INDUSTRIAL DEVELOPMENT IN KABUPATEN LUWU

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PROJECT LUWU
PALOPO, SOUTH SULAWESI
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INTRODUCTION

The Scope of Work for the three-month assignment to Project Luwu of the Industries Specialist called for:

1. Review and analysis of existing industrial and mining operations in Kabupaten Luwu.

2. Contact with government agencies and banks to determine extent of their involvement in development of industry and mining in Luwu, South Sulawesi, and Indonesia.

3. Assessment of the effectiveness of these existing policies and programs and recommendations for any appropriate modifications. Development of policies and programs which will have the effect of stimulating industrial growth of the Kabupaten.

4. Analysis of population trends, infrastructure, and raw material production trends, to determine areas to be designated as poles of industrial development. As appropriate, formulation of government projects such as industrial estates to stimulate industrial growth, as well as other infrastructure and marketing facilities.

5. Reconnaissance grade feasibility studies to identify promising projects for initiation by the government or the private sector.

6. Recommendations concerning institutional arrangements.

7. Preparation of an industrial and mining five-year plan for Kabupaten Luwu.

Our findings are presented in two major sections: Part One covers the existing structure of manufacturing and mining in Kabupaten Luwu and appraises government support programs for industry as they now exist. Part Two is in the form of a development strategy for industry. Based on an assessment of resources and of infrastructure, recommendations are made for implementation of specific industries in two categories: new small and medium-scale industries, and small-scale industries which can be upgraded. Finally, government programs to support industrial growth in Luwu are recommended.

The work of the consultant was carried out in the months of April, May and June 1983 in Kabupaten Luwu, and in Ujung Pandang and Jakarta. We gratefully acknowledge the assistance of the Department of Industry in Palopo in carrying out field survey work; the Provincial Department of Industry, including the UNIDO advisors; the Regional Projects Management Unit of the Bank Indonesia in Ujung Pandang including advisors from the Carl Bro International firm of Denmark; as well as officials of other banks and government agencies and numerous private businessmen. The Checchi and Company staff at Project Luwu provided assistance throughout the study. We especially thank Mr. Suherman Laila for his help in translation and interpretation.

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DEFINITIONS

"Industry" in the broad sense as defined in the SIC and ISIC systems would include all productive sectors such as manufacturing, mining, trade, construction, transportation and service industries. Data sources available in Indonesia most frequently use the terms "industry" to mean "manufacturing" as defined by the ISIC 30 code, the convention also adopted in the study. Some locally available data includes service industries, such as auto repair shops, as well as trading establishments, in "industry" data. We have not included these in our analysis.

Mining is included in our survey in response to the terms of reference.

Thus it may be stated that the term "industry" is here defined as manufacturing and mining.

As to size or scale of industry, we have in our analysis of existing industry adopted the definition used by the Department of Industry, and the Central Bureau of Statistics:

Household (cottage)	:	1 to 4 workers
Small	:	5 to 19
Medium	:	20 to 99
Large	:	100 or more workers

In the recommendations section, we have also used the less precise terms small-scale and medium-scale industries and distinguished these from cottage industries.

PART ONE
THE EXISTING STRUCTURE OF INDUSTRY

A. MANUFACTURING

1. Overall View

The structure of industry in Kabupaten Luwu at present is characteristic of the first stage of development: concentration on food processing based on locally available farm products (rice, coconuts), exploitation of forest resources (such as timber, and sago palm), and fabrication of building materials (bricks, lumber, concrete blocks).

The reasons for this pattern are not hard to find: the great distance to urban markets, the basically rural nature of the district which still has farm land available for new settlers, and the accompanying low level of urbanization. This is not to say that new small enterprises are not now being established in Luwu. No doubt more will be in the future in response to market forces. The objective of this study is to propose policies and procedures to accelerate the pace.

The only large scale manufacturing industry in Kabupaten Luwu at present is the plywood factory at Bua, 15 km south of Palopo. With 586 employees it is the only manufacturer employing more than 10 persons. (P.T. Inco's mine and smelter, the largest enterprise in Luwu, is discussed in the following section.)

All other manufacturing is carried out on a small scale, for the most part without machinery. In fact many of the enterprises described below would come under the heading of cottage industries or artisanal activity rather than small or small-scale industry. Yet, as the following section will show, the small industry sector in Luwu is experiencing rapid growth.

2. Employment and Output by Type of Industry

The various types of manufacturing enterprises in Luwu in 1980 and 1982, together with their employment and output, are shown in Exhibit 1. (Nickel mining is excluded.) The data is for enterprises licensed by the

Exhibit 1

Output of Licensed Industries in Kabupaten Luwu, 1980/81 and 1982/83

ISIC Code	Type of Industry	1980/81 No. of Enterprises	1980/81 No. of Employees	1980/81 Prod'n value 000 Rps	1982/83 No. of Enterprises	1982/83 No. of Employees	1982/83 Prod'n Value 000 Rps
31	Food/Beverages	30	178	11,383	42	214	33,710
31122	Ice confections	11	78	1,800	12	81	3,600
31171	Noodles	2	36	1,105	3	36	4,990
31179	Bakery	1	5	450	1	5	1,525
31210	Sago Flour 1/	10 (est)	33	1,800	20 (est)	66 (est.)	15,225
31230	Ice	5	24	6,048	5	24	8,370
31290	Egg/peanut conf.	1	2	180	1	2	N.A.
32	Textiles/Clothing	11	34	5,725	11	34	7,898
32210	Tailors	10	29	2,925	10	29	6.218
32400	Shoemaking	1	5	2,800	1	5	1,680
33	Wood Products	63	1002	1,409,535	107	1,407	1,568,234
33111	Sawmills 2/	39	298	900,000 (est)	73	650 (est)	1,000,000(est
33140	Wood handicrafts	6	32	5,472	8	47	16,564
33190	Rattan furniture	2	7	103	2	7	560
33210	Wood furniture	15	75	8,960	23	98	52,500
33113	Plywood	1	590	495,000	1	605	498,610
34	Paper/Paper Products	5	18	6,766	6	26	14,400
34200	Printing	5	18	6,766	6	26	14,400
35	Chemical Products	N.A.	N.A.	N.A.	1	4	10,500
35140	Citronella Oil 3/	N.A	N.A	N.A	1	4	10,500

ISIC Code	Type of Industry	1980 No. of Enterprises	1980 No. of Employees	1980 Prod'n Value 000 Rps	1982 No. of Enterprises	1982 No. of Employees	1982 Prod'n Value 000 Rps
36	Non-metalic Mineral Products	53	378	32,149	81	533	110,682
36110	Ceramics	1	5	300	1	5	4,900
36330/ 36410/ 36420/	Bricks, roof tiles, & lime	49	359	30,221	76	510	90,215
36320	Concrete floor tiles	1	6	468	2	10	13,553
36320	Concrete Blocks	2	8	1,160	2	8	2,014
38	Metal Products	18	81	42,131	21	94	94,581
38111	Small Agric. Tools, misc. metal products	15	69	39,326	18	82	92,241
38120	Metal furniture	3	12	2,805	3	12	2,340
39	Other Mfg	22	46	11,700	25	54	43,000
39010	Jewelry	22	46	11,700	25	54	43,000
	TOTALS	202	1,737	1,519,389	294	2,366	1,883,005

Estimates by author

Estimates based on information from Forestry Department, Palopo

Information from Producer.

Source: Department of Industry, Palopo

N.A. - Not available

Department of Industry in Palopo. In theory, enterprises with fewer than 5 employees and less than Rps 500,000 in assets are not to be licensed but only enrolled. It appears, however, that "cottage industries"* are included together with "small industries"*. On the other hand, Department officials acknowledge that enterprises in the more remote areas have not been licensed due to shortage of funds and personnel. In fact, the Economic Office of Kabupaten Luwu reported as of 1980 seventy-two enterprises of the types listed in Exhibit 1 which have apparently not been licensed. The Department of Industry does not include rice milling among industries it licenses and data on employment and output in this section is not reported officially.

Although the data in Exhibit 1 does not give a complete picture of small industry in Luwu, we may draw a few general conclusions from it. The wood and wood products sector predominates, this sector accounting for 84% of industrial output. Also noteworthy is the rapid growth in the two years from 1980 to 1982: the number of firms increased 46%, employees increased 36%, and output 24%. All sectors are experiencing rapid growth, especially wood products and building materials. However, in absolute terms, the industrial sector in Luwu is still small.

Details on the functioning of the industries listed in Exhibit 1 will be found in the Appendix.

Total industrial employment may be estimated by adding to the 2,366 employees in Exhibit 1 an estimated 500 workers in unlicensed firms and rice mills, plus employees of the P.T. Inco operation (3,125 employees). We conclude therefore that there are roughly 6000 industrial employees in Luwu at present. Of this number, 3730 or about 62% are employed by two large-scale enterprises, plywood and nickel mining, and are full-time employees. An undetermined portion of the remainder are part-time workers, farmers who return to the rice fields at planting and harvest times. This is especially true of the cottage industry category. The 6,000 employees represent only 1.8% of the labor force (males and females above 10 years of age) based on 1980 census data.

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* See "DEFINITIONS" at front of the report.

Output of the enterprises listed in Exhibit 1 totals Rps 1.883 billion, or about US $ 1.94 million. This is an output of Rps 793,000 per worker (US$ 817). 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 Rps 339,000 ($ 350) per year. As this is not far above the Rps 250,000 to Rps 300,000 a worker might receive in wages, it is clear that most industry in Luwu is highly labor intensive.

Information on value added by type of industry and on Gross Domestic Product in Luwu is now being compiled at the BAPPEDA office in Palopo with the assistance of Project Luwu consultants. This information will give a clearer picture of industrial activity and the extent to which it contributes to income in Luwu. It will also allow comparison with other districts and the province as a whole.

2. Location of Manufacturing Activity

Manufacturing in Kabupaten Luwu is concentrated in the more populated areas along the highway. These populated areas are approximately located on the accompanying map (Exhibit 2).

The data in Exhibit 3 compares population statistics by Kecamatan with the limited data on industry. The first seven Kecamatans listed account for 64% of the population but 84% of the buildings devoted to manufacturing and 99% of the industrial output. The output data, which does not include the nickel mine in Kecamatan Nuha, is heavily influenced by the plywood factory in Bupon.

A rough correlation of the population and industry data seems to indicate four main areas of activity:

- an area centered on 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 Masamba,
- a smaller area centered on Wotu
- the Malili-Soroako area, which derives its activity from the nickel mine.

In general, it may be said that manufacturing activity is located along the main highway and, with the exception of Palopo, is fairly evenly distributed.

The question arises as to whether these concentration trends are continuing. The population increase data in Exhibit 3, together with other census data not reported here, indicates that in fact increases in some of the less densely populated areas are greater than in the seven main Kecamatans. Large increases in Malili, Nuha and Larompong are examples. Population increases shown for Malili and Nuha between 1978 and 1982 are only partly due to employment at the P.T. Inco facility. In fact, the company reduced output and employment in 1981. Some of the increase is due to settlement of transmigrants and others on previously unoccupied land in these sparsely settled Kecamatans.

The industrial output data in Exhibit 1, if the plywood factory in Bupon is excluded, would show that about 68% of output comes from the Palopo area of Wara. The concentration in Palopo is due first to its location as Kabupaten capital 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 by its harbor. These transport facilities, and the urban markets, have attracted small industry together with the necessary manpower.

4. Trading Patterns

An examination of patterns of external and internal trade in Luwu reveals quite a bit about the stage of development of local manufacturing.

Statistics on the volume of trade by commodity appear unreliable and in any case are not essential to this discussion. (Some data on shipments through Palopo harbor are however discussed below.) More relevant is the type and form of goods exported and imported. (These terms are used here to mean goods moving in and out of Kabupaten Luwu.)

a. Exports

Exports from Luwu are exclusively agriculture or natural resource-related and much of it is raw or unprocessed:

Unprocessed Goods	Processed Goods
Maize	Rice & Rice Bran
Soybean	Sago Starch
Mung bean	Copra
Coconuts	Dried animal skins
Fish & shrimp	Lumber
Cloves	Plywood
Fruit (Durian, banana)	"Atap" roofing
Duck eggs	Bricks
Live animals (buffalo mainly)	Charcoal
Tobacco	Nickel Matte
Timber (logs)	Citronella oil
Lumber	
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 labor-saving 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. Most of the remaining items go to Ujung Pandang. Of these the following are known to be exported from Indonesia: rattan, ebony wood, timber, plywood, copra, and nickel matte. 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 and value-added. 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. The feasibility of some of these ventures is examined in Part Two of this report.

b. Imports

The following goods are regularly imported from out side Luwu:

Petroleum products (gasoline, diesel, kerosene)
Cement
Wheat flour
Sugar
Salt
Vegetables
Floor tiles
Galvanized roofing
Soft drinks
Textiles/apparel
Fertilizer
Agricultural chemicals
Miscellaneous household and industrial items
Miscellaneous food items

Opportunities to create import-substitution industries based on the above generalized list appear limited at present. With the growth of a local floor tile industry reported on elsewhere, imports should eventually cease. 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.

c. Port Movements

Although the improvement in roads has sharply increased shipments by truck relative to those by boat, shipments from the Palopo harbor were still increasing as of 1981. Imports increased from 15,200 tons in 1978 to 46,200 tons in 1981. Export by sea however decreased somewhat during this some period, from 16,400 tons to 12,700 tons. Much of this traffic is within Kabupaten Luwu and the remainder to and from Ujung Pandang (plus some from southeast Sulawesi).

Some idea of the goods transported may be had from Exhibit 4. Of the exports shown, only plywood* and some

* Although statistics indicate shipments of plywood from Palopo, the operators of the plywood mill at Bua state that they have always shipped their products directly from Bua by barge (and by truck).

rice is shipped from Kabupaten Luwu (both for Ujung Pandang). Rice, coconut oil and dried fish are examples of local products shipped from Palopo to other parts of the Kabupaten in small craft. Transhipped items imported from Ujung Pandang include cement and fertilizer. Finally goods arriving in Palopo from elsewhere in the Kabupaten include wood (logs), rattan, and resin, virtually all of which is processed or semi-processed in Palopo and shipped to Ujung Pandang or other points in South Sulawesi. Heavy equipment and asphalt imports were for road-building projects.

In summary, the vast majority of port movements is by small craft engaged in local trade within Kabupaten Luwu.

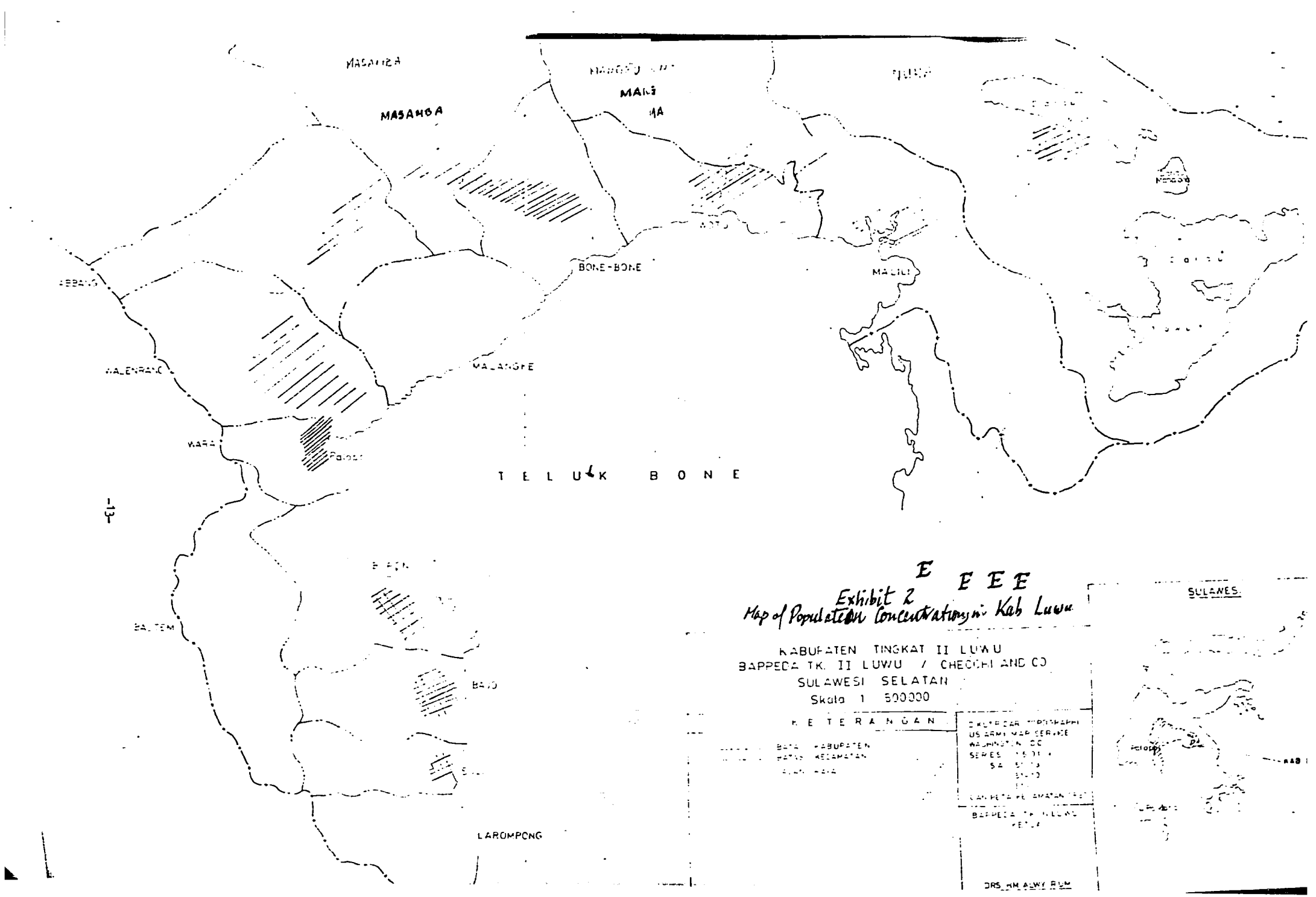

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Exhibit 2

Map of Population Concentrations in Kab Luwu

Exhibit 3
Population and Manufacturing by Kecamatan
1981 & 1982

	Kecamatan	1982 Population	Population Increase, 78-82	1982 Population Density, pers/ha	No. of buildings		1981 Industrial Output 000 Rps
					Total	Manufact.	
1.	Walenrang	70,974	7,699	0,39	13,064	65	29,880
2.	Wara	60,405	8,891	3.12	10,039	95	260,352
3.	Bone Bone	53,487	6,279	0.84	10,105	76	10,880
4.	Bupon	49,237	3,412	0.66	8,735	14	520,100
5.	Mangkutana	37,188	9,721	0.18	7,011	22	1,600
6.	Bajo	37,129	2,847	0.63	6,219	5	35,600
7.	Wotu	31,912	9,881	0.16	5,109	10	15,607
8.	Sabbang	30,909	3,640	0.13	4,038	10	6,602
9.	Nuha	29,112	8,438	0.10	4,907	9	2,681
10.	Masamba	28,493	5,147	0.10	5,337	5	7,980
11.	Malili	24,976	12,979	0.12	2,833	17	1,425
12.	Larompong	23,022	7,899	0.63	4,293	3	1,525
13.	Malangke	18,708	3,996	0.23	2,925	-	3,000
14.	Suli	17,130	2,286	0.79	3,029	9	2,340
15.	Bastem	12,256	- 938	0.04	2,445	-	-
16.	Limbong	10,651	23	0.04	1,413	-	-
	TOTALS	532,241	92,200		85,512	340	881,525
	% accounted for by first seven:	64%	53%		70%	84%	99%

Sources: 1980 Population Census, Department of Industry/Kabupaten Luwu

Exhibit 4
Exports and Imports from Palopo Harbor, 1981

Exports		Imports	
Commodity	Tons	Commodity	Tons
Rice	7,470	Wood	38,837
Plywood*	2,755	Cement	2,600
Cement	1,060	Bulgur Wheat	1,600
Misc Goods	576	Rattan	977
Sugar cane	243	Heavy Equipment	977
Petroleum products	243	Fertilizer	500
Coconut oil	84	Resin	484
Other fuels	65	Asphalt	200
Wheat flour	45	Salt	36
Fertilizer	38	Other	14
Vegetables	22		46,225
Salt	6		
Dried Fish	104		
TOTAL	12,713		

* Shipment frim Bua, Kecamatan Bupon

Sources: BAPPEDA, Palopo

B. MINING

1. Nickel Mining Operations

a. Overview

P.T. Inco, a 98% owned subsidiary of Inco Ltd. of Canada began operations in 1977 at Soroako, operating an open pit mine and smelter to produce "nickel matte" a nickel-sulfur product consisting of 75% nickel. It was initially constructed with a smelter capacity of 12,000 tons* and with power supplied from a 56 MW thermal power station, but a decision was made before operations even began to convert to hydroelectric power due mainly to high oil prices. At the same time smelter capacity was increased to 35,000* MT to utilize most of the 165 MW generating capacity of the new hydro power plant built on the Larona River.

Shareholders in P.T. Inco in addition to INCO Ltd. are six Japanese metal processing companies, three of whom contracted to purchase a total of 14,000 MT of nickel matte annually for 15 years. The original 25% investment of these companies has been reduced to 2% by INCO Ltd's large injections of new equity capital to finance the expansion.

b. Mining Operations

Ore is recovered from the nickel laterite soils of the area by stripping away an overburden varying in thickness from 5 to 15 meters. Extensive screening operations are necessary to remove non-nickel bearing rock from the ore, which in addition to nickel contains silica, magnesium and iron.

Operations are complicated by the different character and Ni content of ore from the west and east sides of the mine. This has necessitated blending of the ores at a later point in the process. The wet screened ore is trucked to the processing plant for drying.

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* Initial and final capacities were to have been 16,000 tons and 45,000 tons respectively, but the ore as extracted proved to be lower in Ni content than surveys had indicated.

c. Processing

After drying in an oil-fired rotary dryer, and screening to remove additional low Ni rock, the ore goes to storage. From there the dry ore is blended and fed to one of three 100 meter-long rotary kilns to dehydrate the ore and to pre-reduce and sulfide the iron and nickel. The sulfur comes from the high-sulfur oil used to fire the kiln, plus elemental sulfur injected into the kiln. This partial reduction reduces the electrical energy required in the smelter.

The resulting "calcine" is fed to one of three electrical furnaces, each consuming 36 MW of electrical power and smelting 78 tons of calcine/hr. Slag is progressively skimmed from the surface as calcine is added to the furnace. About once a day, the furnace is tapped into ladles holding 20 tons of "matte". At this point the product is over 50% iron, so an additional "converting" step is required in which air is blown over the surface of a rotating converter containing the molten matte, and a slag high in iron is removed. The final product after granulation, drying, screening, and filling into large rubberized bags, contains 75% nickel and 20% sulfur.

Production of nickel matte since start-up of the plant is as follows (in terms of amount of nickel in the matte):

	Millions of lbs	Metric tons	% of Capacity
1979	18.9	8,570	24
1980	44.7	20,270	58
1981	43.9	19,910	57
1982	30.3	13,740	39
1983	40.0 (est'd)	18,140 (est'd)	52

Reasons for the decline in production since 1980 and subsequent recovery are commercial rather than technical and are discussed below.

d. Sales

Sales of P.T. Inco have been strongly affected by the decline since 1980 in demand for nickel used in making stainless steel. Prices on the London Metal Exchange, which basically govern the prices at which the company's Japanese customers purchase nickel matte, fell from US $3.14/lb. in

1980 to US $1.40/lb. in November 1982. By May 1983 they had recovered to US $2.20/lb. Company analysts expect that the price may reach US $3.00/lb. by the end of 1983. This expected recovery of the market is the basis for a projected 1983 production almost up to the 1980 level.

Shipments (sales) of matte since start-up are as follows:

	Million of lbs	Metric tons
1979	17.5	7,920
1980	46.7	21,160
1981	41.1	18,640
1982	33.9	15,370
1983 (1st quarter)	5.6	2,520

It will be noted that shipments and production balance out over the 1979-1982 period.

Shipments of matte are from the harbor at Malili, a 50 km haul by truck on a company-built road from Soroako. The absence of a deep water port makes it necessary to lighter the product by barge from a company pier in Malili approximately 5 km by river to vessels anchored offshore.

c. Company Prospects

The world market for nickel has been affected not only by the recession but also by a recent increase in nickel production capacity as new facilities in various parts of the world came on stream. P.T. Inco officials state that worldwide production capacity for nickel is currently 1.7 billion pounds*, while demand now is no more than 1 billion pounds. Even with a strong economic recovery worldwide it appears that it will be several years before demand and supply come more into line and prices reach previous levels.

P.T. Inco has since 1981 reduced its debt burden by retiring some long-term high interest loans and replacing

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* "Effective capacity", the amount of production which can be reached without any additional investment, is about 1.45 billion pounds.

them with inter-company loans at lower rates and additional equity capital. However, due to accumulated losses of P.T. Inco, as well as losses suffered by the parent company, INCO Ltd. has limited resources to continue such support. Instead, the company offered in November 1982 to sell 20% of its shares to the Indonesian government, an option provided in the original work contract*. The government is considering the purchase of at least a part of this amount but has not yet acted. P.T. Inco hopes that such an investment by the Indonesian government would also have the effect of encouraging other investors, such as banks in Indonesia and Japan, to participate.

Prospects for bringing P.T. Inco into a profit-making position would seem to rest on:

- the recovery of world nickel prices;
- a reduction of unit production costs through operation of the smelter at closer to capacity levels; and
- a reduction of the debt burden by the injection of new equity from outside the P.T. Inco/INCO Ltd. structure.

f. Impact on Kabupaten Luwu

P.T. Inco currently employs 3,143 persons (including staff of the Jakarta and Singapore offices). At Soroako there are currently 87 expatriates. The injection of this income into the area has obviously benefitted Kabupaten Luwu. Yet it appears that the "multiplier effect" of this income has not been great, that is, it has not given rise to any appreciable development in the form of small industry or service industries serving the mine or the local population. Reasons for this have to do first of all with the "enclave" nature of the mine; it is essentially a self-contained unit obtaining most of its supplies from outside Kabupaten Luwu. Secondly, the area surrounding the mine, Kecamatans Nuha and Malili, are rural areas where most inhabitants make their living from the land. There are few towns of any size outside of the three company towns, and consequently a dearth of businessmen who might be expected to capitalize on opportunities to sell products or services to P.T. Inco. These two points are to some extent a cause and effect situation.

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* Far Eastern Economic Review April 28, 1983.

The company, through its External Relations Office, has made and continues to make efforts to increase local purchasing, but has had difficulty finding reliable suppliers or contractors who can meet their specifications.

(1) Local Purchasing

Pursuant to the Indonesian government's "Promotion of National Interest" Plan, P.T. Inco buys many Indonesia-made products in preference to imported goods even though the cost is frequently higher. Examples of such purchases in the first quarter of 1983 are petroleum products (about 75% of all purchases), coal, food supplies, medical supplies, and office supplies. Offers were also requested from Indonesian companies for tires and tubes, electrical cables, mattresses, soap products, metal products, and miscellaneous items including tools and insecticides. However purchases of these items were not made because specifications could not be met, price differences with imported products were too great (40 to 170% higher in the case of Unilever soap products), or no offers were received.

Local (Soroako) purchases were restricted to food supplies (chicken, beef, shrimp, and fish) and office maintenance supplies. Services purchased included vehicle maintenance and transportation services. A vendors list, which includes a number of firms in Malili, Palopo, and Soroako is maintained and updated regularly. These are mostly sellers of auto upholstery, food products, wood and furniture, printing, and building contractors and bus companies.

Plywood from Kecamatan Bupon is virtually the only manufactured product from elsewhere in Luwu. Almost all other purchases in Sulawesi come from suppliers in Ujung Pandang. Products purchased there include medical supplies, printing, markisa juice, and rattan furniture.

In the first quarter of 1983 local purchases totaled US $6.1 million, of which 4.3 was from Jakarta (73% fuel), $1.1 million from Ujung Pandang (88% fuel), $334,000 from Soroako, and $362,000 from Singapore.

(2) Company Efforts to Increase Local Purchases

Under a "divestiture plan" some local transportation services have already been contracted out, as has garbage collection in the company town.

The company would like to extend this to catering (obtaining food supplies from local sources), messing facilities, and repair of personal vehicles used by company staff, but this has not yet proved possible. It would also like to see Pertamina install a gasoline service station for personal vehicles and relieve the company of the necessity of operating its own station.

The company has sought to stimulate local businessmen to produce such goods as improved rattan furniture, coveralls for workers (through a proposed cooperative of local tailors), and a fisherman's cooperative in Malili which would have been provided with of cold storage unit by the company. These efforts have been fruitless. Company officials report a lack of capability on the part of local enterpreneurs due to lack a capital, business experience, and technical expertise.

Reported attempts to interest businessmen in Ujung Pandang in setting up ventures in Soroako were also non-productive as the area was considered too remote.

(3) Potential Local Industries

In response to our inquiries company officials suggested the following types of businesses which could possibly be set up to supply P.T. Inco and other local markets:

- quality rattan furniture
- beef and milk
- coveralls of fire-resistant material
- tire re-capping
- food catering
- operation of mess halls
- house painting
- servicing of air conditioners and other household appliances.
- servicing of personal vehicles
- bus transport
- fish cold storage and transport
- wood office furniture
- metal products used in the smelter such as sampling spoons and electrode casings (the latter being a precision product)
- electrical motor rewinding

The feasibility of some of these ventures in considered in Part 2, Section D of this report.

2. Copper Deposits

a. Explorations

P.T. Aneka Tambang has been conducting explorations since 1974 of copper-zinc-lead deposits in a mountainous area west of Batusitanduk. Elevation of the area is about 1100 meters. Roughly 60% of these deposits lie within Kabupaten Luwu; the remainder are in Kabupaten Tana Toraja. At present the area is accessible by vehicle only from Rantepao, the location of the company's field office. A Japanese geologist is assisting with the field survey work.

The accompanying map (Exhibit 5) shows the location of the deposits. Three separate deposits have been identified in the region known as "Sangkaro-Sungai Sa'dan". Their principal characteristics and the extent of exploration are shown in Exhibit 6.

As explained by the local P.T. Aneka Tambang Manager, Mr. Anthon Pongrekun, and the Japanese geologst, Mr. Sato, this type of ore deposit contains copper, lead, and zinc, with zinc the most abundant, but copper -- with a value about two times greater than zinc -- being the principal mineral sought. Zinc and lead are usually recovered as secondary products.

The upper level of a typical deposit contains the "black ore" which has the highest percentage of copper. As such deposits are relatively simple to trace and map, the extent of the Batumaruba deposit is fairly well established. The much more extensive Rumanga deposit has had the upper or black ore level mostly weathered away, leaving a poorer "network" type of formation which has proved very difficult to map. The Bilolo deposit, though largely of the black ore type, is much smaller in extent.

Field exploration work is drawing to a close and no further drilling or tunneling is planned. Current work consists mostly of data interpretation and correlation with surface phenomena. Estimates of the tonnages of these deposits are not yet available.

b. Exploitation Plans

With the completion of field work, the next phase is a detailed study of mining costs to be conducted by the Jakarta office of P.T. Aneka Tambang. The Rantepao office will continue to operate at a reduced level to supply any additional data required for this study.

Exhibit 6

Sangkaro-Sungai Sa'dan Copper Deposit/Characteristics

Name of Deposit	Kabupaten	Distance from Rantepao	Nature of Ore body	Approx % Copper	Relative Sizes of Deposit	No. of Core drills Made	No. of Tunnels
Batumaruba	T. Toraja	16 Km	Black ore	3 to 7 %	Medium	183	-
Rumunga	Luwu	22 Km	Network	< 1 %	Large	130	4
Bilolo	Luwu	25 Km	Black Ore	3 to 7 %	Small	36	1

Technically, the ore deposits are considered "mineable". Should exploitation be undertaken, ore would be extracted by both open-pit and underground shaft methods. Most likely two or even all three deposits would be mined simultaneously and the ore blended to give a constant infeed to the processing plant, which would be located on the Luwu side of the area. Copper, zinc, and lead concentrates would be produced by the flotation process. No smelting is foreseen.

The ore concentrates would be trucked out, probably to Palopo, and dispatched by sea to buyers in Japan (see below). Though mining costs are not yet available to calculate profitability of the mine, the project is unlikely to proceed at the present time in any case for two reasons:

(1) World copper prices remain low. While pound sterling prices on the London Metal Exchange have held up over the past several years, most trading is conducted in U.S. dollars which have steadily increased in value relative to the pound. Thus the price in U.S. dollars dropped from $2.10/lb. two years ago to $1.65/lb. at present. Demand from Japanese copper processors remains depressed.

(2) The government mining company, P.T. Aneka Tambang, plans to proceed soon on a joint venture with Kaiser Aluminium to produce alumina on the island of Bintan. Funds are not likely to be available for a second project until this is on stream. Even so, the Toraja-Luwu copper project may have to compete for funds with yet another project -- expansion of the ferro-nickel operation at Pomalaa in Southeast Sulawesi.

Even if copper prices return to previous levels it seems unlikely that the project would be launched before the final year of the coming 5 year plan (1989), at the earliest. From that point it would be roughly three years before shipment of concentrates could begin.

c. Infrastructure Planning

Supporting infrastructure for this project, should it proceed, could have a beneficial impact on Kabupaten Luwu. The two alternative routes considered for shipment of concentrates are (1) by road to Palopo and from there by sea, and (2) by road to Pare-Pare and then by sea. The Palopo route appears to favored at present due to the much shorter road distance involved.

A road link would be established between the processing plant and Batusitanduk. The first 12 km section would be a new road as far as the village of Simbawang. The existing 8 km stretch of road from there to Batusitanduk would be upgraded. The road would not be asphalt surfaced.

The harbor at Palopo would be upgraded to handle the ore shipments. It seems likely that the harbor would have to be deepened to handle 10,000 ton vessels and a new or enlarged wharf constructed, along with storage and loading facilities and improved access roads.

d. Impact on Kabupaten Luwu

The project would directly benefit Luwu in two ways:

- an improved harbor would become available which would permit direct export of locally produced goods rather than transhipment via Ujung Pandang. Direct export would alter the economics of marketing such exportable products as rice, soybeans, lumber, palm oil, processed fish and shrimp and possibly other new processed products such as cassava starch. It could likewise reduce costs of some imported goods.

- The existence of the mine could spawn new industries or expand existing ones to supply the company's needs, such as poultry, fish, and beef; services such as transportation, catering, equipment repair and maintenance; and possibly manufactured goods such as work clothing, small tools and tire recapping. The parallels with the Inco operation are obvious.

It was also learned through the Rantepao office of P.T. Aneka Tambang that a study is planned of the feasibility of a dam and hydroelectric power project at Malea, near Kakale in Kabupaten Tana Toraja. The site on the Sadang River is said to have a power generating capacity of 190 MW and could supply power to much of the northern part of South Sulawesi, including Luwu. The project if implemented would undoubtedly benefit development of industry in Kabupaten Luwu.

3. Other Mineral Resources

A report issued in 1980 by the Provincial Office of Mining on Kabupaten Luwu mentions the following mineral deposits in addition to nickel and copper:

a. Gold

Primary deposits of gold exist in Luwu in quartz veins associated with granite intrusions. Gold from these veins appear as placer deposits in the Laboni area east of Malili and in river beds in the southern part of Kabupaten Luwu. The report does not evaluate the extent of these deposits.

b. Iron

The Dutch government conducted exploration between 1917 and 1921 of lateritic iron deposits in the Verbeek Mountains (Kecamatan Nuha). Ten locations were identified with a total of 500 million tons of ore, 15 million tons of which was "lump ore" and the rest "clay ore". The clay ore was reported to be 49% Fe_2O_3. These deposits were not considered economic to mine, a conclusion which apparently still holds true today.

c. Chromite

The Dutch explorations mentioned above also identified chromite deposits in the Latau area of Kecamatan Malili, said to be 50% Cr_2O_3. An Indonesian survey team in 1980 confirmed the existence of this ore, but no other findings are contained in the above-referenced report. A figure of 3,000 tons for the size of the deposit is mentioned, but this appears unreasonably low and may be an error.

C. APPRAISAL OF GOVERNMENT SUPPORT PROGRAMS

1. Overview

A great diversity of government programs exist 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 in this very large sector of the economy.

A 1979 study* noted that the estimated 1.3 million household or cottage industries in Indonesia accounted for 80% of manufacturing employment but only 16% of value added. Employment in these industries is largely a part-time activity.

Small enterprises, those with 5 to 19 employees, account for about 8% of employment and 10% of value added. Their productivity is much higher than that of household industries despite the fact that few use electrical power.

This same study concluded that: "employment growth in rural and small-scale manufacturing industry has continued to be rapid in the 1970's, but the situation is hardly a happy one, since the average real earnings of workers in Small Scale Industry appear to have declined".

This situation seems to be continuing and clearly justifies the government's concern for small industry and the substantial resources devoted to various programs of assistance. Some comments on the effectiveness of the programs are included below.

The following discussion focuses on programs now in effect in South Sulawesi and particularly in Luwu, under two main headings: Credit and Finance, and Technical Assistance and Training.

2. Credit & Finance

The Indonesian government has an elaborate credit system for small industry administered by the Bank Indonesia through commercial and development banks. The KIK/KMKP scheme, begun in December 1973, offers medium term credits for investment (KIK) and for working capital (KMKP) to small

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*Small-Scale Manufacturing Industries: Patterns, Trends, and Possible Policies, Donald R. Snodgrass, Harvard Institute for International Development, March 1979.

enterprises in agriculture, livestock, fishing, trade, communication, and industry sectors. An enterprise is eligible if it's net worth does not exceed Rp. 100 million and its ownership is at least 75% indigenous Indonesian.

Terms are as follows:

	KIK	KMKP
Maximum Loan amount:	Rp. 10 million	Rp. 10 million
With supplementary amount:	Rp. 15 million	Rp. 15 million
Interest rate	10.5% p.a.	12% p.a.
Max. duration	10 years	3 years (extendable for 3 yrs)
Max. grace period	4 years	overdraft facility
Collateral	Assets financed by loan. Additional collateral up to 50% of loan, if available.	

Funds for the program are obtained from the Indonesian Government's own resources and from a World Bank loan. As of 1981, the program was operating in nine provinces and had outstanding KIK loans of Rps 295 billion and KMKP loans of Rps 536 billion. Due to the size limitations of the loans, most applicants tend to be in the small industry category as defined by the Department of Industry (5 to 19 employees).

The principal participating or "handling banks" for the program were BRI (which had 46% if all KIK loans outstanding as of June 1980), BNI 46 (with 15% of KIK loans but focusing more on the manufacturing sector), and the regional development banks.

The average loan size under these programs was considerably smaller than the maximums noted: Rp. 4.2 million ($4,375) for KIK and Rps. 1.3 million ($1,355) for KMKP, as of August 1981.

Small industry (manufacturing) receives a relatively small proportion of these loans -- the largest share goes to trade. This is particularly true for South Sulawesi: only 9% of the KIK loans and 10% of KMKP loans were for industry as of June 1980, the lowest of any province in the program.

This reflects in part a low level of industrialization in South Sulawesi, but could also be related to differing policies of handling banks and the readiness of businessmen to avail thenselves of lending facilities.

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

	Millions of Rupiahs		
	KIK	KMKP	Total
December1981	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% of all KIK loans and 7.8% 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 handling banks known as the Small Enterprise Development Project. Regional Project Management Units (RPMU's) staffed by expatriate and Indonesian consultants are located in BI branches in 12 provinces. Functions of these units are to provide on-the-job training to the staff of handling banks while carrying out project identification studies and pilot projects. These studies are made available to handling banks for use as they see fit in support of lending programs. The units also have other monitoring and training functions. The program also receives support from the Australian government.

The KIK/KMKP program has grown steadily since its inception, the number of loans granted about keeping pace with applications received. However, the program is currently facing two problems: a worsening repayment rate and decreased funding levels. Accordingly handling banks have been instructed to be more discriminating in making loan approvals. It can be expected therefor that the rate of loan approvals will slow in the future.

The Palopo branches of the BRI and the BNI-46 banks are both making loans under the KIK/KMKP program. The BRI manager reports a total of Rps. 186 million in outstanding loans to 89 customers (an average of about Rps. 2 million/loan). Loans for manufacturing included brick making, ebony handicrafts, rice milling, sawmills, and automobile repair shops. BNI-46 would not divulge the amount of loans but mentioned the same industries plus manufacturers of tiles, ice, bread, and metal working products as loan recipients.

The BNI manager stated that one of the problems experienced with the program was indequate market studies by some loan applicants which caused losses and loan defaults.

In addition to bank lending facilities there are three development finance institutions: the IDFC, the PDFCI and P.T. Bahana Pembinaan Usaha Indonesia. All three grant medium and long-term credits and take equity participation in industry. We are not aware of any activities of the first two institutions in Luwu, but P.T. Bahana is working with a citronella oil manufacturer in Kecamatan Mangkutana.

P.T. Bahana officials state that this government-owned company invests in small and medium-scale industry utilizing funds made available through Bank Indonesia. Their principal focus is on firms with Rps. 100-150 million in assets (which is defined as medium-scale) though investments are also made in firms with under Rps 100 million in assets (small-scale). They currently have 40 projects involving a total of Rps. 2.5 billion in loans and equity. P.T. Bahana is anthorized to hold up to 49% of equity and to provide debt financing up to a 3 to 1 debt/equity ratio at 10.5% interest. They also conduct training courses in management, which is cited as the main need of their client enterprises. These enterprises include citronella oil, fishing, shellfish raising, and rattan furniture, as well as number of service industries.

P.T. Bahana has a 30% interest in the citronella oil firm, P.T. Citronella Sumber Alam. A P.T. Bahana staff member sits on the Board of Directors of the company.

3. Technical Assistance and Training

The Department of Industry (Perindustrian) plays a major role in technical assistance and training actvities for small industry through its BIPIK Program (Guidance and Development Program for Small Industry).

Services include:

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

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 on the use of a piece of equipment, which 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.

Officials in the South Sulawesi provincial office of the Department of Industry depicted the BIPIK program as having a "hardware" and a "software" aspect. The hardware program includes the provision of equipment and raw material as noted above, while the software program covered not only training but 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 in Indonesia with limited resources. This method of delivery is not as effective in a more sparsely settled rural area like Luwu where with a few exceptions (wood furniture in Palopo is one) there are not large concentrations of manufacturers. The local office in Palopo has however, assisted groups of brick, sago, wood furniture and ebony handicraft makers with tools, equipment and some training. The director would like to see a small industry estate established near Palopo to facilitate provision of services. In his view candidate industries could include rattan furniture, ebony wood products, and ceramics.

The BIPIK program also aims to improve 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 which is intended to link small producers to large firms through subcontracting of 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 General Manager recently headed a study for the Provincial governor

on ways to improve coordination of industrial development programs. KADIN has also been involved in promoting a handicraft center in Rantepao, Tana Toraja, where local products are displayed and sold.

The KADIN branch in Luwu with a staff of four persons, has 156 members. These include mainly local building contractors, but also traders in rattan and fish, and sawmill and brick plant owners. In 1982, KADIN organized a seminar on small industry which included local government officials, Department of Industry, commercial banks, and KADIN members. A second such seminar to scheduled for July 1983.

In the Jakarta headquarters a number of export promotion activities are conducted. One example is KADIN's sponsorship of the "Indonesia Rattan and Plaitware Joint Marketing Agency". The nine member companies are "coordinating production activity and export marketing"

The Investment Coordinating Board (BKPM) in Jakarta, with offices in provincial capitals, administers the investment incentive scheme which is available for certain promoted industries. 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).

4. Appraisal

In our opinion, 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 here, as in many other developing countries, 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. Government programs take time to devise and implement, and by their nature are more or less fixed in size and scope. Yet the very essence of business is flexibility, the rapid adaptation to changing conditions which requires a strong measure of judgement and imagination on the part of the entrepreneur. There are some widely recognized problems in delivery of services to small-scale industry in all developing countries. Many different approaches have been tried and successes have been few.

One point which all evaluators seem to agree on is that the 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. All observers stress the importance of targeting direct assistance on the small or medium-scale enterprise, which is likely to be managed by a committed entrepreneur with paid employees and his own invested capital, and even then selecting for assistance only those sectors which have good long-term market prospects.

Beyond these generalities, a number of specific recommendations have been made in recent studies on developing small enterprise in Indonesia. We feel it is worthwhile to repeat some of the main points here as they represent informed opinion of these who have spent much more time dealing with these complex issues than it has been possible for this consultant to do in a three-month study. Furthermore it seems obvious that any recommendations which might be made regarding industrial development policies and programs in Kabupaten Luwu must take into account the situation at national and provincial levels as well.

A 1980 World Bank study* on small scale enterprise (SSE) made the following comments:

- There is a lack of central direction and focus to the great number of government and private technical assistance programs. 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 SSE loan applications.

- a progam to reserve certain items for government procurement from SSE's is poorly coordinated and lacks direction.

It was suggested that consideration be given to creating a central authority to provide policy guidance and coordinate assistance to SSE's.

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* Indonesia: Second Small Enterprise Development Project, IBRD, November 1980.

The Harvard Institute for International Development published a paper in 1979 (cited in paragraph 1 above) on small-scale manufacturing industries in which suggestions were made for policy changes. These included forming an interdepartmental coordinating committee which would mobilize political support for small industry development, develop new policies and improve coordination among various government programs to aid small industry.

A report* prepared in March 1983 by Development Alternatives Inc. for USAID dealt with design of a project to aid small industry in Central Java. The report made the following points:

- entrepreneurs in Central Java felt that there was no institution in the province which approached their problems from a business perspective.

- banks and other financing institutions found that there was "an absence of well prepared and economically sound projects presented for financing"

With respect to technical assistance offered by the BIPIK program in Central Java, there were several deficiencies noted:

- Industrial extension workers lacked the training and experience to gain credibility with the entrepeneurs they were assisting, and also lack commitment to their work as they were hired on a two-year contract.

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

- Raw materials were often delivered at the wrong time and were not of the right type or amount.

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

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* Central Java Enterprise Development Project: Interim Report by Development Alternatives Inc. for USAID, March 31, 1983.

Other problems mentioned include:

- the services of various industry technical institutes were under-utilized, often due to lack of knowledge of what was available, but also to problems in paying for the service.

- there was a lack of coordination among the 43 agencies which offer training related to enterprise development.

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

In a paper* prepared for a workshop on small scale enterprise held in Jogjakarta in December 1981, Mr. Abdul Latief stressed the importance of marketing, commenting:

> "Marketing is the spearhead of all the concepts of small scale industry development I have ever known. Without starting from the point of marketing all development programs will be meaningless".

Other comments included:

- planning of development programs for small industry must include people knowledgeable about the potential for marketing the products.

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

- it would be better to design an integrated program which includes government and non-government bodies which could design a comprehensive program.

- BIPIK should work together with marketing associations owned by government, by cooperatives, or by private enterprise.

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* Development of Small Scale Industry through Merchandising, by Adul Latief, 27 November 1981.

- many credit programs for industry are not effective because banks cannot be assured of "the essential soundness of the projects they finance".
- development programs should integrate three groups: the small enterprises concerned, the banks which will finance them, and the distributor who will collect and market the commodities.

These comments, and the consultant's own observations and experience, serve as the basis for recommendations in Part Two of this study.

PART TWO
DEVELOPMENT STRATEGY

A. APPROACH

The proceding section of this report has demonstrated that development of industry -- virtually all of it on a small or "cottage" scale -- is taking place in Kabupaten Luwu in response to market forces. Government programs of credit and technical assistance are having an impact on this development, but not in any substantial way. We believe that it is possible to accelerate the process by removing several key impediments to growth, and hopefully avoiding some of the economic problems encountered in Java where the industrial sector has been unable to absorb the excess manpower coming from the agriculture sector -- without decreasing incomes in the process. Kabupaten Luwu has not yet had to cope with this problem but inevitably it will have to.

The situation in Kabupaten Luwu is different than some of the areas now receiving attention in small industry development programs such as central Java. As we pointed out in Part One, Section A, we are dealing here with an area where pressure on the land has not yet become a problem; there is a relatively low population density and low degree of urbanization. This combined with its remote location -- some 6 hours by road from the nearest urban area (Ujung Pandang) -- 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. There are two notable exceptions: the nickel mine in Kecamatan Nuha and the plywood factory in Kabupaten Bupon.

The implication of all of this for industrial development is that:

- Luwu offers at present 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, our approach has been to identify 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. The successful establishment of such industries will require careful study of markets and preparation of appropriate feasibility studies. Several such industries are discussed in Section D. Sections B and C examine the infrastructure base for these industries.

In our analysis we have not restricted ourselves to small industries only. In view of the limited number of opportunities, and the potential for growth we foresee in some cases which would make "cottage industries" into "small industries" and "small industries" into "medium-scale industries", we felt that the distinction was not a useful one.

To enable effective implementation of new industrial projects, we believe that certain changes are required in the way government programs of assistance to industry are carried out. Some policy recommendations are made in Section E.

B. RESOURCE ASSESSMENT

In assessing the resource base for industrial development in Luwu, we have not gone into detail. Other reports, especially one on agriculture, have already done that. Our purpose here is to give an overview of resources to serve as a background to later discussions.

1. Land Use

A summary of land use by Kecamatan appears in Exhibit 7. Estimates of the amount of land contained within the forest, grassland, and other categories which is potentially cultivatable vary from about 90,000 hectares to 600,000 hectares. In 1975 there were estimated to be between 100,000 and 150,000 hectares of potentially cultivatable land in the North Luwu plain alone. Suffice to say that there is likely to be at least as much agriculture land still available as is already being cultivated (132,000 ha) though very little if any sawah or flooded riceland will be included in this figure.

A study of agriculture prepared under Project Luwu notes the need for a land use survey to update available information. It is suggested that already cultivated land be farmed more intensively rather than opening up new lands. Recent information on returns to the farmer from the various crops other than rice is needed as a basis for recommending optimum cropping patterns.

In general, future growth in agricultural production will have to come from field or tree crops. The largest available areas are in the more remote Kecamatans of Limbong, Sabang, Bastem, Masamba, and Nuha; poor access to these areas will continue to hamper their development. On the other and, if estimates are correct, substantial amounts of land still remain in the more accessible Kecamatans of Malili, Wotu, Mangkutana, and Walenrang.

Soil surveys in the North Luwu plain area, however, have indicated that dry land cultivation of much of the upland area will require good soil management as soils were not particularly fertile.

Exhibit 7
KABUPATEN LUWU
LAND USE SUMMARY
PENGGUNAAN TANAH (ICHTISAR)
(dalam Ha. in Ha)

KECAMATAN	TANAH PERTANIAN DITANAMI / AGRIC. LAND	PADANG RUMPUT / PASTURE/ GRASSLAND	KAWASAN HUTAN / FOREST	TANAH BANGUNAN / VILLAGES/ URBAN	LAIN LAIN / OTHER	JUMLAH / TOTAL
(1)	(2)	(3)	(4)	(5)	(6)	(2 to 6)
1 Larompong	10517	-	18573	134	6776	36000
2 Suli	6148	1071	605	419	11757	20000
3 Bajo	10844	626	470	2297	44963	59200
4 Bastem	12875	38875	142650	1716	128884	325000
5 Bupon	16651	625	33078	1701	22945	75000
6 Wara	2954	1700	8000	2578	3768	19000
7 Walenrang	17317	1350	101861	2800	59672	183000
8 Sabbang	3862	98	179578	193	57669	241400
9 Limbong	9948	3668	41605	202	188877	244300
10 Masamba	11084	52615	47376	1038	161887	274000
11 Malangke	4520	1455	14619	1533	57873	80000
12 Bone Bone	5838	-	28271	2437	26654	63200
13 Wotu	6048	10	132153	910	38179	177300
14 M. Tana	10249	223	23447	2619	174462	211000
15 Malili	2305	380	84402	1843	126570	215500
16 Nuha	1249	921	239003	399	49428	291000
TOTAL	132409	103617	1095691	22819	1160364	2514900
% of total	5.3	4.1	43.6	0.9	46.1	100.0

Source: Statistical Office, Palopo

2. Agriculture

Exhibit 8, prepared for the report on agriculture, demonstrates the rapid growth in rice cultivation as new irrigation projects were completed and suitable upland rice areas were taken up. Field crops such as maize, cassava, sweet potato, and soybeans have not increased. The report notes that farmers practise rice cultivation in preference to all other crops where conditions permit, but where rice cannot be grown farmers will seek off-farm employment in preference to growing upland crops. That such off-farm employment exists is evident from the statistics on upland crops. Farmers are still able to find seasonal employment in logging, rattan gathering, sawmills, fishing, small industries such as furniture making, sago starch production, and household industries such as coconut oil making.

Tree crops grown widely include coconuts, coffee, and cloves, though only the latter appears to be undergoing expansion. Clove cultivation is in fact one of the fastest growing sectors in agriculture, with planting going on in many mountainous areas of Luwu. There is concern in fact that the market cannot sustain the large increase in production without a fall in prices.

Exhibit 8

HECTARES HARVESTED OF FOOD CROPS, KABUPATEN LUWU 1975-1981
(Hectares)

	1975	1976	1977	1978	1979	1980	1981	% Increase
Padi	35,907	44,017	43,042	56,231	61,717	62,471	65,068	81
Maize	3,335	2,201	1,990	4,556	3,576	4,120	5,257	58
Cassava	2,236	1,396	1,597	1,695	1,788	1,371	1,774	-21
Sweet Potato	1,146	846	1,058	849	959	873	680	-41
Groundnuts	907	636	1,225	1,914	1,005	2,924	935	3
Soya Bean	2,538	1,519	1,948	2,957	4,300	2,424	1,804	-29
Mung Bean	287	123	313	163	308	355	704	145
Fruit	459	474	530	369	585	749	1,557	239
Vegetables	438	375	611	648	1,555	1,487	2,197	402
TOTAL	47,253	51,587	53,336	69,582	76,793	77,774	79,977	69
Padi as % total	76%	85%	78%	81%	80%	81%	81%	

Source: BAPPEDA, Palopo.

3. Inland Fisheries

Fish farming in fresh and brackish water ponds, while not as developed in Luwu as along the west coast of South Sulawesi, is increasing rapidly. Fish ponds increased from 8710 ha in 1980 to 9298 ha in 1981. Brackish water ponds are found mainly on coastal areas from Malangke southward (Kecamatans Malangke, Walenrang, Wara, Bupon, Bajo, Suli and Larompong). Fresh water ponds, less extensive in area, are found chiefly in Walenrang, Sabbang, Masamba, and Bone Bone. Fish culture in rice fields in widely practised, the tonnage produced even exceeding that from brackish ponds.

Of the species produced shrimp is the most valuable and the only one shipped beyond the adjoining Kabupatens. Some shrimp packed in ice is transported all the way to Ujung Pandang for processing. For some time shrimp farmers in South Sulawesi have been unable to meet demand from processors who export a high proportion of production. Prices have risen to Rps. 7,000/kg for the "tiger prawn" species. Yet production in Luwu of prawns (red and white) only increased from 3,639 tons in 1977 to 5,402 tons in 1981. Reasons for this probably have to do with the difficulty of catching wild fry in the mangrove swamp areas of the coast and the high mortality suffered in collection and transport. Low growth rates and high mortality is experienced also in the ponds due to improper practices such as inadequate flushing to maintain oxygen content, lack of predator control, competition from other species for food, etc. Lastly, problems experienced by farmers in building and maintaining ponds is also restricting growth in shrimp production.

4. Sago Palm

The sago palm, from which sago starch is extracted, grows in abundance in coastal areas of Luwu. An estimate by Bank Indonesia places the area of sago palm at 29,500 ha. Another estimate by the Department of Agriculture in Luwu shows only 1,117 ha, of which 46% is mature and 54% is immature. The higher estimate seems to conform more to visual observation.

Production figures obtained by Bank Indonesia show production peaking at about 1,500 tons in 1973, then declining to 255 tons in 1979. In later years, since machines were introduced for grating the sago, it appears likely that production has again increased. Certainly a flourishing trade in the product exists and it remains, despite low quality, a staple source of food starch.

The question arises as to whether sago is a renewable or depleting resource in view of the fact that wild stands are being cut. Information from the processors themelves suggest that if practices stipulated by the government are followed, it is renewable. The practices allow cutting only of mature trees, which means trees which have put out suckers around the main trunk. Sometimes owners of sago land will replant suckers to allow full development of the tree. Otherwise competition results in a smaller tree (and less starch).

5. Timber and Rattan

The Forestry Development has specified that of the 1,852,000 hectares of forest in Luwu, 630,000 hectares may be exploited for timber and other forest products.

These vast timber resources are currently being exploited by two concessionaires who operate under license, and by individuals who cut wood for their own use. There are also numerous unregulated chain-saw operators who fell trees and cut them into planks on the spot.

Government policy on timber cutting and export of logs was changed in 1980, but the effect of these policies is not yet clear. A regulation issued in May, 1980 calls for consulation by the Ministries (Department) of Agriculture, Trade and Cooperatives, Forestry, and Industry to determine domestic requirements and set export levels for logs. Later in 1980 a regulation eliminating export of logs entirely by 1985 was reportedly issued. The Forestry Office in Palopo does not have a copy of this regulation and states that they have only verbal notification of the change via the Ministry of Agriculture. The new regulations are said to include restrictions on exports of sawn lumber from districts where the timber is cut, but this is unconfirmed.

Rattan cutting is also done under license. For individuals cutting less than 5 tons/year, a letter from the local Forestry Office is sufficient. For amounts greater than that a permit from Provincial authorities is required. Within the past two years it was announced that a large hinterland area of Kecamatans Nuha and Mangkutana was closed to rattan cutting as a measure "to protect the flora and fauna" of the area. A substantial portion of the forests of Nuha are still open to ratting cutting, however. Roughly 95% of all rattan cut in Luwu comes from this Kecamatan.

It appears that the new regulations on timber cutting will not negatively impact the plywood industry.

Regulations now reportedly permit licensing of plywood mills to any parties which have logging concessions of at least 100,000 hectares from which extraction of at least 60,000 m^3 annual is permitted. Two or more such concessions may be combined.

Wood removals from 1976 to 1983 appear below.

Exhibit 9
Wood Removals, 1976-1983

Year	Mixed Timber 000 m^3	Mangrove 000 m^3	Ebony 000 m^3	Rattan 000 tons
1976/77	45.8	0.1	1.2	1.4
1977/78	49.2	0.1	0.4	2.3
1978/79	31.7	4.0	2.2	2.4
1979/80	16.6	2.2	5.2	3.0
1980/81	11.4	1.2	0.7	1.4
1981/82	11.6	0.9	0.1	(17.1)
1982/83	13.9	2.3	0.4	1.4

Source: Forestry Service, Ujung Pandang 1976/77 to 1979/80
Forestry Service, Luwu 1980/81 to 1982/83

The sharp decrease in timber extraction after 1977/78 was explained by the local Forestry Office due to the combined effects of the world economic recession, and increased enforcement of regulations on timber cutting. The enormous increase in rattan cutting in the single year of 1981/82 would appear to be an error, though Forestry Office officials maintain that it is correct and have detailed reports by Kecamatans to support it.

C. INFRASTRUCTURE

1. Manpower

Of a total 1980 population of 503,743 persons, 333,075 were in the 10 years and older age group --- commonly regarded as the work force. Of this number, 221,425 were between 15 and 49 years of age, of which 104,866 were male. Elsewhere in this report we have es imated industrial employment at roughly 6000 persons of which only 3,730 were full time (at the nickel mine and plywood factory) and the remainder were members of farm families who derived their primary income from farming.

The pool of trained industrial workers in Luwu is thus extremely small. Some workers who were released by P.T. Inco in recent cut-backs have found other outlets for their skills in small industry as workers or entrepreneurs. However availability of other such trained workers cannot be relied upon.

It follows therefor that any new larger-scale industrial enterprise in Luwu will have to c[illegible]nt on training most of its work force. On the other hand, those based on existing industries such as rattan furniture can draw on a pool of skilled artisans, though without prior experience on machinery.

Industrial wages should be sufficient inducement for full-time employment by farmers who do not have sawah rice lands. All others will continue to be unavailable during the rice planting and harvesting season. Over time as population expands and pressure on the land increases more and more people will be seeking full-time employment. We do not therefore see manpower as a constraint at the expected relatively slow rate of industrial growth in Luwu.

2. Ports

It has been requested that this report examine the possible effect of industrial growth on port shipments from Palopo and from Ujung Pandang during the next five-year plan period.

The relatively high value and low bulk goods which we foresee moving out of Luwu as a result of new projects (markisa juice, shrimp) will almost certainly go by road. With the transit time to Ujung Pandang now six to seven hours, mostly on good roads, this route provides a much

faster and safer way to ship such goods. Though the cost is higher than boat shipment, shipping cost will represent a relatively small part of the total value of the goods and won't be a key consideration. A starch industry, if realized, is expected to serve in large part the local plywood industry. Starch for food processing plants in Ujung Pandang and elsewhere will surely go by truck.

The only bulky industrial items we foresee moving out of Luwu would be rattan furniture and plywood. However we are recommending manufacture of knocked-down rattan furniture to reduce shipping volumes. We anticipate that a factory in Luwu would pack such furniture in "nested" or compact packages which would go by truck directly to the port at Ujung Pandang.

The existing and possible new plywood plants in Luwu are potential shippers of plywood to Ujung Pandang for local use or export to other Asian countries. Plans for new enterprises should be investigated to determine potential locations in Luwu and their impact on the port at Palopo. It should be noted however, that transshipment from the mill site by truck for loading on ships in Palopo is not likely to be feasible unless large craft and low freight rates and direct shipment to export markets are involved. Otherwise, barge shipment directly from the mill to Ujung Pandang, as is now done by the mill in Bupon, is the more likely route.

In the section of this report devoted to mining, we have discussed the possible exploitation of copper deposits on the Tana Toraja-Luwu border, and the possible use of Palopo harbor for shipment of ore concentrates. Should this occur, deepening of the harbor and possibly construction of a new or extended wharf would take place, allowing larger vessels to use the port. This would change the economics of sea shipment relative to road shipment and could lead to some increased shipments of such items as plywood, furniture and rice.

The World Bank-supported oil palm project near Masamba would be shipping drums of palm oil from Luwu by some time in 1987. A Bank mission to Luwu in June 1982 looked into the possibility of improving the Palopo harbor for these shipments, but eventually come out in favor of construction of a barging wharf near the project site, from whence oil would be lightered out to larger vessels offshore. While this would not impact the Palopo harbor it would make available a lightering facility in the central part of the Kabupaten, and possible favorable freight rates to Java (destination of the palm oil).

Shipments from Ujung Pandang could increase as a result of industrial growth in Luwu by roughly the following amounts:

	1985	1986	1987	1988	1989
			(Tons)		
Rattan furniture	50	100	200	300	300
Starch	10	30	50	100	100
Markisa juice	15	30	30	100	200
Frozen shrimp (Semi-processed)	10	20	50	100	200
Total	85	180	330	600	800

3. Roads

With completion of paving of the highway link in Kabupaten Wajo, there will remain only a strech of about 20 km which is in bad condition which needs improvement between Palopo and Ujung Pandang. With the exception of a portion of the Malili - Wotu road, paved highway connects all the lowland areas of Luwu with Ujung Pandang. We do no not therefore see roads as a constraint on industrial growth in Luwu.

Secondary roads conecting outlying areas with the main highway are lacking in many areas. This undoubtedly has an effect on the cost of transporting wood and rattan, and possibly cloves, from remote areas to the highway. Also, as new farmland is cleared for upland crops in more remote areas, this could begin to have an impact on the price of crops such as cassava. However, as long as land remains available closer to the coast, we don't see this as a problem affecting industry appreciably over the next five years.

4. Electric Power

Generation of electric power in Palopo and in rural areas has been increasing steadily and should pose no problem for any new small-scale enterprises to be located in Luwu. Medium scale industry using substantial amounts of power would have to count on generating their own current for the foreseeable future.

Excess power is available from the Larona River hydroelectric plant of P.T. Inco. The company remains

committed to supplying 5 MW of power to outside users of which no more than 0.2 MW is now used*. However no transmission network exists to make this power available outside the Soroako-Malili area.

In addition, a new hydroelectric project on the lower Larona River is planned to supply an expanded nickel processing plant at Pomolaa in Southeast Sulawesi. Power could become available also from this plant.

In the absence of transmission lines, the present and future availability of electric power in the Malili area can only benefit local industry. A small port at Malili for lightering cargo to ships at a distance of 8 km could also be available through P.T. Inco. A rattan furniture factory supplied from local forests is one possibility.

A hydroelectric power project is also under study at Malea on the Sadang River in Tana Toraja. This location is no more than 70 km from Palopo and could be a source of power to accomodate industrial growth in Luwu after 1990.

5. Industrial Estates

The Department of Industry has built several industrial estates in or near Ujung Pandang. Department officials in Luwu are interested in promoting a similar project near Palopo.

In our view, this 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 sub-contractors 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) would be doomed to failure. A possible sharing of facilities such as machinery repair, electric power (even at concessionary rates), common shipment, or

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* Voltage fluctuations occur, however, due to certain characteristics of the electric furnaces.

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.

D. RECOMMENDED INDUSTRIES

1. New Small and Medium-Scale Industries

a. Summary

Four new small medium-scale industries have been identified as having good potential for Luwu: starch, markisa jiuce, rattan furniture, and shrimp processing. All are based on agricultural products or natural resources and would add value to commodities now exported in unprocessed form or not yet well developed.

The four industries are discussed in detail in the following sections. Findings are briefly summarized in Exhibit 10.

Exhibit 10
Recommended Small and Medium-Scale Industries

Industry	Source of Raw Material	Markets	Illustrative Annual Outputs	Pre-Conditions	Key Points to Investigate
Starch (for industrial and food use)	Cassava--plantation and small holder Sago palm-wild trees	Plywood industry in Sulawesi (as glue extender) Food processors in Ujung Pandang	7,900 tons (fully mechanized) or 1,600 tons (modified traditional) Both 3-shift basis	Establish cassava plantation Expansion of small holder planting of cassava	Confirm starch market and prices Confirm sago palm area Cassava yields, growing costs Select processing method
Markisa (passion fruit) juice (pulp in cans for reprocessing)	Passion fruit grown at elevations above 600 meters	Export to reprocessors in Europe (pasteurized) or to processors in Ujung Pandang	300 tons of canned pasteurized juice or 35 tons of canned preserved juice	Establishment of plantations in Luwu	Available land Growing costs and returns Confirm markets Feasibility of pasteurized vs. preserved pulp.
Rattan Furniture (knocked-down)	Rattan from Nuha and Malili	Export to Europe, America	300 tons (if approx. 25% of rattan production converted to furniture)	Government to restrict export of unprocessed rattan	Structure of industry Market requirements Knocked-down furniture manufacturing Investment level
Shrimp Processing and Freezing	Brackish water ponds	Export	1,000 tons frozen packaged shrimp (headed and veined)	Development of local pond culture Availability of fry (possible local hatchery) Introduction of intensive techniques.	Availability of wild fry Costs of intensive culture Mortality rates of fry

b. Starch

Markets:

A recent study* prepared by the UNIDO project at the Department of Industry, Ujung Pandang, recommended creation tion of a cassava starch enterprise in Kabupaten Sidrap. The study found favorable conditions for production of starch for industrial and food uses in East Indonesia.

It was noted that the export market for "gaplek", or dried cassava chips, was not favorable despite the fact that Indonesia has an unfulfilled EC quota of 500,000 tons yearly. Indonesian exports of this product to Europe partially due to decreasing prices in Europe, higher freight rates from Indonesia than from Thailand -- the principal world producer, as well as higher loading costs and taxes. Another complicating factor is that cassava is traditionally a secondary crop and tends to be planted only when or where there is insufficient water for rice. This staple food substitution role leads to large fluctuations in area planted and in market prices from year to year. An enterprise producing starch, through it would still have to deal with this supply problem, would have access to markets in South Sulawesi and elsewhere in East Indonesia, thus reducing risks. The export market for starch is quite limited due to competition from corn starch, and from cassava starch produced at low cost in China.

The UNIDO study calculates a consumption by plywood mills of starch, used as an extender for glue of 47 kg. per cubic meter of plywood. On this basis the plywood factory in Luwu would consume 719 tons annually.

The study also reports that a plywood factory is scheduled to be established at Donggala in Central Sulawesi in the near future. Capacity would be 115,000 m^3/year. Information in the report on licensing of other new mills in East Indonesia may be summarized as follows:

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* Cassava Starch Project in South Sulawesi, U.P. 0782, by Andre Guichard, David Sussman, and Abie Palinggi, Kanwill Department Perindustrian of South Sulawesi, October 1982 (Revised January, 1982).

	Licenses granted	Provisional Licenses
	(cubic meters)	
South Sualwesi	100,700	-
Central Sualwesi	-	39,600
Southeast Sulawesi	361,000	28,500
Maluku	282,200	96,800
Irian Jaya		30,000
Total	743,900	194,900

The study identified the followig current markets for starch in South Sulawesi:

Plywood factory Palopo:	719 tons annually
Food Industries:	969 tons
Home use in cooking:	2,000 tons (est'd)
	3,688 tons

Based on licenses already granted for new plywood mills in South, Southeast, and Central Sulawesi, a demand for 4,000 tons was estimated by the year 1985. Adding mills already licensed elsewhere in East Indonesian brings demand to 16,000 tons. (This estimate assumes that only half the licensed projects will be realized and assumes production at 60% of capacity.)

Adding markets for cooking starch in East Indonesia, a total demand by 1985 of 24,000 tons was forecast. Output of the proposed plant was set at 7,900 tons/year.

Production:

There are two potential sources of starch in Luwu: cassava and the sago palm.

Kabupaten Luwu is not one of the major cassava producing areas of South Sulawesi at present. According to the provincial Department of Agriculture, Luwu's 1981 production of 11,707 tons was only 4.5% of total provincial production (though this represented a slight increase from the 3.8% figure for 1977). Yields at 6.6 tons/hectare in 1981 were somewhat lower than the provincial average of 7.6 tons/ha.

As figures in Exhibit 8 showed, there have been wide fluctuations in area planted (and in production) since 1975, but in fact 1981 production was slightly below that of 1975. This situation is likely due to a combination of factors, including the availability of new irrigated ricelands which the farmer planted in preference to upland crops, and the relative market prices which favored rice over cassava. This relationship could, however, change more in favor of cassava in the future if rice production continues to increase.

We have noted in Part One of this study that there are very large stands of sago palm in Luwu, though estimates of their extent very greatly. At present starch is being extracted by small operators working in teams to cut the tree, trim the bark and cut the heartwood in large pieces for transporting to the processing site near a source of water. Grating of the wood was formerly done entirely by hand, though there are now at least 100 power graters operating in Luwu. The starch is dissolved out of the ground pulp with a water wash, then allowed to settle out in a trough. After allowing the water to run off, the starch is collected and sundried, then packaged in woven palm leaf baskets for sale at about Rps 100/kg. Quality of the product varies greatly depending on how clean the wash water was. Production in 1979 was estimated at 255 tons.

In Sumatra there are larger-scale operations using powered rotating drums with a water spray to wash out the starch. Water may be pumped from a well or river and be relatively clean. Nevertheless a Department of Industry report (in 1979) found serious quality problems in a Sumatra factory, resulting in loss of an export market in Singapore, and declining sales and prices in Indonesia as well.

Upgrading of this industry is a distinct possibility. One consequence of large-scale production might be the displacement of small processors and this should be taken into account.

Project Parameters:

The project proposed for Kabupaten Sidrap is based on production from plantations of 2,026 ha in total area, of which 1,846 ha would be in cassava and the balance interplanted crops such as cashew nuts, coconuts, and ground nuts. A total of 14,500 tons of cassava tubers (at 25 T/ha) would be mechanically harvested from this area annually. An additional 25,000 tons would be obtained from local farmers whose yields would be about 10 T/ha. A farmgate price of

Rp. 15/kg of tubers is assumed, which compares to a reported actual price of Rp. 5/kg when the study was prepared. The plant, which would employ 126 persons, would be fully mechanized and require an investment of Rps. 2.2 billion, while the plantation would require a Rp. 376 million investment. Adding other expenses results in a total investment of Rp. 3.4 billion (US$ 3.54 million). Taking into account sales of starch, groundnuts, and dried cassava fiber, an IRR of 24% is calculated. A gross profit of 20% of investment costs is projected by the 6th year of operation (1990).

A 1974 study* by the Tropical Products Institute of London compare the economics of several different sizes of plants, both larger and smaller than the above. Although costs and prices were of course different in 1974, it is interesting to note that a higher financial rate of return (but only 7.7%) was found for a small plant using more traditional methods with less machinery, operating 3 shifts/day, than for a more mechanized plant double the size (0.7% return). A 12% return was found for a plant slightly larger than the one planned for Sidrap (3,225 tons/shift, 3 shifts/day).

Recommendations:

It is recommended that a study be undertaken of the feasiblity of establishing a starch processing plant in Luwu. Raw materials would be (1) cassava tubers grown intensively on plantations and by farmers and (2) hearts of sago trees purchased from cutters who in turn buy the trees from property owners. Starch would be sold to the local plywood factory (as an extender for glue) and shipped to Ujung Pandang and elsewhere in East Indonesia for use by food processors and in the home for cooking use. Expansion of the plywood industry in Sulawesi offers a very large potential market (though there is some question about the use of cassava in waterproof glue for exterior plywood, should that type of plywood be produced in the future).

Assuring regular supplies of cassava has been a problem for many starch processing plants in developing countries due to the low price paid for tubers by industrial processing. Those plants which relied on farmer production of cassava have often been the victim of price fluctuations,

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* The Industrial Manufacture of Cassava Products, by D. Edwards, Tropical Products Institute, London, May 1974.

or alternative more profitable uses of the farmers time. The problem can be partially overcome by supply of tubers from company-owned plantations using intensive techniques such as proper amounts of fertilizer to increase yields, and possibly higher yielding varieties. Plantation yields can reach 30-40 tons per hectare vs. smallholder yields now averaging 6 tons/ha in Luwu. Nevertheless improved practices for growing cassava, possibly inter-cropped with other crops, can increase yields and returns to farmers and should be an objective of any cassava processing venture established in Luwu.

However given the uncertainties surrounding cassava supplies, and their seasonality, it is deemed advisable to supplement supply by purchase of sago palm heartwood. Collection of the wood in times of cassava shortage could possibly be organized by contracting with cutters or teams of cutters for deliveries according to an agreed schedule. It appears likely that most of the same machinery could be used for processing both products, once the sago wood was reduced to smaller pieces.

The feasibility study would have to examine the following points:

1. Present cassava growing practices, localities, and yields; potential yields under improved practices (consult research stations).

2. Cassava price trends, projections of future trends taking into account rice price trends.

3. Confirmation of sago palm area, and starch yields per kg of wood; time which freshly cut wood can be stored without deterioration.

4. Confirmation of expected growth in the plywood industry in Sulawesi and the resulting demand for starch used in glue. Possible effect on demand if plywood makers switched wholly or partially to waterproof glue.

5. Confirmation of food markets for starch by contacting food processors in Ujung Pandang to verify quality requirements, prices, and quantities.

6. Process and machinery required to process both cassava and sago. Alternative capital and labor-intensive methods. Optimum plant size based on market projections.

7. Costs and returns based on assumed raw material prices, processing costs, and market prices for starch.

8. Financial projections, equity and loan funding, financial return, IRR.

c. Markisa (Passion Fruit) Juice

Markets:

Domestic and export markets for markisa juice are favorable at present and for the foreseeable future. South Sulawesi, the principal producing area in Indonesia, is unable to meet even the local demand in Sulawesi, not to mention the rest of the country. The expanding world market has not yet been tapped. Lack of production is the limiting factor.

To avoid confusion in terms, we refer here to "pulp" as the liquid product extracted from the fruit without dilution, and "juice" as the commerical product containing 40 to 45% sugar syrup plus benzoate of soda as preservative.

A study* prepared by UNIDO experts in December 1982 estimated the Indonesia market for markisa juice at 490,000 liters, or 294,000 liters of pulp. Of this amount 350,000 liters represents current production of South Sulawesi, and 140,000 liters unfulfilled demand in Java. All indications are that demand is continuing to increase, and that the Sulawesi product is regarded as superior to that from any other part of Indonesia.

Export markets in Europe are expanding along with that for other tropical fruit juices. Passion fruit pulp imported from East Africa and Brazil is mixed with other juices for sale as a full-strength juice beverage, or used without dilution as a yoghurt flavoring. European importers have expressed interest in importing at least 500 tons annually. At current prices c.i.f. European ports, and taking into account the recent Rupiah devaluation, it appears that Indonesia could offer a competitive product.

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* Markisa Juice Processing for Export, Report UPO682, prepared for the Provincial Department of Industry, Ujung Pandang, under a UNIDO Project by Andre Guichard, David Sussman, Abie Palinggi, and Dr. Najamuddin, December 1982.

It should be noted that the European market demands a pasteurized pulp, without any additives, a product which has not yet been produced here. There are no technical problems in doing so, but more costly equipment is required.

Production of Fruit and Juice:

Passion fruit is grown at altitudes above 800 m in two areas of South Sulawesi: the Malino region east of Ujung Pandang (principally Kabupaten Gowa), and Tana Toraja including near-by points in Luwu. With the exception of one new plantation in Luwu, all the fruit is grown by farmers on vines planted near or on their homes. Traders collect the fruit during the two harvest seasons (December to March and July/August) and bring them to one of the 15 licensed manufacturers (plus 10 unlicensed) in Ujung Pandang. The amount collected from Tana Toraja is much the smaller of the two -- many of the farmers are too remotely located so the fruit is consumed locally. Prices to the farmer vary from Rps. 3 to 6 or more per fruit depending on the season. Each vine produces about 100 to 200 fruits per year with little or no care. Under optimum conditions a vine can produce 500 fruits, or even more, in the two seasons.

Production in the Malino area has remained practically constant since 1978 at about 10 million fruits, which is the equivalent of 100,000 liters of pulp (10 grams per fruit). One possible reason offered for this is that prices the farmer receives from the collector do not justify more intensive cultivation. Any large scale planting would require surveillance as theft and losses to animals can be high.

Juice is extracted from the fruit by processors by hand cutting and removal of the pulp and seeds, then passing through a simple pulper-finisher which separates seeds from the juice. Sugar syrup and benzoate of soda are then added so that the final product is 55 to 60% pulp. It is sold in one liter bottles for Rps. 1,200 to 1,500.

Project Parameters:

Two different types of projects have been proposed for development of markisa juice in South Sulawesi:

1. The UNIDO study proposes the establishment of local processing plants, one each in the Malino and Tana Toraja areas, with the fruit coming 15% from an adjoining plantation area and 85% from small farmers. Farmers would be shown how to grow the crop more intensively using

trellises, possibly inter-cropped with another crop, each farmer having 1 ha plots. The plantation would serve as an example to farmers of the new methods. The processing plant would produce pasteurized fruit pulp in #10 cans (3 liters) for export sale. Mechanical juice extractors would be used, along with can filler and seamer, cooker/cooler and associated boiler and power generation equipment. Total investment would be on the order of US$ 200,000. The investment could be reduced by almost half if hand operations were substituted.

2. The Regional Projects Management Unit of the Bank Indonesia in Ujung Pandang proposed in 1981 the organization of farmer groups in growing areas linked by contract to markisa juice processors in Ujung Pandang (Bapak Angkat system). Twenty-five percent of the fruit would be sold fresh to the processing plant, while the remaining 75% would be processed by the farmer group in small plants under supervision of the "bapak angkat". This would be a simple process similar to that in use by processors in Ujung Pandang. The pulp, in bottles with preservative added, would be sold to the "bapak angkat" who would process it further by mixing with sugar syrup and bottling it. Vines would be grown on trellises. An investment in processing equipment of under Rps. 5 million would be involved.

Both of these plans attempt to increase production of fruit by introducing intensive methods of cultivation and both would establish local processing plants. In addition to increasing overall juice production, this approach has the following advantages:

- it increases returns to the farmer by inducing him to grow more vines and to do so intensively.

- it also increases returns by eliminating the middleman-financed collection and transport of fresh fruit to Ujung Pandang, and substituting collection by the local organization and local transport to the plant, thus increasing farm-gate prices.

- it opens the possibility of replacing Ujung Pandang processors at least partially with local businessmen as fruit processors.

The first of the two plans (UNIDO) would involve a fairly large investment and would try to tap international markets immediately. The RPMU plan would take a more conservative approach, linking farmer groups to existing processors under a bapak angkat or "foster father"concept.

Recommendations:

There are obviously some profit-making opportunities available in connection with Markisa juice. A businessman in Tana Toraja has in fact already started a plantation using the trellis method at a site some 14 km west of Palopo. Fifteen hectares have already been planted but insect infestation (worms in the fruit) are preventing shipments to the Ujung Pandang processor who is working with him. (This is the first time this problem has been experienced in South Sulawesi.) This is also the first attempt to grow passion fruit in this manner here (through it is commonly done in other countries).

It is recommended that a feasibility study be carried out for a nucleus plantation/processing enterprise in Luwu. Pontentially, a small plantation could be established at an elevation of at least 600 meters near the Palopo-Rantepao highway by the enterprise, and nearby farmers induced to establish similar plantings or small household plots. The processing plant might be located within 20 km of the plantation, near Palopo to utilize available electric power, and would initially prepare and bottle markisa pulp with addition of preservative for sale to processors in Ujung Pandang.

Many alternatives exist for organizing such a project. One would be to associate with the businessman who has already started a plantation in Luwu (through it is understood he plans eventually to process the fruit in Rantepao). This would have the advantage of benefitting from his experience with intensive cultivation.

The feasibility study should address these points:

1. Location and availability of suitable land at elevations above 600 meters and accessible by road.

2. Confirmation of growing costs under local conditions including need for credit by farmers for clearing and planting.

3. Updated market study examining current, demand and prices (Indonesian market).

4. Updated processing plant costs, especially any imported equipment, taking into account local labor and power costs.

5. Propose organization plan based on interest by local businessman or cooperatives, and also considering inducing an existing processor in Ujung Pandang to invest in a local plant.

6. Prepare financial projections for both the farmer and the processor, including financial return on investment and IRR.

Particular attention needs to be paid to how to get farmers to plant markisa and to build up area planted sufficiently to justify a processing plant (possibly 1,000 hectares would be needed). This suggests a phased approach with fruit initially sold fresh in Ujung Pandang by farmer associations who transport the fruit in their own trucks, followed by later installation of a processing plant.

d. Rattan Furniture

Markets:

Indonesia is the world's largest exporter of rattan, accounting for 90% of all shipments. An average of 35,000 tons were exported annually between 1950 and 1970 and 5,000 tons were used locally. Main producing areas are Kalimantan, Sulawesi, and Sumatra. Virtually all this rattan is exported in semi-processed form (dried, fumigated, sanded, or machine- processed into core and peel) to Hong Kong or Singapore for futher processing. The balance goes out as "plaitware" (basketware).

A comprehensive report on the rattan industry* was optimistic about export prospects. Referring to the semi-processed rattan, the report notes:

> "From discussions with exporters and importers, it would seem that consumption of rattan could be immediately tripled, providing good quality raw material was consistently available in much larger quantities, and marketing and promotion were conducted in a more organized manner".

The report also noted excellent market prospects in the U.S. and Canada for rattan furniture, adding that rattan ware seemed to be "fashion proof".

Both Thailand and the Philippines have banned exports of raw rattan in order to stimulate local industry. Both now export furniture and in fact Thai exports include "knocked-down" furniture, a fairly recent development in the industry which can reduce shipping costs by as much as 75%.

Some interesting cost figures were included in the report which showed that the value of furniture made locally is ten times the value of raw unprocessed rattan (value added of 900%). The retail value in Paris of rattan furniture was nine times the value the furniture f.o.b Bangkok, so the retail value of the rattan product must be roughly 90 times that of raw rattan. Even allowing for inclusion of some taxes in these figures, the total value added must be about 9,000%! It is obvious that there is excellent profit-making potential in manufacturing of rattan products, particularly in knocked-down furniture, provided quality standards can be met.

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* Rattan: A Report of a Workshop Held in Singapore, 4-6 June 1979, by K.D. Menon, for the International Development Research Center of Canada, Ottawa, 1980.

Currently (1983) traders report declining sales which they attribute to the recession in the U.S. and Europe.

Production and Processing of Rattan:

Harvesting of rattan from natural stands in South Sulawesi takes place on the west coast (locations reported are Mamuju, Kaluku, Sampaga, and Karossa, all part of a forest concession to the P.T. Sulwood Group)* and the Malili-Nuha area of Kabupaten Luwu. A number of different species are collected, one known as "Tahiti" having the highest value. The various species exhibit differing characteristics as far as diameter and elasticity are concerned and have different uses.

The Forest Products Institute at Bogor was quoted in 1971 as estimating that about 67,000 tons of six types of rattan could be harvested annually on a sustained basis from 7.9 millions hectares in Kalimantan, Sulawesi (South, Southeast, and Central), and Sumatra. Plantations of rattan exist in Kalimantan, and Central Sulawesi (1,500 tons production), though plantation culture is in general very limited in Asian countries. If the 40,000 ton production figure mentioned above is correct, then only about 60% of the potential tonnage is being harvested. Official figures show export of 1,360 tons of rattan from Luwu in 1982/83.

Harvesting of rattan is a laborious and sometimes dangerous task involving pulling of the vine by hand from the host tree, removal of the thorny leaf sheath, trimming, washing, and transporting to collection points in bundles. Collections are irregular as this is not a full-time activity. As of 1979, rattan cutters were not licensed and unlike the situation in Thailand and the Philippines,** cutting is not controlled in any way.

Rattan traders located mostly in or near Palopo buy rattan from collectors who bring it from Malili by truck, or from Southeast Sulawesi by boat. These operators basically dry, sort, and bundle the rattan for shipment to Ujung Pandang. This process includes boiling in vats containing a diesel oil/coconut oil mixture to hasten drying and avoid fungus attack which discolors the wood and decreases its value.

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* Notes on South Sulawesi Rattan, by D.T Gray, 1980

**Currently licensing is required and certain areas are closed to rattan cutting.

The largest trader in Palopo ships an average of 78 tons/month of rattan to a buyer in Ujung Pandang in his own truck, currently receiving Rps 300/kg for first quality "Tahiti" variety. These buyers process the product for export to Hong Kong and Singapore. Sub-standard wood is sold to furniture makers in Ujung Pandang.

Rattan furniture makers exist also in Palopo, operating on a cottage or small industry scale without the aid of machinery. One such enterprise has 5 artisans working independently, each able to make a chair with three days of work. A set of 3 small and one larger chair sells for Rps 20,000; a single high-back chair also sells for Rps. 20,000. The manager reports that all sales are local (Palopo) and have not increased over last year.

It was learned that P.T. Inco procurement of rattan furniture is entirely from Ujung Pandang as local (Luwu) furniture was found to be of inferior quality.

Project Parameters:

It seems that opportunities should exist to increase local value-added of Luwu's extensive rattan resources. Production of quality rattan furniture in Luwu would be a classic example of increasing local income by further processing of a natural resource. However a number of steps would have to be taken before this could become a reality.

First of all the Indonesia government would have to restrict export of rattan in non-manufactured form, as Thailand and the Philippines have already done. This would best be done step-wise to avoid dislocations in the industry. Exporters of semi-processed rattan might shift to furniture manufacture, for example, possibly even becoming investors in factories in Luwu.

Upgrading of local skills in furniture making would be essential, requiring technical assistance from experts. Techniques for making knocked-down furniture could be very important to the success of a local industry.

Marketing, as always, is of primary importance. In fact knowledge of market demand in America and Europe is so important that it may be desirable to seek financial participation by furniture makers or importers in these countries. A trade association of Indonesian rattan and plaitware exporters exists and could assist in making contacts (provided government action was first taken to restrict unprocessed rattan exports).

Transport costs from Luwu are an important factor here, due to the high bulk of the furniture. Comparisons should be made of sea and truck transport costs to the port at Ujung Pandang. Again production of knocked-down furniture could greatly reduce the importance of this problem.

A recent newspaper article noted : "The foreign buyers (of finished or half-finished rattan products) are reluctant to conclude a contract because they are still uncertain whether the Indonesian producers are able to fulfill the orders, according to quality, price and capacity"*. The article quoted the head of the Indonesian Rattan Association as saying that in order to intensify the export of finished rattan products reorganization of the domestic trade system was necessary so as to guarantee the supply of the raw material and introduce new designs and quality control. Finally, it was noted that the EEC is providing the services of three consultants to assist with design, marketing, and production techniques.

Recommendations:

It is recommended that a feasilibility study be undertaken of manufacture of rattan furniture -- and other rattan products -- in Kabupaten Luwu. Elements of this study would be:

1. Structure of the industry: a thorough understanding is needed of each step in the process of collecting, pretreating, and processing of rattan; manufacture of rattan products; and local, Asian, and international marketing. Some information is already available in the literature; additional would have to be collected to update the situation.

2. Markets: Data is needed on current demand in major market areas and prices at each level of marketing. Given current depressed economic conditions it will be important to take a long-term view, looking at demand trends over ten years and seeking the opinions of those in the business.

3. Manufacturing Techniques and Equipment: Current modern techniques for making rattan furniture need to be studied, especially

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* Indonesia Times, June 18, 1983.

knocked-down furniture. Cost estimates are needed for the necessary machinery. Alternative capital-intensive and labor-intensive methods should be compared.

4. Plant capacity, investment and operating costs: Costs should be calculated for alternative approaches involving various plant sizes and types of processing.

5. Organization: alternative approaches to structuring an enterprise, including local investment, joint investment with traders or buyers, first-stage processing by cooperatives. Availability of marketing expertise through joint investment or contract arrangements.

6. Need for technical assistance: Given the recommended production process, and the level of local skills, gauge the necessity for outside technical assistance and sources for such assistance. This should include firms already in the furniture business in Indonesia or elsewhere who might participate in a local venture.

7. Production: Assess supplies of rattan in Luwu and suggest ways to regularize deliveries of rattan. Experience with rattan plantations in Central Sulawesi and Kalimantan should be studied and appropriate recommendations made for Luwu.

8. Financial Projections: Sales forecasts, financial and economic rates of return, cash flow, etc.

e. Shrimp Raising & Processing

Markets:

World markets for frozen shrimp have been good for several years and the outlook remains good. Demand is especially strong for the large tiger prawns produced by Indonesia. Market prospects for Indonesia are clouded at present by a ban on shipments to the U.S. caused by contamination found on frozen shrimp (through reportedly not from Sulawesi). Recently (mid-June 1983) a shipment of 26 tons of frozen shrimp to Japan was destroyed for this reason. The government is understood to be tracking down the source of this contamination. Demand is so strong, however, that there has been no effect as yet on prices.

A shrimp processor in Ujung Pandang, one of five located there, reports that prices he receives for the best quality frozen (headed and veined) shrimp in packages are up $ 2/kg from last year to $ 15/kg. He states that his buyers " will take all I can produce" but that he has difficulty obtaining enough shrimp. He is operating well below capacity at about 20 tons/month currently, and is also packing other items such as squid and fish. He purchases shrimp from pond operators in the Takalar and Barru areas along the coast west of South Sulawesi, and also gets a small amount from Palopo.

Production:

Shrimp are grown in brackish water ponds on the west coast of South Sulawesi and to a smaller extent in Luwu. As of 1979, there were 46,300 ha of brackish ponds in the province, of which 4,569 ha were in Luwu. The area devoted to shrimp culture in the province grew rapidly from 100 ha in 1968 to 8,400 ha in 1979.

Shrimp production (tiger, white, and api-api or "fire" species) for the province was reported to be 6,531 tons in 1981, of which only 107 tons came from Luwu. A portion of this locally produced shrimp is consumed in Palopo while traders transport some to markets in Tana Toraja and Soroako. An unknown amount reaches buyers in Ujung Pandang.

Much of the shrimp is grown under mixed culture conditions with milk fish. Fish farmers are ready to raise more shrimp but are unable to get enough fry from collectors. There are three hatcheries in South Sulawesi -- two near Pare-Pare and one in the South at Bulu Kumba. One of these

is operated by the Fisheries Service and the other two are private. Limited quantities of fry are available from these hatcheries.

Consultants at the Bank Indonesia state that in 1979 there were about 165 million shrimp fry collected from natural sources. (The Provincial Fisheries Department reports 142,285,000 tiger prawn fry were introduced into ponds in 1981). These fry were raised to shrimp in ponds at populations of 3,000 to 5,000/ha. Intensive raising, with supplementary feeding and other measures, calls for populations of 10,000/ha. By this measure there was a shortage of some 250 million fry. The shortfall would have to be met by hatcheries. However one of the new hatcheries is reported to have an eventual output of only 5 million fry annually.

The Fisheries Service in Palopo has begun a special program to increase production from fish ponds. With a goal of 600 ha of improved ponds, the service has six extension workers in the field. The program is linked with loans from Bank Rakyat Indonesia of Rps 1 million/ha. The funds will be used primarily to improve water control by constructing better gates. The service also has a facility for making fish feed from rice bran, vegetable matter such as leaves, coconut oil cake, fish meal, and concentrates which is sold to farmers at Rps. 260/kg. As yet, few farmers use the feed. They rely instead on algae growth in the ponds stimulated by addition of organic fertilizer.

The Rural Extension Centers (REC) are conducting field demonstrations of fry collecting methods. Farmers have shown a high degree of interest in raising shrimp.

Project Parameters:

Development of the shrimp industry in South Sualwesi is still in the early stages of development. Much work needs to be done in such areas as:

- collection and transportation methods of wild fry to reduce mortality,

- pond improvements, especially better control of water to regulate oxygen content, salinity, acidity and temperature,

- better culture techniques to allow higher populations, especially supplementary feeding,

- new hatcheries, and further development of hatching and raising methods, so as to sharply increase availability of fry. This should include adaptation units for the fry.

Kabupaten Luwu is at this point far behind areas such as Kabupaten Pangkep and Pinrang in development of shrimp culture. Yet Luwu's potential is great due to the large expense of shallow-water mangrove forests which are natural breeding grounds for shrimp. While these areas might eventually be exhausted by intensive fry collection, they do provide a rich resource base from which to launch a local shrimp industry.

A development program for shrimp raising in Luwu is planned by the Farm Cooperative Center (FCC) program under Project Luwu which appears to have excellent potential. The FCC program will consist initially of the following steps:

1. Improve catching of wild fry:
   Experienced fry catchers from the Pinrang area on the west coast of South Sualwesi area will come to Luwu to instruct local catchers. This involves a knowledge of typical habitats of shrimp and their breeding times. Other possible techniques include creation of an artificial shrimp fry habitat using vegetable fibers.

2. Collection stations for fry:
   Catchers will deliver their fry to collection stations where they will be counted and transferred to water-filled plastic bags into which oxygen will be injected. (The water will consist of 75% seawater and 25% fresh water.) Catchers would be paid at the rate of Rps. 12,5 per fry.

3. Establishment of adaptation units:
   Initially this will consist of a pond in which freshly caught fry will be adapted to brackish water by holding them for 7 or 8 days. The fry will be contained between two layers of mosquito netting below and at the surface of the water. After adaptation, the fry will be packed and sold to farmers.

This first phase is designed to determine the availability of wild fry in Luwu waters. If the supply proves insufficient to sustain growth in shrimp production, other sources of fry will be sought. Possible sources include (1)

fry caught in the Pare-Pare area, (2) the hatchery near Pare-Pare operated by the Fisheries Service, (3) a privately-owned hatchery at Bulu Kumba south of Ujung Pandang, and (4) hatcheries in Java.

The FCC plans to purchase fully grown shrimp from farmers and hold them temporarily in a cold storage facility to be built in Palopo*. From there shrimp packed in ice would be shipped by truck to processors in Ujung Pandang. Partial processing (head and vein removal) before shipment is also being considered.

Recommendations:

1. It is recommended that Kabupaten Luwu fully support the FCC development program as a first step in developing Luwu's shrimp raising industry. The program has the potential to introduce improved practices to traditional shrimp culture and make better use of Luwu's resources.

2. As yet the amount of wild fry which can be captured in local waters has not been demonstrated. The rate of development of the shrimp industry will largely depend on wild fry since the supply of hatchery fry is still quite limited. The FCC program should provide useful information. Research is needed also on the effect of increased capture rates on availability of wild fry.

3. Close coordination between activities of the Fisheries Service, the FCC program, and REC field demonstrations will be important to assure optimum use of resources. It is suggested that the Fisheries extension program be doubled in size to 12, with funding for support and training.

4. Field trials designed to test Indonesian state-of-the-art production methods under Luwu conditions are also recommended.

The eventual aim of these programs -- and the reason for the inclusion of this discussion in the present report -- is the potential for a local shrimp processing and freezing plant in Luwu. As with other industries we have recommended, shrimp processing can potentially exploit a natural resource and maximize local value-added.

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* This facility will have quick freezing equipment, storage capacity of about 5 tons at -20° C, and a chilling room for eggs.

Furthermore, increased wild fry collection can provide employment for large numbers of people, as it has done elsewhere.

Before this final stage is reached, it is likely that a hatchery would have to be established in Luwu to supply enough fry to support substantial growth and justify a processing plant. The hatchery could be built by private investors, possibly a joint Indonesian-foreign venture. (Bank Rakyat Indonesia has already indicated a willingness to provide credit for this purpose.) The same enterprise might then go on to build a processing plant and begin direct export by ship from Luwu.

Much remains to be done before this can happen. We would not anticipate a processing plant would be built here before the latter part of the next five-year plan. In the meantime partial processing of small amounts of shrimp prior to shipment to processors in Ujung Pandang is a possibility.

2. Small-scale Industries to be Upgraded

a. Summary

As a second category of industries for potential development in Luwu, we discuss below some small-scale industries (in the small or cottage classifications) which might be upgraded and expanded. Considerably less field work has been done on them than on the larger industries proposed above, and recommendations are more tentative. It is felt however, that in every case the size of potential markets justifies study by the SBDC.

Findings are summarized in Exhibit 11.

b. Coconut Products

The market for the main coconut product, cooking oil, is complicated by the existence of two separate products: "coconut oil" made from fresh nuts and "copra oil" (refined and crude) made from copra. In South Sualwesi consumption of the two products is roughly equal but demand is reportedly increasing faster for coconut oil. The latter product also commands a higher price: currently an average of Rps. 750/kg compared to Rps. 540/kg for first quality copra oil in Ujung Pandang (Rps. 679/kg in Pare Pare).

In Luwu, coconut oil is made by small home or kitchen industries by boiling up a solution of freshly grated coconut meat with water and separating oil from the water. Increasingly, mechanized grating is being used which greatly reduces the labor required. The product is the preferred local cooking oil. Fresh nuts are selling for roughly twice the value of the copra derived from the nut, resulting in very limited local production of copra.

A government company, PNP VIII, operates a plantation near Masamba where hybrid varieties are produced by crossing the "West African Tall" variety with an Indonesian hybrid known as "NIAS". The resulting hybrid "PB 121" is now being distributed throughout East Indonesia. It is a high yielding variety with a short trunk. Current policy in Luwu is to distribute two or three nuts per farmer. In 1981 7,000 nuts were distributed to farmers in Mangkutana which amounts to about 35 ha. The chief aim of the program was to increase small holder production of copra, which is now mostly exported from Ujung Pandang for processing in Java. However no large increases in planting have occurred: the 7,825 ha of coconuts reported in 1983 is in fact less than that in 1981, and yields are reportedly decreasing due to age of the trees.

It is not clear whether the policy is to increase coconut growing generally, or to increase copra production for local or external processing. At all events demand for fresh coconut oil is so high that virtually all production is diverted for that use.

One possible policy would be to reduce the cost of fresh coconut oil by manufacturing it more efficiently on a large scale, thus reducing consumer prices. If production could be increased sufficiently to meet local demand for oil, eventually a surplus would be available to support copra production and processing.

Exhibit 11
Small Scale Industries to be Upgraded

Industry	Source of Raw Material	Markets	Issues to be studied
Coconut products (copra, dessicated coconut, coir and shell products)	Coconut plantations or smallholder trees	Local and Sulawesi markets for cooking oil. Possible export markets for other products.	Markets for copra and copra oil. Local cooking oil markets. How to increase planting of coconuts. Costs and returns to farmers. Feasibility of integrated operation.
Handicrafts (ebony wood, ceramics)	Local ebony wood and clay	Tourists coming to Toraja. Possible export.	Possibility of selling through handicrafts center in Rantepao Export markets. Necessary tools.
Machine shop (small machines, spare parts, tractors, fasteners)	Steel from Java Local scrap steel	Local industry for machinery, parts and fasteners. Farmers for tractors and parts.	Market study for additional products to allow expansion.
Wood Furniture (cabinets, desks, tables, bookshelves)	Local Wood	Local -- government offices and private.	Market study, including possibility of sale to Kabupaten under government procurement from small industry policies. Requirements for tools and training.

Bank Indonesia consultants in Ujung Pandang have studied the possibility of improving the quality of the oil and increasing its shelf life (which is now on the order of 3 days). They are also studying ways to improve traditional processing methods.

Industrial-scale processing alternatives for coconuts grown in Luwu include: copra, copra oil, dessicated coconut, coir products, and shell products.

It is recommended that:

1) a study be made to determine expected local markets for coconut oil in Luwu, and long term prospects for copra and copra oil markets elsewhere in Indonesia. The future availability of palm oil from the government plantation near Bone Bone (PNP 28) needs to be considered. Although plans are to export the oil in an unrefined state, local refining would appear to be a possibility. The acceptability of palm oil or palm oil/coconut oil mixtures for cooking oil would have to be considered.

2) the technical feasibility of substantially increasing coconut growing in Luwu be investigated, as well as costs and returns to the farmer from plantations, taking into account yields from improved varieties.

3) Financial costs and returns be calculated for a nucleus farm-smallholder scheme, with associated copra production facilities, making various assumption about market prices for coconuts and copra.

4) The preliminary feasibility of an integrated coconut plantation and copra or coconut oil production plant be examined, again making assumptions about market prices for copra and oil. At what level of production of coconuts and at what prices would this be feasible?

5) a concerted effort be made, perhaps with the aid of technical institutes, to develop improved, more efficient methods for small-scale manufacture of fresh coconut oil.

This preliminary study would point the way for future development of coconut processing in Luwu.

c. Handicrafts

Production of handicrafts (other than jewelry) in Luwu is limited to items made from local ebony wood by eight small workshops in Palopo and ceramic items produced by a single potter in Bupon.

Ebony wood handicrafts such as swords, canes, animal heads, and folding sewing boxes are made by small shops with as many as five artisans working with hand tools. Several larger shops are concentrating on ebony furniture, with small handicrafts a secondary product. In all cases items are made to order and sold to traders from Ujung Pandang who basically set the prices. Very little direct marketing occurs, though producers of handicrafts occasionally go to Ujung Pandang and sell to handicraft dealers there.

Ceramic items are mostly covered bowls, vases, teapots, pitchers, all of dark green color. Sales are made by the potter occasionally to tourists (the location is known to some tour leaders) and also to Ujung Pandang traders who place orders with him.

The present method of producing only against orders from middlemen, with virtually no direct contact with the market by the entrepreneur, is not likely to lead to growth of these businesses. Knowledge of changing tastes, demand for new designs or colors, retail price trends or competing items, reaches the entrepreneur indirectly, if at all. However given the present scale of operations direct marketing is not feasible.

One possible alternative is to link up with the handicrafts center in Rantepao built by the government Tourism Office. This is a permanent exhibition and sales outlet for Torajan wood and bamboo handicrafts, catering especially to tour groups coming up from Ujung Pandang. The Tourism Office makes annual tours to Europe and the USA which includes promotion of tours to Toraja.

We recommend that officials from the Department of Industry in Luwu contact the Tourism Office and request that ebony wood and ceramic items be included among the products sold at the center. Local artisans would sell their products directly. According to the KADIN office in Ujung Pandang, 72% of all Torajan handicrafts sales (Rps. 131 million last year) are made through the Rantepao center and only 23% in shops in Ujung Pandang. This therefore represents a potentially large new market for Luwu handicrafts.

The proposed Small Business Development Center should sponsor a broader study of the handicrafts industry and of export potential, with the objective of identifying new products in demand. This could lead to growth of the local handicrafts industry. Should expansion be indicated, the study would suggest additional tools and raw materials needed and credit needs of entrepreneurs.

d. Machine Shop

A well-equipped machine shop exists in Palopo. The owner is a skilled machinist who migrated from Java. He has 5 or 6 semi-trained employees. Among his products are small grating or rasping machines for shredding coconut, and spare parts for machinery. He has also made several "Rototiller" type (hand-pushed) tractors with gear boxes and engines purchased elsewhere. The FCC organization plans joint manufacture of 25 of these tractors for its members with this shop.

The importance of this enterprise to Luwu lies in its potential for servicing an expanding industrial sector. Such a facility could become an important source of spare parts, tools and small machinery to support mechanized plants such as recommended in this report.

Once some of these industries are launched it is recommended that the SBDC do a market study to identify products which the shop could produce including regular production items such as fasteners (screws and bolts). This could form the basis for a loan application for purchase of additional machinery. Worker training programs might also prove helpful.

e. Wood Furniture

Manufacture of wood furniture in Luwu is now carried out in some twenty small workshops in Palopo. These are essentially artisans employing a few local wood workers who are also farmers. They work entirely with hand tools. The cabinets, beds, and other products they make are sold on the local market only.

Upgrading and expansion of wood furniture manufacturing seems a logical objective, given the extensive timber resources of the area and the governments intention to reduce or eliminate export of both logs and lumber. Yet there is some doubt about the feasibility of exporting markets for wood furniture into other points in Sulawesi or

elsewhere in Indonesia, given the fact that such items are produced almost everywhere.

UNIDO experts at the Department of Industry in Ujung Pandang have done a furniture feasibility study for a timber cutting concessionaire which recommended production of traditional cabinets on a large-scale, reducing costs and improving quality. They were not in favor of a plan to make wooden desks for government offices, pointing out that such sales are usually made through contracts with very large firms.

It is recommended that a market study be undertaken by the SBDC on demand for wooden furniture which could be made by local shops with addition of some basic powered equipment (drills, planers, routers, lathes, sanders) and technical training. If policies regarding government procurement from small business are being carried out, it should be possible for Kabupaten Luwu to purchase desks, cabinets, bookshelves, and tables from local industry. Whether export of furniture from Luwu would ever be feasible should also be part of the study.

3. Other Industries

The small industries listed below were briefly examined but are not recommended at this time for the reasons indicated.

Ceramic Pipe:

Abundant clay resources exist in Luwu and brick making in wood-fired kilns is a well developed art. Clay drainage pipe would seem a logical extension of these activities. However brick makers report that the only possible market for such pipe is on government building projects and there is not enough of such construction going on. This could change in the future.

Imprinted Plastic Bags:

Based on the local consumption of imprinted plastic bags by bakeries, makers of egg-peanut confections and repackaging of a variety of goods brought in bulk, it was thought that it would be feasible to set up a small "converting" business. Rolls of clear polyethylene sheeting could be imported, imprinted and made into bags. It was concluded, however, that local demand is too small at this time. In time, this could become a viable proposition.

Tire Recapping:

The existence of a very large market for re-capped industrial tires at P.T. Inco in Soroako was thought to be the basis for a tire-recapping plant at Soroako or Malili which would also serve bus and truck operators and private vehicles. The owner of a tire recapping enterprise in Ujung Pandang was interviewed to determine possible interest in expanding to Soroako. While the availability of contracts from large operators is indeed the key to success in this business, it is our judgement that no businessman is likely to be found who would invest the large sums necessary to be able to re-cap the very large tires used by earth moving vehicles at P.T. Inco.

Poultry and Fish Feed:

Suggestions have been made to establish a poultry and fish feed venture which would grind, mix, and bag feed from local materials such as maize, soybeans, rice bran, fish meal, leaves, concentrates, etc. However at this time the growth potential for the poultry and the cultured fish industries is too uncertain to justify investments in this business. Also many of the materials mentioned are readily available to farmers who are able to mix their own feed. The Fisheries Department in fact operates a small feed mixing facility for fish farmers, but thus far it has been little used.

Fish Meal or Fish Flour:

The industrial-scale manufactures of fish meal or fish flour is only likely to be justified by the existence of a poultry-feed industry. In Luwu, dried fish is readily available if the farmer chooses to use it in his feed.

Small Agricultural Tools:

As long as no import restrictions are imposed on very low-cost Chinese shovels, spades, hoes, and axes, a small industry based on making these items locally could not succeed. A local blacksmith using scrap metal can produce a crude wooden-handled spade for Rps. 7,500 while a well-made Chinese shovel sells for Rps. 3,000 in a Palopo store. Local blacksmiths apparently survive making knives (machetes) and a few spades for farmers who may be willing to pay for a trenching spade of special dimensions. If imports were restricted this situation would change.

E. RECOMMENDED SUPPORT PROGRAMS

1. The Small Business Development Center

a. Basic Rationale

We have in Part One, Section C, of this report assessed the effectiveness of existing support programs for industry, especially programs directed at small and cottage-scale units. The views of this consultant and others who have studied the subject can 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.

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

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

- Training of industrial extension workers is inadequate.

At the same time, it is generally agreed that in the aggregate there are many useful and valuable programs available to the small businessman. It is not a lack of facilities or programs which causes concern, but rather problems connected with accessing them. Observers seem to agree that this could be overcome by (1) improving coordination and (2) giving programs more of a business orientation, especially as regards marketing.

The aim of this section is to propose a solution to the problem, starting with these basic objectives:

- increase off-farm employment opportunities.

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

- do this by utilizing existing programs to the maximum extent possible.

- take full advantage of private sector resources.

b. The Philippine Experience

In an excellent paper* prepared for delivery at the Workshop on Small Scale Enterprise held in Jogjakarta in December 1981, Mr. Exequiel P. Villacorta Jr. of the Private Development Corporation of the Philippines, described the experience in the Philippines since 1974 with programs similar to that being proposed here. It's relevance to the Indonesian situation warrants a review of the paper's findings.

A Medium and Small Industry Coordinated Action Program (MASICAP) was set up to formulate projects for financing by banks. Field teams seek out viable projects and the entrepreneurs to undertaken them, after which they assist these entrepreneur in putting together the documentation required by the bank. Graduating college seniors with outstanding academic records serve as field extension workers and are allowed course credits for their work. Upon graduation many of them find employment in business or in financial institutions.

A Small Business Advisory Center (SBAC) was also established to provide the services of specialists in engineering, finance, marketing, and business management to small enterprises without charge. There are also Trade Assistance Centers (TAC's) in the Ministry of Trade and Industry to provide market information and assistance. A great number of other programs and institutions also exist to aid industry such as loans at concessionary interest rates, a loan quarantee program, venture capital firms, and the "KKK"

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* Programs of Assistance to Small and Medium-Scale Business Entrepreneurs in the Philippines, by Exequiel P. Villacorta, Jr.

Exhibit 12

Small Business Development Center Scheme

Inputs: Available Resources

Department of Industry:
(incl. UNIDO advisors)
- Equipment and materials
- Marketing
- Training courses
- Bapak Angkat

Department of Trade:
- Licensing
- Government contracts

Department of Agriculture
- statistics
- extension services

Department of Cooperatives/FCCs
- organization of producers

Banks: BNI-46, BRI, BPD
- loans through KIK, KMKP or other
- RPMU, Bank Indonesia

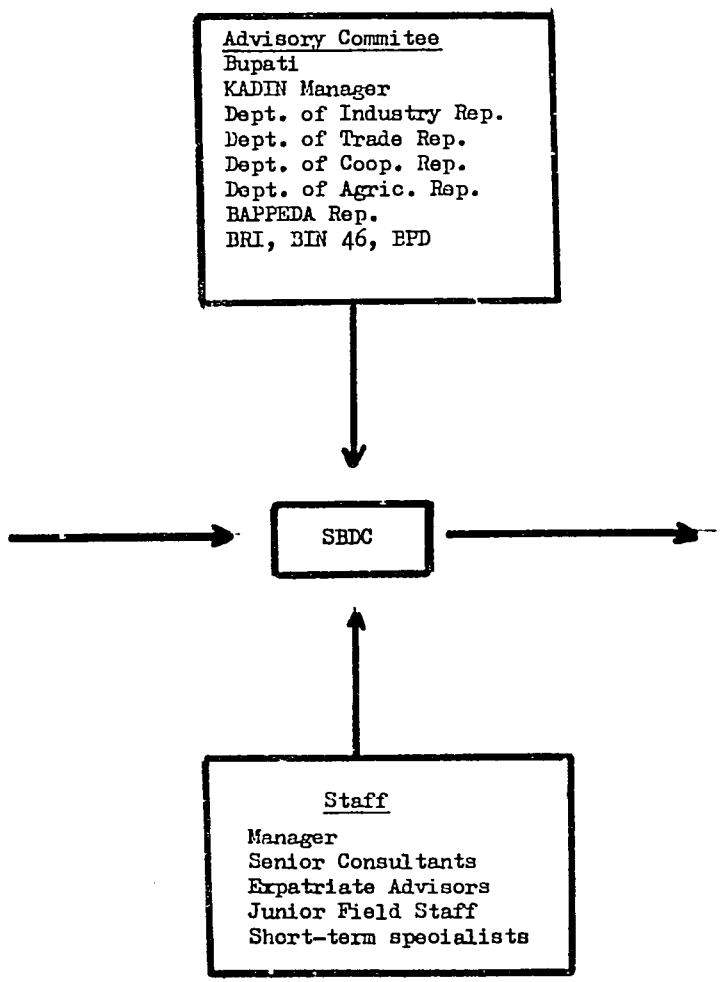
Financing companies
(P.T. Bahana, PDFCI, & IDFC)
- equity capital
- management training

Industry Technical Institutes
- Technical information
- Pilot scale testing

KADIN
- contacts with manufactures
- contacts with trade associations

Investment Coordinating Board (BKPM)
- investment incentives

Private Volunteer Organizations
- training
- technical assistance



Outputs: Assistance to Entreprenuer

Project identification studies

Feasibility studies

Market studies and information

Contacts between buyers and sellers
including sub-contracting

Bapak Angkat (foster father
arrangements with large firms)

Organizational assistance:
- incorporation
- licensing
- joint venture
- subcontracting

Investor contact
- Indonesian
- Foreign

Loan Applications to Banks

Technical Assistance:
- financial
- production
- technical
- material procurement
- marketing

Training Courses:
- management
- technical skills
- accounting
- marketing

Seminar/Workshops:
- marketing
- product design
- quality control

program to establish rural enterprises in every village with government seed capital.

In a discussion of policy issues, Mr. Villacorta poses the question as to whether the growth of small enterprise "can be best left to the workings of market forces" and the general framework of government tax, credit and other policies, or should there be "special forms of intervention by government in favor of small enterprise". The Philippine approach has been one of direct intervention --indeed a progam very similar to Indonesia's (with the exception of the KKK program). He concludes that "it may not be prudent and efficient to make the growth of small enterprises highly dependent" on such government measures as price supports or subsidized raw material costs. He feels that this may work against the creation of industries which are efficient and competitive in world markets. "The economy may be giving out more than what it receives from such enterprises". He recommends that programs be designed to "draw out the potential for self-reliance and self-cultivated productivity in small enterprises; in short, the potential for true entrepreneurship".

Mr. Villacorta suggests the building in to these programs of a fuller involvement of the private sector rather than dependence on government programs. He proposes mobilization of large-scale private trading corporations to act as conduits for dissemination of technology and modern production techniques, and to provide linkages between small enterprises and their markets by taking over the collection and distribution function for them, and possibly also providing working capital. Finally he urges that a more thorough evaluation process be introduced to lessen the risk of failure of small businesses, and that project monitoring and supervision be carried out once a project is implemented.

c. Description of the Project

Principal Features:

The creation of a "Small Business Development Center" based in Palopo is proposed. Principal features of the Center are depicted in Exhibit 12.

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.

As the accompanying exhibit makes plain, the SBDC is intended to serve both as a channel for services already available and as a catalyst to "make things happen". 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 businessment 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 not 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 of its work may be very relevant to planning of assistance to these activities. Examples might include sago starch making or wood furniture.

An activity such as this could not be confined to Kabupaten Luwu since the area is and must be closely linked with Ujung Pandang, both from a government administration standpoint and a commercial one. It is therefor proposed that there be an SBDC "headquarters staff" in Ujung Pandang maintaining necessary contacts at that level and providing a base of operations for field staff from Luwu. Whether or not this structure would be replicated throughout South Sulawesi, or operated in Luwu initially on a "pilot program" basis, is a matter for policy decision.

Location:

There are two possible locations for the Center:

- attached to the local chamber of Commerce and Industry (KADIN) offices, or
- under the Bupati's office.

We prefer the first of these alternatives to more closely associate the Center with the private sector. If it should prove to be impossible to do this, the Center could be placed administratively under the Bupati. It this is done, we recommend that offices be located separately from the Kabupaten, preferably in downtown Palopo. This would facilitate access and give the center more of an "independent image" in the eyes of the entrepreneur.

Though the service should eventually become self-supporting through user's fees (except possibly for the smaller scale businesses) it will for the first 5 years have to be supported by the government, and by foreign aid.

In connection with KADIN, it is interesting to note that the "work program" for KADIN in South Sulawesi, agreed upon in 1979, calls for the Ujung Pandang office to:

- assist exporters through promotion and market information activities,
- increase cooperation with government agencies in identifying new export industries, and in collecting economic data on South Sulawesi to assist investors in making feasibility studies,
- within the framework of cooperation rather than competition among the three provinces of South, Central, and Southeast Sulawesi, propose new agro-industries for South Sulawesi,
- establish regular communication with government agencies and with technical institutes,
- maintain a list of all existing small industries in the Province,
- encourage the younger generation to work in the private sector or to go into business for themselves,
- provide management training to owners of small industry*

* Information from interview with General Manager and from 1981 yearbook for KADIN in South Sulawesi.

This mandate directly involves KADIN in many of the activities we have in mind for the SBDC. This kind of orientation seems to make KADIN the logical location for the Center. Perhaps most important of all, contact between local businessmen and potential private section investors from other areas would be greatly facilitated through KADIN members.

Functions:

There is a very large scope of activity which could be undertaken by the SBDC on behalf of small industry development, as can be see from Exhibit 12. Not all of them could be begun at once, but functions could be added in stages as the staff increased.

Taken together, the outputs shown constitute a full range of services to small business. (The emphasis here is on manufacturing rather than services or trade, but an expandend staff could eventually assist these sectors as well.) The Center will take on a limited number of projects at first. These will have to be carefully chosen as it is important to begin with some "success stories". The Center will also be "client-directed" rather than serving groups of entrepreneurs (except in the case of seminars, workshops, and training courses). The principal task then is one of bringing the clients and the project together and assisting the entrepreneur to actually realize the project.

Work of the Center should begin with the carrying out of the feasiblity studies recommended in the proceeding section of this report. This would engage the full staff for the first six months, or longer, depending on how fast the staff is built up. This will familiarize the staff with Kabupaten Luwu and with the existing small business sector. With the completion of the first study , contacts would be made with potential local investors and possible external joint-venture partners, contractors, or trading companies.

Once promising contacts have been made, the Center staff involved should begin to play a 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 large company partner should provide this. In the initial phases the Center will not be equipped to offer training courses. 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.

The name of the Center carries the word "small" and indeed many of the industries fostered would be small. However the objective is to make them grow so that they eventually reach medium-scale or even large-scale. In like manner, some industries which are now on cottage scale will grow to the "small" category.

Staff:

The work of the Center will be carried out by a staff under the direction of a General Manager. The staff will consist of senior Indonesian business consultants supported by a field staff consisting of young college graduates in business, or possibly senior students in business who receive course credit for their work (as in the Philippines). It is suggested that expatriate advisors also be made available for the first three years of the project. Advisors and consultants should be specialists in (1) industrial and agro-industry feasibility studies, (2) management and finance, and (3) marketing. Short term specialists, both Indonesian and foreign, would be needed in support of particular projects.

An Advisory Committee, consisting of representatives of all organizations with whom the Center would be in contact, would meet monthly to review progress, resolve problems of coordination, and provide advice and counsel. Such a committee would be needed at both the provincial and Kabupaten levels.

The Center would occupy an office in Palopo and would be equipped with vehicles for field work, including jeeps and motorbikes. Funds would be budgeted for

field travel to the extent of 3 months a year for senior consultants and expatriates and 4 months a year for junior staff.

A budget for the office appears below. It assumes full deployment of personnel from the beginning. In practise, the staff would probably be built up over the first 6 months.

c. Costs

Recurring Costs

Staff		Total Annual Cost (000 Rps)
1 General Manager	Rps. 100,000/mo	1,200
3 Senior Consultants	Rps. 85,000/mo	3,060
10 Junior Field Staff		
5 Graduates	Rps. 68,000/mo	4,080
5 Seniors	Rps. 50,000/mo	3,000
Short-term Specialists		
12 man-months	Rps. 120,000/mo	1,440
3 Secretary/Stenos	Rps. 75,000/mo	2,700
3 Expatriate Advisors	(see dollar cost below)	
		15,480

Travel:

Senior Staff	300 days x Rps. 20,000/day (ave)	6,000
Junior Staff	1200 days x Rps. 20,000/day (ave)	24,000
Expatriates	300 days x Rps. 20,000/day (ave)	6,000
		36,000

Vehicle Fuel and Maintenance:

Fuel

Jeeps:	5 x 20,000 km at 5 km/liter and Rps. 320/liter	6,400
Motorbikes:	5 x 20,000 km at 50 km/liter and Rps. 320/liter	640

Maintenance

15% of price of Jeeps	7,500
10% of price of motorbikes	650
Office Rent:	15,190
Office Supplies:	2,500
Seminars or workshops: 4 at 3,500,000	6,000
Total Recurring Costs (Rps)	14,000
	89,170

One-time Costs

Vehicles	Rps.000
5 Toyota Land Cruisers at Rps. 10 million	50,000
5 Motor bikes at Rps. 1,300,000	6,500
	56,500
Furniture and Equipment:	15,000
Total	71,500

US. Dollar Costs

Staff

	US $
3 Advisors at $ 8,000/mo	288,000/year
Travel:	
To and from Indonesia (with wives) 6 x 2,600	15,600
Annual trip to Hong Kong: 6 x 2,000	12,000/year
Shipment of personal effects: 3 x 5,000	15,000

DEVELOPMENT BUDGET PROJECT FORM

PROJECT NAME Small Business Development Center
PURPOSE/OBJECTIVE Increase employment and incomes through development of small industries

TARGET 1984-85
1985-86
1986-87
1987-88
1988-89

Expenditures in Million Rupiah in Constant 1983 Price

	Budgeted	Proposed					
A. PROJECT COSTS	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	Total Five Years
1. Additional Administration Costs		73.5	73.5	73.5	73.5	73.5	73.5
2. Recurrent Costs							
3. Construction/ Project Cost		71.5	-	-	-	-	-
Total							
B. ADDITIONAL MANPOWER REQUIRED TO OPERATE THE PROJECT							
1. Professional		5.7	5.7	5.7	5.7	5.7	5.7
2. Technical		7.1	7.1	7.1	7.1	7.1	35.5
3. Skilled		2.7	2.7	2.7	2.7	2.7	13.5
4. Unskilled							
Total							

A-1 Enter on this line the additional headquarters cost resulting from the implementation of this project.

A-2 Enter on this line the costs which continue year after year. These are often termed operation and maintenance costs.

A-3 Enter on this line the capital costs which will be spent each year to implement/construct the project.

B Enter on these lines the additional manpower required to undertake the project as it is completed. Do not include manpower used in the construction phase. Professional means doctors, teachers, engineers, economists, etc. Technical means nurses, midwives, surveyors, etc. Skilled means equipment operators, typists, mechanics, drivers, etc. All other employees would be categorized as unskilled.

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 the "other end" of the Kabupaten near Malili has stimulated only minimal economic growth in the area (some food production, bus transport contracting, garbage collection). Yet this complex offers markets for local manufactures and services, has abundant 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.

In our view, local authorities should take steps 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. Entrepreneurs in the area operate on an artisanal scale and are not risktakers. Opportunities mentioned in the section of this report covering P.T. Inco are heavily in the service sector, but also include such manufactures as wood and rattan furniture, work clothing and some metal products which offer possibilities for small scale ventures.

A rattan furniture factory, drawing on the rich resources of rattan in Kecamatan Nuha could take advantage of available power and port facilities, as well as sales to P.T. Inco personnel. The difficulty of inducing an investor to come to this remote area could be overcome by offering such incentives as elimination of sales and income tax for a specified period, subsidizing of worker training, and the services of design, marketing and technical consultants (such as the EEC experts mentioned in the discussion of the rattan furniture prospect). Given the 10 hour road trip to Ujung Pandang it seems likely that sea shipment of furniture would be less expensive. It may be that favorable rates could be obtained for export to Japan on ships which call at Malili for nickel matte.

These ideas all require futher investigation and study. The Small Business Development Center proposed elsewhere in this report would be an ideal vehicle for this investigation.

APPENDIX A
DESCRIPTION OF EXISTING INDUSTRIES

1. Food Industries

Rice Mills

The Department of Agriculture has information on the number of mills of various types in Luwu, listing a total of 690 in 1982. However many of these are no longer in operation. Roughly two-thirds of the mills are very small Englebert mills of German manufacture which hull and polish padi in a single pass. They are owned by individuals who mill their own rice and that of their immediate neighbors. Some larger mills are owned by entrepreneurs who mill rice for some cooperatives and for individual farmers.

The Farm Cooperative Center (FCC's) established under Project Luwu have installed the only large-scale modern rice mills ("Millmore" from the U.S.). Two of these mills, with a capacity of 1.5 tons/hour, are already operating and three more of 3 ton/hour capacity are planned.

All rice except that milled locally is purchased by the government agency DOLOG for shipment elsewhere in Indonesia. It expects to purchase 15,000 tons this year in Luwu, which makes the district the third largest producer in the province. Of this amount the FCC's expect to deliver about 1,625 tons.

Sago Starch Processing

Extraction of starch from the trunk of the sago palm is widely practised in Luwu in the coastal area where these palms abound. Traditional hand grating of the fibrous heart of the tree is gradually being replaced by mechanized grating. It is estimated that there are 100 of these graters now in use in Luwu. They are manufactured in Ujung Pandang and are driven by a small Japanese-made gasoline engine. They cost about Rps. 210,000 in Palopo.

While there is at least one processing cooperative in operation, most graters are individually owned, the owner sharing the profits with workers who cut the trees and wash the starch out of the grated material by hand methods.

The dried starch is put up in palm-leaf packages of 15 kg (North Luwu) and 2 kg (South Luwu) and sold at Rps 100/kg. The product is much in demand as a food starch in

Luwu and neighboring areas. Traders in the central Palopo market purchase it for sale in Tana Toraja and other inland areas for food purposes but some also reaches Ujung Pandang where it is purchased by the textile mill for sizing. Total sago exports from Luwu in 1979 were estimated at 255 tons*.

Up to 30,000 ha of sago palm are said to exist in Luwu, though some estimates are much lower. Processors pay the land owner between Rps 1,000 and 3,000 per tree depending on the size of the tree. Government regulations prohibit cutting trees less than 10 years old. By this age, suckers are growing from the roots of the mature tree, so if this practise is followed there will presumably be constant regeneration of the resource.

The industry at present suffers from highly uneven quality of the product due to the practice of some processors of using dirty water for washing. A market study is needed to quantify the industrial demand, and to check prices and quality requirements.

Industrial-scale processing of sago starch, which would improve product quality and increase productivity needs to be examined. A factor to be considered also is that of income distribution, since the present system allows relatively easy entry into the business and provides employment opportunities throughout Luwu. Sago starch processing as presently practiced is quite profitable for the machine owner.

Cooking Oil

The manufacture of cooking oil might be expected to appear on the list of local industries. It does not because of the ready availability of coconuts and the strong local preference for coconut oil made from fresh grated coconut meat**. The householder may grow or buy coconuts and do his own grating (by hand or machine) and boiling, or he may buy it from others and make a business out of processing for sale (cottage or home industry).

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*Source: Bank Indonesia.

**This preference is reflected in the price relationship between copra and fresh coconuts. A fresh coconut sells for twice the copra equivalent. Of course the low copra price also is related to the long distance from Luwu to the copra export market in Ujung Pandang.

The oil palm plantation which is being established near Bone Bone should be processing palm oil locally in about four years, but this will be unrefined oil which will be shipped to Java for further proccessing and possible export. Five hundred hectares have already been cleared and enough year-old seedlings are now available to plant this area. Planting is scheduled to start in 1984. Under the nucleus plantation concept, the national company, "PNP 28" will clear and plant oil palm for smallholders in the area.

Other Food Processing

There are three small bakeries and a noodle factory utilizing wheat flour imported from Ujung Pandang. The bakeries are home kitchen operations using no machinery. One in fact uses a charcoal oven to prepare 100 loaves/day. Another enterprise makes an egg-peanut confection used in soups, also a small hand operation.

There are five ice plants in Palopo, the largest of which is currently producing 3 to 4 tons of ice in 30 kg blocks daily (though capacity is 8 tons/day). The ice is sold to local householders and to fisherman or traders in fish at Rps. 50 per kg. Demand has reportedly not been increasing in recent years. To the extent ice is used by the fish traders who carry fish by motorcycle to inland areas, this stable demand accords with the stable level of fish exports from Luwu over the past three years.

A number of small businessmen are producing an "ice" or sherbet confection from shaved ice and flavorings which are sold by street vendors.

Slaughterhouses are operated by the municipality in Palopo and in some other Kecamatans. The one in Palopo slaughters 2 or 3 cows or buffalo per day. Any meat sold in the central market must be from animals inspected and slaughtered in this facility. The charge is Rps 2,500 per kg for a buffalo and Rps. 2,000 for a cow. However many farmers prefer to do their own slaughtering and sell directly. Apparently there is little supervision of meat selling outside the more populous Kecamatans.

Cold Storage Facilities

The only cold storage facility in Luwu outside of the P.T. Inco facility is in Palopo. It belongs to the Fisheries Department who does not operate it. The facility has about 32 m^2 of storage area at -18^{o}C and is

leased out on a shortterm basis to a local trader. Most recently, the trader used it to store shrimp and fish destined for sale to P.T. Inco. The company, with reduced needs due to cutbacks in the number of expatriates, now buys elsewhere so the facility has been idle since December 1982.

Fish and smaller amounts of shrimp are currently marketed fresh by small traders who buy daily from fisherman in Palopo, Bupon, Wotu, and Malili. The fish is sold locally or iced and carried on motorcycles by traders to inland points such as Tana Toraja and Soroako. No large markets for fish exist outside Luwu as most other area of South Sulawesi are well supplied by local fisherman.

Shrimps, and especially the large "tiger" prawns, are currently much in demand and there is great interest in developing Luwu as a production center for shrimp. Should this occur, a cold storage facility would be required for temporary holding prior to shipping to buyers in Ujung Pandang. When justified by the volume of prawns, a processing/freezing plant could be built here.

A secondary use of a cold storage facility would be a temporary holding facility for eggs and holding or freezing of broiler chickens. The FCC's are now building a small cold storage/freezing facility for this purpose in Palopo.

2. Textiles

There are numerous small tailor shops in Luwu operated by Chinese. Kabupaten statistics indicate a total of 29 establishments but it is estimated that there are at least 50. These are family enterprises with 2 or 3 people working in each. Inexpensive articles of clothing are brought in quantity from Ujung Pandang by local traders.

No leather is made in Luwu, though at least one business in Palopo is based on cleaning and drying of animal skins. These are transported to Ujung Pandang and sold to traders there. There is also one shoemaker in Palopo. His leather is brought entirely from Ujung Pandang.

3. Wood and Wood Products

In terms of employment and output value, wood and wood products is the largest manufacturing sector in Luwu.

Sawmills

Information obtained from the Departments of Industry and Forestry do not give a clear picture of the status of sawn lumber production. This is undoubtedly due to the great number of small unlicensed mills using hand saws as well as uncounted numbers of chain saw operators. Apparently these men cut trees and saw them into planks on the spot with a chain saw, thus evading any kind of control.

In 1981/82 a total of 54 licensed sawmills were reported by the Department of Industry of which 15 were mechanized. The "real capacity", of these mills (as opposed to the "potential capacity") was 16,533 cubic meters per year. By the year 1982/83, an additional 19 mills had been licensed, for a total of 73 mills, of which 31 were mechanized. The newer mills are of larger capacity, the majority ranging from 750 m^3 to 1080 m^3, while the older ones tend to be from 100 to 300 m^3. The newer mills added 10,775 m^3 of capacity bringing the total to 27,308 m^3 of which 53% was mechanized.

Until this past year, sawmills were almost all in Palopo which was a convenient location due to available transport facilities for moving lumber out by truck, the easy use of tidal estuaries for floating logs into the mills, and available labor. Most of the new larger mills were established in near by Malangke (nine mills with average capacity of 775 m^3 vs. Palopo with 13 mills averaging 370 m^3 capacity).

Actual production of sawn lumber is currently only about half of capacity. Figures for the past 3 years, according to the Forestry Department in Palopo, are as follows:

Year	Production in Cubic Meters
1980/81	13,284
1981/82	5,330
1982/83	13,852

The marked decline in 1981/82 is said to be due to the entry into force of new regulations controlling logging. A June 1980 decree requires a permit for logging and restricts the size of tree which can be cut. At present only two concessionaires are operating, P.T. Sisco in the Malili area, and P.T. Serdit in Wotu. The Forestry Department

states that the new regulations forbid export of logs and will in the future restrict cutting to a level meeting local lumber requirements only.

Exports of sawn lumber from Luwu now go mainly to Kabupaten Tana Toraja, Enrekang, Sidrap, and Wajo. Only limited quantities are sent to Ujung Pandang as the transport cost of Rps. 12,000/m^3 makes it uncompetitive with wood from other areas. Presumably these shipments would be curtailed in the future. Forestry Department officials expect production of sawn lumber to decrease next year.

Sawn lumber brings Rps. 90,000/m^3 for 2nd quality wood currently in Palopo (Rps. 45,000 and 30,000 for 3rd and 4th grade respectively). Since 2nd quality wood predominates, we may assume an average value of Rps. 70,000/m^3. Thus the value of 1982/83 production is approximately Rps. 1 billion (The Department of Industry reports Rps. 1,424,525,000.)

One typical mechanized mill in Palopo is currently processing about 100 cubic meters of wood annually from logs cut in nearby Kecamatan Walenrang and floated down river to the bay and thence by tidal estuary to the mill. Planks of approximately 1" in thickness are the main product, though sizeable quantities of wooden pallets are also produced.

The pallets are shipped to Ujung Pandang to be used by the paper mill in Kabupaten Gowa. The two saws, which are belt-driven by diesel engies, are 11 years old and will soon need replacing. The mill employs nine persons permanently, plus up to 10 casual laborers.

Plywood

Luwu's second largest enterprise ---- after P.T. Inco --- is the plywood factory at Bua in Kecamatan Bupon, 15 km from Palopo. Owned by the Army, it is operated on a contract basis by a Jakarta-based company, P.T. Nelly Dwi Putri. The raw material for the plant comes from outside Sulawesi to the extent of 70%, mostly from Maluku but also from Irian Jaya.

After start up of the plant in June 1963, the Army experienced problems with operations and the plant closed in January 1965. Operations began again in June 1968 by P.T. Nelly under the terms of a 16 year contract. The company pays the Army a fee for use of the plant which allows them

an increasing return if production exceeds 1,000 m^3 per month. Production over the past four years is as follows:

1979 - 13,447 m^3
1980 - 15,037
1981 - 18,105
1982 - 15,554

The plant produces 4 x 8 ft. plywood sheets in thicknesses ranging from 4 mm to 18 mm. Red and white "Maranti" wood from Maluku is used for facing material, while local wood (from the Wotu and Malili areas) and waste Maranti wood is used for the core. For certain types of decorative plywood, teak obtained from Southeast Sulawesi is used for facing material. Company officials state that a much higher percentage of mixed local woods could be used, perhaps as high as 70%, but they have difficulty obtaining enough wood from the two logging companies they deal with. The company has applied for a license to engage in logging in Kabupaten Luwu but has not been granted one.

Sales are 90% within South Sulawesi and are made mostly from company offices and warehouses in Ujung Pandang. The balance of sales are made in Hong Kong and Singapore, according to company officials. Since the March 30, 1983 devaluation of the Rupiah the company has been actively seeking to increase its export business, hoping eventually to export 50% of production. Prices vary from Rps. 2,700 per sheet of 4 mm plywood to Rps. 12,000 for 18 mm "lumber core" plywood.

Wood is transported from Maluku by two company -ed tugs and barges (pontoons). A third barge is now being built at the harbor next to the plant. The trip from Maluku takes 3 days while that from Irian Jaya takes 20 days. The long hauls have resulted in high raw material cost: Maluku wood costs the company more than twice the Rps 23,000/m^3 cost of local woods. Finished plywood is transported to Ujung Pandang also by tug and barge and also by truck (40% of total).

There is no wharf or pier at Bua. Movement of barges in and out of the small inlet next to the factory is possible at high tide when water depth is about one meter. Logs unloaded from barges are held in an inlet and restrained by a log boom, from where they are removed as needed by a crane.

The plywood plant is operated on a 3-shift, 6 day/week basis and employ 586 persons, half of whom are women. Wages ranges from Rps. 700 to 1,300 for a 7-hour shift for men and from Rps. 600 to 1,000 for women. While the machinery is now rather antiquated, and there is a high degree of manual operations, the product appears to be of good quality. No waterproof glue is used, however, which restricts its usefulness.

Company officials state that most of the machinery is old and should be replaced. They have sought without success to obtain duty-free import of new machinery. The operation is reportedly losing money as a result of high raw material costs and the antiquated machinery. To overcome these problems, the company is seeking to diversify its product range by adding such products as hardwood flooring and decorative panels of various shapes of wood glued to a back panel. (The latter is still in an experimental stage.) Sales prospects for hardwood flooring are encouraging; so far 18 m^3 have been exported to Japan.

Rattan Furniture

Large quantities of rattan are available in Palopo as the area serves as a collection and transfer point for rattan cut in other parts of Luwu, especially Malili and Nuha from whence it is hauled by truck. Rattan cut in Southeast Sulawesi also arrives by boat. Local dealers sort and bundle the rattan after first giving it an oil bath treatment to reduce moisture and retard fungus growth. The product is shipped to Ujung Pandang, where it is further processed and the bulk of it exported to Hong Kong (and some to Europe). Some is used by furniture makers in Ujung Pandang.

Wood Furniture

Twenty-three wood furniture makers were licensed in 1982; there were in 1980 at least 15 more unlicensed firms. Approximately 20 of these are in Palopo. They are essentially cabinet making operations using hand tools only and employing up to 10 part-time workers. (One such cabinet maker in Palopo when visited reported that all of his workers were absent working in the rice harvest.) Cabinets, desks, tables, and beds are typical products (made to order only), a variety of wood from Malili known as "Kapati" being favored. A small business like this might gross Rps 5 million in a year.

Ebony Wood Furniture and Handicrafts

There are several craftsmen in Palopo (reportedly 8) producing items from the valuable ebony wood, much of it from the Mangkutana area. One makes very attractive furniture such as chairs with upholstered seats. He employs nine workers who assemble chairs with hand tools. Some parts are jobbed out to another local shop which has a power lathe. The operation is able to turn out annually 25 sets consisting of 4 chairs, a settee, and a coffee table, the set selling for Rps. 550,000. Typically, this venture does not engage in marketing. All items are made against orders from an Ujung Pandang trader who picks up the furniture in his own truck.

Another craftsman makes canes, ornamental swords, and animal heads (on which are mounted real deer antlers). This man employs nine workers and also has no power tools. He received assistance from the local Department of Industry Office last year in the form of free hand tools (under the BIPIK program). He also got a Rp 25 million bank credit to purchase wood. His products are sold partly to traders from Jakarta who come to him and place orders, of which some are destined for export to Japan. He occasionally takes some pieces to Ujung Pandang where he sells them to handicraft dealers.

4. Citronella Oil

A local entrepreneur, Mr. Umar Abdullah, operates a lemon grass plantation and citronella oil extraction plant near Maleku in Kecamatan Mangkutana, under the name P.T. Citronella Sumber Alam . Lemon grass, originally imported as seedlings from Bogor, is grown in blocks on a 100 ha tract which he was given the right to utilize by the Provincial Government in 1968. Currently 40 ha is planted, 20 ha of which is mature and being harvested. Local villagers are hired to cut grass and receive Rps 500 per quintal. A worker can cut 3 quintals in a day.

Two large steam kettles are used to distill the oil, one holding 1.5 tons of grass, the other 0.8 tons. Dried, spent grass is used to fire the kettles. The first fraction of distillate drawn off is 60% oil and is considered first quality, the second at 40% oil is second quality.

The oil (minyak sereh) is sold through a broker in Ujung Pandang to one of several small pharmaceutical firms which bottle it as a rubbing oil or linamint. The oil is all consumed locally in Sulawesi,through there is also a flourishing export market. Mr. Abdullah receives Rps 7,000/liter for first quality oil. The price has steadily increased from Rps 5,000/liter 2 years ago in response to increasing export prices. (Some portion of this increase should be due to the devaluation of March 30, 1983.) Production is reported to average 150 liters per month. The oil is transported to Ujung Pandang by truck in 30 liter plastic drums. Assuming annual production of about 1,500 liters of oil, production value for the current year is valued at Rps. 10.5 million.

A Jakarta "project development company", P.T. Bahana Pembinaan Usaha Indonesia, owns 30% of the firm. In addition to an injection of capital of about Rps 6 million --- used to purchase a tractor --- P.T. Bahana provides consulting help and has arranged credits through Bank of Indonesia for 100 farmers, each of whom will plant 2 ha of lemon grass shoots provided by P.T. Citronella. Under this nucleus plantation/smallholder scheme, P.T. Citronella will purchase all the grass grown and process it.

P.T. Citronella is presently engaged in a dispute with Kabupaten Luwu officials over some 35 ha of land which has been reclaimed for use by the local village to build schools and for expansion of a Rural Extension Center. Mr. Abdullah is appealing to the provincial governor in the case. Having cleared the land originaly and planted most of it in lemon grass, Mr. Abdullah has considerable investment in the disputed area.

5. Non-Metallic Mineral Products

Ceramics

A potter operates a small shop in Kecamatan Bupon using a hand-powered wheel and a small kiln. He produces covered dishes, tea pots, ashtrays, and vases, all of them dark green in color. While local supplies of clay are plentiful, no sources of coloring matter have been found in Luwu. The potter imports his colors from Java. He reports that he doesn't use other colors as they are "too expensive".

The potter does no marketing of his own. He produces only against orders from a trader in Ujung Pandang. His goods are sold through stores in Ujung Pandang at prices three times as high as his sale price to the trader. His

prices are very low; a small covered dish sells for Rp. 500. He makes occasional sales to tourists who return from Tana Toraja by this route. Other than occasional help in obtaining wood and clay, there are no employees.

It appears that this enterprise could benefit from some market studies which might indicate other products to be made for sale to tourists who come regularly to Sulawesi or for decorative household use by Indonesians. Exploration to find local coloring materials could also benefit the enterprise by increasing the variety of production and by giving them more of a local character. A sales outlet in Rantepao might be a surer route to the tourist market. Basically the enterprise is too small at present to support any expenditures on machinery, marketing, or new product development. Outside assistance would be needed.

Bricks, Roof Tiles, and Lime

Brick kilns are to be found throughout Luwu near the coastal clay soils, though many are concentrated in an area just south of Palopo. Of the reported 49 brick-making businesses in Luwu, some 35 are in Palopo.

A typical enterprise has a kiln covered by a rough "atap" roofed structure. Clay is extracted from near-by pits with the aid of buffalo, whose feet puddle the clay. Bricks are formed by hand in wooden molds and air-dried before firing. A screw press and mold is used to form roof tiles from the same material. During a period of about 3 months, some 100,000 bricks are made ready, at which point they are loaded into the kiln and fired for 3 days by burning local wood. Limestone rock from Toraja (and some times coral) is exposed to the open fire at the same time to make a crude lime.

Bricks are sold locally to builders or individuals at Rps 25/brick. Roof tiles cost Rps 75 each. The enterprise employs 7 full-time workers and last year grossed about Rps 2 million (US $2000). The owner reported that this was about the same level as the previous year.

An interesting sidelight on this business is that the owner received a bank loan last year to purchase 7 oil burners for his kiln. (This is said to be part of a government effort to reduce wood cutting and to produce a better quality brick.) However local buyers will not buy bricks made this way, possibly due to some bad batches produced locally. They insist on bricks made with wood fires. The owner of the kiln is not using the burners, nor has he repaid the loan.

Floor Tiles

This is a relatively new industry for Luwu, the only existing venture using machinery having been started in 1980 in Palopo. The owner opened a second production unit in June 1983, doubling his capacity. Government buildings in Palopo are the main users of his product.

All raw materials except sand are purchased in Ujung Pandang. This includes cement, ground stone and decorative stone pieces for terrazo type tiles, and coloring matter. Each unit has an hydraulic press with molds for two sizes and the new unit is also equipped with a polishing machine for terrazo tiles. The equipment with a total value of Rps 14 million was purchased with the aid of a loan from BNI-46. The loan for the first press has already been paid off.

Two basic sizes are produced: 20 cm x 20 cm and 30 cm x 30 cm. The smaller one sells for Rps 90 and the larger ones range from Rps 600 to 700. He has an order now for 40 cm x 40 cm tiles and will add a third mold to produce them. Production for 1982 and the first 5 months of 1983 was:

20 x 20 tiles:	200,000 pcs.	with value of Rps 18 million
30 x 30 tiles:	40,000 pcs.	with value of Rps 26 million
TOTAL :	240,000 pcs.	with value of Rps 44 million

On an annualized basis, the value of production would be about Rps. 30 million.

The owner uses a contract labor system. Each time an order is received he contracts with a local man to produce that number of tiles at fixed price per tile. This person hires a team to work for him. We observed a team of 8 persons who judging by the rate at which they were working were also being paid on a piece rate basis. The owner has a small laboratory to test the quality of the tiles to see that they are acceptable.

Concrete Blocks and Other Shapes

Two such firms are operating in Palopo, both recently established. Utilizing cement from Ujung Pandang and local sand in proportions of one to four, they are producing blocks equivalent in size to 8 of the local bricks. However the block sells for Rps. 400 vs. Rps 240 for the eight bricks. The owner of one of these ventures reports that he is beginning to make inroads on the brick market since with the aid of reinforcing bar and by filling the cavity with

concrete a much stronger structure results. He is selling about 1000 blocks/mo. now, plus a variety of concrete grills (decorative ventilation shapes) for building walls. All products are made from wooden molds and no machinery is used. The owner, who learned his trade as a P.T. Inco employee, is optimistic about the sales potential and would like to purchase machinery when his market develops further.

6. Metal Products

Small Agricultural Tools

There are a reported 15 small blacksmith shops in Luwu producing hand tools for agriculture. A typical blacksmith, located on the main road about 7 km north of Palopo, is making knives (machetes) and spades. He has two employees and a primitive forge which has a bellows constructed of hollow logs. His raw materials are discarded truck springs. He is able to produce two knives or one shovel in a day. He sells the knives for Rp. 3500 and the spades, with wooden handle, sell for Rp.7000. It is interesting to note that shovels imported from China are selling in Palopo stores for Rp.2,750.

Metal Furniture

There are at least eight metal working (welding) shops in Luwu producing a variety of items from steel shapes purchased in Ujung Pandang. Five of these are in Palopo. A typical shop is equipped with an electric welder, a power drill, and a break and employs 4 persons. They are making decorative metal fence sections, chairs, beds, and the kitchenware drying racks in common use in Palopo.

Machinery Manufacture

A fairly well equipped machine shop exists in Palopo. The machinist, a Javanese migrant, has recently begun making a "rototiller" type of hand operated tractor starting from imported engines and gear boxes. Most of the other parts he is able to make in his shop. A joint venture is planned with the FCC organization to make these tractors for cooperative members. Bank loans have been applied for by 25 farmers, the proceeds of which would help finance manufacture of the same number of tractors.

7. Other Industries

A total of 22 goldsmiths are licensed in Kabupaten Luwu, most of them in Luwu, and produced jewelry worth Rps 43 million in 1982. Five printing shops are reported to exist in Luwu but no information on them was available.