

DEVELOPMENT PLAN KABUPATEN LUWU SOUTH SULAWESI

1984-1985 to 1988-1989

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Checchi/DMJM Consultants to Project Luwu Ministry of Transmigration.

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1. Introduction

1.1. Background

Kabupaten Luwu is an area of 17,791 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.

The principal city in the Kabupaten is Palopo which is the administrative center for the area. The Kabupaten contains 16 administrative areas or Kecamatans. Many villages are located principally along the road connecting Larompong in the south and Malili to the northeast (figure 1).

The scope of this document is limited to Kabupaten Luwu. Its purpose is to provide an economic development program for the area. This program includes all sectors of the economy. The period covered is from 1984-1985 to the year 2000. Definitive programs are provided for the intermediate term comprising the years 1984-1985 through 1988-1989.

1.2. History of Development

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. Some of the irrigation systems are now being renovated and expanded, programs to provide supporting services to agriculture are underway, the road between Larompong and Malili has been improved, and the physical and social infrastructure are being developed.

1.3. Planning Procedure

The program for the period 1984-1985 to 1988-1989 is generally provided at two levels. The first level consists of the development budget for the activities which should be undertaken to provide balanced economic growth of the area. The second level of the development budget includes those projects and programs which (1) might be deferred but should be undertaken if development funds are available or (2) will be deferred unless a scheduled study indicates they are necessary.

The actual development budget for the year 1982-1983 has been used as a basis for scheduling of projects and programs during the initial year of the intermediate term plan. It is assumed that economic conditions will improve so that most increases in the first level expenditures in the later years can be obtained.

All monetary data are presented in constant 1983 prices. These prices reflect the effects of the devaluation of the Indonesian rupiah in March 1983.

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In all cases, development agencies cooperated by preparing the program for ongoing activities. The special programs and recommendations designed to provide for an accelerated and rationalized development program have been combined with these to provide the program and budget for the five year plan period.



2. Summary

The plan for the next five years provides for continuation of the current program during the initial years. During that period, organizations will be put in place to provide for rational water resources, agricultural, and forest resources development as well as emphasis on the growth of small business. At the same time studies will be begun to determine the future thrust of development activity. The physical and social infrastructure will continue to receive emphasis throughout the plan period.

The strengthening and reorganization of the BAPPEDA to create the BAPPEDA Planning Office is of first priority. The BAPPEDA Planning Office will include a Water Resources Planning Unit, Agricultural Planning Unit, Watershed Management Unit and Small Business Development Center in order to secure coordinated overall planning in the agriculture, water resources, forestry and business areas.

Of importance will be the staff functions of program control and organization and procedures. Inspection and control of work, particularly in the irrigation program, must be improved if funds devoted to the development program are to have the results expected. Organization and procedures of some line agencies need to be reviewed and changes effected in certain areas.

Population is expected to grow at a rate of 2.5 percent per year from 1980 to 2000 compared to 4.8 percent per year from 1970 to 1980. This is stems from an expected decrease in fertility rate and the termination of the government transmigration program. Population will be 644 thousand in 1980 and 834 thousand in 2000.

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Active labor force will be 260 thousand in 2000. While cultivated food farm land is expected to increase, employment on food farms will stabilize in 1990 at about 121 thousand. About 85 thousand jobs will have to be provided between 1980 and 2000 in the areas of industry, trades, services and government.

The Small Business Development Center in the BAPPEDA Planning Office will help provide jobs in the industrial sector. It will encourage industrial growth by bridging the gap between the small entrepreneur and government support programs which are not now being fully used because of lack of coordination and knowledge of procedures. The SBDC will also prepare reconnaissance grade studies to identify investment opportunities for investors.

A review of the hydrology indicates that assumptions concerning water availability are in general correct. The irrigation expansion program will continue and 34 thousand hectares will be commandable under engineered irrigation systems completed during the plan period. Total hectares irrigated using semi-technical or technical irrigation systems will total 50.5 thousand by the end of 1988-1989.

The direction of future agriculture development must be determined. An agriculture baseline study will begin the first year of the plan period. It will determine the future thrust of agriculture. This will be preceded by a program to provide aerial photographs of the Kabupaten.

While hectares of double cropped rice are expected to increase, the agriculture baseline study will assess the potential for other crops which might be feasible in terms of production and marketing. A flexible attitude toward future agricultural development is recommended. The

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Agricultural Planning Unit in the BAPPEDA Planning Office will continually monitor market conditions and a flexible stance will be taken in agricultural development.

The REC and FCC programs will continue. It is recommended that all of the RECs be put within the organization of the Agricultural Agency for Education, Training and Extension. The RECs will adopt a "whole farm" approach including training in water use and water system management in their efforts to assist farmers.

The management plan prepared by the Forestries Office and now being reviewed may be too restrictive. If adopted, it would essentially prevent development in much of the watersheds and keep the higher elevations under forest cover. With planning and control, development is compatible with economic use of forested areas. Data required for planning, however, are lacking. Aerial photography of Luwu early in the plan period is thus essential.

Existing laws and statutory authorizations concerning publicly-owned watersheds appear to be adequate except in environmental control. Education and extension service work will be needed to ensure good practices on privately-owned land. The environmental impact assessment of proposed industries such as the palm oil seed processing plant is a necessary function of the Watershed Management Unit to be established in the BAPPEDA Planning Office.

The completion of the road from the Kabupaten Wajo border to Malili provides the backbone to which other roads can be connected as well as a fast link to the rest of the province. All Kecamatans now have connections to this road except Bastem, Limbong and Malangke. Roads to Limbong and Malangke are proposed in the plan program. The connection

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to Kecamatan Bastem is proposed to be started the third year of the plan. These roads will be expensive but should be constructed for political and social as well as economic reasons.

An important project which must be undertaken is the road maintenance project. This has a high internal rate of return and should be started the first year of the plan.

An expansion of the port facilities at Palopo may be required if construction of the hydroelectric project in Makali takes place. A staff study is scheduled in 1985-1986 to review this possibility and other potential throughput to determine if port expansion is necessary.

The Ministry of Communications proposes to install 1,000 telephone lines in Palopo in 1988-1989. The Palopo potable water system will be expanded. Potable water systems for 20 desas will be constructed if funds are available.

Most of the villages will have electric power by 1988-1989. The Palopo electric system will be expanded. A hydroelectric facility on the Larona River is proposed to generate power for export. The BAPPEDA Planning Office should carefully monitor this to secure an allocation of power for North Luwu where replacement capacity will be required in 1991.

School enrollment in 1982-1983 which comprised 77 percent of school age population will be 89 percent by 1988-1989. During the plan 477 basic school rooms, three secondary schools, a high school, and a teachers' training school are to be built.

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Construction of a regional Class C hospital of 150 beds will begin in 1984-1985. The number of health centers will be increased from 21 to 28 at the end of the plan period. Thirty-six sub-health centers will be constructed making the total 70. Other ongoing health programs include malaria control, provision of Vitamin A for children, infectious disease control and food and drug supervision.

The development budget for the five year period is Rp 133.5 billion. The largest portion or 38 percent will be devoted to water resources development. The social and physical infrastructures will require 23 percent and 18 percent of the budget respectively. These areas typically require relatively large allocations during the early stages of the development. After 1988-1989, the expenditure for infrastructure will docrease considerably.

The development budget will increase rather sharply in 1985-1986. This is because of the installation of electric generation capacity at Palopo in that year. In addition the roads to Kecamatans Malangke and Limbong have increased expenditures in that year. After 1985-1986, annual expenditures increase at a fairly uniform rate.

A secondary level of the development program is recommended if funds are available, or, in the case of port development at Palopo, if study finds the project to be needed. These projects increase the expenditure level more than two-fold. This increase mainly results fom two projects which are not likely to have a profound effect on Luwu. These are the improvement of the road to Central Sulawesi and a hydroelectric facility on the Larona River to provide power for a nickel mine in Southeast Sulawesi.

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The BAPPEDA Planning Office must annually review the program on a project-by-project as well as sectoral basis to provide guidance during the budgetary process to agencies at the provincial as well as at the kabupaten level. The plan should be extended one year into the future at that time.

The detailed development budget information is shown in appendix A. Also shown is a year-by-year proposed budget for each development agency.

Table 2.1

Development Budget by Economic Activity

		(Mi	llion	1983 Ruj	piah)	
	1984 1985	1985 1986	1986 1987	1987 1988	1988 1989	Total
Central planning/						
coordination	975	1,725	825	825	1,675	6,025
Water resources	6,894	9,107	11,545	12.025	11,919	51,490
Agriculture	609	650	782	512	547	3 100
Fishing	36	13	384	34	11	5,100
Watershed mangement/		10	204	54	*1	508
torestry	842	1,268	1,850	2.080	2,205	8.245
Manufacturing and mining	13	. 35	61	82	2,200	230
Physical infrastructure	2,584	5,609	4,214	4.472	6.800	23.679
Social infrastructure	7,857	5.672	5,658	6,123	6 026	31 336
Other (non-economic areas)	1,700	1,740	1,785	1,830	1,875	8,930
Total	21,510	25,819	27,104	27,983	31,127	133,543

3. Institutional Arrangements

3.1. BAPPEDA Planning Office

Most of the problems usually arising when development is purposefully accelerated have been experienced in Kabupaten Luwu. Integration and synchronization of some multi-sectoral projects have been inadequate as discussed in section 5.1.7.2. This stems from a lack of program control and coordination which cause loss of time and inefficient utilization of manpower. Both increase costs. Another major problem stems from the lack of inspection methods for designs and construction. These are but a few of the problems experienced and identified.

The implementation of the intermediate term economic development plan will require an organization capable of overcoming these problems. Its task of planning and overseeing the execution of many related projects will require an organization with good leadership and a strong technical orientation. The BAPPEDA is the logical location for this group. It must be strengthened and augmented, to form the BAPPEDA Planning Office which will undertake the expanded role of facilitating and ensuring a well-coordinated and integrated approach to planning and development.

National and provincial projects must be designed and implemented with participation at the Kabupaten level. Most of the development funding, project planning and execution will be at the discretion of organizations at the national and provincial levels. This makes the task of the local planning group more difficult than if it had control over the entire development budget. Developing and maintaining communications and strong ties with the provincial and

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national level development organizations are thus primary requisities of the planning and coordinating group proposed. The emphasis on bottom-up-planning must be recognized.

The organizational changes proposed will be in two stages with the second possibly necessary in the longer term. Recommendations are:

- a. a new organizational structure, the BAPPEDA Planning Office, to begin operations as soon after the beginning of fiscal year 1984-1985 as possible and continue into Repelita V, or the fifth national plan period; and
- b. a long-term organizational planning structure to cope with regional development involving more than one kabupaten.

Shown in figures 3.1, and 3.2 is the organizational structure proposed for adoption relatively soon after the plan period begins. The longer term organizational structure which may be required is shown as figure 3.3.

The main tasks of the BAPPEDA Planning Office will be to formulate overall plans, coordinate development activities, and in some cases, develop preliminary project proposals for implementation by the line organizations. In this way interdependencies can be recognized and steps can be taken to avoid duplication and/or lack of coordination. The final feasibility studies, design, and execution will be the responsibility of the implementing agency. Figure 3.1

General Structure of BAPPEDA Planning Office



Notes: Dotted line indicates communication and coordination. Dashed line indicates functional relationship for planning, program control and organization and procedures.

Figure 3.2



Functions of Sections of BAPPEDA Planning Office





- Notes: 1. Input/output analysis is now more important since it provides objective view of potential development work in what may be competing jurisdictions.
 - 2. Dotted line indicates communication and coordination.
 - 3. Dashed line indicator functional relationship for planning, program control and organization and procedures.

3.2. Functions of BAPPEDA Planning Office

3.2.1. Rational Overall Planning

The main overall function of the BAPPEDA Planning Office will comprise the revision of this economic development plan as required and the extension of it one year into the future prior to the beginning of each fiscal year. Establishment of priorities and the determination of intersectoral relationships in this overall planning effort will be facilitated by use of the input-output system developed by the BAPPEDA in 1982-1983 and 1983-1984.

Specifically the input-output analysis provides:

- a. the input of capital into the economy from the activities proposed;
- b. the local market for the products derived; and
- c. the estimated effect of the new activities on other economic activities of the region.

The input-output technique of data management allows the examination of each project and its effect on the economy. Priorities for development activities can thus be determined in an objective manner. The input-output framework also provides a methodology to determine the potential impact of new development upon the economy in general as well as pon specific factors such as employment, direct and indirect income, government services, and tax revenues. Given the data provided by an input-output table, it is possible to formulate consistent and reasoned answers to the questions faced in comprehensive regional planning. 3.2.2. Program Control

The BAPPEDA Planning Office will also have the staff function of program control. The program control staff will exercise functional control over the corresponding organizations in the Kabupaten execution agencies so that the coordination and inspection functions are improved. It will also have the function of coordination of project implementation on an intersectoral basis.

3.2.3. Management Guidance

In addition to changes in organization of BAPPEDA TK II there is a need for modifications of organization and/or procedures of the service and implementing agencies of the Kabupaten. These are problems which have long-term solutions. While they cannot be treated in detail in this plan, the first step is the establishment of an organization and procedures section in the BAPPEDA Planning Office to advise the service and implementing agencies concerning how they can function more effectively.

3.2.4. Detailed Sectoral Planning Functions

As shown in figure 3.2, the Agricultural Planning Unit, Small Business Development Center, and the Watershed Management Unit are placed in the agriculture, commerce and industry, and forestry sections respectively. A Water Resources Planning Unit is within the water resources section. These activities are deemed to be of sufficient importance to warrant individual planning groups. Each involves more than one agency and/or economic sector. The organizations are discussed in some detail in the appropriate sections which follow.

3.3. Technical Support

A team of five general consultants having broad backgrounds is also needed and included in the organization chart. This group will act as advisors as required. One should be experienced in computerized data management and two in water resources planning.

3.4. Proposed Program

Some projects, usually data gathering and studies, provide needed information for several development agencies. Unless these are a clear responsibility of one organization, they should be undertaken by the overall planning organization or the BAPPEDA Planning Office.

A first step toward rational land use, watershed management and agriculture planning is to obtain aerial photographic mosaics. A project to provide this information is scheduled to begin the first year of the plan.

More detailed studies of agricultural land use and soils will be needed beyond the plan period. Since it might not be within the administrative capability of the BAPPEDA Planning Office to undertake and utilize these data effectively in the earlier years, they have been scheduled to be undertaken in 1988-1989. Funds are allocated in the plan for about 100,000 hectares to be studied. Areas to be surveyed and unit costs are quite tentative. The program can be defined after the aerial photography.

The other major projects of the BAPPEDA Planning Office requiring funds from the development budget are the general consultants and the agricultural study. The latter is shown under section 6.10.3.1.

Table 3.1 Program for BAPPEDA Planning Office

(Million Rupiah)

	Budget Source	1984 1985	1985 1986	1986 1987	1987 1988	1988 1989	Total
Aerial photo- graphy mosaics	APBN	500	1,000				1,500
Land use/soil studies	APBN				·	750	750
Miscellaneous studies	APBN	100	100	200	200	300	900
Technical assistance	APBN	375	625	625	625	625	2,875
Total		975	1,725	825	825	1,675	6,025

4. Population and Labor Force

4.1. Population

The population of Kabupaten Luwu which was 503.7 thousand people in 1980 is expected to total 644 thousand in 1990 and 834 thousand in the year 2000. These projections by the BAPPEDA of the Kabupaten indicate an annual growth rate of about 2.5 percent per year during the 20-year period. This rate of growth is relatively high but is typical of areas in the early stages of development.

The population of Luwu in 1980 was young and will continue to be young in the year 2000. The median age was 17 years in 1980 and will rise to 20 years in 2000. This means that half the population was younger than 17 years of age in 1980 and half will be younger than 20 years of age in 2000.

The Luwu population is characterized by a decrease in the number of young males ages 15-25 while they leave home to find work, join the military, or attend school. This is followed by a bulge in the number of males between ages 25-29 when some of the young men come back home or young transmigrants come to Luwu with their families.

By the year 2000, the age characteristics of the population will reflect a maturing population. Children under 15 years of age will represent only 40 percent of the population compared to 47 percent 20 years earlier. Those over 65 will have increased to 2.9 percent of population compared to a corresponding figure of 2.5 percent in 1980. Populations by age group in the years 1980, 1990 and 2000 are shown in table 4.1.

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Table 4.1

Population by Age Group in Thousands in 1980, 1990 and 2000

	1980				1990		2000			
	 Male	Female	Total	Male	Female	Total	Male	Female	Total	
Age Group 9-9 10-19 20-29 30-39 40-49 50-59 60-69 70-79 Over 79 Total	88.2 54.3 35.9 29.2 19.9 14.0 7.4 2.7 0.5 252.1	$\begin{array}{c} 82.5 \\ 54.1 \\ 40.3 \\ 30.7 \\ 21.5 \\ 12.0 \\ 7.0 \\ 2.9 \\ 0.6 \\ 251.6 \end{array}$	170.7 108.4 76.2 59.9 41.4 26.0 14.4 5.6 1.1 503.7	94.8 83.0 52.1 33.6 26.2 16.6 9.9 3.8 0.6 320.6	92.4 78.4 52.3 38.8 28.7 19.0 9.4 4.0 0.8 323.8	$187.2 \\ 161.4 \\ 104.4 \\ 72.4 \\ 54.9 \\ 35.6 \\ 19.3 \\ 7.8 \\ 1.4 \\ 644.4$	121.291.280.350.831.622.512.25.20.9415.9	118.2 88.7 75.9 51.1 36.7 25.7 14.9 1.0 417.6	239.4 179.9 156.2 101.9 68.3 48.2 27.1 10.6 1.9 833.5	

SOURCE:

: Penduduk Kabupaten Luwu, 1980; BAPPEDA, 1990, 2000.

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4.2. Labor Force

The labor pool of potential workers is considered to be age group 15-64. In 1980, 255.8 thousand were in the labor pool. By the year 2000, the labor pool will comprise 475 thousand persons.

The active labor force, i.e., those employed or partially employed, numbered 138.0 thousand persons in 1980 of which 33 thousand or 24 percent were females, and 105 thousand or 76 percent were males. By the year 2000 the active labor force is expected to consist of 60 thousand females and 200 thousand males for a total of 260 thousand. If light industry is located in Palopo, considerably more females could be employed than forecasted.

To employ 260 thousand workers by the year 2000 will require the creation of 122 thousand jobs or an average of over 6 thousand new jobs per year for the 20 year period beginning in 1980. This will require a continuous planning and promotional task since a substantial portion of these will be employed in nonagricultural activities. The input/output analysis system will assist in the formulation of the optimum approach to this problem.

4.2.1. Labor Force by Sector

Data concerning employment are not precise and only limited data concerning active labor force are available. It is possible, however, through use of existing data and inference to arrive at certain conclusions concerning the future composition of employment in the Kabupaten. This will provide an indication of the focus of the effort required to develop employment opportunities to meet the requirements of new workers entering the job market. The number of workers required to care for a hectare of paddy is declining. This stems from the use of better farming techniques and mechanization. The ratio of workers to land cultivated is expected to continue to diminish in the future. Mechanization is the principal factor which will result in this decline in farm manpower requirement per unit, or to put it another way, the increase in farm productivity per manhour. This presupposes the continued efficacy of the REC and FCC programs as delineated in the agricultural program. This will be offset to some degree by the expected increase in land brought under cultivation.

Plantings of paddy excluding the second crop in the year are estimated to be 47 thousand hectares in 1980 and to increase to 66 thousand hectares in 1990 and 82 thousand in 2000. The second crop of paddy in the year as well as field crops are not considered because they represent off-peak farm work. Because of increased productivity, however, food farm worker requirement should level off in the second decade in the fcrecas: period. Thus food farm employment is estimated to increase from 106 thousand in 1980 to 121 thousand in 1990 where it will stabilize until at least the year 2000.

Estate crops are expected to utilize significantly more economically active personnel in the future. Forestry and mining employment will have relatively large increases but will not be of great significance numerically. This information is summarized in table 4.2.

The implications of these projections are that it will be necessary to add 85 thousand new jobs between 1980 and 2000 or 4 to 5 thousand per year in the areas of industry,

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commerce, trades and services. These are full-time positions and do not include jobs for workers who will be underemployed or employed on a seasonal basis.

The industrial sector will have to receive emphasis to provide most of these jobs. The multiplier effect, i.e., supporting employment in industry, trades and services for each production worker job in the industrial sector is not known but it should be quite significant in an underdeveloped society such as Luwu. Thus a focus on the development of the industrial sector is extremely important. The Kabupaten Planning Office must give the industrial sector great emphasis in its research and study effort. Effort must be directed toward identifying opportunities for investment in the sector; providing the necessary actions to bring these opportunities to the attention of investors; and coordinating the development of the requisite physical and social infrastructure.

Table 4.2

	1980	1990	2000
Food farms Estate farms Fishing Forestry Mining Other	106 10 3 - 4 15 ^a	121 15 4 1 5 50	122 20 5 5 8 100
Total	138	196	260

Estimated Economically Active Labor Force

^aIncludes 2,000 manufacturing workers. INCO employment is included in the mining category.

5. Water Resources

5.1. Present Conditions

5.1.1. Terrain

The Kabupaten surrounds the north and northwestern shoreline of the Bay of Bone. It is an alluvial plain bounded on the west and north by foothills and the mountains of Central Sulawesi. Tidal plains occur along most of the coast. The land gradually slopes from these tidal lands to the foothills of a mountain range which confine the Luwu Plain. The distance between the sea and the foothills varies from about 5 to 35 kilometers.

There are 26 rivers including major tributaries traversing the Kabupaten. They originate in the nearby mountains. Catchment areas ar relatively small. The streams meander as they near the Bay and frequently change course. Dependable flows in a number of small rivers are low-to-very-low.

Drainage is a problem in some areas making them unsuitable for development as agricultural land. In a substantial part of the North Luwu Plain, the area given development priority, soils are poor-to-moderately drained. This makes construction of well-managed irrigation schemes rather costly.

5.1.2. Climate

The climate is typical of tropical areas and is warm and humid the year around. Rainfall on the plain area averages about 2,700 millimeters per year with amounts being

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less in the south and greater in the north. April is usually the month with greatest precipitation while September or October have the least.

Rainfall varies considerably from year-to-year because storms tend to be localized. The amount of rainfall also varies depending upon elevation. It increases 800 millimeters on average for each 500 meters increase in elevation above sea level.

5.1.3. Organization of Water Resource Development

Water resources development within Kabupaten Luwu is the responsibility of the Area Office, Public Works, Province.

Special projects with their own staffs have been established. These project offices are responsible for the design and execution of irrigation schemes. Upon completion, responsibility for these projects is assigned to Department of Public Works, Province which will then be responsible for operation and main cenance.

Study, design and construction of large irrigation projects is the responsibility of the Directorate of Irrigation while the Water Resources Section, (Public Works, Province) has a similar responsibility for smaller schemes. Project Luwu has had the responsibility for coordinating the activities of these and selected other development agencies in the North Luwu area.

Hydrological and meteorological activities within Kabupaten Luwu are performed by two organizations. The

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Directorate of Rivers and Directorate of Swamps are responsible for most stations and activities within the Kabupaten including some within Project Luwu. Project Luwu has its own Hydrology Section which is responsible for stations and activities located within its project limits.

5.1.4. Meteorology and Hydrology

5.1.4.1. Meteorology

There are four meteorological stations in the Kabupaten. All are located in North Luwu. The stations are well laid out and properly equipped for observing and measuring the parameters necessary for calculation of open water evaporation and potential evapotranspiration. These data are processed by the Project Luwu Hydrology Section. Nainfall quantities, hours of sunshine, relative humidity, dew point and evaporation and evapotranspiration are determined.

There are 51 rainfall gauge locations including the ones located at the meteorological stations. Two of the rainfall recording locations are in South Luwu. Thirtyeight locations have one nonrecording gauge.

5.1.4.2. Hydrology

Stream flow data are recorded for 22 rivers in the Kabupaten including two rivers in South Luwu. Staff-type gauges which provide stream flow data from manual readings at specified intervals are in operation on all 22 rivers. Eighteen of the rivers also utilize automatic water level recorders.

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Capabilities to measure discharge and make sediment transport determinations are available for 15 rivers including the two in South Luwu. Sediment sampling and discharge measurements are taken once a month, from January through December, for all 15 rivers and twice a onth, from July through December, for six rivers. Knowledge of discharge is required for irrigation project design. Sediment measures are necessary in watershed management as well as irrigation project design.

5.1.5. Water Availability

The conclusions set forth in the "Master Plan for Irrigation, North Luwu Plain" were evaluated using the more complete data developed since that time. In summary, the "Master Plan" overstated the water loss from evapotranspiration and overestimated dependable rainfall. As a result of the current study, it can be concluded that:

a) the Balease River appears to lack adequate discharge to satisfy the gross irrigation water requirement allocated to it in the "Master Plan". If detailed study reveals this to be true, the Masamba River, which is now unallocated, might be used to meet the deficiency.

b) the Rongkong River appears to have sufficient discharge to meet the water requirement assigned to it. Due to the extreme variability of rainfall and runoff during the year and especially the dry season, a shortage of water could occur. In this event, water from the nearby Baebunta River could be utilized to supplement the Rongkong River flow.

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c) problems of water insufficiency should not arise insofar as the other rivers in North Luwu are concerned.

d) in the event of chronic shortage of water during the dry season and it is decided not to transport water from elsewhere, a number of alternatives may be employed, i.e., cropping intensity may be reduced, crops with lower water requirements may be grown, short duration varieties may be planted, or the risk of crop loss during years of especially low rainfall could be accepted.

With development of the Kabupaten, water will become a more scarce resource. It will have to be allocated for irrigation, domestic and industrial consumption. As a result, water resources including groundwater will have to be considered and managed on an overall basis. Consideration must be given to watershed management, fishing, flooding and flood control, water quality, multiple purpose projects, and environment.

Groundwater is an untapped potential source of water about which little is known. Studies of this will need to be undertaken. Development of ground water resources in littoral areas such as Luwu must consider seawater intrusion, stream flow effect and tidal effects as well as the other factors involved in using this source of water.

5.1.6. Irrigation

5.1.6.1. Historical Development

A substantial portion of the lowland area is reported to be under irrigation. Estimates of the actual amount of land irrigated vary considerably ranging from 37,000 to 53,000 hectares. Most of the irrigated land employs "village" irrigation or systems developed over the years by the farmers. Almost all of the Camats in the Kabupaten characterized the village irrigation systems as being in "poor" condition.

Semi-technical and technical irrigation systems provided irrigation for 4,500 hectares in 1982. Under semitechnical irrigation the water to each farmer is controlled in terms of quantity. Under the technical irrigation system, time of each farmer's use as well as quantity are controlled. The advantage of the latter is that more land can be irrigated with a given quantity of water. The disadvantage is that it requires management and discipline on the part of the users.

In those areas where relatively large quantities of water are available, it is better and less expensive to use the semi-technical approach. There are few instances where ample water supplies are available relative to potential irrigated land. It appears that Kabupaten Luwu is an area where water is not available in the quantities that would make semi-technical irrigation the desired system.

Irrigation is desirable for rice cultivation to ensure that moisture is available when needed. Since rainfall in the Kabupaten is erratic, supplemental moisture or irrigation may be needed to prevent crop damage or crop failure during both the rainy and dry seasons. The need for irrigation is greater during the dry season, however, for both rice and other annual crops.

Semi-technical and technical irrigation systems are designed and constructed by the Directorate of Irrigation.

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Another organization, the Water Resources Section, Public Works, Province, has the role of designing and supervising construction of smaller complicated irrigation schemes. Its budget has been insufficient in recent years to carry out this activity.

The least complicated projects are carried out by the farmers themselves.

The Department of Public Works, Water Resources Section, Province, is responsible for operation and maintenance. A tax on water users will cover the cost of this. This tax is not being collected at present.

5.1.6.2. Ongoing Irrigation Programs

The principal area proposed to be irrigated is located on the North Luwu Plain. The project area covers about 2,250 square kilometers or 13 percent of the Kabupaten.

The project area of the North Luwu Plain as covered by the "Master Plan for Irrigation" completed in 1975 contains about 135,000 hectares of land which is suitable for irrigation. After subtracting non-commandable lands and areas required for infrastructure, the net irrigated area was determined to be about 100,000 hectares.

A USAID financed project in the area is to be completed during 1983 and will cover rehabilitation and extension of irrigation systems for 1,758 hectares in the Bone Bone area and 6,722 hectares in the Kalaena area. Systems for all of the 8,480 hectares planned to be irrigated under this phase of the overall project will be completed by December 1983.

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In the Lamasi area The Netherlands government is providing financing for construction of the Pompengan Irrigation System which will serve an area of 4,472 hectares when completed. Work on this system was started in May of 1981. It is presently about 40 percent complete.

There are numerous village irrigation systems in operation in the North Luwu Plain area. These consist of simple diversion structures on rivers, creeks, or drains and various lengths of small canals and ditches. These systems which irrigate more than δ ,000 hectares in the area serve the most accessible lands and those lands with minor drainage or flooding problems. As the irrigation development continues, most of the village systems will be included in the technical projects.

The Directorate of Irrigation under the Ministry of Public Works, is continuing to plan and construct irrigation systems. Summarized in the following tabulation are the areas of development, project sponsors, hectares developed or to be developed, and planned completion dates of these works.

Area of Development	Sponsor	Area to be Irrigated	Completic Dates
Kalaena Bone Bone Lamasi (Pompengan) Bone Bone Kanjiro Right Bank Lamasi Right Bank Total Area	USAID - GOI USAID - GOI Netherlands - GOI GOI GOI GOI	6,722 1,758 4,472 1,009 1,517 1,064 16,542	Dec. 1983 Dec. 1983 1984 1983 1984 1984

By the end of 1984 a total of 16,542 hectares will be under technical irrigation if current construction is completed as scheduled. The Department of Irrigation proposes to design and construct 2,500 to 3,000 hectares each year after 1984. If external funds are available, the program can be accelerated.

5.1.7. Problem Areas

5.1.7.1. Data Gathering and Processing for Meteorology and Hydrology

The establishment of Project Luwu as a separate entity encouraged a division of meteorological and hydrological data gathering and processing responsibilities between it and the Directorates of Rivers and Swamps. This results in higher unit costs for performing the work because of duplication in personnel, tasks, tools, equipment and materials.

There is no clear delineation of the hydrological and meteorological activities resulting in an overlapping of certain tasks and areas of operation. While this is of minor significance in some of the work, other functions could suffer in the future because of a difference in procedure and, more importantly, a difference in standards for the finished product.

The existing arrangement has thus far provided adequate data and information to satisfy requests made upon the system. Kabupaten Luwu is rapidly approaching a level of development which could overwhelm the present *crpabilities* of each of the two sections interested in these areas of work. Organizational problems in these areas need to be carefully reviewed and resolved. There are some problems in the area of data gathering and processing. While field measurement facilities are reasonably adequate, there is a low level of accuracy. Further, some tools and equipment are lacking. Their use would make the work easier, more accurate, and reduce the time required to accomplish the tasks.

Existing data processing procedures result in many errors. Publications at present contain mostly raw data without introduction, explanation, commentary, analysis, or summary. Effort must be made to present the results of these expensively acquired data in a manner so they can be understood and utilized.

The rainfall gauge network is clustered mainly in the areas of Lamasi, Bone Bone and Kalaena. Gauges are generally located in the flat downstream areas. Few are located in the upstream mountainous terrain which comprises most of the river catchment areas. The data consequently fail to be representative. This diminishes the usefulness of rainfall data in stream flow analysis. The rainfall gauge network needs to be expanded numerically and geographically.

The present river stage-type gauge network appears to reasonably adhere to basic criteria for the selection of hydrometric stations. A more effective network could be developed by increasing the number of rivers gauged.

There is a lack of attention being given to operation and maintenance of the hydrologic and meteorologic instruments and equipment. Some instruments and pieces of equipment remain out-of-order for inordinate periods of time. The resulting data gap weakens the water resource data analysis.

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Training is required for both administrative and technical personnel. On-the-job, in-country and formal training abroad should be considered. Training programs in data gathering and evaluation would yield a high return relative to incremental cost.

5.1.7.2. Irrigation

Numerous problems have been encountered in the implementation of the works. Many of these relate to inadequacies in the survey and design work.

Accuracy of surveys in many areas of the project has been very erratic causing major changes to be required during construction. These changes cause delays and add considerable cost for resurvey, redesign and reconstruction.

Some of the designs have been inadequate. Many of the design problems stem from a lack of basic information. For example, information concerning soil structure was inadequate, or in some cases, ignored. Hydrological data were sometimes inadequate. Because of inadequate information concerning river crest elevations and tidal information, drainage structures have been improperly located. Designs of structures sometimes do not properly consider operation and maintenance after completion. There have also been problems because designs have tended to be standarized rather than reflecting the requirement of varying field conditions.

There are problems in construction. Inadequately trained field staff of the Directorate of Irrigation results in deficiencies in materials testing, inspection and control. Contractors are not fully experienced and qualified. Care and maintenance of construction equipment is a Problem.

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An effective maintenance program for the operational irrigation system has not been undertaken. A workable transitional program between construction and operation and maintenance remains to be developed. Budgets, personnel, materials, supplies and equipment have thus far been inadequate for operation and maintenance of the completed systems.

The problems of operation and maintenance are increased because of these problems. Poor construction and designs compound the ordinary problems encountered in operation and maintenance.

Training of farmers to receive and use irrigation water and development of personnel to manage operation of the irrigation systems have been inadequate.

In addition to these problem areas, some of the land is not irrigated after the system is completed. An example is the Kalaena irrigation system where about 1,830 hectares are being irrigated of the potential of 3,160 hectares. There are three main reasons for this:

- regrowth of land previously cleared is restricting access.
- (2) farmers were not available to assume control of the land at the time clearing was completed and water was available. It has been reported that part of this problem may be attributed to large areas of this land being controlled by absentee land owners.
- (3) there are some problems with design and the system does not function properly.

Plans have been made involving representatives of Project Luwu land clearing function, irrigation design and

local government to correct the above problems. Implementation has thus far been slow.

Problems of this nature will continue to arise as the development program expands. Formulation of departmental and overall program control systems must be undertaken if the development program is not to be impeded by these costly constraints.

5.2. Proposed Program

5.2.1. Irrigation

The program delineated in the "Master Plan", Irrigation Development, Project Luwu, March 1977", will be generally followed. Water supply investigations indicate that the program is technically feasible. Revisions will be made as appropriate, however, as further quantitative and qualitative data concerning water and land resources become available.

The most important considerations in the determination of future priority should be water availability, drainage problems and social factors. The program will be concentrated on prior feasibility study and complete development of an area rather than work in several scattered sites at one time. The irrigation plan must be coordinated with the results of the agricultural development plan and other local development programs. The results of the agricultural study proposed in section 6.10.3.1. may require revision of assumptions concerning cropping patterns in the "Master Plan".

The physical works to be completed during the five year Period comprise special projects, medium projects, simple

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projects and tertiary projects. These are defined as:

Special Projects Medium Systems Simple Systems	 Over 10,000 hectares From 5,000 to 10,000 hectares About 5,000 hectares
Tertiary Systems	 Small areas where no primary or secondary canals are involved

Special projects are undertaken by Project Luwu with the provincial government being responsible for operation and maintenance. The remaining three types of systems (medium, simple and tertiary) are the responsibility of the provincial government.

Targets for the five year period for the special projects program are as follows:

Special Projects 1984-1985	Hectares Completed
Kalaena - right bank Kanjira ight bank Iama - Tht bank Tana	$ \begin{array}{r} 1,500 \\ 300 \\ \overline{700} \\ \overline{2,500} \end{array} $
1985	
Kalaena - right bank Lamasi - right bank Total	900 <u>1,600</u> 2,500
1986-1987	
Kalaena Lamasi - right bank Tomoni Total	900 1,500 <u>600</u> 3,000
1987-1988	
Kalaena - left bank Lamasi - right bank Tomoni Total	1,450 980 <u>570</u> 3,000

1988-1989 Kalaena - left bank 1,630 Sengenni 570 Tubu-Ampak 800 Total 3,000

It is expected there will also be some reconstruction and rehabilitation of completed work before it will be accepted for operation and maintenance.

Medium systems proposed to be completed during five year period comprise two projects in South Luwu. These are:

Padang Sappa - rehabilitation of system covering 8,000 hectares and extension of irrigation to additional 4,600 hectares. Construction will begin the first year and be completed by the end of the fifth year.

Bajo - complotion of studies and designs for rehabilitation of a system for 8,000 hectares. Completion of designs for an additional 4,000 hectares. Construction to begin after 1988-1989.

Simple systems proposed for the five year period are also located in South Luwu. These are:

Sampano - design and construction of system covering 6,000 hectares.

Larandu - rehabilitation of existing system covering 1,000 hectares.

Komba - rehabilitation of existing system covering 367 hectares.

The following is expected to be accomplished during the plan period under the three programs:

	I	rrigation	
	New	Rehabilitation	Design
Special Projects Medium Projects Simple Systems Tertiary systems	14,000 4,600 6,000 None prop	8,000 1,367 posed	12,000
Total	24,600	9,367	12,000

To summarize, 33,967 hectares will be brought under irrigation by schemes completed during the plan period. These together with projects completed by the end of 1984 will provide irrigation for about 50,500 hectares.

The foregoing program must incorporate significant improvements in the quality of designs and construction of major irrigation works. Otherwise the benefits expected will not be achieved. It is now quite evident that domestic design engineers and contractors employed thus far do not have the managerial capability as well as sufficient trained engineering and technical staff to undertake large-scale and complicated works such as the Kalaena Weir.

An alternative arrangement is to employ foreign firms in joint venture with local ones to do the designs and to construct major works. This, in the long run, is the best way to build up a qualified provincial construction industry. Better quality work will also help assure that the money invested in irrigation projects will result in the economic and social benefits expected. Inspection and quality control must still be maintained by the government with supervision by foreign advisors. With good inspection and control, local contractors can undertake the smaller projects.

5.2.2. Technical Assistance

The Palopo office of the Directorate of Irrigation needs technical assistance in several areas. These include planning, studies, supervision of construction to assure quality control, and operation and maintenance of completed Works. Therefore, foreign consultants are proposed to assist in this activity.

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5.2.2.1. Technology Transfer

Based upon past experience it appears quite doubful whether the existing staff can undertake the studies and supervision of construction required for a fully functioning irrigation program. In the long run it is better to construct the projects correctly initially rather than reconstruct faulty works or have an improperly functioning irrigation system. A technical assistance program is proposed to help overcome problems of this nature.

A team of four foreign consultants is proposed to assist in planning, design, and construction of irrigation systems. It is expected the consultants will be required for a two year period to improve planning, design and construction techniques and thereby reduce operation and maintenance problems.

A five man team of consultants is proposed to assist in the implementation of an operation and maintenance pilot program for completed work in the North Luwu area. These consultants will have hands-on supervisory responsibilities. It is expected the consultants will be required only during the first two years while (1) the existing program is being reviewed and revised; (2) maintenance equipment is being repaired; (3) equipment is being purchased; and (4) the operation and maintenance program is being developed and implementated.

In addition, two foreign consultants are proposed to provide technical assistance in water resources development. This team would advise a Water Resource Planning Unit in the BAPPEDA Planning Office. It would plan overall water resource development and coordinate it with other sectoral activities. It is expected the consultants will be required for the five year period to provide continuity and overall direction to the program.

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5.2.3. Data Gathering and Analysis Improvement

Programs to improve the meteorological and hydrological data gathering and analysis are proposed. These include expansion and improvement in the measuring networks as well as training of personnel.

5.2.4. Studies

Groundwater resources may be required for those areas where irrigation using gravity systems are not feasible. Groundwater investigations should be made beginning the latter part of the plan period.

Multipurpose projects may also be feasible. Investigation of them should be included in the long-term water resources development program. Since it appears that largescale run-of-river type generators may not be feasible because of low river flows during the dry season, storagetype multipurpose projects should be considered in long-term planning. In addition, small scale run-of-the-river single purpose hydroelectric facilities should be studied. These studies extend beyond the five year period.

5.2.5. Operation and Maintenance with Related Technology

Operation and maintenance of completed works will be a ¹⁴³ge undertaking. As indicated in section 5.1.7.2., this ¹⁴⁵ not been addressed as yet. The proposed program, which ¹⁴¹ provide technology transfer to improve design and ¹⁴⁵ struction as well as assistance in operation and

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maintenance implementation, will require high level planning, organization, and budgeting, along with competent and diligent field staff to successfully implement the program. All parties concerned must recognize the need for equipment with accompanying shops, warehouses and trained personnel. Hand labor will be required for projects smaller than 5,000 hectares (simple systems).

In view of the existing and increasing operation and maintenance problems of completed irrigation systems, the following steps should be undertaken during the five year period:

- (a) an operations and maintenance program should be implemented immediately;
- (b) planning, design, and construction of new systems should be improved;
- (c) training and education of farmers to receive irrigation water and maintain tertiaries and quatenaries must be implemented and carried out. Consideration should be given to training extension workers to undertake this program;
- (d) the proposed construction program for new works should be at a pace that can be administered by the operation and maintenance program. Excess funds budgeted for new construction, if any, should be transferred to the operation and maintenance program; and
- (e) the Water Resource Planning Unit should be organized and begin operation as soon as possible.

5.2.6. Expenditure

The expenditure proposed for water resources is shown in table 5.1.

Table 5.1

Program for Water Resources Development

		Budget	(Million Rupiah)					
		Sou-ce	1984-1985	1985-1986	1986-1987	1987-1988	1988-1989	Total
I	Directorate of Irrigation - Central Government							20041
]	Special irrigation systems Technical assistance Directorate of Irrigation - Province	APBN APBN	3,500 265	3,300 530	4,000 265	4,600	5,000	20,400 1,060
	Medium systems	-						
7	Padang Sappa Bajo Simple irrigation systems Operation and maintenance improvement program Technical assistance Operation and maintenance other	APBD-I APBD-I APBD-I	632 81	3,375 60	6,100 70	6 , 500 70	5,000 70 984	21,607 351 984
4		APBD-I APBD-I	1,883 330	942 660	532 330	600	600	4,557 1,320
	than North Luwu Meteorology/hydrology training	APBD-I	105	100	116	122	128	571
	program Stream discharge data improvement	APBD-I	2	18	18	18	17	73
program Meteorology data improvement	APED-I	33	32	40	42	42	189	
	program	APBD-I	8	30	8	2	2	50
R	ural Development Office - Kabupaten							-
B	ANDES village irrigation program	APBN	55	60	66	71	76	328
	Total		6,894	9,107	11,545	12,025	11,919	51,490

6. Agriculture

6.1. Agriculture Land Use

Rice culture is the principal agricultural and economic pursuit in Kabupaten Luwu. Land devoted to cultivation of lowland rice totaled 53 thousand hectares in 1982 or 40 percent of the 132.4 thousand hectares of agricultural land. Another 12 percent or 16 thousand hectares were used for dry land crops such as upland rice, maize, soybeans, and cassava. Estate crops and fish ponds utilized the remaining 48 percent of agricultural land. Pasture land is classified separately and represented 103.6 thousand hectares in that year. This does not include approximately 60 thousand hectares of forest land which is expected to be converted to agriculture by the year 2000.

These estimates should be regarded as tentative since a land use study has not been made. Until such a study has been done, potential agricultural land cannot be known with any degree of precision.

The general conclusions which can be drawn from the present evidence concerning land use are that in the longer term there is a considerable amount of land available for agricultural expansion should policy so dictate. In the short:r term the main area of expansion is likely to be in the North Luwu Plain. At the end of 1983, approximately 85,000 hectares of land, some of which is already cultivated, will remain to be developed for irrigation. In addition, approximately 14,000 hectares of largely forest land is being converted to oil palm over a seven year Period.

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6.2. Climate as Related to Agriculture

The climate in the Kabupaten is generally favorable for rainfed agriculture. Monthly precipitation varies considerably from year-to-year and short drought periods frequently occur so that the planting of annual crops under rainfed conditions involves a certain amount of risk. While the Maros Research Institute for Agriculture has successfully grown dry season crops without supplemental moisture in some areas, irrigation is generally required to ensure adequate moisture during the rainy as well as the dry seasons.

6.3. Topography

Much of the Kabupaten is mountainous and topography is a limiting factor to expansion of annual cropping in particular and, to a large extent, perennial cropping by smallholders. The latter have already expanded both annual and perennial cropping in mountanous areas particularly in the southern part of the Kabupaten.

Steep-to-very-steep land should be left uncultivated in the interests of soil conservation and sound watershed management. Commercial estates can plant, with proper practices, perennial crops on slopes up to 40 degrees where slope length and soil depth and texture are suitable.

Present policy discourages smallholders from planting perennial crops on slopes above 15 degrees and annual crops on slopes above 5 degrees. Annual crops can be planted on slopes up to 7 degrees provided terracing and grass stripping is undertaken. These are difficult tasks, however, for a smallholder to effectively carry out. 6.4. Soils

The only semi-detailed soils analyses available for the Kabupaten are those delineated in the "Master Plan for Irrigation, North Luwu Plain" in 1977 and the "North Luwu Micro Economic Study" of the Institut Pertaniar Bogor in 1976.

Generally the soils studied were found to be low in organic matter and nutrient content and in some areas were acidic. They will require high dosages of nitrogen and phosphates if rice is to be double cropped under irrigation. There is also a possibility of iron toxicity under double cropping. In order to avoid this, good drainage is essential so that the fields can be completely dried before harvest.

According to these surveys the soils are also slightly less suitable for continuous cultivation of crops such as maize and soybeans because of poor aeration of the soil and possible sheet erosion. These problems stem from the high silt content present.

It was concluded in the "North Luwu Micro Economic Study" that, with some exceptions, soils in North Luwu in general are not very fertile, and in many of the sawah areas high permeability presents a problem for irrigation. In many of the potential annual dry land cropping areas the soils are of light texture and, where topography is unfavorable, terracing is required.

These problems are not thought to be insurmountable but, in general, cultivation requires a plentiful supply of Water under irrigated conditions. Adequate fertilization,

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careful cultivation and careful husbandry techniques are required under dry land conditions.

6.5. Existing Agriculture

Kabupaten Luwu is a major producer of rice. Maize, soybeans, groundnuts and cassava are also important food crops. The area devoted to annual crops other than rice is about one-fifth of the total hectares planted to paddy.

While rice will continue to be an important crop, the emphasis on non-rice annual crops needs to be increased. Reasons given for farmers' apparent disinterest in crops other than rice vary. They include lack of markets and/or infrastructure to facilitate marketing; lack of knowledge and education concerning them; and tradition. Additionally, the hectares of these crops which are reported to be planted and apparently failed is much higher than for rice. While reasons for this relatively high incidence of crop failure are not fully known, the risk of crop failure may also contribute to the reluctance of farmers to grow these crops.

Hectares devoted to vegetables and fruits have increased in recent years. These crops are usually grown on the farmstead for local consumption.

6.5.1. Rice Culture

The principal agricultural emphasis has been and continues to be rice. The area of rice harvested increased by 6 percent per year between 1975 and 1982 when calculated or the basis of trend values.

Luwu is an important rice producer in the Province. The Kabupaten accounts for 8 percent of provincial production.

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	Ta	able	6.1	
Hectares	of 1	Food	Crops	Harvested
	in	Thou	isands	
	19	975-]	L982	

	1975	1976	1077	1070				
	2075	10/11	19//	19/8	1979	1980	1981	1982
Rice (Paddy)	35.7	43.2	43.4	58.4	61.7	62.4	65.1	47.2
Maize	3.3	2.2	3.3	4.6	3.6	4.1	5.2	4 1
Cassava	2.2	1.4	1.6	1.7	1.8	1.4	1.8	1.0
Sweet Potatoes	1.1	0.9	1.0	0.9	1.0	0.9	0.7	0.6
Ground Nuts	0.9	0.6	1.2	1.9	2.0	2.9	0.9	0.4
Soybeans	2.5	1.5	1.9	3.0	4.3	2.4	1.8	0.6
Mung Beans	0.3	0.1	0.3	0.2	0.3	0.4	0.7	0.3
Vegetables	0.5	0.5	0.7	0.8	1.6	2.5	2.2	2.1
Total	46.5	50.4	53.4	71.5	76.3	77.0	78.4	56.3

SOURCE: BAPPEDA.

Table 6.2 Production of Food Crops in Thousand Tons 1975-1982

	1975	1976	1977	1978	1979	1980	1981	1982
Rice (Paddy)	111.7	156.2	145.1	180.3	151,2	196.9	221.5	187.6
Maize	2.1	1.3	2.0	3.5	2.5	3.1	4.8	4 5
Cassava	12.5	7.4	9.3	. 8.6	7.6	7.7	11.7	
Sweet Potatoes	4.6	3.5	4.8	3.5	4.1	4.0	2 9	2.0
Ground Nuts	0.5	0.4	0.8	1.2	1.5	1 9	0.5	2.9
Soybeans	1.5	1.0	1.4	2.0	3 2	1.5	0.5	0.3
Mung Beans	0.1	0.1	0.1	0 1	0.2	1.0	1.3	0.4
Fruit	0.5	03	0.2	0.1	0.2	0.2	0.5	0.2
Vegotables		0.5	0.2	0.6	9.8	8.9	10.7	11.8
vegecables	2.1	1.8	3.7	5.9	3.7	4.8	3.7	3.5
Total	135.6	172.0	167.4	205.7	183.8	229.1	257.6	218.9

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SOURCE: BAPPEDA.

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Average yields are generally lower in the Kabupaten than in the Province as a whole. An exception is rainfed upland rice or ladang. Yields from this are higher in Luwu than in the Province as a whole.

Production per hectare harvested for the combined types of paddy -- rendengan, gadu, and ladang -- has changed little during the 1975-1982 period. These data obscure the trends for the rainy season, dry season and upland rice. The yield for dry season rice or gadu, which requires irrigation and has received the most attention from extension and training services, has increased the most or 4.4 percent per year; rainy season paddy or rendengan has gained 1.0 percent per year; and upland rice or ladang has increased 1.0 percent per year. All of these percentage annual increases were computed on the basis of trend values.

Perhaps a better way to view the trends in paddy production is to consider the rendengan or rainy season rice and gadu or dry season rice in terms of yield in tons per hectare of sawah available. This is because these crops are usually grown on the same land. Further, there has been an emphasis on the provision of technical irrigation systems in recent years.

Data for the entire Kabupaten do not reveal the implication of the provision of irrigation and ancillary agricultural inputs. Kecamatans Bone Bone and Walenrang have had relatively substantial portions of the available sawah under well-functioning irrigation systems along with concentrated efforts to provide other inputs. Yield comparisons for these areas are shown as follows:

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	Rendengan and	l Gadu
Bone Bone Walenrang	Per Hectare Harvested 3.7 3.7	Per Hectare of Sawah 5.6 7.9

Regression analysis supports the conclusion that the most important factors leading to increased yields of rice are engineered irrigation systems and improved farming practices such as use of improved seeds, fertilizers, herbicides and pesticides. Tenure seemed to have little influence on yields while village or indigenous irrigation systems have a small positive effect.

The effects of the benefits of the coordinated provision of seeds, chemical inputs and irrigation was observed in the Lappo Ase program in 1982. This program which resulted in dramatic increases in yields in some areas was generally considered to have been very successful.

6.5.1.1. Improved Practices

As indicated in section 5.1.6.2. there has been an emphasis on the provision of technical irrigation in the North Luwu Plain. This is in addition to the traditional village irrigation systems provided by the farmers themselves. Many of these systems are poorly designed and maintained. While no detailed surveys of them have been made, it appears that most of the systems or their sources of water are inadequate to ensure a second crop of rice in all years.

During the recent past, emphasis has been placed on the distribution of improved agricultural inputs and marketing through improvements in the cooperative systems and the

expansion of their scope of activities. There has been expansion of the extension service and improvements in their methods of operation. Much of this effort has been directed toward the production of rice.

As indicated by the regression analysis mentioned, the thrust of the past development program has been appropriate assuming that the objective of an almost exclusive emphasis on rice culture is the appropriate one to be pursued.

6.5.1.2. Marketing

Most of the past increases in rice production have been absorbed by the producers themselves while the surplus has largely been disposed of to local markets in and around the Kabupaten. The "Master Plan", however, projected that with quite realistic yield levels of 8 tons per hectare per year of double cropped rice, 800,000 tons of rice could be produced in the project area alone by the time of completion of the program envisaged in the "Master Plan". It was also estimated that 658,000 tons of this production would be surplus to the consumption requirements of the population in the area, i.e., 3-4 times the total production in the whole Kabupaten at present time.

Indonesia is now moving toward self-sufficiency in rice production. If the drive throughout the country to intensify production continues to succeed, there may eventually be an exportable surplus. Under this circumstance growing rice for exportable surplus from Luwu might not be profitable in economic terms. This is because of the relatively high costs of (a) irrigation; (b) fertilization; and (c) transport of the product to market. It is implicitly assumed in the tentative provincial agricultural policy that the capacity of the market to absorb additional rice production from South Sulawesi may be limited. It is envisaged that major increases in production should come from the producing areas in the center of the Province, while areas such as Luwu should concentrate on increased production of other annual crops. There is therefore a need to question how quickly rice production should be expanded in Luwu before the implications of possible changes in markets and profitability of additional production can be assessed.

Improved transport can facilitate marketing of farm products from Luwu to other areas of South Sulawesi. It is therefore appropriate to determine how production of other annual crops can be expanded. This should be the subject of an overall agricultural study to be undertaken during the early years of the plan period.

This should be accompanied by a research program to determine which non-rice annual crops can be grown and how they can be introduced to farmers.

6.6. Other Crops

6.6.1. Maize

Maize production has increased about 17 percent per year in Luwu during the 1975 to 1982 period. Tons produced in 1982 numbered 4,500. Yields per hectare have increased significantly during the period and are approximately the same as in the Province as a whole. Yield in 1982 was 1.1 tons per hectare harvested.

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The amounts of maize exported from the Province and entering inter-island trade was relatively small in 1978 and 1980 and it would appear that most of the maize production in the Province was absorbed in the domestic market. The market for maize, which is affected by growth of the livestock industry, should continue to grow both within and outside the Province. Present indications suggest there will be annual limits on the amount which production can be increased profitably in Luwu.

In the short term at least, Luwu must compete with large production areas to the south. The Kabupaten does not appear to enjoy any particular comparative advantage since its soils are apparently not highly fertile. It is also probably at a comparative disadvantage with an area such as Kabupaten Bone in items of competition for inter-island trade. Kabupaten Bone has the capacity to produce maize in bulk near the port of Ujung Pandang.

6.6.2. Cassava

Although cassava production increased rapidly in the Province between 1975 and 1978 it declined between 1978 and 1980 despite a rising price trend. This probably indicates a production and, possibly, a marketing bottleneck. Cassava is normally cultivated in small patches around or near the farmstead. It is grown to ensure a basic food supply while clearing and preparing new land. Once a plentiful supply of tice is available, cultivation tends to diminish although it seldom disappears altogether.

The major single export market for cassava is the European Economic Community which has agreed to a new quota

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for the export of cassava from Indonesia. A major difficulty in meeting their requirements is the collection of the product from small scattered production units. The lack of developed marketing arrangements tends to increase costs.

Kabupaten Luwu has one of the largest cultivated areas of cassava in the Province, and in 1980 accounted for 14 percent of provincial area planted to cassava. It will be able to take advantage of expanding export markets providing production units can be organized on a larger and more continuous scale so that collection is easier. The main constraints to larger scale production on small individual farms is that cassava has a relatively long maturation period and has heavy labor requirements at harvest time. Another disadvantage is that it requires careful rotation with non-root crops such as legumes and heavy fertilization if it is to be grown continually. This matter requires careful research to determine appropriate cropping patterns to prevent serious soil nutrient depletion.

6.6.3. Soybeans

Production of soybeans in the Province rose rapidly from 1975 to 1980. In constant terms, prices rose rapidly between 1976 and 1979 and dropped substantially in 1980. Apparently in response to price, the area of soybeans cultivated in Luwu fell from 4,300 hectares in 1979 to 600 hectares in 1982. Prices fell rapidly in the early part of 1983 which suggests that demand has not significantly increased. Indonesia imported substantial quantities of soybeans in 1983. This seems to indicate a marketing limit within the Province. Since soybean curd is an integral part of national diet, demand for soybeans should continue to grow. Expansion of prod tion in the Kabupaten is possible since the present production base is small. The market situation requires monitoring.

There are other problems associated with soybeans culture which must be resolved. Research is needed to determine how yields can be increased. Soybean seed also requires care in storage which has been lacking in Luwu. If plantings are to be increased, better storage and distribution facilities for seed need to be provided.

6.6.4. Coffee

Coffee growing farmers have production and marketing problems. Many smallholders in the Kabupaten cultivate coffee in a semi-wild state with the crop usually being allowed to propogate unattended. Harvesting methods are extremely primitive which result in poor quality beans.

Substantial increases in production could be achieved by merely pruning and fertilization. Largely because of a lack of extension services, improvements in coffee growing techiques were not introduced between 1975 and 1980. Extension services to rehabilitate existing coffee plantings are now being provided by the Estates Crop Office. Farmer response to the training provided is considered to be favorable.

Coffee production is also experiencing problems because many smallholders were not receiving a price in early 1983 which made production attractive. Better prices were being received by those farmers in areas where cooperatives were working effectively. Better marketing arrangements to help

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farmers increase the price spread between medium quality and high quality beans can be provided by the FCCs. This will encourage farmers to make the extra effort to produce a quality product to increase income.

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The immediate prospects for increased coffee production in Kabupaten Luwu are not particularly favorable because of excess coffee bean stocks in the country.

6.6.5. Clove

Clove production in the Province amounted to 91 tons by smallholders and 28 tons by estates in 1979. Production will rise very rapidly in the future as large areas planted in the 1970's begin to bear.

Hectares planted to clove are rapidly increasing in the Kabupaten, largely from private initiative because of the large domestic market and high prices obtained. High rates of planting are likely to continue in the future with the only constraint being the present policy to discourage planting on steep land.

Clove plantings may be expanding too rapidly. Similar increases of plantings are occurring in other parts of Indonesia and a glut has appeared. The matter must be appraised to determine to what extent the expansion of clove production should be encouraged in Luwu.

6.6.6. Oil Crops

Prices for copra rose very rapidly between 1975 and 1978 and thereafter declined substantially between 1978 and 1980. The price remained 12 percent above the 1975 level in

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constant terms. Production responded only slightly to this price rise largely because it can only be substantially increased by new plantings or replantings. Trees require a minimum of four years to bear.

Present policies are largely directed toward increasing production for the copra market. The effects of these efforts must be monitored very carefully. Production of palm oil, a major competitor to coconut oil, is increasing rapidly in the country. Palm oil trees are also being planted in Luwu. Present estimates indicate production in Luwu will be between 40 and 50 thousand tons by 1990.

Normally coconut oil produced from smallholder copra cannot compete with refined palm oil produced on large estates unless there is a specific preference for coconut oil among consumers. This is no doubt the case in Indonesia. Thus, coconut oil will continue to be competitive with palm oil.

The smallholder coconut rehabilitation program in Luwu experienced severe marketing constraints in the early part of 1983. This caused the price of copra to be well below that of fresh nuts. This is likely to continue while copra processing and collecting facilities are rudimentary. Large scale increases in coconut production should therefore not be encouraged unless fairly specific marketing opportunities have been identified and adequate copra processing and collection systems can be provided.

6.7. Cattle

The Province is a major cattle producing area. The number of cattle slaughtered in the Province rose virtually

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continuously between 1975 and 1982. The major aim of present policy is to increase cattle population as quickly as possible in order to maintain stock, provide draft animals and supply both the increasing provincial market and the markets in East Kalimantan.

The strong demand for beef is affirmed by the rapid rise in prices between 1975 and 1977 which have since remained constant against increasing production. This indicates cattle production can be increased in the Kabupaten.

The numbers of livestock raised on the grasslands and the area of the latter which can potentially be converted to other forms of agricultural use, will depend on future livestock policy as well as price. A study is underway to determine the potential nutrient status of the grasslands by examining both the possibilities of improving existing grasses and of introducing exotic species of grasses and legumes. After this study is completed and the results combined with general land use studies, the area of grassland which can be used for livestock raising and the area which can be developed for other agricultural activities can be determined.

6.8. Input Supplies and Credit

Use of agricultural inputs is relatively small when calculated against the total area of rice cultivated. (Rice is the main crop for which improved inputs are used.) Total expenditure on mechanization in the Kabupaten rose from Rp 2.3 million in 1975-1976 to Rp 173.3 million in 1980-1981 but declined to Rp 119.3 million in 1981-1982.

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The main source of physical inputs is the BIMAS package for the intensification of rice cultivation, which is administered by Agriculture Food Crops Office - Province through the KUDs and to a much smaller extent the BIMAS package for nonirrigated annual crops. The BIMAS program is often less than satisfactory largely because of inappropriate timing and insufficient delivery. The Lappo Ase program has demonstrated, however, that coordinated efforts to provide improved farm inputs is possible.

The FCCs which began operating in the North Luwu area in 1978 have been quite successful in the provision of inputs. For example, they provided no inputs in Wotu, Malili and Nuha in 1980. By 1982 they were providing 100 percent of the inf 'ts supplied in these areas. The FCCs have provided inputs to farmers on a timely basis and where operating have generally captured the market for them.

Mechanization is usually acquired by the farmer through purchase or hire of a tractor. Tractors can be hired from other farmers, contractors, or various institutional cooperative systems. In 1982 there were 213 tractors in Luwu.

The results of institutional mechanization programs have been mixed. They have generally failed to operate profitably. Lack of maintenance or poor maintenance of tractors has inhibited the development of the mechanization program thus far.

The FCCs have the most promising institutional mechanization service in the Kabupaten. Certain operational problems have to be overcome, however, before a financially viable tractor rental operation can be mounted. Credit is obtained from a wide variety of sources including family, friends and traders. The main institutional sources are the Bank Rakyat Indonesia (BRI) and the FCCs. BRI provides credit and finance for a wide variety of agricultural activities with the major one being the BIMAS package of inputs. It also gives credit for the perennial crop rehabilitation programs, intensive livestock raising, and fish farming. Procedures of BRI are cumbersome which lead to delays in receiving funds in sufficient time to purchase the inputs for planting annual crops.

The FCC has instituted a credit program for purchase of inputs in North Luwu under which borrowers are required to be members of a sub-cooperative group. All loans granted to members must be approved and guaranteed by the group while the loan amount is limited to the group's savings with their KUD. Under this system the loan volume in two seasons rose from an amount sufficient to provide inputs for 500 hectares to an amount sufficient to provide inputs for 5,200 hectares.

6.9. Agricultural Research

The Maros Research Institute for Agriculture began implementing a system of adaptive research in South Sulawesi in 1979. Cropping systems research was the major activity. North Luwu was chosen as one of the areas in the Province where adaptive research concerning suitable cropping patterns for small farmers was carried out.

The aims of the research in Luwu as stated were to:

- (a) increase farmers profit per unit of land;
- (b) increase employment opportunities and to distribute labor utilization more uniformly in order to permit more extensive land cultivation;

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- (c) improve the farmers overall socio-economic condition by increasing the frequency of harvesting, the profit per crop, and minimization of the need to borrow; and
- (d) teach improved practices to farmers, extension workers and government officials through demonstrations.

An important part of the research was a baseline survey concerning participating farmers. Objectives were to:

- (a) establish base period conditions for each site for the purpose of evaluating future change;
- (b) describe the existing resources in terms of quality, quantity and utilization;
- (c) identify existing management practices and levels of technology which either serve as constraints to productivity or contribute to productivity
- (d) identify existing cropping systems and constraints to higher productivity; and
- (e) assess
 - (1) why farmers use existing practices;
 - (2) farmers' opinions of constraints to better production;
 - (3) farmers' responses to innovations; and
 - (4) farmers' goals, needs and aspirations.

The research, which was funded by USAID, has been completed and is now being reviewed. The Institute plans to continue operation of a small research facility financed by its own funds in North Luwu. More, however, is required.
The results of their work in North Luwu now must be tested to determine if they are valid for other portions of the Kabupaten.

6.10. Proposed Program

6.10.1. Strategy

6.10.1.1. Current Strategy

The strategy for the development of the agricultural economy in Kabupaten Luwu in the past has been to encourage the expansion of rice cultivation using the national price and logistical marketing support programs. Policy has been directed toward intensification of cultivation by providing a subsidized package of inputs designed to increase yields under the BIMAS program and the introduction of the Lappo Ase program in 1982.

The decision to provide controlled irrigation in the North Luwu Plain on up to 100,000 hectares greatly increased the possibilities for the extension and intensification of rice cultivation. The REC program has been aimed at improving rice production techniques through training of both farmers and Agriculture Food Crops Office staff in improved technologies. The FCC program has provided efficient milling, marketing, input supply, and credit services. Farmers have thus been able to meet increased rice consumption needs and produce substantial saleable surpluses.

There has been much less support for the production of other food crops than rice. It was not until 1978-1979 that the RECs, FCCs and the Maros Research Institute for

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Agriculture began a significant and coordinated effort to increase the production of other food crops.

Maize is the only major dry land food crop which has shown a significant increase in production. Clove plantings, among the crops in the perennial category, have increased while oil palm is being introduced. The lack of support for fish farming is gradually being rectified, but farmers still require considerable technical support and marketing services.

Livestock numbers have increased substantially. Cattle and buffalo are to a great extent, however, still considered as capital assets or draft animals.

6.10.1.2. Plan Strategy

The agricultural development strategy now being pursued has been highly successful in the case of rice but much less so with other crops and enterprises. There is now a need to take a more reasoned approach to agricultural development. A new strategy for development is proposed. It has the following premises:

- (a) effective planning of implementation cannot take place until (1) a detailed knowledge of what is happening at the farm level is available and (2) a clear assessment of market potential is available;
- (b) implementation cannot be based on a fixed long-term program since market and production conditions change -- planning of implementation must be a continuous and evolving process; and
- (c) activities of line agencies must be viewed as components in a whole and not independent development processes in themselves.

Agricultural development in the smallholder sector is a complicated process cf identifying development possibilities and constraints, establishing priorities and guiding implementing agencies to meet those priorities. In order to deal with the complexity of the development process, new institutional mechanisms, which can be involved in all aspects of development have to be created. Therefore a professionally staffed organization, an Agricultural Planning Unit (APU) which is independent of line agencies and has sufficient influence to direct their activities to priority tasks, must be formed. The APU will be located organizationally in the BAPPEDA Planning Office.

With the assistance of technical personnel in line organizations, the APU will make the studies required to develop an agricultural sector that is viable and sufficiently flexible to meet changing market conditions over relatively short periods of time. The proposed areas of activity believed to be important functions at this time are:

- a) production planning;
 - b) market assessment; and
 c) coordination
 - c) coordination of agricultural development programs.

The emphasis of future development strategy should be directed toward optimizing production in the light of market developments rather than merely maximizing production. Since the behavior of markets cannot be predicted with certainty, the major aim of development strategy should be to develop as much flexibility in farming systems as possible so that output can be optimized in relation to changing market and production conditions. The system of diversified farming developed by farmers is a flexible one which can be made more profitable than it is at present. In order to fully develop this potential, however, a whole-farm approach considering all the factors affecting farm profitability must be developed. The current extension approach, for example, has until very recently consisted of each agency promoting measures to increase the productivity of the individual crops and enterprises for which they are responsible. The impact of the development of one crop or enterprise on another, or the implication for the total profitability and management of a diversified farm must be given greater consideration.

A detailed knowledge must be developed concerning:

- (a) the market prospects for agricultural products of the Kabupaten;
- (b) the actual farming conditions in the Kabupaten; and
- (c) the constraints which limit the opportunities for increasing farm productivity.

This knowledge must then be analyzed and transformed into a coherent and implementable program of integrated farm development.

While an analysis of future markets cannot entirely eliminate uncertainty, the large volume of production in Kabupaten Luwu provides justification for continuous monitoring and analysis of market conditions. Impediments in the marketing system must also be assessed. The profitable marketing of the existing large volume of production and further increases expected will require assessment of impediments in local, national and international markets as

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well as the ramifications of national policy decisions concerning agriculture.

Production planning is another role of the APU. Achieving an increase in the productivity per labor unit and crop production of many farmers who cultivate small, scattered plots with a minimum investment in tools and equipment is not an easy task.

The heterogeneous nature of the farmers and farming areas will always make the extension service with a general message to all farmers through a line commodity approach less successful than it should be. The RECs have assessed to some degree the background of both the farmers and the farming areas before developing a program. They must now develop programs directed toward a whole-farm cropping package accompanied by intensive demonstrations.

Before the APU can undertake formulation of a production program, it must survey and classify the different farming systems found in the Kabupaten. From present limited knowledge these can very broadly be defined as:

- (a) systems where double cropping of rice predominates;
- (b) systems which have a mixture of sawah cropping and dry land cropping;
- (c) systems where dry land cropping predominates;
- (d) systems where livestock production predominates; and
- (e) systems where brackish water fisheries predominate.

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This will be a very broad classification based on existing data. Once more detailed information from a land use study is available, other systems and subsystems will probably be identified.

Once these assessments have been made they will be used to formulate a framework of the appropriate strategy for specific areas. Activities considered in the program will be coordinated extension, input supply, and marketing services programs. Possible radical restructuring of production conditions including land levelling, provision of irrigation, changes in cropping patterns; changes in the mix of livestock culture and/or other farm enterprises, drainage, or replanting of perennial crops, among other actions, will be considered.

It should be emphasized, however, that rice is expected to continue to be the most important food crop to the economy of Luwu for many years to come. Hectares of rice double cropped will increase as the irrigation systems are completed and farmers are trained to use irrigation. Because of increased double cropping, new land brought under cultivation, and increased yields due to improved farming practices, tons of rice produced are expected to double by the end of the plan period.

6.10.2. Ongoing Programs

The ongoing food crops enhancement programs of the Agriculture Food Crops Office - Province will continue to provide improved seeds and assistance in plant protection and soil conservation. Under the BIMAS program of food crop production enhancement, group training will be provided. BIMAS will also continue the special program in the

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transmigration villages. The activities include crop intensification programs, extension services and provision of packages of technical assistance.

At the Kabupaten level, the program to improve agricultural education through the SPMA will continue. Programs to provide better nutrition through promotion of the growth of vegetables, fruits and field crops will be undertaken. An office building is proposed to be constructed.

The livestock program proposed will concentrate on disease prevention and improvement in breed through provision of artificial insemination and breeding stock.

The estate crop program comprises projects to provide hybrid and local coconut seedlings, cocoa seedlings and coffee seed. These are proposed to be provided at minimal cost to growers. Seedlings to be provided total 36,000 hybrid coconut, 80,000 local coconut; and 280,000 cocoa as well as 100 kilograms of coffee seed.

The coffee seeds will be available the first year of the plan period. If the program is accepted by farmers, it will be continued.

The ongoing programs are in addition to the special programs which follow. All the programs, both the ongoing and special programs, must be coordinated by the APU. When data are sufficient, the whole farm approach must be emphasized.

6.10.3. Special programs

6.10.3.1. Agriculture Study

Agricultural planning requires the agricultural potential of the sawah areas be evaluated in detail. The reason sawah areas without irrigation are not cropped during the dry season must also be determined.

A study of all sawah areas is scheduled to begin the first year of the plan. It will determine the potential for mixed cropping, both with and without dry season irrigation. The results will provide:

- (a) an indication of the potential for increasing the effective land use particularly in areas where land is inadequate;
- (b) actions required to overcome impediments to cultivation of crops other than rice during dry season under both rainfed and irrigated conditions and/or crops of short ma⁺ ration grown after harvest of the first crc of rice and before transplanting the second
- (c) a measure of the possibilities for changing cropping patterns of irrigated areas should double cropping of rice become less profitable due to market conditions;
- (d) a measure of the rate at which rice cultivation should be expanded in relation to future markets should the possibilities for mixed cropping be limited;
- (e) a measure of what should be done to rehabilitate existing irrigated areas; and
- (f) a basis for evaluating the design of future irrigation development in North Luwu.

In view of possible changes in rice markets it is important to examine the assumption that irrigation development in North Luwu will continue to be based on double cropped rice. If rice cropping becomes less profitable, alternative cropping may have to be developed or the rate at which double cropping is expanded must be carefully controlled.

The "Master Plan" was based on the assumption that the North Luwu Plain was not particularly suited for growing non-rice crops. Some areas awaiting irrigation are at present being used for cultivation of such crops as maize and soybeans. This indicates there is a potential for other forms of cropping. The study will provide very useful baseline data upon which to plan future development.

An important element will be an examination of the possibility of introducing commercially viable farming systems in areas of new development. While the potential for increasing productivity on existing farms is limited somewhat by the small size of plots under irrigation and scattered nature of other cultivated plots, the possibilities of introducing a system to enlarge units under cultivation will be examined. The farmer would still own his land but would agree to having it cultivated cooperatively as part of a larger unit. Thus, more efficient use of water will be possible, problems of water control simplified, and the use of mechanization facilitated. contrary to existing practices, this should be considered as While a possible long-term innovation.

The study is urgent and must be carried out. At present little is known concerning trends in agriculture and whether present cropping systems are actually based on best land use. Uncontrolled opening up of land is still occurring and will continue as population increases. It is essential this natural expansion is guided in the right direction.

This study is regarded as an interim measure until data from a comprehensive land use and land capability study are available. Land use studies provide information concerning amounts of land available for agricultural development, and past damage to the watersheds because of uncontrolled expansion of farm land. A land use study is proposed in section 3.4.

6.10.3.2. Rural Extension Centers

The initial function of the Rural Extension Centers (REC) was to develop a system of coordinated extension services which included all agricultural sub-sectors. Their role has changed and they are beginning to be important contact and coordination centers in the field. Their future development should continue in this direction. The RECs will provide the Agricultural Planning Unit with a direct link to farmers through data collection, contacts with farm groups, and coordination of the various extension and support groups.

The REC program is not functioning properly due to organizational problems. Four RECs are under the administration of the Agricultural Agency for Education, Training and Extension. Four RECs have been set up under the control of the Agriculture Food Crops Office and are working independently of the REC sub-project. This duplication is not in the interest of coordinated Agricultural development since it perpetuates promotion of individual crops rather than development of a whole-farm approach. A major impact can only be achieved by RECs if they are focal points where a farmer can obtain a wide range of advice based on knowledge of his farming circumstances.

A condition for the success of the RECs is that they remain independent of line agencies. Training programs must be based on judgements of other actual field conditions during the plan period. It is therefore recommended that all the RECs be assigned to the Agricultural Agency for Education, Training and Extension. The other workers who deal with farmers, designated as the PPS, PPM, PPL and PPH, should become a part of the RECs. If this is not a practical move at this time, these personnel should be seconded to the RECs.

Personnel effectiveness has been hindered by frequent personnel shifts. This instability impedes the formation of permanent links with farmers by extension workers. At least one senior field extension officer should be stationed permanently at each REC along with sufficient junior staff to provide continuity of operations. If the centers are to function properly, staff must have a thorough knowledge of the area and the farmers who work in it.

The need for an immediate expansion of RECs is not necessary. Effort in the short term should be directed toward consolidating and improving existing operations. The REC function is to identify farm problems, suggest means to overcome them, and provide necessary training and support for effective implementation of improvements.

The existing programs of the RECs will continue during the plan period. The broadening of the extension role of

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the REC to the whole-farm approach including application of irrigation and management of water users' associations will require training of staff. Administrative staff also needs to be expanded to free key headquarters personnel to better monitor REC activities.

6.10.3.3. Research

The research program begun by the Maros Research Institute for Agriculture will have a bigger role after completion of the agricultural base study. Ways to introduce the recommendations of the study will have to be developed. Funds for this are allocated beginning in the third year of the plan.

6.10.3.4. Farm Cooperative Centers

The Farm Cooperative Centers (FCCs) will have a major and larger role in development by (1) assisting the APU identify marketing constraints, (2) suggesting how these can be overcome, and (3) providing improved inputs, processing, storage, handling and marketing facilities. The FCC sub-project, although still relatively small in its marketing and supply operations, is rapidly consolidating its position in this field and is providing effective services to its members. The continuing availability of these skills from an institutional organization will be an invaluable aid to agricultural planning and program implementation.

A high level management input has been a major Contributor to the success of the FCCs. This management input will continue under technical assistance for another Year. It is essential that strong centralized management Continues after this period. It is also important that the

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policy of training and maintaining middle management at the field level continues in order to promote further successful expansion.

Expansion of FCCs beyond the present four in operation is not contemplated. Existing facilities for processing and storage will have to be expanded in North Luwu. The facilities for the newly created FCC in the south will have to be developed to serve.perennial crop farmers. Increased marketing depot facilities will be required in Palopo and Bone Bone.

It is recommended that the FCCs as well as the RECs be the main means for promoting intensive livestock raising. At present farmers can obtain loans from BRI to undertake intensive production of pigs and exotic breeds of poultry. Feed packs are also being distributed to individual farmers under a BRI package program. For such enterprises to succeed, high levels of technical skills are required for proper construction of pens and sheds. RECs together with the Livestock Office can undertake this.

Good management is necessary to balance feed levels against live weight gain. Good butchering methods, weighing, and marketing facilities have to be provided to dispose of the carcasses profitably. The institution most capable of providing and developing these skills at the farm level is the FCC.

Mechanization must be introduced into the Kabupaten. Thus far programs to do this have had mixed results. The present approach of the FCCs is to slowly build up the necessary servicing facilities with a small fleet of minitractors. Deployment is undertaken after a careful survey of the areas requiring mechanization has been completed and an agreement has been reached with the farmers on the logistics and timing of deployment. The FCCs are now able to cultivate large areas without experiencing substantial downtime and it is recommended that any future increase in the provision of mechanization services be undertaken by the FCCs.

The FCCs should be financially self-sufficient after government investment in initial capital items. Capital items proposed are facilities to process and market shrimp produced as a result of a proposed hatchery. New cooperative faculities are also proposed to be constructed in Bone Bone, Mangkutana and Sabbang in 1985-1986 and 1986-1987.

Program	for	Table 6.3 Agricultural	Development
		-	Deveropment

		Budget	(Million Rupiah)					
	Agricultural Food Crops Office - Province	Source	1984–1985	1985–1986	1986–1987	1987–1988	1988–1989	Totai
. •	Supply of improved seeds and chemicals BIMAS assistance program BIMAS transmigration program Agriculture Food Crops Office - Kabupaten	APBN APBD-I APBN APBN	9 32 57 10	9 32 57 10	10 33 58 11	11 34 60 12	11 35 63 12	50 166 295 55
-78	Rural Extension Centers SPMA - Agricultural education Ehancement of fruit/vegetable production Enhancement of field crop production Construct office building ^a Frod crops totals state Crops Office - Area I - Luwu	APBN APED-II APBD-II APBD-II APBD-II	40 10 158	50 15 4 32 209	55 22 4 35 228	56 34 5 38 60 310	57 50 5 40 48 321	258 131 18 145 108 1,226
	Hybrid coconut expansion program Indigenous coconut expansion program Cocoa expansion program Coffee seed propogation program Estate crops total	APBN APBD-I APBD-I APBN APBD-II APBD-II	24 7 31	12	15	17	11	24 12 17 15 11 7
					<u>ل</u> ــ	17	11	86

		Budget Source	1984-1985	1985-1986	1986-1987	1987-1989	1000 1000	
	Livestock Office - Province					2307 1900	1988-1989	Total
	Supply of artificial insemination Medicine and guidance services	APBN APBD-I	46 4	56 5	67 6	80	93	342
	Livestock Office - Kabupaten				-	0	8	29
	Animal disease prevention Rabies prevention Livestock quality enhancement Training and education Livestock total	APBD-II APBD-II APBD-II APBD-II	3 2 3 3 61	3 3 4 4 75	4 3 4 4	5 3 4 4	5 4 5 4	19 15 20 19
]	Rural Extension Centers		•		00	TOT	119	444
- 70	Ongoing program Staff training Additional administrative staff Whole-farm training for specialists	APBN APBN APBN 3 APBN	74 23 22 10	74 23 22	74 23 22	74 23 22	74 23 22	370 115 110
E	BAPPEDA Planning Office			5	12	5	5	37
	Agricultural base study Agricultural research	APBN APBN	150	230	50			430
F	arm Cooperative Centers Other programs total	APBN	80		20 250	20	20	60
	Total		צכנ	354	451	144	144	330 1,452
			609	650	782	572	595	3.208
	2	•						

^ato be undertaken as budgetary constraints permit.

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7. Fish Resources and Fishing Industry

7.1. Present Conditions

7.1.1. Fish Resources

There are five sources of fish in Kabupaten Luwu. These are fish ponds, rice fields, brackish water, the rivers and the sea. While the extent of the areas of these is known, little information is available concerning the potential fish resources from them.

7.1.2. Exploitation of Fishing Resources

The fish harvest in 1982 in Kabupaten Luwu totalled 21 thousand tons. The bulk or four-fifths of the tonnage caught is salt water fish from the Bay of Bone.

Wara's harvest from the Bay accounts for almost half of the total from that source. Other important Kecamatans in terms of tonnage of fish caught from the Bay are Malili, Larompong, Wotu and Bupon. These Kecamatans have the requisites for a primitive sea fishing industry, i.e., harbor and market.

7.1.3. Markets

7.1.3.1. Salt Water Fish

The market for the fish in excess of local needs from the southern Kecamatans of Larompong and Suli is Kabupaten Wajo to the South. The northern Kecamatans of Wotu, Bone Bone and Malili have an additional market in the Soroako mining population. Bupon and Bajo market in Wara while Malangke markets in both Soroako and Wara. Some fish is also exported from Wara to Kabupaten Tana Toraja and to Soroako.

Marketing arrangements are primitive. There is usually a middleman who purchases fish from the fisherman. Reportedly these people, who number 20 at Palopo, act as moneylenders to the fisherman. Thus they can exercise leverage on the fisherman in terms of a lower purchase price for the catch.

The fisherman have no other occupation and try to catch as many fish as possible. If the price is low, they try to catch more in order to enhance their income.

The Fisheries Office once maintained a cold storage facility (which also sold ice) at Palopo for use by fishermen who, because of price considerations, may have wanted to hold one day's catch for later sale and for middlemen who assembled fish to fill orders for Soroako or occasionally Ujung Pandang. This facility of the toos capacity is at present inoperative. The facility will have to be improved and expanded if the fish harvest increases.

At the government's encouragement, a marketing cooperative was started in the spring of 1982.

7.1.3.2. Cultured Fish and Prawns

Prices for prawns increased very substantially between 1978 and 1979, declined in 1980, and rose rapidly again by 1983. The strength of price stems from the export market which continues to grow with production failing to respond significantly. This inelasticity is largely because of

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airriculties experienced by farmer. In constructing and maintaining ponds and limitations in the supply of fry. There is a large market potential for significant increases in prawn production in the Kabupaten, particularly for export to Japan. The difficulties of supplying fry and constructing and managing ponds properly will, however, have to be overcome. Marketing is handled by private traders who pack the prawns in ice for dispatch to cold storage in Ujung Pandang. Marketing arrangements will also have to be

A rapidly rising demand for cultivated fish was experienced between 1975 and 1980. Prices in constant terms rose by 91 percent during this period while reported production remained static.

Cultured fish cultivation suffers from similar production limitations as prawn cultivation. There are also marketing constraints. This is because cultured fish are harvested twice a year. Because of a lack of cold storage facilities, production has to be disposed of to local markets over a short period depressing the price to the producer. Adequate storage facilities will be essential if production is to be expanded.

Despite these limitations it appears that cultured fish production in Luwu is now responding to strong market demand. According to figures from the Fisheries Office the area of fresh and brackish water fish ponds rose from 8,710 hectares in 1980 to 9,298 hectares in 1981 and production from 2,668 tons to 4,432 tons.

7.1.4. Government Assistance

The government program to increase production from the Bay of Bone consists of extending credit to buy equipment, providing training and making improvements in marketing. All of these are being done through cooperatives which are established with governmental guidance. The program began in February 1982.

The Fisheries Office also assists in fish farming. It has hatcheries at Kecamatans Mangkutana, Bone Bone, Wara, Bajo and three in Walenrang. Operators can purchase fry at subsidized prices. Training programs are in progress and fish pond demonstrations have been expanded.

As part of its fishing program the government maintains some controls over the industry. Licenses are required when certain types of equipment are used. It has been the practice not to issue licenses to fishermen who wish to use trawls in the Bay of Bone.

7.2. Proposed Program

Programs proposed for implementation during the plan period cover both those relating to salt water and cultured fishing. While most of the individual programs relate to fish farming, the greater expenditure is proposed to assist the fishermen who harvest fish from the Bay of Bone. Training is proposed for both groups.

A fish harbor comprising auction house, cold storage and workshop for fishermen is proposed at Palopo. This will be adjacent to the existing harbor facilities. Auction of fish should permit the fisherman to secure a better return from their catch. The present cold storage facility at Palopo is inoperative and will be rehabilitated under the plan. A meeting hall to conduct training and other extension activities is also proposed for Palopo. The harbor and ancillary facilities will cost Rp 350 million.

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Demonstration ponds in five kecamatans will be rehabilitated. One demonstration pond is located in each of the Kecamatans of Mangkutana, Bone Bone, Wara and Bajo. Three are located in Kecamatan Walenrang.

Canals to convey water from the Bay of Bone to 1,071 hectares of brackish water fish ponds including three fish ponds now in operation will be constructed to be jointly operated by groups of individuals. About 3,000 operators will be benefitted. The following Kecamatans will be affected:

Malangke Wotu	
Walenrang	184 best
Wara	156 hectares
Dun	176 hectares and
Bupon Sul:	91 hectares
Part	128 hectares
Total	160 hectares
	1,071 hectara
Three	

Three brackish water demonstration ponds are proposed. One each of 2.5 hectares, will be constructed in Kecamatans Wotu, Malangke, and Suli.

Production facilities for shrimp and bandeng fry will be provided in four kecamatans. Units of 2.5 hectares will be built in Kecamatans Malangke, Walenrang, Wara and Larompong. A running fresh water demonstration pond is proposed for Kecamatan Mangkutana. A building to house workers supervising a fry hatchery is proposed in Kecamatan Bajo.

The training courses will be provided for both fishermen plying the Bay of Bone and extension workers in fish farming. This training will cost Rp 19 million.

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Table 7.1

Program for Fishing Industry

	Budget	(Million	Rupiah)				
Fisheries Office Kabupaten	Sources	1984-1 995	1985-1986	1986-1987	1987-1988	1099 1000	· . · ·
Fish harbor, auction facilities new cold storage and workshop at F						1900–1988	Total.
Rehabilite cold storage/ice	APBN			350			
Rehabilite fry production	APBD-II	3					350
ponds in five kecamatans	APBD-II	2					3
Construct canals to 1,071 hectares of brackish upter and							2
Construct brackish water ponds tion ponds in Kecamatans Wotu, Malangke, and Suli	APBN 1-	5	10	13	6		34
Facilities to produce shrimp and bandang fry in Kecamatans Malangke, Walenrang, Wara, and	APBN			9	9	10	28
Construct running fresh water pond Kecamatan Mangkutana	APBN	8		8	9	20	45
House for watchman at fry	APBD-I				C	20	45
Meeting hall for training, Palopo	APBD-I	2			0	б	12
Training courses for fishermen and fish pond farmers Rehabilitate office building, Palopo	APBD-II APBD-II APBD-II APBD-II	6 6 1 2	2 1	2 2	2	2	2 6 9
	APBD-II	1				3	10
Total		36	13	204			1
			~~	384	34	41	508

8. Watershed Management and Forestry

8.1. Present Conditions

A large part of Kabupaten Luwu is under forest cover. The Forestries Office estimates forested areas comprise 1.3 million hectares or almost three-fourths of the area of the Kabupaten. Most of the forested area is government-owned and controlled.

Much of the forest contains a variety of species including hardwoods and softwoods. These consist of ebony, mangrove, rattan and mixed timber. An overall survey of the forests has not been made. Thus there is no good inventory of the forest resources. Based upon observation, however, the majority of the mixed timber resources are not considered to be of particularly high quality.

Nearly all the forests, with the exception of the coastal mangroves and river bank growths of rattan are in the upland area. There are three forest concessions now operated by private companies with licenses to harvest timber on about 660,000 hectares. Two of these concessionaires are active on an area of about 173,000 hectares.

There have been no aerial surveys made of forest reserves which are publicly available. Without a survey and inventory, little can be said about the overall value of forest resources in Kabupaten Luwu except that they cover an extensive area and have significant potential.

8.1.1. Forest Management

The Ministry of Forestry, with provincial offices in ^{Ujung} Pandang and a local office and staff in Palopo, is

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directly responsible for managing the forested areas of the Kabupaten. Under present regulations all exploitation of forest resources is supposed to be done under license issued by the Forestries Office.

There are several specific regulations which apply to the harvest of forest products. These regulations include a ban on harvesting in critical areas and limits on the amount and size of logs harvested. Limits of log size specify that certain varieties of trees must reach a specified size before they are cut. For example, in the case of hardwood logs such as ebony and terminalia gigantea, only trees with a trunk diameter of 60 centimeters or more can legally be cut. At the present time, harvesting mangrove is prohibited except when clearing for a fish pond. Certain areas in Nuha and Malili are closed to the harvesting of rattan.

The implementation of these regulations and the control of the exploitation of forest resources are difficult because of the very large area of forest in the Kabupaten and the small forestry staff available to police activity. The large concessions are not too difficult to control because restrictions can be built into the licenses. There is an extensive amount of "informal" harvesting of timber, however, by individuals for firewood and lumber. It appears to be common practice for farmers and others, during idle Periods when no income is available, to cut wood for sale from the public forest. This has led to some clearing of steep slopes and areas which, with good forest management, should have been kept under forest cover.

The Forestries Office also plays a major role in reforestation of disturbed areas. This is a national program to restore the nation's watersheds through

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reforestation and implementation of soil conservation measures and is termed the National Regreening Program (P3RPDAS). Responsibility for this was formerly under the Ministry of Agriculture, through the Director General for Forestry. It is now in the newly formed Ministry of Forestry. Within the Ministry there is a Directorate of Reforestation and Land Rehabilitation, a Directorate of Soil Conservation and a Directorate of Regreening and Shifting Cultivation Control. All can have a strong future influence on watershed management activities.

In Kabupaten Luwu the regreening effort is primarily aimed at reforestation on steep slopes. In 1980, 1981 and 1982, 510 hectares were replanted with pine and lantoro in Kecamatan Bastem. In 1982-1983, 440 hectares were reforested in Limbong.

There is also a plan to reforest about 4,500 hectares in the steeply sloped area adjacent to the North Luwu irrigation projects. These slopes, located near the transmigrant villages were seriously damaged by cutting and clearing before controls were put in force. Reforestation in that area is expected to cost about Rp 500 million over a five year period.

8.1.1.1. Management Plan

The Forestries Office has prepared a management plan for the forest in all of Luwu. This plan divides the forest into five categories as follows:

 Absolutely protected for ecology, wildlife and preservation purposes

173,750 hectares

 Protected for watershed management
 611,875 hectares

- 3. Limited production forest 381,564 hectares
- 4. Regular production forest 36,875 hectares
- 5. Forest which can be converted to agriculture 121,250 hectares

The stated purpose of the plan is to protect the watersheds so that the water resources are available in the proper quality, quantity and distribution for the important downstream uses. The only upland forested areas that now would be cleared for agriculture under the plan are:

- a small area in Bastem in the upper watershed of the Peremang River;
- a high, flat valley in upper Limbong in the watershed of the Betuwe River, which flows northwest out of Kabupaten Luwu;
- c. a high flat valley in upper Masamba which drains into Sulawesi Tengah; and
- d. an area of high valley in upper Mangkutana in the farthest reaches of the Kaleana watershed.

All the other existing forest would remain as permanent forest. Although it is not clear at present what the ultimate use of the "regular production" forest would be, forest areas defined as "absolutely protected for ecology, wildlife and preservation purposes" and "protected for watershed management" would not be subject to exploitation at any level. "Limited production forest" would be harvested at a rate not to exceed 30 cubic meters per hectare per year which is apparently the estimated sustained yield capability.

Under the plan, all people living in the protected forest areas would be relocated, given a house, land and a months supply of food. Relocation would cost up to Rp 3 fillion per family. There are an estimated 2,060 families Now residing in those areas. This relocation program comprises a large part of the Luwu Forestries Office budget for the 5 year planning period, and continuing for 3 years at an estimated cost of over 6,000 million rupians.

The forest management plan prepared by the Forestries Office and now under review in Jakarta is an ambitious plan. If implemented it will essentially prevent development in most of the Kabupaten's watersheds and keep all the high elevation land under forest cover. From an environmental and ecological point of view it appears to be a superior plan. It would guarantee that the rivers and streams would be maintained in their present condition. And, coupled with the reforestation efforts now under way and planned, in the long run it could lead to improved water resources.

The Forestry plan may be too restrictive. More productive use can be made of many of the upland areas without damaging the water resources or the soils of the area. New agricultural packages, tree crops, for example, in combination with permanent cover, useful as forage, could mean more productive use of the hilly areas <u>if done</u> <u>properly</u>. Not enough attention or serious consideration has been given to such alternatives. That attention will not be forthcoming in any systematic manner until a coordinated planning framework is in place and functioning.

Much of the privately held land is in small agricultural plots. Most small farmers do not have the technical knowledge or the financial resources to do a proper soil conservation job. Agriculture, through its Rural Extension Centers and the Estate Crops extension workers, can play a

very important role in teaching these farmers the reasons for and methods of soil conservation. started this on a limited scale. The REC program has materials such as films and slide shows, etc., to convey the proper message concerning conservation.

The use of large scale estate development in specific areas poses fewer problems. Organizations which develop large areas have more and better technical knowledge and resources with which to assure proper initial preparation of the land and appropriate conservation and cultivation practices. The use of the "nucleus estate" concept, where a portion of the land is turned over to smallholders when production begins, also has a potential role in upland development. The crops raised in these enterprises are usually perennial which can be grown with permanent cover to prevent serious erosion.

The Estate Crops Office has indicated that several large companies are ready to develop estates in the higher lands of Bastem and Limbong if and when an access road is provided. These higher elevations are well suited to coffee and tea and other profitable crops requiring similar climatic conditions. These potential productive activities should not be overlooked in the watershed planning approach. 8.1.2. Planning Data

Data on soil capability, land use, and forest inventories are lacking for much of the Kabupaten. A good program of aerial photography, coupled with ground and soil surveys will substantially improve the data base upon which realistic plans can be established.

8.1.2.1. Technical Information

Most of the agricultural research for Luwu has concentrated on food crop production in the irrigated lands. There is a need for a systematic evaluation of technical agricultural options suitable for use on the steep and mountainous land of Luwu. Information is needed on the various crop combinations suitable for the existing soils and different agro-climatic zones at the various elevations. There also is a need for improved guidelines in terms of limits to cultivation on various slopes. Some general rules are available now which can guide the early development. More must be done to determine what the safe limits of cultivation are, and what practices should be followed to prevent serious erosion on steep lands.

Present policy discourages annual crops on slopes over 5 degrees or, with terracing or grass contour strips, on slopes up to 7 degrees. Perennial crops can be planted on slopes up to 15 degrees with some commercial estates being permitted to plant on slopes up to 40 legrees in areas with appropriate slope length and soil texture. Previous experience and observations in other regions indicate that there are technical agricultural packages which will allow good use of steeper land without seriously endangering the soil or water resources. This needs further study considering conditions in Kabupaten Luwu.

Another area about which little is known is the hydrologic behavior of the watershed system when the land

Over half of the land of Luwu, outside of the Coastal plain is over 1,000 meters in elevation. create very different climates and very different practical cropping patterns than the coastal plains and lowlands.

cover is modified. It is obvious that clearing slopes without proper precautions causes massive erosion and exacerbates flooding and drought conditions. The net effect on the water resources of changing from a forest eccsystem to an oil palm plantation or a grass-tree-fruit combination for example, is not clear. In a watershed where the river flows are already marginal for downstream users it is important to know these effects before proceeding with development in the upper watershed. This matter needs further study.

8.1.3. Laws and Regulations

The existing laws and statutory authorizations appear to be reasonably adequate for watershed management on public lands. They reflect an awareness of the importance of the watersheds. One area where there are now weaknesses is in environmental control. The general law specifying the need for environmental concern and establishment of a case for the environmental assessment of potentially damaging projects is now in place. Under the present law, however, this responsibility is placed at the local or Kabupaten level where technical resources are extremely limited.

Means to require and enforce good conservation management on private land are not within the present legal framework. Therefore, without legislative change, good practices must be effected through extension, education, and personal persuasion.

8.1.4. Results of Continued Present Trends

If current practices and trends in land use continue, there will be increasing small scale but damaging clearing

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of the steep hills, especially in areas accessible by road. Most of the clearing will be done without proper conservation methods such as terracing, contour strips or permanent cover. Erosion will continue and the small watershed areas of North Luwu will be susceptible to severe modification. The rivers will carry increasing silt loads and over time, the river flows will change.

The high forest land now in government ownership will be reasonably well protected for the next few years especially if the plan for conservation proposed by Forestry is implemented. However, with increasing population in the Kabupaten and increasing economic activity, there will be growing pressures to harvest more timber from the steep lands as well as to clear and plant to provide a living for the people. Forestry now has problems enforcing limits on cutting. The population pressure will be very difficult to resist. Problems will very likely be compounded as development pressures increase.

As the development continues, roads will be improved, making the now remote Kecamatans of Bastem, Limbong and others in the watersheds more accessible. The problems of protecting the high steep lands will then be exacerbated.

Generally, while conditions in the watershed of Kebupaten Luwu are now comparatively good, without a reasonably well balanced management program that reflects the future needs of the people for a healthy economy and a healthy environment, watershed conditions must inevitably deteriorate.

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8.1.5. Options for Watershed Management

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There are different ways in which the watersheds of Kabupaten Luwu can be managed. These can be classified as degrees, or intensities of management.

On one extreme there is the option of "no action" at all. In this case nature and man take their chosen courses with respect to what is done with the resources of the watershed without regulation or control. In the short run this is the easiest and least expensive option to implement. It is often the one chosen because it offers the maximum short-term exploitation potential.

On the other extreme there is a "total preservation" alternative. Under this option any and all activities which might alter the environmental conditions of the watershed are prohibited. While difficult to enforce, the costs of implementation of this option are relatively low because studies, surveys, or judgements concerning how resources

From a short-term economic point of view the "total preservation" alternative has little appeal as there would be no resource exploitation. In some cases this is chosen as the preferable option, however, because society may wish to preserve 1) limited or unique areas with special attributes or 2) an area until better data are available for management decisions.

Within these two extremes there is a continuum of Options which provide different levels of exploitation and Preservation. Just what constitutes an optimum point between them is a policy decision. The conscious selection

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and implementation of a management option that seeks to provide this optimum is difficult to obtain and requires good data and reasonable knowledge bases.

While the most expensive to implement, the balanced plan in the long term serves the people well, helping them to meet their economic needs and maintain a good natural resources base and environment for sustained development. This is the option recommended for watershed management in Kabupaten Luwu.

8.1.6. Data for Planning

In addition to the forest inventory previously suggested there is also a need to develop good data on soil capability, land use and watershed conditions and river conditions.

A program of aerial survey and land use mapping should be undertaken. It will take time and will be costly. It is essential to planning in both the agricultural sector and the forestry sector as well as the overall planning effort. The information will be of use to many organizations engaged in work in the Kabupaten in the future.

A soil capability survey should also be carried out. Some data now exist for watershed areas of South Luwu. If these data are reliable and sufficient then the major survey effort should focus on the watersheds of North Luwu.

8.2. Proposed Program

The recommendations for managing the watersheds and forests of Kabupaten Luwu are in two general categories.

One deals with the establishment of the institutional framework for planning and management while the other category deals with specific items which should be underway now, or initiated under existing authorizations and within the scope of activities of existing agencies.

8.2.1. Institutional Framework

A Watershed Management Unit (WMU) should be set up in the BAPPEDA Planning Office. The WMU would be responsible for developing and coordinating the implementatation of a plan for the protection and long-term development of the watershed areas in Kabupaten Luwu in balance with the overall development program and objectives of the Kabupaten.

8.2.2. Long Term Plan

The WMU would develop the overall watershed management plan within a five year period. The planning period is governed to a large extent by the need to acquire data and conduct research. Following completion, approval and adoption of the plan, the level of staffing and activity within the WMU may be reduced. The individual members of the planning team who will be assisted by personnel from the operating agencies should, after detailed planning, concentrate on the implementation of those parts of the plan relevant to their own agencies. It is essential, however, that the WMU continue to exist as a permanent base for watershed management. It would be responsible for coordinating the parts of implementation, act as a catalyst as necessary when and if progress in implementation slows down, monitor and report on the status of the implementation program in all the agencies and, over time, adjust plan elements if conditions change within the Kabupaten.

9.2.3. Near Term Recommendations

As an adjunct to the main planning process the WMU should immediately begin the task of coordinating, monitoring, and enhancing watershed management that is now underway or should be underway to prevent further deterioration of watershed conditions. Each relevant agency program should be rev ewed in detail, and evaluated with respect to its relationship to other activities and the overall needs in watershed management. Assistance should be provided to expedite those activities which are needed. The following items should be given attention in the near term.

8.2.3.1. Forestry Related Activity

The area designated for park and wildlife use in Northwest Nuha by the Department of Forestry should be officially set aside as a preserve. The contempleted plan to relocate families now living in the areas designated as protected forest, however should be delayed until the WMU has a more balanced program for managing the watersheds. The forest management plan should be considered a holding action for the near term, subject to modification on the basis of additional data and analyses.

The Forestries Office should strengthen its enforcement capability by adding additional forest police to control illegal harvesting of timber and clearing of steep slopes. Where such harvesting provides the only essential income to people, such as farmers between cropping seasons, the Forestries Office should consider setting up a program, such as a Conservation Corps to provide short-term employment in forest management labor as a substitute source of income to these people. The Forestries Office should also undertake a forest survey to provide a good data base concerning forest resources. Areas for survey should be selected on a priority basis in coordination with WMU needs.

Stream bank protection should be enforced and reforestation of improperly cleared slopes should be continued. The plan for reforesting 4,500 hectares in North Luwu should be implemented in 1984-1985.

The Forestries Office should cooperate with the Ministry of Agriculture in identification and evaluation of alternative tree and crop combinations which may be suitable for steep slopes and high elevations.

Finally, the Forestries Office should assign a professional forester to the WMU as a permanent staff member.

8.2.4. Environmental Management Activity

The activity of the Office of Environment should be expanded at the Kabupaten level. A staff member knowledgeable in environmental assessment procedures should be assigned to the WMU in the BAPPEDA Planning Office. This officer should be able to provide technical assistance as necessary.

All new proposed major developments in the watersheds, or river systems, should be subjected to an environmental assessment which can be multi-stage. An initial screening should be done by the local staff. In most cases this will indicate that there will be no serious, long lasting iffects, in which case the assessment ceases. Should the
indications be that serious effects may occur, a more detailed assessment should be done with assistance from the provincial level, or with experts in relevant fields.

As a starting point there should be an initial screening of the proposed palm oil mill on the Bungadidi River. Palm oil mills are generally heavy water users and notorious polluters. If the waste sludge is returned to the river without adequate treatment, downstream users will be faced with serious problems. This matter and similar ones must be carefully monitored by he Watershed Management Unit in the BAPPEDA Planning Office.

As a second task the environmental officer should review the plans and earlier studies related to the potential copper mine and associated developments in the upper Lamasi River.

8.3. Proposed Program

The principal project is for reforestation and forest protection. Within the total project which will amount to almost Rp 7.4 billion, 37,000 hectares of forest area will be replanted. This will require construction of 17 workhouses and 75 kilometers of forest road. A nursery of approximately 165 hectares will also be developed. In addition, 100 kilometers of road to be used in fire prevention activities will also be constructed.

A second project to purchase, operate and maintain 41 vehicles to be used in the forestry work will cost Rp 100 million over the period.

A new forestry administration office (KPH) in Palopo and five forestry suboffices (BKPH) and 15 forestry police offices (KPPH) and equipment are proposed. All or part should be undertaken to the extent budgetary constraints permit. They are therefore shown in the accompanying table as an optional project. Thus, the BAPPEDA Planning Office should review with the agency personnel the preparation of each year's proposed program to determine priorities at that time.

At the present time there are little or no data concerning forestry resources. These data are necessary not only for forestry management purposes but also for rational utilization of forestry resources. A survey is therefore proposed in the last three years of the plan. Thus, its planning and extent can be ascertained after the aerial survey has been done (section 3.4). This is a matter which also must be coordinated and planned by the WMU in the BAPPEDA Planning Office.

Table 8.1

	in the folestly							
,	Budget Source	(Millic 1984 1985	on Rupia 1985 1986	ah) 1986 1987	1987 1988	1988 1989	Total	
estries Office - Papaten forestation							IOLAI	
chase/operation	Inpres	830	1,250	1,580	1,805	1,930	7,395	
^{or} vehicles ^{restry} inventory	APBN	12	18	20	25	25	100	
lice	APBN			250	250	250	750	
°uildings ^a ∴	APBN	75	100	125	135	175		
Total		917	1,368	1,975	2,215	2,380	8,855	

Program for Watershed Management and Forestry

^ato be undertaken as budgetary constraints permit.

9. Manufacturing and Mining

9.1. Character of Manufacturing

The structure of industry in Kabupaten Luwu at present is characteristic of the first stage of development with concentration on food processing based on locally available farm products, exploitation of forest resources, and fabrication of building materials. The reasons for this pattern are the great distance to urban markets, the basically rural nature of the area, and the accompanying low level of urbanization.

The only large scale manufacturing industry in Kabupaten Luwu at present is a plywood factory with 586 employees in Kecamatan Bupon and the nickel mine and smelter in Kecamatan Nuha. All other manufacturing is carried out with fewer than 10 employees usually without mechanization. Many of the enterprises would be characterized as cottage industry or artisan-type activity rather than small or small-scale industry. The small industry sector in Luwu is, however, experiencing rapid growth.

The wood and wood products industry predominates accounting for 84 percent of industrial output. All sectors are experiencing rapid growth, especially wood products and building materials. The industrial sector in Luwu is still small, however, in absolute terms. Shown in table 9.1 is information concerning industries licensed by the Department of Industry.

There are roughly 6000 industrial employees in Luwu at present. Total industrial employment may be approximated by adding an estimated 500 workers in unlicensed firms and rice

Table 9.1

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Employment and Value of Production of Industries in 1982-1983

ISIC Jode	Type of Industry	Number of Enterprises	Number of Employees	Value of Production
				(Rp million)
31	Food/Beverages	42	214	33.7
31122 31171 31179	Ice Confections Noodles Manufacturing Bakeries	12 3	81 36	3.6
31210 31230 31290	Sago Flour Ice Making	1 20 5	5 66 24	1.5 15.2
11290	Egg/Peanut Confections	1	2	n.a.
32	Textiles/Clothing	11	34	7.9
32210 32400	Tailoring Shoemaking	10 1	29 5	6.2 1.7
3	Wood Products	107	1,407	1,568.3
3111 3140 3190 50	Sawmills Wood Handicrafts Rattan Furniture	73 8 2	650 47 7	1,000.0 16.6 0.6
3210 3113	Wood Furniture Plywood	23 1	98 605	52.5 498.6
	Paper/Paper Products	6	26	14.4
3200	Printing	6	26	1.4.4
.:	Chemical Products	1	4	10 5
5140	Citronella Oil	l	4	10.5
	Non-Metallic Mineral Products	81	533	10.5
10	Ceramics	,	_	110.7
:330 :410	Bricks Poof miles	Ŧ	5	4.9
	and Lime	76	510	90.2

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Code	Type of Industry	Number of Enterprises	Number of Employees	Value of Production
36320 36320	Concrete Floor Tiles Concrete Blocks	2	10	(Rp million)
38	Metal Products	2	8	2.0
38111	Small Agricult	21	94	94.6
	Miscellaneous Metal Products	ols,		
381.20	Metal Furniture	18	82	92.3
39	Other Manufacturing	25	12	2.3
39010	Jewelry	25	54	43.0
	- Notal	25	54	43.0
		294	2,366	1,883.0

n.a. not available

TOTO

mills and 3,125 employees at the nickel mine and smelting operation to the 2,366 employees shown in table 9.1. Of this number, 3720 or about 62 percent are employed by two large-scale enterprises, plywood and nickel mining. These are full-time employees. An undetermined portion of the remainder are farmers who work during the off-season and return to the rice fields at planting and harvest times. This is especially true of the cottage industry category. The 6,000 total workers represent only 1.8 percent of the labor force (male and female above 10 years of age) based on 1980 census data.

Output of the enterprises listed in table 9.1 totals Rp 1,883 million or Rp 796 thousand per worker. Excluding the plywood factory, which has a fairly high degree of mechanization, and sawmilling of which most of the output is mechanized, output per worker drops to Rp 346 thousand per year. As this is not for above the Rp 250 thousand to Rp 300 thousand a worker might receive in wages, it is clear that most industry in Luwu is highly labor intensive.

Manufacturing is concentrated in the more populated arcas along the highway. In general, it is located along the main highway and, with the exception of Palopo, is fairly evenly distributed. There are four main areas of activity:

- an area centered in Palopo and including Walenrang to the north and Bupon to the South;
- an area along the highway in Kecamatan Bone Bone and to a lesser extent in Kecamatan Masamba;
- a small area at Wotu; and
- the Malili-Soroako area, which derives its activity from the nickel mine.

Excluding the plywood factory in Kecamatan Bupon and the nickel smelter in Kecamatan Nuha, 68 percent of output is derived from the Palopo area. The concentration in Palopo is due to its location as Kabupaten administrative center and the high proportion of government workers. This urbanization is complemented by good transportation links to other parts of South Sulawesi, especially Ujung Pandang, and to a lesser degree, by its harbor. These transport facilities, and the urban markets, have attracted small industry together with the necessary manpower.

9.2. Exports

Exports from Luwu are exclusively agricultural or natural resource related and many of them are raw or unprocessed.

Unprocessed Goods Processed Goods Maize Rice and Rice Bran Soybeans Sago Starch Mung Beans Copra Coconuts Dried Animal Skins Fish and Shrimp Lumber Cloves Plywood Fruit (Durian, Bananas) Atap Roofing Duck Eggs Bricks Live Animals (mainly Buffalo) Charcoal Tobacco Nickel Matte Timber (Logs) Citronella Oil Ebony Resin Rattan

Of the processed goods, nickel matte, plywood, lumber, rice, and citronella oil are the only ones produced on an industrial scale, i.e., with laborsaving machinery. All others, including sago starch, animal skins, atap roofing, bricks, charcoal and copra are more properly regarded as artisan-scale activities. They generally employ fewer than Five persons and have no machinery (except for the grating of sago).

The Tana Toraja area receives fish. coconuts, sago starch, lumber, and live buffalo from Luwu. Nickel matte is exported from a lighterage port at Malili. Most of the remaining items go to Ujung Pandang. The following are known to be exported from Indonesia: rattan, ebony wood, timber, plywood and copra. A few, such as citronella oil and cloves, go to other parts of Indonesia.

An examination of the list of unprocessed goods exported from Luwu suggests several opportunities for further local processing of raw materials. These might include rattan, timber, ebony wood, coconuts and soybeans. Timber exports in the form of logs will in fact cease after 1985 according to government regulations. Lumber exports are also supposed to cease. These changes should stimulate local processing into various wood products. Further processing of such goods as copra into oil, animal skins into leather, and higher quality sago starch also appear possible.

Opportunities to create import substitution industries based on the above generalized list appear limited at present. The only apparent exception is the floor tile industry. Growth of this industry should result in the cessation of imports of this type of product. Demand for wearing apparel is not likely to be high enough to justify economical local production.

With population growth it may eventually prove feasible to bottle soft drinks locally but it is doubtful that this would occur within the coming five year plan period.

9.3 Potential Mineral Development

There are a number of known mineral deposits in the Kabupaten. Most of these appear to be uneconomic for exploitation.

The copper-zinc-lead deposits located in Kabupaten Luwu and nearby Kabupaten Tana Toraja, however, may be economically viable. Exploration to determine the extent of the deposits is nearing completion. The next phase in the exploitation process is to determine if mining is economically justified. If these deposits are mined the effects on Palopo will be significant. The port facilities will require augmentation. A road from the mining operation to Palopo will be required or the existing one improved. These represent project costs of the mining facility and should be borne by it. In any event, it is unlikely that they would be required before the end of the plan period. Therefore, no action to develop infrastructure for this purpose is proposed at this time.

9.4. Government Support Programs

A great diversity of government programs exists to aid industry in Indonesia. Many of these are aimed at small and household industry in furtherance of government policies to increase employment and output.

9.4.1. Credit

The Indonesian government has an elaborate credit system for small industry administered by the Bank Indonesia through commercial and development banks. Two programs begun in December 1973, Kredit Investasi Kecii (KIK) and Kredit Modal Kerja Permanen (KMPK) offer medium term credits for investment and for working capital respectively to small enterprises in agriculture, livestock, fishing, trade, communication, and industry sectors. An enterprise is eligible if its net worth does not exceed Rp 100 million and its ownership is at least 75 percent Indonesian.

Terms are as follows:

	KIK	КМКР
Maximum Loan Amount	Rp 10 million	Rp 10 million
With Supplementary Amount	Rp 15 million	Rp 15 million
Interest Rate	10.5 percent	12 percent
Maximum Duration	l0 years	3 years (extendable for 3 years)
Maximum Grace Period	4 years	overdraft facility
Collateral	Assets financed by Additional collater percent of loan, in	loan. ral up to 50 f available.

As of 1981, the program was operating in nine provinces. Due to the size limitations of the loans, most applicants tend to be in the small industry category or an organization with 5 to 19 employees as defined by the Department of Industry.

Small manufacturing industry receives a relatively small portion of these loans. The largest share goes to trade. This is particularly true for South Sulawesi where only 9 percent of the KIK loans and 10 percent of KMKP loans were for industry as of June 1980. This was the lowest of any province in the program. This reflects in part a low level of indu crialization in South Sulawesi, but could also be related +, differing policies of handling banks and the readiness of businessmen to avail themselves of lending facilities.

Outstanding loans to borrowers in Kabupaten Luwu have increased as follows over the past 15 months:

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		KIK	Million Rup: KMKP	iah Total
December	1981	1,658	2,264	3,922
December	1982	2,092	3,983	6,075
March	1983	2,368	4,563	6,931

As of January 1983, loans to industry in Luwu represented 8.4 percent of all KIK loans and 7.8 percent of KMKP loans--lower than the average for all South Sulawesi.

In support of the KIK/KMKP program, Bank Indonesia has a World Bank supported program of technical assistance to participating banks known as the Small Enterprise Development Project. Regional Project Management Units staffed by expatriate and Indonesian consultants are located in bank branches in 12 provinces. Functions of these units are to provide on-the-job training to the staff of participating banks while carrying out project identification studies and pilot projects. These studies are made available to the banks for use as they see fit in support of lending programs. The units have other monitoring and training functions as well. The program also receives support from the Australian government.

The KIK/KMKP program has grown steadily since its inception. The program, however, is currently facing two problems, i.e., a reduced repayment rate and decreasing funding levels. Accordingly, participating banks have been instructed to be more discriminating in making loan approvals. It can be expected that the rate of loan approvals will decrease in the future.

The Palopo branches of the Bank Rakyat Indonesia (BRI) and the Bank Negara Indonesia 46 (BNI-46) are making loans under the KIK/KMKP program. Loans were made to 89 customers by the BRI at an average of about Rp 2 million per loan.

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Loans were for manufacturing of bricks, ebony handicrafts, rice mills, sawmills, and automobile repair shops. In addition to these industries, BNI-46 has made loans to manufacturers of tiles, ice, bread, and metal working products. It is reported that one of the problems experienced with the program is inadequate market studies by some loan applicants. This has caused loan defaults and losses.

In addition to bank lending facilities there are three development finance institutions: the P.T. Indonesia Development Finance Company, P.T. Private Development Company of Indonesia, and P.T. Bahana Pembinaan Usaha Indonesia. These private companies grant medium and long-term credits and take equity participation in companies with Rp 100-150 million in assets. It is not known if the first two institutions are active in Luwu. P.T. Bahana Pembinaan Usaha Indonesia is working with a citronella oil manufacturer in Kecamatan Mangkutana.

9.4.2. Technical Assistance

The Department of Industry plays a major role in technical assistance and training activities for small industry through its Bimbingan Dan Pengembangan Industri program (BIPIK). This guidance and development program for small industry has the following services:

- provision of tools and equipment;
- assistance in obtaining raw materials;
- technical and managerial training courses; and
- marketing assistance through product promotion and marketing centers.

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This assistance is made available mainly to groups of 20 or more entrepreneurs engaged in similar businesses, usually at service centers. This makes it possible to conduct training courses for groups concerning, for example, the use of a type of equipment. The equipment is then made available to members on a shared or rotating basis. Courses in management are also offered. Marketing centers to promote the sale of products are in some cases tied into these service centers.

Centers have also been established at small industry estates, another BIPIK activity. Field work is carried out by extension agents trained by the Department of Industry.

The BIPIK program has a hardware and a software aspect. The hardware program includes the provision of equipment and raw material as noted above, while the software program covers training in addition to the preparation of feasibility studies.

The provision of services to groups of entrepreneurs through service centers is a logical approach to the problem of reaching the vast number of small manufacturers with limited resources. While this method of provision of services is not as effective in rural areas such as Luwu, the office in Palopo has provided brick, sago, wood furniture and ebony handicraft makers with tools, equipment and some training.

The BIPIK program also has the aim of improving the climate for small business by such means as easing taxes and simplifying licensing procedures.

Another potentially effective measure coordinated by BIPIK is the Bapak Angkat or "foster father" program. This

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is intended to link small producers to large firms through subcontracting the manufacture of components or semi-processed goods.

Several other institutions are engaged in assisting industry in South Sulawesi. The Chamber of Commerce and Industry (KADIN) in Ujung Pandang is actively working on behalf of its members by serving as an information clearing house and training center. Training courses are conducted in management, marketing, and salesmanship.

The KADIN branch in Luwu with a staff of four persons, has 156 members. These mainly include local building contractors, but also traders in rattan and fish, and sawmill and brick plant owners.

The Investment Coordinating Board (BKPM) in Jakarta, with offices in provincial capitals, administers the investment incentive scheme which is available for certain industries being promoted. All enterprises with foreign investment must use this channel for licensing. Most small businesses however prefer to forego any possible incentives and apply for a license through normal channels (Department of Trade and Industry).

9.4.3. Evaluation of Support Programs

The various programs and policies described above, many of which are well-designed and executed, are not having the desired impact on development of small industry in Kabupaten Luwu.

A fundamental problem is that it is extremely difficult for a government official to adopt a business viewpoint when working with the small businessman. In general his training does not equip him to understand the problems and risks facing the entrepreneur. Formulation and implementation of government programs require considerable time. By their nature they are more or less fixed in size and scope. Yet the very essence of business is flexibility with the rapid adaption to changing conditions. This requires a strong measure of judgement and imagination on the part of the entrepreneur and fixed governmental policies may impede his actions.

Cottage and household industries can best be reached indirectly through improvement in the climate for small business generally, given limited resources and the enormous number of concerns or activities involved. It is important to target direct assistance to the small or medium-scale enterprise which is likely to be managed by a committed entrepreneur with paid employees and his own invested capital. Even then only those sectors which have good longterm market prospects should be selected for assistance.

Beyond these generalities, a number of specific problems can be identified concerning the task of developing small enterprise.

- A great number of government and private technical assistance programs lack central direction and focus. The Directorate General of Small Scale Industry in particular lacks experienced extension agents.

- The regulatory system which requires firms to obtain business licenses and operating permits works more against small firms than larger ones and is a major cause of rejection of Small Scale Enterprise (SSE) loan applications. - The program to reserve certain items for government procurement from SSEs is poorly coordinated and lacks direction.

- Entrepreneurs in some areas feel there is no institution that approaches their problems from a business perspective.

- Banks and other financing institutions report there is an absence of well-prepared and economically sound projects presented for financing. Many credit programs for industry are not effective because banks cannot be assured of the essential soundness of the projects they finance.

- Industrial extension workers lack the training and experience to gain credibility with the entrepreneurs they assist. They also lack commitment to their work as they are hired on a two-year contract.

- Equipment provided is often inappropriate, and is not used except in training courses. In other cases, equipment is used only by the most prosperous member of the group instead of being shared.

- Raw materials are often delivered at the wrong time and, or are not of the right type or in the correct quantity.

- The Bapak Angkat (foster father) program is not producing the intended results since few large firms have found it in their interest to engage in subcontracting.

- The services of various industry technical institutes are underutilized. This is often due to lack of knowledge of what is available. Enterpreneurs also have difficulty paying for the service. - There is a lack of coordination among the 43 agencies which offer training related to enterprise development.

- There is very little coordination among various government programs related to marketing assistance, and market research activities. There are no programs (other than Bapak Angkat) to put buyers in direct contact with sellers.

- Marketing aspects of a project may not receive sufficient emphasis in the planning and implementation process.

- The lack of a departmental coordinating system to design a development program is often the main weakness in implementation of such program.

The foregoing may be summarized as follows:

- There is a lack of coordination among the many government programs to aid industry, including technical assistance, training, marketing, credit, and research and development activities.

- There is inadequate representation of the private sector in implementing such programs, as well as in formulating policy on industrial development. Such representation could supply a much needed "business viewpoint" to the programs.

- Programs have insufficient emphasis on marketing.

- Projects presented to the banks for financing are often inadequately prepared.

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- Licensing procedures are still regarded as an obstacle by the small businessman.

- Training of industrial extension workers is inadequate.

At the same time, there are many useful and valuable programs available to the small businessman. It is not a lack of facilities or programs which causes concern. Rather, the problems are connected with using them. These problems can be overcome by (1) improving coordination and (2) giving programs more of a business orientation, especially marketing.

9.5. Development Strategy

Development of industry is taking place in Kabupaten Luwu in response to market forces. Virtually all of it is on a small or cottage scale. Government programs of credit and technical assistance are having an impact on this development, but not in any substantial way. It should be possible to accelerate the industrial process by removing several key impediments to growth. This should avoid some of the economic problems encountered elsewhere in the country where the industrial sector has been unable to absorb the excess manpower from the agriculture sector without decreasing incomes in the process. While Kabupaten Luwu has not had to cope with this problem thus far, it is probable it will arise.

The situation in Kabupaten Luwu is different than some of the areas of the country now receiving attention in small industry development programs. Pressure on the land has not yet become a problem in Kabupaten Luwu. There is a relatively low population density and low degree of urbanization.

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This combined with its remote location has fostered a degree of self-sufficiency which is exemplified by a substantial reliance on home or cottage industry products. Thus industrialization can be said to be only at the very earliest stage of development in Luwu with two notable exceptions being the nickel mine in Kecamatan Nuba and the plywood factory in Kabupaten Bupon.

Luwu at present offers only a small market for locally produced goods. Products destined for sale in the major market area of South Sulawesi face a substantial transportation cost barrier compared to similar products produced elsewhere in the province.

Given these impediments, industries where Luwu has some advantage in terms of natural or agricultural resources, infrastructure, or a market created by the presence of the nickel or plywood industry have been identified and are shown in table 9.2. The successful establishment of such industries will require careful study of markets and feasibility studies, however. To enable effective implementation of new industrial projects, certain changes are required in the way government programs of assistance to industry are carried out.

9.6. Development Plan

The objective of the plan for development of industry is to provide increased off-farm employment opportunities. The main thrusts of the program proposed are to:

a. strengthen the small industry sector and the economy of Kabupaten Luwu by creating new business opportunities for entrepreneurs and by helping existing businesses to grow;

- b. utilize existing programs to the maximum extent possible;
- c. take full advantage of private sector resources; and
- d. identify detailed industrial opportunities.

9.6.1. Improve Coordination and Planning

In order to improve the business climate and to help overcome the coordination, planning and other existing problems, a Small Business Development Center (SBDC) based in Palopo in the BAPPEDA Planning Office is proposed. It is designed to bridge the gap between the private entrepreneur and the various support programs available to him while involving private sector resources to the maximum extent possible. Principal features of the center are depicted in table 9.2.

The SBDC is intended to serve both as a channel for services already available and as a catalyst in their use. It will be an active participant in the development of small industry in the sense that staff will be engaged in field studies and in arranging contacts between local businessmen on the one hand and government agencies, banks, traders, contractors and investors on the other. Investors from outside the area, both Indonesian and foreign, will be made aware of opportunities, but participation through direct or cooperative ownership by local residents will be encouraged.

The Center will not be equipped to deal with large numbers of cottage industry ventures. These are better left to government programs such as those of the Department of Industry. However, market studies performed in the course

Table 9.2

Small Business Development Center Scheme

Available Resources

Department of Industry -Equipment and materials -Marketing -Training courses -Bapak Angkat

Department of Trade -Licensing -Government contracts

Department of Agriculture -Stastistics -Extension services

Department of Cooperatives -Organization of producers

Banks BNI-46, BRI, BPD -Loans through KIK, KMXP or other -RPMU, Bank Indonesia

Financing Companies -Technical information -Pilot scale testing

KADIN

-Contacts with manufactures -Contacts with trade association

BKPM (Investment Coordinating Board) -Investment incentive

Private volunteer organizations

Small Business Development Center Advisory Committee

Bupati

KADIN Manager Representatives from: Department of Industry Department of Trade Department of Cooperatives Department of Agriculture BAPPEDA Bank Rakyat Indonesia Bank Indonesia 46 Bank Pembargunan Daerah

Staff

Manager Senior consultants Expatriate advisors Junior field staff Short-term specialists

Assistance to Entrepreneur

Project identification studies

Feasibility studies

Market studies and information

Contacts between buyers and sellers including subcontracting

Bapak Angkat (Foster Father arrangements with large firms)

Organizational assistance -Incorporation -Licensing -Joint venture -Subcontracting

Investor contact -Indonesia -Foreign

Loan applications to banks

Technical assistance -Financial -Technical -Marketing

-Production -Material procurement

Training Courses -Management -Accounting

-Technical skills -Marketing

Seminars/Workshops -Marketing -Product design -Quality control of its work may be very relevant to planning of assistance to cottage industry ventures. Examples might include sago statch making or wood furniture.

The SBDC should eventually become self-supporting through users' fees (except possibly for the smaller scale businesses). Then it should move from BAPPEDA Planning Office to become attached to the local equivalent of the Chamber of Commerce (KADIN). During the first five years, however, it will require support by government.

There is a very large scope of activity which could be undertaken by the SBDC on behalf of small industry development. Not all of them could be begun at once, but functions could be added in stages as the staff increased.

Taken together, the activities constitute a full range of services to small business. The Center will undertake a limited number of projects at first. These will have to be chosen carefully since it is important to begin with potentially successful ventures. The Center will also be client directed rather than serving groups of entrepreneurs (except in the case of seminars, workershops, and training courses). The principal task then is one of bringing the clients and the project together and assisting the entrepreneur to make a success of the project.

The work of the Center should begin with the feasibility studies recommended and shown in table 9.3. This will familiarize the staff with Kabupaten Luwu and with the existing small business sector. With the completion of the first study, contacts can be made with potential local investors and possible external joint venture partners, contractors, or trading companies.

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Apparently Feasible Small Scale Industries to be Upgraded and/or Initiated

Industry Source of Raw Material Markets Issues to be Resolved Upgraded Coconut products Plantations, small Oil - local, Sulawesi farms-local Extent of markets Copra, dessicated How to increase planting Coconut, coir, shell Feasibility of integrated products - export operations Costs/returns to farmers Handicrafts Ebony wood, clay-Tourists - export local Marketing arrangements Extent of markets Training procedures Machinery Steel - Java Small machines - local Scrap metal-local Market potential of Spares - local products Fasteners - local Wood furniture Wood - local Forests - local Extent of markets Initiated Market arrangements Starch Cassava Plywood industry - local Wild sago palm Confirm demand Food processors - Sulawesi Confirm extent of potential Smallholders/plantations local raw material Passion fruit juice Plantations - local Sulawesi - export (Markisa) Determine potential land Determine costs/returns Confirm markets Feasibility of pasteurized vs preserved pulp Rattan furniture Rattan - Nuha, Malili Export Structure of industry Market requirements/government Shrimp processing/ Brackish water pondssupport investment level Export freezing Availability/mortality ratio local of fry Cost of intensive culture

Once promising contacts have been made, the Center staff should begin to play the secondary role of providing information and advice to the parties concerned. Assistance in preparing loan applications, supported by appropriate analyses and financial projections, will be a high priority. Other assistance includes advice on form of organization and arranging for the services of special consultants. Training of local investors in financial and business management could be provided by the Center, but wherever possible a company partner should provide this. Once project implementation has begun, technical assistance not provided by a large company partner will be arranged through the Center, though such facilities will also be limited at the outset. Financial monitoring of the on-going project should be carried out insofar as possible by the lending bank, with assistance from the SBDC.

9.6.2. A Second Development Pole

At this point in the economic development of Kabupaten Luwu, growth of small industry is heavily concentrated in Palopo. The existence of the large mining/processing complex at Malili has stimulated only minimal economic growth in the area. Exceptions are some food production, bus transport, contracting and garbage collection. Yet this complex offers markets for local manufactures and services, has electric power available, and is equipped with a small port for lightering to larger vessels offshore. There are also direct airline connections from Soroako to Ujung Pandang.

Efforts should be made to promote Malili as a second pole of development in Kabupaten Luwu. P.T. INCO officials have demonstrated a willingness to be cooperative in increasing economic exchanges with the local community but have had limited response. This is because entrepreneurs in the areas operate on an artisan scale.

This matter should be addressed by the SBDC during the early stages of the plan period.

9.6.3. Industrial Estates

Development of one or more industrial estates is not justified at present. Industrial estates are justified where land and utilities are in short supply and can only be obtained by government intervention. The sharing of common facilities such as repair shops, a central processing facility, or warehouses and bulk shipments can also justify an estate in the case of groups of similar small-scale industries. Finally, the need for small-scale suppliers or subcontractors to be close to the primary contractor's facility could justify an industrial estate. None of these situations now exist in Kabupaten Luwu.

Any attempt to move the existing small or cottage industries in Palopo away from town (or in many cases away from their homes) no doubt would fail. A possible sharing of facilities such as machinery repair, electric power (even at concessionary rates), common shipment, or availability of training courses, could not outweigh the cost and inconvenience of having to travel to and from the site outside of town, not only for the entrepreneur but for his employees. The impossibility of surveillance of his workshop would also be regarded as a disadvantage by the entrepreneur.

The matter of industrial estates should be considered by the SBDC, however, at the appropriate time.

9.6.4. Proposed Projects

The main activity for the plan period is the establishment of the Small Business Development Center in the BAPPEDA Planning Office. Other minor projects will be undertaken as well. These include implementation of demonstration factories for brick and tile; the BANDES program to provide small loans to undertake simple industrial activities, and the Department of Commerce program to provide managerial training to 600 commercial and industrial operators.

		Table 9.4		
Program	for	Manufacturing	anđ	Mining

Department of Industry Office - Kabupaten	Budget Source	(Million 1984 1985	Rupiah 1985 1986	1986 1987	1987 1987	1988 1989	Total
Construct demons- tration brick kiln in Wara Construct demons- tration roof tile factory in Bone	APBN			10	30	5	45
Bone	APBN		20	32	30	8	90
Rural Development Office - Kabupaten		·			, .		
Bandes support home industries	APBN	11	13	16	18	21	79
Commerce Office - Kabupaten							
Training for management small companies	APBN	2	2	2	A	r.	
-		. 6	2	3	4	5	16
Total		13	35	61	82	39	230

10. Physical Infrastructure

The physical infrastructure includes transportation, communication, public utilities, and urban services. These areas have been receiving emphasis in the development program. There is still much that needs to be done to provide the foundation for continued economic development in the Kabupaten.

10.1. Roads

10.1.2. Present Conditions

The improvement of the road from the Kabupaten Wajo border to Malili not only provides reasonably good access to Ujung Pandang but also the backbone route through Kabupaten Luwu. All Kecamatans except three are connected to this road. Only the Kecamatans of Bastem, Limbong and Malangke do not have all-weather roads linking them to the remainder of the Kabupaten.

A total of 84 collector roads representing 561.2 kilometers have been identified. Of these, 14 roads comprising 64.7 kilometers were in good condition, already budgeted, or of less than two kilometers in length and not considered in the program. Thus, 70 collector roads totalling 496.5 kilometers in length should be considered for improvement if financial and other constraints permit.

The national road from Tarengge to Central Sulawesi is in poor condition. While this road is doubtless of limited economic significance to Kabupaten Luwu, it is of social and political importance. A road maintenance program has been developed for the national roads in the Kabupaten. This program needs to be implemented as scheduled so that the existing national road network can be preserved.

10.1.3. Proposed Program

10.1.3.1. National Road Program

Perhaps the most important road project to be undertaken is the maintenance of existing national roads. These are the roads from Palopo to the Kabupaten Tana Toraja border; and from the Kabupaten Wajo border to Malili. Maintenance represents one of the best investments in the transport field. The internal rate of return in some areas has been found to exceed 100 percent.

The road from Kabupaten Luwu to the Central Sulawesi border is being considered for implementation. While this road would have some impact on the economy of Kabupaten Luwu, it would not be profound. It is therefore proposed to be undertaken if funds are available.

There are political, social and economic reasons to undertake road projects to link the Kecamatans of Limbong, Malangke and Bastem with the backbone route. A reconnaissance grade study completed in 1982 found the first two roads to be economically viable while the road to Bastem was not. Therefore, the roads to Limbong and Malangke have been scheduled to be completed during the plan period. The Bastem road as well as a second route to Malangke are scheduled to begin the third year.

The Bandes program to meet rural roads, bridges and other transport needs will continue.

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Table 10.1

Proposed Program for Roads

	Budget Sources	(Millic 1984 1985	on Rupi 1985 1986	ah) 1986 1987	1987 1988	1988 1989	Total
ablic Works, High- Fay Division - Mentral Government	-						10041
Central Sulawesi link ^a	APBN			800	2,400	800	4,000
abupaten							
Sabbang-Limbong rc 60 kilometers Masamba-Malangke road 43 kilo-	ad APBN		575	1,165	765	980	3,485
meters Beriti-Malangke road 35 kilo-	APBN	80	440	505	880	615	2,520
meters ajo-Bastem road ^a	APBN			250	290	330	870 ^b
40 kilometers	APBN			350	400	460	1,210 [°]
ral Development fice - Kabupaten							
andes program for local roads, bridges	APBN	65	70	75	80	85	375
blic Works, Area Lice - Province							
Mintenance of Mational roads - routine and							
extraord:.nary A "intenance of national roads -	APBD-I	320	320	475	515	515	2,145
periodic P	APBD-I		160			1,920	2,080
Total		465	1,565	3,620	5,330	5,705	16,685

a, b^to be undertaken when budgetary constraints permit. c^{additional} expenditure of Rp. 690 million required after 1988-1989. additional expenditure of Rp. 1,210 million required after

10.2. Ports

10.2.1. Present Conditions

There are two ports in Kabupaten Luwu. These are a causeway and pier at Palopo and a lighterage port at Malili. In addition there are several small fishing harbors in the Kabupaten. Throughput at the port of Palopo in 1981 was approximately 55 thousand tons.

The recently completed road through the Kabupaten which links with Ujung Pandang provides an alternative mode of transport which will compete for the relatively small amount of cargo and few passengers using the port at Palopo.

The developing oil palm industry in Kecamatans Wotu and Masamba represents the only potential large user of transport facilities with a strong probability of coming on stream during the plan period. It may not use the port, however, since a private company developing the palm oil industry is now considering a designated lighterage port to serve its needs. This organization's port requirements will materialize in 1987. Therefore, analysis of expected actual potential throughput of the port at Palopo indicates that little needs to be done to it, insofar as development of the Kabupaten is concerned. Routine maintenance of the causeway will be required.

A major construction project in adjacent Kabupaten Tana Toraja may affect the Palopo harbor, however. If this actually materializes, the company developing the palm oil industry may decide to use Palopo port rather than constructing duplicating facilities. A 191 megawatt hydroelectric generating plant is proposed to be constructed 15 kilometers west of Makale. At the present time it is proposed to import construction materials through the Palopo facility. If this actually takes place, it will be necessary to dredge the harbor, widen the causeway, and expand facilities.

Construction of the hydroelectric generating facility is now proposed to begin in July 1988. The progress of study, design, and tendering of this activity must be carefully monitored.

10.2.2. Proposed Program

During 1985-1986 a study is needed to determine future port development in the Kabupaten. This will be a staff study which can be undertaken by the Department of Communications Maritime Transportation.

The port expansion will take place, if required, the last three years of the plan. The cost is estimated to be Rp 1.94 billion for expansion of the pier from 55 meters to 105 meters, dredging, improvement of the causeway, construction of godowns and purchase of equipment.

Another port may be needed in the Kabupaten sometime in the future at Munte in Kecamatan Bone Bone or elsewhere. Palopo, however, is the logical site for development during the foreseeable future. In the meantime, the BAPPEDA Planning Office should discourage the construction of dedicated facilities by government or the private sector unless they are clearly economically advantageous.

Table 10.2

Proposed Program for Port Development

		(Million	Rupiah)				
	Budget Sources	1984 1985	1985 1986	1986 1987	1987 1988	1988 1989	Total
Directorate General Marine Transportatio Area VI	on,						
Palopo port expan- sion study			staff				
Dredging, pier expansion, causeway rehabilitation	APBN			990	500		1,490
Godowns, equip- ment	APBN				75	375	450
Total				990	575	375	1,940

^ato be undertaken if required.

10.3. Airports

An existing airport at Masamba has a runway of 1,500 meters in length. It has a grass surface underlaid by a compacted gravel over a rock base. It will be adequate for the duration of the plan period.

10.4. Communications

10.4.1. Present Conditions

The Post, Telegraph, and Telephone Organization provides telephone and telegraph services to Palopo. The remainder of the Kabupaten does not have telephone or telegraph services. SSB radio is used by some government

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organizations for telecommunications within the Kabupaten and to Ujung Pandang.

At present Palopo has 245 telephone lines using magneto instruments. The exchange has capacity for an additional 157 lines which are expected to be installed as soon as equipment becomes available. There is also a proposal to install a semiautomatic exchange with 600 line capacity to replace the system now in existence. This has been pending for some time and its status is quite nebulous.

Long distance telephone service is provided by an earth station which utilizes the domestic satellite. The earth station became operacive in May 1982. Service has improved somewhat the past year. External telephone calls are still difficult mostly because of untrained or indifferent staff.

Telegraph service is provided using high frequency radio to Ujung Pandang. Service is slow and messages are often garbled. Some telex equipment has been delivered and is waiting installation. Equipment to connect with the earth station to make the service operable has not arrived.

There are two television stations in Kabupaten Luwu. One is located in Palopo and the other is privately owned and serves the mining facility in Kecamatan Nuha and surrounding areas. Both stations are repeaters of programming from Jakarta. The station in Palopo has an operating strength of 100 kilowatts and operating hours are 1730 to 2400 daily.

10.4.2. Proposed Program

Permutel, the operating agency of the Department of Tourism, Posts and Telephone, is formulating plans to expand

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the microwave network nationwide. Palopo and some other towns will be included in this network. If this is undertaken it will greatly facilitate communication in the Kabupaten. Telephone service will be improved when the Permutel program for installation of 1,000 automatic telephone lines is effected in 1988-1989.

In the meantime, the BAPPEDA Planning Office should expedite to the extent possible the completion of the public telex installation. It should also encourage the training of personnel so that better service standards can be obtained.

Existing television service facilities will be adequate for the plan period.

Table 10.3

Program for Telephones

	(Millia	on Rupia	ah)			
Budget	1984	1985	1986	1987	1988	_
Source	1985	1986	1987	1988	1989	Total

Telecommunications Company - Central Government

Install exchange for 1,000 automatic telephone lines APBN

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10.5. Potable Water System

10.5.1. Present Conditions

The source of potable water for Palopo is the Mangkaluku River. Capacity of the system at present is 40 liters per second. This is sufficient water to supply a population of approximately 40,000.

Water from the river is diverted to the system by a small dam. It is filtered, treated, and distributed to individual connections and public hydrants. The number of connection. at the end of 1983-84 approximates 2,950 individual connections and 40 public hydrants.

There is no piped water system in any of the desas outside Palopo except Soroako. Water in these locations is secured from shallow wells or streams.

10.5.2. Proposed Program

The growth of the population of Palopo requires that the potable water system be expanded to the capacity of the water source during the next five years. Water supply is adequate for the period and is estimated to be 80 liters per second or twice the amount now consumed in the city. Expansion of the treatment plant and distribution network is required however.

In 1984-85 the treatment plant expansion will be designed. The years 1985-86 and 1986-87 will be devoted to plant expansion and construction of main conveyance lines. During the remainder of the plan period the distribution network will be expanded and consumers connected.

It is expected that four-fifths of the population will have piped water available by the end of the plan period. Of the population with treated water available to them, 80 percent will be provided water through direct house connections and 20 percent will have potable water available at public hydrants.

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If funds are available, 20 desas will be provided with potable water systems during the plan period. The desas with the most convenient and least expensive water sources such as springs will be provided with the systems during the first years of the plan. In this way more of the population can be served faster with the least cost.

After 1990, another source of water for Palopo will have to be developed. At the present time, it is believed another river in the same general area as the present source will be used.

Table 10.4

Program for Potable Water Systems

		(Milli	on Rupi	ah)			
	Budget Source	1984 1985	1985 1986	1986 1987	1987 1988	1988 1989	Total
Public Works - Potable Water - Province				•			
Palopo treatment plant, conveyance lines and distri- bution network	APBN	240	310	320	320	170	1,360
Potable water systems for 20 desas ^a	APBN		700	900	1,000	1,790	4,390
Total		240	1,010	1,220	1,320	1,960	5 , 750

^ato be undertaken as budgetary construints permit.

10.6. Electric Power

10.6.1. Present Conditions

The electrical systems in Kabupaten Luwu are inadequate. Service standards of the Palopo system are
poor. Many of the rural areas do not have electrical service.

The generating capacity of the Palopo system is marginally adequate with firm capacity, which is total derated capacity minus the capacity of the largest generator, being less than the peak load. The distribution system is inadequate and is characterized by low voltage and frequent interruptions of service.

The capacity of the Palopo system is being expanded. Derated capacity at the beginning of the plan period will be 1,818 megawatts. Service is being extended to more customers and will total 6,060 at the beginning of 1984-1985.

The Government Electric Company (PLN) is also extending service to the communi anghout the Kabupaten. In addition, some areas all and i by small privately-owned companies. Service to the ore rural areas is often provided only during the evening or night. Service during only part of the day precludes the use of equipment such as refrigerators. This results in a load pattern that makes a financially viable operation almost impossible to obtain.

A rural electrification cooperative is being installed in North Luwu to provide service to customers in Kecamatans Sabbang, Masamba, Bone Bone, Wotu and Mangkutana. At the end of 1983-84, 5,400 customers will be provided service. Capacity of the generators will be 1.6 megawatts in January 1984. Service for 24 hours per day began in late 1983. Generators are high speed self-contained units which have a lifetime of about seven years. At the end of that time, another source of electric power must be found. This may be available from the existing and proposed hydroelectric generation plants in the area.

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Aneka Tambang proposes to construct a 135 megawatt hydroelectric generating plant on the Larona River above Malili. The power generated will be dedicated to the nickel mine c? Aneka Tambang in Southeast Sulawesi. Five megawatts of capacity will be available for local consumption.

If the hydro facility were sited differently, generating capacity could be increased by 16 megawatts. The economic cost of the additional power is the cost of the best alternative source of 16 megawatts of capacity. This approach to the analysis might make the different site for the dam and plant an attractive proposition.

Another potential source of a small quantity of electric power is the generating plant at the nickel mine and smelter at Soroako. Abov' 3.5 megawatts are available at the present time.

Because of the characteristics of the ore run and the smelting of it, interconnection of the two facilities might make more power available than what is indicated. A study should be undertaken to determine the validity of this assumption and the amount of power available.

The BAPPEDA Planning Office should become involved in the power planning process so that Kabupaten Luwu can have the requisite power for development at the least cost.

10.6.2. Proposed Program

The program for the PLN system in Palopo is designed to include improved service standards and additional generation capacity. Capacity will increase from 1.8 megawatts at the end of 1983-84 to 3.5 megawatts in 1988-1989. Customers

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served are expected to increase from 6,000 at the beginning of the plan period to 11,500 five years later.

In addition to Palopo, service will be extended by PLN to villages in Luwu. Most of these are located in South Luwu. Customers expected to be served in 1988-89 total 5,000. This will require 1.4 megawatts of installed capacity.

The details of the rural electrification program of PLN have not been fully defined for the five year period. In 1984-1985, however, (1) transmission lines will be extended from Kecamatan Bupon to Belopa in Kecamatan Bajo and (2) the principal towns of Kecamatan Malangke will be electrified.

The cooperative now being developed to serve 51 desas in the five Kecamatans of Sabbang, Masamba, Bone Bone, Wotu and Mangkutana will be fully operational in September 1984. At that time generating capacity will total 3.5 megawatts. Eighteen thousand or three-fifths of the total potential customers in the Kecamatans will be provided service.

With the expiration of the lifetime of the cooperative's generating equipment after about seven years or in the early 1990's, another source of power will need to be found. It is expected that the the Government Mining Company (Aneka Tambang) hydroelectric generating plant proposed for construction on the Larona River above Malili will be completed by that time. Excess capacity beyond the requirement of the nickel mine and smelter in Southeast Sulawesi for which the electric power generated is designated should be adequate for replacement of the cooperativeowned plants which will have reached the end of their reliable lifetimes by that time. It is recommended that steps are now taken to ensure this allocation becomes

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firm. In the meantime the BAPPEDA Planning Office must work with Aneka Tambang to ensure the economic utilization of the Kabupaten's resources.

It is not too early to consider the interconnection of Luwu from the north in Kecamatan Nuha to Palopo and power centers to the south and southeast. This is not a function solely of the Kabupaten Planning Office. Nonetheless planning and coordination today may help avoid problems in the future.

Тa	bl	е	1	0		5
				_	-	-

Program for Electric Power Systems

	Source Budget	(Milli 1984 1985	on Rupi 1985 1986	lah) 5 1986 5 1987	5 1987 7 1988	/ 1988 1989	Total
Sovernment Electric Sompany - Area VIII							
xpansion/Improvement of Palopo System	nt						
Generation Improve distribu-	APBN	170	2,870	280	370	520	4,210
tion network Extension of	APBN	200	160	215	230	270	1,075
service	APBN	470	260	420	445	525	2,120
looperative in forth Luwu							
Generation Distribution	APBN	640	60	60	60	60	880
network	APBN	135	60	60	60	60	375
Government Mining Company - Central Government				f			
Larona hydro generation ^a	APBN		21,260	15,395	76,330	33,720	146,705
Total		1,615	24,670	16,430	77 , 495	35,155	155,365

^ato be undertaken as budgetary constraints permit.

10.7. Housing

10.7.1. Present Conditions

The government has a program designed to provide low cost housing to certain types of families. Recipients purchase the dwelling units under long-term loan arrangements. Of the total units built under the program, 75 percent are allocated to government employees, 15 percent to retirees, and 10 percent to residents in areas of inadequate housing.

The program is designed to assist in the development of a construction industry and construction materials supply at the local level. This is done by giving priority to local contractors so that they can acquire experience. Perumnas, the government organization responsible for the program, will purchase materials locally for resale to the builder.

It was estimated by Kabupaten personnel in 1982 that 3,400 dwelling units of government housing were required in Palopo. During 1982 and 1983, 852 units were constructed. This is more than the market can absorb at this time. Only 468 families have requested housing, leaving 384 available as of September 1983.

10.7.2. Proposed Program

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A survey has recently been completed of all the Kabupatens in the nation to determine requirements for housing. According to a weighting system considering population, size of family, population density and other factors, it was deemed that Palopo required 184 additional units during the next five years. Under the final

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determination, the needs of Palopo were of insufficient magnitude for the program of 184 units to be included in the agency's program.

These units should be required as the economy of the Kabupaten expands. Therefore, the cost of construction of the 184 dwelling units has been included to be constructed if needed and if funds are available. Construction is tentatively scheduled near the end of the plan period.

Table 10.6

Program for Housing

Budget Sources	(Million 1984 1985	Rupia) 1985 1986	1986 1987	1987 1988	1988 1989	Total
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National Urban Development Corporation - Central Government

184 housing units	APBN	515	515
Total		515	515

^ato be undertaken if required.

10.8. Urban and Village Services

10.8.1. Current Programs

Bandes provides all of the programs for the towns and villages. These include small infrastructure projects such as markets, fish auctions, public drinking water, religious facilities and desa planning.

A unique program is to provide two sample dwelling units in a desa for the residents to copy for their own house. This program also includes provision to pay the cost of one room of a home providing the owner completes the rest of the house.

An urban plan for Palopo was recently completed. It is not expected that another will be required during the next five years.

10 8.2. Proposed Program

The ongoing programs will be continued. Total allocation for these during the five year will be Rp 1.9

billion.

Table 10.7

Program for Urban and Village Services

	Budget Sources	(Million 1984 1985	Rupiah) 1985 1986) 1986 1987	1987 1988	1988 1989	Total
Rural Development Office - Kabupaten							<i>1</i> o <i>1</i>
Markets, fish auc- tions for desas	APBN	26	32	37	42	47	TOA
Public drinking water, meeting halls, religious facilities, etc.	APBN	21	26	32	37	42	158
Sample housing, upgrade housing, streets, public wells	APBN	96	113	120	131	139	599
Desa planning,		121	153	200	247	279	1,000
gutters, etc.	APBN	264	324	389	457	507	1,941
Total		204	52 -				

11. Social Infrastructure

The social infrastructure which for the most part includes education and health care is being expanded rapidly. Cooperatives other than the FCC program have been included in the group for planning purposes.

11.1. Education

The Department of Education and Culture has the responsibility of providing the basic educational needs of the school age population. There are at present some desas and kecamatans which do not have certain levels of schools available. Classrooms are overcrowded in the facilities available because of insufficient classrooms, teachers or both.

11.1.1. Enrollment

There are three main types of schools. These are the ordinary government schools, those provided under the President's Inpres program, and those provided by the private sector. Private sector schools account for about 7 percent of total enrollment in schools from primary through the high school levels. Privately-owned schools at the upper levels have a much more important role. About twenty-five percent of total high schools in the Kabupaten are privately-owned.

Total enrollment in Kabupaten Luwu at the beginning of 1982-1983, the latest period for which data are available, was 128,297 students. Of these, 79 percent were in the 6 classes of the basic school systems and 19 percent were in secondary schools. Only 7 percent were in high school.

11.1.2. Tuition and Other Attendance Requirements

Children must be six years cld to enroll in the basic school system. Tests are given prior to enrollment in secondary or high schools. The number of students allowed to enroll depends upon the availability of classroom space.

Tuition is charged in government as well as private schools. Fees vary by area and by the parents' ability to pay.

11.1.3. Enrollment and School Age Population

A comparison of the number of children enrolled at each school level, i.e., primary, basic, secondary and high school with the population for the corresponding ages indicates that overall 77 percent of the children were enrolled in school in 1982-1983.

Table 11.1

Percent of School Age Population Enrolled in 1982-1983

Basic	107
Secondary	46
High School	26
Total	77

The percentage of 107 for the basic education school system indicates a backlog of students who had wanted to attend school but could not. In addition, the figure includes dropouts or students held over from one year to the next who have re-enrolled.

According to statistics from the Department of Education and Culture, over one thousand students applied for admittance to the basic school system in 1982-1983 but were refused because of a lack of space. 11.1.4. Teachers and Enrollment Per Teacher

School teachers in government and private schools numbered 3,541 for all grade levels from basic through high school in 1982-1983.

	Number of
	Teachers
	2,376
Basic	618
Secondary High School	547
Total	3,541

Most of the teachers employed in the government basic schools in 1981-1982 were secondary school graduates with one year of teacher training. Few have college degrees. An analysis of the training level by kecamatan reveals little difference between them. Data for 1981-1982 are shown below.

B.A.Degree	Percent of Total 3 1
High school plus one year Secondary school plus three years of teacher training	90 a
teacher training Religious school	6
_	100

Total

a less than 0.5 percent

The student teacher ratio for the basic school system was 42. In secondary schools the ratio was 30 while it was 16 for the high school systems.

11.1.5. Educational Planning and Efficiency

One measure of development is the relative educational effort of a country or region. It was found that Kabupaten

Luwu ranks at about the average for less developed countries in respect to basic school enrollments, and slightly above less developed countries for secondary school enrollments. This would suggest that efforts thus far are in the right direction to provide education to the children of the Kabupaten.

Rational educational planning decisions rely heavily upon information concerning demand and supply. Demand can be related to social demands and/or manpower needs. Social demand arises from the parents who want their children to obtain the best possible education, and from statements of national/local policy which reflect these interests.

Precise quantification of manpower requirements for future development in Luwu cannot be made at this time either by parents or planners. In fact, there are indications that Luwu is an exporter of manpower and will continue to be one for some time in the future. Therefore, most of the demand for education is no doubt social demand.

The Kabupaten educational system is thus faced with the problem of providing an equitable general, rather than targeted, educational system in the most efficient manner possible. It does, however, provide personnel who will be capable of being trained later for specific occupations.

Effective educational planning requires a continuing analysis of how well the educational task is being accomplished. A number of methods may be used to examine educational efficiency both for planning new institutions and for monitoring their efficiency once they are operating. Such statistics as student flow rates, enrollment targets, dropout rates, completion rates, promotion rates and

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attrition are frequently employed as measures of efficiency. While it is important to compare students retained with those going on to the next year's classes, this particular statistic was unavailable. Similarly, the attrition or dropout rate from class-to-class was not available for all grade levels. Longitudinal enrollment records, however, were available on a kecamatan-by-kecamatan basis. These provide one basis to determine educational efficiency.

The cost per student educated can be determined from longitudinal enrollment records. Analysis of these indicates that the median number of school years required for a student to pass through the ordinary basic school system is 7.1. This means that 7.1 school years are required to be taught to get the typical student through 6 grades of school in the basic school system. The corresponding figure for the basic schools financed under the inpres budget is 9.5 years.

The reasons for the difference between the ordinary basic schools and those financed under the inpres budget are not clear. The grade levels covered are the same. The number of students per teacher is less in the inpres system. Apparent teacher qualifications are about the same for the two types of schools. Differences in the types of area in which the schools operate vary, however, as well as the length of time the systems have been in operation.

The inpres system of basic schools was begun about 10 years ago while the ordinary basic school system has been in operation for many years. The areas where inpres budgetary financing was used were the more rural ones where schools had not previously been available. Perhaps the lack of parents' knowledge of education and its merits accounts for

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the poorer efficiency of the inpres schools. In any event the performance of schools financed under the inpres system represents an area that needs to be investigated and, if problems exist, appropriate measures taken.

The numbers of school years required to graduate a secondary and high school student are quite reasonable being 3.7 and 4.1 respectively.

Another measure of the relative efficiency of the school system is the degree to which students move from one level of school system to another. There is an apparent strong demand for continuing education in Kabupaten Luwu. About 85 percent of those leaving the basic including the inpres system move into the secondary school system. On average, the number entering high school exceeds 100 percent which indicates a backlog of young people desiring a high school education.

The conclusion concerning future education planning is that more physical facilities will be needed during the next five years. This is particularly true of secondary and high schools. The average number of students per classroom in the basic school system is still high and some expansion to reduce the number per classroom will be required. This program must be monitored closely by the BAPPEDA to avoid unnecessary expenditure for capital items.

More and better qualified teachers are necessary. The solution to this problem is long-term. While the situation will be improved, it will not be fully resolved during the plan period.

11.1.6. Other Programs

Adults who are literate may attend night school to learn cottage industry-type occupations such as sewing, carving or basket weaving.

Three institutions of higher learning also operate in the Kabupaten. These are also located in Palopo. Each offers three years of college level work. All have been in operation since the 1960's. The areas of specialty and enrollment in 1982 are shown below:

	Enrc Male	llment Female	Total	Specialty
Institution of Social Policy	317	114	431	Private
Institution of Education	450	210	660	Private
Institution of Moslem religion	87	62	149	Government
Total	854	386	1,240	

11.1.7. Proposed program

The proposed educational program for the five year plan period includes provision for expansion and renovation of physical facilities, youth programs, adult education and cultural activities. Expansion and improvement of facilities will require the largest amount of the funding.

It is expected that school enrollment in 1988-1989 will be 89 percent of the school age population. This compares with 77 percent in 1982-1983. Enrollment in the government basic school system including the inpres financed schools, or in grades one though six, is expected to be 127,600 in 1988-1989 or 26 percent more than in 1982-1983. Secondary enrollment in government schools will be 21,751 and high

11.1.6. Other Programs

Adults who are literate may attend night school to learn cottage industry-type occupations such as sewing, carving or basket weaving.

Three institutions of higher learning also operate in the Kabupaten. These are also located in Palopo. Each offers three years of college level work. All have been in operation since the 1960's. The areas of specialty and enrollment in 1982 are shown below:

	Enro Male	llment Female	Total	Specialty
Institution of Social Policy	317	114	431	Private
Institution of Education	450	210	660	Private
Institution of Moslem religion	87	62	149	Government
Total	854	386	1,240	

11.1.7. Proposed program

The proposed educational program for the five year plan period includes provision for expansion and renovation of physical facilities, youth programs, adult education and cultural activities. Expansion and improvement of facilities will require the largest amount of the funding.

It is expected that school enrollment in 1988-1989 will be 89 percent of the school age population. This compares with 77 percent in 1982-1983. Enrollment in the government basic school system including the inpres financed schools, or in grades one though six, is expected to be 127,600 in 1988-1989 or 26 percent more than in 1982-1983. Secondary enrollment in government schools will be 21,751 and high

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school enrollment will be 20,991. These will be 18 percent and 146 percent more than in 1982-1983 respectively.

A total of 159 basic schools of three rooms each is proposed to be constructed. In addition funds have been set aside in the five year basic school program for expansion and rehabilitation of existing schools. At the end of the plan period the physical requirements of the basic school system should be adequate for the population at that time. Further expansion of new facilities will only be required to meet population growth.

Education to train adults in various occupations will continue to be provided. This program, which has proved to be successful, will be provided to 20 people in each of 16 courses. Total individuals trained is expected to number 320 during the five year period.

Three secondary schools and one high school will be constructed. A new teachers' training school will be completed the first year of the plan. Future emphasis will be required in these areas as the number of graduates from basic schools increases.

Six cultural programs are proposed. These have a small cost and represent efforts which should be made now to preserve knowledge concerning the background of the Luwu area.

Youth programs are important and should receive more emphasis than in the past assuming budgetary constraints permit them. The youth program proposed includes not only the construction of youth centers but also training in the areas of agriculture, poultry production, and home industry among others for youth ages 10-15; leadership and political training; and employment in local works such as constructing simple roads and irrigation systems; training for scoutmasters; and scouting activities. Sports projects include construction of mini-stadia, sports halls, and swimming pools as well as purchase of sports equipment and training for sports officials. A total of Rp 2.4 billion has been allocated for these two activities. This is only a rough measure of requirement. The BAPPEDA Planning Office will have to determine how much will be actually allocated each year based upon budgetary constraints and/or need as seen at that time.

11.2. Health

The health program consists of projects which relate to infectious diseases, control of food and drug sales, nutrition, education concerning health, and construction of health facilities.

11.2.1. Nutrition

There have been no nutritional studies made in Kabupaten Luwu. Those undertaken in other parts of the country indicate the principal dietary deficiencies are Vitamin A, iron and iodine.

Protein intake of the population is also insufficient. Anemia which may be associated with diet also has a relatively high incidence. This emphasizes the importance of improving the fishing industry, particularly fish pond output, and the poultry industry of Luwu. At the same time, incomes must be improved so that the farmers, who comprise the bulk of the population, will be able to consume these

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Table 11.2

Program for Education and Culture

	(Million Rupiah)						
	Budget Source	1984-1985	1985 - 1986	1986-1987	1987-1988	1988-1989	Total
Department of Education and Culture - Kabupaten							
Basic school construction/							
expansion	Inpres	3,200	2,300	2,000	2,500	2,000	12,000
Adult education program Preservation of local	APBD-II	35	50	50	55	55	245
languages	APBD-II	5	5	5	5	5	25
Training in the arts Maintenance of historic	APBD-II	10	10	10	15	15	60
places Improvement of historic	APBD-II	10	10	10	10	15	55
places	APBD-II	80	80	80	85	85	410
Museum improvement Biographies of historic	APBD-II	25	25	25	25	25	125
persons	APBD-II			5	5	5	15
Youth activities	APBD II	200	200	300	300	300	1,300
Sports activities ^a	APBD-II	200	200	200	200	300	1,100
Department of Education and Culture - Province	-						
Construct three secondary schools and one high school	APBN	990	1.340	1,365	1,705	2,220	7,620
Fauirment/supply one	•==••			•	•	·	
technical school Construct and provide	APBN	10	10	10	11	13	54
equipment/supplies one teaching school	APBN	123	8	8	9	10	1.58
Total		4,888	4,238	4,068	4,925	5,048	23 , 167

^ato be undertaken as budgetary constraints permit.

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products themselves rather than being forced to sell them for cash income.

11.2.2. Incidence of Disease

Tuberculosis and anemia were the most common ailments for which people were treated in 1980-1981, the latest year of data available. A total of 8 percent of the population was treated for these r lems. This does not reflect the true incidence of these lessess since many people who have them are not treated.

Seven percent of the population was treated for malaria. That this figure is not coincident with the portion that have the disease is borne out by a study of three villages in the Malili area in 1970. This study found that 19 percent of the population was infected by malaria.¹

In addition, "of the 659 people examined 97 percent were found to be infected with at least one parasite, 80 percent with two or more, and over 60 percent with three or more parasites. Those in whom no parasites were found were, for the most part, infants".²

The incidence of malaria may not be as high for all of the Kabupaten One of the village studied was comprised of migrants from Java who had a higher incidence of the disease than natives of Sulawesi. Based upon data for the other

²Ibid., p. 588.

¹J.H. Cross, et. al., "Intestinal Parasites and Malaria in Margolembo, Luwu Regency, South Sulawesi, Indonesia", <u>The Southeast Journal of Tropical Medicine and</u> <u>Public Health</u>, Vol. 3, No. 4, (December 1973): p. 590.

villages, perhaps 10 percent of the population of Luwu had malaria at that time.

The ten most prevalent problems for which people received treatment in 1980-1981 were:

	Percent of
	Population
Tuborculosis	- 8
	7
Anemia	7
Malaria	7
Diarrhea	5
Bronchitis	5
Abscesses	3
Eye problems	т Э
Worms	ວ າ
Scabies	3
Accidents	Ζ

^{11.2.3.} Medical Facilities

There are two government hospitals in the Kabupaten. Both are located at Palopo. In addition, there is a government leprosarium, a private hospital at the P.T. INCO facility at Soroako and a military hospital in Palopo.

There are 16 doctors, 77 nurses, and 90 midwives in the Kabupaten. Again, these figures do not include those at P.T. INCO and at the military facility. This represents one doctor for 32 thousand population and one nurse for each 7 thousand people. The problem of the shortage of nurses is exacerbated because some are reported to be volunteers and cannot be relied upon to adhere to a schedule.

Shown below are the other facilities in the Kabupaten.

	Number
N-t-maity alipics	53
Alinian	103
	21
Health Centers	34
Subhealth centers	5.

It is quite apparent that health facilities and personnel to staff them must be expanded. The main constraint will be the expansion of personnel. This may be a limiting factor in the health development program.

11.2.4. Proposed Program

An important project scheduled to begin in 1984-1985 is the construction of a Class C regional hospital of 150 beds in Palopo. The facility will serve Kabupaten Luwu, North Wajo, and parts of Central Sulawesi. It will specialize in the areas of internal medicine, gynecology, pediatrics and surgery. Securing specialists is expected to be a problem during the initial years of operation. During this period coctors from other hospitals and the Unhas University who are specialists in the areás covered will join the staff for predetermined temporary periods.

The number of health centers will be increased from 21 at the beginning of the plan period to 28 at the end. This will be an average of one for each 23 thousand people. While this is a greater density than typical at present for the country, the relatively greater number will accommodate the scattered population of the Kabupaten.

Thirty-six sub-health centers will be constructed making the total at the end of the plan period 70. This will still not be one for each desa but will probably be all that can be staffed. The rehabilitation and expansion of existing health and sub-health centers will continue at the 1983-1984 rate of expenditures. The construction and staffing program will continue beyond the intermediate plan period.

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The BAPPEDA Planning Office must maintain a continual review of these programs to ensure that facilities are not being built in excess of staffing potential.

The programs for malaria control, provision of Vitamin A for children, food and drug control and infectious diseases control will continue. The nutribion programs include public education and provision of Vitamin A supplements to 138 thousand children in the one to five age group by 1988-1989. Village water and sanitation programs will also be undertaken. The programs for health are summarized in table 11.3.

11.3. Other Social Services

11.3.1. Present Program

The remaining activities within the category of the social infrastructure are cooperatives, (other than FCCs), transmigration, the village programs of Bandes, and the activities of the Department of Labor.

The cooperatives programs include the provisions of credit for governmental employees and others.

The program of the Department of Transmigration to move people from the more densely populated areas is completed. All that remains is the continuation of assistance during the transitional period to those already settled.

The Department of Labor provides work to unemployed persons in the villages as well as training for school dropouts and high school graduates and scholars.

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Table 11.3

Program for Health and Disease Prevention

		(Million	Rupiah)				
	Budget Source	1984-1985	1985-1986	1986 - 1987	1987-1988	1988-1989	Total
Department of Health, Area Office - Province							
Construction Regional Hospital - Palopo	APBN	925	538	605	605	435	3,108
Construct/improve health and subhealth centers Malaria control program	Inpres APBN	85 75	85 55	85 49	119 37	119 25	493 241
Nutrition improvement, Vitamin A program Food and drug control program Nutrition/health education Infectious disease control	APBN APBN APBN APBN	3 51 1 31	3 16 1 37	4 18 1 39	5 20 1 43	5 22 2 43	20 127 6 193
program Worms and parasites control program	APBN	20	42	49	53	46	210
Village water supply/sanitation facilities	Inpres	73	84	97	111	128	493
Department of Health - Kabupaten							
Provide staff offices, equipment, for desas, Palopo hospital Infectious disease control, bygene and sanitation,	APBD-II	29	7	9	9	7	61
education, nutrition improvement, public education and food/drug control	APBD-II	3	4	5 -	6	7	25
Total		1,296	872	961	1,009	839	4,977

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11.3.2. Proposed program

The other social services activities will continue at about the 1982-1983 levels. The one with the greatest expenditure, assistance to transmigrants will be phased out after the third year of the plan. Overall, Rp 5.6 billion are allocated for these works.

Table 11.4

Program for Other Social Services

			(Million	Rupiah)				
		Budget Source	1984–1985	1985-1986	1986–1987	1987–1988	1988–1989	Total
Dep	partment of Cooperatives - Kabupat	en						10
	Training courses for personnel ^a	APBN	9	11	9	9	11	49
	Training courses for managers of cooperatives	APBN	30	32	34	36	38	170
Ru	ral Development Office - Kabupaten							
	Credit to individuals for small ventures	APBN	8	ш	13	16	18	66
1	Settlement of migratory people	APBN	221	253	300	347	379	1,500
159 De	partment of Transmigration - Kabup	aten						- 165
1	Aid to transmigrants	APBN	1,560	400	505			2,465
De	epartment of Manpower - Kabupaten							
	Village works-irrigation/roads Training for school dropouts	APBN APBN	152 11	159 11	167 12	174 12	181 13	833 59
	Special training high school graduates	APBN APBN	78 4	81 4	85 4	90 5	94 5	428 22
	Guidance on use of manpower Total		2,073	962	1,129	689	739	5 , 592

^anot including those employed by FCCs.

Appendix Table A.1

Development Budget by Activity for Essential Programs

		(N	Aillion 1	1983 Rupi	iah)	
	1984 1985	1985 1986	1986 1987	1987 1988	1988 1989	Total
Central planning/coordi- nation	975	1,725	825	825	1,675	6,025
Water resources	6,894	9,107	11,545	12,025	11,919	51,490
Agriculture Food crops Estate crops Livestock Supporting activities	609 158 31 61 359	650 209 12 75 354	782 228 15 88 451	512 250 17 101 144	547 273 11 119 144	3,100 1,118 86 444 1,452
Fishing	36	13	384	34	41	508
Watershed management and forestry	842	1,268	1,850	2,080	2,205	8,245
Manufacturing and mining	13	35	61	82	39	230
Physical infrastructure Roads	2,584 465	5,609 1,565	4,214 2,470	4,472 2,530	6,800 4,445	23,679 11,475
Ports Telephones Potable water Electric power	240 1,615	310 3,410	320 1,035	320 1,165	243 170 1,435	243 1,360 8,660
Housing Urban/village services	264	324	389	457	507	1,941
Social infrastructure Education Health Other social services	7,857 4,488 1,296 2,073	5,672 3,838 872 962	5,658 3,568 961 1,129	6,123 425 1,009 689	6,026 4,448 839 739	31,336 20,767 4,977 5,592
Other ^a	1,700	1,740	1,785	1,830	1,875	8,930
Total	21,510	25,819	27,104	27,983	31,127	133,543

^arepresents organizations which are included in the development budget but are not economic development organizations. Data for 1984-1985 are estimated and projected to the end of the plan period at the rate of expected population growth.

Appendix Table A.2

Development Budget by Activity for Essential and Optional Programs

		(M	illion	1983 Rupi	ah)	
	1984 1985	1985 1986	198 198	6 1987 7 1988	1988 1989	Total
Central planning/coordi- nation	975	1,725	82	5 825	1,675	6.025
Water resources	6,894	9,107	11,54	5 12,025	11,919	51,490
Agriculture Food crops Estate crops Livestock Supporting activities	609 158 31 61 359	650 209 12 ;5 354	782 228 15 88 451	2 572 3 310 5 17 8 101 - 144	595 321 11 119 144	3,208 1,226 86 444 1,452
Fishing	36	13	384	34	41	508
Watershed management and forestry	917	1,368	1,975	2,215	2,380	8,855
Manufacturing and mining	13	35	61	82	39	230
Physical infrastructure Roads Ports Telephones Potable water Electric power Housing Urban/village services	2,584 465 240 1,615 264	27,569 1,565 1,010 24,670 324	22,649 3,620 990 1,220 16,430 389	85,692 5,330 575 1,320 77,495 515 457	43,945 5,705 375 243 1,960 35,155 507	182,439 16,685 1,940 243 5,750 155,365 515 1,941
Social infrastructure Education Health Other social services	8,257 4,888 1,296 2,073	6,072 4,238 872 962	6,158 4,068 961 1,129	6,623 4,925 1,009	6,626 5,048 839 739	33,736 23,167 4,977
Other ^a	1,700	1,740	1,785	1,830	1.875	5,592
Total	21,985	48,279	46,164	109,898	69,095	295.421

^arepresents organizations which are included in the development budget but are not economic development organizations. Data for 1984-1985 are estimated and projected to the end of the plan period at the rate of expected population growth.

Appendix Table A.3

Development Budget by Government Agency

	(Million 1983 Rupiah)						
- •	Budget						
Project	Source	1984-1985	1985-1986	1986-1987	1987–1988	1988 - 1989	Total
BAPPEDA Planning Office							
Aerial photography mosaics	ADDN	500	1 000				1
Land uso/soils studios	ADDN	500	T ,000				1,500
Tand use soirs scures	APDN	775	605	605		750	750
lecimical assistance	APBN	3/5	625	625	625	625	2 , 875
Agricultural case study	APBN	150	230	50			430
Agricultural research	APBN		_	20	20	20	60
Miscellancus studies	APBN	100	100	200	200	300	900
Total		1,125	1,955	895	845	1,695	6,515
Divertorate of Invitation Colle	1 0				•	• • •	
Directorate of irrigation - Centra	al Governm	ent			` n		
Special irrigation systems	APBN	3 , 500	3,300	4,000	4,600	5,000	20,400
Technical assistance	APBN	265	530	. 265			1,060
Total		3,765	3,530	4,265	4,600	5,000	21 460
		-,	-,	1/200	1,000	5,000	21,400
Directorate of Irrigation - Provis	nce						
Medium systems - Paddang Sappa	APBD-I	632	3,375	6,100	6,500	5,000	21.607
- Bajo	APBD-I	81	. 60	70	70	70	351
Operation and maintenance							201
Improvement program	APBD-I	1,883	942	532	600	600	4.557
Technical assistance	ABPD-I	330	660	330			1,320
Operation and maintenance	•						1,520
other than North Luwu	APBD-I	105	100	116	122	128	571
Meteorology/hydrology training			200	~~V	یک <i>ش</i> ر طر	120	211
program	APBD-T	2	18	18	18	17	70
		£	10	10	TO	11	13

Project	Budget Source	1984–1985	1985–1986	1986–1987	1987-1983	1988-1989	Total
Stream discharge data improve- ment program	APBD-I	33	32	40	42	42	189
Meteorology data improvement program Simple irrigation systems	APBD-I APBD-I	8	30	8	2	2 984	50 984
Total		3,074	5,217	7,214	7,354	6,843	29,702
Rural Development Office - Bandes	Kabupaten		(0)	66	71	76	328
Village irrigation program	APBN	55	60	10	18	21	79
Support hame industries	APBN	11	13	10	20	85	375
Iccal roads, bridges, etc.	APBN	65	70	/5	40	47	184
Markets fish auctions for desas	APBN	26	32	37	42	47	104
Dublic drinking water, meeting			•				
Public uninking water, meeting					•		150
halls, religious facilities;	NDBN	21	26	32	37	42	128
etc.	AF DN						
Sample housing, upgrade housing,		06	113	120	131	139	599
streets, public wells	APBN	20	152	200	247 -	279	1,000
Desa planning, gutters, etc.	APBN	121	100	200	217		•
Credit to individuals for small				10	16	18	66
contures	APBN	8	11	13	01	270	1 500
Sottlement of migratory people	AFCN	221	253	300	347	319	1,000
Settiment of migratory people	14.200						
Total		624	731	859	989	1,086	4,289
Cooperatives	זארותא	80		250			330
Farm Cooperative Center	APBN	00					
Demostrant of Cooperatives - Kabu	naten						40
Department of cooperatives have	APRN	9	11	9	. 9	11	49
Training courses for personner		30	32	34	36	38	170
Training courses for managers	APDIN	50					540
Total		119	43	293	45	49	549
Presetment of Transmittration - Ka	bupaten						0 ACE
Department of framework of a contraction - No	APRN	1,560	400	505			2,465
ALC TO TRANSMUGLANCS		_,					0.477
Total		1,560	400	505			2,465

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Project	Budget Source	1984-1985	1985-1986	1986-1987	1987-1988	1988-1989	Total
Department of Manpower - Kabupate	n						
Village works - irrigation/road		152	150	167	174	101	
Training for school dropouts	APRN	11	11	10/	1/4	181	833
Special training for high		TT	TT	12	12	13	59
school graduates	APBN	78	81	85	00	0.4	400
Guidance on manpower use	APBN	4	4	<u>ر</u> ی ۸	50	94	428
L		-	7		Ċ	C	22
Total		245	255	268	281	293	1,342
Agriculture Food Crops Office - Ka	abupaten				-		
SPMA - Agricultural education	APBD-II	10	15	22	34	50	101
Enhancement of fruit/vegetable				LL	JŦ	00	121
production	APBD-II		4	4	5	5	19
Enhancement of field crop				-	5	5	10
production	APBD-II		32	35	38	40	145
Construction office building ^a	APBD-II				60	48	108
RECs operation	APBN	40	50	55	56	57	258
That a l		50	• • •				
IOCAL		50	101	116	193	200	660
Agriculture Food Crops Office - Pr Supply of improved seeds and	ovince						
chemicals	APRN	Q	٥	10			
		32	33	22 T0		11	50
BIMAS assistance program	APBN	57	57	50	34 60	35	166
BIMAS transmigration assistance		57	57	20	60	63	295
program	APBN	10	10	11	12	12	55
						12	55
Total		108	108	112	117	121	566
Estate Crops Office - Area I - Luw Hybrid coconut expansion	ru .						
program	APBN	24					24
	APBD-I		12				24 12
Indigenous coconut expansion							Τ¢
program	APBD-I				17		17
							— -

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Project	Budget Source	19841985	1985-1986	1986–1987	1987–1988	1988–1989	Total
Cocoa expansion program	APBN APBD-II			15		11	15 11
Coffee seed propogation program	APBD-II	7					1
Total		31	12	15	17	11	86
Livestock Office - Province Supply of artificial insemi-							
nation; medicine and guidance services	APBN APBD-I	46 4	56 5	67 6	80 6	93 8	342 29
Total		50	61	73	86	101	371
Livestock Office - Kabupaten Animal disease prevention Rabies prevention Livestock quality enhancement Training and education	APBD-II APBD-II APBD-II APBD-II	3 2 3 3	3 3 4 4	4 3 4 4	4 4 4	5 4 5 4	19 15 20 19
Total		11	14	15	15	18	13
Rural Extention Centers Ongoing programs Staff training Additional administrative staff Whole farm training for specialists	apbn apbn apbn apbn	74 23 22 10	74 23 22 5	74 23 22 12	74 23 22 5	74 23 22 5	370 115 110 37
, Total		129	124	131	124	124	632
Fisheries Office - Kabupaten Fish harbor, auction facilities cold storage and workshop at Palopo Rehabilitate cold storage/ice plant at Palopo	, APBN APBD-II	3		350			350 3

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Project	Budget Source	1984–1985	1985-1986	1986-1987	1987–1988	1988–1989	Total
Rehabilitate fry production demonstration ponds in five kecamatans Construct canals to 1,071	APBD-II	2					2
hectares of brackish water ponds Construct brackish water demonstration ponds in	APBN	5	10	13	б		34
Kecamatans Wotu, Malangke and Suli Facilities to produce shrimp and bandang fry in Kecamatans Malangke, Waleprang, Wara	APBN	e Se an		9	9	10	28
and Larompong Construct running fresh water	APEN	8		8	9	20	45
pond in Kecamatan Mangkutana House for watchman at frv	APBD-I				. 6	6	12
hatchery in Kecamatan Bajo Meeting hall for training -	APBD-I	2	<u>y</u> -				2
Palopo	APBD-I APBD-II	6 6			•.	•	6
Training for fisherman and fish pond farmers	APBD-I	1	2	2	2	2	9
Rehabilitate office building -	APBD-II	2	1	2	2	3	10
Palopo	APBD-II	1					1
Total		36	13	384	34	41	508
Forestries Office - Kabupaten Reforestation program Purchase/operation vehicles Forest inventory survey Office building ^a	Inpres APBN APBN APBN	830 12 75	1,250 18 100	1,580 20 250 125	1,805 25 250 135	1,930 25 250 175	7,395 100 750 610
Total		917	1,368	1 , 975	2,215	2,380	8,855

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Project	Budget Source	1984-1985	1985-1986	1986–1987	1987–1988	1988-1989	Total '
Government Mining Company - Cent Larona hydro generation	ral Governme APBN	ent	21,260	15,395	76,330	33,720	146,705
Total			21,260	15,395	76,330	33,720	146,705
National Urban Development Corpo 184 housing units	ration - Ce APBN	ntral Govern	nent		515		515
Total	-				515		515
Department of Education and Cult Basic school construction/ expansion Adult education program Preservation of local language Training in the arts Maintenance of historic places Improvement of historic places Museum improvement Biographies of historic person Youth activities Sports activities	Inpres APBD-II APBD-II APBD-II APBD-II APBD-II APBD-II APBD-II APBD-II APBD-II APBD-II	aten 3,200 35 5 10 10 10 80 25 200 200 200	2,300 50 5 10 10 80 25 200 200 2.880	2,000 50 5 10 10 80 25 5 300 200 2,685	2,500 55 5 15 10 85 25 5 300 200 3,200	2,000 55 5 15 15 85 25 5 300 300 300	12,000 245 25 60 55 410 125 15 1,300 1,100
Total			27000	-,			
Department of Education and Cul Construct three secondary schools and one high school	ture - Prov AFBN	ince 990	1,340	1,365	1,705	2,220	7,620
Equip/supply one technical school	APBN	10	10	10	11	13	54
Construct and provide equipme supplies one teaching school	nt/ APBN	123	8	8	9	10	158
Total		1,123	1,358	1,383	1,725	2,243	7,832

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Project	Budget Source	1984-1985	1985-1986	1986-1987	1987-1988	1988-1989	Total
Department of Industry Office - : Construct demonstration	Kabupaten						
brick kiln - Wara Construct demonstration roof	APBN			10	30	5	45
tile factory - Bone Bone	APBN		20	32	30	8	90
Total			20	42	60	13	135
Commerce Office - Kabupaten Training for management of							
small companies	APBN	2	2	3	4	5	16
Total		2	2	3	4	5	16
Public Works, Highways Division-C	Central Gov	ernment			•		
Central Sulawesi link ^a	APBN			800	2,400	800	4,000
Total				800	2,400	800	4,000
Public Works, Area Office - Provi Maintenance of national roads	ince						•
routine and extraordinary periodic	APBD-I APBD-I	320	320 160	475	515	515 1,920	2,145 2,080
Total		320 ·	480	475	515	2,435	4,225
Public Works - Kabupaten Sabbang - Limbong road							
60 kilometers Masamba - Malangke road	APBN		575	1,165	765	980	3,485
43 kilaneters	APBN	80	440	505	880	615	2,520

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Project	Budget Source	1984-1985	1985 - 1986	1986-1987	1987–1988	1988–1989	Total [.]
Seriti - Malangke road 35 kilometers	APBN			250	290	330	870 ^b
Bajo - Bastem road 40 kilometers ^a	APBN			350	400	460	1,210 ^C
Total		80	1,015	2,270	2,335	2,385	8,085
Directorate General Marine Trans- portation Area VI							
causeway rehabilitation Godowns, equipment	APBN APBN			990	500 75	375	1,490 450
Total				990	575	375	1,940
Telecommunications Company-Central	Government	t					
Install exchange for 1,000 automatic telephone lines	APBN					243	243
Total						243	243
Public Works, Potable water - Prov Palopo treatment plant,	ince						-
tribution network	APBN	240	310	320	320	170	1,360
Potable water systems for 20 desas	APBN		700	900	1,000	1,790	4,390
Total	·	240	1,010	1,220	1,320	1,960	5 , 750
Government Electric Company - Area	VIII						
Palopo system-generation	APBN	170	2,870	280	370	. 520	4,210

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Project	Budget Source	1984-1985	1985-1986	1986-1987	1987–1988	1988-1989	Total
	2001	200	160	215	220	270	1 075
Improve distribution network Extension of service	APBN APBN	470	260	420	445	525	2,120
Total		840	3,290	915	1,045	1,315	7,405
Cooperative in North Luwu							
Generation	APBN	640	60	60	60	60	880
Distribution network	APBN	135	50	00	60	60	375
Total		775	120	120	120	120	1,255
Department of Health, Area office	- Provinc	e					
Construct regional hospital -							-
Palopo	APBN	925	538	605	605	435	3,108
Construct/improve health and					•		
sub-health centers	Inpres	85	85	85	119 .	119	493
Malaria control program	APBN	75	55	49	37	` 25	241
Nutrition improvement.							
Vitamin A program	APBN	3	3	4	5	5	20
Food and drive control program	APBN	51	16	18	20	22	127
Nutrition/health education	APBN	1	1	1	1	2	6
Infoctious disease control		*	÷	-	-	_	-
	ומסג	21	. 37	20	43	43	193
program	AF DIN	JL	57		-15	15	275
worms and parasites condition	זאסמא	20	10	40	53	46	210
program Willens set as seen la (sesitation	APDIN	20	. 42	77	55		210
facilities	Inpres	73	84	97	111	128	493
Total	•	1,264	861	947	994	825	4,891
		- , - , -			•		
Department of Health - Kabupaten							
Provide staff offices/equipment							
for desas, Palopo		• •	_	~	<u>^</u>	-	<i>с</i> ,
hospital	APBD-II	29	7	9	9	1	61
Project	Budget Source	1984-1985	1985-1986	1986-1987	1987-1988	1988 - 1989	Total
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Infectious disease control, hygiene and sanitation, education, nutrition impro- vement, public education and food/drug control	APBDII	3 .	4	. 5	6	7	25
				-	· ·	,	23
Total		32	11	14	15	14	86
Other ^a		1,700	1,740	1,785	1,830	1,875	8,930
GRAND TOTAL		21,985	48,279	46,164	109,898	69,095	295,421

^ato be undertaken budgetary constraints permit.

1 1 7 ^badditional expenditure of Rp 690 million required after 1988-1989.

^cadditional expenditure of Rp 1,210 million required after 1988-1989.

^drepresents organizations which are included in the development budget but are not economic development organizations. Data for 1984-1985 are estimated and projected to the end of the plan period at the rate of expected population growth. Appendix Table A.4.

Glossary

ANEKA TAMBANG	Mining company owned by the Indonesian Government
APBN	National Budget
APBD-I	Provincial Budget
APBD-II	Kabupaten Budget
APU	Agricultural Planning Unit
BANDES (Bantuan Desa)	The program of BANGDES Office
BIMAS (Bimbingan Massal)	The national agricultural credit and input intensifica- tion program
BIPIK	Technical assistance and training activities for small industries
ВКРН	Forestry Suboffice
BKPM (Badan Koordinasi Penanaman Modal)	Investment Coordinating Board
BNI-46 (Bank Negara Indonesia - 46)	State Bank of Indonesia - 46
BPD (Bank Pembangunan Daerah)	Area Development Bank
BRI (Bank Rakyat Indonesia)	The National Rural Banking and Credit institution res- ponsible for the provision of funding for BIMAS credit programs and cooperatives, marketing, and capital invest- ment activities
Camat	Head of government for Kecamatan (subdistrict)
FCC	Farm Cooperative Center
Gadu	Paddy grown during the dry season
INPRES	Presidential Instruction Budget

Kabupaten A regency, the political subdivision of an Indonesian <as province 3 KADIN The Chamber of Commerce and Industry Kecamatan The political subdivision of a Kabupaten Oil palm Kelapa Sawit KIK (Kredit Investasi Kecil) Medium term credit n KMKP (Kredit Modal Kerja Working capital Permanen) KPH Forestry Administration вn Office KPPH Forestry Police Office KUD (Koperasi Unit Desa) The village level of cooperative unit of Indonesia ir: Ladang Upland paddy Lappo Ase A program in South Sulawesi Province to increase rice production Lembaga Penelitian Pertanian Maros Research Institute for Maros Agriculture Paddy Threshed, unmilled rice, the equivalent of the Indonesian term "gabah" Penāuduk Resident, people PLN (Perusahaan Umum Government Electric Company Listrik Negara) PPM Agricultural Field Extension Supervisor PPLAgricultural Field Extension Agent

РРН	Pest and Disease Monitor	ikasi
PPS	Aqricultural Subject Matter Specialist	7a
P3RPDAS	National Regreening Program	
Pekerjaan Umum Seksi Pengairan	Public Works Water Resources Section	
REC	Rural Extension Center	an
Rendengan	Lowland paddy grown during the rainy season	
RPMU	Regional Project Management Units	ten
Sawah	Low lying land, used mostly to grow paddy	
SBDC	Small Business Development Center	'ara
SPMA (Sekolah Pertanian . Menengah Atas)	Agriculture School	
SSE	Small Scale Enterprise	
USAID	United States Agency for International Development	
WMU	Watershed Management Unit	

Appendix Table A.5

Government	Organization	ikasi
BAPPEDA	Planning Office	ya
Directorate of Irrigation	Direktorat Irrigasi	
Directorate of Irrigation - Province	Direktorat Irrigasi — Propinsi	
BANGDES	Rural Development Office - Kabupaten	an
Agriculture Food Crops Office - Province	Dinas Pertanian Tanaman Pangan Propinsi Sulawesi Selatan	
Agriculture Food Crops Office - Kabupaten	Dinas Pertanian Tanaman Pangan Kabupaten	ten
Estate Crops Office Area I - Luwu	Cabang Dinas Perkebunan Wilayah I Luwu	
Livestock Office - Province	Dinas Peternakan Propinsi	Jara
Livestock Office - Kabupaten	Dinas Peternakan Kabupaten	
Fisheries Office - Kabupaten	Dinas Perikanan Kabupaten	
Forestries Office - Kabupaten Luwu	Kehutanan Daerah Tingkat II Luwu	
Department of Industry Office - Kabupaten	Departemen Perindustrian Kabupaten	
Commerce Office - Kabupaten	Kantor Perdagangan Kabupaten	
Public Works, Water Resources Section	Pekerjaan Umum, Seksi Pengairan	
Public Works, Highway Division	Pekerjaan Umum, Bina Marga	
Public Works, Kabupaten	Pekerjaan Umum Kabupaten	
Public Works, Area Office - Province	Kantor Wilayah Pekerjaan Umum Propinsi Sulawesi Selatan	
Directorate General, Marine Transportation, Area VI	Dirjen Perhubungan Laut, Kanwil VI	

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Telecommunications Company Perusahaan Umum Telekomunikasi Public Works, Potable Pekerjaan Umum, Cipta Karya Water - Province Propinsi National Urban Development Perum PERUMNAS Corporation Department of Education and Departemen Pendidikan dan Culture - Kabupaten Kebudayaan Kabupaten Department of Education Kanwil Departemen Pendidikan and Culture, Area Office dan Kebudayaan Propinsi Province . Department of Cooperatives -Departemen Koperasi Kabupaten Kabupaten Department of Manpower -Departemen Tenaga Kerja Kabupaten Kabupaten Government Electric Company Perusahaan Umum Listrik Negara Area VIII (PLN) Wilayah VIII Government mining company Aneka Tambang Department of Health -Kantor Departemen Kesehatan Kabupaten Kabupaten Department of Health, Area Kanwil Departemen Kesehatan Office - Province Propinsi Rural Extension Center Balai Penyuluhan Pertanian Farm Cooperative Center Pusat Pelayanan Koperasi Rural Electric Cooperative Koperasi Listrik Pedesaan "Samabotuna"