. Subproject annual budgets must also be approved by these offices. The national level coordinating committee of the Directors General however met only on the occasion of its formation. This committee should have met at least once a year to discuss overall progress of the project, budget and policy issues, and implementation difficulties.

Communication between the project site and Jakarta has also proven to be a difficulty. When major bottlenecks in project implementation have arisen and a decision from Jakarta or Ujung Pandang was necessary, delays of a week or longer have not been unusual. Projects being implemented in remote areas like Luwu should be provided with radio communications capable of reaching the provincial capital as well as Jakarta.

Another coordination difficulty, at the local level, is that between the project offices in Luwu and the regular service (dinas) offices of the government in the kabupaten.

Each subproject office must interact to a certain degree with its counterpart dinas office in Palopo. These working arrangements have ranged from extremely good to non-existent. The FCC subproject manager has worked closely and consistently with the head of the local cooperatives office. The REC subproject works with the four agriculture service offices in Palopo, but is hampered by bureaucratic difficulties and by the fact that there are four, not just one, service offices<sup>1</sup>. The irrigation subproject has been working somewhat with the irrigation section of the public works office who must take over and operate and maintain the irrigation systems after construction is completed. Unfortunately, that section is hampered by a lack of funding and trained manpower. The highways section of public works must maintain the road once it is finished. Yet until a consultant was provided there was no effort between the project and the section to develop a maintenance program.

Methods must be found in future projects to include the local dinas offices more closely in project implementation, with funding and training from donor funds if possible. The dinas offices are left with the responsibility to continue the program, yet they tend to be left out of or left on the side of project implementation.

In June of 1981, a fifth GOI Ministry, the Ministry of the Home Affairs, was brought into Project Luwu upon the signing of a grant agreement with USAID. This agreement continued the expatriate technical assistance to Project Luwu, and expanded the consultant team to provide assistance to the newly created Kabupaten planning agency (Bappeda Tingkat II) and to help them produce a development plan for

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<sup>1</sup>These four are the food crops, livestock, fisheries, and estate crops offices.

the Kabupaten. This program did involve the local dinas offices more in the development process.

## 8.2. Institutional Components

The institutional components of Project Luwu are defined by the term inputs, outputs, purpose and goal. These terms, arranged in a matrix shown in Figure 5. complement the USAID Logical Framework Matrix in a way that fully describes this multi-faceted project and illustrates its complexity.

### 8.2.1. Inputs

The government, though its organization's sectoral departments (GOI Ministries, USAID, Project Luwu, etc.) provides funds which are the project inputs. The inputs can be direct rupiah funding by GOI agencies (called DIP Murni), rupiah funding prefinanced by GOI which is to be reimbursed by USAID (called DIP Supplement), or direct foreign exchange cost funded by USAID.

### 8.2.2. Outputs

Certain planned outputs of the project are the result of the use of project inputs. Contractors (either government agencies or private contractors) are given specific tasks through contracts to create accomplishments. These accomplishments can be physical construction projects, or non-construction projects such as training.

### 8.2.3. Purpose

The outputs accomplished lead to the purpose of the project, which is to create ongoing planning, operations and maintenance (POM) programs which benefit the people of Luwu. Examples of these are ongoing agricultural extension programs or irrigation operations and maintenance programs.

# PROJECT INSTITUTIONAL COMPONENTS

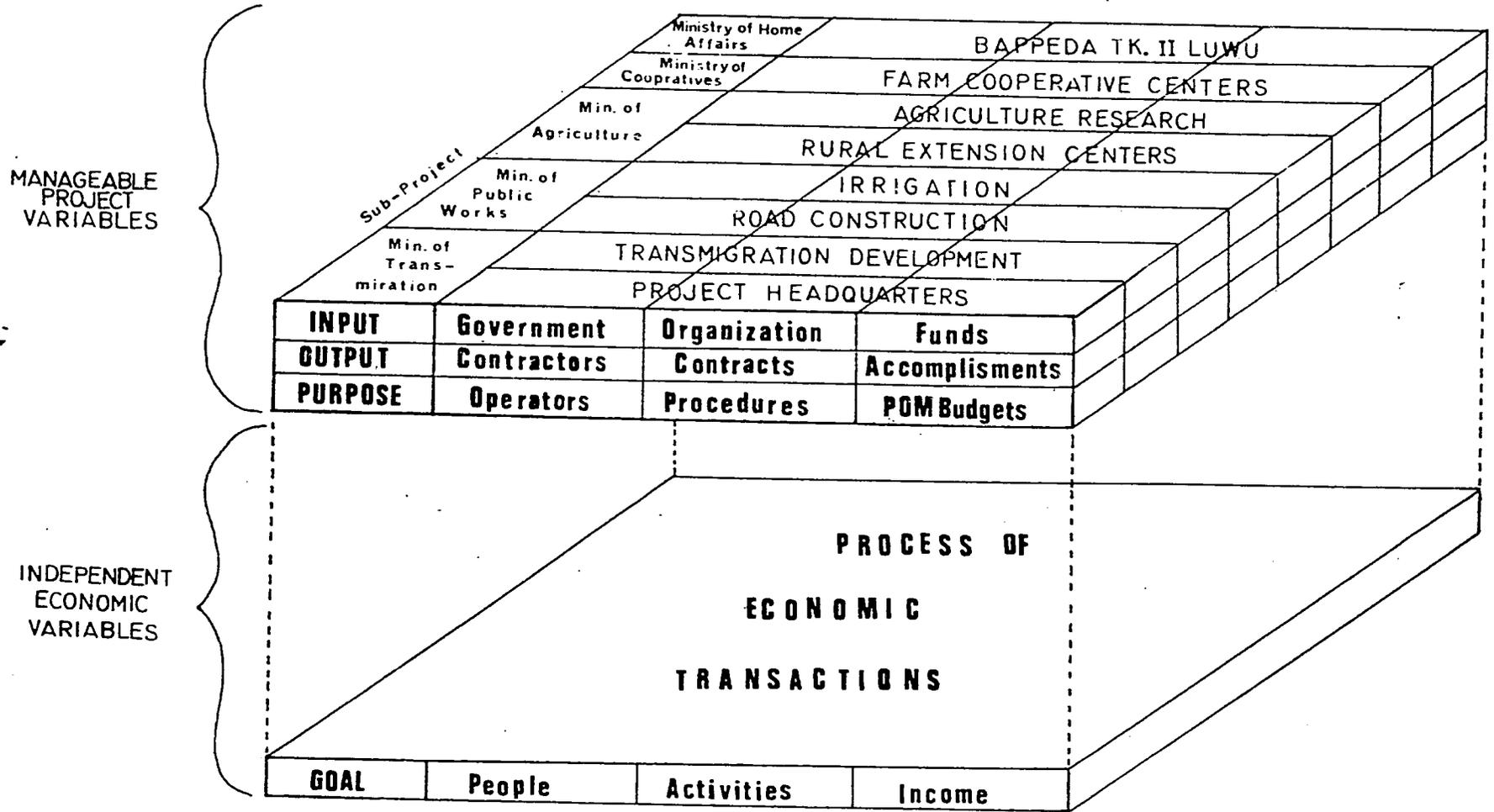


Figure 5

The procedures for these programs are often specified in manuals, and are usually implemented by GOI agencies or groups associated with the GOI. Evidence of the existence of POM procedures is the availability of the required budgets for these programs.

These three components, the inputs, outputs, and purpose of the project are called "manageable project variables" since the use of inputs, the accomplishment of outputs, and the creation of POM procedures are directly managed by Project Luwu and other government agencies. Each of the components of the matrix can be analyzed as to its progress and its impact on other elements of the project moving either vertically or horizontally.

#### 8.2.4. Goals

The impact of the three above components combine through the process of economic transactions to attain the project's goal. The goal in this case is to improve the conditions of the rural poor in Luwu by making their activities, basically small farming, more productive and thereby increasing their incomes. The project goal is called the "independent economic variable" since it cannot be directly controlled by the project, but only influenced through the proper management of the inputs, outputs, and purpose of the project. The attainment of the project goal can be measured however using certain indicators which include changes in population, hectares of food crops harvested, food crop production, purchased farm inputs, food exports, food consumption, spontaneous investment, and farm income.

For most projects a two dimensional four by four matrix of inputs, outputs, purpose, and goal would sufficiently describe the project. A third dimension must be added to the institutional components of Project Luwu however, by adding the subprojects behind the matrix to adequately reflect the multi-sectoral nature of the project. Each of these subprojects has its own inputs, outputs, and purpose, which leads to quite a complex project.

This shows this complexity is illustrated in Figure 6. The organizational components are enlarged to show that each subproject has its own organization, each with its own staffing patterns and hierarchy. The existence of 96 components of the manageable project variables suggest the difficulties faced by anyone assigned to manage such a project.

# PROJECT INSTITUTIONAL ELEMENTS

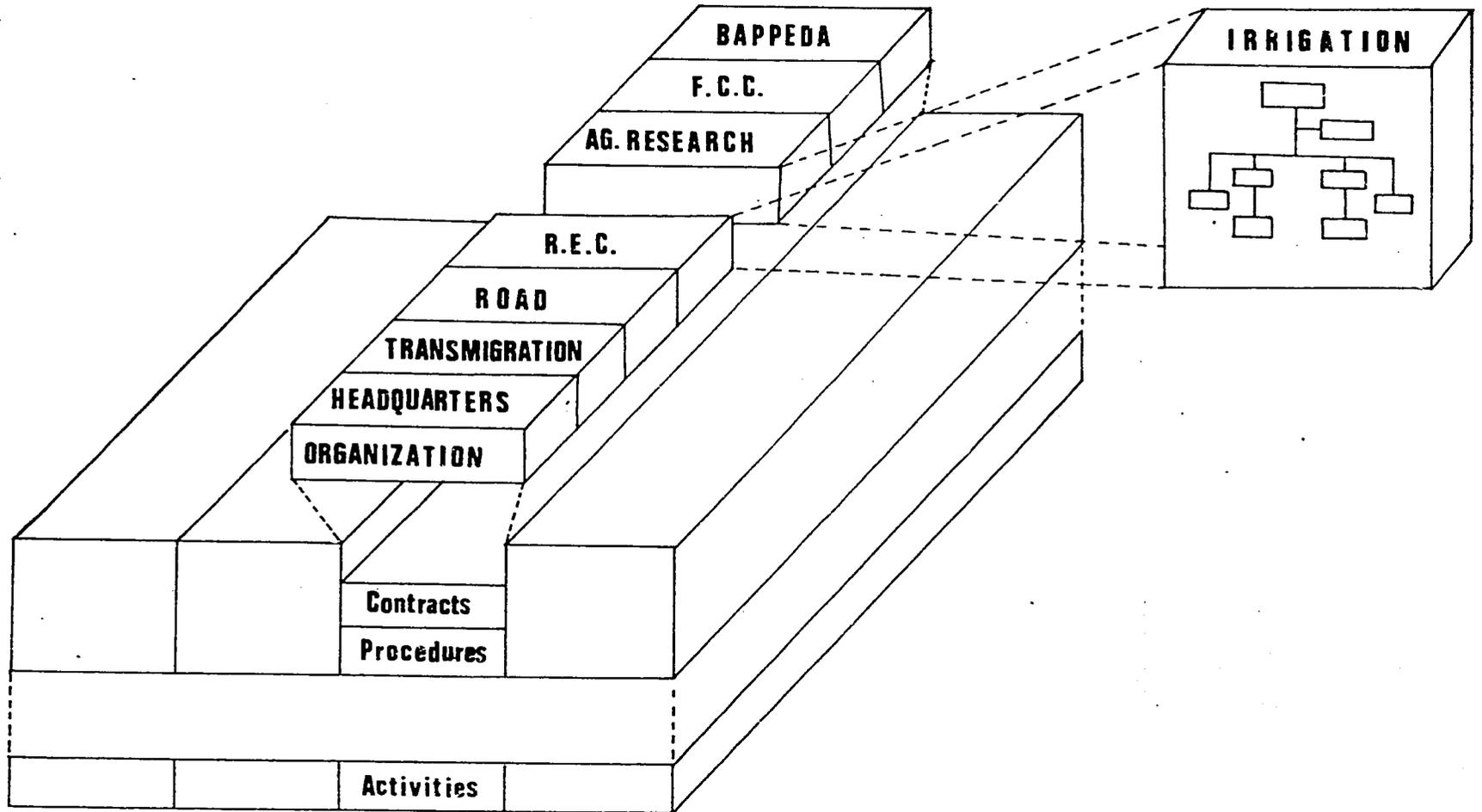


Figure 6

## 9. Project Report and Recommendations

### 9.1. Road Subproject

An initial consideration in the formulation of project Luwu was the need for an all weather road access to the project area. Such a road between Palopo and Malili was considered essential to the development of the North Luwu area. Both Bina Marga and UNDP placed the Palopo-Malili road high in priority for attention. Because of this, Bina Marga readily agreed to join Project Luwu.

The design study of the road was begun in 1974 by PT Inda Karya and was completed in 1976. Design approvals were required from both USAID and Bina Marga and this took quite some time. Consequently, the tenders were not out and the bids were not opened until October 1977. Again, much time was lost in administration at the central level and the contract winners were not able to sign the construction contracts until the end of May 1978. The contracts called for the work to be completed in 1,095 days. The work was divided into two sections. Section I begins at Minna in Kecamatan Bone Bone and runs through Wotu to Malili, a total of approximately 78 kilometers. Section II, approximately 98 kilometers starts in Palopo and runs through Masamba to Minna. PT Sekayu International was awarded Section I and PT Pembangunan Jaya won the Section II contract. The bidding was limited to Indonesian contractors with the intent to further the development of the contracting industry in Indonesia.

PT Sekayu was in position and got off to a fast start in the fall of 1978. PT Pembangunan Jaya took extra time in their mobilization phase and work did not really get underway on Section II until the spring of 1979. After a short time PT Sekayu began to have funding problems. Their personnel and work in the field was excellent, but support from PT Sekayu Jakarta in the form of operating funds began to dry up. By late 1982 PT Sekayu had to withdraw from the job and PT Bumi Kars was chosen to take over Segment 3 of Section I. PT Pembangunan Jaya was given Segments 1 and 2 to complete.

After a slow start PT Pembangunan Jaya finally developed a rhythm and moved ahead strongly on Section II and were in position to move rapidly and take over Segments 1 and 2 of Section I. The pace only slowed when Bina Marga ran out of money for Project Luwu in March of 1983. At that point PT Bumi Karsa, who had taken over Segment 3 of Section I, withdrew from the work. After the funding problems were solved, PT Pembangunan Jaya was assigned that segment and given instructions that the whole road must be finished and all road reimbursement documents must be available for submission to USAID prior to the Project Luwu Loan Terminal Disbursement date. With their mobilization to the Segment 3 area not completed until the end of August 1983, PT Pembangunan Jaya was not given much chance to complete the work before the end of December 1983. They scored a major breakthrough. For the first time in any part of the project a contractor set up a work schedule and either met it or beat it. The Palopo-Malili Highway was completed by early December 1983.

#### 9.1.1. Lessons Learned

In planning a project element of the nature of a highway such as the Palopo-Malili road, the project plan itself must be very carefully laid out. The coordination between the host country and the donor country must be close and thorough to insure a complete understanding about what is to be done. In Project Luwu, despite the fact the road design started in 1974, Bina Marga did not finally decide the highway cross section specifications until early 1979. This was many months after the construction contracts had been let. The type of surfacing to be placed on the road was in question until about the same time as the cross section was settled.

In the case of major construction, such as the Palopo-Malili road, more attention should be paid to the quality of the design prior to letting the construction contracts. The expatriate engineers were not brought in until after the Luwu road contracts were let. Only then did it become known that the road design was unuseable. The

consultants had to bring in more personnel to redesign the road. This was after the first design had been through 18 months of approval processing in Jakarta. Even with PT Pembangunan Jaya taking almost a year in mobilization, during the summer of 1979, it was difficult for the design team to stay ahead of their embankment crews.

On major projects marginal contractors should not be used. So much management time is spent on trying to decide what to do about them that not enough attention is given to vital elements of the project. In the case of the Project Luwu Highway Subproject more than a year of frustrations and limited progress were endured before PT Sekayu withdrew from the project. Also, based on their performance on the Irrigation Subproject, it was surmiseable that PT Bumi Karsa would not be capable of taking over Segment 3 of Section I of the Highway Subproject and finish it properly, let alone on time. Once they began to work this became clearly obvious. PT Bumi Karsa withdrew from the project after almost six months of work.

## 9.2. Irrigation

### 9.2.1. Background

In 1971 the Government requested the Government of the Netherlands to study the project area. In 1975, a team of Dutch consultants began to assist the Provincial Department of Public Works with irrigation development of the North Luwu Plain area, including preparation of the Master Plan for Irrigation in March 1977. The Dutch consultants have continued to provide technical assistance to the Luwu Irrigation Project.

As a result of USAID investigations, a first phase agreement was put into effect which provided construction funds and technical assistance to rehabilitate and extend irrigation systems for an area of 10,760 hectares in the Bone Bone and Kalaena areas during a 4 year period.

On May 13, 1982, a Project Implementation letter issued by USAID reduced the area to be irrigated to 8,480 hectares and extended the time for commitment of Phase I funds to July 1, 1983. The final date for reimbursement of phase I funds was established as December 31, 1983.

#### 9.2.2. Progress to Date

The project area of the North Luwu Plain, as covered by the Master Plan for irrigation, contains about 135,000 hectares of land suitable for irrigation. After subtracting non-commandable lands and areas for infrastructure, net irrigated areas are about 100,000 hectares.

Of the 135,000 hectares of gross irrigated land, 22.5 percent is cultivated, 18.5 percent is covered with brush; 21 percent is covered with light forest and the remaining 40 percent is covered with forest. About 10,000 hectares of the forest area has been cut and cleared since work started on Phase I.

##### 9.2.2.1. Irrigation

During implementation Phase I of the work, as defined by USAID agreement was reduced to cover rehabilitation and extension of irrigation systems for 1,758 hectares in the Bone Bone and 6,722 hectares in the Kalaena area or a total of 8,480 hectares.

In October 1976 the first contract for rehabilitation of irrigation systems in the Kalaena areas was awarded. Since that time a total of 17 contracts have been awarded on USAID-FAR Phase I work, amounting to about 2.65 million dollars of USAID funds. The USAID-FAR cost sharing was based upon 39 percent of estimated construction cost.

At the end of 1983 it is anticipated that 8,480 hectares will be under irrigation. By the end of 1984 a total of 16,542 hectares, or about 16.5 percent of the total planned Luwu irrigated area is expected to be under irrigation.

Shown in the following table are the areas of development, project sponsors, hectares developed or to be developed, and completion dates for work scheduled through 1984.

Area of Development	Project Sponsors	Area to be Irrigated	Completion Dates
Kalaena	USAID - GOI	6,722	Dec. 1983
Bone Bone	USAID - GOI	1,758	Dec. 1983
Lamasi (Pompengan)	Netherlands - GOI	4,472	Scheduled 1984
Bone Bone	GOI	1,009	Scheduled 1983
Kanjiro-Right bank	GOI	1,517	Scheduled 1984
Lamasi-Right bank	GOI	<u>1,064</u>	Scheduled 1984
Total		16,542	

Future plans of the Irrigation Department are to design and construct from 2,000 to 3,000 hectares of new irrigation system each year utilizing their own forces and financing. If other outside funds are made available, the development will be accelerated.

#### 9.2.2.2. Water Availability for Future Development

Records of stream flow which were available in 1977 when the Master Plan was completed, were not sufficiently extensive to provide reliable estimates of dependable river discharges. Since then, a hydrometric network has been installed to measure flows of most major rivers. During this period a network of meteorology stations has been installed throughout the Luwu area providing valuable data on the climate of the North Luwu Plain.

When the Master Plan was prepared it was found that the major rivers would provide more than enough water for any irrigated land near them. The smaller rivers might have periods of low flow when the irrigation supply was not adequate to meet the proposed requirements.

In September 1983, a study, "Hydrology and Water Resources for Kabupaten Luwu", was completed by Checchi/DMJM. The results of the study revealed that values used for evapotranspiration and dependable rainfall in the

Master Plan areas were considerably higher than values determined in the Master Plan study. As a result there is a better overall ratio of dependable river discharge to irrigation to provide reliable estimates of dependable river discharges. Since then, a hydrometric network has been installed to measure flows of most major rivers. During this period a network of meteorology stations has been installed throughout the Luwu area providing valuable data on the climate of the North Luwu Plain.

When the Master Plan was prepared it was found that the major rivers would provide more than enough water for any irrigated land near them. The smaller rivers might have periods of low flow when the irrigation supply was not adequate to meet the proposed requirements. The September 1983 study shows there is a better overall ratio of dependable river discharge to irrigation requirement on all rivers except the Rongkong and Balease. It is expected that supplemental water from rivers adjacent to the Rongkong and Balease can be developed. Continuing analysis and study of meteorology and hydrology information is needed as each area is developed.

#### 9.2.3. Problems Encountered

(a) Survey - Accuracy of surveys has been very erratic causing major changes during construction. These cause delays in the completion of work and add considerable extra cost for resurvey, redesign and reconstruction.

(b) Design - Many design problems have arisen since work started. Some of these are:

(1) Survey information was not accurate and was not adequately detailed.

(2) Soils information was not sufficient.

(3) Soils information was not utilized in design of irrigation systems. The type of protection, side slopes,

depth of channel, etc., must be determined after consideration of all design information.

(4) Structures in canals were not provided with adequate upstream and downstream cutoff. Protection with stone gabions should extend further downstream from the structures. Sufficient care was not given to location of weep holes.

(5) Levees or dikes along meandering rivers have been located too close to the river in some areas.

(6) Coordination between adjacent contracts in some areas has been lacking. Borrow areas, for example, have been allowed in areas which require fill in subsequent contracts.

(7) Information concerning crest elevations along rivers and high tide elevations of the Bay of Bone were not adequate. As a result, drainage structures have been located in places where they cannot function properly.

(c) Construction - Some of the major problems related to construction are as follows:

(1) Most of the contractors have lacked sufficient experience, equipment and experienced management to perform well.

(2) The field staff of the Directorate of Irrigation has not been trained to enforce compliance with specifications.

(3) One of the major problems to date has been the care given to heavy equipment on the project. Contractors were not capable of providing heavy equipment to undertake their contracted work. The Government and USAID thus decided to provide at least part of the equipment needed on a lease basis. There are presently 93 pieces of heavy equipment owned by GOI. At the end of August 1983 there were 29 pieces, or 31 percent in service and the remainder were deadlined. Most of the 29 pieces in use were in bad condition and in need of repair and service.

(4) The Directorate of Irrigation has not set up a laboratory to perform needed soils and concrete tests on the construction projects.

(d) Operational problems - Some of the major problems arising after completion of construction are:

(1) Construction work on completed segments of the systems has been of poor quality and many of the gates and structures are not functioning properly.

(2) Maintenance of completed segments of the system is not carried out. The flow through canals and tertiaries is restricted by weed and grass growth.

(3) Training of personnel for operation has been attempted but has not been adequate.

(4) Training of farmers and farmer organizations to receive the water and undertake maintenance responsibilities has been attempted but has not been adequate.

(5) A workable program between the Directorate of Irrigation (design and construction) and the Provincial Public Works (Operation) has yet to be developed and implemented.

(6) Budget, personnel, material, supplies and equipment for operation of the completed systems have not been adequate.

(7) The temporary Kalaena weir which diverts irrigation water into the system has been washed out. It is questionable whether it can be kept serviceable until the permanent Kalaena weir is completed. This is scheduled for completion in November 1984 but the contractor is far behind schedule.

Because of these factors the completed project area is not being fully utilized. During 1982 and in September 1983

surveys were made in the Bone Bone and Kalaena areas to determine the extent of: (a) irrigation systems designed (b) irrigation systems functioning and (c) area of rice planted. The following results were obtained:

	1982	1983
Bone Bone		
Area designed, hectares	1,758	1,758
Area with systems functioning, hectares	1,305	1,388
Rice planted, hectares	1,130	1,189
Percent of functioning area planted	87	86
Kalaena		
Area designed, hectares	6,722	6,722
Area with system functioning, hectares	3,163	5,158
Rice planted, hectares	1,826	3,269
Percent of functioning area planted	58	63

These surveys indicated that plantings of field crops are not keeping pace with the area being completed and functioning. There are several reasons for this. These are:

- (1) Clearing of land was completed long before the irrigation work and now regrowth is restricting access;
- (2) Farmers were not available to assume control of the land at the time clearing was completed and when water was available. It has been reported that part of problem may be attributed to large areas of this land being controlled by absentee land owners;
- (3) There are some problems with design of the system and in some cases it does not function properly;
- (4) Slow completion of construction and acceptance by Irrigation has prevented farmers from using irrigation water as it becomes available.

#### 9.2.4. Recommendations

A plan for use of water resources in Kabupaten Luwu is needed. It should include a determination of available water and its best use considering irrigation and hydroelectric generation. The plan, once adopted, should be used as the means of development for the Kabupaten and should be continually reviewed, updated, and modified as necessary to meet growing needs. Areas related to social criteria, economic criteria and water availability must be given adequate consideration in developing a plan for the entire Kabupaten. The construction Master Plan must be adjusted to fit the overall water use plan.

Hydrology records and projections are not sufficiently reliable and designs for new systems should not be initiated until they are better substantiated. Studies made during 1982 indicate changes may be needed in the method of irrigation application from technical to semi-technical. This would affect the application efficiency and would result in additional water requirement. If additional water cannot be developed, the only alternative is to reduce the irrigated areas. Thus cropping patterns should be under constant review as part of the continuing evaluation.

As development continues, land clearing will become more expensive since lands easiest to clear are being developed first. Special efforts will be needed to coordinate land clearing, irrigation system construction and availability of farmers to receive water when the system is complete.

Priority for future development should be determined only after considering all pertinent criteria including soils and topography, water availability, diversion sites, land clearing, social factors, and internal rate of return. This evaluation must be undertaken each time a new project or segment of the overall plan is started.

Large scale projects, such as the Kalaena weir, should use foreign contractors in joint venture with an in-country

contractor. Ownership of heavy equipment should be the responsibility of the contractor with adequate compensation for ownership and operation being included in the contract price.

A management program for operation and maintenance of the irrigation systems must be developed by the Directorate of Irrigation and the Provincial Department of Public Works.

Due to the fact that Project Luwu will have a construction period of many more years, it will be necessary for the irrigation system to be completed and turned over to the Provincial Department of Public Works in portions. A most urgent need is to implement the operation and maintenance program on completed portions of the system, including training of farmers concerning methods of water system operation and their responsibilities in maintaining the tertiary and quarternary systems. Water users' associations must be better organized and functioning as the portions of the system are completed.

To summarize, each new area to be developed should undergo the following routine.

1. Hydrology information update and verification of adequacy of water availability.
2. Survey in enough detail to satisfy final design needs.
3. Develop appropriate cropping pattern, and economic justification.
4. Collect sufficient soil data for final design needs.
5. Final design utilizing the data to the fullest extent possible. This may include modification of the design standards to fit certain conditions.
6. Field check of design before, during and after completion to insure that it meets field conditions. Where farmers have been cropping on the areas to be irrigated, the designers should meet with farmers groups to make sure the design is agreeable to them.
7. Adjacent segments of the irrigation system must have proper construction sequence so that work required by the first segment does not hinder work on the second. The specifications must be written

and enforced so that the sequence of work is controlled.

8. Designs must recognize operation and maintenance needs.
9. A program of better control of construction work in progress must be developed including use of heavy equipment, closer control in the field by inspectors and field personnel, and materials testing.

#### 9.2.5. Conclusions

In summary, the work to date on Phase I of the Luwu Project as related to irrigation, has not progressed as well as had been expected. There are many reasons for this but the important factor at this point is to initiate measures improve future phases of the work. It seems advisable to slow new construction and utilize some of the funds scheduled for new construction to organize and implement a successful operation and maintenance program.

### 9.3. Farm Cooperative Center

#### 9.3.1. Background

Prior to the onset of Project Luwu, the cooperative movement within the Kabupaten was centered around the KUDs. The accomplishment of most KUDs in the project area in the 1960s and the 1970s was only marginal. During this period the KUDs' functions were mainly the distribution of agricultural inputs received from the Directorate General Transmigration on a grant basis to transmigrant farmers.

The distribution of these agricultural inputs was difficult because the source of supply was the PUSKUD located in Ujung Pandang. Communication and road conditions inevitably caused late arrival of inputs to KUDs and discouraged farmers' participation in the cooperative movement.

The future of the management, however, will be dependent upon the legal status of the FCCs and whether the

FCCs will eventually be able to make the transition from GOI management to a more expensive private sector management with its present profit margins.

The concept of the FCC has proven to be quite effective in reaching the original goals. Unfortunately, the participation of the Directorate General of Cooperatives in the initial project planning and formulation of the project was minimal. The basic organizational structure and the method of evaluation of a cooperative organization was basically contrary to government policy, and today the FCCs have no legal status within Indonesia. This indefinite status is probably the most critical issue facing them at the completion of the first phase of the cooperative development program within the project area.

The FCCs have proven their ability to provide the necessary link between farmers, KUD and PUSKUD required for an area such as Luwu, with its communication and distance problems. The infrastructure and farmer awareness have been developed so that the FCCs can provide a PUSKUD operation within Palopo independent of Ujung Pandang. Assuming the legal status of the FCCs is resolved, this independence will allow the FCC concept to move to its original goal, i.e., being a cooperative organization managed and run by its members.

Crop marketing functions of the KUDs also discouraged farmers' participation because staff within the KUDs had no experience in the buying and milling paddy. In most cases, the KUDs did not have adequate working capital to purchase surplus production from members. At least in part because of these factors, farmers remained at the subsistence level of production. This further reduced the role of the cooperatives to a minimum.

With necessary infrastructure and development of the cooperative framework, Luwu was believed to have significant potential for production expansion. It was felt that farmers would be able to shift from subsistence to surplus

production provided there was improved agricultural input supply, credit, marketing institutions, and other supporting infrastructure.

On this basis the concept of the Farm Cooperative Center was created with the basic purposes being to provide the link between the provincial PUSKUD and KUDs and to strengthen the business activities of the KUDs.

#### 9.3.2. FCC Program Proposed

Four FCCs were to be constructed with the functions of overcoming these problems under the Project Luwu program. The FCCs were to be semi-autonomous organizations, providing the members with milling facilities, storage and marketing functions. They were to be constructed one at a time so that organizational structure and staffing could be developed gradually. Staffing was to come from both government and private sectors. Eventually the responsibility for operation and financial management was to be given to a board of directors consisting of representatives from each of the affiliated KUDs. Following this transition, the GOI staff would assume a supervisory role to assure the interests of cooperative members were met.

#### 9.3.3. FCC Functions

Three FCCs have been put in operation with funds from USAID. One is located in each of Kecamatan Bone Bone, Mangkutana, and Walenrang. A fourth is being constructed in South Luwu and is 30 percent completed. All four have become viable institutions. At present 92.6 percent of the farm inputs supplied to farmers in the project areas are distributed through the FCCs. Combined grain handling by KUDs and the FCCs has increased from 300 tons in 1979 to 8,000 tons in 1983. FCCs and KUDs have become the sole suppliers of inputs for the BIMAS credit program within the project area. FCCs have been able to provide tractor hire services to areas where seasonal manpower shortages have been a major constraint to farmers.

Poultry feeds have been provided to poultry cooperatives. Newly formed desa level cooperatives now provide a more convenient supply of inputs and marketing services to members. Seed multiplication units have been established at Bone Bone and Mangkutana providing farmers a supply of uniform high quality seeds.

The services now being offered farmers in the project area through the FCCs are the result of institution building which has taken place within the FCC subproject since its onset. This includes construction of the FCC facilities; the purchase of equipment for facilities; transport facilities for inputs; rental of mini-tractors and roto-tillers; member and staff education; and provision of working capital.

#### 9.3.4. Construction and Equipment

The total construction cost of the FCC facilities including the partially completed FCC and other support godowns in the project area was Rp 323 million. Equipment costing Rp 75 million has been purchased to support the FCCs.

Equipment installed includes (1) various rice processing equipment such as dryers and moisture testers; (2) equipment for communication with the central office in Palopo and the PUSKUD provincial office in Ujung Pandang, and (3) bulk rice storage bins and portable grain pumps for bulk handling of grains. This new approach to rice handling generates considerable savings because of greater productivity of labor and reduced turn-around time of the gunny bags. Two FCCs are equipped with garage facilities for tractor maintenance. A central workshop has been constructed in Palopo headquarters for vehicle servicing and repair.

The total FCC structure is supported with 23 motor vehicles. Five trucks handle the bulk of the input and rice

movement between KUDs and TPKs and the FCC units. Two four wheel drive vehicles give field supervision support from Palopo and 16 motorcycles enable the field staff to give extension services to the affiliated KUDs and TPKs.

A mobile tractor unit has been established with a fleet of 17 tractors. This fleet is able to service the entire project area because land preparation seasons vary within it. This unit is completely self-contained and in the past year has become an important service to farmers as well as an income generating activity for the FCCs.

This infrastructure development permits (1) qualification for quantity discounts on purchases; (2) maintenance of buffer stocks for times of input shortages; (3) paddy to be milled more efficiently than in the past; and (4) rice to be stockpiled in anticipation of price fluctuations.

#### 9.3.5. Training

Training was felt to be the linch pin for the development of the cooperative movement. Since the onset of the project Rp 112 million have been spent on farmer and staff training.

Farmers had been discouraged with the past performance of cooperatives within the area. They therefore required education concerning cooperative concepts and services. Various extension training courses were conducted for credit programs, poultry programs, fish farming, and the establishment of the TPKs as extensions of the KUDs.

Staff training was also required. Staff at all levels have been trained in basic cooperative principles and practices. Staff received on-the-job as well as classroom training concerning new accounting procedures and forms required for the new activities of the FCCs.

A new computer based accounting system is now being developed to permit a better interpretation of the entire

FCC operation. Headquarters staff is now being trained in the usage of the computer. Field staff is receiving training concerning the supply of information to the computer.

#### 9.3.6. Financial Aspect of FCCs

Working capital had been a problem for the KUDs. Loans totalling Rp 292 million have now been established, however, for working capital within the FCCs. Retained earnings have also been a source of working capital and contributed over Rp 55 million since the start of the FCCs. This working capital has enabled the FCCs to buy on a cash basis from farmers guaranteeing them a fair market price. Farmers are now protected from the monopsony of the private trader and price fluctuations.

#### 9.3.7. Outlook

The financial base of the FCCs at the present time is stable following the influx of grant and loan money which provides the basis of the entire infrastructure of the FCCs. This favorable equity position should enable the FCCs to become independent of government for future sources of development capital and working capital assuming sound management practices are maintained.

#### 9.4. Rural Extension Center Subproject

The USAID Capital Assistance Paper of 1975 proposed the establishment and operation of the Rural Extension Centers (REC). Under the original concept four Farm Service Centers were proposed with each consisting of a Rural Extension Center and a Farmers' Association Complex. Their purpose would be to fulfill the educational needs of the migrant and local subsistence farmers concerning improved practices and to provide agricultural inputs. These functions have been bifurcated and now the farm supply function is a responsibility of the Farmers' Cooperative Centers.

#### 9.4.1. Organizational Arrangement

The RECs under Project Luwu are operated by the Agricultural Agency for Education, Training and Extension within the Ministry of Agriculture. In addition the Directorate of Animal Husbandry, Fisheries, Forestry and Estate Crops which are also within the Ministry of Agriculture have their own extension service staffs.

##### 9.4.1.1. Background

There are no clear records of extension prior to 1975. The "North Luwu Micro-Economic Study" (Institut Pertanian, Bogor, 1976) noted that in the area surveyed (Lamasi, Bone Bone and Kalaena) there were two extension workers comprising an Office of Food Crops Extension Agent and a BIMAS Field Extension Worker for each area. Each transmigraton unit also had one or two extension agents; the Office of Fisheries had a few field extension agents; and the Office of Animal Husbandry had none. Of the 371 farmers surveyed during the study, 43 percent had no contact at all with extension workers during the previous 5 years.

It was noted in the study that yields in Luwu were lower than those in the rest of Indonesia. Since there was no agronomic reason for this, fertilizer, marketing and agricultural extension were the major constraints. It was further stated there were no signs of coordination, integration, synchronization or simplication of extension activities in the area surveyed.

The lack of coordinated extension was also noted in the Capital Assistance Paper which stated less than 10 percent of the farmers were using high yielding rice varities or fertilizers. None of the farmers were using disease resistant rice varities. The task of improving coordination between agricultural subsector agencies was assigned to the Rural Extension Center (REC) Subproject.

At the project's inception there were no RECs in Luwu and only 355 in Indonesia. The function of the RECs was to: (1) disseminate current agricultural information; (2) conduct field trials ; (3) impart good farming practices to farmers; (4) develop farmer groups; and (5) hold training sessions.

The RECs were to serve all of the extension needs of farmers rather than extension matters concerning only food crop production or the Directorate of Food Crops and BIMAS programs. In order to accomplish this task the Luwu RECs were to have a larger building, a larger farmyard, more equipment, a staff of 30 rather than 18 persons, and a university graduate for a manager. Each REC was to specialize in the agricultural subsector predominating in the geographic area served. The RECs were also to have programs for irrigated farming, improved upland cropping, and improved rice cultivation practices and varieties . They were to improve coordination among the governmental and educational agencies involved in agriculture under Project Luwu, and to maintain a close relationship with research agencies to provide farmers with the most up-to-date information on high yielding and disease resistant varieties.

#### 9.4.2. REC Program and Progress, 1975-1983

Each REC consisted of a classroom/office complex, 3 units of staff housing, outbuildings (cattle sheds, chicken coups, etc.) and a farmyard surrounding the buildings. Construction was completed in 1978 and the REC extension program began operations in the 1977-1978 fiscal year. Although not included in the original concept, an REC headquarters complex was constructed in Palopo from funds provided by the Government.

It is important to note that with a very few exceptions, REC Subproject staff have all been seconded from other subsector agencies within the Ministry of Agriculture.

There have been a few problems with conflicting subsector agency/REC interests at the senior staff level.

Some conflicts have resulted from the fact that individual REC managers have been from a different subsector agency than the field staff under them. These problems have been exacerbated since the field extension staff are not under the direct control of the REC Subproject and most owe their primary allegiance to the Office of Food Crops. Despite this handicap the REC has been able to carry on its extension program in an effective manner.

REC Subproject extension activities can be divided into the categories of staff training, farmer training, demonstrations, and extension communications. Most extension activities have been funded from loan funds, while most of the funds provided for operations have come from the GOI. The small amount of field activity funds provided by the GOI has been limited to transmigration areas.

#### 9.4.2.1. Staff Training

Staff training has included special workshops and other training activities, but has mostly consisted of bi-weekly, in-service training programs for food crops extension staff at each REC. In-service training has been scheduled so that the training of extension staff parallels in time the activities of farmers. This means that PPLs are receiving training at the time they will be advising farmers about those same activities in the field.

Early in the REC Subproject both instructor and PPL attendance at bi-weekly training sessions were very low. Funds were provided to pay for transportation and consumption costs for all participants and attendance rates improved significantly. This type of funding should be continued since in-service training is the most important tool available at the Kabupaten level for improving the performance of agricultural extension workers.

#### 9.4.2.2. Farmer Training

In the early stages of the REC Subproject farmer training courses were from two to four weeks in length and

consisted mostly of lectures. As the farmer training program progressed it was found that farmers showed more interest and retained more of what was taught from courses which were limited to three days covering one or two subjects and containing a substantial amount of practical training conducted outside the classroom. When it was difficult to develop suitable practical training plots at RECs, courses were conducted at village sites. Practical training sessions were held at key points in the cultivation cycle.

Luwu extension staff became adept at conducting these courses and learned to gear them toward the specific problems faced by farmers in a particular geographic area. Unhas evaluations have shown that the farmers who attended REC courses have passed some of what they have learned on to other farmers in their villages. To date 190 farmer training courses have been conducted under the REC Subproject and 4,685 farmers have received 28,061 man-days of farmer training.

#### 9.4.2.3. Field Demonstrations

Prior to 1980 when the REC Subproject Demonstration System was introduced, field demonstrations were designed to show farmers the magnitude of yield improvements obtained by following certain technical practices. Method demonstrations which show farming techniques were added to the program. Two to four field training days comprised each demonstration at which a group of farmers received both theoretical and practical training concerning activities they should conduct on their own fields before the next training day. On the final training day the plot was harvested and the results compared to a control plot or to the results being obtained by farmers whose fields surrounded the demonstration site.

The first and most numerous demonstrations concerned various aspects of rice production. Some later demonstrations concentrated on specific problems areas, e.g., rat control, herbicide usage, etc.

The REC Subproject demonstration system has proved to be workable and superior to simple demonstrations. Approximately 250 REC demonstrations have been conducted during the project to date with 17,743 farmers receiving training. If the 190 farmer training courses are also included, at least 22,428 farmers have been directly contacted through REC extension activities.

#### 9.4.2.4. REC Extension Communications

Activities in this area have included the production of brochures, pamphlets, posters, and slides in addition to film and slide presentations and some radio broadcasts. The most important aspects of the communications program have been the locally produced stenciled booklets produced for training programs and the slide and film presentations shown during training exercises and at villages throughout Kabupaten Luwu. Subproject staff have been surprised at the amount of information farmers retained from film presentations and this source of information should not be allowed to become defunct because of budgetary inadequacy. During the loan funded life of the REC Subproject an estimated 73,000 persons have viewed film and slides at presentations given by the Subproject.

#### 9.4.3. Accomplishments to Date

It is difficult to measure the accomplishments of agricultural extension programs because the results are often not immediate nor are they attributable to one source. Certainly production increases and increases in farmer income are goals of extension but factors such as input credit and market availability have an influence bringing about such increases. The quite remarkable production increase under the Lappo Ase rice intensification program demonstrated the potential achievements when all factors of production are presented in a coordinated effort by pertinent agencies.

While not exact measures of the effectiveness of agricultural extension, the figures provided in Table 9.4.1 give a broad picture of the accomplishments of the Rural

Table 9.4.1.

ACTIVITY	UNITS	REC SUBPROJECT TOTAL DEMONSTRATIONS AND FARMER TRAINING			AVERAGE DEMONS. YIELD*2	AVERAGE FARMER YIELD*3	DIFFERENCE
		FARMERS TRAINED	FARMER TRAINING MAN-DAYS	FARMERS CONTACTED			
I. GENERAL FARMER TRAINING *1	137	3035	22366	-	-	-	-
II. RICE PRODUCTION					T/HA	T/HA	T/HA
1. Rice Producers Training Courses	10	377	912	-	-	-	-
2. Rice Production Demonstrations	78	-	-	5329	7.07	4.61	2.46
III. SECONDARY CROPS (PALAWIJA)							
1. Maize Producers Training Courses	8	240	720	-	-	-	-
2. Maize Production Demonstrations	9	-	-	261	2.2	1.07	1.13
3. Soyabean Producers Training Courses	5	150	450	-	-	-	-
4. Soyabean Production Demonstrations	9	-	-	230	1.21	.72	.49
5. Other Demonstrations *4	33	-	-	1170	-	-	-
6. 78/79 DIP Food Crop Demonstrations	43	-	-	1021	n/a	n/a	n/a
IV. ESTATE CROPS					KG/PLANT	KG/PLANT	KG/PLANT
1. Clove Producers Training Courses	5	145	655	-	-	-	-
2. Clove Production Demonstrations	16	-	-	704	3.7	2.5	.8
3. Coffee Producers Training Courses	3	90	270	-	-	-	-
4. Coffee Production Demonstrations	12	-	-	793	.6	.27	.33
5. 78/70 Estate Crop Demonstrations	9	-	-	190	n/a	n/a	n/a
V. ANIMAL HUSBANDRY							
1. Cattle Producers Training Courses	7	210	1110	-	-	-	-
2. Cattle Related Demonstrations	20	-	-	664	-	-	-
3. Small Animal Producers Training	2	60	180	-	-	-	-
4. Poultry Producers Training Courses	2	60	180	-	-	-	-
5. Poultry Production Demonstrations	11	-	-	1099	9291 chickens inoculated		
6. Inoculation Demonstrations	30	-	-	4978	11765 Large animals vaccinate 41700 chickens inoculated		
7. 78/79 DIP Livestock Demonstrations	7	-	-	232	-	-	-
VI. FISHERIES					KG/HA/YR	KG/HA/YR	KG/HA/YR
1. Brackish Water Producers Courses	11	318	1218	-	(shrimp)	(shrimp)	(shrimp)
2. Brackish Water Demonstrations	6	-	-	308	160 (milfish)	none (milfish)	160 (milfish)
3. Freshwater Demonstrations	7	-	-	326	513 (carp)	325 (carp)	188 (carp)
4. 78/79 DIP Demonstrations	20	-	-	438	982 n/a	574 n/a	408 n/a
TOTAL DEMONSTRATIONS AND FARMER TRAINING	500	4685	28061	17743			

Extension Center Subproject. The rice yields presented in the table are yields collected from demonstrations and from farmer fields surrounding demonstration sites. Thus they are not representative of all of the Kabupaten.

The evaluation of Universitas Hasanuddin conducted in 1982 confirms the broad coverage of the REC programs. It found that 64 percent of the farmers in their sample had participated in three REC programs, 30 percent had participated in two REC programs and about six percent had participated in one REC program.

#### 9.4.4. Recommendations

The major lesson learned has been that a meaningful degree of coordinated agricultural extension services can be achieved even without a workable organizational structure mandated by provincial and national authorities. The key element necessary to obtaining coordination is the organizational location of the REC outside the principal agricultural subsector line agencies of the Offices of Food Crops, Fisheries, Animal Husbandry and Estate Crops with a higher level technological (PPS level) staff working as a unit in a central location. Senior technical (PPS level) staff should be provided with programs which encourage coordination. They should work together to plan coordinated programs from a central office.

The REC Subproject experience has also demonstrated that the most important tool for improving the performance of field extension workers is a coordinated effort to improve the planning and implementation of a viable bi-weekly in-service staff training program with a strong practical training element. This program should be oriented in time toward farm activities and toward the most important problems as visualized by farmers, field extension staff and senior extension staff. In addition to in-service staff training, funding to continue the work begun by the inter-agricultural subsector agency group for planning a whole farm management and extension program will be a very positive step toward continuing to improve coordination efforts.

#### 9.4.5. Outlook and Requirements for Kabupaten Luwu

Until September 1983 the future of the REC Subproject was very much in doubt. BPLPP has now funded the subproject for the 1983-1984 and the 1984-1985 fiscal years. The level of field activities permitted by those budgets will, however, be at a reduced rate.

According to the BPLPP representative who attended the evaluation and recommendation meeting for Project Luwu during November 1983, the RECs are to continue in approximately the same form except that BPLPP will provide funding only for the day-to-day operations while the funding for special activities will be provided from other agricultural subsector agencies.

#### 9.5. Planning

##### 9.5.1. Intermediate Term Development Plan

During the 1982-1983 period a concentrated effort was made to formulate a development plan for Kabupaten Luwu with an accompanying proposed Development Budget for the 1984-1985 to 1988-1989 period. All sectors of the economy were included in the plan.

In critical areas, specialists were used to review existing data and formulate plans for the subsectors involved. These areas were water resources, agriculture, industry, watershed management and institutional arrangements. Recommendations and plans developed by the specialist were combined with programs developed by development agencies at the national, provincial and local levels to formulate the program in these critical areas. Long term staff prepared the plans for the fishing and infrastructure subsectors in conjunction with the development agencies with responsibilities in these areas.

The overall program which proposes an expenditure of Rp 131 billion over the planning period is designed to provide

the effort required improve the welfare of the people and provide jobs for new entrants into the labor force.

#### 9.5.2. Input/Output

Concurrent with plan development the technique of input/output analysis was applied to the Kabupaten economy. This program will permit the future planner to select activities to be promoted in his region. Questions dealt with include:

1. the input structure of the activities;
2. the local market for its products; and
3. the effect of the new activity's presence on the operations of other industries in the region and how it fits into the existing economic structure.

The input/output technique of data management allows the planner to examine the economy in these terms and select priority development activities in an objective manner.

The input/output analysis, for example, provides the means to estimate the effects of a plan of given size and thrust on the other economic sectors as well as the economy as a whole. This analysis can lead to estimates of jobs created, and effects of implementation on infrastructure such as schools, and health facilities. It also permits a rational analysis of the impact of specific development activities on local supplies and prices.

Input/output analysis will become an increasingly important planning tool if two or more kabupatens are formed into a development region. In this case objective and rational decision concerning project solution can be made in what could be competing jurisdictional areas.

#### 9.5.3. Recommendations

It is recommended that the development plan be updated annually and extended one year into the future. The input/output system will require monitoring and periodic updating. Most importantly, it is recommended that it be used as a means to provide bottom up planning in the development plan updating.

## 9.6. Training Program

There was an initial awareness there would be numerous problems in Project Luwu due to the complexity of the management staffing and the settling of families. It was recognized the involvement of five different ministries working together in a remote area would require an extensive cooperative effort and intensive training activities to coordinate project personnel. Funds were made available to provide training to assist in the adjustments required for success of the program. The Project Capital Assistance paper placed stress on the importance of providing management training for coordinated projects.

### 9.6.1. Early Programs 1976-1979

Luwu Project Headquarters Staff Training funds were initially used primarily to train project staff and other management personnel. The concept of training in-country and abroad was considered vital to the success of the project because of the involvement of several ministries which had a history of independent operating procedures and functioning. It was assumed the use of across-the-board training for Project Luwu personnel would diminish their traditional independence and a dedicated Project Luwu staff would emerge.

The training activities were begun in August 1976 and staff training was later carried out in Jakarta and at the Project Luwu Headquarters in Palopo to orient and familiarize the new staff with the goals and procedures needed to achieve the project's objectives. In 1977 and 1979 several subproject staff managers were sent to Malaysia, South Korea and Philippines to participate in short training courses on land resettlement.

In 1981, in response to a Government-wide effort to improve development planning, funds were made available for the training of the staff of the BAPPEDA in regional planning. An organized program of five courses was developed within the Project.

### 9.6.2. Staff Training

In addition to training management personnel, funds were allocated for training those connected to the Rural Extension Centers and Farmer Cooperative Centers. These funds were to be used for training in the areas of cooperative marketing procedures, agricultural practices improvement and other related subprojects. Training sessions were held in the various Rural Extension Centers and Farm Cooperative Centers for field staff of these organizations as well as for local farmers and governmental personnel.

### 9.6.3. Other Training Activities

At the beginning of the project, training funds were not allocated for staff development of the subprojects of roads, irrigation, transmigration, and health since internal training programs already existed within the Ministries of these subprojects. Subproject management staff assigned to the project were included in the overall management staff training but only as their functions related to the project as a whole.

Another reason for light coverage in training for the roads and irrigation subprojects was that contractors were used to undertake the construction required. Once the work was done the ongoing operations and maintenance functions would then shift to the Ministries involved.

It became apparent, however, that the ongoing operation and maintenance of the project as a whole would be much more effective if training activities were carried out for the personnel of all the subprojects. Without properly trained people to carry on the project once the contractor left, the project's future would be questionable. The Irrigation Subproject conducted operation and maintenance training for farmers in 1980 and 1981. In 1982 an expanded training course was proposed and conducted to train farmers and local government personnel in irrigation operation and maintenance.

A Training Consultant developed a Project Luwu Training Study which summarized training from 1976 to 1979 and project training requirements through 1982. This study identified unmet needs, established priorities, detailed course curricula, and laid out schedules for a much expanded training program.

The training study recommended that more training funds be spent in all project areas. As a consequence some expansion of training was made into fields such as operation and maintenance of irrigation systems, the development of an economic planning unit for the Luwu area, and the improvement of health services.

#### 9.6.3.1. Headquarters Subproject Training

The limited training activities of Project Luwu Headquarters staff personnel were useful in that they oriented subproject managers and key governmental personnel to the overall purpose and goals of the project. Longer and more intensive training of the managers would have better prepared them for project implementation. An absence of a training director in the early years to organize the activities prevented this and managers were forced to direct their respective subprojects without in-depth training. In most cases they trained themselves on-the-job through the trial and error method.

This initial series of project Luwu orientation courses was very valuable in establishing the basis and framework of the project and can be considered worthwhile. On the other hand, the training travel tours were felt to have questionable value since they were very expensive and served only to give the participants a somewhat broader view of large scale development similar to that planned by Project Luwu. The earlier tours were tourist-type and areas were visited briefly. A longer and more intensive study of particular areas and their key development problems would have made the exercise more useful and worth the high costs involved.

The training activities scheduled for this subproject in the training guide encouraged an approach which tended to make the tours more meaningful. Two project officers have also completed three month courses in the U.S.A.

#### 9.6.3.2. Road Subproject

The training activities of the Roads Subproject have been limited to on-the-job training by contractors and consultants. Although there is a great need for more experienced road inspectors, support personnel for the surveyors and mechanical equipment personnel, the short construction schedule and long working hours are not conducive to additional training activities. A road maintenance training program would be very helpful to the members of local government, as they assume responsibility for certain aspects of maintenance upon the completion of the project.

Some training sessions for the personnel of Bina Marga who will assume the responsibility for maintenance of the road have been carried out by Bina Marga training officers on a routine basis. The officials feel assistance is not needed to train their personnel except for the provision of road equipment by the contractors to help train their heavy equipment operators and mechanics. This would supplement the slide and tape shows available at the Bina Marga training office in Ujung Pandang and make the training sessions more meaningful to the participants. Several training courses were identified in the 1979 training study and should be considered. The development agency has not expressed interest in these courses to date.

#### 9.6.3. Irrigation Subproject

There were four on-site training courses held in the past five years within the Irrigation Subproject for the field construction section personnel. The primary reason for the relative absence of training activities in this sector has been that contractors who use their own personnel

have been used to complete most of the construction projects.

Project personnel such as surveyors and inspectors belonging to the Irrigation Subproject require further training since they will assume a number of new responsibilities as the project expands. With the presence of a Senior Irrigation Engineer Consultant, and a Heavy Equipment and Shop Consultant, considerable in-service training of an incidental nature did occur. While the Training Study outlined a formal program for training personnel, little has been done to implement it.

The operation and maintenance section of the Irrigation Subproject has completed three training activities since the project began. These, have trained 54 farmers in Bone Bone and Kalaena in the responsibilities of membership in water users' associations. These are, however, only a few of the several hundred qualified operation and maintenance personnel needed to carry out the critical support operations vital to the Irrigation Subproject's continuation.

#### 9.6.3.4. Farm Cooperative Centers Subproject

The Farm Cooperative Centers Subproject has also carried out a number of successful training activities on crop marketing, bookkeeping, financial management and other topics vital to establishing an efficient farm cooperative operation. The field offices in Bone Bone, Mangkutana and Walenrang have been utilized for the practical, on-the-job and in-service training conducted primarily by the FCC Advisor. Three courses were presented in 1983 at the last of the four Farm Cooperative Centers to be built in the southern part of the Kabupaten.

In order to maintain the ongoing progress of the centers, continual training is needed for the present and incoming field staff which have to be fully trained in the involved methods and procedures required to operate an FCC. There has been a high rate of personnel turnover in the past

which also needs to be stabilized before the training being presented will be permanent.

#### 9.6.3.5. Rural Extension Centers Subproject

Of the six Project Luwu subprojects the most extensive training activities have been carried out by the Rural Extension Centers.

The primary trainers have been local agricultural extension officers (PPL) and area extension officers (PPM) who are stationed throughout the Kabupaten. A number of PPL who are female have become active in the rural extension effort and more are being encouraged to become staff members due to their effectiveness with the local population.

The activities which were carried out over the past five years were well planned and executed in most areas. Trainees interviewed following the courses described the training sessions as "useful" and "well done" and were anxious to have more classes conducted in subjects not yet covered in detail such as rice transplanting, general farming practices, machinery care, etc. In 1982 an intensified program for rice production occupied a great portion of the available training time for both the agriculture and the FCC subprojects.

Of critical importance to this subproject has been the presence of three Agricultural Extension Advisors whose direct involvement assisted the staff to determine their training needs and formulate the wide range of training activities required by the large farming population which makes up the majority of the transmigrant population. This long-term presence on the subproject has been vital to the ongoing success and future improvement of all training activities.

#### 9.6.3.6. Transmigration Subproject

While some ad hoc on-site training activities have occurred during the resettlement of transmigrants, very few planned training activities have been carried out in the past five years by the Transmigration subproject staff. The primary function of this subproject has been to assist transmigrants resettle in the new areas and extensive training sessions have not been required.

While few courses have been planned exclusively for the transmigrant group, they have constituted as much as 30 percent of the farmer groups receiving training through the other subprojects. In cases where farming practices were involved the Rural Extension Centers staff and the FCC staff have conducted the required training to help the transmigrants adjust, till the unfamiliar land, and utilize the new Farmers' Cooperative Centers.

## 10. Measures of Goal Achievement

The measures of goal achievement are the same as those used previously in Checchi's annual reports. These measures are the annual average growth rates of:

1. Food farm population
2. Hectares harvested per food farm person
3. Purchased agricultural inputs
4. Food production
5. Food exports
6. Food consumption per capita
7. Net income per food farm person
8. Bank credit

Data concerning food production, or food farm income, are based on the production and rice, corn, soybeans, peanuts, mung beans, sweet potatoes, cassava, and livestock. These commodities were chosen because they represent the agricultural sectors which Project Luwu primarily attempted to influence. In addition, the Logical Framework Matrix of the CAP specifically refers to the increased production of rice and non-rice food crops as the target of Project Luwu.

The above indicators are used to measure the impact of the project, and to monitor overall development progress in the Kabupaten. The impact studied is that shown by growth trends of production and income. These growth trends are comparable to a certain extent to the trends of other indicators calculated by various other agencies.

Baseline growth rates represent pre-project trends from 1970-71 to 1975-76. Progress growth rates indicate trends of the indicators from 1975-76 to 1982-83. These progress growth rates are compared with baseline trends to estimate project impact. Trends are also comparable over different geographic areas to observe the differences between project and non-project areas. Luwu is divided into the following geographic areas for data comparison:

1. Kabupaten Luwu as a whole
2. Primary Project Area - Kecamatan Bone Bone, Wotu, and Mangkutana
3. Palopo Headquarters Area - Kecamatan Wara (Palopo), Walenrang, and Bua Ponrang
4. Other Kecamatan

Growth rates are developed using regression analysis<sup>1</sup>. Figure 7 illustrates the geographic areas used in this study. Figures 8 and 9 illustrate the baseline growth rates and current progress growth rates for the measures of goal achievement.

#### 10.1. Goal Achievement Progress

##### 10.1.1. Food Farm Population

Current food farm population growth rate estimates are lower in all areas of Luwu when compared with trends up to 1980-81. This is the result of revised population estimates available last year for estate crop farmers which indicate a greater number of persons cultivating estate crops than previously indicated. This large figure, when subtracted from the total population leaves a smaller residual population on food farms than previously estimated.

The growth trend of food farm population is estimated at three percent, a rather high figure when compared with all of Indonesia. Total population growth for Luwu is estimated to be 4.8 percent per year since 1975-76, which results from high birth rates and high immigration. The Project Area with land being cleared and settled has the highest growth rate of food farm population or 5.5 percent per year, compared to 3.8 percent in the Headquarters Area and 3.3 percent in the Other Kecamatan.

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<sup>1</sup>This methodology was described in detail in Checchi and Company's February 1980 Evaluation Study for Project Luwu.

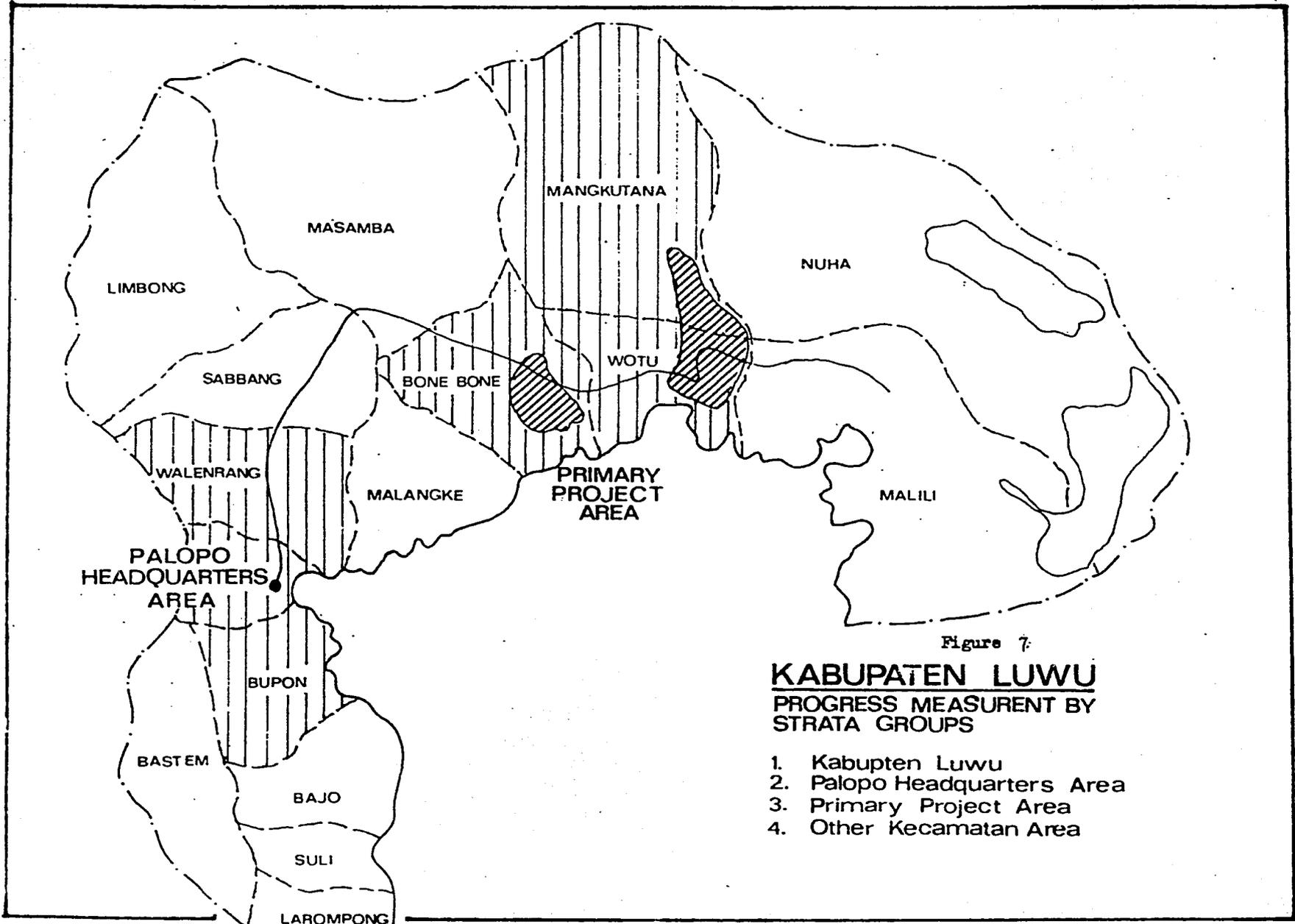


Figure 7:

**KABUPATEN LUWU**  
PROGRESS MEASUREMENT BY  
STRATA GROUPS

- 1. Kabupten Luwu
- 2. Palopo Headquarters Area
- 3. Primary Project Area
- 4. Other Kecamatan Area

# GOAL PROGRESS ESTIMATES

## BY GROWTH RATES %

1970-71 to 1981-83

	FOOD FARM POPULATION		HECTARES/F <sup>2</sup> CAPITA		PURCHASED INPUTS		FOOD PRODUCTION		
	Base Line	Progress	Base Line	Progress	Base Line	Progress	Base Line	Progress	
<b>KABUPATEN LUWU</b>	3.9%	3.6%	-1.0%	2.5%	31.4%	17.3%	5.1%	10.9%	
<b>PRIMARY PROJECT KECAMATANS</b>	10.4%	5.5%	-6.8%	10.1%	34.0%	16.0%	0.1%	23.3%	
<b>PALOPO HQ KECAMATANS</b>	2.7%	2.8%	-2.9%	3.7%	30.6%	22.8%	3.3%	9.2%	
<b>OTHER KECAMATANS</b>	2.0%	3.3%	2.8%	-0.3%	29.6%	11.4%	7.7%	7.2%	
	71	76	83	71	76	83	71	76	83

Figure 8

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# GOAL PROGRESS ESTIMATES

## BY GROWTH RATES %

1970 - 71 to 1981 - 83

	FOOD EXPORTS		FOOD CONSUMPTION / CAP		NET INCOME / F <sup>2</sup> CAP.		BANK CREDIT								
	Base Line	Progress	Base Line	Progress	Base Line	Progress	Base Line	Progress							
<b><u>KABUPATEN</u></b> <b><u>LUWU</u></b>	9.6%	9.6%	0.6%	7.2%	0.8%	6.8%	28.9%	28.2%							
<b><u>PRIMARY</u></b> <b><u>PROJECT</u></b> <b><u>KECAMATANS</u></b>					-9.9%	17.2%	32.2%	4.4%							
<b><u>PALOPO</u></b> <b><u>H G.</u></b> <b><u>KECAMATANS</u></b>					-0.2%	5.8%	23.6%	57.6%							
<b><u>OTHER</u></b> <b><u>KECAMATANS</u></b>					5.4%	3.8%	23.8%	33.1%							
	71	76	83	71	76	83	71	76	83	71	76	83	71	76	83

Figure 9

### 10.1.2. Hectares Harvested Per Food Farm Person

The growth rate of this indicator is the highest in the Project Area at 10.1 percent per year, compared to 3.7 percent in the Headquarters Area and a minus 0.3 percent in the Other Kecamatan. All areas had negative trends during the baseline period except for the Other Area which had a baseline trend of 2.8 percent. That status has been reversed throughout the project period.

The current Kabupaten Luwu figure of 0.144 hectares harvested per capita means 0.71 hectares harvested for a family of five compared to 0.140 hectare per capita 0.70 hectare harvested harvested for a family of five in the Project Area.

Although the Project Area still shows the highest growth trend in hectares harvested for the progress years, actual hectares harvested decreased from 19,781 hectares in 1980-81 to 18,934 in 1981-82 and to 14,470 in 1982-83. This is a 27 percent drop, to about the same level as 1978-79. Kecamatan Bone Bone showed a 52 percent decrease in hectares harvested this year, but Wotu declined only 12 percent and Mangkutana increased 21 percent. The fall in Bone Bone was due in part to very dry weather and the lack of reliable irrigation water.

### 10.1.3. Purchase Food Farm Inputs

This past year showed a 40 percent decrease in the value of purchased food farm inputs\* sold in Luwu, down from Rp 740 million to Rp 440 million. This is a return to the 1980-81 levels. The overall progress trend for this indicator in Luwu remains a high 17.3 percent. The value of inputs in the Headquarters, Other, and Project Areas still show long range growth at rates of 27.8 percent, 11.4 percent and 16 percent respectively. All of these trends

\*Inputs include fertilizers, pesticides, seeds, tools, tractor rental, fuel for tractors, and land taxes.

show the positive continuation of the baseline trends which were also quite high due to the extremely low level of inputs used before the project started. It is significant that the progress trends, while not as high as the baseline trends, remain between 11 percent and 23 percent in the different areas of Luwu. In addition to dry weather hampering planting, the worldwide recession and the reduction of available credit caused a reduction of input purchasing power.

#### 10.1.4. Food Production

Though total hectares harvested in Luwu decreased by 29 percent in 1982-83, and the total value of food production declined 14 percent. Again dry weather and the reduced ability to purchase inputs adversely affected food production. Food production decreased by 24 percent in the Headquarters Areas and 17 percent in the Project Area. The Other Area shows an increase of one percent. Despite the decreases, overall production progress trends still show the Headquarters, Other, and Project Areas growing since the benchmark year at average rates of 9.2 percent, 7.2 percent, and 23.3 percent respectively.

In the Project Area, the value of crop production decreased by 15 percent in 1982-83 compared to the previous year. In Kecamatan Mangkutana, however, there was an increase of 22 percent. In Wotu crop production was slightly lower than the previous year. In Bone Bone the drop in value of the crop production was a sharp 33 percent. Though livestock production decreased on an annual basis in all kecamatans the long range trends are still quite positive. The irregular 1982-83 rainy season and lack of dependable irrigation water in Bone Bone led to lower production figures this year.

Rice production decreased by 17 percent in 1982-1983. The overall progress trend for Luwu remains 9.6 percent while the progress trend for the Project Area is now 31.8 percent. Rice production trends for the progress years in

the Headquarters and Other Areas stand at 8.9 percent and 4.6 percent respectively. The baseline years showed practically no growth in rice production, with a negative baseline trend in the Project Area before the 1975-76 benchmark.

#### 10.1.5. Food Exports

Food exports since the benchmark year have been increasing at an average annual rate of 9.6 percent, the same as baseline rate of 9.6 percent per year. The total value of food exports actually declined between 1980-81 and 1981-82, but increased again in 1982-83. In 1980-81, Dolog shipped 3475 tons of rice to other areas and had a stock at the end of the year of 3125 tons in Palopo warehouses. In 1981-82 Dolog purchased 7918 tons of rice in Luwu and shipped 6275 tons out of the area. In 1982-83 Dolog purchased 12,750 tons of rice and exported 2,050 tons. The civil service in kind payments program absorbed 7,200 tons of rice this year. Exports of corn, soybeans, durian, cattle, pigs, and eggs a declined between 1980-81 and 1981-82 however to bring about an overall decrease of 10 percent in the value of food exports. Despite the slight increase in 1982-83 the slowed export growth rate can be accounted for by the increasing local demand for these commodities. Corn is now used locally for the production of livestock feed. Livestock production itself is growing in Luwu and much of the local production is kept in Luwu to build up local herds. Egg production has been increasing throughout the province which has diminished the opportunity for marketing eggs outside of Luwu. The increasing egg production in Luwu is finding a large market though at the nickel mine complex in Kecamatan Nuha.

#### 10.1.6. Food Consumption Per Capita

Decreased food production this past year has decreased the estimated food consumption percapita\* by 18 percent

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\* Consumption of rice, corn, cassava, sweet potatoes, mung beans, soybeans, peanuts, fruit, vegetables, and livestock.

from an approximate value of Rp 39,290 to Rp 32,400 per capita. The overall progress growth rate for this indicator in Luwu is now 7.3 percent which compares favorably to the baseline rate of only 0.6 percent per year. Not only is Luwu's population growing at a rapid rate, but the data indicate nutritional levels have improved.

#### 10.1.7. Net Income Per Food Farm Person

For the entire Kabupaten, net income per food farm person (income only from food commodities studied in this report) dropped by 18 percent between 1981-82 and 1982-83, from Rp 53,700 to Rp 43,780 per person. The 1982-83 figure means an income for a family of five is about Rp 220,000. The overall progress trend for Luwu stands at 6.8 percent annually compared to a practically stagnant baseline rate of 0.8 percent.

As in past years, the Project Area has the highest progress rate for this indicator at 17.2 percent per year, compared to 5.8 percent in the Headquarters Area and 3.9 percent in the Other Area. For the third year in a row, the average annual food farm income per capita in the Project Area is greater than the Other Kecamatan which show a figure of Rp 39,333 per person. The Project Area food farm income is equal to 89 percent of the Palopo Area figure of Rp 49,780. In 1980-81 however, the Project figure was only 79 percent of the Palopo Area's estimated income, indicating not only that farm incomes overall are increasing but that the difference in incomes between the Project Area and the more advanced Palopo Area is declining. This fulfills one of the major objectives of Indonesia's General Outline for Development (GBHN), that of "Pemerataan" or equity in development.

#### 10.1.8. Net Cash Income Per Food Farm Person

The progress trend for this indicator in Luwu is now 9.5 percent per year, somewhat larger than the 6.8 percent figure for total food farm income. This indicates that

marketable surpluses of food commodities are growing and farmers are moving away from subsistence incomes. Cash income for food farms in Luwu is now estimated to be approximately Rp 11,470 per person or Rp 57,350 for a family of five (in 1978 rupiah). Cash income from sources other than agriculture (food crops and livestock) are not included in this figure.

#### 10.1.9. Bank Credit

Data for 1981-82 was made available by the Bank Rakyat Indonesia branch office in Palopo. No other local banks would volunteer information, which makes comparisons with previous years somewhat difficult. Using only the BRI figure for 1982-83 total credit outstanding in Luwu decreased by 70 percent from the previous year. What is significant is that the largest amount remained in "small enterprise" credit. The overall progress growth rate for small enterprise credit remains high although its baseline rate of 23.8 percent was (along with livestock and fisheries) the slowest growing type of credit.

Although no direct correlation between small enterprise credit and Project Luwu can be made from the data, it does appear that small enterprises have been growing rapidly since the project began, perhaps the result of a multiplier effect from project activities.

#### 10.1.10. Total Net Farm Income In Luwu

The current progress growth rate of total net food farm income is 6.8 percent. Although harvests have fluctuated from year to year, annual income over the entire project period is increasing on the average at a steady rate. Total estimated income from food farms for 1981-82 is now Rp 17.7 billion\* or Rp 43,780 (\$73) per food farm person. With the regression curve extended one more year to 1983-84, food farm income per capita may be expected to reach Rp 55,751

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\* based on regression trend.

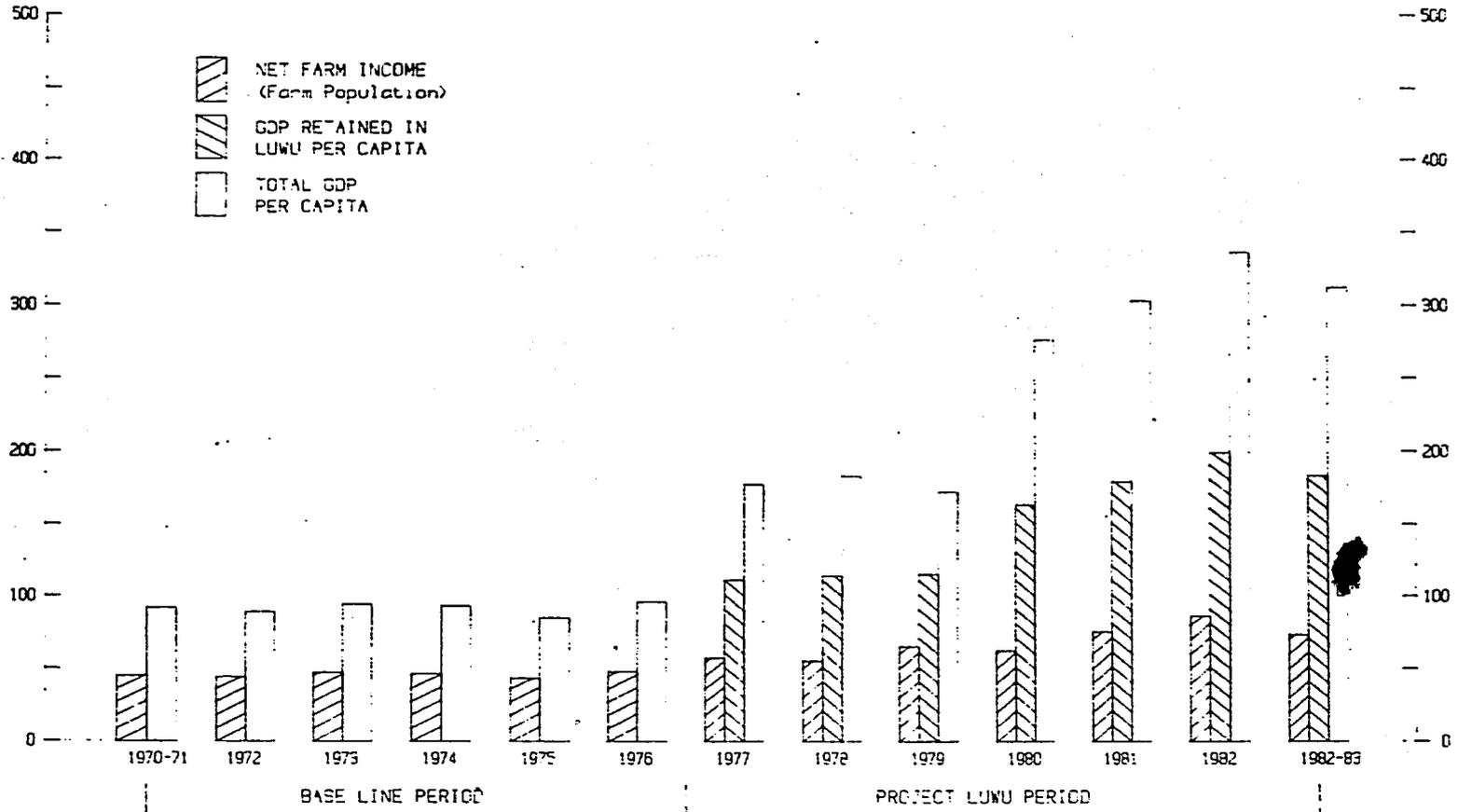
(\$89) per capita, or Rp 278,755 (\$446) for a family of five. This compares very favorably to the figure of Rp 30,600 (\$49) per capita or Rp 153,000 (\$244) per family if the baseline growth rate of 4.8 percent had remained unchanged through 1982-83. This estimated increase in food farm income of \$202 per family is 67 percent greater than the target increase of \$135 stated as a "Condition Indicating Achievement - End of Project Status" in the Capital Assistance paper for the project.

Figure 10 shows very clearly the start of the impact of Project Luwu in 1977 and the general increasing trends in Gross Domestic Product and Net Food Farm Income Per Capita in Kabupaten Luwu. Both are on a general upward trend that was arrested as the impact of the world wide recession reached Luwu in 1982-83. The Gross Domestic Product Per Capita was \$312 which is more than triple the \$96 found in the bench- mark year 1975-76. More significantly the percentage retained in Luwu increased from 50 percent to 59 percent.

# LUWU GROSS DOMESTIC PRODUCT (GDP) AND NET FARM INCOME PER CAPITA (Constant 1978 Rupiah at US\$1 = Rp 625)

US Dollars  
Per Capita

US Dollars  
Per Capita



-87-

Figure 10

## 11. Manageable Project Variables

### 11.1. Project Inputs

#### 11.1.1. Overview

In the final years of the project there has been excellent progress in the level of disbursement of project funds. At the end of March 1981 only 43 percent of local project costs had been disbursed. By June 30, 1982 the disbursement of funds equalled 70 percent and by December 1983 they equalled 101 percent of the 1981 revised cost estimates. Much of this progress is due to the rapid finish of the road improvement subproject which accounts for approximately 53 percent of the total local cost estimates for Project Luwu.

Project cost estimates used in this report are those which were calculated in 1981 for local and foreign exchange costs plus \$3.7 million additional funding committed by USAID through a grant agreement and loan addition that year. Total costs are summarized below:

Table 11.1

#### REVISED PROJECT COST ESTIMATES SUMMARY

	LOAN AGREEMENT		GRANT AGREEMENT		PROJECTED TOTAL COSTS	
	Local Costs	Foreign Exchange	Local Costs	Foreign Exchange	Local Costs	Foreign Exchange
	(Rp. Millions)	(\$ thousands)	(Rp. Millions)	(\$ thousands)	(Rp. Millions)	(\$ thousands)
DIP/M	24 375		913		24 374	
DIP/S	6 880				6 880	
USAID		3 998	75	3 580	75	7 578
	Rp 31 254	\$3 998	Rp988	\$3 580	Rp31 329	\$7 578

#### 11.1.2. Analysis by Source of Funds

Total local cost expenditures for the project to date equal Rp 31,710 million or 101 percent of the total estimated local cost. Of the total expenditures, Rp 24,978 million are DIP Murni and Rp 6,732 million are DIP Supplement, meaning 102 percent of total estimated DIP Murni costs

**PROJECT LUWU  
INPUTS PROGRESS ESTIMATES  
DECEMBER 1983**

SUBPROJECT	PLANNED INPUTS				INPUTS PROGRESS		
	ORIGINAL CAP ESTIMATES (1977)		REVISED COST ESTIMATES (1981)		DISBURSEMENT Rp (000)	PROGRESS %	
	\$ (000)	Rp (000)	Rp (000)	(%)		(5)	(5)/(2)
	(1)	(2)	(3)	(4)	(5)	(5)/(2)	(5)/(3)
HEADQUARTERS	DIP/M	783	324900	2515012	2288282	704	91
	DIP/S	199	82600	745981	844543	1022	113
	TOTAL	982	407500	3264993	3132825	769	96
TRANS-MIGRATION	DIP/M	2166	899900	729567	833440	93	114
	DIP/S	50	20700				
	TOTAL	2216	920600	729567	833440	91	114
REC	DIP/M	702	291300	551256	548389	188	99
	DIP/S	429	178100	247574	192678	108	78
	TOTAL	1131	469400	798830	741067	158	93
FCC	DIP/M	711	295100	849546	771194	261	91
	DIP/S	420	174300	460479	603500	346	131
	TOTAL	1131	469400	1310025	1374694	293	105
IRRIGATION	DIP/M	6735	2795000	5795862	7919220	283	137
	DIP/S	3501	1452900	1671598	881755	61	53
	TOTAL	10236	4247900	7467460	8800975	207	118
ROAD IMPROVEMENT	DIP/M	16791	6968300	13933502	12618115	181	91
	DIP/S	6743	2798300	3687500	4148211	148	112
	TOTAL	23534	9766600	17621002	16766326	172	95
AGRICULTURE RESEARCH	DIP/M			62500	61369		98
	DIP/S						
	TOTAL			62500	61369		98
TOTAL LOCAL COST	DIP/M	27888	11574500	24374745	24978640	216	102
	DIP/S	11342	4706900	6879632	6732056	143	98
	TOTAL	39230	16281400	31254377	31710696	195	101
FOREIGN EXCHANGE (\$)	LOAN	3658		3998	3699	101	93
	LOAN ADD. & GRANT			3700	3200		63
	TOTAL	3658		7698	6899	109	90
PROJECT TOTAL	RP	17798500		RP 36065627	RP 36022571	202	100
	US\$	42888		US\$ 57705	US\$ 57636		100

(1) Calculated at rate of Rp 625 = \$1.00

(\*) Includes DRAs

Figure 11

have been disbursed, and 98 percent of total DIP Supplement costs have been disbursed. Over the past year, disbursements of DIP Murni increased by 35 percent over total disbursement in 1982 of Rp 18,530 million. DIP Supplement disbursements increased by 105 percent from last years total of Rp 3,279 million.

Foreign exchange expenditures now total \$6,899 million, 90 percent of the total planned cost \$7,698 million. The entire foreign exchange component of the original loan has been exhausted as final payments for consultant services and overseas training were made. Of the \$3,700,000 committed under the Project Grant Agreement and Loan Extension, \$3,183,404 have been disbursed for technical assistance services. This constitutes 80 percent of the commitment. It is expected most of the remainder will be disbursed in December 1983 and January 1984. Approximately \$242,000 or 6,5 percent will not be used.

#### 11.1.3. Analysis by Subproject

##### 11.1.3.1. Headquarters

As of December 1983, the Project Headquarters had disbursed 96 percent of its total budget estimate. DIP Supplement disbursements were Rp 844 million representing 113 percent of the 1981 cost estimates. DIP Murni disbursements totalled Rp 2,288 million or 91 percent of the cost estimates. The Headquarters will operate for another three months and is expected to spend another Rp 226 million of DIP Murni. This would bring their disbursements to 100 percent of the cost estimates.

##### 11.1.3.2. Road Improvement

The Road Improvement Subproject has shown great improvement in disbursement of funds over the past year. A total of Rp 16,766 million or 95 percent of the total cost has been expended. The final billings at the end of December 1983 should bring the expenditures to 100 percent of the cost estimates.

Although the situation has improved, late payments to the contractor were one reason why PT Sekayu had to quit work in Section I and turn its contract over to another contractor. Contractors with low capitalization and old equipment cannot be expected to work continuously without prompt payment of monthly billings\*.

Total cost estimates for the Road Improvement Subproject increased during the final year as Bina Marga and PT Pembangunan Jaya negotiated new unit prices for the portions of Section I which this contractor took over.

#### 11.1.3.3. Irrigation

The Irrigation Subproject has disbursed 118 percent of its total estimated cost or Rp 8,817 million as of June 1982. This subproject exceeded the revised budget estimate of Rp 7,467 million because of escalation costs and because completed works had to be rebuilt or improved due to poor construction quality.

#### 11.1.3.4. FCC

The FCC Subproject has disbursed Rp 1,374 million, or 105 percent of its total planned budget of Rp 1,310 million. Good progress has been made in the disbursement of DIP Supplement funds with 131 percent now disbursed. Ninety one of the subproject's DIP Murni has been disbursed.

Several changes in the planned expenditures for FCC, DIP Supplements were made this year which held up their disbursements to wait for USAID and Project approval. Rather than using the FAR process to purchase machinery and equipment, the subproject proposed that Rp 318 million be allocated for Direct Reimbursement Authority by USAID. To date, Rp 299.6 million has been approved by USAID, all but approximately Rp 37 million has been disbursed. Approval of that expenditure has just arrived from BAPPENAS and disbursement is underway.

\*The reader should refer to the Louis Berger Consulting Engineer's monthly reports for more complete information on road budget problems.

#### 11.1.3.5. REC.

Ninety-three percent of the REC's local costs are now disbursed. Good progress has been made this year in disbursing this subproject's DIP Supplement funds, which will total approximately Rp 248 million. To date Rp 193 million have been disbursed, a sizeable increase over the Rp 93 million disbursed as of June 1982, this was possible following the approval of project implementation documents in mid-1983. The Subproject however has still not received final approval of a Direct Reimbursement Authority (DRA) of \$31,000 which was approved by USAID in July 1983. The timely receipt of this approval is necessary in order for the REC's to complete all scheduled work.

#### 11.1.3.6. Transmigration

The transmigration subproject has expended 114 percent of its planned total cost. So far Rp 833 million have been disbursed by the headquarters for the placement and guidance of the transmigrants. This does not however represent the total expenditures of this subproject as the early pembinaan (guidance) budgets were handled by the Directorate General of Transmigration's regular staff in Luwu.

#### 11.1.3.7. Agricultural Research

Disbursements by the Project Headquarters to BPTP Maros for this subproject equal 98 percent of the research cost estimates. This subproject is subcontracted to BPTP using Headquarters DIP Supplement funds. A total of Rp 61.3 million has been disbursed.

#### 11.1.4. Loan Commitments and Disbursements/Reimbursements

In June 1980 the entire \$15 million loan was allocated among the subprojects except for \$31,221 remaining as a contingency fund. As of July 31, 1983 the loan TDDA \$14,947,133 million was officially committed by USAID to specific activities. By December 1983, \$14,820,836 had been

disbursed/reimbursed or was in the disbursement/reimbursement process. If the long awaited BAPPENAS approval of the REC Subproject DRA authorized by USAID PIL #43 comes through before 23 December another \$34,119 will be disbursed.

As mentioned earlier, \$3.7 million additional funding through a grant and a loan was committed to the project to continue technical assistance through 1983. Currently \$3,183,404 has been disbursed. Another \$274,807 will be billed soon as all consultant contracts are completed in December 1983.

## 11.2. Project Outputs

For the second year in a row, project implementation advanced significantly. Sixty-eight percent of the road subproject was asphalted this past year. The REC doubled the number of farmers who were trained during all previous years of the project, and the FCC subproject doubled the amount of crops it had purchased during the previous year. Two thousand hectares of land were cleared under headquarters supervision, and the Kabupaten Bappeda TK II Luwu planning office began operations in January with technical assistance from the Checchi/DMJM team and training funded through the headquarters. The first phase of the agricultural research subproject was completed and irrigation construction continued in the Kalaena area. It was generally a good year for outputs progress in all subprojects and it looks probable that remaining obstacles can be overcome to complete all subprojects by the end of 1983. The Terminal Date for Disbursement Authority under the loan agreement remains July 31, 1983 and the Terminal Disbursement Date is December 31, 1983, by which time all subproject activities financed under the loan must be completed and reimbursement requests processed through USAID.

### 11.2.1. Project Headquarters

The Project Headquarters conducted its primary function of project coordination. The forum of monthly coordination

**PROJECT LUWIJ  
OUTPUTS PROGRESS ESTIMATES**

-----  
DECEMBER, 1983

SUBPROJECT	PROGRESS INDICATOR	UNIT	ORIGINAL	REVISED	PROGRESS	PROGRESS PERCENT	
			PLAN	PLAN		(6)	(6/4)
	(2)	(3)	(4)	(5)	(6)	(6/4)	(6/5)
HEADQUARTER	Construction	m <sup>2</sup>	1965	2455	2455	125	100
	Cord.Meeting		60	70	70	117	100
	Training Courses			49	49		100
	Trainees	persons		2628	2628		100
TRANSMIGRATION	Villages			5	5		100
	Families		3550	700	700	20	100
	Kanmil Families		4450	11415	11725	263	103
RURAL EXTENSION CENTER	Constuction	m <sup>2</sup>	2720	2364	2364	87	100
	Extention Agents		80	80	80	100	100
	Extention Activities			504	504		100
	Farmer Trainees	persons		9645	22428		233
FARM COOPERATIVE CENTER	Construction	m <sup>2</sup>	940	9676	9676	1029	100
	Coops Participating	KUDs	41	26	34	83	131
	Crops Handled	tons/year	17300	9900	7949		80
	Input Sales	Rp(000)/yr		80000	141137		176
IRRIGATION CONSTRUCTION	Land Cleared	ha	7420	7975	7975	107	100
	Weirs		3	3	3	100	100
	Land Irrigated Boxes	ha	10760	8480	8480	79	100
	Completed Canals	m	81994	67887	67887	83	100
IRRIGATION EQUIPMENT	Spare parts stock	Rp million		225	45		20
	Equip.Availability	%		80	28		35
	Up Grade 3 Workshops			3	0		0
ROAD IMPROVEMENT	Asphalted length	km	177	177	177	100	100
	Drainage	m	1229	4100	4100	334	100
	Earthwork,Subgrade, and Subbase	m <sup>3</sup>	1019660	1325525	1522570	149	115
	Shoulders and base	m <sup>3</sup>	197506	121500	121600	62	100
	Wearing Course	tons	537318	76100	76100	14	100
	Structures	m	1318	514	514	39	100
AGRICULTURAL RESEARCH	Dry Land Crops Trials			105	105		100
	Wet Land Crops Trials			19	19		100
	Swamp Land Trials			33	33		100
REGIONAL PLANNING	Staff Seminars	meetings		75	95		127
	Base Mapping	maps		7	7		100
	Training Manual			1	1		100
	I-O Tables	tables		17	17		100

Figure 12

meetings played an important role in that activity. A total of 70 meetings were held during the life of the project.

Over the entire range of subprojects, 49 Training Courses have been completed since the project began. A total of 1512 trainees attended the courses. Training during the past year included on-the-job training in Bone Bone), and Bappeda Staff (twice weekly staff seminars). Other training included specialized staff training for the FCC staff and operation and maintenance training for the Irrigation Subproject.

#### 11.2.2. Road Improvement

Despite a Bina Marga funding shortfall and contractor financial and equipment shortages, remarkable progress was made on the Road Improvement Subproject during the last few months of the project period. In March 1983 work on the road ground to a virtual halt when Bina Marga ran out of funds. By the end of July, with USAID assistance, funds became available. By this time PT Pembangunan Jaya, who had finished the work on the other five segments, was in position to take over the final segment of the road. PT Pembangunan Jaya established a work schedule and either met it or beat it and the highway is complete.

The asphalted length of the highway is approximately 170 kilometers because seven kilometers of base is still settling in a swampy area. A decision was made to cover this area with two coats of primer coating and wait for the asphaltting until after the road has finishing settling.

Bina Marga took a major step to insure the flow of traffic to North Luwu over the road by replacing the spans of the Sabbang Bridge with Bailey Bridging.

#### 11.2.3. Irrigation

Irrigation construction progressed during the last year, and the systems to irrigate 8,480 hectares of land in North

\*excluding REC farmer training courses.

Luwu is considered completed. Canal and diversion box construction is now 100 percent completed for the Bone Bone and Kalaona irrigation systems. The total of canal lengths is 67007 meters and 63 diversion boxes were built.

With the completion of the irrigation systems Operations and Maintenance activities assume prime importance. Unfortunately, the GOI does not have effective regulations on this important area. A national level study leading to changes in basic policy is needed.

#### 11.2.3.1. Irrigation Heavy Equipment

Special emphasis has been placed on the Irrigation subproject's heavy equipment since the consultant was brought on the job for this activity in January 1982. Recommendations have been made to bring the three equipment workshops up to standard, improve spare parts inventories and increase equipment availability rates. All three targets however are far from being fulfilled due to budget restraints and a lack of long range planning.

No real progress has been made in upgrading the shops to a Grade 3 level. A detailed plan for the improvement of the Lamasi shop was submitted to the subproject headquarters but no action was taken.

The inventory value of spare parts has not been increased due to lack of funds, and a gradual decline in available stock can be seen. Spare parts inventory value is currently estimated at Rp 45 million, only 20 percent of the target value of Rp 220 million.

Equipment availability has declined to 35 percent with 28 out of a total 87 units deadlined. An 80 percent equipment availability rate is considered good.

This area is one where the GOI needs to take a close look at their policies and regulations. A major revision of those is required for any Heavy Equipment care and use program to be effective.

#### 11.2.4. Farm Cooperative Centers

The FCCs in Luwu experienced an active year in all aspects of operations from training and construction to input supply and marketing operations. Eighty six percent of the subproject's construction goal in North Luwu has been met with the completion of the Walenrang FCC and warehousing facilities in Palopo.

All of the 26 North Luwu KUDS have now participated in FCC training programs and in FCC input supply or marketing programs. The 8 KUDS in South Luwu began participation when the Belopa FCC (constructed without AID financing) began operations in 1983.

The FCC this year achieved 80 percent of their end of project target of 9900 tons for rice and maize purchased annually. This figure is expected to reach close to 100 percent in 1983-84 as the general economy improves.

Sales of agricultural input supplies to farmers increased dramatically during the final years of the project. The FCC Subproject was awarded sole distribution rights for agricultural inputs in the North Luwu kecamatans. The 141,137,000 rupiah worth of supplies sold to farmers in the last year equals 176 percent of the originally planned sales target. The distribution of such a large amount of supplies represents a logistical and organizational success for which the FCC is to be commended.

#### 11.2.5. Rural Extension Centers

Extension activities conducted by the REC subproject are now complete with a total target of 504 agriculture field demonstrations and training courses. The achievement for trainees and farmer contacts was 22428 farmers attending REC extension activities. This excellent response was somewhat due to several livestock inoculation programs which were implemented in 1982-83 and reflects the importance of livestock to Luwu's agricultural economy.

Rice demonstrations were a major part of the REC's demonstrations and they have successfully demonstrated high yields from improved varieties and improved farming practices.

Biweekly training meetings for PPLs (extension agents) continued until the end of the project with attendance recorded above 90% for most sessions. Throughout the planting seasons problems coinciding with the farmer field activities were discussed with the 80 PPLs and new extension and training techniques were introduced by the PPS staff.

#### 11.2.6. Transmigration

The "Pembinaan" activities at the project transmigration villages continued this year under the Project Headquarters. The results have been gratifying and the villages will be formally turned over to the local government on 9 January 1984. Land titles have been prepared and will be issued to the transmigrants at that time.

#### 11.2.7. Agricultural Research

The two year cropping patterns research program has been completed by the Maros Food Crops research station. In all 105 Dry Land Crops Trials, 19 Wet Land Crops Trials and 33 Swamp Lands Crops Trials were conducted. A report of the results of these trials has been prepared and is being submitted.

#### 11.2.8. Bappeda TK II Luwu

As mentioned earlier, the Bappeda TK II Luwu office was formed in January 1982 as an additional activity under Project Luwu. This office did gather data and created an input-output model of Kabupaten Luwu which will serve as the basis for development planning in Luwu. The input-output technique was chosen because of its flexibility and because of the discipline inherent in the model during the data collection process which requires the double checking of all

data as both an output of a production process and as an input to another production process or to final demand. The model can be used to identify opportunities for new projects and investments as well as to analyze project proposals as to their impact on the economy. Several different proposals can be applied to the model as a package to analyze the best mix of project activities, and various projects can be compared to set development priorities when allocating budget funds.

The consultants held staff seminars twice each week with the Bappeda staff as a vehicle for teaching the input-output theory and to discuss progress in data collection and analysis. These seminars continued through August of 1983. In all 95 staff seminars have been held at the Bappeda office.

Data on basic infrastructure was also collected for a series of base maps for the Kabupaten. A new general base map of kecamatan and desa boundaries, roads, rivers, and other mapping in the Kabupaten. Land use potential has also been mapped showing a comparison of available land in the kecamatans of Luwu. A total of seven maps have been completed.

A training manual for the process of input-output analysis at the Kabupaten level was published and 17 input-output tables were developed for the kabupaten.

The consultant's economist worked with the Project Luwu staff to gather economic, marketing and labor force data which was used to identify future development projects for Luwu Phase II and the Kabupaten Repelita five year development plan. This was published in an economic study of Kabupaten Luwu in the fall of 1982. Using this study as a basis, the economist coordinated the activity of four short term experts to work with the GOI offices at the national, provincial, and local levels to produce a five year plan for Kabupaten Luwu. Thanks to the outstanding cooperation of the GOI agencies, that plan has been published.

## 12. Project Purpose

### 12.1. General

The project purpose is discussed to focus on the long term activities which are expected to continue after Project Luwu is completed in December 1983. During the past year, this issue has become extremely critical for all sub-projects. Previous reports have made recommendations regarding the project purpose. Some are being worked on but much more needs to be done.

### 12.2. Project Headquarters

The Luwu Project Headquarters was set up strictly for the purpose of monitoring the implementation of the Luwu Project activities and to evaluate the impact of the project on the rural poor. The office was never meant to be a permanent body and it is planned that the headquarters will be closed following the successful execution of its duties on the Terminal Date of Disbursement for loan funds of December 31, 1983. Each of the individual subprojects will have activities or responsibilities which will be expected to be carried out individually to continue the benefits of the project. The Project Headquarters therefore has no planned POM (Planning, Operations, and Maintenance) responsibilities once the project is complete.

### 12.3. Road Improvement

The best estimates to date indicate that Seksi PU Bina Marga will require approximately Rp 321 million per year to properly maintain the Kabupaten Luwu national roads. Seksi PU Bina Marga will probably receive about Rp 100 million for wages, but the remainder must come from national funds. A consultant was brought to Luwu under the Grant Agreement to look at the needs of the Seksi to maintain the road. His recommendations may well lead to proposals for further foreign donor assistance to road maintenance activities. The Louis Berger consultant team which completed the Kabupaten Luwu secondary road study also wrote recommendations regarding maintenance needs for Kabupaten roads

Figure 13

# PURPOSE PROGRESS ESTIMATES

Planning + Operating + Maintenance = P.O.M. Budget

	Responsible P.O.M. Entity	P.O.M. Budget Estimates		P.O.M. Budget Probability
		Technical Estimates	Availability Estimates	
HEADQUARTERS/ TRAINING	OPEN	OPEN	OPEN	OPEN
TRANSMIGRATION	NONE	NONE	NONE	NONE
R.E.C.	Luwu Rural Extension Services	Rp115million/yr	Rp60million/yr	52%
F.C.C.	Luwu Farm Cooperatives	Rp34million/yr	Self supporting	90%
IRRIGATION	DG.W.R.D. Luwu Section	Rp58million/yr	Rp25million/yr	43%
ROAD (All Kabupaten Roads)	DG Bina Marga Luwu Section	Rp321million/yr	Rp100million/yr	31%
AG. RESEARCH	Maros Research Station	NONE	NONE	NONE
BAPPEDA TK.II	Kabupaten Luwu	Rp31million/yr	Rp12million/yr	38%

in Luwu. These two sets of recommendations may lead to an overall road maintenance program for the Kabupaten which would require funding assistance from sources other than Bina Marga in the early stages of training and for equipment purchases.

#### 12.4. Irrigation

POM budget operations for the irrigation subproject can be divided into two separate operations for primary and secondary canals through the local Seksi PU Pengairan, and for the tertiary and quaternary canals through the water users associations (PJA). The primary issues facing the operation and maintenance of the primary and secondary canals is that of proper equipment maintained with trained operators to handle the maintenance of the canals. As mentioned in the project outputs section, equipment availability is less than 40 percent and will only decline further without proper workshops, spare parts, and tools. A consultant was brought to the project in January 1982 specifically to assist the Irrigation Subproject in this matter, but funding to implement maintenance improvement programs has been very limited. Meetings have recently been held at the highest level of the Directorate General of Water Resources Development to discuss alternative solutions to this problem. It is hoped that leasing arrangements with local construction contractors will be improved to ensure that equipment leased by contractors from the government will be returned in running condition to be used in maintenance programs. More preferable would be to require contractors to purchase and maintain their own equipment.

The formation of water users associations has been initiated in the Kalaena, Bone Bone, and Lamasi irrigation areas. An extensive training effort was conducted by the Project Headquarters and the Irrigation Subproject to train both PJA groups and employees of Seksi PU Pengairan to undertake proper operations and maintenance activities. However water flow is still not controlled technically to ensure equal distribution throughout the entire systems and collection of water user fees to help support the maintenance costs is still not carried out.

An estimated Rp 58 million will be required annually to maintain the Bone Bone and Kalaeen systems alone. Without proper equipment maintenance, regular maintenance of the primary and secondary canals, and well organized PJA groups, the cost could run much higher. This can already be seen in increased construction costs as some structures not properly maintained have already had to be rebuilt before they are even turned over to the local government.

#### 12.5. Farm Cooperative Centers

Although considerable progress has been made by the FCC Subproject in achieving all output targets, the future organizational status of the FCCs remains unclear.

During the past two-years the subproject structurally reorganized the FCCs by administrative and operational centralization into a secondary cooperative organization established as a branch of the South Sulawesi PUSKUD. Although implementing limited joint operations with the South Sulawesi PUSKUD, the Palopo based organization is operating under the supervision of the FCC Subproject and is financially and managerially independent of PUSKUD.

The structural centralization of the FCCs has greatly increased operational and administrative efficiency, especially in the areas of external input procurement and output marketing. It has in addition effectively created an organization in Palopo potentially transferable to both a viable post-Project Luwu entity and one sanctionable and compatible to current GOI cooperative policy.

The Ministry of Cooperatives has decided upon two alternative future structures for the current Farm Cooperative Center Organization. The first and potentially much more attractive is to create an autonomous PUSKUD in Luwu with operational branches in Bone Bone, Mangkutana, Walehrang, South Luwu and possibly later in Kabupaten Tator. The second is to have the Palopo organization continue as a branch of the South Sulawesi PUSKUD with sub-branches in the current FCC locations.

The previous volume of operations at FCCs along with the potential agricultural production service requirements of Kabupaten Luwu more than justify the mostly administrative investment associated with organizing a Palopo based PUSKUD. In addition, a Palopo based PUSKUD would offer the only possibility of a truly cooperative management structure within the FCCs where primary cooperative farmer members could participate in meaningful representative management and potentially receive dividends yielded by the organization. Furthermore, operational and financial difficulties currently encountered in activities jointly conducted with the South Sulawesi PUSKUD due to a lack of reliable communications, a four to six hundred kilometers distance between branches and center, and less than attractive profit sharing arrangements have placed the latter option's viability in doubt.

The Ministry of Cooperatives held a workshop in Kabupaten Luwu in October 1983 in hopes of researching recommendations to resolve the status issue. A timely resolution to the status issue will be essential to the project's ability to leave in position a viably operating post-Project Luwu entity. The final report of the seminar has not yet been received.

Although it is higher than originally estimated, through greater than anticipated operational revenues, the possibility of the FCCs meeting their POM budget appear extremely good.

#### 12.6. Rural Extension Centers

As mentioned in previous annual reports, the REC subproject has the lowest project budget of all the subprojects, yet may very well require the highest POM budget to continue project operations after Project Luwu is complete. The need for agricultural extension will continue and indeed expand as new areas come under cultivation. Funds will be needed in the future to maintain a high level of PPLs in the field and to fund extension activities. It is estimated that Rp 115 million annually will be required to keep the extension activities at the current level.

The future of the RECs however is not yet certain. Not only are funding sources uncertain, but it is still not clear who will manage the RECs. The Agency for Agricultural Extension and Training/BPLPP currently funds and operates the four RECs in coordination with the four agricultural services offices in Luwu. No organizational structure or permanent funding source has been identified for this vital operation in the Kabupaten. It was proposed that a workshop be held in Palopo in late 1982 to discuss the future of the RECs, to decide what their role will be and how they will function in the future. This workshop was considered to be of vital importance as the project nears completion without any defined future for the Rural Extension Centers. Unfortunately, lateness of funding and approvals from the Jakarta level forced the cancellation of that activity.

#### 12.7. Transmigration

Transmigration villages normally remain under the direct administration of the Directorate General of Transmigration for a period of five years. During this period called "pembinaan" or guidance the transmigrants are given training in farming skills and other basic needs to ensure that they become self-supporting farmers in their new villages. Following this pembinaan period, the villages are turned over to the local government, to be served by all of the regular local government programs. The pembinaan program for the 700 families under Project Luwu will come to a close in mid-1983. The process of land certification for the transmigrants has been completed and the villages are ready to be turned over to the local government on 9 January 1984. There will be no long term POM activities for the Transmigration office in these villages.

#### 12.8. Agricultural Research

This project was planned as a two year research program to investigate appropriate cropping patterns in the project area. No ongoing programs using local funds are planned for the future.

The real purpose of the research component of Project Luwu will be met when final findings are published by DPTP Maros and are made available to the farm extension agents to disseminate to the farms. This further emphasizes the need to establish a permanent framework for the Rural Extension Centers so that close cooperation is possible between the research and extension services.

#### 12.9. Bappeda TK II Luwu

This planning office for the Kabupaten was created at an early date so that they may take over from the Project Headquarters some of its coordination and monitoring functions as well as to plan for future development opportunities in Luwu. The Bappeda office has a permanent staff of 26 persons plus supporting personnel which will require an annual budget of at least Rp 31 million to properly operate the office. Budget requirements will also increase in the future as the Bappeda office expands from a "B" type office with four operational divisions to an "A" type office with five divisions. The Bappeda office is operating in 1982-83 with a limited budget of only Rp 12 million and a very small amount of assistance for training from the Luwu Project Loan through the Project Headquarters. The regional planning consultant has estimated that a minimum of Rp 31 million will be required annually for operations alone, let alone funds required for equipment purchases which could total Rp 41 million. Funding for the Bappeda office must come from local APBD sources. The local government has made a strong commitment to development planning through the establishment of a planning office with a large staff. Increased funding commitments will be required in the future however to ensure a properly operating office which can attract and hold skilled personnel.

## 13. CONSULTANTS

### 13.1. Consultants Service

Consultant services to Project Luwu were divided into two groups. One team provided by contract between Checchi and Company/Daniel, Mann, Johnson and Mendenhall, a joint venture, and the Ministry of Transmigration covered most of the subprojects. Another team provided by contract between Louis Berger International/PT Inda Karya, a joint venture, and the Directorate General of highways assisted the Highway Subproject.

The Checchi/DMJM consultancy began on 19 June 1977 with the arrival of the first Resident Manager and the Resettlement Officer in Jakarta. The contract termination date is 31 December 1983. During the contract period 24 consultants have provided 472 person months of services. Figure 14 and Table 13.1 show lists of consultants who have served with the team in Palopo.

A shift was made in organizational concept for the team in 1978. It was determined that in implementation type projects short term consultants have little or no effect or impact upon project activity. Most short term time was then combined to bring in long term consultants for the FCC and REC Subprojects. This markedly improved the technical assistance that was provided to those subprojects.

The initial consultant contract period was for four years. With the signing of the Project Grant Agreement in 1981, the contract was extended for two additional years. In early 1983 it became apparent that the project work would continue almost until the Project Loan Terminal Disbursement Date and the consultant contract was extended an additional five months.

As a result of the Grant Agreement an additional function was assigned to the consultant team. Earlier the

# CONSULTANT SERVICE TO PROJECT LUWU

NAME	POSITION	1977	1978	1979	1980	1981	1982	1983
		JASOND JFMANLIASOND JFMANLIASOND JFMANLIASOND JFMANLIASOND JFMANLIASOND JFMANLIASOND						
MESSEGE	Res. Manager	_____						
NUNN	Resettlement	_____						
NUNN	Res. Manager	_____						
OLIVIER	Irrig. Constr.	_____						
NOORDHOORN	Irrig. O&M	_____						
RENSHAW	Ag. Extension	_____						
FILIACI	Cooperatives	_____						
COCHRANE	Resettlement	_____						
COCHRANE	Reg. Planning	_____						
DENNIS	Irrig Constr	_____						
MANLY	Eval/Planning	_____						
LENZ	Ag Extension	_____						
SCHANTZ	Training	_____						
RUDE	Ag Extension	_____						
PATTEN	Irrig. Hyv. Equip.	_____						
WILLIAMS	Irrig Constr	_____						
SMAIL	Training	_____						
SCOVEL	Econ/Planning	_____						
HARMSTON	Input/Output	_____						
HAYLES	Ag Planning	_____						
RUTSKY	Irrig Planning	_____						
ABBOTT	Sm Bus Planning	_____						
CHENEY	Watershed Plan	_____						
TENBRINK	Cooperatives	_____						
DENNEY	Management	_____						
SANTOSO	Computer Trng	_____						

TPI-

## CONSULTANT SERVICE

NAME	POSITION	DATE ARRIVED	DATE DEPARTED	MONTHS
1. Gordon H Messogee	Resident Manager	June 19, 1977	October 22, 1978	16
2. Clifford Clyde Nunn Jr.	Resettlement/Resident Manager	June 19, 1977	December 31, 1983	79
3. Harold James Olivier	Irrigation Construction	July 14, 1977	May 9, 1979	22
4. William J. Noordhoorn	Irrigation Operation & Maintenance	December 10, 1978	June 18, 1981	30
5. Anderson N. Renshaw	Agricultural Extension	October 2, 1978	January 31, 1979	6
	Agricultural Extension	June 30, 1979	August 31, 1979	
6. Samuel D. Filiaci	Business Cooperatives Specialist	January 22, 1979	July 31, 1983	54
7. Steven George Cochrane	Regional Planner/Asst. Res. Mgr.	March 3, 1979	September 1, 1983	54
8. Norman Fred Dennis	Irrigation Construction	August 3, 1979	June 18, 1981	23
9. Robert Philips Manly	Evaluation/Data Management	August 12, 1979	December 31, 1980	21
	Evaluation/Regional Planner	September 11, 1982	December 21, 1982	
	Regional Planner/Economist	March 28, 1983	December 24, 1983	
10. Frederick W Lenz	Agricultural Extension	August 20, 1979	February 23, 1980	6
11. Frederick Frank Schantz	Training Consultant	September 23, 1979	December 18, 1979	3
12. Wayne Lawrence Rude	Agricultural Extension	June 15, 1980	December 31, 1983	43
13. Alfred Leon Patten	Irrig. Plant Engr/H.E.	December 28, 1981	December 23, 1983	24
14. Max Gray Williams	Senior Irrigation Engineer	February 8, 1982	December 22, 1983	22,5
15. Floyd K. Harnstom	Input-output Expert	August 1, 1982	September 2, 1982	1
16. Robert William Smail	Training Consultant	March 31, 1983	April 2, 1983	12
17. Victor Lark Scovel	Development Economist	April 15, 1983	December 31, 1983	20,5
18. Neil R Hayles	Agricultural Planner	January 30, 1983	May 6, 1983	3
19. Joseph Rutsky	Hydrologist/Water Resource Engr.	February 2, 1982	October 2, 1983	8
20. Richard D Abbott	Small Industry Specialist	April 1, 1983	July 1, 1983	3

Table 13.1

N A M E	P O S I T I O N	D A T E	A R R I V E D	D A T E	D E P A R T E D	M O N T H S
21. Philip B Cheney	Watershed Specialist	April	27, 1983	July	26, 1983	3
22. Purnomo W Santoso	Computer Training Consultant	October	1, 1983	December	31 1983	3
23. James Harry Tenbrink	Business Cooperatives Specialist	September	3, 1983	December	31, 1983	4
24. Prof. Hugh Denney	Management Analyst	September	8, 1983	November	7, 1983	2
25. Lerner/Black	Principal Time		v a r i e s		v a r i e s	9

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team activity had been concentrated around implementing projects. Since August 1981 the team has mounted a strong effort to assist the GOI in development planning. This necessitated a return to the use of short term consultants to obtain planning expertise in certain specified sectors.

### 13.2. Consultant Costs

#### 13.2.1. Contract

The Checchi/DMJM Joint Venture has been under contract to the Ministry of Transmigration to provide consultant services to project Luwu since March 7, 1977. The costs are established in the basic contract and Amendments as follows:

Document	Date	Amount	Used
-----	-----	-----	-----
Basic Contract	Mar. 7, 1977	\$1,108,170	\$1,108,170
Amendment No. 3	Jan. 1, 1980	351,580	351,580
Amendment No. 5	Jul. 31, 1981	2,398,423	2,398,423*
Total		3,858,173	3,858,173

#### 13.2.2. Local Support Funds

Under the terms of Amendment No. 5 to the basic contract Rp 110,060,000 were to be provided for consultants local support costs. This was augmented by an allocation of Grant Funds in the amount of \$120,000 for a Discretionary Fund to meet unfunded local support increased by \$30,000 in Amendment No. 6 the Checchi/DMJM contract dated 1 April 1983. The final financial statement on these two funds is attached as Annex I to this report.

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\* Approximately \$210,000 will be covered in the final billing.

ANNEX I

FINAL FINANCIAL STATEMENT  
DECEMBER 1983  
RUPIAH FUNDS

A. CONSULTANT'S RUPIAH FUND

ACCOUNTS	TOTAL	HQTRS	IRRIG	REC	FCC
DECEMBER REVENUES	0	0	0	0	0
Cumulative Revenues	104410183	55213363	26084220	11556300	11556300
DECEMBER EXPENDITURES					
Transportation	0	0	0	0	0
Consultant Per Diem	14500	0	0	0	14500
Local Staff Per Diem	185000	0	0	0	185000
Local Staff Salaries	0	0	0	0	0
Miscellaneous/ Reproduction	1304152	983038	4519	0	316595
TOTALS	1503652	983038	4519	0	516095
CUMULATIVE EXPENDITURES					
Transportation	16147010	7852385	3815395	1755455	2723775
Consultant Per Diem	12588750	5763750	3190000	1160000	2475000
Local Staff Per Diem	7095000	4743000	1616110	155240	580650
Local Staff Salaries	46258130	25561510	10186210	6659265	3851145
Miscellaneous/ Reproduction	22321293	11292718	7276505	1826340	1925730
TOTALS	104410183	55213363	26084220	11556300	11556300
UNEXPENDED BALANCE Rupiah Zero					

Note: Most December expenditures were paid by Discretionary Fund.

B. DISCRETIONARY FUND

REVENUES	DECEMBER	CUMULATIVE
From BNI 1946, Ujung Pandang	12892000	104084368
EXPENDITURES		
Equipment	570000	26202325
Services	14189455	49934429
Supplies	899773	13091982
Miscellaneous	3472332	14834882
Bank Charges	0	20750
TOTAL	19131560	104084368
UNEXPENDED BALANCE Rupiah Zero		

C. RUPIAH FUNDS STATUS DECEMBER 24, 1983

CASH ON HAND

Consultant Rupiah Fund	Zero
Discretionary Fund	Zero
	<hr/>
Total	Zero
Less: On Deposit	
BRI - Palopo	Zero
BNI 46 - Palopo	Zero
Less: Receivables	Zero
	<hr/>
Total	Zero
CASH ON HAND	Zero

DOLLAR FUNDS

	DECEMBER	CUMULATIVE
Received from Checchi, WDC	\$ 4997.00	\$ 130326.52
Interest Income: BNI 46 - UPG	40.90*	1450.21
Transfers to Rupiah Cash	1000.00	82521.90
Transfers to Rp. Acct BNI 46 - Palopo	11000.00	48000.00
Bank Charges BNI 46 - UPG	0.00	23.00
Transfer to Checchi, WDC	1231.83	1231.83
	<hr/>	<hr/>
Funds Remaining BNI 46 - UPG		Zero

Note: The conversion of Dollars to Rupiah during December was done \$1000 at the rate of \$1.00 = 988.00 Rupiah, \$11000.00 at the rate of \$1.00 = 992 Rupiah, and \$1000 at the rate of \$1.00 = 993 Rupiah.

\* Interest adjustment

**A N N E X   I I**

**PROJECT LUWU  
MEASURES OF GOAL ACHIEVEMENT  
(1970-71 TO 1982-83)**

	KECAMATAN GROUPS			
	LUWU	PALOPO	OTHER	PROJECT
<b><u>POPULATION</u></b>				
1970-71	314 700	127 800	137 000	49 900
Growth Rate %	4.4%	2.5%	3.9%	11.4%
1975-76BM*	389 200	144 600	161 800	82 500
Growth Rate %	4.8%	3.3%	5.2%	6.5%
1982-83	535 596	180 616	232 386	122 594
<b><u>FOOD FARM POPULATION</u></b>				
1970-71	256 400	86 100	123 000	47 300
Growth Rate %	3.9%	2.7%	2.0%	10.4%
1975-76BM	309 200	98 500	136 100	74 200
Growth Rate %	3.6%	2.8%	3.3%	5.5%
1982-83	404 828	122 633	179 913	102 282
<b><u>FOOD FARM HECTARES</u></b>				
1970-71	37 300	13 200	18 400	5 700
Growth Rate %	2.5%	- 2%	4.8%	2.8%
1975-76	45 300	13 500	26 000	5 900
Growth Rate %	6.2%	6.2%	2.0%	16.0%
1982-83	57 006	17 334	25 202	14 470
<b><u>HECTARES/F2 CAP</u></b>				
1970-71	.149	.153	.150	.121
Growth Rate %	-1.0%	-2.9%	2.8%	-6.8%
1975-76BM	.147	.137	.192	.078
Growth Rate %	2.5%	3.7%	-0.3%	10.1%
1982-83	.141	.141	.140	.142

\* BM = Benchmark.

KECAMATAN GROUPS

	LUWU	PALOLO	OTHER	PROJECT
--	------	--------	-------	---------

PRODUCTION VALUE (MILLIONS OF 1978 RUPIAH)

1970-71	7 275	3 028	3 168	1 218
Growth Rate %	5.1%	3.3%	7.7%	0.1%
1975-76BM	9 128	3 286	4 585	1 215
Growth Rate %	10.9%	9.2%	7.2%	23.3%
1982-83	20 830	7 515	7 189	4 667

PRODUCTION VALUE (RICE) (PADDY) ONLY, (MILLIONS OF 1978 RUPIAH)

1970-71	5 396	2 048	2 530	819
Growth Rate %	0.2%	1.5%	2.6%	-18.0%
1975-76BM	5 162	1 908	2 967	265
Growth Rate %	9.6%	8.9%	4.6%	31.8%
1982-83	10 554	4 030	4 069	2 454

PURCHASED INPUTS (MILLION OF 1978 RUPIAH)

1970-71	54	21	21	12
Growth Rate %	31.4%	30.6%	29.6%	34.0%
1975-76BM	172	67	63	39
Growth Rate %	17.3%	22.8%	11.4%	16.0%
1982-83	444	282	112	127

NET INCOME/F2 CAP (1978 RUPIAH)

1970-71	28 200	34 900	25 600	25 500
Growth Rate %	. 8%	-.2%	5.4%	-9.9%
1975-76BM	29 200	32 700	33 200	15 600
Growth Rate %	6.8%	5.8%	3.8%	17.2%
1982-83	43 780	49 780	39 333	44 390

	TOTAL	FOOD FARMS	LIVESTOCK AND FISHERIES	SMALL ENTERPRISE
	-----	-----	-----	-----
<b>BRI &amp; BNI LENDING (THOUSANDS OF CURRENT RUPIAH)</b>				
1970-71	188 666	50 234	8 789	105 317
Growth Rate %	20.9%	32.2%	23.6%	23.8%
1975-76BM	672 300	203 600	29 000	280 200
Growth Rate %	28.2%	4.4%	57.6%	33.1
1982-83	1 960 801	103 763	662 495	896 461

FOOD IMPORTS (THOUSAND OF 1978 RUPIAH)

1970-71	5 280
Growth Rate %	86.4%
1975-76BM	139 874
Growth Rate %	4.0%
1982-83	183 056

FOOD EXPORTS (THOUSAND OF 1978 RUPIAH)

1970-71	318 095
Growth Rate %	9.6%
1975-76BM	466 252
Growth Rate %	9.6%
1982-83	801 904

FOOD CONSUMPTION PERCAPITA (THOUSAND OF 1978 RUPIAH)

1970-71	22.12
Growth Rate %	.6%
1975-76BM	22.70
Growth Rate %	7.3%
1982-83	32 40

NET CASH INCOME F2 (1978 RUPIAH)

1970-71	6 070
Growth Rate %	2.5%
1975-76BM	6. 798
Growth Rate %	9.5%
1982-83	11 470

**PROJECT LUWU  
MEASURES OF GOAL ACHIEVEMENT  
GROWTH RATE COMPARISON  
(BASELINE, 1976-79, 1976-80, 1976-1981, 1976-82)**

		KABUPATEN LUWU	KECAMATAN GROUPS		
			PALOPO	OTHER	PROJECT
		%	%	%	%
<b><u>POPULATION</u></b>					
70-76	<u>BASELINE</u>	4.4	2.5	3.9	11.4
76-79		4.6	3.7	3.4	6.8
76-80		3.9	2.8	3.1	6.9
76-81		4.7	3.5	4.5	7.3
76-82		4.8	3.4	5.0	6.5
76-83		4.8	3.3	5.2	6.5
<b><u>FOOD FARM POPULATION</u></b>					
70-76	<u>BASELINE</u>	3.9	2.7	2.0	10.4
76-79		4.1	4.5	2.4	7.1
76-80		3.5	3.1	1.9	7.1
76-81		4.0	3.2	2.7	7.3
76-82		3.4	3.0	2.4	6.1
76-83		3.6	2.8	3.3	5.5
<b><u>FOOD FARM HECTARES</u></b>					
70-76	<u>BASELINE</u>	2.5	-2.0	4.8	2.8
76-79		14.1	21.6	3.6	33.7
76-80		14.5	17.9	6.2	32.9
76-81		12.6	15.4	5.0	28.4
76-82		10.3	12.7	4.4	20.6
76-83		6.2	6.2	2.0	16.0
<b><u>HECTARES/F2 CAP</u></b>					
70-76	<u>BASELINE</u>	-1.0	-2.9	2.8	-6.8
76-79		11.2	14.5	0.9	25.2
76-80		11.6	14.4	4.2	24.6
76-81		8.3	11.6	2.1	19.5
76-82		6.9	9.7	2.0	14.7
76-83		2.5	3.7	-0.3	10.1

		KECAMATAN GROUPS			
		KABUPATEN LUWU	PALOPO	OTHER	PROJECT
		0	0	0	0
<u>PRODUCTION VALUE</u>					
70-76	<u>BASELINE</u>	5.1	3.3	7.7	0.1
76-79		17.5	23.1	7.2	35.7
76-80		12.3	9.1	9.3	28.3
76-81		12.3	10.1	8.1	28.2
76-82		12.3	11.3	7.6	24.7
76-83		10.9	9.2	7.2	23.3

PRODUCTION VALUE, RICE (PADDY) ONLY

70-76	<u>BASELINE</u>	0.2	1.6	2.6	-18.0
76-79		21.6	32.0	8.3	59.4
76-80		11.0	10.3	10.8	33.3
76-81		11.5	11.0	7.8	37.2
76-82		11.5	12.0	5.9	31.3
76-83		9.6	8.9	4.6	31.8

PURCHASED INPUTS

70-76	<u>BASELINE</u>	31.4	30.6	29.6	34.0
76-79		26.2	19.8	36.1	21.0
76-80		27.3	21.3	39.4	14.0
76-81		20.8	18.7	28.1	10.6
76-82		21.1	25.7	18.7	14.8
76-83		17.3	22.8	11.4	16.0

		KECAMATAN GROUPS			
		KABUPATEN LUWU	PALOPO	OTHER	PROJECT
		0	0	0	0
<u>NET INCOME/F2 CAP</u>					
70-76	<u>BASELINE</u>	0.8	-0.2	5.4	-9.9
76-70		12.6	17.8	4.2	28.3
76-80		8.1	5.5	6.7	20.6
76-81		7.7	6.5	4.9	20.2
76-82		8.5	7.9	5.0	19.0
76-83		6.8	5.8	3.9	17.2

BRI & BNI LENDING	TOTAL	LIVESTOCK AND SMALL ENTERPRISE		
		FOOD FARMS	FISHERIES	ENTERPRISE
	-----	-----	-----	-----
70-76	28.9	32.2	23.6	23.8
76-79	45.8	40.2	25.8	61.0
76-80	45.5	42.6	-7.2	59.6
76-81	35.3	35.2	26.1	55.2
76-82	37.3	23.6	37.9	46.2
76-83	28.2	4.4	57.6	33.1

<u>FOOD IMPORTS</u>		
70-76	<u>BASELINE</u>	86.4
76-79		4.9
76-80		5.9
76-81		-0.1
76-82		3.7
76-83		4.0

<u>FOOD EXPORTS</u>		
70-76	<u>BASELINE</u>	9.6
76-79		18.6
76-80		9.8
76-81		12.4
76-82		10.0
76-83		9.6

FOOD CONSUMPTION PER CAPITA

70-76	<u>BASELINE</u>	0.6
76-79		12.5
76-80		8.1
76-81		7.1
76-82		9.2
76-83		7.3

NET CASH INCOME PER F2 CAP

70-76	<u>BASELINE</u>	2.5
76-79		13.8
76-80		7.8
76-81		9.4
76-82		11.1
76-83		9.5

A. KABUPATEN LUWU  
DATA FOR GOAL AND IMPACT ESTIMATES

Year	Population		Food Production			Purchased Farm Inputs
	Total	On Food Farm	Hectares Harvested	Crop value	Livestock Value	
	(.. in thousands of 1978 rupiah..)					
1970-1	314 724	256 352	37 332	6 022 253	1 252 534	53 715
1971-2	327 933	265 686	40 715	5 713 538	1 598 243	55 702
1972-3	339 235	272 948	47 296	6 348 468	1 694 076	69 916
1973-4	354 676	284 013	42 696	5 924 279	2 356 485	71 959
1974-5	372 720	297 844	39 848	5 707 868	2 376 946	130 425
1975-6	391 486	311 274	47 253	7 450 192	2 174 161	217 261
1976-7	411 656	324 654	51 587	9 408 386	2 507 753	261 994
1977-8	430 446	338 865	53 336	9 406 243	2 581 942	272 516
1978-9	445 793	348 860	69 582	11 409 272	4 158 340	368 148
1979-0	453 056	354 677	76 793	9 967 778	4 305 724	484 412
1980-1	503 743	378 963	77 774	12 504 321	5 025 969	420 103
1981-2	521 519	378 032	79 977	14 348 713	6 690 438	739 853
1982-3	535 596	404 828	57 006	11 685 735	6 479 972	443 613

B. PALOPO HEADQUARTERS AREA KECAMATANS  
DATA FOR GOAL AND IMPACT ESTIMATES

Year	Population		Food Production			Purchased Farm Inputs
	Total	On Food Farm	Hectares Harvested	Crop value	Livestock Value	
	(.. in thousands of 1979 rupiah..)					
1970-1	127 788	86 083	13 186	2 240 117	788 256	20 900
1971-2	131 630	89 146	13 780	2 045 997	781 840	22 464
1972-3	135 195	91 607	16 084	2 046 797	977 673	27 483
1973-4	135 796	91 410	12 168	1 629 372	1 120 648	30 317
1974-5	140 662	95 415	12 164	1 780 906	1 031 313	50 629
1975-6	145 666	99 682	14 787	2 949 576	929 683	81 559
1976-7	152 933	106 070	18 033	4 003 703	956 199	84 670
1977-8	160 223	112 417	18 807	4 438 090	926 399	102 259
1978-9	160 614	111 688	25 609	4 997 104	1 406 839	114 460
1979-0	161 664	111 770	25 781	3 090 218	1 385 029	151 462
1980-1	177 495	119 480	27 879	4 954 734	1 666 032	153 290
1981-2	180 023	120 278	29 663	6 227 979	2 039 887	415 095
1982-3	180 616	122 633	17 334	4 227 266	2 082 218	204 425

C. PRIMARY PROJECT AREA  
DATA FOR GOAL AND IMPACT ESTIMATES

Year	Population		Food Production			Purchased Farm Inputs
	Total	On Food Farm	Hectares Harvested	Crop value	Livestock Value	
				(.. in thousands of 1978 rupiah..)		
1970-1	49 913	47 255	5 734	994 129	224 250	11 953
1971-2	52 211	48 429	4 827	825 092	283 095	12 328
1972-3	60 793	55 515	5 465	1 067 463	285 717	15 356
1973-4	69 844	63 322	4 752	567 847	586 123	13 667
1974-5	75 495	68 250	6 359	672 384	637 885	23 135
1975-6	82 745	74 789	6 078	786 332	359 283	65 069
1976-7	82 225	73 440	8 276	1 147 295	563 234	65 190
1977-8	91 744	82 584	11 129	1 433 196	727 971	58 586
1978-9	99 070	89 601	14 067	1 804 135	1 306 774	76 361
1979-0	105 096	94 654	18 792	1 747 902	1 388 677	69 475
1980-1	114 427	102 681	19 781	2 827 621	1 642 372	71 838
1981-2	116 816	100 454	18 934	3 350 780	2 298 101	136 987
1982-3	122 594	102 282	14 470	2 849 489	1 817 708	126 968

D. OTHER KECAMATANS  
DATA FOR GOAL AND IMPACT ESTIMATES

Year	Population		Food Production			Purchased Farm Inputs
	Total	On Food Farm	Hectares Harvested	Crop value	Livestock Value	
				(.. in thousands of 1978 rupiah..)		
1970-1	137 023	123 014	18 412	2 798 007	370 028	21 080
1971-2	144 092	128 111	22 108	2 842 449	443 208	20 910
1972-3	143 247	125 795	25 747	3 234 226	430 686	27 047
1973-4	148 936	129 281	25 776	3 727 060	649 714	27 975
1974-5	156 563	134 219	21 325	3 254 578	707 748	56 597
1975-6	163 085	136 803	26 388	3 714 284	885 195	70 633
1976-7	176 498	145 609	25 278	4 257 388	988 320	112 134
1977-8	178 479	144 191	23 617	3 588 957	927 572	111 671
1978-9	180 109	147 571	29 906	4 648 033	1 424 727	177 336
1979-0	186 746	148 253	32 220	5 129 663	1 532 017	263 475
1980-1	211 811	161 011	30 114	4 721 966	1 717 565	194 976
1981-2	225 480	157 300	31 380	4 769 954	2 352 450	187 771
1982-3	232 386	179 913	25 202	4 608 979	2 580 047	112 220

KABUPATEN LUWU  
DATA FOR GOAL AND IMPACT ESTIMATES  
WITH LUWU AREA TRADE DATA

Year	Population		Food Hectares Harvested	Luwu Food Values			Purchased Farm Inputs
	Total	On Food Farms		Production	Imports	Exports	
	(.....in thousands of 1978 rupiah.....)						
1970-71	314 724	256 352	37 332	7 274 787	5 280	318 095	53 715
1971-72	327 933	265 686	40 715	7 311 681	10 246	280 340	55 702
1972-73	339 235	272 948	47 296	8 042 562	29 498	454 229	69 916
1973-74	354 576	284 013	42 696	8 280 764	48 210	345 466	71 959
1974-75	372 720	297 844	39 848	8 084 814	77 027	308 003	130 425
1975-76	391 486	311 274	47 253	9 624 353	111 340	603 055	217 261
1976-77	411 656	324 654	51 587	11 916 139	133 996	406 688	261 994
1977-78	430 446	338 865	53 336	12 042 185	158 087	589 144	272 516
1978-79	445 793	348 860	69 582	15 567 612	155 291	729 317	368 148
1979-80	453 056	354 677	76 793	14 273 502	172 723	554 303	484 412
1980-81	503 743	378 963	77 774	17 530 290	119 968	839 605	420 103
1981-82	521 519	378 032	79 977	21 039 151	205 928	756 448	739 853
1982-83	535 596	404 828	57 006	18 165 707	183 056	801 904	443 743

DATA CALCULATION  
FOR GOAL AND IMPACT ESTIMATES

	Kecamatan Groups			
	Luwu	Palopo	Other	Project
	(.....in 1978 rupiah.....)			
 <u>Net Farmer Income</u>				
 Per Capita				
1970-71	28 170	34 940	25 580	25 530
1971-72	27 310	32 480	25 480	22 630
1972-73	29 210	32 720	28 920	24 100
1973-74	28 900	29 750	33 640	18 010
1974-75	26 710	28 940	29 100	18 860
1975-76	30 220	38 100	33 110	14 450
 1976-77	 35 900	 45 960	 35 260	 22 400
1977-78	34 730	46 810	30 550	25 460
1978-79	43 570	56 310	39 950	33 870
1979-80	38 880	38 680	43 160	32 400
1980-81	44 650	54 130	39 030	42 830
1981-82	53 700	65 290	44 090	54 870
1982-83	43 780	49 780	39 333	44 390

Net Cash Income

Per Farm Capita		
1970-71	6 070	
1971-72	5 880	
1972-73	6 860	Not available
1973-74	6 560	
1974-75	5 890	
1975-76	7 250	

	Kecamatan Groups			
	<u>Luwu</u>	<u>Palopo</u>	<u>Other</u>	<u>Project</u>
	(.....in 1978 rupiah.....)			
<u>Net Cash Income</u>				
Per Farm Capita				
1976-77	8 030			
1977-78	8 220			
1978-79	10 380	Not available		
1979-80	8 700			
1980-81	11 600			
1981-82	14 960			
1982-83	11 470			
 <u>Food Consumption</u>				
Per Capita				
1970-71	22 120			
1971-72	21 470			
1972-73	22 460			
1973-74	22 510	Not available		
1974-75	21 070			
1975-76	23 330			
1976-77	22 280			
1977-78	26 970			
1978-79	34 630	Not available		
1979-80	30 660			
1980-81	33 370			
1981-82	39 290			
1982-83	32 800			

KABUPATEN LUWU  
ANNUAL CREDIT EXTENDED BY PALOPO BRANCHES OF  
BANK RAKYAT INDONESIA AND BANK NEGARA INDONESIA 1946  
FOR GOAL AND IMPACT ESTIMATES

	Luwu Totals		Credit Categories			
	Borrowers	Credit	Agriculture	Livestock and Fisheries	Small Enterprise	Other
	(.....thousands of current rupiah.....)					
1970-71	6 931	188 666	50 234	8 789	105 317	24 326
1971-72	7 879	229 979	61 253	13 070	115 221	40 253
1972-73	8 409	331 208	95 362	16 828	136 832	82 186
1973-74	8 905	420 273	120 143	21 209	180 283	98 638
1974-75	9 382	516 037	165 932	22 840	219 330	107 935
1975-76	10 869	655 772	185 734	26 407	301 280	142 351
1976-77	11 774	898 880	217 321	28 316	479 785	173 458
1977-78	13 914	1 296 397	240 021	40 410	797 888	218 078
1978-79	21 542	2 093 252	608 047	55 266	1 156 891	273 048
1979-80	14 266	2 877 285	717 004	14 306	1 871 326	274 649
1980-81	7 258	3 675 491	682 781	208 030	2 489 439	295 241
1981-82*	8 219	6 559 098	594 020	360 332	5 259 582	345 164
1982-83*	1 411	1 960 801	103 763	662 495	896 461	298 082

\* Data made available by BRI only.

KECAMATAN LAROMPONG  
DATA FOR GOAL AND IMPACT ESTIMATES

Year	Population		Food Production			Purchased Farm Inputs
	Total	On Food Farm	Hectares Harvested	Crop value	Livestock Value	
				(.. in thousands of 1978 rupiah..)		
1970-1	11 169	9 435	1 800	299 464	13 866	1 501
1971-2	11 434	9 596	2 640	380 472	13 746	1 641
1972-3	11 486	9 650	2 755	403 482	12 180	1 823
1973-4	11 581	9 763	3 550	648 182	60 391	1 726
1974-5	11 636	9 820	3 213	160 761	12 907	8 081
1975-6	12 486	10 554	3 899	533 750	18 173	4 067
1976-7	13 249	11 224	2 537	408 255	18 166	4 360
1977-8	13 935	11 742	1 867	277 680	45 400	4 493
1978-9	15 123	12 677	2 700	415 630	45 400	6 254
1979-0	15 225	12 487	1 401	182 384	45 399	7 042
1980-1	21 383	15 123	2 668	398 465	52 573	7 150
1981-2	22 577	10 711	1 539	269 401	52 574	12 478
1982-3	23 022	19 896	1 104	271 277	56 936	8 235

KECAMATAN SULI  
DATA FOR GOAL AND IMPACT ESTIMATES

Year	Population		Food Production			Purchased Farm Inputs
	Total	On Food Farm	Hectares Harvested	Crop value	Livestock Value	
(.. in thousands of 1978 rupiah..)						
1970-1	13 322	11 990	2 436	420 411	15 875	2 883
1971-2	13 761	12 260	2 514	331 055	52 431	2 842
1972-3	13 765	12 218	2 212	349 340	18 312	3 343
1973-4	13 495	11 908	2 152	266 948	27 503	3 876
1974-5	14 130	12 514	2 442	150 363	24 472	6 557
1975-6	15 514	12 892	3 446	400 810	62 153	10 365
1976-7	14 392	12 490	2 356	430 747	62 153	19 697
1977-8	14 204	12 162	2 139	335 068	69 758	17 289
1978-9	14 884	12 672	3 047	404 173	65 839	41 191
1979-0	14 488	12 191	3 260	677 804	65 758	53 608
1980-1	15 941	11 656	3 309	571 113	77 890	43 569
1981-2	15 368	8 424	2 612	569 277	77 890	48 981
1982-3	17 130	14 211	2 187	580 257	86 213	10 816

KECAMATAN BAJO  
DATA FOR GOAL AND IMPACT ESTIMATES

Year	Population		Food Production			Purchased Farm Inputs
	Total	On Food Farm	Hectares Harvested	Crop value	Livestock Value	
	(.. in thousands of 1978 rupiah..)					
1970-1	27 244	25 380	5 579	992 244	29 805	10 684
1971-2	27 841	25 540	5 778	543 735	38 849	9 875
1972-3	28 018	25 382	9 055	1 054 933	40 199	11 429
1973-4	31 149	28 130	7 432	1 448 500	127 426	9 191
1974-5	32 822	29 623	5 324	1 648 399	135 812	18 593
1975-6	29 170	26 323	6 307	1 142 767	132 294	25 573
1976-7	31 870	28 937	7 141	1 546 921	132 172	57 981
1977-8	32 682	29 465	3 294	600 130	112 146	55 928
1978-9	34 202	30 695	7 279	1 140 460	493 926	84 952
1979-0	33 600	29 447	7 359	1 300 855	449 202	148 203
1980-1	35 349	29 456	5 919	984 677	563 882	92 841
1981-2	36 754	26 290	6 446	1 175 734	563 883	53 891
1982-3	37 129	27 264	3 957	1 172 835	631 669	33 549

KECAMATAN BASSESANGTEMPE  
DATA FOR GOAL AND IMPACT ESTIMATES

Year	Population		Food Production			Purchased Farm Inputs
	Total	On Food Farm	Hectares Harvested	Crop value	Livestock Value	
	(.. in thousands of 1978 rupiah..)					
1970-1	11 279	9 186	1 284	152 106	64 543	103
1971-2	11 321	8 835	1 894	280 944	128 595	257
1972-3	11 403	8 571	1 458	195 572	128 492	316
1973-4	11 234	8 223	2 000	173 398	73 292	538
1974-5	11 558	8 450	1 071	91 056	174 189	582
1975-6	12 372	9 291	1 089	91 063	175 271	590
1976-7	12 565	9 272	1 400	151 815	187 825	690
1977-8	13 087	9 887	2 159	214 852	169 544	686
1978-9	13 194	9 699	2 534	259 750	176 978	524
1979-0	13 262	9 890	1 998	201 322	175 553	779
1980-1	12 535	8 609	2 352	290 389	208 571	1 077
1981-2	13 186	10 019	3 977	394 517	669 370	688
1982-3	12 256	9 464	2 629	398 028	212 416	753

KECAMATAN BUAPONRANG  
DATA FOR GOAL AND IMPACT ESTIMATES

Year	Population		Food Production			Purchased Farm Inputs
	Total	On Food Farm	Hectares Harvested	Crop value	Livestock Value	
	(.. in thousands of 1978 rupiah..)					
1970-1	27 968	24 425	3 279	522 463	62 090	3 650
1971-2	29 184	25 411	2 639	292 926	89 845	4 064
1972-3	31 313	27 332	3 379	359 099	89 702	5 392
1973-4	32 277	28 139	2 434	257 209	190 567	8 072
1974-5	33 299	28 955	3 389	55 989	190 567	12 856
1975-6	35 140	30 923	4 795	777 422	190 293	16 012
1976-7	42 135	37 626	5 314	1 047 804	210 769	18 943
1977-8	44 536	39 720	5 933	1 526 795	296 816	13 216
1978-9	45 825	40 706	8 261	1 350 370	274 655	19 521
1979-0	46 254	41 097	8 996	1 160 988	274 655	16 160
1980-1	47 909	42 389	11 026	1 861 072	324 229	27 421
1981-2	48 959	41 848	10 157	2 367 178	324 229	18 310
1982-3	49 237	42 688	4 485	1 051 861	344 335	20 385

KABUPATEN LUWU  
 DATA FOR GOAL AND IMPACT ESTIMATES  
 FOOD PRODUCTION  
 VALUE OF RICE PRODUCTION (PADDY) ONLY

	Kecamatan Groups			
	Luwu	Palopo	Other	Project
	(.....in thousands of 1978 rupiah.....)			
1970-71	5 396 400	2 047 556	2 529 506	819 338
1971-72	5 235 300	1 859 231	2 632 500	743 513
1972-73	5 136 131	1 810 181	2 858 456	467 550
1973-74	4 684 781	1 349 494	3 105 675	229 556
1974-75	4 289 906	1 506 600	2 590 312	193 050
1975-76	6 285 206	2 740 050	3 014 663	530 494
1976-77	8 565 693	3 808 575	3 754 913	946 013
1977-78	8 281 069	4 209 075	3 073 106	998 887
1978-79	10 030 556	4 660 313	4 142 025	1 228 219
1979-80	8 050 560	2 809 406	4 716 788	979 313
1980-81	11 075 512	4 665 375	4 134 544	2 275 593
1981-82	12 787 531	5 856 636	4 170 934	2 759 961
1982-83	10 553 866	4 029 986	4 069 462	2 454 419

KECAMATAN WARU  
DATA FOR COAL AND IMPACT ESTIMATES

Year	Population		Food Production			Purchased Farm Inputs
	Total	On Food Farm	Hectares Harvested	Crop value	Livestock Value	
				(.. in thousands of 1978 rupiah..)		
1970-1	44 879	8 553	1 236	190 741	171 673	1 493
1971-2	45 593	8 696	1 306	168 005	162 839	1 849
1972-3	46 585	9 130	1 167	119 998	270 104	1 977
1973-4	44 897	6 645	1 080	80 056	270 059	2 664
1974-5	46 938	8 114	1 080	139 157	275 532	5 225
1975-6	48 192	8 660	1 112	145 388	222 047	2 999
1976-7	49 118	9 150	1 038	225 083	222 032	6 282
1977-8	51 166	10 709	961	212 366	221 936	6 000
1978-9	51 514	10 409	1 057	190 001	221 936	9 160
1979-0	51 495	9 832	1 063	175 432	140 126	13 902
1980-1	60 260	11 685	937	124 136	168 388	12 492
1981-2	60 730	12 759	1 080	175 261	168 387	21 067
1982-3	60 405	12 216	1 019	176 447	172 193	16 938

KECAMATAN WALENRANG  
DATA FOR GOAL AND IMPACT ESTIMATES

Year	Population		Food Production			Purchased Farm Inputs
	Total	On Food Farm	Hectares Harvested	Crop value	Livestock Value	
	(.. in thousands of 1978 rupiah..)					
1970-1	54 941	53 105	8 671	1 516 913	554 493	15 757
1971-2	56 853	55 039	9 835	1 585 066	619 156	16 551
1972-3	57 297	55 145	11 538	1 567 700	617 867	20 114
1973-4	58 622	56 626	8 654	1 274 107	660 022	19 581
1974-5	60 425	58 306	7 695	1 081 751	565 214	32 611
1975-6	62 334	60 099	8 880	2 026 766	517 343	62 548
1976-7	61 680	59 294	11 681	2 730 816	523 398	59 445
1977-8	64 521	61 988	11 913	2 698 929	407 647	83 043
1978-9	63 275	60 573	16 291	3 456 733	910 248	85 779
1979-0	63 915	60 841	15 722	1 753 793	970 248	121 400
1980-1	69 326	65 406	15 916	2 969 526	1 173 415	113 377
1981-2	70 334	65 671	18 426	3 685 540	1 547 271	375 718
1982-3	70 974	67 729	11 829	2 998 958	1 565 960	167 102

KECAMATAN SABBANG  
DATA FOR GOAL AND IMPACT ESTIMATES

Year	Population		Food Production			Purchased Farm Inputs
	Total	On Food Farm	Hectares Harvested	Crop value	Livestock Value	
				(.. in thousands of 1978 rupiah..)		
1970-1	21 185	20 627	1 494	213 343	111 904	2 184
1971-2	20 875	20 229	1 774	246 521	61 536	2 587
1972-3	21 860	21 124	2 350	248 730	66 255	5 377
1973-4	24 557	23 773	2 169	255 678	65 944	6 393
1974-5	24 804	23 968	1 819	192 741	51 359	10 355
1975-6	25 475	23 333	1 926	258 778	126 311	15 517
1976-7	25 309	22 996	3 072	550 488	155 594	15 198
1977-8	26 911	24 223	5 072	796 431	115 615	16 969
1978-9	27 269	24 253	3 552	728 502	155 615	18 064
1979-0	27 427	24 743	5 590	707 819	267 715	21 755
1980-1	28 922	26 002	3 433	557 780	300 858	19 772
1981-2	30 739	27 216	4 248	397 187	300 736	16 926
1982-3	30 909	28 319	3 430	683 807	315 999	20 507

KECAMATAN LIMBONG  
DATA FOR GOAL AND IMPACT ESTIMATES

Year	Population		Food Production			Purchased Farm Inputs
	Total	On Food Farm	Hectares Harvested	Crop value	Livestock Value	
	(.. in thousands of 1978 rupiah..)					
1970-1	8 201	6 290	1 551	223 715	18 443	736
1971-2	8 396	6 308	1 839	210 655	18 870	360
1972-3	8 515	6 287	2 383	211 569	18 843	408
1973-4	8 673	6 328	1 816	73 927	21 986	620
1974-5	8 959	6 806	2 251	284 143	37 236	758
1975-6	10 055	7 606	2 229	346 188	22 130	1 022
1976-7	9 967	7 512	2 979	313 851	42 483	1 213
1977-8	10 404	7 977	3 318	388 510	55 172	1 213
1978-9	10 628	8 143	3 788	480 096	55 173	1 241
1979-0	10 374	7 913	4 902	391 966	55 409	1 273
1980-1	10 709	8 090	4 057	522 126	64 580	1 571
1981-2	10 506	9 662	5 145	550 759	64 580	2 110
1982-3	10 651	9 961	5 150	411 975	66 595	911

KECAMATAN MASAMBA  
DATA FOR GOAL AND IMPACT ESTIMATES

Year	Population		Food Production			Purchased Farm Inputs
	Total	On Food Farm	Hectares Harvested	Crop value	Livestock Value	
	(.. in thousands of 1978 rupiah..)					
1970-1	16 156	14 911	1 753	262 510	66 945	1 444
1971-2	16 576	15 146	3 086	438 121	66 985	1 722
1972-3	17 144	15 548	3 068	436 365	67 514	2 085
1973-4	17 250	15 515	3 060	357 499	70 978	2 138
1974-5	18 715	16 799	2 126	247 368	69 176	2 892
1975-6	20 229	18 338	3 674	475 513	87 232	8 396
1976-7	21 441	19 404	3 083	526 038	111 569	7 011
1977-8	22 298	20 094	3 036	611 369	99 964	9 248
1978-9	23 346	20 991	4 278	757 202	99 964	16 652
1979-0	23 612	21 339	5 010	1 124 119	92 284	22 246
1980-1	25 208	22 498	5 155	889 467	116 228	20 732
1981-2	27 422	24 743	4 206	580 855	171 939	29 961
1982-3	28 493	26 245	4 248	758 356	115 020	15 887

KECAMATAN MALANGKE  
DATA FOR GOAL AND IMPACT ESTIMATES

Year	Population		Food Production			Purchased Farm Inputs
	Total	On Food Farm	Hectares Harvested	Crop value	Livestock Value	
				(.. in thousands of 1978 rupiah..)		
1970-1	12 228	10 887	881	86 645	38 545	777
1971-2	12 736	11 151	826	128 146	38 577	473
1972-3	13 089	11 294	631	87 546	38 545	949
1973-4	13 456	11 532	1 734	214 243	121 626	765
1974-5	13 817	11 721	1 497	295 733	121 989	5 755
1975-6	14 558	12 365	2 251	321 442	205 310	1 137
1976-7	14 381	11 829	1 152	166 081	150 737	1 188
1977-8	15 134	12 453	1 305	209 444	152 386	1 163
1978-9	14 712	11 273	1 454	289 015	152 400	2 311
1979-0	15 749	11 855	1 362	236 965	140 707	2 465
1980-1	17 835	13 446	1 816	298 128	163 669	1 913
1981-2	18 605	14 203	1 824	361 741	163 608	10 134
1982-3	18 708	13 347	610	85 658	922 399	9 065

KECAMATAN BONE BONE  
DATA FOR GOAL AND IMPACT ESTIMATES

Year	Population		Food Production			Purchased Farm Inputs
	Total	On Food Farm	Hectares Harvested	Crop value	Livestock Value	
				(.. in thousands of 1978 rupiah..)		
1970-1	24 038	23 170	3 037	557 166	87 222	8 567
1971-2	26 614	25 328	2 432	550 447	95 191	8 336
1972-3	32 662	30 771	2 263	457 004	105 244	10 553
1973-4	37 213	34 882	1 855	245 454	367 178	8 465
1974-5	41 383	38 751	2 756	224 385	379 684	14 542
1975-6	43 646	40 830	3 388	465 308	210 530	53 326
1976-7	43 913	40 770	4 712	676 321	227 894	48 370
1977-8	46 246	43 176	4 889	665 626	387 814	34 960
1978-9	47 208	44 070	5 441	732 451	433 893	47 595
1979-0	48 725	44 770	8 229	748 218	434 839	53 358
1980-1	51 965	47 051	8 834	1 451 708	509 928	46 641
1981-2	52 890	46 463	10 358	2 065 487	745 328	116 213
1982-3	53 490	44 266	4 993	1 391 354	631 438	90 740

KECAMATAN WOTU  
DATA FOR GOAL AND IMPACT ESTIMATES

Year	Population		Food Production			Purchased Farm Inputs
	Total	On Food Farm	Hectares Harvested	Crop value	Livestock Value	
	(.. in thousands of 1978 rupiah..)					
1970-1	12 909	11 566	962	144 494	40 493	746
1971-2	12 667	10 801	603	93 373	85 788	939
1972-3	13 350	10 877	904	136 735	85 547	1 255
1973-4	15 524	12 469	1 131	122 748	90 028	1 671
1974-5	15 744	12 352	727	109 504	129 284	2 693
1975-6	19 283	15 882	932	110 095	21 723	3 353
1976-7	18 267	14 414	1 546	217 146	28 793	4 444
1977-8	19 838	15 617	1 600	197 276	31 536	4 078
1978-9	22 031	17 656	2 857	274 650	31 536	6 978
1979-0	22 706	18 329	3 901	315 481	112 493	6 443
1980-1	26 693	21 232	3 329	422 144	130 607	9 701
1981-2	26 391	19 148	2 794	373 344	273 530	3 109
1982-3	31 912	25 622	2 469	348 401	141 230	12 696

KECAMATAN MANGKUTANA  
DATA FOR GOAL AND IMPACT ESTIMATES

Year	Population		Food Production			Purchased Farm Inputs
	Total	On Food Farm	Hectares Harvested	Crop value	Livestock Value	
	(.. in thousands of 1978 rupiah..)					
1970-1	12 966	12 519	2 735	292 469	96 535	2 640
1971-2	12 930	12 300	1 792	211 272	102 116	3 053
1972-3	14 781	13 867	2 298	474 724	94 926	3 548
1973-4	17 107	15 971	1 766	199 645	128 917	3 531
1974-5	18 368	17 147	2 876	338 495	128 917	5 900
1975-6	19 806	18 077	1 758	210 929	127 030	8 390
1976-7	20 045	18 256	2 018	253 828	306 547	12 376
1977-8	25 660	23 791	4 640	570 294	308 621	19 548
1978-9	29 831	27 875	5 760	797 034	841 345	21 788
1979-0	33 665	31 555	6 662	684 203	841 345	9 674
1980-1	35 769	34 398	7 618	953 769	1 001 837	15 496
1981-2	36 735	34 843	5 782	911 949	1 279 243	17 665
1982-3	37 129	32 394	7 008	1 109 734	1 045 040	23 532

KECAMATAN MALILI  
DATA FOR GOAL AND IMPACT ESTIMATES

Year	Population		Food Production			Purchased Farm Inputs
	Total	On Food Farm	Hectares Harvested	Crop value	Livestock Value	
	(.. in thousands of 1978 rupiah..)					
1970-1	8 995	8 590	420	40 341	3 700	225
1971-2	9 958	9 478	630	105 379	4 365	477
1972-3	10 215	9 681	677	84 811	25 645	613
1973-4	8 890	8 326	524	49 366	25 500	880
1974-5	9 206	8 582	694	87 584	25 539	1 114
1975-6	11 220	10 490	721	72 020	12 267	1 486
1976-7	13 658	12 747	723	74 982	22 380	1 786
1977-8	12 833	11 828	547	70 072	22 320	1 665
1978-9	11 997	10 828	601	68 589	115 000	1 731
1979-0	12 171	10 946	722	78 477	115 000	1 715
1980-1	15 107	13 810	931	138 131	136 806	2 355
1981-2	20 477	18 408	708	374 819	255 362	2 846
1982-3	24 976	22 979	760	87 864	138 196	1 652

KECAMATAN NUHA  
DATA FOR GOAL AND IMPACT ESTIMATES

Year	Population		Food Production			Purchased Farm Inputs
	Total	On Food Farm	Hectares Harvested	Crop value	Livestock Value	
	(.. in thousands of 1978 rupiah..)					
1970-1	7 244	5 718	1 214	111 228	6 402	525
1971-2	11 194	9 568	1 127	177 421	19 254	676
1972-3	7 752	6 071	1 158	161 878	14 701	1 198
1073-4	8 751	5 783	1 339	239 319	55 008	1 848
1974-5	10 916	5 936	888	96 430	55 069	1 910
1975-6	13 006	5 611	846	71 953	44 054	2 480
1976-7	19 666	8 733	835	88 210	105 241	3 010
1977-8	16 291	4 033	663	85 428	45 267	3 017
1978-9	14 674	6 340	673	104 616	64 432	4 416
1979-0	20 839	7 442	616	227 952	79 990	4 389
1980-1	28 822	8 122	474	71 690	32 508	4 996
1981-2	29 846	7 624	675	95 664	32 508	9 756
1982-3	29 112	8 227	1 127	158 921	34 604	9 845