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AGRICULTURAL SECTOR SURVEY

INDONESIA

(in four volumes)

VOLUME III

ANNEXES 6 THROUGH 10

April 10, 1974

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CURRENCY EQUIVALENTS

US\$ 1.00 = Rp. 425

1 Rupiah = \$0.002

1,000 Rupiah = \$2.410

NOTE

The Agricultural Sector Survey report is based on data collected by a Bank mission to Indonesia in March 1972. Some of its major findings and conclusions have been overtaken by events. Therefore, this report is not intended to represent the Bank's current assessment of Indonesia's agricultural sector. Nevertheless, much of the technical data presented in the Annexes remains valid and it should be useful to the Government of Indonesia, IGGI members and to other countries, agencies and institutions interested in the development of Indonesia.

April 10, 1974

INDONESIA

AGRICULTURAL SECTOR SURVEY

Forestry

1. The forestry and forest industries sector can play a very significant role in Indonesia's economic development for three main reasons. First, the forestry resource is the largest in Asia. Second, the long term demand prospects for exports and domestic consumption offer a sound basis for development--exports could reach nearly US\$600 million by 1980, an increase of almost sixfold over 1970. Third, the Government's policy to attract foreign capital has led to the granting of 55 forestry concession agreements that are expected to result in a large volume of investment. Development of the forestry sector, however, is seriously constrained by a series of problems which may be roughly categorized as related to the institutional framework, the exploitation in the Outer Islands, and the situation in Java.
2. Administration of the forest resources is the responsibility of the Directorate General of Forestry of the Ministry of Agriculture. A weak institutional structure, an inadequate supply of properly trained personnel at all levels, and a dichotomy between regional forest control and central technical backstopping are some of the problems affecting the Forest Service and seriously jeopardizing orderly development of the forest sector.
3. The Outer Islands contain vast areas of dipterocarpus forest with high export potential, although the productive forests are probably less extensive and lower in quality than originally thought. Comprehensive inventories do not exist, and only small areas have been surveyed and demarcated. Since 1967, the Government has granted concessions on about 50% of the productive forests and substantial areas of protective forests without preparing an overall master plan. This has led to a spectacular increase in log exports and in revenues to the provincial and central governments, but has not yet been accompanied by the establishment of wood processing facilities. Wasteful logging methods and poor silvicultural practices are common. And with only 30% of the Directorate General of Forestry assigned to look after the entire Outer Islands forest resources--over 97% of the country's total--supervision is almost non-existent.
4. The forests in Java have been surveyed and demarcated and are, in general, reasonably well managed. There are areas, however, where population pressure has led to acute overexploitation, causing grave watershed problems and a severe shortage of forest products and fuelwood. Forest industries are obsolete and operate at low levels of efficiency. Valuable

teak and conifer plantations exist that can form the basis of new industries. Presently very little teak is exported, as it is largely locally consumed for construction, fuelwood, and sleepers.

5. This annex surveys the potential, prospects and constraints of the forest sector of Indonesia, expounds a development strategy and formulates detailed recommendations to carry it out.

#### A. The Forest Resource <sup>1/</sup>

##### The Importance of Forest Products

6. Indonesia has more forest land than any other country in Asia and is thought to rank seventh in the world after the U.S.S.R., Canada, Brazil, U.S.A., Australia, and Zaire. About 63% of Indonesia's land area, or an estimated 120 million ha, is classified as forest land.

7. In recent years, forest products have emerged as one of Indonesia's most important export commodities. According to Government sources, timber exports amounted to US\$6.3 million in 1967 (less than 1% of total exports) and subsequently increased very rapidly to some US\$100 million in 1970, and US\$174 million in 1971. Other miscellaneous forest products, such as rattan, tengkawang and resin, have never amounted to more than a few million dollars. All told, timber is now the country's third most important export commodity, after petroleum and rubber.

8. Reliable information on removals of industrial wood does not exist. According to the IBRD industrial sector survey, production of industrial wood stagnated at a level of about 2 million m<sup>3</sup> for a number of years, then began to rise rapidly in 1967. In four years from 1966 to 1970, production almost sextupled. This was mainly due to the rapid expansion of log exports from Kalimantan where, currently, more than 60% of industrial wood is produced. Among the hardwoods, the most important in terms of quantities produced and exported is "meranti". <sup>2/</sup> Teak is also important because of its high value and its unique status in the world market. For example, the average reported value (FOB) of teak sawnwood in the U.S. imports was US\$298 per cubic meter in 1964-1969, while that of lauan group sawnwood was US\$68 per cubic meter in the same period. The important export species and volumes are set forth in Table 1.

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<sup>1/</sup> West Irian is not covered in this Annex because the mission did not have sufficient time to visit the area.

<sup>2/</sup> A collective name for at least half a dozen similar but distinct species of the Shorea family.

Table 1: EXPORTS OF TIMBER FROM INDONESIA, BY SPECIES, 1970  
(thousand m<sup>3</sup> actual)

<u>Species</u>	<u>Volume</u>	<u>% Share</u>
1. Meranti (Shorea spp.)	5,018	67.8
2. Ramin (Gonystyllus spp.)	681	9.2
3. Agathis (Agathis spp., softwood)	425	5.7
4. Pulai (Alstonia spp.)	118	1.6
5. Djati or Teak (Tectona grandis)	118	1.6
6. Kapur and Keruing	85	1.2
7. Djelutung (Dyera spp.)	27	0.4
8. Others	<u>940</u>	<u>12.6</u>
Total	<u>7,412</u>	<u>100.0</u>

Source: Directorate General of Forests.

9. Although a very large volume of wood is believed to be used as fuelwood, there are no reliable statistics. The FAO estimates production of fuelwood in 1969 and 1970 at 92.8 and 95.4 million m<sup>3</sup>(r) 1/, with virtually no exports or imports. Paper is the big deficit item for forestry in the economy. Consumption in 1970 amounted to about 140,000 m tons, of which about 15% was supplied domestically. Requirements are increasing very rapidly.

#### Indigenous Forests

10. The basic statistics on forestry were probably compiled 25 to 30 years ago, and have been updated only in specific, limited areas. However, based on official documents and reports, an attempt has been made in Appendix 1 at classifying forest land according to geographical location and ecological types. The regional distribution is summarized in Table 2.

1/ (r) means roundwood equivalent.

Table 2: DISTRIBUTION OF FOREST LAND BY REGION

	<u>Total Land Area</u> -----million ha-----	<u>Total Forest Land</u> -----million ha-----	<u>Percent of Total Land Area</u> -----%-----
Kalimantan	54	41	76
Sumatra	47	28	60
Sulawesi	19	10	53
Java and Madura	13	3	23
Maluku	8	6	75
Nusa Tenggara	7	2	29
West Irian	<u>42</u>	<u>30</u>	<u>71</u>
Total	<u>190</u>	<u>120</u>	<u>63</u>

Source: Directorate General of Forests. According to more recent estimates of the Directorate of Topography, the land areas of Kalimantan, Sumatra and Sulawesi are somewhat larger than the above figures, giving a total land area for Indonesia of 201.9 million ha.

Over 75%, or nearly 95 million ha of the forest land, is reported to carry primary indigenous forest. A description of the major forest types, indicating the most important commercial species, is contained in Appendix 2.

11. Pressure to process concession applications and a desire to avoid over-allocation of the productive tropical rain forests encouraged the Directorate General of Forests (DGF) to develop estimates of optimum land use categories that could be used as a basis for planning in the absence of a national forest inventory. This resulted in the classification shown in Table 3.

Table 3: FORESTS CLASSIFICATION

<u>Category</u>	<u>Description</u>	<u>Area</u> (million ha)
Protection Forest (reserved for watershed protection)	Forested land over 500 meters in the Outer Islands and over 700 meters in Java	48
Production Forest	Forest land generally below the elevations above	45
a. Suitable for permanent forest production		24
b. Suitable for conversion to agriculture		18
c. Managed forests on Java not currently considered eligible for conversion to agriculture		3
Degraded Forest	Secondary forest land or forest land currently deforested by fires and shifting cultivation	27
	Total	<u>120</u>

Source: DGF.

The location of these categories has not been determined on the ground and it is not clear what criteria were used to distinguish between forested land suitable for agriculture and that suitable for permanent managed forest. Estimates of degraded forest range between 25 and 37 million ha.

12. The present status of allocation of forest resources by the Central Government 1/ is shown in Appendix 3 and summarized in Table 4.

Table 4: STATUS OF ALLOCATED RESOURCES

<u>Categories</u>	<u>Number</u>	<u>Area</u> (million ha)
Concessions Granted	75	11.8
Forest Agreement Prepared	139	10.3
Surveys Contemplated	174	19.7
Applications Received	112	14.8
Total	<u>500</u>	<u>56.6</u>

Source: DGF, Directorate of Planning.

1/ Including concessions granted to wholly owned foreign companies, joint venture companies and local companies; but not including cutting or harvesting permits issued by Regional Governments.

In August 1971, a decree was issued suspending the granting of further concessions; but it is unknown which, if any, of the latter three categories will be affected. In any event, it appears there is a grave danger of the Government over-allocating the 24 million ha of forest it has earmarked for management on a sustained yield basis.

13. Even allowing for major inaccuracies in the forest resource area figures, a number of other interesting points emerge from the available data. Although current estimates of natural high forest range from 83 to about 100 million ha, there are indications that the actual figures may be substantially lower.

14. Some of the forest already allocated contains protection forest, and may also include land that is classified suitable for conversion to agriculture. This goes against the original intention which was to grant concession over land that would be maintained and operated in perpetuity as production forest.

15. Assuming the bulk of the allocated land is from the permanent production forest (estimated at 24 million ha), then almost 50% has already been granted. If applications that had reached the "Forest Agreement" stage by the end of 1971 are also approved, then little will remain for further allocation. And if the "surveys completed" and "applications received" categories are exempt from the August 1971 decree, then the total area of productive forest allocated will be exceeded by over 10 million ha; this could only be done by alienation of land presently classified as protection forest.

16. Finally, following from the foregoing, there is a high probability that all the tropical rain forest suitable for maintaining on a sustained yield basis might be allocated before the National Inventory is completed.

17. Volume and Yield. No comprehensive inventory is available, so very little information exists on volume, species distribution, timber qualities and yields. Small reconnaissance surveys were made in the past in accessible places, but the sampling procedures used do not permit the results to be applied to larger areas. A considerable amount of information is being generated by applicants for concessions, who are obliged to carry out 0.2% ground sample surveys and are undertaking further inventories with a ground sampling intensity of between 2% and 10%. However, these data have yet to be collected and analyzed. A better picture of the standing volumes is needed to enable a more rational approach to be taken in the allocation of concessions.

18. For general planning purposes, Government has assumed certain average volumes and yields, from which allowable cut estimates have been made. For the natural high forest in the Outer Islands, an average gross standing volume of 100 m<sup>3</sup>(r) per hectare of trees is assumed (for trees 35 cm breast height diameter over bark and above). Merchantable volume is

assumed to be  $50 \text{ m}^3(\text{r})/\text{ha}$ . It is further assumed that the average mean annual increment (MAI) ranges between 1 and  $1.5 \text{ m}^3(\text{r})/\text{ha}/\text{year}$ . The allowable annual cut of merchantable timber is estimated at 25 to 30 million  $\text{m}^3(\text{r})$ , depending on the rotations selected for permanent productive forest and the liquidation period for forests to be converted to agriculture. Assuming a cutting cycle of 36 years and yield per hectare of  $30 \text{ m}^3(\text{r})$  for the permanent forest, and a life of 60 years and yield of  $50 \text{ m}^3(\text{r})$  for forests to be liquidated, the total allowable annual cut would be about 35 million  $\text{m}^3(\text{r})$ . Projected estimates of the allowable cut in 1973 and thereafter to 1990 stabilize at 31 million  $\text{m}^3(\text{r})$ . 1/

19. A realistic assessment of the allowable annual cut will not be possible until existing inventory data are analyzed and supplemented by further area, volume and yield statistics. However, there are indications from the output figures of existing concessions that, unless more of the secondary species can be marketed, the estimates of merchantable volumes may well be overoptimistic. A company operating in Riau, Sumatra, reports it is able to extract only  $5\text{-}10 \text{ m}^3(\text{r})/\text{ha}$  of "meranti", and that at this level of output operations are uneconomic. In East Kalimantan--one of the largest remaining dipterocarp forests in Southeast Asia--total volumes are reported to range between 45 and  $160 \text{ m}^3(\text{r})/\text{ha}$  for all merchantable species, and between 30 and  $130 \text{ m}^3(\text{r})/\text{ha}$  for "meranti" species; the figures for Sumatra, Sulawesi, West and Central Kalimantan can be expected to be lower than for East Kalimantan.

#### Plantation Forests

20. Teak. In Java, the systematic establishment and management of teak plantations dates back well over 100 years; and the island now has an estimated 750,000 ha of teak forest. Small quantities also occur Muna, Sulawesi, and in the Nusa Tenggara islands. Reafforestation of cut-over teak areas and the planting of bare lands in East and Central Java is said to be taking place at the rate of about 24,000 ha a year using the "tampungsari" or "taungya" system of establishment. 1/ Teak plantations have generally been established at lower elevations of 200-500 m on calcareous soils.

21. The average rotation for teak is about 70 years and, at that age, yields of about  $100 \text{ m}^3(\text{r})$  per hectare can be expected. This is equivalent to a MAI of about  $1.5 \text{ m}^3(\text{r})/\text{ha}/\text{year}$  (excluding thinnings), which is well below the theoretical MAI of  $2\text{-}4 \text{ m}^3(\text{r})$  quoted in various official documents.

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1/ Summary of Forestry Master Plan, DGF, Dec. 1971.

2/ In exchange for being allowed to grow agricultural crops on forest land, farmers are obliged to prepare the area for tree planting and tend the forest plantation until it is established, normally between two and four years.

As the plantations in West Java are much younger, the main production areas will continue to be East and Central Java. The gross annual allowable cut (construction and fuelwood) from the 440,000 ha in this area is expected to be about 800,000 m<sup>3</sup>(r). Due to relatively low wood quality (it is better in Thailand and Burma), poor methods of exploitation, and demand from the railways for wood fuel, nearly 50% of production is converted into fuelwood. This is an exceedingly uneconomic utilization for a high value timber such as teak. Improved bucking<sup>1/</sup> policies, dieselization of the state railways, and use of materials other than teak for sleepers should greatly increase the proportion of logs converted into construction timber.

22. Conifers. Coniferous plantations using the indigenous species Pinus merkusii and Agathis borneensis were first established in Java on a trial basis in the mid-1930's. Considerable areas now exist in Java and Sumatra, mainly at elevations between 800 and 1,600 m above sea level on volcanic soils. The estimated area of coniferous plantations and indigenous stands, by geographical location, is detailed in Appendix 4 and summarized in Table 5.

Table 5: DISTRIBUTION OF CONIFEROUS STANDS

	<u>Pine</u>	<u>Agathis</u>	<u>Total</u>
	-----('000 ha)-----		
East Java (Banjuwangi)	12	4	16
Central Java (Notog)	31	8	39
West Java (Jatiluhur)	26	3	29
N. Sumatra (Lake Toba)	22	-	22
Atjeh (Takengon)	<u>150</u>	-	<u>150</u>
Total	<u>241</u>	<u>15</u>	<u>256</u>

Source: DGF.

23. Existing yield tables <sup>2/</sup> indicate the theoretical gross MAI's for Java pine and agathis at a rotation of 20 years would be about 15 m<sup>3</sup>(r) ub/ha and 20 m<sup>3</sup>(r) ub/ha, respectively. <sup>3/</sup> Other sources report higher yields but based on ground observations the average MAI's of existing plantations do not appear to be higher than 8 to 10 m<sup>3</sup>(r) ub/ha for pine and 10 to 12 m<sup>3</sup>(r)

1/ Cross cutting into log lengths.

2/ Yield tables for Pinus merkusii by J.H.A. Ferguson, Bogor Research Note #9, 1955; Research Note #52 yield tables for Agathis borneensis by M.K. Sudarmo, Bogor, 1965.

3/ ub = under bark.

ub/ha for agathis. This is mainly due to very poor seed selection in the past. Seeds are normally collected from heavily branched, easily accessible, poor quality trees which are easy to climb. The result is negative selection. Other causes are poor initial establishment, grazing, illegal fellings, fires and, in the case of pines, excessive resin tapping.

24. If brought under sustained yield management, the coniferous plantations in East Java--scattered throughout the central highlands--could in the future produce nearly 300,000 m<sup>3</sup>(r)/ub annually. An increase in the area of conifer plantations is unlikely unless districts presently carrying other plantation trees such as Albizia falcata, Dalbergia latifolia, and Acacia decurens were converted.

25. In Central Java, the present area of coniferous plantations under proper management could yield about 600,000 m<sup>3</sup>(r)/ub a year. If the bare forest land east and west of Mount Slamet, estimated at over 100,000 ha, is planted at a rate of some 5,000 ha/year of pine for 20 years, and 500 ha/year of agathis for 40 years, the total production could be expected to reach nearly 800,000 m<sup>3</sup>(r) ub/year in 1980 and over 2 million m<sup>3</sup>(r)/year in the year 2000. This assumes yields from bare afforested lands prove to be the same as those already planted.

26. The existing scattered plantations in West Java, if managed on a sustained yield basis, could eventually yield over 500,000 m<sup>3</sup>(r) ub/year. This could increase to nearly 1 million m<sup>3</sup>(r) ub if the available bare forest land of some 30,000 ha were also planted with conifers, and yielded volumes similar to existing plantation areas.

27. In the Lake Toba area of North Sumatra, sustained yield management of the existing pine plantations might eventually produce over 250,000 m<sup>3</sup>(r) ub of wood/year. Not enough is known about additional areas that could be converted to plantations, but there may be land use competition with tourism, livestock development, and market gardening. Older plantations are currently being clear cut to supply match factories in Medan.

28. The natural stands of pine forest in the Takengon area of Atjeh Province, Northern Sumatra, are generally sparsely stocked and scattered in blocks from Blangkedjeren to 30 km south of Bireun, a total distance of some 160 km by road. No comprehensive inventory of the growing stock exists, but limited surveys indicate wide variance in stocking densities and mixed age classes with an average standing volume of possibly 100 m<sup>3</sup>(r) ub/ha. The total growing stock of the accessible forest (estimated at about 120,000 ha), making allowances for fire, has been estimated at about 10 million m<sup>3</sup>(r) ub. Assuming a pulpwood rotation of 20 years, this would give an immediate allowable annual cut of about 500,000 m<sup>3</sup>(r) ub. With replanting on a 20-year rotation and an assumed MAI of 15 m<sup>3</sup>(r) ub/ha (which is high), production by the year 2000 could be about 1.8 million m<sup>3</sup>(r) ub/year. Portions of these forests are being tapped for resin. Logs are not being extracted at present.

29. Other Plantations. Other tree species including Albizia falcata, Dalbergia latifolia, Eucalyptus alba and deglupta, Sweetenia macrophylla, Acacia decurens and Anthocephalos cadamba have been planted in Java, Sumatra, Sulawesi, and Nusa Tenggara. They are reported to exceed 130,000 ha. In Java, these species are normally established on land unsuitable for teak or conifers, so that areas designated as forest land are fully utilized. Their end-use has not been clearly defined but would probably be for fuelwood, forage, poles, and rough sawn timber.

### Forest Industries

30. The existing forest industries are characterized by a relatively small number of conversion units operating at low levels of efficiency. They are at present unable to meet domestic requirements for processed wood products. Basic data are given in Table 6. There is also a small (1,500 TPD) hardboard plant in East Java that uses bagasse. The BPU Perhutani is the largest operator, with 10 teak sawmills in Java which produce about 18,000 m<sup>3</sup>(r) annually, and seven in the Outer Islands with a total capacity of about 80,000 m<sup>3</sup>(r) per year.

Table 6: PRIMARY MECHANICAL WOOD-USING INDUSTRIES

<u>Type</u>	<u>Unit</u>	<u>Number</u>	<u>Estimated Annual Production</u>	<u>Estimated Average Annual Prod./Unit</u>	<u>Operating Capacity %</u>
1. Sawmills with power equipment	m <sup>3</sup> (r)	412	0.9 M	2,200	50
Other (pitsawyers, etc.)		3,600	3.1 M	900	
2. Plywood mills:	m <sup>3</sup>				
Java		2	very small	operating	occasionally
Sumatra		2	18,000	9,000	60
Sulawesi	1		not in production		
3. Matches	cases	11	50,000	5,000	50
4. Pencils: Java	gross	1	12,000	12,000	40
5. Wood boxes	m <sup>3</sup> (r)	27	37,000	1,370	60

Source: IBRD Industrial Sector Mission, 1971.

31. Seven small pulp and paper mills under the management of the Department of Chemical Industries are producing some 20,000 tons of paper and board annually or, as mentioned earlier, about 15% of the country's

requirements. All of them face technical and financial problems and are operating at about 40% of rated capacity. Basic data are given in Table 7.

Table 7: PULP AND PAPER PLANTS

<u>Name</u>	<u>Location</u>	<u>Year of Start-up</u>	<u>Capacity TPD</u>	<u>Raw Materials</u>
Padalarang	W. Java	1923	12 )	Rice straw + imported pulp
Blabak	C. Java	1961	20 )	
Letjes	E. Java	1940	30 )	
Banjuwangi	E. Java	1969	30 )	Bamboo
Gowa	S. Sulawesi	1967	30 )	
Pematang Siantar	N. Sumatra	1969	15 )	Waste paper, pine and imported pulp, rubber wood, agathis and imported pulp
Martapura	S. Kalimantan	not yet operating	10 )	

All but the two older mills are reported to be suffering from shortages of operating supplies, spares and working capital; lack of skilled operators; over-abundance of labor; and complexity of plant equipment for such small production units.

32. Two major studies of the teak industry and of pulp and paper development have recently been undertaken by Vancouver forestry consulting firms. Preliminary findings are discussed in paras 89-96.

#### B. Forest Administration, Tenure and Management

##### Administration

33. All but an estimated 20,000 ha of forest land is state-owned and administered by the Directorate General of Forestry of the Ministry of Agriculture. The DGF is organized into five Directorates, two research institutes, a Board of Directors for the State Forest Enterprise (B.P.U. Perhutani), and 25 regional headquarters all of whom report directly to the Director General. There are four Assistant Director Generals with advisory functions, plus a headquarters' secretariat.

34. It is obvious that serious difficulties are being experienced by the Director General in administering effectively the forest estate and in planning for the future. Reasons why are not hard to discover. The responsibility ladder is essentially a one-line structure. There are overlapping

functions of the various Directorates, separation of headquarters offices between Djakarta and Bogor, and an overworked Secretariat (which acts as a clearing house for all timber concession applications). Regretfully, no action appears to have been taken on the realistic proposals outlined in the USAID FEDs Field Report No. 10 <sup>1/</sup> which suggests the creation of three line assistants (land management, research and administration), realignment of the directorates to bring allied activities together, and addition of a public relations officer to assist the Director General.

35. Adding to the difficulties is the dual role of the regional foresters; although technically responsible to the Director General, they report directly to the Provincial Governor. Thus, neither the regional foresters nor the central government foresters consider themselves fully responsible for the supervision and administration of concessionaires operations. This has led to organizational breakdown in the field which could be overcome by making the regional forestry director responsible to the Director General for all matters. He could at the same time maintain close liaison with the local government to ensure the interests of the province are considered.

36. The B.P.U. Perhutani (State Forest Enterprise) was founded in 1962 as a commercial entity to stimulate the production and marketing of forest products, to manage the forest lands in East and Central Java and operate in selected areas of the dipterocarpus forests in the Outer Islands. In neither area have its operations been financially successful. Two joint ventures in Kalimantan were forced to close down. Furthermore, utilization of the extensive teak resource in Java has generated slim revenues to the central government. Perhutani does not pay stumpage in East and Central Java; instead 55% of profits (net income) accrue to Government. This amounted to an average of US\$0.25 per m<sup>3</sup> in 1970, or less than 2% of the total revenue generated. In spite of relatively low profits Perhutani has played an important role in Java by providing employment, developing infrastructure and community facilities, and providing management of the teak forests. Perhutani is now in the process of being dissolved and replaced by two separate autonomous state companies or "Perseros": one would continue to administer the forest estates, logging operations and processing facilities in East and Central Java, and the other would be involved in joint government/private sector forestry ventures in the Outer Islands.

37. In 1971, there were close to 40,000 civil service and other employees of the DGF and Perhutani. Over 70% work for Perhutani: some 25,000 technical and 3,200 administrative. A further 22% are with the Regional Forest Organization: 7,350 technical and 1,550 administrative. The heaviest concentration of employment is in Java, where possibly over 70% of Perhutani's staff is employed even though the island contains less

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<sup>1/</sup> "A Review of Certain Aspects of the Forestry Program and Organization in Indonesia" by B. H. Payne and D. S. Nordwall, April, 1971.

than 3% of the country's forested land. The DGF's office employs about 1,780, of which about 650 are technical: and the research institutes employ about 680, of which 305 are technical. Statistics on the education of staff employed are unreliable, but the latest (1971) estimates prepared by the Manpower Division of the DGF indicate there are about 380 professional university-trained foresters, and 1,710 technical foresters (Rangers and Forest Guards) with a high school education.

38. Government estimates of future requirements are as follows:

	<u>Public Sector, 1971</u>		<u>Public &amp; Private</u>
	<u>Establishment</u>	<u>Requirements</u>	<u>Sectors' Requirements</u>
			<u>1990</u>
Professional	384	660	3,300
Technical	1,711	3,300	16,500
Others	<u>18,265</u>	<u>16,500</u>	<u>82,500</u>
Total	<u>20,360</u>	<u>20,460</u>	<u>102,300</u>

Source: DGF Forestry Masterplan and manpower study.

It was not possible to check the validity of these figures, but clearly there are insufficient professional foresters to cope with the rapidly increasing workload associated with timber concession activities in the Outer Islands. A comprehensive assessment of future needs will be required.

39. Budget allocations to the DGF (including Central, Regional and Forestry State Enterprises) for the past three years are:

	<u>1969/70</u>	<u>1970/71</u>	<u>1971/72</u>
	-----millions of rupiah-----		
Routine	4,154	6,915	9,541
Development	<u>2,664</u>	<u>2,192</u>	<u>3,480</u>
Total	<u>6,818</u>	<u>9,107</u>	<u>13,021</u>

Source: DGF, Forestry Masterplan, December 1971.

In 1971/72 the total budget was equivalent to about US\$31.4 million (assuming an exchange rate of 415 rupiahs to the dollar). The substantial increase from 1969/70 to 1971/72, even allowing for devaluation of the rupiah, is indication of the importance now being attached to developing

the country's forest resources. The routine budget, which is mainly used to cover salaries <sup>1/</sup> and the operation and maintenance of plant and equipment, is financed by the Government's own resources. Substantial increases will be required to improve the administration of the forest resource and supervise the operations of the concessionaires. The development budget covers all projects approved annually by BAPPENAS in the five-year development plan and is largely financed from contributions of the Inter-Government Group for Indonesia (IGGI).

#### Forest Tenure and Rights

40. When the responsibility for managing the natural forests was transferred from the central to regional governments in 1957, the Governor was empowered to grant concessions of up to 10,000 ha for as long as 10 years. In 1970, the Governor's powers were reduced to grants of cutting or harvesting rights for only 100 ha and not more than two years.

41. The stimulation of foreign and domestic investment in forestry derives from two laws passed in 1967-68. Benefits offered to foreign investors, based on a 20-year license period, included rights to employ foreign nationals and to repatriate the original capital, plus profits; exemption from corporate and dividend tax for five years and from stamp duty and import duty on machinery and equipment; and provision for compensation in the event of nationalization. These laws had the desired effect: by January, 1972, 15 wholly-owned and 40 joint enterprise foreign investment projects had been approved <sup>2/</sup> by the Government, with an expected total investment of over US\$380 million. A Philippine company, A. Soriano y Cia, would account for nearly 62% of this figure (by the 15th year of operation). Another 12 projects in process of approval could increase total indicated capitalization to over US\$400 million. Details are shown in Appendix 6.

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<sup>1/</sup> Salaries of university-trained foresters with a title of engineer range from about US\$30 to US\$60 a month. Those with civil service status also receive fringe benefits in the form of a furnished home, all utilities, servants, automobile and driver, rice and sugar allowances, and medical care. In addition, those reaching retirement age are pensioned at full salary and are allowed to continue with the fringe benefits received before retirement until their death. This compares with average ranger and forest guard salaries of some US\$10 and US\$5/month, respectively. Salaries in Perhutani are normally 30% higher than those in the forestry service. By comparison, private sector bulldozer operators and fallers can earn up to US\$100/month with overtime; if board and lodging is included, this amounts to the equivalent of some US\$150/month.

<sup>2/</sup> Plus concessions to local entrepreneurs.

42. Although the objectives of attracting foreign investment and converting standing timber into capital for development has been largely achieved, both concessionaires and Government have come under severe criticism. Concessionaires are accused of being reluctant to establish processing facilities; of high grading the forest; of failure to adopt a sustained yield basis of operations; of slowness to employ Indonesian nationals and/or institute training schemes. The Government has been accused of handing out the productive forests too quickly, without adequate inventory or planning; of granting long-term concessions with insufficient safeguards; of failure to provide adequate supervision of the concessionaires activities; of inadequate research into methods of replenishing logged forest areas; and of excessive escalation of taxes. These issues are discussed in their relevant context. At this point, however, it is important to remember that a few "cut-and-get-out" operators can give a bad name to the industry as a whole.

43. It is important to differentiate between international companies such as Soriano y Cia, Weyerheuser, Mitsui, Mitsubishi, Georgia Pacific, Korean Development Corporation, etc. that are committed to feeding existing wood processing capacity and world market demand, and the smaller, often local or joint venture companies who generally do not have such commitments. The former are interested in the long-term prospects, as there are not many other tropical hardwood resources of equal quality left in other parts of the world. The latter appear more interested in short-term gains and are tending to operate on a more obvious "cut-and-get-out" concept than the larger operators. Visits to a cross section of companies in East Kalimantan clearly demonstrated these differences in approach, not only through discussion but by comparing standards of road construction, permanence of buildings, logging operations and plans for the future.

44. The majority of larger companies have been operating for less than two years (Mitsubishi, the first, started logging in March 1970). So far none have established processing facilities in Indonesia. The reason is probably lack of time but there is concern that the "establish when feasible" clause in earlier concession agreements is responsible for the near absence of plans or proposals being put forward by timber companies. Other factors thought to be responsible for this slowness to establish process facilities are set out in para 54 of this Annex.

45. The recently prepared draft concession agreement that may be introduced in the future makes it obligatory for the concessionaire to establish a fully integrated forest based industry unless he can demonstrate that it is not economically feasible. It also specifies that a sawmill and a plywood mill would have to be established in the third and sixth years, respectively. This is possibly too rigid an approach, and it is not clear that the sequence is correct, since raw materials and markets favor the establishment of a plywood mill first.

Forest Management

46. Management of the teak and coniferous forests in Java is relatively intensive and follows very much the same lines that were used by the Dutch. Plantations established on the "tampung Sari" system are normally thinned before clear felling at rotation age. Establishment costs for teak and coniferous species are reported to be about US\$12/ha and US\$17/ha, respectively. Logging is labor-intensive and delivered wood costs are reported to be equivalent to about US\$6.50/m<sup>3</sup> for teak (no royalty) and are estimated at about US\$10.50/m<sup>3</sup> for pine and agathis.

47. In the tropical rain forests of the Outer Islands, management on a silvicultural or stand improvement basis is almost unheard of. Concessionaires remove merchantable trees of their choice - presently almost 95% meranti - and are seemingly unconcerned with subsequent operations such as girdling and thinning that could improve the residual stand. Timber companies are not entirely to blame, however, because little is known about the management of tropical rain forests anywhere in the world. Several methods have been tried and rejected. Those methods attempted to promote a few favored species in a near even-aged stand. All of them tried to restrict the natural trends of tropical rain forest towards a multi-species and multi-diameter class structure. Further research is required to find a suitable system for the Indonesian dipterocarp forests. In the meantime, release by canopy manipulation, and improvement by cutting and selective logging on periodic cutting cycles, should be practised. Complete replacement by plantations should also be investigated in areas located close to potential mill sites. Pinus ocarpa var. ochoterenai, Anthocephalus cadamba, Araucaria klinki and Eucalyptus, Albizia, Shorea, and Agathis species have been successfully grown in other Southeast Asian areas and should be included in any future species trials.

48. Although the "selective logging" system (which consists in removing the best trees rather than improving the future forest composition or value) has been criticized by many concerned with Indonesia, it is unrealistic to assume any other system could be adopted successfully on a large scale during the pioneering stage of forest development. Currently the log market is highly competitive and encourages high grading practices. Once processing facilities have been established, the position should improve, and the gradual introduction of more sophisticated systems of tropical silviculture (provided they are based on research findings) would be warranted. Furthermore, the selective system need not devastate a forest stand (currently between four and six trees are being removed per ha). After extraction there is usually sufficient cover to protect soil and water resources.

49. The annual allowable cut is based on a cutting cycle of 35 years. Companies are allowed to harvest the trees with diameters over bark of 50 cm at breast height or greater. They are permitted an annual cut of 1/35th of a concession's total harvestable volume, less a grade reduction of 20% for

unsound material. <sup>1/</sup> The Government uses this figure both as a restriction on rates of removal and as a target for production. However, it is not clear whether "harvestable volume" refers to all trees over 50 cm or those species that are currently marketable. The assumption that the residual stand will yield similar volumes 35 years later still has to be proved.

50. Forest Service supervision of concessionaire's activities is totally inadequate due to lack of staff, means of communication, funds and insufficient training in the management of tropical forests, logging, log grading, and scaling. In East Kalimantan, for example, the total number of trained technical staff (excluding forest guards) is reported to be a little over 100 people - who must cope with 246 central and regional government licence areas covering over 9 million ha of forest land. Transportation facilities include eight jeeps, 15 motor bicycles, and about 20 motor boats in various states of repair. There is no radio equipment. In addition to these deficiencies, attracting staff to the Outer Islands is not easy to begin with, and getting them into the jungle is doubly difficult. It is quite common to have extra jobs to supplement government salaries, and these obligations discourage visits to the field. This problem, of course, is not unique to the forestry subsector.

51. Management of the pine plantations in the Lake Toba area of North Sumatra will require marked improvement to justify continuing with the afforestation program. Ground inspection of a range of age classes indicates that:

- (a) very poor strains of Pinus merkusii are being used;
- (b) lack of maintenance after establishment (weeding, pruning, and thinning) is resulting in low quality timber; and
- (c) merchantable yield at rotation age is half what it should be according to "normal" yield tables.

The DGF is fully aware of this situation and blames lack of staff and funds.

52. The absence of management and fire control measures plus steady encroachment is endangering the natural pine stands in the Takengon area of Atjeh province. This could seriously jeopardize the prospects of establishing a pulp and paper complex and should receive the immediate attention of the DGF. Investment possibilities are discussed in a later section.

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<sup>1/</sup> Annual allowable cut = (Harvestable volume) (0.8)

Royalties and Other Taxes

53. Royalty is only paid on the volume of logs actually exported; no royalty or fees are paid for the logs or cut-offs left in the forest and only token amounts (US\$0.36/m<sup>3</sup>) for logs used by the concessionaires or sold on the domestic market. 1/ Scaling and log grading is done by company employees and is occasionally checked by DGF staff after logs have been made up into rafts for transportation down river to ship loading areas. Royalties and taxes on export logs in East and Central Kalimantan are currently higher than in other provinces because a dredging surcharge has recently been added. The present structure of the taxes is shown in Table 8.

Table 8: STRUCTURE OF FORESTRY TAXES

<u>Tax</u>	<u>Rupiah/m<sup>3</sup></u>	<u>US\$/m<sup>3</sup></u>	<u>Distribution</u>	
			<u>Central Govt.</u>	<u>Regional Govt.</u>
Basic Royalty	652	1.57	30	70
Dredging Surcharge	622	1.50	100	-
Export Tax (10% of check price/ <u>1</u> )	830	2.00	-	100
Grading Fee	30	0.07	30	70
Local Tax	10)		-	100
Community Development Tax	) 10)	0.10	-	100
Athletics/Festival Tax	) 20)		100	-

1/ The FOB average price by grades set by the Ministry of Trade and changed from time to time (see below, para 67).

Source: Regional Forest Office, Samarinda, East Kalimantan.

54. In addition, a licence fee of US\$0.05/ha/year and an initial survey fee is paid. Added together this amounts to about US\$6.00 per m<sup>3</sup> in official taxes. On top of this some companies are reported to pay

1/ The solid volume content of logs is measured by obtaining the mean of two under bark diameters taken at both ends of the log and multiplying the mean of the sectional areas by the length.

as much as US\$4.00/m<sup>3</sup> for "other services". These compare with official stumpages of US\$3/m<sup>3</sup> in Malaysia and US\$4/m<sup>3</sup> in British Columbia. By law and regulations, 70% of the licence and basic royalty fees remain with the Regional Government and the balance accrues to Central Government.

55. A group of major companies operating in Kalimantan have advised Government that, over a recent six months, royalties and other taxes directly associated with production have increased from 16% to about 26% of the average FOB price. They say that this, combined with the recent market weakness (partly reflecting the international monetary situation) is putting pressure on cash flows and forcing them to review their investment plans. It can be observed that average FOB prices are thought to be about US\$23/m<sup>3</sup>, rather than the US\$18/m<sup>3</sup> used as a basis for their pleas. But this is not to prejudge the merits of the basic argument.

56. Reported revenue from royalties (excluding export and other taxes) for the last two fiscal years and projections for 1972/73 are shown in Table 9. There has apparently been a three-fold increase, from about US\$7 million in 1970/71 to an estimated US\$22 million in 1972/73. Kalimantan accounted for about 70% of all royalty collected in the last two years. Once tax holidays come to an end, total revenues will be substantially higher. When Perhutani is converted to a "Persero", the enterprise will be expected to pay similar royalties to other timber companies.

Table 9: REVENUES FROM ROYALTIES

	1970/71	1971/72	1972/73	
			High/ <sup>1</sup>	Low/ <sup>2</sup>
	-----millions of Rupiah-----			
Royalty	3,069.8	5,486.4	6,360.9	5,898.3
Dredging Surcharge	-	1,001.5	3,147.5	3,147.5
Total	3,069.8	6,487.9	9,508.4	9,045.8
Central Government Share	925.7	2,647.4	5,055.5	4,923.1
Regional Government Share	2,144.1	3,840.5	4,452.9	4,122.7

<sup>1</sup> Assumes monthly volume of timber exports from Kalimantan, Sulawesi and Maluku increased by 20% over the average months levels for the first seven months of 1971/72 and by 10% for the other areas.

<sup>2</sup> Assumes these increases are 10% for Kalimantan, Sulawesi and Maluku and 5% for the remaining areas of Indonesia.

Source: BAPPENAS.

### Map and Aerial Photographic Cover

57. The available aerial photographic cover is of limited use for forest typing or the production of forest cover maps. The DGF has requested US\$5 million from external sources to undertake aerial photography of selected priority areas. If granted, the DGF hopes to recover a portion of the cost from the sale of photos and maps to holders of forest concessions who, under the terms of their licence agreements, are obliged to photograph and map their concessions at a 1:20,000 scale within a specified period. As numerous other sections of Government also require aerial photographs, it would seem prudent for BAPPENAS to coordinate activities in this field. A scale of 1:25,000 should adequately cover the agricultural and forestry sectors needs for detailed planning and mapping purposes. With very limited photographic interpretation equipment, the DGF is producing 1:50,000 forest type maps based on the classification prepared by the Directorate General of Agraria (Ministry of Home Affairs) in 1964. (For more discussion of maps aerial photographs, and satellite imagery see Annex 1, "Natural Resource Base".)

58. With the exception of Java, which is entirely covered, only a small proportion of forest land has been demarcated and surveyed. About 70% of Sumatra has been demarcated, and 5% surveyed; about half of Sulawesi, and 30% of Nusa Tenggara, have been demarcated. Demarcation work on Kalimantan is just getting underway.

### Education and Training

59. The trained manpower constraint on development is well known, and the discussion here will be brief. A high priority project to increase the supply of subprofessional technicians - so that supervision of timber company activities at the field level can be introduced quickly - is being supported by an IDA credit for agricultural education. Support is being given to two forestry technical training centers: a new one at Samarinda in East Kalimantan, and another at Madium in East Java. Between them they will be able to train about 230 people a year in log measurement, timber grading, logging, and simple regeneration and reforestation techniques.

60. At the professional level, there are two Universities located in Java (the Agricultural Institute, Bogor and Gadjah Mada, Jogjakarta) that offer six-year courses leading to a forestry engineering degree (IR) and seven Outer Island universities that prepare undergraduates for two-year completion courses at either Bogor or Jogjakarta. Annual intakes at the two Java universities average about 125; of these less than 50% graduate. Training facilities are not adequate from any viewpoint, including teaching staff, lecture halls, and library facilities; practical training is virtually nonexistent. Universities come under the jurisdiction of the Ministry of Education, and about 90% of recurrent expenditures are spent on salaries. It is understood that undergraduate courses are to be reduced to four years and facilities provided for postgraduate work. Limited technical assistance is provided by the U.S. Consortium of Midwestern Universities and by Dutch bilateral aid.

61. There is an Academy of Forest Sciences in Bandung, financed by the provincial government of West Java, which offers a three-year BSc level course. From an annual intake of some 100, only about 25 graduate. The only permanent staff members are the secretary and five clerks; the academy functions with visiting lecturers from the DGF and the two forestry faculties. As the academy has no building of its own, lectures are given in the Regional forest office and laboratory work done in the Bandung Institute of Technology. Its future is not clear; the West Java government would like to expand facilities but students feel their prospects would be better if they graduated from a recognized university.

62. The DGF allocates about 10% of its total budget (current and development) for education, training and extension, including the operation of:

- (a) two forestry senior secondary schools for forest rangers (Bogor and Cirebon);
- (b) two forestry technical training centers for graders, scalers, etc. (Madiun and eventually Samarinda); and
- (c) seven temporary forestry police schools (West Irian, Central Java, Timor, Central Kalimantan, South Sulawesi, North Sumatra).

### Research

63. The Forestry Research Institute and the Forest Products Research Institute are both housed in the same buildings in Bogor. Funds, staff, equipment and facilities are grossly inadequate; 55% of the staff is administrative and there is no central direction to coordinate the activities of both institutes. There is an urgent need to determine priorities and reevaluate existing programs. The lack of line authority handicaps administration of research. However, it is not clear that a forestry research service separate from other agricultural services is the best approach under present circumstances. The fields of research that require immediate attention relate closely to the problems of the sector as discussed under various topics: silviculture management, reforestation, utilization, land use and, not least of all, the task of collecting and collating available data on the sector.

64. The Cellulose Research Institute at Bandung, which comes under the Directorate of Chemical Industries of the Ministry of Industry, has a pilot plant that was originally designed for rayon production. It has adequate facilities for undertaking many aspects of pulp and paper research and is currently concentrating on the use of pines, bamboo, rubber wood, rice straw, and bagasse for making chemical pulps. There appears to be no particular reason for overlapping pulp research to be carried out at the Forest Products Research Institute.

### The Export Picture

65. Indonesia figures on timber exports differ from the FAO Yearbook of Forest Products. The latter reports that log exports from Indonesia (as taken from importers' data) were 2.06 million  $m^3(r)$ , valued at US\$58.5 million in 1968 and 3.83 million  $m^3(r)$ , valued at US\$118.5 million in 1969. These figures, especially the value figures, are far larger than the corresponding figures given by the Indonesian government. Furthermore, the quantity and value figures given by the two sources imply different unit values: the Indonesian figures imply US\$10.08/ $m^3$  in 1968 and US\$7.23/ $m^3$  in 1969, versus US\$28.4/ $m^3(r)$  and US\$30.9/ $m^3(r)$ , respectively, for FAO figures. The true figure is probably somewhere in between.

66. A significant portion of log exports have been "Kuda Kuda" logs, which are cut by indigenous people who normally operate without licences or the help of machines. These low quality logs emerged as a significant factor in the market around 1966. Since then prices have fluctuated considerably, in line with rapidly changing market conditions: from US\$16-17/ $m^3(r)$  in 1966, price of Kuda Kuda logs climbed to US\$25-26/ $m^3(r)$  in 1970, then declined to US\$18/ $m^3(r)$  by the summer of 1971. In the meantime, exports of Kalimantan logs produced by mechanized logging operations increased very rapidly in the last three years. According to one industry source, the estimated FOB price of top quality logs was about US\$21/ $m^3$  in 1969, rising to the historic high of US\$32/ $m^3(r)$  in 1970, and then dropped to US\$26-27 in the latter half of 1971.

67. Another source of difficulty is that recorded export of logs from Indonesia are normally valued at "check prices", which are floor prices determined by the Ministry of Trade for the purpose of assessing export taxes. In the past, check prices were set at levels far below estimated actual FOB prices, and thus they would underestimate unit values. Since 1969, Indonesia has been raising the check prices very substantially every year. This, combined with the sharp volume increase, has contributed to the dramatic growth in reported export earnings from timber.

68. An estimation of unit values based on Japanese import data, adjusted to FOB values, suggests a unit value of about US\$17/ $m^3$  for 1968 and US\$20/ $m^3$  in 1969. These offer a useful compromise with the much higher FAO and much lower Indonesian figures (Table 10).

Table 10: UNIT VALUES OF HARDWOOD LOGS EXPORTED  
BY INDONESIA, 1968 and 1969

	1968 (US\$/m <sup>3</sup> )	1969
Based on figures reported by Indonesian sources (FOB)	10.1	7.2
Based on FAO figures (FOB)	28.4	30.9
Based on Japanese import statistics:		
(1) CIF value <sup>/1</sup> (deduct estimated freight cost)	25.2 approx. <u>8</u>	28.3 <u>8</u>
(2) Estimated FOB value	17	20

/1 Average CIF unit values of "lauan and apitong" logs imported from Indonesia. The category includes Dipterocarp spp. and Shorea spp.

Sources: DGF; FAO, Yearbook of Forest Products, 1969-70; Japan, Ministry of Finance, Exports and Imports of Japan.

#### Trends in World Wood Economy

69. Over 1960-68, world exports of forest products (including "miscellaneous minor products" 1/) increased from US\$6.2 billion to US\$11.1 billion 2/. Exports from developing countries rose from US\$0.5 billion in 1960 to US\$1.4 billion in 1968. In spite of this fast change, however, exports from the developed countries still dominate the scene, accounting for 80% of all forest products trade in 1968. Developing countries tend to export products with little or no processing and import wood with a high degree of processing. Although their overall negative trade balance in forest products has tended to disappear, more than half of their 1968 forestry export earnings came from roundwood; sawnwood accounted for about one-quarter; wood-based panels for about one-fifth; and pulp and paper exports were negligible. On the other hand, pulp and paper imports by developing countries have been growing very fast; more than half of all their forest products export earnings is offset by paper and paperboard imports alone. Demand for these products is expected to continue to expand rapidly in the year ahead in developing countries.

1/ "Minor products" include fuelwood, charcoal, poles, wood residues, chips and particles, raw cork and cork manufactures, waste paper and nonwood pulp and paper articles.

2/ FAO Yearbook of Forest Products, 1969-70, p. X.

70. The most important trend in the world wood economy in the last two decades has been the growing importance of tropical hardwood in world production and consumption of logs. <sup>1/</sup> From the mid-1950's to 1968, annual production of logs increased by 147 million m<sup>3</sup>(r), or by 25.5%. Softwood accounted for 70% of this increase in absolute terms; however, in terms of percentage increases, production of hardwood increased more rapidly than softwood. Furthermore, tropical hardwoods expanded much more (84%) than temperate hardwood (only 13%).

71. The Asia-Pacific region as a whole accounts for over 70% of the world's tropical hardwood exports. The major log-producing exporters in the region have been the Philippines, Malaysia and, recently, Indonesia. The Territories of New Guinea and Papua as well as the British Solomon Islands are also important exporters. Burma and Thailand have been important sources of teak, which has a special status and high value in world markets, but their exports have been stagnating for some time. Most of the exports from the region have been in the form of unprocessed logs, although the Philippines and West Malaysia now export significant quantities of tropical hardwood in processed forms.

72. There are two other exporting regions, Africa and Latin America. African hardwoods come mostly from West Africa and go mainly to Europe. About three-quarters is exported in log form and the remainder as sawnwood, veneers and plywood. Exports from tropical Africa as a whole have grown at the rate of 4-1/2% per year in the last decade or so. Latin American exports have not increased very much in the last two decades, and a relatively high proportion of what is exported goes to countries within the same region.

#### Major Markets for Tropical Hardwood

73. World consumption of tropical hardwood (logs and products made from logs only) has increased at about 4.8% per year over the past 15 years, reaching 71 million m<sup>3</sup>(r) in 1968. The main consuming centers are Europe, the United States, and Japan (followed by Canada, Australia, and South Africa). Consumption in these main centers has been rising at over 12% per year for over a decade.

74. Several developing countries e.g. Korea, Taiwan, Singapore and Israel - import significant quantities of tropical hardwood logs and reexport major portions in processed forms. With the exception of Singapore, which has been exporting mainly sawn timber, "in-transit" processors have been exporting mostly plywood.

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<sup>1/</sup> In this report, the expression "logs" is used for sawnlogs, veneer logs and logs for sleepers.

75. Japan is the largest single consumer of tropical hardwood. During 1971, Japan imported almost 21 million m<sup>3</sup>(r) of tropical hardwood logs together with some 3/4 million m<sup>3</sup> (roundwood equivalent - RWE) of processed hardwood. Indonesia supplied about 40% of the logs 1/.

76. U.S. imports of tropical hardwood in 1970 are estimated at 6.91 million m<sup>3</sup> (RWE), 82% as plywood and 12% as sawnwood. Supply sources have not been stable. Throughout most of the 1960's, imports from the Philippines, Taiwan and Korea kept on rising while those from Japan remained stagnant; in recent years, imports from the Philippines stagnated, while those from Korea surged dramatically. As of 1970, the relative shares of the main suppliers of tropical hardwood plywood in the U.S. import market were: Korea, 43%; Taiwan, 23%; Japan, 15%; and the Philippines, 14%. Most of the imports from these countries are made of "Philippine mahogany" (Shorea sp.), so-called in the broadest sense, which comes principally from the forests of the Philippines, Malaysia and Indonesia.

77. Tropical hardwood consumption in Europe is estimated to have increased from 3.5 million m<sup>3</sup> (RWE) in the mid-1950's to around 10.0 million m<sup>3</sup> (RWE) in the late 1960's, i.e. at a rate of about 7% per year. Growth in Europe's consumption has been quite slow in the last three years. A little less than 70% of Europe's tropical hardwood imports are in the form of logs, a bit less than 30% as sawnwood, and the rest (2-3%), as veneers and plywood. The proportion of imports from Africa has decreased to about 75%. It is noteworthy that, in 1970, about 60% of Europe's tropical sawnwood imports came from Malaysia, Singapore, Burma and Thailand. In 1970, Europe also imported almost 400,000 m<sup>3</sup>(r) of logs from Asia, of which 214,000 m<sup>3</sup>(r) were Italy's imports from Indonesia.

78. Demand for tropical hardwood in the importing regions is generally expected to continue to grow rather rapidly, although the rate of growth is likely to decline over time. Projections to 1975, 1980 and 1985 are set out in Table 11. By 1980, Japan and the U.S. are expected to account for about three-quarters of all consumption outside the tropical region, as a result of faster growth rates (but which are expected to slow down after 1975). This implies that prospects for the tropical Asia-Pacific region are especially favorable because of the latter's geographical proximity to markets in Japan and the U.S. Furthermore, there seem to be good prospects for an increasing proportion of imports by Japan to be in processed forms. There is every reason to believe that U.S. imports will continue to be in plywood form.

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1/ Japan also imported a significant quantity of agathis from Indonesia, but this is not included in tropical hardwood import figures cited here.

Table 11: PROJECTED DEMAND FOR TROPICAL HARDWOOD, BY MAJOR AREAS, TO 1985<sup>/a</sup>  
(Unit: million m<sup>3</sup> (r))

	Actual <sup>/b</sup>				Projected			Implied Annual Growth Rates (%)		
	1955	1960	1965	1968	1975	1980	1985	1965-75	1968-75	1975-85
<u>Tropical Producing Areas</u>	31.3	30.6	35.1	38.1	46.3	53.2	61.0	2.8	2.8	2.8
<u>Importing Areas</u> <sup>/c</sup>	7.3	14.2	22.8	33.2	54.5	69.5	83.1	9.1	7.3	4.3
Europe	3.5	6.2	8.4	10.0	12.0	13.0	14.0	3.6	2.6	1.6
United States	1.4	2.0	3.2	6.4	10.9	14.3	16.0	13.0	7.9	3.9
Japan	1.3	4.1	9.2	13.7	28.0	37.5	47.0	11.8	10.8	5.3
Rest of the world	1.1	1.9	2.1	3.1	3.6	4.7	6.0	5.5	2.2	5.4
<u>World Total</u>	38.6	44.8	57.9	71.3	100.8	122.7	144.0	5.7	5.1	3.6

<sup>/a</sup> Regional figures may not add to totals because of rounding.

<sup>/b</sup> Three-year averages, except for 1968.

<sup>/c</sup> Consumption in all areas outside the tropical areas.

Source: IBRD Economics Department.

79. European prospects depend on developments under UNCTAD Generalized Preference Scheme. Although the preferential duties on imports of manufactures (including wood products) are subject to tariff quotas, it is quite possible that these quotas would be expanded more rapidly than the original offers of the major importing countries indicated. If Europe takes greater and greater proportions of its imports in processed forms, the resulting lower transport cost per unit of value would put Asia into a more competitive position vis-a-vis West African suppliers. The immediate beneficiaries of the changing situation are likely to be Singapore and West Malaysia, but other producers such as the Philippines, Sabah, Sarawak and Indonesia could also benefit as wood processing facilities are developed.

80. Although Japan has been importing most of its tropical hardwood requirements in log form, imports of various processed wood products have recently been increasing from a small base. There are indications that more significant increases will take place in the medium-term future. Wood processing technology, especially sawnwood, veneers and plywood, is relatively simple and relatively labor-intensive. Because labor costs are rising faster in Japan than in the neighboring developing countries, comparative advantages in this type of manufacturing should continue to shift. Furthermore, tariff barriers may be reduced significantly on the processed forms of wood imports: while there is no duty on logs, there is a 10% duty on Dipterocarpacea (meranti, keruing, kapur, etc.) sawnwood, a 15% duty on veneer sheets of tropical species (except teak which is free), a 20% duty on hardwood plywood, and 15-20% duties on a variety of reconstituted wood. Since imported logs account for 50-60% of plywood manufacturing costs in Japan, effective protective rate is double or more the nominal rate of 20% on plywood imports. Under the UNCTAD Generalized Preference Scheme, Japan decided to halve the duties on sawnwood and veneer sheets for imports coming from LDC's (subject to tariff quotas). <sup>1/</sup> This offer was put into effect as of August 1, 1971. (No offer was made on hardwood plywood.) Because of exchange rate turmoil in the intervening period, however, the effects of the preferences on imports are not yet clear. On the whole, the Japanese policy is expected to move toward allowing more and more imports of processed products.

81. Export Prospects for Teak. Along with Burma and Thailand, Indonesia has traditionally been an important source of teakwood, which has a unique status in world timber markets. Current consumption outside the producing countries is estimated to be about 350,000 m<sup>3</sup> (RWE). Europe as a whole accounts for 63% of world consumption, while Hong Kong accounts for 23%; other significant consuming countries are Singapore, the U.S., Australia, Japan, Taiwan and Korea which, together, account for 14%.

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<sup>1/</sup> These are scheduled to be expanded every year in favor of developing countries.

82. Available statistics indicate that world teak markets levelled off in recent years. Because of higher prices for teak <sup>1/</sup>, other hardwoods have recently made large inroads into traditional teak end-use markets. However, the loss of markets to other hardwoods was counterbalanced by the overall growth in the luxury market for hardwoods. Assuming that the price of teak will not rise materially in relation to the prices of other preferred species, world import demand for teak might increase at about 3-4% a year up to 1980.

83. The other major exporters of teak are having supply problems. Burma's share of the market has declined from 73% to 68% in recent years; the country's chronic production problems are expected to continue as long as political problems keep some of the finest teak forests in the hands of the insurgents. Thailand's share has decreased from 20% to 16%, and its supply position is believed critical as a result of overcutting.

84. Indonesia is the only country which has shown steady growth in teak exports, increasing its share of the market from 7% in 1967 to 16% in 1970. Yet, Indonesia currently exports only about one-tenth of her production of teakwood (excluding fuelwood). Currently, about 900,000 m<sup>3</sup>(r) of teakwood is produced annually from the government-owned forests of East and Central Java <sup>2/</sup> but almost half of it is used as fuelwood, and all but 40-50,000 m<sup>3</sup>(r) (which are exported) is industrial wood used in the domestic market. With appropriate measures, Indonesia could easily expand exports of teakwood, partly at the expense of domestic consumption. Furthermore, by promoting exports of teak products rather than teak logs, foreign exchange earnings could be increased substantially. Current export earnings from teak are about US\$2-2.5 million. If, for instance, the currently proposed teak development project in Central and East Java is successfully implemented, export earnings from teak could be increased to US\$10.8 million by 1976, and even to US\$45 million in 20-30 years.

#### Trend in Domestic Consumption

85. As population and income grow, domestic consumption of sawnwood and wood-based panels is also expected to increase. It is noteworthy that, despite a significant increase in exports of these products by the mid-1970's, processed-wood exports (measured in roundwood equivalent) would still amount to only 10% of log exports. More dramatic changes can be expected for the latter half of the 1970's, when exports of logs should begin to decrease in absolute volume and processed wood exports continue to grow rapidly.

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<sup>1/</sup> CIF prices of teak sawnwood in the U.K. are roughly 2.5-3.0 times as high as the CIF prices of such typical African species as acajou and sapele. The relative prices do not seem to have changed very much over the 1966-1970 period. (See ECE/FAO, Timber Bulletin for Europe, January-June 1971, Vol. XXIV, No. 1, p. 54.)

<sup>2/</sup> Teak production in West Java and Sulawesi is relatively insignificant.

Processed wood should account for about 30% of total wood exports (roundwood equivalent) in 1980, and about 50% in 1985.

86. Wood consumption in paper-making is currently very small, about 20,000 m<sup>3</sup>(r). Domestic consumption of paper is estimated at about 140,000 m tons for 1970; about 20,000 tons as supplied by domestic paper mills, the rest being imported. Total capacity of existing mills is estimated at 47,100 m tons per year. However, the mills operated at only 40% of their capacity in 1970. It is estimated that only a quarter of the raw materials being used is local pulpwood, the rest being bagasse, rice straw, bamboo, waste paper mixed with imported pulp, etc. Domestic production of paper, and the required volume of pulpwood, have been projected on the basis of a development program for this subsector (para 103). Pulpwood required to sustain the projected capacity of paper production will be 60,000 m<sup>3</sup>(r) in 1975, 1.6 million m<sup>3</sup>(r) as of 1980, and 3.4 million m<sup>3</sup>(r) as of 1985. It is feasible to secure a supply of such quantities from local sources. Paper imports, currently about 120,000 tons per year, are expected to increase to 230,000 tons by 1975, and then expected to decline to 90,000 tons by 1980, and to zero by 1985. There are currently less than 20,000 m<sup>3</sup>(r) of pulpwood exports. These may increase to 100,000 m<sup>3</sup>(r) by 1975. No exports of pulpwood are expected in 1980 or 1985.

87. Current consumption of other industrial wood, such as poles, pilings and pitprops, is roughly estimated at 1.8 million m<sup>3</sup>(r). This consumption is assumed to increase slightly up to 1975 and then to level off in the years beyond. No significant exports or imports of this category of wood are expected to take place.

88. Statistics on fuelwood are at best educated guesses. According to FAO, estimated consumption of fuelwood in Indonesia in 1970 was 95.4 million m<sup>3</sup>(r). This may be far too high, but for want of a better guess it has been accepted. The policy of the Indonesian government is to discourage the wasteful use of wood for fuel purposes. However, world experience tends to indicate that, in most developing countries, fuelwood consumption grows as the population grows. On the other hand, use of fuelwood seldom grows faster than growth in population. It is assumed here that demand for fuelwood in Indonesia will rise at 1% per annum up to 1975 and then will decline. It is assumed that there will be no exports or imports of fuelwood.

#### D. Forest Industry Proposals

89. The two major studies of forestry industry for Indonesia, recently undertaken by Vancouver forestry consulting firms, comprise: a feasibility study for development of the teak industry by C.D. Schultz & Co., Ltd for the Asian Development Bank (ADB); and a national pulp and paper development survey by Sandwell & Co., under the auspices of the Canadian International Development Authority (CIDA).

90. The teak study group is believed to favor the establishment of two integrated wood processing mills requiring an estimated total investment of about US\$12 million over a four-year period. The first stage is expected to be located near Surabaya and comprise a sawmill, dry kiln, moulding section and a parquet flooring plant. It would require a roundwood input of some 48,000 m<sup>3</sup>, for an output of nearly 24,500 m<sup>3</sup> of sawn wood products directed towards the export market. The second phase would probably be situated near Semarang and be similar to the first mill, except for the addition of a particleboard plant producing some 20 million sq ft/year and the omission of a parquet flooring plant. The project would include logging and transportation equipment. It is understood that the project is likely to be appraised by the ADB later in 1972. It is aimed at raising the value of teak exports from US\$2.8 million to US\$10 million over the same period. To achieve these objectives, the consultants are also recommending: improved bucking practices; continuation of the labor-intensive logging methods; 100% truck hauling (instead of a combined rail and truck haul); reduction in the existing number of sawmills; establishment of a separate entity to manage all operations from logging to marketing; forest management to remain the responsibility of the Perhutani; introduction of royalty payments; drastic reductions in the use of teak for locomotive fuel and sleepers; and the introduction of Outer Island construction timber to release teak for export.

91. With regard to pulp and paper, Sandwell's report indicated that the following projects appeared sufficiently attractive to warrant at least four detailed feasibility studies.

92. First, a study of the rehabilitation and expansion of all existing mills except Gowa and Martapura, where no action is considered worthwhile. Total cost would be in the region of US\$8 million and the study could be started immediately.

93. Second, the establishment of an integrated forest industrial complex near the harbor of Cilacap in Central Java. It would be based on man-made plantations of pine and agathis. The timing, composition and output of this complex, as tentatively proposed by the consultants, would be as follows:

<u>Year of Start-up</u>	<u>Mill</u>	<u>Output/Year</u>
1973	Plywood	3 M m <sup>2</sup> of 9 mm thickness
1976	Particleboard	1 M m <sup>2</sup> of 19 mm thickness
1978	Kraft pulp	450 TPD

With logging and transportation equipment included, this would require a total capital expenditure over five years of about US\$112 million, with a foreign exchange component of US\$73 million. It would provide direct employment for about 1,200 people in the mill and many more in supporting plantation, logging and transportation activities. The operation is expected to result in a foreign exchange saving of about US\$20 million annually and would earn a DCF rate

of return of some 19% on equity capital of US\$40 million. These proposals assume that a further 120,000 ha of land is available in Central Java for plantation establishment and a high MAI for both species. Both assumptions would have to be carefully checked by undertaking a detailed survey of the existing plantations and "plantable areas" before embarking on a full feasibility study.

94. Third, the establishment over the next 10 years of a fine paper mill at Leces, East Java (US\$37.6 million); a corrugated medium mill at Cirebon, West Java (US\$17.6 million), both from bagasse raw material; and a box board mill in Jakarta (US\$16.4 million) from waste paper. The foreign exchange component for these is expected to be about US\$46 million.

95. Fourth, the establishment of a bleached kraft pulp and paper complex near Lhoksukon in Aceh Province, North Sumatra, based on the natural pine resource in the Takengon area. The IFC is interested in this project and the consultants have put forward a proposal for a prefeasibility study of the area that would determine the location, character and volume by age classes, density and volume; prepare cover maps; determine the allowable annual cut; indicate location of access routes; recommend system of management for a sustained yield basis; and determine an annual planting program.

96. The consultants' preliminary view is that the establishment of a pulp and paper mill should be planned for the 1980's after an intensive reforestation program has been completed to supplement the existing stands. However, if the results of the inventory are positive, it may be wise to establish some form of mechanical wood processing facilities immediately followed as soon as possible by a pulp mill, so that the resource is tied to a phased industrialization program and not lost to encroachment and annual burning practices. The Sandwell team also concluded that:

- (a) Rice straw and bamboo will not in the future have a significant role to play in the pulp and paper industry;
- (b) A pulp and paper mill in the Jatiluhur area of West Java would be less viable than one in the Tjilatjap area - better to establish one large mill than a small one in each place;
- (c) The immediate prospects for developing profitable pulp and paper mills based on the tropical hardwood forests in Riau Province, (Sumatra) and East Kalimantan do not appear bright; however, studies should be initiated to determine whether and when such development would fit into a long-term plan;

- (d) The pine plantations around Lake Toba should be used for resin production and for supplying the Siantar paper mill; continued plantations established for pulpwood production should be discouraged as the area is not sufficiently close to possible pulp and paper mill sites along the coast;
- (e) It may be possible to use overmature rubber wood in the future as raw material for local pulp and paper production. In the meantime, the possibilities of converting it into chips for export on the same lines as in Malaysia should be investigated.

97. One of the main purposes of the Government's concession allocation policy was to encourage the establishment of processing facilities in the Outer Islands. This would cater for bright prospects foreseen in the future for selling timber products on the export and local markets, ensure added value remained in the country, and create employment possibilities. Unfortunately, this has so far not happened. Possibly, this is simply due to insufficient time on the ground. However, a number of other reasons are thought to be involved. There is a lack of sound inventory data on which to base firm industrial proposals. The overseas market situation was depressed in 1971. Shipping facilities are inadequate and inter-island freight rates are high; and in general there is a lack of infrastructure and services in the Outer Islands. There is uncertainty over the speed and cost of customs clearance formalities for capital goods and basic raw materials, such as phenolic glues for plywood production, as well as steadily increasing taxes on the wood raw material. Finally, it is easier and less risky to export logs than to establish processing facilities; and Government has not pressured timber companies to honor commitments undertaken in concession agreements. Under the circumstances, the most appropriate line of action would be the introduction of tax measures to encourage local processing. An increase in the export tax on logs from the present 10% should be one element of this incentive scheme. 1/

#### E. Development Strategy and Outlook

98. The main problems of Indonesia's forestry sector can be related to the Outer Islands, Java, and the institutional framework. Although the Outer Islands contain vast areas of dipterocarpus forest with high export potential, the productive forests are probably less extensive and lower in quality than originally thought. Comprehensive inventories do not exist and

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1/ It is noted that Malaysia recently increased the tax on export logs from 10% to 15%.

only small areas have been surveyed and demarcated. Since 1967, the Government has handed out about 50% of the productive forests and substantial areas of protective forest without preparing an overall masterplan. This has led to a spectacular increase in log exports and revenues to the regional and central governments, but has not yet been accompanied by the establishment of wood processing facilities. Wasteful logging methods and poor silvicultural practices are common. And with only 30% of the DGF staff assigned to look after over 97% of the country's forest resource, supervision is almost nonexistent.

99. With 70% of the DGF staff employed in Java, the forests are reasonably well managed and have been surveyed and demarcated. Population pressure, however, has led to acute overexploitation of some forests. This has caused grave watershed problems and a severe shortage of forest products and fuelwood. Forest industries are out of date and operate at low levels of efficiency. Valuable teak and conifer plantations exist that can form the basis of new industries. Presently very little teak is exported, as it is consumed locally for construction, fuelwood, and sleepers.

100. The Forest Service suffers principally from an inadequate supply of properly trained personnel at all levels. The DGF has a particularly weak institutional structure with five subject matter directorates each operating largely independently of the others. Furthermore, the dichotomy between regional control of forests and centralized technical backstopping makes for poor forestry practices.

101. The development strategy for forestry must be formulated within the wider national objectives which are: to develop agriculture and infrastructure; to establish natural resource based industries that contribute strongly to import substitution and export earnings; and to encourage foreign investment as a means of overcoming shortages of capital and skilled manpower. Within this framework, strategy for the forestry sector can aim at several major objectives: self-sufficiency in wood based panels and paper production; and a major expansion in the export of sawnwood and plywood, with a corresponding steady reduction in the export of logs. These major objectives can be complemented by policy measures aimed at rehabilitation of water catchment areas; the preservation of protection forests and nature reserves; the management of production forests on a sustained yield basis using proven silvicultural techniques; and the transfer of "forest land" that is better suited for agricultural purposes, including transmigration schemes.

#### Outlook for 1970-85

102. Production of logs is projected to rise from 14.6 million m<sup>3</sup>(r) in 1971, to 23 million m<sup>3</sup>(r) in 1975, and to 27 million m<sup>3</sup>(r) in 1985 (Table 12). These projections differ from one made by the Indonesian Government, in that we assume a much slower build-up of log production by 1975. This view is based on the proposition that Indonesia should restrain

export of logs in favor of longer term gains from more intensive utilization of the forestry resource. This can be achieved to some extent by slowing down the granting of concessions, raising check prices, and increasing export taxes on logs. The encouragement of processing is, of course, the other side of the coin. Projected changes in the exports of logs are reflected in the production and exports of sawnwood and wood-based panels.

103. In terms of timing and quantities, major achievement goals for the sector could be set as follows:

- (a) self-sufficiency in wood-based panel products by 1975;
- (b) self-sufficiency in pulp and paper production by 1985;
- (c) expansion in export of sawnwood and plywood from about 1 million m<sup>3</sup>(RWE) in 1974 to some 9 million m<sup>3</sup>(RWE) in 1985; and
- (d) reduction in export of logs from a high of possibly 16 million m<sup>3</sup>(r) in 1974 to about 10 million m<sup>3</sup>(r) in 1985.

104. Indonesia's long-term prospects for capturing a significant share of the market for tropical hardwood logs and processed products in the U.S.A., Japan, Europe, Taiwan, Korea, Singapore, etc., are excellent.

105. Projections indicate that annual export earnings could increase from US\$178 million in 1971 to about US\$450 million by 1975, and to almost US\$600 million by 1980 (Table 13). Logs will continue to dominate forestry exports. This is not only because the volume of log exports is expected to rise at high rates, but also because it is assumed that check prices will be raised. Although check prices have been raised every year since 1969, they have been substantially below the estimated actual FOB prices: <sup>1/</sup>

<u>Year</u>	<u>Check Price</u> (\$/m <sup>3</sup> )	<u>Actual FOB Price</u> (\$/m <sup>3</sup> )
1970	13.56	20
1971	16.55	23
1972	18.50	22

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<sup>1/</sup> One industry source, however, claimed that, due to the latest changes in the check prices, in some cases, the actual FOB price of a particular grade had been lower than the check price.

**Table 12: PRODUCTION, CONSUMPTION AND EXPORTS OF FOREST PRODUCTS**  
 1970-1971 (ESTIMATED) AND  
 1972-1985 (PROJECTED)  
 (million m<sup>3</sup> roundwood equivalent)

	Logs <sup>a/</sup>			Sawnwood			Wood-based Panels			Non-Log Industrial Wood			Total Industrial Wood <sup>b/</sup>	Fuelwood <sup>c/</sup>
	Total Production	Exports	For Domestic processing <sup>b/</sup>	Total log intake	Exports	Domestic Consumption <sup>e/</sup>	Total log intake	Exports	Domestic Consumption	Domestic Consumption <sup>d/</sup>	Exports <sup>e/</sup>	Other Industrial Wood <sup>f/</sup>		
1970	11.4	7.3	4.0	4.0	0.1	3.9	0.02	-	0.02	0.02	0.02	1.8	13.2	55
1971	14.6	10.4	4.2	4.2	0.1	4.1	0.02	-	0.02	0.02	0.03	1.8	16.5	56
1972	16.4	12.0	4.4	4.4	0.1	4.3	0.02	-	0.02	0.02	0.04	1.9	18.4	97
1973	19.0	14.0	4.9	4.9	0.2	4.7	0.03	-	0.03	0.02	0.05	1.9	21.0	98
1974	22.0	16.0	6.0	5.5	0.6	4.9	0.50	0.4	0.10	0.04	0.10	1.9	24.0	99
1975	23.0	16.0	7.0	6.0	0.9	5.1	1.00	0.8	0.20	0.06	0.10	2.0	23.3	100
1980	26.5	14.0	12.5	9.0	3.0	6.0	3.5	2.7	0.80	1.70	-	2.0	30.0	94
1985	27.0	10.0	17.0	11.0	4.5	6.5	6.0	4.5	1.50	3.40	-	2.0	32.0	92

Note: Totals may not add due to rounding.

a/ Sawlogs, veneer logs and logs for sleepers.

b/ Logs going into sawnwood and wood-based panel industries in Indonesia.

c/ Includes logs directly used in manufacturing pencils, matches, cases, furniture, etc.

d/ Consumption of wood in domestic paper mills excluding non-wood materials and imported pulp.

e/ Roundwood and wood chips.

f/ Posts, pilings, pitprops, etc.

g/ Logs plus non-log industrial wood, excluding the double-counting of residues used as pulpwood.

h/ FAO estimates for fuelwood production are suspected of overestimation, but they were used as the basis for projection here for want of more reliable estimates.

Source: 1970-71, IBRD mission estimates, based on data from FAO, Indonesian Department of Forestry and IBRD Industrial Projects Department.  
 1972-1985, IBRD mission estimates.

Table 13: PROJECTIONS OF EXPORT EARNINGS FROM FOREST PRODUCTS IN INDONESIA, 1968-1976 and 1980

(million US dollars, FOB)

	Actual				Projected <sup>a/</sup>					
	1968	1969	1970	1971	1972	1973	1974	1975	1976	1980
1. Logs (nonteak) (assumed av. check price, \$ per m <sup>3</sup> ) <sup>b/</sup>	10.3 (n.a.)	23.5 (7.23?)	99.4 (13.56)	168.0 (16.55)	222.0 (18.50)	308.0 (22.00)	368.0 (23.00)	384.0 (24.00)	400.0 (25.00)	364 (26.00)
2. Sawmwood (nonteak)	-	-	2.7	3.0	3.0	4.4	14.7	24.0	27.0	103.0
3. Teak (logs and conversions)	2.2	2.5	2.9	3.0	3.0	4.0	6.0	8.0	10.8	13.0
a. Logs	0.8	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
b. Conversions	1.4	1.3	1.6	1.7	1.7	2.7	4.7	6.7	9.5	11.7
4. Plywood & Veneers <sup>c/</sup>	-	-	-	-	-	-	12.0	25.0	(37.5)	110.0
5. Subtotal (1+2+3+4)	12.5	26.0	100.5	174.0	228.0	316.4	400.7	441.0	475.0	590.0
6. Pulpwood	-	-	0.1	0.2	0.3	0.4	0.8	1.0	1.0	-
7. Miscellaneous Nonwood Forest Products <sup>d/</sup>	5.2	1.9	3.8	4.1	4.0	4.0	4.0	4.0	4.0	4.0
8. Grand Total	17.7	27.9	104.4	178.3	232.3	320.8	405.5	446.0	480.0	594.0

<sup>a/</sup> Projections for logs, sawmwood, teak and "plywood & veneers" are based on the projected export volumes indicated in Table and projected average prices which are not shown except for logs (nonteak).

<sup>b/</sup> It is assumed that the check prices will be equal to estimated actual FOB prices, beginning 1973.

<sup>c/</sup> It is assumed that exports of this category will consist of veneers and plywood in the following proportions respectively: 100% (veneers) vs. 0% (plywood) in 1974, 70% vs. 30% in 1975 and 30% vs. 70% in 1980.

<sup>d/</sup> Includes rattan, tengkawang, resin, copal, gum, etc.

Source: 1970-71 IBRD mission estimates, based on data from FAO, Indonesian Department of Forestry and IBRD Industrial Projects Department. 1972-1985, IBRD mission estimates.

The Indonesian Government should attempt to set check prices at levels only slightly below the probable market prices (FOB), starting in 1973. The projections assume this would be done, with prices increasing from US\$22/m<sup>3</sup> in that year to US\$26/m<sup>3</sup> in 1980. Earnings from sawnwood (other than teak) are projected to increase from the current level of US\$3 million to US\$24 million in 1975, and to US\$100 million in 1980. Earnings from veneer exports are assumed to become significant in 1974, and earnings from plywood exports from 1975. The veneer and plywood exports are projected to earn some US\$100 million a year by 1980.

106. The projected rapid progress in the earnings from exports of processed wood assumes that the Government takes necessary steps immediately to encourage timber companies operating large logging concessions to establish export-oriented processing facilities. Steps to be taken should include not only measures to slow down (or discourage) the expansion of log exports, but also positive measures to encourage the establishment of processing facilities. The latter could include the improvement of infrastructure and the offer of additional logging concessions to efficient operators who do not have sufficient forest to justify processing facilities.

107. Assuming that the proposed teak development program in Central and East Java will be implemented--i.e. modernization of conversion facilities--export earnings by the teak sector could be expected to increase from the current level of US\$3 million to over US\$10 million by 1975.

108. Earnings from pulpwood are minor and are not expected to build up to a scale greater than US\$1 million a year. Besides wood and wood products, Indonesia has been exporting miscellaneous nonwood forestry products. These include rattan, "tengkawang" (an oil used in lipstick production), resin, gum, and a few other minor items. The first two are the more important, and have generally good prospects. Earnings from the other items have tended to decline and are expected to do so in the future.

109. Although expansion of the pulp and paper industry will require more study, the prospects for self-sufficiency within 15 years are sound. Furthermore, it seems reasonable to assume that:

- (a) The existing mills will be improved so that they will be able to operate at capacity by 1975;
- (b) The proposed bagasse paper mill to be located at Letjes will be in operation by 1975, provided sufficient bagasse is available;
- (c) Conifer resources in Java and North Sumatra will be developed and exploited to supply a sufficient volume of pulpwood needed for feeding the projected papermaking capacity; and
- (d) By 1985, a significant volume of paper will be made from mixed tropical hardwoods.

Development of the Outer Islands

110. The basic requirements for the rational development of the Outer Island timber resources are:

- (a) a better knowledge of the area, quality and location of the timber by optimum use categories (protection, production, etc.);
- (b) the establishment of wood processing facilities in selected locations phased to satisfy expected increases in the domestic and overseas markets; and
- (c) the introduction by government of measures to ensure that the forests are operated and managed on sound silvicultural lines.

111. Although it could be argued that it is now too late to undertake a forest inventory on grounds that the bulk of the productive forest has been or is being granted to timber companies, it is clear that a sensible master plan cannot be prepared until sound factual information on the productive resource base is available. This is being undertaken by the DGF, which hopes to have it completed by 1977. However, as the information is urgently required, the following steps are recommended:

- (a) a crash program to photograph, at a scale of 1:25,000, the nonmountainous forest zones of Kalimantan, Riau, Jambi and South Sumatra that have not yet been satisfactorily photographed by the Government or by timber companies;
- (b) a 0.2% ground survey of the newly photographed areas to determine volume, species, composition, density and quality; and
- (c) analysis of existing and new data to determine the extent of productive forest (divided into those areas that would remain as permanent forest and those that would eventually be converted to agriculture) and allowable annual cut.

With external technical assistance, it should be possible for this inventory to be completed within three years and the priority areas such as East Kalimantan within 18 months.

112. The present requirement that each concession company is to establish its own processing facilities is unrealistic. If each and all did so in the immediate future, there could be a proliferation of inefficient mills and a possibility of temporary overproduction. Also, the quantity of timber remaining in a concession is often insufficient to operate a viable sized complex for a reasonable project life. However, it is clear that processing facilities must be established--on a planned, phased and controlled basis--and that the Government should introduce incentives to overcome some of the constraints before harsher measures are considered.

113. A sound approach would be a temporary stop to the granting of concessions and a full review of the present concessionaires' activities. One of the first tasks should be to group companies into four categories:

- (a) those with a good or adequate performance record who do have sufficient timber to establish a viable complex. These should be encouraged;
- (b) those with a good or adequate performance record who do not have sufficient timber to establish a processing complex. These should be offered additional areas if they agree to establish processing facilities immediately;
- (c) those with a poor performance record. These should be threatened with cancellation of agreements if improvement in performance is inadequate; and
- (d) those who have not taken up their concessions. These should have their licenses cancelled.

114. It may not be possible to grant additional areas to some of the smaller but competent operators; in such cases it may be appropriate to encourage several of them to form a consortium, pool their timber resources (which together could be operated on a sustained yield basis) and establish mills in strategic positions bearing in mind disbursement of wood resources and proximity to infrastructure and service facilities. The lull during the concession review would give the Government breathing space to determine where, when and to whom future areas should be granted. It would also allow for the introduction of a new concession agreement more in keeping with the Government's long-term objectives.

115. Tax measures are an appropriate means of influencing private activity. The aim should be to make it attractive for companies to process locally rather than export logs. An increase in the tax on log exports would be an effective measure. This should be done within 18 months, but announced well in advance of the operative date so that firms would have an opportunity, if they so wished, to start installing processing facilities before the deadline. In addition, check prices on export logs should be increased and maintained at approximately the level of estimated actual FOB prices.

116. For its part, Government should give high priority to investments for improvement of infrastructure, harbor facilities and services, particularly in potential growth centers (Tarakan, Samarinda, Balikpapan, Pontianak, Banjarmasin, etc.), for the purpose of encouraging processing. Improvement of inter-island transport facilities is necessary to enable the economic transport of logs to mills established in Java. There are very encouraging results with the use of self-loading, self-dumping log barges. Estimates of freight and handling costs are:

	US\$/m <sup>3</sup>
Palembang to Jakarta	2.40
Banjarmasin to Surabaya	2.60
Samarinda to Surabaya	4.10

These compare with present costs of between US\$8 and 10/m<sup>3</sup>.

117. It is timely for a review of the royalty rates and other taxes (excluding export tax) levied on logs. They should be roughly competitive with other tropical hardwood producing countries in the region. Also, the streamlining of customs procedures would be of considerable value to the industry, especially if the "other costs" associated with clearance formalities are reduced. The concession holders should be prepared to pay such royalties and taxes but should at the same time be protected from instability in tax treatment, uncoordinated Government policies related to forestry activities and possible arbitrary actions.

118. An increase in DGF staff, additional transportation equipment and the introduction of radio communications will be required to supervise logging operations and the management of licenced areas. It is recommended that the following issues be given special attention:

- (a) Aerial photography and inventory. Enforcement of obligations to produce photos and an inventory of the concession within the specified period.
- (b) Logging and road construction. Greater control over the trees selected for felling, bucking practices, size of log considered marketable, road gradients and skidding practices.
- (c) Treatment of residual stand. Investigation with research units and companies to develop a minimum acceptable level of stand improvement practices.
- (d) Scaling and grading. Greater involvement to ensure maximum utilization and correct royalty assessment.

- (e) Reports and Reporting. Enforcement of requirements under the terms of the concession agreement to prepare logging plans, management plans, and periodic progress reports.

119. An immediate survey of the natural pine resources of Aceh, North Sumatra, is recommended, along the lines suggested by Sandwell & Co. (para 89). Pine pulping trials on a laboratory and industrial scale will be required. For Lake Toba, a review of the planting program is called for, to determine if further afforestation in this area is justifiable in view of the location vis-a-vis a future pulp mill site and other land-use demands.

#### Development of Java

120. There are four priority areas in Java's forestry sector that will require a concentration of staff and funds in the future:

- (a) afforestation and management of the main water catchment and denuded hilly areas;
- (b) expansion of coniferous plantations in areas where there is sufficient bare land adjacent to existing plantations to establish compact units to supply viable pulp and paper industries;
- (c) improvement in the management and utilization of the teak forests to increase exports; and
- (d) rehabilitation and expansion of forest industries particularly in the pulp and paper sector.

121. One of the more serious problems caused by overpopulation has been the destruction of natural vegetation in the island's water catchment areas. This has led to erosion and flash floods in many areas of Eastern and Central Java. The UNDP/FAO Solo River Projects and the World Food Program-supported reforestation program (also known as the "Greening Movement") are helping to seek solutions to some of these problems. However, other measures are required.

122. First, a survey is required to assess the extent of the problem and to put forward land exchange proposals. There may be areas presently demarcated as forest land that should be converted to agriculture and vice-versa. Many areas presently under teak, for example, would have to be carefully scrutinized. However, before alienation is considered, full recognition would have to be given to teak's special position as a foreign exchange earner.

123. Second, priority in the selection of future transmigrants should be given to the higher altitude, hilly areas, subject to erosion. These areas could be completely reforested and used as a future source of fuelwood.

124. Third, rather than combine agriculture and forestry in the same plots of land (as observed in the Gesi and Sukasari areas of the Upper Solo River basin), it may be more appropriate to convert the eroded calcareous areas (e.g. Gesi) to pure teak plantations and the volcanic areas (e.g. Sukasari) to suitable forms of agriculture after contouring and levelling.

125. In spite of the great pressure for land, significant areas have been planted with conifers. The largest concentration, which exists in Central Java, is ideally suited to become the resource base of a major pulp and paper industry near Cilatjap, provided additional land is available for planting and yields are adequate. As this could become the first priority wood-based pulp and paper project in the country, it is recommended that a detailed study be made of the existing plantations and adjacent Government-owned "plantable areas" to determine volumes, quality, age classes, yields, allowable annual cut, etc. If the results are positive, a full feasibility study should be undertaken by forest industrial consultants and an annual planting program of some 5,500 ha/year started immediately. This planting program should be given priority over the afforestation schemes in East and West Java.

126. The Sandwell proposals for the rehabilitation of selected pulp and paper mills and the establishment of three new mills based on bagasse and waste paper are also of priority. Before feasibility studies on the bagasse based mills are initiated, it will be important to determine whether the sugar mills will be converted to other types of fuel or continue to use bagasse.

#### The Institutional Framework

127. In the long term, the success of a development strategy for Indonesia's forestry sector must depend on vastly improved educational, training, and research facilities. Only in this way can the appropriate short-term objectives be conceived and implemented. Immediate steps need to be taken to determine how University and subprofessional establishments should be reoriented, staffed, equipped and located to cater for the country's long term public and private forestry sector manpower needs. At the same time, it would be opportune to assess the situation in other Southeast Asian countries on the assumption that economies could be achieved on a regional basis. 1/

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1/ Poor facilities exist in the Philippines, for instance, and there is no faculty of forestry in Malaysia.

128. Steps proposed in the USAID Forestry Report of April, 1971 to improve administration and organization are fully supported. Briefly they recommend the creation of three line assistants (deputies to the Director General) that would be responsible for land management, research and administration; a realignment of directorates to bring allied activities together; the replacement of the dual role of the provincial foresters with a structure reporting directly to the deputy to the Director General in charge of land management; and improvement of the financial, administrative, and personnel management systems and procedures.

129. To cope with research needs (outlined below), priorities need to be reassessed and a task force approach adopted. Overseas expertise will be needed, as well as financial assistance from appropriate external agencies. The research effort would be directed by a deputy to the Director General who would coordinate the activities of both research institutes and help to assess the merits of setting up a central Indonesian Agriculture Research Organization, that would cater for the needs of agriculture, animal husbandry, forestry and fisheries. It is important that research results be written up for distribution and an annual report published. Priority research needs are set forth below.

130. Silviculture and Management of the Tropical Rain Forest. To determine the most appropriate method of perpetuating and improving yields of the main merchantable species. This will require field plots in a range of locations and probably substations in Kalimantan and/or Sumatra. It is recommended that at least one substation be set up. Close liaison should be maintained with other research institutes in Southeast Asia and timber companies such as Weyerhaeuser, Mitsui, Mitsubishi, and Soriano, that have already shown interest and offered facilities for research.

131. Reafforestation of Clear Felled Tropical Rain Forest. To determine what coniferous and hardwood species can be successfully grown for pulpwood and saw/ply logs. Again, this should be done in conjunction with selected timber companies, a number of which have experience in Malaysia and the Philippines.

132. Utilization of Secondary Species: To determine which are likely to find a market in the future and to formulate a promotion program for the ones selected. Additions will influence the treatments problem.

133. Economic Planning Research Unit. To bring together the plethora of data on forest areas, volume, domestic and external trade patterns, expenditures and revenues, etc. so that forest policy can in future be based on actual facts rather than notions. The unit would also be set up to monitor feasibility studies carried out by timber companies, and bi- and multi-national ad agencies. A reliable national inventory would be required as a basis for this work.

134. Land Use Studies. To assess the extent and location of the upland areas of Java requiring afforestation for preserving catchment areas and reducing erosion and flood damage. This would include land exchange proposals which might involve some flat agricultural areas currently under teak.

135. Degraded Forest Lands (estimated at 25-37 million ha). To determine optimum land use for the future (e.g. forestry, agriculture, others). Work on trying to define suitable areas for settlement by the Dyaks and for transmigration schemes has already started in East Kalimantan where one professional forester has been assigned full time to this work.

136. Productive Forest (estimated at 18 million ha). To determine which could be appropriately handed over to agriculture for transmigration or local settlement. In East Kalimantan alone it is estimated some 4 million ha of forest could be converted to agriculture.

137. Tree Improvement. To determine best seed sources and to establish seed orchards so that selection and breeding can produce a better strain of pine, agathis and teak than presently being used in afforestation schemes. Part of this program is already successfully underway with the assistance of an FAO specialist.

138. Pulping Trials. To determine the suitability of Pinus merkusii, Agathis borneensis, Anthocephalus cadamba, Shorea sp. and other selected tropical hardwood species for manufacturing pulp and paper. Laboratory work is being done on some of these species locally and overseas, but coordination is required. Once promising species emerge, industrial scale tests will be required. All research related to pulp and paper production (excepting the physical properties of wood for pulping purposes) should be undertaken in the Cellulose Research Institute, Bandung, to avoid duplication.

#### Possible Projects and Preinvestment Requirements

139. Prospects of investment projects in the forestry and forest industries sector are good. A list of the major possibilities indicating components, estimated total capital costs, present status and suggested next steps, follows at the end of this section. This list is concerned with projects that might qualify for external financial assistance. It does not include the substantial number of forest industrial projects that the private (foreign and local) sector is expected to finance in the Outer Islands, some of which may, nevertheless, qualify for partial multilateral financing.

140. The temptation to press for the development of the pulp and paper industry in the Outer Islands, using mixed tropical hardwoods, should be resisted. In practice, the prospects are brighter for using the existing pine resources. It would be more difficult and costly to pulp mixed tropical hardwood species of various densities and colors than to pulp the two local conifers, which are similar in density and color. Long-fibered conifer pulp is generally stronger than short-fibered hardwood pulp and would be in greater demand than the latter in the domestic market. And, according to recent

studies, the estimated gross return on invested capital for a kraft pulp and paper mill situated in Kalimantan would be substantially below that of kraft mills situated in either Central Java or North Sumatra.

141. The proposed integrated forest industrial complex in East Kalimantan, if proven technically and economically feasible, would have definite merit if it were based on the pooled timber resources of a number of companies with concessions that are too small to justify each establishing processing facilities. This would maximize the utilization of the forest resources already allocated, and ensure greater effectiveness of the smaller entrepreneurs.

142. A list of preinvestment requirements follows after the list of projects. These requirements are related either to overall planning and development needs or to studies associated with the investment project possibilities listed below. None of the technical assistance needs are included, even though they are urgently required for research activities.

143. In the past, the DGF has usually asked for technical assistance to help solve specific problems in limited fields (wood preservation and seasoning, tree breeding, etc.) rather than project aid to solve major problems covering a whole subsector or involving overall strategy. The mission feels very strongly that the current situation calls for a change of this policy and has, therefore, included proposals for a manpower survey, inventory, and establishment of an Economic Planning Research Unit.

LIST OF INVESTMENT PROJECT POSSIBILITIES

<u>TYPE OF PROJECT</u>	<u>LOCATION</u>	<u>POSSIBLE COMPONENTS</u>	<u>ESTIMATED TOTAL CAPITAL COST</u>	<u>PRESENT STATUS</u>	<u>NEXT STEPS</u>
Educational and Research	Bogor, Java	Buildings, equipment, transportation and laboratories for: a) University and higher sub-professional levels of training for Indonesians and nationals of other S.E. Asian countries. b) Modernization of existing research institutes	US\$ 3 million	a) the US consortium of mid-western Universities and other bilateral agencies have shown interest in aspects of this but no one has looked at it with a view to a major input of staff and funds. b) recent IDA credit for Agricultural education does not cater for professional or higher level sub-professional training.	a) Forestry and forest industries sector manpower requirements survey with FAO assistance b) Bank/FAO(CP) joint identification mission
Plantations/ Industrial	Tjilatjap, Central Java	a) plantation establishment @ 5,500 ha/year. b) Plywood mill - 1973 ) c) Particle Board mill - 1976 ) d) Kraft pulp & paper mill - 1978 )	US\$ 10 million US\$ 112 million	a) Re-identified by Sandwell & Co. in recent report submitted to CIDA. b) Nearly 40,000 hectares of conifers already established c) appears in Bappenas list of Project aid proposals, 1972/73	a) Survey of existing plantations and plantable areas. If results positive b) Full-scale feasibility study covering afforestation and industrial aspects.
	Lhokaukon, Aceh, North Sumatra	a) plantation establishment @ about 4,000 ha/year b) plywood mill ) c) kraft pulp & paper mill )	US\$ 8 million US\$ 100	a) Re-identified by Sandwell b) Accessible natural pines already cover about 120,000 ha. c) IFC has expressed specific interest	a) Pre-feasibility study by consultants to determine area, volume, density yields and available annual cut. If results positive b) Full scale feasibility study of plantation and industrial elements.
Industrial	Java & North Sumatra	Rehabilitation of five of the seven existing pulp & paper mills (para 52 (a)). In Gowa and Martapura no action is considered worthwhile	US\$ 8 million	a) Identification by Sandwell b) The rehabilitation or expansion of Letjes, Biabak and Banjuwangi are included in the Bappenas list of project aid proposals for 1972/73.	a) Feasibility study
	East & West Java	Establishment over the next five years of: a) fine paper mill, <u>Letjes</u> b) corrugated medium mill, <u>Tjirebon</u> c) box-board mill, <u>Diakarta</u> (para 52 (c)).	US\$37.6 US\$17.6 US\$16.4	a) Early proposal stage identified by Sandwell. b) The Letjes project is probably the same as the Djatiroto project identified by PEDCO and included in the list of project aid proposals, 1972/73.	a) Check if sufficient bagasse will be available. If result positive b) Full-scale feasibility study.
	Central & East Java	a) Establishment over the next four years of integrated wood producing plants using teak at: (i) Surabaya ) (ii) Semarang ) b) Would include cost of sawmills, dry kilns, flooring plant, particle board plant, moulding sections, logging and transportation equipment.	US\$ 12 million	a) A feasibility study has been completed by C.D.Schultz & Co. for the Asian Development Bank b) Based on the 440,000 ha of teak forests in C & E. Java	Appraisal by ADB scheduled for August, 1972.
	East Kalimantan	Establishment of an integrated forest industrial complex comprising: (a) Sawmill input 300,000 m <sup>3</sup> (r)/year. ) (b) Plywood plant input 450,000 m <sup>3</sup> (r)/year ) (c) Kraft pulp & paper output 500 TPD ) (d) Particle board output 60,000 m <sup>3</sup> /year. )	US\$ 120	a) Identified by IBRD Industries Department Sector Review Mission, 1971. b) Pre-feasibility undertaken by same mission. c) Assumes: (i) Sufficient area of uncommitted forest (1.8 m ha) in the <u>Bukitapanan, Samarinda</u> area yielding about 1.6 mill m <sup>3</sup> (r) annually could be set aside for project. (ii) satisfactory pulp can be made from mixed tropical hardwoods.	a) Confirmation that adequate uncommitted forest exists in area indicated. b) Obtain Government approval c) Full-scale feasibility study.

PRE-INVESTMENT REQUIREMENTS

<u>CATEGORY</u>	<u>DESCRIPTION OF ACTIVITY</u>	<u>ESTIMATED DURATION AND FOREIGN EXCHANGE COST</u>	<u>AGENCY OR ENTITY THAT MIGHT ASSIST</u>
Associated with overall planning and development needs and/or indirectly with investment project possibilities	1. <u>Manpower - Educational/Training Survey</u>	3 months US\$ 30,000 (assumes nine man months)	FAO has frequently expressed interest in assisting to improve the educational and training facilities.
	a) To assess future manpower needs in the forestry and forest industries sector b) To determine the educational and training facilities required over the next twenty years to satisfy these needs. (see para 90).		
Directly associated with investment project possibilities	2. <u>Inventory (Outer-island timber resources)</u>	3 years US\$ 6.5 million (assumes about 18 m ha @ 33¢/ha)	FAO, CIDA or USAID
	a) Aerial photographs of selected areas at 1:25,000 scale b) 0.2% ground survey of selected areas c) Analysis of old and new data to determine extent of productive forest and future yields. (see para 92)		
	3. <u>Economic Planning Research Unit</u>	4 years US\$ 750,000 (assumes 24 man years @ US\$30,000/man year).	FAO, CIDA or USAID
	Using data from 1 and 2 above together with existing information this unit would: a) bring together the facts on which future policy decisions would be made; b) advise on the future development of the forestry sector c) assess all feasibility studies undertaken by timber companies, bi- or multi-national aid agencies, and consultants and advise the IGF on appropriate action.		
Directly associated with investment project possibilities	4. <u>Central Java : Plantations/Pulp &amp; Paper</u>		
	a) Survey of existing plantations and plantation areas. b) Full scale feasibility study - if (a) above is positive.	US\$ 80,000 US\$ 300,000	CIDA as follow up to Sandwell Report
Directly associated with investment project possibilities	5. <u>Atjeh, North Sumatra - Pulp &amp; Paper</u>		
	a) Pre-feasibility to determine area, volume, density, yields, allowable annual cut and planting program. b) Feasibility study provided (a) positive	US\$ 100,000 US\$ 300,000	CIDA as follow up to Sandwell Report - I.P.C.
Directly associated with investment project possibilities	6. <u>Rehabilitation of Existing Pulp &amp; Paper Mills</u>		
	Feasibility study	US\$ 150,000	CIDA as follow up to Sandwell Report.
Directly associated with investment project possibilities	7. <u>Establishment of Paper Mills - Java</u>		
	Feasibility study	US\$ 200,000	CIDA as follow up to Sandwell Report - USAID.
Directly associated with investment project possibilities	8. <u>East Kalimantan forest Industrial Complex</u>		
	a) Survey of forest area at a 0.2% intensity. b) Full scale feasibility study	US\$ 600,000 US\$ 350,000	

ESTIMATED AREA OF FOREST<sup>1/</sup> BY GEOGRAPHICAL LOCATION AND ECOLOGICAL TYPE

(millions of hectares)

REGION	Total Land Area	Primary Rain Forest <sup>3/</sup>	Mixed Deciduous Forest	Secondary Forest <sup>4/</sup>	Mangrove Coastal & Swamp Forest <sup>3/</sup>	Teak Forest <sup>5/</sup>	Non-Teak Plantations <sup>6/</sup>	Total Forested Area	Percent Forested
Kalimantan	54	25.7	-	9.2	6.1	-	-	41	76
Sumatra	47	15.5	-	5.6	6.9	-	-	28	60
Sulawesi	19	6.8	-	3.2	-	-	-	10	53
Java & Madura	13	0.3	1.5	-	0.1	0.8	0.3	3	23
Maluku	8	4.9	-	1.0	0.1	-	-	6	75
Nusa Tenggara	7	1.4	-	0.6	-	-	-	2	29
West Irian	42	25.5	-	-	4.5	-	-	30	71
<b>TOTAL</b>	<b>190 <sup>2/</sup></b>	<b>80.1</b>	<b>1.5</b>	<b>19.6</b>	<b>17.7</b>	<b>0.8</b>	<b>0.3</b>	<b>120</b>	<b>63</b>

1/ "Forest" as defined in law #5 of 1967 is any "area covered with growing trees which as a whole forms a natural biological living community with its surrounding".

2/ In the "Statistical Pocketbook of Indonesia", April 1971, the total land area according to the Directorate of Topography is 201.9 million hectares, but according to the Directorate General of Forestry the figure is 190.4 million hectares.

3/ These categories will include areas which were once forests but are now open grassland, cultivated or in some other way converted.

4/ These develop after the original forest has been destroyed by fire or shifting cultivation. Areas indicated are very rough estimates based on data contained in "Forestry Resources in Indonesia" Department of Forestry, May 1966 and Dr. J.A. von Monroy's "Forestry and Forest Industries in the First and Second Five-year Plans of Indonesia", October 1968.

5/ Comprises plantations and natural stands.

6/ Includes coniferous and hardwood plantations

Source: Several official documents and reports which due to purpose and time of publication do not agree in all respects. Main sources are the "Forestry Masterplan Summary, D.G.F., Dec. 1971 and the documents noted in footnote <sup>4/</sup>.

INDONESIAN FOREST TYPES

The forests of Indonesia can be classified into six broad categories:

1. Tropical Rain Forest - which occurs in regions of high rainfall and can be sub-divided by elevation:
  - (a) Lowland Rain Forest from 2-1,000 m. Dominant species are Shorea sp. (meranti), Hopea sp. (merawan), Dipterocarpus sp. (keruing), Dryobalanops sp. (kapur), Vatica sp. (resak), Agathis sp. and Pinus merkusii (tusam). Commercial, accessible forest and main source of log exports.
  - (b) Middle Elevation Rain Forest 1,000-3,300 m. Dominant species are Lauraceae, Quercus sp., Castanea sp., Northofagus sp. and, in West Irian, Rapanea sp., Leptospernum sp. Noncommercial protection forest.
  - (c) High Elevation Rain Forest 3,300 m and above containing Araucaria sp. and Podocarpus sp. Commercial but currently inaccessible forest mainly in West Irian.
2. Mixed Deciduous Forest - also called "Monsoon" or "Seasonal" forests as they occur in regions with pronounced wet and dry season at altitudes varying from 2 to 1,000 m. Found mostly in the eastern part of Indonesia. Valuable species include Tectona grandis (Teak or "Djati"); Acacia sp. (pilang); Albizia sp. Dalbergia latifolia (sonokeling); Eucalyptus alba (ampupu); Pterospernum sp. (bajur); and Casuarina equisetifolia (tjemara). Commercial, accessible forest.
3. Peat Bog Forest - occurs in regions with a wet climate (e.g. West Kalimantan and East Sumatra). Soil consists of peat layers varying in thickness between 1 and 20 m with a ph of about 3.2. Valuable species include Gonstyllus sp. (ramin), Anisoptera sp. (mersawa), Callophyllum sp. (bintagur), Shorea sp., Cratoxylon sp. (geronggang), Alstonia sp. (pulai), and Tristania sp. (pelawan). Commercial, accessible forest.
4. Coastal Forest - found on dry land along the shore in narrow strips. The main valuable species are Terminalia sp. (ketapang) and Hibiscus sp. (waru gunung). Noncommercial but accessible forest.
5. Swamp Forest - almost always associated with fresh water and found mainly in Sumatra, Kalimantan and West Irian. Valuable species are Sapotaceae, Shorea belangeran (belangeran), and Vatica rasak (resak). Other associated species are Alstonia sp. Dyera sp. (djelutung) and Adina sp. (berambung). Commercial, accessible forests.

6. Tidal Forest - also known as mangrove forest. Occurs along the shore and frequently several hundreds of meters inland. Valuable species are in the Rhizophoraceae family such as Rhizophora (baku<sup>2</sup>), Avicennia (tinggi) and Bruguiera (tantjang). Commercial, accessible forests.

Sources: "Some Aspects of Forest Development in Indonesia", Directorate General of Forestry, October 1967 and "Forestry in Indonesia", FAO TA 2984, 1971.

PRESENT STATUS OF ALLOCATION OF FOREST RESOURCES

--- DECEMBER 31, 1971 ---

(Area in millions of hectares)

<u>REGION</u>	<u>Concessions Granted</u>		<u>Forest Agreement Stage</u>		<u>Survey Stage</u>		<u>Applications Received</u>		<u>TOTAL</u>	
	<u>No.</u>	<u>Area</u>	<u>No.</u>	<u>Area</u>	<u>No.</u>	<u>Area</u>	<u>No.</u>	<u>Area</u>	<u>No.</u>	<u>Area</u>
Kalimantan	46	9.4	84	6.6	69	7.0	52	4.9	251	27.9
Sumatra	23	1.8	43	2.9	63	4.6	33	3.0	162	12.3
Sulawesi	2	0.2	5	0.4	16	1.6	4	0.4	27	2.6
Maluku	4	0.4	5	0.2	11	1.1	9	1.6	29	3.3
Nusa Tenggara	-	-	1	(0.02)	-	-	-	-	1	(0.02)
West Irian	-	-	1	0.2	15	5.4	14	4.9	30	10.5
<b>TOTAL</b>	<u>75</u>	<u>11.8</u>	<u>139</u>	<u>10.3</u>	<u>174</u>	<u>19.7</u>	<u>112</u>	<u>14.8</u>	<u>500</u>	<u>56.6</u>

Source: DGF Directorate of Planning, March 1972.

ESTIMATED AREA OF PLANTATIONS BY GEOGRAPHICAL LOCATION AND SPECIES

<u>REGION</u>	<u>Conifers</u>		<u>Teak</u>	<u>Others</u>	
	<u>Pine</u>	<u>Agathis</u>			<u>Total</u>
East Java (Banjuwangi)	12,000	4,000	16,000	250,000	
Central Java (Notog)	31,000	8,000	39,000	190,000	85,000
West Java (Jatiluhur)	26,000	3,000	29,000	?	
North Sumatra (L. Toba)	22,000		22,000		
Aceh (Takengan)	150,000	<u>/2</u>	150,000		24,000
Sulawesi (Muna)				7,000	4,000
Nusa Tenggara				6,000	
<b>TOTAL</b>	<u>241,000</u>	<u>15,000</u>	<u>256,000</u>	<u>775,000</u> <sup>/3</sup>	<u>131,000</u>

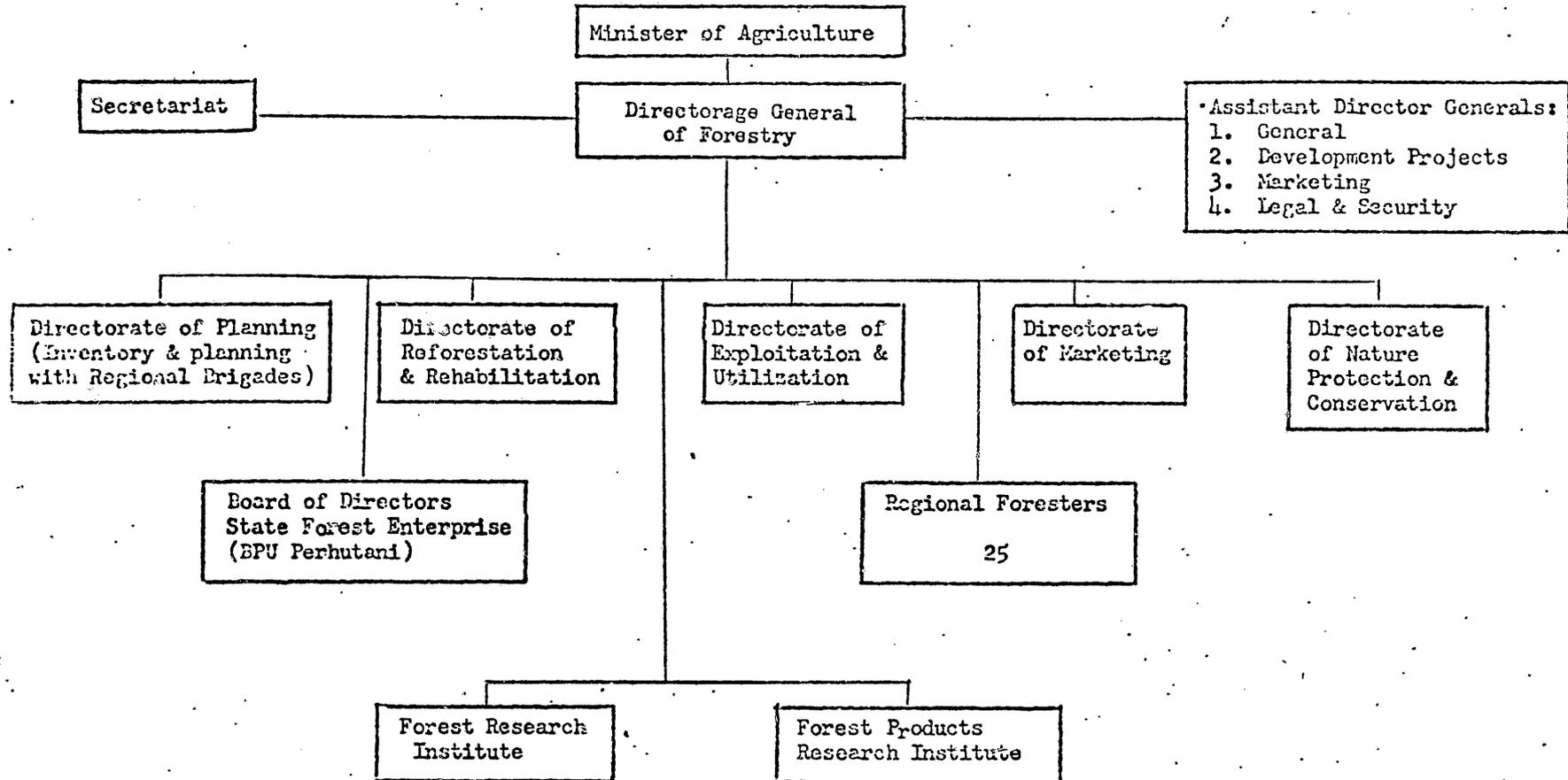
/1 This includes Albizia falcata, Dalbergia latifolia, Acacia decurens and many other hardwood species.

/2 Mainly natural pine stands of Pinus merkusii but does include some plantations.

/3 This total also includes substantial areas of natural teak forest.

Source: Several official documents and reports which due to the purpose and time of publication do not agree in all respects. Main sources are the Forestry Masterplan Summary, Directorate General of Forestry, Dec. 1971 and "Forestry in Indonesia", FAO Report 2984, 1971.

STRUCTURE AND ORGANIZATION OF THE DIRECTORATE GENERAL FOR FORESTRY



Source: D.G.F.

STATUS OF FOREIGN INVESTMENT PROJECTS IN THE FORESTRY AND FOREST INDUSTRIES SECTOR  
BY COUNTRY, TYPE AND INDICATED CAPITALIZATION - JANUARY 1972

COUNTRY	Approved by Government January 1967 - January 1972			Approved by Departments, Reviewed by Foreign Investment Board, (FIB), but not yet approved by Government			Preliminary Approval by Departments and sent to FIB for review			Total Expected Value of Invest- ments
	Wholly owned	Joint En- terprise	Capitaliza- tion US\$ M.	Wholly owned	Joint En- terprise	Capitaliza- tion US\$ M.	Wholly owned	Joint En- terprise	Captlz. US\$ M.	US\$ M.
Phillipines	3	9	261.00							261.00
S. Korea	1	1	51.50							51.50
Hong Kong	3	2	12.50		4	11.00		1	?	23.50
Malaysia	1	7	15.30		2	4.50				19.80
Japan	1	9	11.75		2	4.50				16.25
USA	4	2	15.25							15.25
Singapore	1	4	7.50		1	2.00				9.50
Panama		2	3.00							3.00
France	1		2.50							2.50
Italy		1	1.60							1.60
Holland		1	1.10							1.10
Thailand		1	0.75							0.75
W. Germany		1	0.40							0.40
Norway								2	?	?
TOTAL	15	40	384.15		9	22.00		3		406.15

Source: U.S.A.I.D.

INDONESIAAGRICULTURAL SECTOR SURVEYFINANCE FOR AGRICULTURAL PRODUCTIONA. BackgroundSources of Funds

1. The three main divisions of agricultural production obtain finance as follows:
  - (a) for rural credit; to the 20 million small farmers responsible for the bulk of production, from various sources (below);
  - (b) for publicly-owned estates and other enterprises (including agroindustries); from the government and from state commercial banks;
  - (c) for privately-owned estates and enterprises; from local and foreign private sources and from state and private commercial banks.
  
2. Institutional funds for rural credit to small farmers come mainly from the Bank Rakjat Indonesia (BRI), and to a much lesser extent from PN Pertani (the government-owned fertilizer importing and distributing agency), village and paddy banks, cooperatives, government pawnshops, and provincial development banks. Sugar mills and tobacco estates make some annual loans to growers, while private traders make limited advances in kind to small farmers. Private moneylending is illegal, but occurs in all areas, and provides significant amounts of credit to farmers each year.

The Banking System

3. From 1965 to late 1968, the five state-owned banks, which presently account for most of the banking business, were consolidated into one single institution. Early in 1969, they were separated into eight enterprises, each with fairly well defined but overlapping operating areas. This separation has: (a) made them once again accountable for their own operations instead of relying heavily on the central bank for both guidance and funds; (b) clarified their legal status; (c) contributed to a new sense of purpose and responsibility among bank leadership; (d) reintroduced some degree of competition between them, and (e) given clients a wider, although still limited, choice of bank.

4. The state banks operating in the agricultural sector are:
- (a) Bank Indonesia: the central bank;
  - (b) Bank Rakjat Indonesia (BRI): specializing in credit for agriculture, fisheries, cooperatives, and rural development; described more fully below (para 19);
  - (c) Bank Expor-Import Indonesia: specializing in finance for production, processing, and marketing of export products;
  - (d) Bank Negara Indonesia 1946: specializing in industrial loans, and giving precedence to industries which support agriculture, save foreign exchange, and improve the quality of exported goods;
  - (e) Bank Bumi Daya: specializing in finance for commercial estates and forestry, including a large part of the sugar stocks in 1971 and 1972;
  - (f) Bank Pembangunan Indonesia (BAPINDO): the state industrial development bank, described more fully below (para 69), for which IDA has recently approved a credit of US\$10 million for medium and long term loans to small- and medium-sized industrial enterprises, including agroindustries.

With the exception of Bank Indonesia, all of them accept deposits from the public, and provide commercial banking services.

5. Apart from the state banks, there are 11 branches of foreign banks and 122 private banks, which are mainly small local units. The foreign and private banks together do less than one-eighth of all banking business. Only eight banks (5 state and 3 private) are permitted to deal in foreign exchange. All commercial banks (state, foreign and private) are controlled by the banking laws and regulations, and have to submit to Bank Indonesia at regular intervals various operational information, including audited financial statements.

#### Interest Rates

6. Interest rates charged by the state banks are controlled by Bank Indonesia, and vary according to the purpose of the loan. The changes since October, 1966, in the annual rates are given in Appendix 1. These rates have been progressively reduced over this period, and have tended to follow, somewhat tardily, the reduction in the rate of inflation. In 1966, they varied between 72 and 108%, whereas from June, 1970, to May, 1972, they were between 12 and 48%. As from 1st June, 1972, they are:

- (a) 12%: Loans for imports of fertilizer and PL 480 goods, development purchases by regional governments, and government guaranteed credits;
- (b) 24%: Loans for production and distribution of 9 essential goods, for production and collection of export commodities, for all other production purposes, for agriculture, animal husbandry and fisheries, and for the tourism industry and public transportation;
- (c) 24 to 36%: Loans for all purposes not listed above (the actual rate being at the discretion of the lending bank).

7. Thus loans classified as government guaranteed (which include development loans for estates and agroindustries (para 52) and credit under the rice intensification programs are now at 12% interest a year, while all other loans by state banks for agricultural production are at 24%. In January, 1972, government announced that under a program called "Development Loans through the Banking System", covering longer term foreign exchange loans from overseas sources, the annual interest rate to the ultimate borrower would be 9% plus foreign exchange risk. This program is discussed below (para 67).

8. Much of the funds of the state banks comes from rediscounts through Bank Indonesia and from large deposits (both time and sight). Rediscount rates charged by Bank Indonesia are half the rates quoted in Appendix 1. Deposit interest rates paid by the state banks are also controlled by Bank Indonesia, and are given in Appendix 2. Between March and September, 1969, the rates on large deposits were changed 4 times, during which period the rate for time deposits over 1 year was halved. They currently vary from 9% annually for deposits of from 1 to 3 months to 18% for deposits of more than a year. Small deposits of between Rp 50 and Rp 100,000 are accepted by the state banks, and currently receive interest at 18% annually, irrespective of the period of deposit. They are probably not profitable for the banks. Many small depositors come from rural areas. //

9. Private commercial banks fix their own rates. These vary widely from bank to bank and from borrower to borrower, and currently range from about 30% up to 72% yearly. In general, these banks offer depositors higher rates than the state banks. A discussion on interest rates generally, including their effect on agricultural production, and future trends, is included later in this Annex (para 92 et seq).

## B. Rural Credit

### Credit Sources

10. Production credit for small farmers is obtainable from a variety of institutional sources, but both the supply, and farmers'

access to it, are limited. A number of branches of PN Pertani have given fertilizer credit to small farmers over the past few years, outside the rice intensification programs. More recently, with private importation of fertilizer, village stores have been doing the same, and this had led to limited competition, with some benefit to the farmer. PN Pertani has recently given fertilizer credit for rice production over 6 months at 36% interest a year, for onion and other cash crops over 3 months at 60% to 84% a year with collateral security. No details of the amounts given under these programs are available.

11. Some tobacco estates give credit to leaf growers by supplying fertilizer and insecticides, plus a cash advance of up to Rp 35,000 per ha for labor and living expenses. The credit is deducted from the proceeds of leaf delivered to the curing sheds at harvest. Interest rates are usually around 30 to 36% a year, but the amounts of credit advanced each year are not known.

12. Sugar production is described in Annex 8. Although not strictly a credit operation, sugar mills in Central Java lease portions of farms for growing cane for 16 months, paying rentals of about Rp 70,000 per ha in advance. Farmers use these rents as working capital to operate the rest of their farms, and for living expenses. The annual amounts paid out as rent are of the order of Rp 1.5 to 2.0 billion. In Jogjakarta, some farmers contract with sugar mills under a sharecropping agreement, and receive rents in installments over the rental period.

13. Village Banks (Bank Desa) date back to 1905, and were originally village savings and loan institutions, through which members received production credit. Inflation has eroded their capital, and most of their present working funds comes from BRI advances. Their operations are now almost wholly confined to short-term (10-week) loans to small village traders, with annual interest rates of up to 100%, and sometimes a 5% levy as compulsory savings. A few have made loans to farmers, usually of from 3 to 6 months, with annual interest rates of up to 100%, and sometimes a 5% levy as compulsory savings. The banks are usually operated by a commission of three, with the village head as ex officio chairman. Loans are restricted to registered members, who are screened for character and income potential. Village bank operations are supervised by BRI, which requires the banks to employ at least one qualified bookkeeper part-time. Table 1 gives some details of these operations, which were considerably reduced during 1971 because of the large amounts still outstanding.

Table 1: VILLAGE BANK OPERATIONS

	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>
	-----Rp millions-----				
Number of active banks	3.5	3.2	3.5	3.6	3.5
Credit outstanding at years' end /1	33	154	426	626	778
Credit granted during year	108	569	476	598	188
Credit repaid during year	79	448	411	594	178

/1 Includes interest charges.

Source: BRI

14. Paddy Banks (Lumbung Desa) deal in stalk paddy, and are depositories from which members may borrow seed or rice for consumption, pending the crop harvest. They are supervised by BRI. Their importance has declined considerably, and although there are still over 2,200 of them, their combined stock of paddy reaches only about 70,000 tons maximum. BRI reports only three of them now lend in cash, their credit outstanding at the end of 1971 being about Rp 0.74 million.

15. Agricultural cooperatives were originally formed to provide production credit to member farmers, but inflation has eroded their capital, and many are now dormant. At the end of 1967, there were stated to be about 12,400 of them, but the number dormant was not known. Some were formed in 1965 to handle credit under the original BIMAS rice intensification program (para 32), but while many of these were registered, they did not meet the minimum necessary standards of size, and organizational and financial management to become viable, and are no longer operating. All credit for the cooperatives still operating comes from BRI. Relevant figures for the last five years are given in Table 2. Disbursements declined in 1970 as, on government instructions, BRI made loans only to those which were better managed and financially sound. Loans outstanding were also reduced at the end of 1970, but two-thirds of them constituted arrears.

Table 2: BRI LOANS TO COOPERATIVES

	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>
	-----Rp billions-----				
Disbursed during year	0.3	0.5	1.0	5.5	3.7
Repaid during year	0.3	0.4	0.8	4.2	3.5
Outstanding at years' end	0.1	0.2	0.4	3.5	1.5
Arrears <u>/1</u>	-	0.1	0.2	2.1	1.0

/1 More than 6 months

Source: BRI

16. The 440 government pawnshops presently operating are controlled by the Ministry of Finance. They make loans of up to Rp 500 on the security of household articles for up to 6 months, at a 60% annual interest rate until recently. A considerable number of borrowers are farmers requiring small sums for living expenses, but precise figures are not available. Table 3 gives some details of pawnshop operations, and shows that the present annual loan rate is over Rp 2 billion. With a maximum of Rp 500 per loan, the annual number of loans now exceeds 4 million.

Table 3: PAWNSHOP OPERATIONS

	1967	1968	1969	1970	1971 <sup>/1</sup>
	-----Rp billions-----				
Credit outstanding at years' end	0.17	0.25	1.32	1.86	2.19
Loans granted during year	0.37	1.02	1.34	2.10	0.73
Loans repaid during year	0.25	0.94	1.08	1.68	0.68

<sup>/1</sup> As at end March 1971

Source: Bank Indonesia

17. Following 1962 legislation permitting their formation, a number of provincial governments set up provincial development banks, usually with the objective of initiating and part financing development projects, including working capital. They are not generally allowed to function as commercial banks, and usually accept time deposits only. Some of them have made loans for agricultural purposes, but their impact to date on the sector has been very small. No separate statistics on them are currently available.

18. Under a 1967 law, private moneylending is illegal. Nevertheless, moneylenders <sup>1/</sup> remain one of the largest sources of credit for farmers. Because of the natural reticence of both lenders and borrowers, no reliable information on such transactions is obtainable. Some informed sources suggest that between 30 and 80% of farmers borrow from moneylenders at some time every year, although the amounts are usually small. These sources are unanimous that the terms are usurious, with annual interest rates exceeding 300% on occasions.

#### Bank Rakjat Indonesia

19. Statutes. Bank Rakjat Indonesia (BRI), which has endured many changes since it was established in 1896, is the oldest rural bank in the country. It was first called BRI in 1945, integrated into the single state bank in 1965, and reformed in its present shape with a new charter at the end of 1968.

20. Its main function is to assist the government with agricultural development policies and programs. BRI gives credit to agricultural

<sup>1/</sup> Moneylenders include village storekeepers, rice millers and hullers, and the larger village farmers.

cooperatives, farmers, fishermen and other agricultural enterprises. Additionally, it lends on commercial terms, with emphasis on cooperatives, non-plantation agriculture, fisheries, handicrafts, rural industries and small-scale enterprises. A substantial share of its business has been in transport and tourism. It also provides normal banking services, including acceptance of current, savings, and time deposits. It administers government credit for rural development programs (i.e. small-scale irrigation and farm roads). BRI supervises village banks and paddy banks (at a small loss) under policies and procedures set by Bank Indonesia. It administers the current Improved BIMAS program (para 37) with Bank Indonesia funds. Additionally it now provides limited medium-term investment credit for improvement of rural infrastructure, including farm mechanization, rice processing and storage.

21. Operations and Finance. Data prior to 1969 is virtually unobtainable. Major operational data for 1969 and 1970 is available, but full 1971 figures will not be ready until mid-1972. Loans disbursed and outstanding for the two years are given in Table 4. Loan disbursements are increasing in volume, but trade and services, rather than agriculture, now account for over half BRI's operations. Medium-term investment credit, started late in 1969, has gone mainly to rice millers, hullers and for small irrigation works. The 1970 decline in advances for agriculture, livestock, fisheries and cooperatives, was partly due to a reduction in advances to cooperatives (para 16). Advances to PN Pertani were for fertilizer stocks, and were guaranteed by Bank Indonesia. The large increase in BIMAS advances in 1970 was due to BRI taking over credit responsibilities under the Improved BIMAS program (para 32).

Table 4: BRI LOANS DISBURSED AND OUTSTANDING

	1969		1970	
	Rp bi	%	Rp bi	%
<u>Loans disbursed</u>				
Trade and services	31.3	39	61.3	54
Small-scale rural industries	9.6	12	19.8	18
Medium-term investment credit	-	-	2.7	2
Agric., livestock, fisheries & coops.	24.0	30	6.3	6
PN Pertani fertilizer distribution	12.4	16	16.0	14
BIMAS	2.7	3	6.9	6
<b>Total</b>	<u>80.0</u>	<u>100</u>	<u>113.0</u>	<u>100</u>
<u>Loans outstanding at years' end</u>	<u>37.8</u>	<u>47</u>	<u>49.0</u>	<u>43</u>

22. BRI has an authorized capital of Rp 300 million, all government owned, but as yet none has been paid in. A special committee is reviewing the capital structure of all state-owned banks. It has not yet reported,

but it is expected to recommend Rp 11 billion as BRI's equity capital. At the end of 1970, BRI had reserves and retained earnings of Rp 774 million, after starting at the end of 1968 with a net loss of Rp 361 million.

23. BRI's financial statements for 1969 and 1970 are at Appendix 3, and income and expenditure statements at Appendix 4. BRI's main sources of new funds are Bank Indonesia and deposits, as is shown in Table 5.

Table 5: BRI SOURCES OF FUNDS

<u>Sources</u>	<u>1969</u>	<u>1970</u>
	---Rp billion---	
Borrowing from Bank Indonesia	26.6	30.9
Deposits, including current, savings and time	9.7	12.8
Loan collections	<u>50.0</u>	<u>82.2</u>
Total	<u>86.3</u>	<u>125.9</u>
<u>Loans disbursed</u>	<u>80.0</u>	<u>113.0</u>

Source: BRI

The government's successful financial stabilization programs have produced a useful increase in deposits from the private sector from 1970 onwards.

24. State banks have been required to maintain a minimum liquidity ratio of 30%. BRI's was 54% at the end of 1969 and 43% at the end of 1970. The excess liquidity was partly due to slow communication with some outlying branches, but also to inadequate and cumbersome accounting systems and reporting procedures.

25. The present arrears position is unsatisfactory, and since a thorough examination has not yet been made, details are unavailable. Arrears are around one-fourth of all loans outstanding. The more serious amounts overdue at the end of 1970 arose from the rice intensification programs, and earlier lending to the cooperatives and the private sector. Tentatively, about 8% of all overdues, say 2% of loans outstanding, are considered as bad debts.

26. BRI made an operating profit of Rp 1.1 billion in 1969, and Rp 1.3 billion in 1970. Due to increased administrative expenses (for expanded staff training and improved office facilities), profit for 1971 is expected to be about Rp 0.8 billion.

27. Organization and Management. At the end of 1970, BRI had its head office (in Djakarta), 13 regional offices, 218 branch offices, 77

sub-branch offices, 537 village units and 509 mobile units. At the end of 1971, village units had increased to 1,071 mobile units to 578.

28. BRI's Management Board consists of one President-Director and 3 Managing Directors, appointed for 5 years by the Minister of Finance. Each Managing Director is in charge of a group of head office sections. The Board is supervised by a 3-man Council, two from BAPPENAS and one from the Ministry of Finance, all appointed for 3 years. At the end of 1970, the total number of employees was about 10,000 (including village and mobile unit staff), of which 1,500 were at head office.

29. The present organizational structure was inherited from BRI's 1967 predecessor, and has only been marginally modified to cope with changed circumstances. Recording and operating procedures are outdated, and there is much overlapping between sections. Office equipment is inadequate. There are excess personnel in some sections and shortages, particularly of qualified and trained officers, in others. These shortcomings delay appropriate and timely decisions by BRI's management. To remedy them, the Asian Development Bank (ADB) has agreed to finance the bulk of the cost of a project to modernize BRI's management, particularly on the accounting side.

30. Modernization Project. In 1971, ADB agreed to lend BRI US\$3.4 million, being the foreign exchange cost of US\$4.4 million project, lasting about 3-1/2 years, to modernize BRI. The project consists of some modification and consolidation of sections within head office, the adoption of improved accounting, auditing and reporting systems and procedures, and the initial mechanization of 126 branch offices in East Java. ADB's loan financed (a) the foreign exchange cost of consultants to help improve accounting systems and train staff and (b) the procurement of adding, calculating and bookkeeping machines. Three consultants were provided to help project implementation, and one to strengthen the investment loans section and develop medium and long-term agricultural credit programs.

#### Rice Intensification Programs

31. The technical aspects of these programs are described in Annex 13. The three BIMAS programs all contained some seasonal credit, but detailed records were not kept under the Gotong Rojong program, so that it is not possible to get a clear picture of the total number of loans made or their precise distribution. Throughout the programs the monthly interest rate to borrowers has been 1%. Table 6 summarizes the estimated loan volume under these programs.

Table 6: ESTIMATED LOAN VOLUME UNDER BIMAS PROGRAMS

	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>
	-----Rp billions-----					
Original BIMAS	0.15	1.50 <sup>/1</sup>	2.00	2.25 <sup>/2</sup>	1.80 <sup>/2</sup>	-
BIMAS Gotong Rojong	-	-	-	12.00 <sup>/2</sup>	10.40 <sup>/2</sup>	-
Improved BIMAS	-	-	-	-	-	10.95
<b>Total</b>	<u>0.15</u>	<u>1.50</u>	<u>2.00</u>	<u>14.25</u>	<u>11.20</u>	<u>10.95</u>

/1 Estimated.

/2 Mission estimate from incomplete data.

Source: Rice Intensification Study<sup>1/</sup> and BRI.

32. Original BIMAS Program. Credit under this program was advanced on a group basis, mainly through village cooperatives, although some was through village headmen. In 1965/66 the credit source was BRI. In the following dry season and the 1966/67 wet season, most credit came from Badan Urusan Logistik (BULOG), with a small part from the provinces and BRI. PN Pertani financed the 1967 dry season, but thereafter until the program stopped at the end of 1970, all credit came from BRI. The loan package consisted of fertilizer, seed, and insecticide in kind, together with cash for living expenses. The size of the loan varied with the variety of rice planted, and increased each year. In the wet season, 1969/70, the rate for ordinary varieties was about Rp 9,500 per ha, and for improved varieties, about Rp 14,000 per ha. Cash for living expenses was less than 10% of the total value of the loan throughout the program.

33. The credit side of the original BIMAS program was a failure. Collection rates were satisfactory in the first year, but declined rapidly as loan volumes expanded, as is shown in Table 7. Some reports suggest loan repayments may have been misappropriated in some areas, but the extent is not known. Repayment rates were generally slightly better in the wet season than in the dry. The main reasons for the program's credit failure were that: the cooperatives were hurriedly formed and did not have adequate managerial expertise; collateral was not required as loan security; and there was no evaluation of farmers' repayment ability. The many changes in the source of credit also contributed to the difficulties.

1/ "Study and Evaluation of Rice Production Intensification Programs in Indonesia", November, 1971, by Agrar-und Hydrotechnic GMBH for the Government of Indonesia.

Table 7: ORIGINAL BIMAS LOANS AND RECOVERIES

<u>Year/Season</u>	<u>Volume</u> (Rp billion)	<u>Repayment</u> <sup>/1</sup> (percent)
1966 wet	0.14	96
dry	0.11	86
1967 wet	0.79	50
dry	n.a.	n.a.
1968 wet	0.90	77
dry	1.10	51
1969 wet	2.09	47
dry	0.17	35
1970 wet	1.65	29
dry	0.12	21

<sup>/1</sup> As at end 1970.

Source: BRI, BIMAS, and BULOG.

34. BIMAS Gotong Rojong Program. Under this 1969 and 1970 program, credit was supplied and charged as a fixed package per ha to every farmer in the selected area, whether or not he wanted, needed, or could efficiently use it. The package was provided by one Indonesian and seven overseas contractors, and included seeds, fertilizer, insecticide and rat poison, together with the cost of crop spraying, transportation, and technical assistance. In 1970, the charge for the package was about Rp 8,400 per ha for ordinary varieties, and about Rp 12,700 for improved varieties. BRI provided some cash for living expenses (a total of Rp 0.5 billion over the two program years), while BULOG (through PN Pertani) supplied additional fertilizer for improved varieties.

35. Village headmen received the total allocation for their villages, and were responsible for its distribution to individual farmers. Repayments in the first year were fixed at one-sixth of the crop produced, but were below expectations partly due to underreporting of yields by farmers to evade full repayment in kind. During the second year repayments were changed to cash or kind to the value of the loan. No village records were kept, so that individual farmers' loans and debts were not known. Repayment rates were very poor. At the end of 1970, three-quarters of the 1969 loans were still outstanding.

36. On the farm credit side, the program was unsuccessful because it assumed all farmers would immediately accept the compulsory credit package, and the mandatory technical changes inherent in the program, although these are contrary to basic credit and extension principles. The complete lack of records at village level made it easy for individual farmers to evade repayment. Also the contractors distributing the inputs were not in any way responsible for, or involved in, debt collection. Its

one positive contribution to the rural sector was that farm inputs, particularly fertilizer, pesticide and improved seed, became much better distributed and more widely available, particularly in Java.

37. Improved BIMAS program. This was started as a pilot project in Jogjakarta in 1969/70. Its success led to its adoption on a large scale in 1970/71 as a substitute for the BIMAS Gotong Rojong program, and it is continuing. Its main feature is that individual farmers are eligible for seasonal loans for rice production, rather than the village as a whole. Loans are available from village and mobile units organized and maintained by BRI. Each village unit covers from 600 to 1,000 ha, farmed by 1,800 to 3,000 farmers living in about five adjoining villages. Each unit employs three persons: an agricultural officer, bookkeeper, and cashier. Mobile units, operated from BRI branch offices, serve the more widely-scattered villages. These are essentially similar to village units, but instead of being permanently located, they visit different villages in rotation.

38. Loan procedures have been simplified. Farmers make individual loan applications, and these are countersigned by the village headmen, who confirm the bona fides of the applicants. Loans are processed and approved in one day. Release slips enable villagers to obtain farm inputs in kind from local merchants, and BRI provides the balance for living expenses in cash. Loan policy is flexible. Maximum amounts per ha for each input and for living expenses have been laid down, but farmers are free to choose the composition of their loan within these limits, provided it shows promise of improving production. 1/

39. Table 8 shows the number of village and mobile units in operation for each planting season. The total number of village units under this program will not exceed about 1,300, and mobile units about 600, so that most of the anticipated expansion has already taken place. The Table shows that in 1971, many of the mobile units were opened in the Outer Islands.

Table 8: BRI VILLAGE AND MOBILE UNITS

<u>Village Units</u>	<u>Java</u>	<u>S. Sulawesi</u>	<u>Rest</u>	<u>Total</u>
Wet Season 1969/70	18	-	-	18
Dry " 1970	35	-	-	35
Wet " 1970/71	537	-	-	537
Dry " 1971	666	1	-	667
Wet " 1971/72	985	21	65	1,071
<u>Mobile Units</u>				
Wet Season 1970/71	500	-	-	500
Wet " 1971/72	52	48	478	578

Source: BRI

1/ For example, a farmer would not be allowed cash for living expenses only, but would have to take at least a minimum amount of fertilizer.

40. Loan details up to the end of 1971 under this program are given in Table 9. For the wet season, 1970/71, the average size of loan was Rp 8,400 per ha, or Rp 6,400 per farmer. Although disbursement of loans for the wet season, 1971/72, was not complete by December 31, 1971, the average to that date for that season was Rp 8,500 per ha, or Rp 6,700 per farmer. The average area financed per farmer was 0.76 ha in 1970/71, and 0.79 ha in 1971/72. These figures suggest there has been no substantial change in the credit pattern over these two major seasons. From Tables 8 and 9, the average number of farmers financed per unit (village plus mobile) for the wet season 1970/71 was about 1,250. Comparable figures for 1971/72 are not yet available.

Table 9: IMPROVED BIMAS, SUMMARY OF LOAN DATA

	Area Financed ( <sup>1</sup> 000 ha)	Farmers Financed ( <sup>1</sup> 000)	Credit Volume (Rp m)	% Repayment <sup>/1</sup>
Wet 1969/70	n.a.	n.a.	81	97
Dry 1970	n.a.	n.a.	61	96
Wet 1970/71	1,008	1,326	8,459	79 <sup>/2</sup>
Dry 1971	293	358	2,503	34 <sup>/2</sup>
Wet 1971/72 <sup>/1</sup> <sup>/4</sup>	446	566	3,805	<sup>/3</sup>

<sup>/1</sup> As of December 31, 1971.

<sup>/2</sup> Recoveries in progress.

<sup>/3</sup> Not yet due.

<sup>/4</sup> Loans still being disbursed.

Source: BRI

41. The program has not been going sufficiently long to show any long-term trends in repayment rates. The difference between those for 1969/70 and 1970/71 (97% and 79%) shows clearly that when a credit program of this sort is rapidly expanded the repayment rate falls. However, repayments are still being made for 1970/71, and the final rate will be over 80%. When compared with the BIMAS Gotong Rojong program, the Improved BIMAS program does confirm that controlled credit to individual farmers is more manageable than uncontrolled group credit, provided there is some basic infrastructure through which to channel it. However, a repayment rate of just over 80%, if sustained for a number of years and not improved upon, is unsatisfactorily low. With improvements in the efficiency of the village and mobile units, coupled with a higher level of administration of BRI as a result of the recent ADB loan (para 30) and later proposals (para 88), the prospects of improving the repayment rate are good.

42. The Rice Intensification Study estimated that the administrative cost of running the program for the year 1971 (8.7% of the loans made during the year) was above the income received from interest, and that to break even with an 80% recovery rate, either the loan volume needed to be doubled, or the interest rate increased from its present 1% to 1.75% monthly. Alternatively, if the loan volume was increased by 30% and the interest rate taken up to 1.5% monthly, breakeven would be reached. A more recent study by BRI in East Java, where the repayment rate is over 85%, suggests that in the same year, income about equalled administrative costs in that area.

43. The Study also contains rough estimates of farmers' loan repayment capacity based on harvested area, assuming ability, yields, loan, and family size were average. The results are given in Table 10. The average area financed in the 1970/71 wet season was 0.76 ha, which is almost at the top of the "doubtful" repayment capacity in this Table. Until more experience has been gained with the program, these estimates should be regarded as very tentative.

Table 10: ESTIMATED FARMERS' REPAYMENT  
CAPACITY AND FARM SIZE

<u>Harvested Area (ha)</u>	<u>Proportion of Farmers (%)</u>	<u>Repayment Capacity</u>
Below 0.50	45	Highly doubtful, unless cash living expenses and/or loan repayment funds come from off-farm income
0.50 to 0.85	19	Somewhat doubtful, but can repay if high yielding varieties planted and part of cash living expenses comes from off-farm income
over 0.85	36	Good, especially if high yielding varieties planted

Source: Rice Intensification Study

44. Conclusion. Without doubt one of the most important effects of the intensification programs has been that by the end of 1970, over 1.3 million rice farmers were receiving some credit through institutional sources; at least 10% of the estimated 12 million rice farmers in the country. This is an impressive achievement, considering that five years earlier only a few were receiving very limited credit through cooperatives, and has been accomplished through familiarizing farmers with improved planting techniques, and inducing them to adopt the techniques through much improved credit availability. BRI's village and mobile units show promise of becoming the most satisfactory of all the methods tried in bringing rural credit within reach of the majority of farmers. They are capable of providing credit for crops other than rice, and a pilot maize credit program is underway in East Java.

### Tree Crop Smallholders

45. Indonesian smallholders produce a variety of cash crops, the most important being, in order: rubber, coffee, copra, pepper and tobacco. In 1970, smallholder rubber was 30% by value of all agricultural exports. While government acknowledges the importance of the smallholder sub-sector, and accords high priority to its improvement, it is doing little or nothing in practical terms. Major constraints are the lack of planning, shortage of finance and the absence of an effective extension service.

46. The smallholder rubber sector (covering about 1 million families on about 1.6 million ha) lacks most forms of economic infrastructure, and is characterized by very small uneconomic sized farms producing low yields of poor quality rubber from overage trees. Farm gate rubber prices average between 30 and 45% of export prices, and incomes are insufficient to enable any direct reinvestments; as a result the sector is stagnating. The three key requirements for any improvement program are: (a) financial and technical assistance for planting, replanting and primary processing facilities; (b) the availability of additional land for smaller growers; and (c) better communications and marketing.

47. The importance of the smallholder sector to the agricultural economy is stressed in the main report as is the need to make an early start on its improvement. To this end, IDA has financed a smallholder development project in North Sumatra, which would assist about 18,000 landless laborers and small growers and their families. The project provides grants and credit for new plantings and replanting of rubber and oil palm and redistribution of 9,200 ha of land. The project will also improve the primary processing of their rubber through 800 local coagulating centers and provide technical assistance for infrastructure improvements, including extension. Estimated total cost is about US\$10 million equivalent.<sup>1/</sup>

48. While this project is IDA's first with Indonesian smallholders, and is thus to some extent exploratory, the financing and credit problems encountered are important in the context of the long term development of the smallholder sector, and the main considerations are brought out below. There are few alternatives to rubber that can be grown in the project area and return as high incomes per ha. Oil palm is the only likely alternative, and is at present financially profitable, but any major development program would require heavy investment in roads and processing. Coconuts, cocoa and cloves are possibilities. However, coconuts require too long a gestation period, cocoa requires more research, and cloves may already be approaching overproduction (Annex 15). Thus early improvement in farm incomes depends largely on improving smallholder rubber productivity.

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<sup>1/</sup> An IDA Credit (IND-358 for \$5.0 M North Sumatra Smallholder Development was approved by the Board in February 1973.

49. Raising smallholders' incomes requires direct government financial assistance, as these farmers are too poor to help themselves. One method would be to relieve their tax burden<sup>1/</sup>, but this would not help the smaller growers, since the relief would be insignificant compared with the cost of replanting. The alternative would be for government to provide funds for replanting, either through grants or credits.

Impact of Rural Credit

50. Most institutional funds for rural credit over the past five years have come from BRI. While records are incomplete, Table 11 gives the mission's estimate of the total loans made for rural credit over this period. Although the 1971 figures are not yet available, they are likely to be of the order of Rp 20 billion, somewhat below the 1970 figures, due to the change-over from the BIMAS Gotong Rojong to the Improved BIMAS program.

Table 11: ESTIMATED LOANS FOR RURAL CREDIT

	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>
	-----Rp billions-----				
<u>BRI</u>					
Cooperatives	0.3	0.5	1.0	5.5	3.7
Other Agricultural Production <sup>/1</sup>	<u>0.1</u>	<u>0.3</u>	<u>2.0</u>	<u>3.8</u>	<u>5.3</u>
Subtotal	0.4	0.8	3.0	9.3	9.0
<u>BIMAS All Sources</u> <sup>/2</sup>	0.2	1.5	2.0	14.3	11.2
<u>Other Credits</u> <sup>/3</sup>	<u>0.1</u>	<u>0.2</u>	<u>0.5</u>	<u>1.0</u>	<u>1.5</u>
<u>Total Rural Credit</u>	<u>0.7</u>	<u>2.5</u>	<u>5.5</u>	<u>24.6</u>	<u>21.7</u>
<u>Value of Rural Agricultural Production</u> <sup>/4</sup>	<u>n.a.</u>	<u>n.a.</u>	<u>950</u>	<u>1,210</u>	<u>1,580</u>
<u>Rural Credit as % of Rural Production</u>	<u>n.a.</u>	<u>n.a.</u>	<u>0.6</u>	<u>2.0</u>	<u>1.4</u>

<sup>/1</sup> Excludes BIMAS, Source: BRI

<sup>/2</sup> Includes BRI, Source: Table 6

<sup>/3</sup> Mission estimates

<sup>/4</sup> Source: Central Bureau of Statistics.

<sup>1/</sup> Smallholders are taxed on the area farmed and the value of crop produced. Rubber smallholders in North Sumatra currently pay taxes equivalent to about 30% of the FOB value of their rubber. Most of these are levied after the rubber leaves the farm, and are not included in the farm gate price (para 46).

51. As a percent of estimated value of total rural production, these figures are quite small, but nevertheless the totals show an encouraging improvement over the past five years. The peak figure of 2.0% of rural production in 1969 is mainly accounted for by the BIMAS Gotong Rojong program. The tentative estimate for 1971 is 1.3%, which is lower than 1969 and 1970, but nevertheless the outcome of a much more stable credit program. A comparison with some other selected countries is in Table 12. The figures for both Thailand and Malawi show that it is possible to double the impact of rural credit over four years, starting from a base about the same as that of Indonesia in 1970-71.

Table 12: RURAL CREDIT AS PERCENT RURAL PRODUCTION

	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>
Indonesia	n.a.	0.6	2.0	1.4
Thailand	1.3	2.3	2.6	2.8
Malawi	1.4	2.0	2.5	2.8
Zaire	n.a.	n.a.	n.a.	1.5

Source: Various IBRD Reports.

52. Although precise figures are not available, probably no more than 1.5 to 1.8 million Indonesian farmers received some institutional credit in 1971, or between 7 and 9% of the 20 million farming families in the country. This compares with 1970 figures of about 15% in Thailand, 3% in Malawi and 1-1/2% in Zaire.

53. The average value of loans made through the Improved BIMAS program is at present around 10 to 15% of the average value of production of the farmers receiving them. This is a much lower percentage than is general for rice production in some other countries, but is partly accounted for by the small size of farmers' plots, and the fact that the bulk of their harvest is required for consumption, with only a small share available for marketing to pay off any loan. This, in turn, restricts the size of loan which farmers can reasonably be expected to repay. The average value of loans outside the intensification programs is not known.

54. Prior to 1970, medium (1 to 5 years) and long term (over 5 years) loans were negligible. In 1970, of the estimated Rp 22 billion rural credit, less than Rp 3 billion, or under 15%, was medium term, and virtually none long term. Almost all of this came from BRI's medium term credit fund, started late in 1969, and has gone mainly to rice millers and hullers, and for small irrigation works (para 20).

### C. The Commercial Sector

#### Background

55. In this Annex the commercial sector includes both government and private agricultural enterprises, and agroindustries. Financial statistical data is fragmentary, so that systematic analysis is not always possible. Finance for production is frequently not completely separated from marketing (particularly loans for stockholding), and this again confuses the picture.

56. Estate production from both government-owned and private estates (mainly rubber, oil palm, sugar and tea) has contributed about 15 to 20% of export earnings in recent years, compared with about 60% prior to World War II. The decline has been due to many causes: war-time occupation, war of independence, internal conflicts, nationalization of foreign-owned estates, and shortage of funds for replanting, processing and machinery. Since 1968, government has taken positive steps to stabilize ownership and improve management. Some 90,000 ha of nationalized estates have been returned to their foreign owners, leaving government owning and managing some 475,000 ha (excluding 122,000 ha of pine forest). SOCFIN (Belgium) owns and manages jointly with government a 31,000 ha oil palm and rubber estate.

57. In 1968, the government estates were reorganized into 28 groups (known as PNPs) based on location, crop and size. Each has a Board of Directors, but the Minister of Agriculture retains important powers, including determination of major policy, and approval of budgets, financial statements, and senior staff appointments. Much of the improvement since the 1968 reorganization has been due to easing of financial restraints, previously imposed through heavy taxation and inflation, although poor management standards still remain the major factor limiting a faster rate of improvement. Some progress has been made toward reducing costs in some PNP's as a result of investments and technical assistance under IDA credits but the viability of each PNP has depended largely on commodity price levels. For example, in early 1972 PNP VI and VII were in a comfortable financial position due to high palm oil prices, whereas PNP IV and V were in financial difficulties due to low rubber prices. Government estates are financed from government resources, generally by long-term development loans at 12% annual interest, but in some recent IDA estate rehabilitation projects (para 78) part of government financing has been in equity.

58. Medium and long-term finance for private estates comes mainly from overseas sources, with some from government's Joint Financing Scheme (JFS) (para 64). Short-term financing for stocks comes mainly from the commercial banks. Rates of interest for longer-term finance from overseas are variable, and not known in detail. Short-term funds, from the commercial banks, are presently at 27% or above annually.

59. Agroindustries include the processing of rubber, oil palm, sugar, and tea, and this is largely done on the estates (Annex 8). There are also commercial fishing ventures, which are more fully described in Annex 10. Sawmilling and the processing of forestry products is discussed in Annex 11. No clear distinction is made in the financial statistics between agroindustries and other industries, so that it is not possible to obtain a clear picture of agroindustrial financing. Until recently there were no active specialized institutional sources for medium-term finance for industry, but the vacuum has been partly filled by the five state banks, and more recently by BAPINDO, with some funds coming from JFS. BRI lends medium-term for a few of the smaller rural operations. Again, nearly all of the funds provided have been at 12% annual interest.

#### Joint Financing Scheme (JFS)

60. Two of the major constraints to private commercial development (including estates and agroindustries) have been that until very recently, government regulations limited local loans to a maximum of five years, and did not allow local loans for financing permanent working capital. Although the JFS does not remove these constraints, it is making a useful contribution to private sector development, by providing medium-term loans for industry through the commercial banks. Before it was started in 1969 little institutional finance was available for the development needs of industry.

61. Under this scheme, borrowers contribute 25% of project costs and working capital, which is excluded from project costs. Prior to 1971, the remaining 75% came from three sources: (a) Bank Indonesia (about three-fifths) at 4% annual interest to the state banks; (b) the banks (about three-tenths) from their own resources; and (c) the balance (about one-tenth) by the government from budget allocations. Since 1971, Bank Indonesia has provided two-thirds, and the banks one-third. Priority has been given to projects for rehabilitation, modernization, and expansion, while the use of funds was restricted to the financing of fixed assets. Because of shortage of funds, the scheme is now restricted to new projects. Borrowers pay 12% annual interest, and repay over 5 years maximum.

62. Of the Rp 59 billion disbursed to June 30, 1971, 29% went to agriculture, and the balance to manufacturing (42%) and transport and tourism (29%). Table 13 shows the amounts outstanding at the end of the last three years. Agriculture's relative share has declined from 39% the end of 1969 to 25% at the end of 1971, although the amount outstanding had increased fivefold to almost Rp 18 billion. About three-fourths of the total has gone to the private sector, and about three-fifths has been used to finance imports. The scheme is relatively important, since in 1970, JFS estimated disbursements accounted for about half the total new investment in manufacturing for that year, despite the limitation of such loans to 5 years maximum. Participating banks are authorized to approve individual loans of up to Rp 100 million. Larger loans require

Bank Indonesia approval. Until recently these loans were linked to the US dollar, but they are no longer.

Table 13: INVESTMENT CREDITS THROUGH STATE BANKS

<u>Outstanding at end of year</u>	<u>1969</u>	<u>1970</u>	<u>1971</u> <sup>/1</sup>
	----Rp billions----		
Agriculture /2	3.6	11.6	17.9
Manufacturing	2.5	15.1	31.2
Communications & Tourism	2.7	12.9	20.8
Others	<u>0.4</u>	<u>0.8</u>	<u>0.9</u>
Total	<u>9.2</u>	<u>40.4</u>	<u>70.8</u>
Agriculture as % Total	<u>39</u>	<u>29</u>	<u>25</u>

/1 November 1971.

/2 Includes forestry and fisheries

Source: Bank Indonesia.

#### Development Loans Through the Banking System

63. To utilize foreign capital aid given on a government-to-government basis in the manufacturing sector, government has recently started a program called "Development Loans Through the Banking System" (DLBS), under which foreign exchange loans will be made available to state banks and BAPINDO to relend to the industrial sector for up to 12 years. Terms will be similar to those of the JFS, except that government has recently (January, 1972) stated the annual interest rate will be 9%, with the borrower bearing the exchange risk. Procurement in most cases is likely to be tied to the lending country, so that the scope of the program could be fairly limited, although it partially removes the 5-year lending restriction imposed by government.

64. A Japanese loan of ¥ 3.6 billion (about US\$10 million equivalent) should shortly become effective. Loans below about US\$275,000 will require Bank Indonesia approval, those above, the prior approval of Japan also.

#### BAPINDO

65. The Bank Pembangunan Indonesia (BAPINDO) was established in 1960 as a state-owned development bank, but did little development financing until 1968, when government allocated funds to it for lending to selected state enterprises. In April, 1969, it became a participant in JFS. In June, 1970, the government and IDA agreed on

a reorganization program. This involved appointing a new President, enlarging the Management Board, appointing four advisors, strengthening the financial structure, establishing a new charter, and adopting a firm policy statement.

66. BAPINDO expects to make new loan commitments of about Rp 41 billion in 1972 through 1975. These would include loans to small and medium sized enterprises, including agroindustries. IDA <sup>1/</sup> has recently (May, 1972) approved a project which would involve an IDA credit for about Rp 5 billion (US\$10 million) which should cover its foreign exchange requirements for 1972 and 1973. Loans to borrowers would be for a maximum of 15 years, and the annual interest rate would be a minimum of 9-1/4%, giving BAPINDO a minimum spread of 2% over the 7-1/4% at which the Government would on-lend the credit to BAPINDO.

67. Table 14 shows how past loans made by BAPINDO through JFS have been spent, by industries. The three sectors processing agricultural products received almost one half of the total.

Table 14: BAPINDO LOANS BY INDUSTRIAL CATEGORY

	<u>No. of Loans</u>	<u>Rp billion</u>
Pulp, paper and printing	8	0.2
Textile	26	2.8
Rubber processing	22	2.7
Others	<u>134</u>	<u>6.5</u>
Total	<u>190</u>	<u>12.2</u>

Source: IDA/DFCD from BAPINDO

#### Financial Statistics

68. Table 15 shows the amounts outstanding at each years' end of credit advanced by Bank Indonesia (mainly through rediscounts) through the state banks and to state enterprises direct, from 1967 through 1971. Except for sugar, this Table makes no distinction between advances for production and for marketing. With the exception of an advance to PN Pertani in 1971, to cover its losses on the BIMAS Gotong Rojong program, all advances are now through state banks. The proportion going to agriculture has remained at about one-fourth of total advances over the past four years.

1/ Appraisal of Bank Pembangunan Indonesia (BAPINDO): IDA Confidential Report No. DB-90a of May 8, 1972.

Table 15: BANK INDONESIA CREDIT FOR AGRICULTURE

	Outstanding at end of year				
	1967	1968	1969	1970	1971
	-----Rp billions-----				
<u>Through Commercial Banks</u>					
Sugar Production	3.1	6.5	7.0	7.8	11.0
Sugar Distribution	-	-	2.1	4.3	0.6
Estates	1.0	1.7	3.6	3.1	2.4
Fertilizer	0.3	1.4	17.9	17.1	12.8
BIMAS	-	1.6	2.6	4.6	8.1
Other Agriculture /1	-	-	5.8	6.8	6.7
Total Agriculture	4.4	11.2	39.0	43.7	41.6
All Other Credits	0.6	18.9	40.5	69.1	101.9
Total Commercial Banks	5.0	30.1	79.5	112.8	143.5
<u>Direct</u>					
Fertilizer	2.4	14.6	-	-	-
BIMAS Gotong Rojong (PN Pertani)	-	-	1.2	13.9	17.6
Total Agriculture	2.4	14.6	1.2	13.9	17.6
All Other Credits	9.7	47.2	86.2	82.9	86.1
Total Direct	12.1	61.8	87.4	96.8	103.7
<u>Summary</u>					
Agriculture Through Banks	4.4	11.2	39.0	43.7	41.6
Agriculture Direct	2.4	14.6	1.2	13.9	17.6
Total Agriculture	6.8	25.8	40.2	57.6	59.2
All Other Credits	10.3	66.1	126.7	152.0	188.0
Total Credit	17.1	91.9	166.9	209.6	247.2
<u>Ratio</u>					
Agriculture as % Total Credit	40	28	24	28	24

/1 Includes forestry and fisheries

Source: Bank Indonesia

69. Table 16 shows the foreign investment projects approved by government since 1967, but gives no indication of the estimated period of investment. The figures include rehabilitation of foreign-owned private estates. Of the high 1969 figure for forestry, US\$235 million was for a concession of 1.2 million ha to a Philippine firm (Sarianyo CIA), the investment to take place over 15 years. Over the whole period, agriculture's share of the total was about one quarter, including the large forestry project, or about one-seventh without it.

Table 16: APPROVED FOREIGN INVESTMENT PROJECTS<sup>/1</sup>

	No. of <sup>/2</sup> Projects	US\$ millions					Total 1967/71
		1967	1968	1969	1970	1971	
Agriculture	47	-	18	2	53	3	76
Forestry	56	6	68	286	33	12	405
Fisheries	12	7	4	1	8	4	24
Sector Total	115	13	90	289	93	19	505
Mining & Quarrying	14	140	157	327	75	79	778
Manufacturing	268	31	70	75	159	200	534
Other Sectors	69	8	14	39	26	65	151
Total all sectors	466	192	331	729	353	362	1,968
Agriculture Sector as % Total		7	27	40	26	5	26

<sup>/1</sup> Includes Indonesian share of investment (overall about 7%).

<sup>/2</sup> 1967 through 1971.

Source: Bank Indonesia and Foreign Investment Board.

70. The statistics give a breakdown of the above Table by investing countries. For the agricultural sector, this is shown in Table 17. The Indonesian share is about 6%, compared with about 7% for the total of approved investments.

Table 17: APPROVED FOREIGN AGRICULTURAL<sup>/1</sup> INVESTMENTS

	<u>US\$ ml</u>	<u>%</u>
Philippines	260	51
S. Korea	50	10
Japan	35	7
USA	31	6
<u>Indonesian share</u>	29	6
Malaysia	24	5
Hong Kong	20	4
United Kingdom	19	4
Others	<u>37</u>	<u>7</u>
<b>Total</b>	<u>505</u>	<u>100</u>

/1 Includes forestry and fisheries

Source: Bank Indonesia

#### Private Foreign Investment

71. Applications and approvals of foreign investments have not increased as rapidly as hoped, mainly because mining and forestry project approvals have declined, now that concessions cover most of the relevant areas. In part, however, this may reflect foreign investors' uncertainty over the future of the foreign investment policy, and the growing procedural difficulties and obstacles in reaching investment agreements. Policy doubts were increased by government's action in 1971 in banning 39 manufacturing activities and all distributing activities to foreign investors, and by the decree which practically forbids foreign accountants to practice in Indonesia.

72. Complete and systematic data on actual foreign investment is unavailable, as there is as yet no effective machinery for monitoring expenditures and the physical progress of planned projects. At the end of September, 1971, of the total of about US\$1.61 billion approved since 1967, only about US\$0.27 billion, or 17%, was reported to have been invested. Allowing for underreporting, however, the actual amount may have been of the order of 20 to 25%.

#### Domestic Investment

73. Most domestic investment is for expansion of existing enterprises, is of short duration, and does not require such large initial capital outlay as foreign investment. At the end of 1971, approved domestic investment since 1967 was estimated at about Rp 142 billion (or about one-third of total approved investment). Of this domestic

investment, about one-half was for locally produced fixed assets, one-third for imported capital equipment, and the balance for working capital. About 70% was in Java, the rest widely distributed throughout the other regions. A small part was for agroindustries, but the precise amount is not known. The shortage of loanable funds appears to be the main obstacle to a more rapid growth of private domestic investment.

#### D. Proposals for the Future

##### Rural Credit

74. The lack of long term, and the small amount of medium-term credit, are major shortcomings of the current rural credit programs. For the next few years, at least, the sector could absorb a minimum of 25% of annual loans as medium and long term. The medium term requirement is for small pumps, draft animals, and fishery equipment, in addition to the rice processing and irrigation works currently receiving such credit. The long term requirement is for on-farm improvements of various types, for smallholder rubber and other tree crop planting and replanting, and for fishery equipment. BRI's modernization project includes one consultant to strengthen the investment loans section and develop medium and long term credit programs, and this should help in formulating suitable strategies. However, it may be insufficient to meet the existing pent-up demand for such credit, while new smallholder replanting programs could increase the demand significantly. Proposals to meet it are discussed below.

75. The greatest impetus to rural credit over the past five years has come from the rice intensification programs, for which BRI has lately been responsible for the credit. This has meant a very rapid expansion of BRI's village and mobile units, with aggravated problems of organization and management. These are to some extent being remedied by the modernization project, with ADB assistance, but it is doubtful whether the project will go far enough and have sufficient impact on BRI's overall efficiency to enable BRI to meet adequately the country's rural credit requirements over the next decade.

76. It is essential that for the next year or two BRI consolidates its recent expansion, and the modernization project will materially assist this objective. The proposed mechanization of accounts at 126 of the 218 branches of BRI will mean that over 80% of all BRI business transactions will be processed much more efficiently, as will head office accounts. However, given the size and diversity of BRI's operation and the rapid growth of the organization, it is clear that there is a strong need for consolidation, rationalization and improvement of the overall organization and management of the Bank. An urgent requirement is an effective management information system to keep top management informed of problems as they occur. Also, the quality of existing personnel remains a serious constraint against improved

efficiency, and staff training is seriously deficient, particularly with regard to most intermediate and lower grades who need intensive training in banking, parallel with that given to machine operators.

77. BRI plans to expand the system of mobile units which have proved most effective in bringing credit to farmers but much needs to be done to make them more efficient. In the first place, the anticipated volume of business for the next few years is such that the units will generally serve 4 to 6 villages. This is expected to reduce overheads for the volume of business, and promote greater efficiency and profitability all round.

78. The position of the village headmen in relation to credit approvals needs to be looked at afresh, with the ultimate objective of making each credit transaction a private deal between BRI and the farmer, subject only to technical advice from the extension officer. Methods of improving the efficiency of loan repayments also require further study. The opening of new units outside the present rice intensification areas is essential for full coverage of rural credit facilities, and its phasing requires study. But, as a prerequisite to any improvement of these units, their staff will require intensive training, some upgrading, and admission to BRI's permanent staff. The problems of the village and mobile units need early specialist attention by a rural credit expert.

79. Finally, the long term development strategy for BRI is not clear and this needs special attention. A prerequisite is the rationalization of BRI's capital structure, at present being reviewed by government's special committee (para 22). Over half of BRI's business is currently commercial banking, with much of it outside agriculture. This is the most profitable section of its operations, and it is not suggested that it should be abandoned. 1/ However, longer-term agricultural development credit will undoubtedly become a much larger part of BRI's operations in the future. Also commercial banking needs to be developed at the village level, and in the longer term, village and mobile units could provide these facilities, while at the same time becoming an important channel for mobilization of rural savings. All these problems, together with an overall financing program, require early consideration.

80. In addition to its current modernization project, BRI thus requires an overall management study, an intensive staff training program, a study to determine how village and mobile units can best serve farmers' financial needs, and the formulation of a long-term development strategy.

#### Commercial Investment

81. Although private domestic investment, aided by tax incentives and JFS, has expanded rapidly, it remains only a small part of the total. Investment by government, government-owned enterprises, private foreign

1/ Bank Indonesia has recently instructed BRI to reduce its current investments in transport and tourism, and concentrate more on the agricultural sector.

sources and international agencies are in the aggregate far larger. Retained earnings of enterprises are limited, private savings mobilized through the banking system are growing but limited, and credit creation is primarily restricted by misgivings about its effect on the balance of payments. Although some government savings, derived from budget revenue surpluses, are being transferred through the banking system to state enterprises for investment, no other government budget transfers appear to have been made in the last two years, either through the JFS or elsewhere. In both the short and the long run, if domestic enterprises are to grow at a significant rate, such transfers need to be made, and to be augmented by foreign private and aid capital inflows. The reorganization of BAPINDO with IDA assistance, the government's request for further overseas government funds for DLBS, together with efforts to mobilize private domestic savings, are responses to these needs.

82. The main deterrents to increased private capital investment are presently:

- (a) the five-year maximum term for investment loans;
- (b) the interest rate structure;
- (c) the compulsory 25% cash contribution to fixed investment costs by the borrower, with no provision for permanent working capital; and
- (d) the requirement that for loans above about US\$100,000 feasibility studies be made at applicants' expense, and not included in project cost. <sup>1/</sup>

In spite of these, there is reportedly a large backlog of loan applications at state banks, mainly because of the concessional annual interest rate of 12%.

83. In its 1972/73 budget plans, government proposes to give higher priority to an expansion of private investment, by giving due consideration to working capital requirements, longer term lending, and a rationalized interest rate structure more in line with the scarcity of capital. Government also hopes that the total resources available for investment in enterprises will be significantly increased through greater program and project aid. These are desirable steps towards obtaining adequate funds for private investment. Unless they are taken soon, the rate of private commercial development in agriculture will be unnecessarily retarded.

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<sup>1/</sup> These studies are currently very costly (between Rp 0.6 and 1.3 million), and thus a significant part of project costs.

Interest Rates<sup>1/</sup>

84. With the interest rate structure now strongly positive in real terms, time deposits are still increasing rapidly, notwithstanding the 15% tax levy on interest earnings imposed in July, 1971, and they are currently supporting an expansion of lending by the banks. Until recently, commercial bank lending to private enterprises has been heavily supported by the government and Bank Indonesia through the JFS, with the banks contributing only 15-20% from their own resources, and obtaining the rest from government and Bank Indonesia at 4% a year, permitting a minimum 20% return on the banks' own share. The annual 12% rate to borrowers for medium-term loans is subsidized not only because the bulk of the funds is obtained at 4% (itself a subsidized rate under the present structure), but also because even after the latest rate changes in June, 1972, the average annual rate for most lending purposes is over 24%.

85. The interest rate structure remained largely unchanged, and the value of money remained relatively stable, from January, 1970 to June 1972, when the current rates were introduced. While the 1970 to 1972 structure has contributed to a remarkable increase in deposits, it had obvious defects, which have not been remedied by the recent change. Except for the BIMAS program (for which the rate is 12%), short-term funds for working capital are available only at high rates (24% and above), while the medium-term rate for capital equipment is subsidized at 12%, which is even now only two-thirds the rate obtainable on 12-month deposits. The current 12% rate for development loans is probably still too low when compared with rates for all other purposes, and may have to be raised (even if increased resources are made available for development), if the strong and growing demand for investment funds is to be balanced by the supply. Farmers borrowing under the BIMAS program presently obtain seasonal loans of 10 to 15% of the estimated value of their production, and an increase in the current 12% annual rate on these loans would not significantly affect their incomes, while it would reflect the scarcity of funds, as well as improve the profitability of the village and mobile units.

86. In January 1972, government issued a decree under which banks will be required to charge 9% annual interest on term loans using foreign aid funds with borrowers bearing the exchange risk. This compares with the proposed minimum of 9-1/4% under the proposed IDA Credit to BAPINDO (para 70). These rates may be regarded as special cases, as they relate

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1/ Subsequent to the drafting of this section, beginning in mid-1972 inflation has once more become a problem (see introduction to main report Vol. I) and real interest rates have become negative for the specially subsidized credits under BIMAS and investment credit schemes. Government is continuing to study the question of interest rates but must proceed cautiously in an open economy without foreign exchange controls since interest rate policy is an important determinant of capital flows affecting the country's overall balance of payments position.

to specific overseas loans, but they are lower than the more general 12% development rate, and may also have to be increased later to equate demand with supply.

LOAN INTEREST RATES CHARGED BY

STATE COMMERCIAL BANKS

-----All Rates in Percent per Year-----

<u>Effective Date of Rate:</u>	<u>Oct.</u> <u>1966</u>	<u>Feb.</u> <u>1967</u>	<u>July</u> <u>1967</u>	<u>Oct.</u> <u>1968</u>	<u>May</u> <u>1969</u>	<u>July</u> <u>1969</u>	<u>Sept.</u> <u>1969</u>	<u>Jan.</u> <u>1970</u>	<u>June</u> <u>1970</u>	<u>June</u> <u>1972</u>
Imports of fertilizer and PL 480 goods; and Government guaranteed credits					12	12	12	12	12	12
Production and distribution of 9 essential goods	90	78	36	36	30	27	27	27	27	24
Regional government development purchases				36	12	12	12	12	12	12
Textile production	90	78	36	36	30	27	27	27	27	24
Sugar production by PNPs								12	12	24
Production of other foodstuffs	72	78	36	60	48	36	30	30	30	24
Agriculture, animal husbandry and fisheries	90	78	36	48	30	27	27	27	27	24
Export commodities: Production	90	72	36	36	36	27	27	27	27	24
Export commodities: Collection	108	108	48	60	48	36	30	30	27	24
Public transportation, production of pharma- ceutical and other exports	90	48	36	48	36	30	30	30	30	24
Paper manufacture, handicrafts production of minerals and building materials	90	60	36	48	36	30	30	30	30	24
Other production	90	60	36	60	48	36	36	30	30	24
Tourism industries	108	84	48	60	36	30	30	30	30	24
Other	108	84	60	72	48-72	48-72	36-60	30-48	30-48	24-36

NOTE: Rediscount rates charged by Bank Indonesia to state commercial banks for any of the above purposes are half the above rates.

DEPOSIT INTEREST RATES PAID BY

STATE COMMERCIAL BANKS<sup>/1</sup>

		-----All Rates in Percent Per Year-----			
		Over	Over	Over	Over
		<u>1 month</u>	<u>3 months</u>	<u>6 months</u>	<u>1 year</u>
<u>Effective Date</u>					
1 April	1964	-	-	6	24
16 April	1967	-	36	-	-
1 July	1967	-	24	-	-
1 October	1968	18	48	60	72
17 March	1969	18	-	48	60
1 May	1969	12	24	36	48
10 July	1969	12	18	30	36
15 September	1969	12	18	24	30
1 January	1970	12	18	21	24
1 June	1972	9	12	15	18

<sup>/1</sup> On deposits of more than Rp 100,000. Smaller deposits (Rp 50 to Rp 100,000) are currently paid 18% irrespective of period of deposit.

BANK RAKJAT INDONESIA

SUMMARIZED BALANCE SHEETS

At December 31 Each Year

<u>ASSETS</u>	<u>1968</u> <sup>/1</sup>	<u>1969</u>	<u>1970</u>
	-----Rp billion-----		
<u>Current Assets</u>			
Cash on hand	2.18	4.14	4.41
Call deposits and loans	0.86	2.45	7.02
Securities (Govt. and other)	0.03	0.50	1.67
Receivables	<u>0.57</u>	<u>0.94</u>	<u>2.55</u>
Total	3.64	8.03	15.65
<u>Outstanding Loans</u> <sup>/2</sup>	6.80	37.64	49.05
<u>Fixed and Other Assets</u>	<u>0.34</u>	<u>1.03</u>	<u>1.86</u>
<u>Total Assets</u>	<u>10.78</u>	<u>46.70</u>	<u>66.56</u>
 <u>LIABILITIES</u>			
<u>Current Liabilities</u>			
Accounts payable	1.10	3.09	4.42
Demand deposits	5.93	12.94	24.24
Other	<u>0.17</u>	-	-
Total	7.20	16.03	28.66
<u>Fixed Deposits and Savings</u>	0.86	3.90	6.22
<u>Bank Indonesia Borrowings</u>	3.08	26.55	30.91
<u>Capital</u> <sup>/3</sup>	(0.36)	-	-
<u>Reserves and Retained Earnings</u>	-	<u>0.22</u>	<u>0.77</u>
<u>Total Liabilities</u>	<u>10.78</u>	<u>46.70</u>	<u>66.56</u>

/1 BRI was formed on December 31, 1968.

/2. Less provisions for doubtful debts.

/3 BRI's authorized capital not paid in.

Source: BRI.

BANK RAKJAT INDONESIA

SUMMARIZED INCOME AND EXPENDITURE STATEMENTS

	<u>1968</u>	<u>1969</u>	<u>1970</u>
	-----Rp million-----		
<u>INCOME</u>			
Loan interest, provisions and other charges	2.19	6.92	8.76
Other income	<u>0.09</u>	<u>0.16</u>	<u>0.23</u>
Total Income	<u>2.28</u>	<u>7.08</u>	<u>9.00</u>
<u>EXPENDITURES</u>			
Interest on borrowings and deposits	0.50	2.89	3.79
Salaries and personnel charges	1.19	2.24	2.67
Administrative and general charges	0.40	0.80	1.22
Other expenses	<u>0.06</u>	<u>0.02</u>	<u>0.02</u>
Total Expenses	<u>2.15</u>	<u>5.94</u>	<u>7.70</u>
<u>OPERATING SURPLUS</u>	<u>0.13</u>	<u>1.14</u>	<u>1.31</u>
<u>PROVISIONS</u>			
Bad debts	0.17	0.33	0.33
Depreciation	0.01	0.04	0.15
Taxes	-	-	0.18
Losses	-	<u>0.55</u> <sup>/1</sup>	-
Total Provisions	<u>0.18</u>	<u>0.92</u>	<u>0.66</u>
<u>NET SURPLUS (LOSS)</u>	<u>(0.05)</u>	<u>0.23</u>	<u>0.65</u>

/1 Incurred in transactions prior to BRI formation.

Note: Differences between columns and totals due to rounding.

Source: BRI.

INDONESIA

AGRICULTURAL SECTOR SURVEY

MARKETING AND PRICES

A. Introduction <sup>1/</sup>

1. The marketing system in Indonesia, at least for rice, has been the subject of several recent detailed studies. <sup>2/</sup> Nevertheless, much of the economic essence of agricultural product marketing in Indonesia remains obscure. What are actual marketing margins? Are they reasonable? How do merchants and mills actually interact with BULOG (the Government purchasing agency)? What are the actual (official and unofficial) costs involved in marketing? What are the actual prices paid and received by farmers? What are the production costs on different farms in different areas? The available studies throw some light on these questions, but not enough to provide confident answers.

2. Three factors make it very difficult to come to grips with the marketing system: (a) a great portion of the commodities in Indonesia either do not move off the farm or its movements are not recorded; (b) the Government has for decades pursued an interventionist policy toward agricultural product prices especially for rice, but the actual extent of this influence has never been clear; and (c) between the vague world of "subsistence" farming and the government marketing institutions, of which BULOG is only the latest of many, the marketing operations of a multiplicity of large and small merchants and others are not clearly defined or understood. Markets operate in every nook and cranny of Indonesia life. Virtually everybody is involved to some degree in the market, and both farmers and consumers in Indonesia appear highly responsive to market forces. However, confidence in the marketing process is not widespread.

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<sup>1/</sup> This section was written prior to the rice crises of 1972/73 which became apparent in July/August 1972. The sharp increase in rice prices beginning in August 1972 has been discussed in the introduction to the main report. This Annex has not been changed substantially except for paragraphs in Section B and the addition of Section F.

<sup>2/</sup> The most relevant are Rice Marketing in the Republic of Indonesia (RMRI) (Mears, 1961), Study of Rice Marketing in Indonesia, (SRMI) (Asian Development Bank, 1967), Rice Storage, Handling and Marketing (RMS), (Weitz-Hettlesater Engineers, 1972) and Rice Production Intensification Program Evaluation (RPIPE) (1972).

3. Since 1968, the Government has attempted to maintain a support farm price and a retail ceiling for milled rice in all parts of the country. Considering the large number of very small farms and the great seasonality of rice production, rice price stability was achieved in 1970 and 1971 with remarkably small transactions by the logistics agency (BULOG) in the domestic market. Success has been at least partly related to the larger output; the fact that only a small fraction (20 - 30%) of the total rice harvest is marketed; and the continued reliance by the logistic agency (BULOG) on rice imports, mostly for paying wages in kind to government and institutional employees and for deliveries to the military. It would appear that the amounts of rice needed to stabilize consumer prices have been relatively small.

4. Until August 1972, the nominal price of rice had been stabilized while the real price had declined. Other prices, as well as many agricultural produce prices had risen. Especially rapid relative increases in soybean, groundnut, coconut and livestock prices have developed, partly reflecting the lack of progress in agriculture outside of rice. From August 1972 domestic rice prices have risen sharply in line with increases in world cereal prices resulting from poor grain harvests throughout most of Asia and the U.S.S.R. Low levels of government held stocks necessitated increases in imports and market releases in an effort to dampen price rises.

5. Very little progress has been achieved in making Indonesia an integrated market for agricultural products, including rice. This is due largely to high transport costs and a multiplicity of levies unlawfully imposed, or arising naturally from deficiencies in the transportation system, especially in inter-island shipping as well as the high interest rates for financing working capital and trade. Sustained output increases in agriculture in a number of regions cannot be expected to occur unless some of the most immediate causes for lack of integration of the agricultural market are effectively dealt with. Measures urgently needed include greater freedom for trade in the private sector, elimination of the excessive charges and duties (official and unofficial) levied on goods movements, and reduction of the costs of transport through improved facilities and better management.

#### B. Rice Price Stabilization Policies

6. Historically, governments in Indonesia have followed a price policy aimed broadly at maintaining low and stable rice prices for the consumer while simultaneously safeguarding the real income of the farmer. The new Government retained much of the past policy, personnel, and organizational structure devoted to this end. The major change was to establish a floor price for rice of Rp 13.20/kg of dry stalk paddy, which was considered an incentive price for farmers when combined with subsidized fertilizer and credit, and maintain a retail price ceiling of Rp 50/kg of milled rice. The objective has been to maintain prices within these ranges in all parts of the country throughout the year.

7. At the farm level, this price is tied to the so called "Rumus Tani" -- the farmer's formula -- which equates the price of 1 kg of milled

rice at the farm gate to 1 kg of urea fertilizer delivered to the farmer. Since it takes roughly 2 kg of dry stalk paddy to make 1 kg of milled rice -- the customary conversion rate is 52% -- the price of milled rice at the farm gate is supposed to be maintained at Rp 26.40/kg, the price established for a kilo of fertilizer. To maintain the farm gate price, BULOG is supposed to stand ready to buy milled rice -- from rice mills -- at Rp 36/kg. The marketing margins of millers, upward and downward, are assumed to be such that this price converts to a retail price of Rp 42/kg in urban markets, and Rp 26.40/kg at farm gate.

8. BULOG does not attempt to maintain these price ratios for all rice qualities. It attempts to maintain the retail price of an "average" quality of rice at Rp 50/kg or less, but other varieties can reach higher levels. Thus, merchants can buy relatively better qualities of rice at close to the floor price for average qualities during harvest time, and sell them during patjeklik, the period of rice shortage just prior to the next harvest, at prices from Rp 3 - 5/kg above the ceiling. 1/

9. The studies mentioned earlier conclude that these government policies have been generally successful. Existing price data for urban and rural markets, and at the farm level, indicate that the desired price levels have been achieved and stabilized. These policies have been extended a fair share of credit for the rapid reduction of inflation by 1969, the rapid increase in rice production since 1968, and the stabilization of rice prices throughout the country from 1970 until mid-1972.

Table 1. SIZE OF FARM AND RELATIVE SHARE OF RICE AREA HARVESTED

<u>Average Size of Farm</u>	<u>Farms Harvesting Rice</u>		<u>Harvested Rice Area</u>	
	<u>Millions</u>	<u>Percent of</u>	<u>Million</u>	<u>Percent of Total</u>
<u>Hectares</u>				
0.5 or less	3.7	46.2	0.9	15.5
0.5 to 1.0	2.5	27.2	1.3	34.5
1.0 to 1.5	1.3	14.1	1.0	17.2
1.5 to 5	1.5	16.3	1.9	32.8
Total	9.2	100.0	5.8	100.0

10. A fundamental element in Indonesia's rice economy and its rice market, as well as the market for many other crops, is the extremely small size of the initial producing unit (Table 1) and the fact that a large proportion of the population produce rice as well as consume it. The result is that most rice moves only a short distance from producer to consumer. Aside from some movement from surplus areas to urban centers such as Jakarta and Surabaya, most rice is consumed in or near the village where it is produced.

1/ Rms, p. 257.

11. Although rice is grown throughout the year, seasonality of production is marked --- 52% of the area is harvested during the months of April, May and June. On Java, the main producing and consuming region, 58% of the area is harvested during these months, and almost 70% during March - July. In Sumatra, the harvest is bunched from January to June with even greater concentration within provinces. In Kalimantan the harvest is concentrated in the period February - June, except for South Kalimantan where it falls during June - October. In Sulawesi the harvest is concentrated during May - September, and in most of the other islands during April and May. 1/

12. The seasonal price instability produced by the uneven supply of rice, and a more or less even demand throughout the year, has been a major concern of government rice policy, along with the wide regional and provincial variations produced by locational factors. In 1968, the average retail price of rice varied from a high of Rp 62.7/kg in Djakarta to a low of 26.2 in Kendari (Southeast Sulawesi). By 1970, the average annual price range between provinces had been narrowed from a high of Rp 55.5/kg to a low of about 40. Except for January and February, when the price in Djakarta was around Rp 58/kg, it held fairly stable at around Rp 45/kg in that city, and a similar evening-out of prices during the year was evident in most other cities. 2/ On the other hand, BULOG's policy of buying milled rice from millers has not eliminated substantial swings in the price received by farmers for unmilled rice. Indeed in some of the more isolated areas such as parts of South Sulawesi, prices have consistently fallen below the floor at harvest time.

The Badan Urusan Logistik (BULOG) <sup>3/</sup>

13. Much of the credit for stabilization has been attributed to the operations of BULOG, which is the agency responsible for most of the storage and movement of rice over long distances, and for maintaining the price floor and ceiling through its operations. The statistics on BULOG's activities indicate up to 1972 that this has involved relatively small purchases and sales of domestic rice.

14. Total procurements of rice were less than a million tons in 1969-70 (Table 2), which was less than the average over, say, the 1958-67 period. Only during 1968, when inflation was rampant and prices extremely unstable, did BULOG's domestic purchases account for a large share of the total rice it acquired. During 1969 and 1970, imports were the major source of procurement by BULOG. Domestic purchases in 1969 and 1970 -- presumably for the purpose of supporting farm prices -- were especially small, about 200,000 tons out of a production total reported to be near 12 million tons, of which some 20-30% is estimated to be marketed.

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1/ RMS, p. 85

2/ Rms, p. 115-117.

3/ National Logistics Body Provincial branch offices are known as DOLOG.

15. BULOG's injections into the market for the purpose of maintaining the retail price ceiling at 50 Rp/kg or less were also quite small, around 200,000 tons in 1969 and 1970 (Table 3). Most of the rice is used to provide partial wages in kind to military and civil service personnel, and to supply rice to estates and state enterprises.

16. The stabilization program was probably aided by confidence in the market that the Government would act to maintain the floor and ceiling price levels; this was reasonably successful in influencing private merchants and millers to operate within these margins. Most studies have concluded that the margins allowed by BULOG were wide enough provided that merchants are not expected to hold rice for long periods of time or ship rice for long distances. <sup>1/</sup>

**Table 2: BULOG PROCUREMENT, STOCKS, AND DISTRIBUTION OF RICE, 1968-1970 (000 TONS)**

	Beginning Stock	Imports	Domestic Purchases	Total Procurement	Total Available Supply	Distribution (including waste)	Ending Stock
1968	151	628	958	1,226	1,377	881	496
1969	496	604	206	810	1,307	1,045	262
1970 <sup>/1</sup>	261	542	217	759	1,021	709	312

<sup>/1</sup> January through July.

Source: Badan Urusan Logistik (BULOG), 25 Tahun Bergulat Bengan Butir<sup>2</sup> Beras, Lampiran 22, Sht. 1312/IX'70. RMS, p. 251.

**Table 3: RICE DISTRIBUTIONS BY BULOG, 1968-1970**

(000 Tons)

Year	Military & Civilian Personnel	Estates & State Enterprises	Private Outliers	Total Distributions
1968	697	28	80	805
1969	688	104	214	1,005
1970	420	100	188	709

Source: Badan Urusan Logistik, Djakarta, August 20, 1970. Rms, p. 235.

<sup>1/</sup> RMS, p. 151.

17. Most studies of Indonesia's rice marketing have concluded that BULOG should phase out its deliveries of rice to military and government personnel. <sup>1/</sup> This change seems clearly warranted. The relative stability of rice prices from 1969 to mid-1972 suggests that: (a) increased production had much to do with reducing the seasonal fluctuation in the rice supply; (b) quantities have been stored in a variety of ways -- on farms and by merchants -- in addition to what BULOG was able to store; (c) the demand pressures on rice may not have been as great as anticipated; and (d) the private trade must be accomplishing a large measure of the price-evening effect.

18. Although the quantities used specifically to support floor and ceiling prices were relatively small, BULOG's total purchases (including imports) and disbursements were large (Table 3). These large totals undoubtedly have had a sizable influence on price movements. To the extent that BULOG phases out its deliveries to military and government personnel and to institutions, a larger domestic market demand would gradually be generated. The private trade should be capable of providing for this demand, particularly if price and credit policies are *pari passu* made more flexible.

### C. Barriers to Internal Trade

19. At present, Indonesia appears to be not one, but many more or less self-contained markets. Partly, this results from inadequate and expensive surface and ocean transport. To a considerable degree, however, it is a result of provincial control over the movement of goods and of a variety of official and unofficial levies on those movements.

20. The IBRD Maritime Mission concluded: "Although the situation in the inter-island shipping business is most unsatisfactory, it is not yet a bottleneck in the economy; there is still spare capacity of ships and in ports" (Vol. 1, p. 2). But it also notes that:

"An analysis of the cost of each link in the transport chain reveals that the high cost of inter-island transport does not result from the high cost of ship transport as such, but from the unduly high cost of other links in the transport chain, particularly the high payments to the well organized forwarders who must use part of their receipts for paying so called 'invisibles'". (p. 3)

21. In February 1971, the Governor of East Java prohibited shipments of rice out of the province without prior permission and applied a provincial levy of Rp 1/kg on rice shipped out of East Java.

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<sup>1/</sup> RMS, p. xi.

"BULOG had already purchased 300,000 metric tons from East Java and shipped some of it to Djakarta, Medan, Palembang, etc. Thus the Governor was apprehensive that there would not be enough rice left for consumption during that patjeklik season. Provincial levies were abolished by Presidential Order, but still remain in effect in East Java, because the Central Government did not officially object within the three months' period after (it) was established." 1/

22. In conclusion, the RMS remarked that:

"The market for rice in Indonesia cannot become efficient, and marketing margins cannot be properly narrowed, until the numerous official and unofficial levies on the movement of rice from different provinces and kabupatens are abolished." 2/

23. Aside from these irregularities, transportation bottlenecks are unquestionably a very real constraint to internal marketing, regional specialization and integration of the country and the economy. A major constraint undoubtedly is the absence of an efficient and inexpensive inter-island shipping industry which would transport both goods and people promptly, regularly, and at low cost. Another factor appears to be that there is insufficient scope for the private sector to move people and goods. The shipping industry is essentially dominated by the government shipping firm of P. N. Pelni, and the cost of moving goods is made excessive by bribes and unlawful charges. Without an efficient shipping system and considerably improved marketing links, it is difficult to see how an island economy such as Indonesia can hope to become integrated, and it is difficult to think of Indonesian self-sufficiency in any other terms.

24. The separation of economic centers may account for the traditional import of some fraction of the country's rice needs. It may be cheaper, or the Government may find it easier, to import rice than to eliminate the barriers to trade among its islands and provinces, especially when concessional rice is available. The relatively small quantities of rice apparently needed by BULOG to stabilize prices, and the long standing imports of rice over decades, suggest that the demand for imported rice is limited to a relatively few, probably urban, markets such as Jakarta, which can be more easily and cheaply supplied through imports. It might even be the case in the future that some portion of the demand for rice should be supplied from imports. But the present impediments to domestic trade and the low present cost of concessional rice clearly distort the real cost relationships. If these impediments were eliminated, the prospects for more rapid growth in rice production, and the production of other crops as well, would be much brighter.

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1/ RMS, p. 240.

2/ RMS, pp. 274-5.

D. Prices

25. The fixing of rice prices at the farm and retail levels has significant production and consumption implications, not only for rice but for other crops as well. Although there are sizable month-to-month differences in the prices of many crops, there appears to have been a considerable upward movement in most farm product prices relative to that of rice since 1968 (Table 4).

26. Success of the stabilization effort for rice is clearly shown by the index movements. In fact, the real price of rice has fallen when compared to the average level of consumer prices. How much consumer prices have risen since 1968 is not clear. The official index shows an increase of 3.56% in 1968 and 2% in 1969, but several observers believe that the actual increases were appreciably higher. Cummings, for example, judged that they rose about 10% in 1970 and 5% during 1971. <sup>1/</sup>

Table 4: INDEX OF FOOD COMMODITY PRICES, RURAL MARKETS OF JAVA AND MADURA, 1968 - 71

<u>Commodity</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u> <sup>/1</sup>
Rice	100	93	107	100
Maize, mixed	100	106	103	113
Soybeans	100	149	138	157
Groundnuts, shelled	100	124	142	150
Cassava	100	86	111	101
Sweet potatoes	100	92	115	115
Coconuts, ripe, unshelled	100	147	146	171
Coconut oil	100	119	122	127
Eggs, hens	100	135	156	162
Buffalo meat	100	137	167	225
Fish	100	128	133	145

<sup>/1</sup> October.

Source: Biro Pusat Statistik, Indikator Ekonomi, January 1972.

27. Since 1968, it seems reasonably clear that the real price of rice in rural markets has fallen not only compared with the prices of other goods and services, but relative to most other crops. Livestock products, soybeans, groundnuts, and coconuts have risen sharply in price relative to 1968 and relative to rice, and the price of maize and sweetpotatoes has risen about 13%. Only the cassava price has remained fairly stable.

<sup>1/</sup> Cummings, Ralph, "Contribution of Three Recent Studies to Improve the Information Base on which to Plan the Rice Sector in Replita II", Jakarta, April 3, 1972, p. 10.

28. These movements reflect the relative stagnation in output of most crops except rice and increases in income over the past three or four years. They also demonstrate the strong demand for meat, livestock products and fish in rural markets, reflecting their high income elasticities. One would normally expect much stronger responses to such relative price movements. The thrust of government programs during 1968-71, which favored rice through subsidized credit (at 1% per month compared with 2.4-5% per month from other sources), subsidized fertilizer, and extension efforts, undoubtedly account for some of the absence of response to these price movements.

29. Relative price movements can be taken as an indication of real changes in the agricultural economy. For example, the upward movement in the price of soybeans, groundnuts, and coconuts and coconut oil suggests that all of these crops have good domestic market potential in addition to export possibilities, which reinforces the need to eliminate the restrictions on credit and inputs to them. The relatively slow growth in the price of maize tends to support the view that maize competes poorly with rice as a food, and underscores the need to consider it now as more of a feed and export crop. In general, it would appear that the only major commodity whose price has been stabilized has been rice, which was, of course, the Government's intention.

30. A somewhat different view of the same issue is provided by other indexes of food prices. One for the rural districts of Java and Madura indicates that since September 1966, the general index of food commodities has risen to 547 (Appendix 1). This is a drop from the peak of this index in December 1969 at 610 and 600 in January 1970. On the average, however, the index has remained fairly steady in 1970 and 1971, and confirms that the general movements in relative prices since 1968 were in some cases taking place before 1968, while others were not. The price of rice during 1971 remained, for the most part, well below the general index (around 480 compared with the general index of 550). Cassava, sweet potatoes and maize are also below the general index, whereas groundnuts, soybeans, coconuts and oil, eggs, meat and fish are all well above it. But the prices of eggs, meat, fish and maize all advanced less than the average index and less than rice from 1966 to 1968. Since then the price of rice has fallen, and livestock product prices have advanced faster than average prices.

31. The index of wholesale prices of farm crops in Jakarta indicates even stronger upward movements in the prices of some of these commodities (Appendix 2). In Jakarta, since 1968, rice has increased in price less than the general wholesale price index for farm crops, while all others, except potatoes, have moved up faster than the general index. During the first 10 months of 1971, whereas the price of rice declined, the prices of all other food crops rose sharply again excepting potatoes.

32. It may be that one objective of stabilization policy has been to produce an income transfer from the rice sector to other sectors, by allowing the real price of rice to fall. Consumers would benefit directly through lower real prices of the basic consumption goods and the economy

would benefit indirectly through relatively lower real wage costs. <sup>1/</sup> Maintaining the production incentive to farmers hinges on the belief that if the Rumus Tani is profitable now, it will continue to be so in the future. Thus, as long as inputs are subsidized so that 13.20 Rp/kg remained profitable price to farmers, they would continue to increase rice production.

33. The RMS argues that somewhat lower relative prices do not mean lower profits for rice farmers who adopt the new technology, assuming large enough yield increases. But farmers not able to achieve substantial yield increases, for various reasons, would "feel the full effect of the lower price". <sup>2/</sup>

#### E. A Framework For Price and Marketing Policy

34. Price policy must be recast in order to facilitate a more rapid achievement of the goals of national integration, regional specialization and domestic self-sufficiency in an increasingly competitive context both internally and externally. One of the principal flaws of present Government policy is probably the insistence on uniform producer and retail prices all over the country. The large differences in factor endowments, location, etc. in different regions and provinces, and the production results of the past few years, all suggest that production costs and growth possibilities differ considerably among provinces. In a market-oriented economy prices ought to be allowed to reflect real resource costs, and these are clearly not the same all over the breadth and length of Indonesia.

#### Marketing of Products from Small Farms

35. The Rice Marketing Study produced a number of recommendations with respect to rice marketing. Some are rather general, others are highly specific with regard to matters of pricing. Initial reactions to these proposals are offered below. As a general recommendation, the study recommended that a training program be established to assure adequate manpower for operating new processing facilities and up-grading the management of existing ones. This program is held to be vitally important to the modernization of Indonesia's rice marketing system and an immediate start is recommended. It is not completely clear, however, what sort of training program is envisaged. The launching of a large classroom training program does not seem appropriate. Far more important is facilitating the talents and abilities already existing in the rice processing and marketing system to express themselves. Indonesia has been producing, milling and

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<sup>1/</sup> Afif and Timmer, Rice Policy in Indonesia, p. 23. The real question of who in the final analysis pays the subsidy remains unanswered in this explanation.

<sup>2/</sup> RMS, p. 337.

consuming rice for generations. The processes used may be less sophisticated than in some other countries, but it is inconceivable that capability in this area is seriously lacking. That it may be lacking in BULOG or in mills run by inexperienced millers is quite a different matter. More on-the-job type training would certainly contribute to a more efficient industry.

36. The study recommended that a marketing credit fund should be established to provide rice mill facilities with additional working capital; this fund would be set at a minimum level of US\$10 million in 1972, and increased to US\$20 million by 1975. Since credit is a major bottleneck in the ability of private merchants and millers to store and move rice, more credit is clearly desirable, and the recommendation is endorsed.

37. Establishment of a national marketing extension service was recommended by the rice study. This program was offered as a means of helping farmers as well as rice merchants and processors to solve their marketing problems, and to assist the introduction of other programs designed to improve Indonesia's grain marketing system. The establishment of a continuous, long-term research program in rice marketing was also recommended, with the first two to three years directed towards basic research. The initial work would be carried out jointly by Indonesian and foreign university personnel. Neither marketing extension nor research appear to be priority needs at the present time. The problem with the extension service now is that it is already too departmentalized, understaffed, and especially too poorly paid. Likewise, a long-term research program in rice marketing seems unnecessary. BULOG has already apparently been able to stabilize the market for rice to a surprising degree with relatively little buying and selling. If research in this area is needed, it should take the form of greater support for such activities in the existing universities. Also, a more active and viable private trade would likely develop an interest in market research since the possible benefits of such research would quickly become obvious.

38. The study concluded that BULOG should be allowed to discontinue the distribution of rice to some groups of Government employees during the next three years, in two phases aimed at decreasing distributed amounts by 20-30% by the end of 1974: the first step would be to discontinue distributions to Government enterprises and plantations; the second step would involve armed forces in areas where they have their own rice facilities. Furthermore, the price charged by BULOG for rice distributed to military and civil servants should be increased by Rp 1-2 per kilo. The only comment necessary is that BULOG should discontinue its distributions to employees and institutions as quickly as possible.

39. Another recommendation of the rice study is for the Government to take actions necessary to remove regional restrictions on rice movements and rice storage. This recommendation is strongly supported.

40. A further set of recommendations relate to improvement of crop and market reporting, and introduction of a grading system. The market news program would be expanded over a three-year period, with initial emphasis

on Java, South Sulawesi, North Sumatra, and West Sumatra, in that order. The crop reporting system would be expanded to include livestock, with more rapid reporting and an "outlook" section. The grading system for rice would be nationwide and uniform, with the development phase having a three-year planning horizon, and initial emphasis on a simple grading system that would be understood by farmers and be useful in market reporting. There is clearly a strong need for improving crop reporting and market information dissemination. The former is critical to any efficient rice market policy, and something must be done to eliminate the present confusion about how much of which crops are produced by whom.

41. A market news service is of limited use unless the market is allowed to operate reasonably efficiently. With increased private sector market participation, a program along the lines developed by the Philippines Bureau of Agriculture Economics should be of interest to Indonesia. A grading system would also be useful, but given the relatively small amount of rice that is marketed, and a well established consumer preference based on varieties, its potential impact would not seem to be large.

42. The rice study recommended that the floor price of rice (BULOG's farm support price) should be maintained at approximately the present level until 1973 (except for minor adjustments if the price of fertilizer should be changed); once self-sufficiency is reached, the floor price would be held at approximately CIF levels. A uniform floor price was also recommended as a security measure for farmers and to allow the open market to develop a set of regional and seasonal price differentials for better qualities and varieties of rice. The retail ceiling price would be increased Rp 2-4 per kilo and would also be kept uniform throughout the country.

43. This recommendation should be very carefully reconsidered. Such a policy can seriously distort both production and consumption patterns and in the long run contribute to perpetuate the present fragmentation of the economy.

44. Decisions about floor and ceiling prices should not be made rigidly. Since BULOG is apparently able to hold the floor and ceiling prices reasonably well now, it should adjust them according to an overall strategy with respect to rice and other crops devised by the Government, and influenced strongly by the market. The present lack of specific knowledge about consumer and producer behaviour suggests that equalizing supply and demand in Indonesia is likely to require considerable flexibility, and this should be effected through a flexible price system.

45. Several good proposals exist for a more flexible system of rice prices. There are four essential characteristics. First, the maintenance of prices in different regions, provinces and islands to stimulate the desired level of production, storage and movement of rice to satisfy the total Indonesian demand. Second, the establishment and maintenance of retail and producer price norms based on relative costs and returns by the uncertainties that have given rise to market manipulations in the past; and fourth, an organization designed to inject into or extract from the market sufficient quantities of rice to maintain reasonable price levels throughout the country.

46. To assist the Indonesian Government in developing and implementing a workable system on flexible prices, the following are needed;

- (a) technical assistance to develop the most workable system from the existing alternatives;
- (b) technical assistance and support to carry out - through the existing universities and the agro-economic survey - a series of production and marketing surveys to provide accurate information on relative production and marketing costs in at least key provinces; and
- (c) technical assistance and support in developing, from the information provided in (b), a system of prices which will produce reasonable levels of production and reasonable price stability through the flow of goods among provinces and islands to maximize the advantages of low cost production.

47. Where the existing transport costs are out of line with the most economic pattern - for reasons which can be economically corrected - priority should be placed on the key areas, especially improvement of shipping, roads and trucks. Serious consideration should be given to strategic subsidies in priority areas until transport improvements can be made. Within the context of such a system, decisions about the kinds of milling facilities and storage capacity needed - and whether they should be built by the Government or private firms - can be much more appropriately made within a longer run context of economic integration for all Indonesia.

48. Too narrow a focus on rice is likely to distort both crop production and consumption patterns. Serious and complete marketing studies should be undertaken for other major agricultural commodities as soon as possible, utilizing the Agro-Economic Survey framework and the existing universities, and the active participation of consultants in the field. In contrast to many recent studies, the focus should not be the mechanics of marketing and physical structures, but the existing marketing system and the actual costs involved. Special emphasis should be given to smallholder crops. At present, lack of accurate information about these crops, and the actual costs involved in their production and marketing, impedes any serious consideration of where significant improvements can be made in the marketing chain.

49. Since August 1972, the rice picture has changed throughout the world. International prices have increased by 50% in a short period in response to poor cereal crops throughout Asia and massive grain purchases by China and the U.S.S.R. Domestic rice prices in Indonesia have followed this pattern and government has announced an increase in producer price for the 1972/73 crop. With short government stocks, and a poor dry season crop rice imports and government releases into the market have been sharply increased in an effort to dampen price rises. The most recent indications are that the world rice and grain interaction can be expected to continue to be tight at least until the fall of 1973. This is likely to keep Indonesia rice prices

well above the floor and may provide an opportunity to reduce fertilizer subsidies and eliminate the special subsidized treatment rice producers have been receiving with reference to credit and input supplies.

50. The present situation is not unlike 1966-67 when bad crops on the Indian subcontinent resulted in sharp price rises which generated output increases and a subsequent gradual decline in the relative price of rice. The policy suggestions indicated above are still valid and the present temporary situation should not affect the longer term objectives in the marketing and pricing field.

#### F. A Postscript - Developments in 1973 and their Implications

51. Since this Annex was written and revised in December 1972, the "rice crisis" has continued and the situation was further complicated by major currency realignments, inflation both in Indonesia and abroad, a boom in prices of other crops and sharp increases in the cost of fertilizers, pesticides as well as construction materials and capital goods.

52. With regard to rice marketing, the sharp increase in rice imports initiated in the second half of 1972 continued through 1973 and BULOG injections into the principal urban markets continued into May and June well into the period when the main wet season crop should have brought prices down. In retrospect, this was probably due to the late planting and harvesting of the 1972/73 wet season crop since Government has subsequently been able to virtually stop injections without appreciable price increases. The situation may also have been affected by abortive attempts on the part of Government to use the recently expanded BUUD system (cooperatives covering 4-6 villages) to meet BULOG's procurement target. Government purchase prices were successively increased from the equivalent of Rp. 13.20 per kg. for dry stalk paddy (Rp. 36 per kg for rice) to Rp. 21.20 per kg. for dry stalk paddy (Rp. 52.50 per kg. for BUUD's and Rp. 52 per kg. for others) but except in some localized surplus areas, free market prices were well above the support level and BULOG was not able to meet its procurement targets.

53. Fortunately the 1973 rice crop (1972/73 wet season and 1973 dry season) now appears to be a record crop - better than the record 1971 crop and considerably greater than the poor 1972 crop which precipitated the rice crisis. In addition to more favorable weather, the intensification and expansion of Government's BIMAS program for rice was undoubtedly strongly reenforced by the high rice prices prevailing throughout the country. The relatively large crop and favorable prices for most agricultural commodities permitted farmers to meet urgent cash requirements with a smaller proportion of their crop probably resulting in some increase in on-farm stocks. This is not surprising since Indonesian farmers normally hold any savings which may emerge in the form of paddy. This probably means that farmers did share in the higher rice prices except where they felt obligated to sell to BULOG through the BUUD's at the government purchase price.

54. Insofar as BULOG's performance is concerned, they demonstrated a reasonable capacity to keep track of the market situation and to release rice into urban markets as required. On the domestic procurement side, they have not really been tested since the Government purchase price remained generally lower than the market price. It would appear, however, that deficiencies which showed up in early 1972 with regard to failure to purchase surpluses in South Sulawesi may indicate that BULOG does not have the storage capacity, and resources to effectively carry out its price support role if any substantial surpluses were to emerge.

Table 5: PRICE INDEXES OF 12 FOOD ARTICLES IN THE RURAL DISTRICTS OF JAVA AND MADURA  
(September 1966 = 100)

Month	Rice	Maize, mixed	Soya beans	Groundnuts shelled	Cassava	Sweet potatoes	Coconut ripe, unshelled	Coconut Oil	Salt briquette	Hen's egg	Buffalo meat	Fish salted or dried	General
Average 1968	535	420	500	536	402	381	575	549	410	437	403	424	420
1969: December	633	599	704	780	476	477	766	668	904	692	618	563	610
Average 1969	461	445	702	670	352	355	744	654	836	607	552	547	478
1970: January	649	437	715	754	479	445	752	684	899	680	628	539	600
February	624	419	704	758	495	449	738	666	905	681	637	558	588
March	565	402	721	774	438	445	745	693	943	698	651	562	551
April	485	405	726	759	431	417	698	673	887	682	648	553	506
May	483	416	694	767	428	444	747	675	888	704	652	567	510
June	482	412	674	743	453	447	730	657	873	697	653	570	511
July	504	425	675	754	453	452	717	631	922	676	644	573	522
August	519	456	656	752	433	439	702	643	907	663	657	579	539
September	531	463	671	770	447	417	723	651	935	667	674	584	539
October	527	445	674	771	443	444	723	664	932	694	691	569	536
November	537	461	687	786	434	447	767	701	972	751	766	575	550
December	547	428	704	768	441	435	769	712	1029	768	796	586	553
Average 1970	538	431	692	763	448	440	734	671	924	697	675	568	541
1971: January	563	396	670	737	402	434	910	745	809	700	848	600	562
February	579	428	703	738	449	454	986	759	800	723	855	648	589
March	554	441	725	756	433	446	1002	752	803	749	862	697	580
April	492	458	757	767	437	446	963	733	793	738	861	701	549
May	479	460	830	784	434	451	1024	728	799	728	857	661	518
June	466	455	850	777	424	458	955	703	767	712	826	644	532
July	478	458	842	797	417	431	920	694	758	706	852	627	535
August	482	494	785	810	418	436	899	701	758	708	850	622	539
September	492	461	781	815	393	436	876	697	780	714	856	624	555
October	501	476	786	806	406	440	858	698	820	724	908	616	547

Source: BPS

Table 6: INDEX OF WHOLESALE PRICES OF FARM CROPS IN DJAKARTA  
(1967 = 100)

Month	Rice B II	Maize	Soya beans	Green pea	Groundnuts	Cassava roots	Sweet potatoes	Potatoes	General Index
Average 1968	238,8	224,1	214,6	216,7	229,4	206,2	257,2	193,6	196,3
Average 1969	183,9	324,8	298,8	293,8	282,2	239,6	299,0	225,0	206,6
1970: May	206,7	364,8	282,8	244,5	304,4	377,6	317,1	233,3	237,7
June	200,6	351,4	285,3	246,4	312,2	309,3	335,8	271,2	227,0
July	220,6	338,0	264,4	256,4	284,4	308,3	317,2	266,3	238,1
August	222,2	351,4	281,2	299,5	282,9	325,5	401,8	195,9	244,6
September	215,8	379,9	257,9	303,3	288,7	344,8	391,3	162,1	243,4
October	215,3	367,5	259,2	289,2	283,0	296,9	342,6	161,3	236,2
November	222,0	355,1	251,8	283,2	292,6	349,9	333,3	221,6	244,6
December	222,5	312,1	252,8	276,3	278,9	325,5	317,2	218,3	238,2
Average 1970	223,7	351,2	276,5	273,3	299,2	355,2	336,1	200,7	247,1
1971: January	236,2	302,8	262,0	255,9	276,8	377,6	354,5	177,9	252,8
February	242,8	311,2	300,3	296,4	288,0	332,3	401,8	169,2	256,9
March	223,0	342,4	298,7	371,8	301,4	402,1	444,1	162,6	253,4
April	205,5	356,4	312,4	361,3	306,2	349,0	359,5	155,1	235,6
May	198,2	358,1	356,2	329,2	307,8	351,6	347,7	165,0	231,7
June	193,2	377,8	362,2	324,5	311,1	411,5	391,3	187,3	236,6
July	195,3	355,6	341,8	331,3	325,4	380,7	512,7	197,5	236,5
August	199,5	343,9	331,7	349,8	338,7	396,9	475,9	191,7	239,0
September	196,5	366,4	322,3	332,0	340,5	499,5	527,0	194,3	249,1
October	204,3	346,3	311,6	312,4	330,4	479,2	563,9	238,2	251,1

Source: BPS

INDONESIA

AGRICULTURAL SECTOR SURVEY

AGRICULTURAL PROCESSING

A. Rice

Background

1. Only about one-fourth of the rice harvest moves into the marketing system each year, while surplus and deficit areas vary from year to year, depending on the harvest. These are important factors when considering milling and storage facilities. The recent Rice Study <sup>1/</sup> considers that the main surplus areas in the future will be North Sumatra, East Java, South Sulawesi, and South Kalimantan.

2. Some of the problems and difficulties of the rice processing industry arise from the harvesting and handling methods used in the field prior to milling. Mechanical harvesting and threshing methods are seldom employed. In Java the grain is harvested by cutting the individual stalks below the head with a small knife. These are then tied in bundles of between 5 kg and 7 kg and carried from the field to the farmer's house. Elsewhere the plant is cut close to the ground with a sickle, and threshed and sacked at once, in the field. There has been an increasing trend in the use of the sickle in East Java, where contract harvesting is increasing.

Drying

3. Drying takes various forms, and each has its advantages and disadvantages. In Java, the bundles of stalk paddy are sun dried, by spreading on mats, hanging on poles, or stacking. Shortage of drying space is sometimes a problem. On-farm threshing is done later, by poles or foot treading. Elsewhere, after threshing in the field, the paddy is sun dried on straw mats or any available pavement.

4. When paddy is sold, additional drying is done at the mill. This is frequently further sun drying, which is the least expensive in out-of-pocket costs. There is likely to be increased recognition by mill owners of the physical disadvantages and indirect cost of sun drying. Physical disadvantages include lower milling conversion rates, a higher proportion of broken and fines if rain interrupts drying. Also, uneven drying of stacks of stalk paddy results in yellow or brown milled rice ("stack burn").

1/ Weitz-Hettlesater Engineers; Rice Storage and Marketing Study; Economic and Engineering Aspects, Preliminary draft, December, 1971 (Referred to as the "Rice Study" throughout this Annex).

When the lower portion of the stack dries to the proper moisture content, the upper becomes too dry, resulting in an increased proportion of cracked grain ("sun cracking") in the milled rice. As consumers demand, and are able to pay for, better grades of rice, revenue losses from lower conversion ratios, stack burn, and sun cracking will increase.

5. As the popularity of higher-yielding varieties increases, farmers sell more grain to the mills, and as consumers demand better qualities of rice, mechanical drying will become increasingly necessary at the mills, although it would be too complicated and expensive for on-farm use, where sun drying will undoubtedly continue for many decades. Millers are interested in mechanical drying, but are unfamiliar with its advantages, and with the types of dryers most suitable for their needs. They state that the extra operating costs (around Rp 2/kg of paddy) and the lack of credit on acceptable terms are disincentives, although 75% of the installed cost of driers can be borrowed over five years at 12% annual interest (a subsidized rate) under the Government's Joint Financing Scheme (Annex 7). There are presently about 800 driers in the country, of which about 70% are in Java. It is unlikely that the widespread use of mechanical dryers will become necessary for at least the next decade.

#### Storage

6. The total storage capacity at rice mills, hullers, village godowns, private warehouses, and BULOG is currently estimated to be about 1.6 million tons of paddy. A breakdown by province is provided in Appendix 1. Assuming that paddy flows into commercial storage as it is harvested, and that it flows out fairly constantly throughout the year to retail markets, then the average unit used primarily for rice turns over its contents about three times a year.

7. Very little is known about the storage capacity of private mills. Those buying stalk paddy usually store it unthreshed on hard surfaced drying pads. In Java, a few of the larger mills have capacities of from 1,000 to 3,000 tons, partly open-air and the rest in godowns. The smaller mills probably average around 50 tons. Hullers average even less, probably around 20 tons. A rough estimate of the total capacity of millers and hullers is 0.4 million tons of paddy. There are numerous village godowns throughout the rice growing areas with capacities of from 5 to 10 tons of paddy, and their combined capacity is substantial. In some of the smaller villages, the godowns are more appropriately on-farm storage rather than part of the available capacity for the marketable surplus. Private warehouse operators and retail rice merchants also have some storage capacity.

8. BULOG is the largest single storage operator in the country, and is more fully described in Annex 8. It currently owns 86 godowns, and rents space in 385 others, to a total capacity of almost 1.0 million tons of milled rice. <sup>1/</sup> About 63% of this is in Java, and 7% in South Sulawesi.

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<sup>1/</sup> Storage capacity in terms of paddy is about 75% that of milled rice.

Milling

9. About three-fourths of all rice harvested is consumed within 50 km of where it was grown. Consequently, rice processing is widespread throughout the rice growing areas, and is largely hand pounding, custom milling, or milling for petty trade in nearby markets. Virtually all mills are privately owned. Their plant varies from crude machinery to the latest in compact mill design. The Ministry of Agriculture estimates for the quantities processed by the three main methods for 1962 through 1967 are given in Table 1, which shows that by far the largest proportion of the crop is hand pounded. However, over the past few years an increasing number of farmers have had their paddy processed by machine. <sup>1/</sup>

Table 1: RICE PROCESSING, 1962-1967<sup>1/</sup>

<u>Process</u>	<u>Amount of Crop</u>	<u>Average Yield</u>
	-----Percent-----	
Hand Pounding	85	63
Machine hulling, single stage	10	64
Commercial milling, multi stage	<u>5</u>	66
	100	

<sup>1/</sup> A subsequent study by the ADB agricultural credit specialist points out that between late 1969 and mid-1972 more than 6,000 rubber roller hullers were sold in Indonesia, increasing hulling capacity by more than 9,000 tons of paddy per hour as compared to the estimate of about 6,000 tons per hour total hulling capacity estimated to exist in Indonesia by the Rice Marketing Study.

Source: Ministry of Agriculture.

10. A typical mortar for hand pounding consists of two bowls carved in a wooden log, the large being used for threshing and the smaller for husking and polishing. The pestle used for both operations is a heavy wooden club. This crude machinery produces a mixture of broken, crushed, and completely pulverized kernels of extremely poor quality. The average worker produces around 800 grams an hour, and receives one-fifth of this as wages. In West Sumatra there are about 2,300 "Kintjir" water wheels, where the pounding is done by drop weights. Their average input is about 75 kg of paddy per hour, and their end-product quality is about the same as that from hand pounding.

<sup>1/</sup> A subsequent study by the ADB agricultural credit specialist points out that between late 1969 and mid-1972 more than 6,000 rubber roller hullers were sold in Indonesia, increasing hulling capacity by more than 9,000 tons of paddy per hour as compared to the estimate of about 6,000 tons per hour total hulling capacity estimated to exist in Indonesia by the Rice Marketing Study.

11. There are around 7,500 single stage hulling machines in operation. These simple machines, usually powered by a small diesel engine, comprise the first step in mechanization of rice processing. They consist of a local or foreign manufactured Engelberg-type huller, sometimes with a polisher and/or blower. They are frequently used for both husking and polishing, and require manual feeding. These machines are popular because the capital outlay is substantially less than for multi-stage commercial mills, but their end-product is no better than that from hand pounding, and their yield is lower than from commercial mills.

12. There are about 2,500 conventional multi-stage commercial mills in the country. Each consists of a thresher, husker, cleaner, and polisher, together with the necessary accessories, such as conveyors, elevators and blowers. Their average capacity is around 800 to 900 kg of rice an hour. Although investment is considerably greater than for a huller, the quality of polished rice produced is much better, the yield is higher, and the husks and bran can be separated, thus greatly improving the quality of the bran for livestock feed. Five or six modern integrated mills, with a capacity of 2 to 3 tons of rice per hour, have recently started operating in Java and South Sulawesi. At least two are joint Japanese-Indonesian ventures.

13. The current condition of many of the commercial mills is unsatisfactory. The machinery is generally old, and recovery rates are relatively low. Spare parts are expensive and difficult to obtain, and the standard of maintenance is poor. Factory layouts are frequently unsuitable. There is also an insufficiency of specialized technicians and skilled labor.

14. In the last decade, a small, compact, self-contained commercial mill, featuring rubber roll huskers, has become increasingly popular with small millers throughout the country. It was first imported from Japan, and is known as a "Japanese type" mill, although similar equipment has come from the UK, Germany, the Philippines and elsewhere. Its modular design permits the addition or deletion of equipment (e.g. paddy cleaner or pearler) in the processing train to suit the miller's trade requirements. These mills have capacities of from 200 to 650 kg of rice per hour. On the basis of sales by the main suppliers a sufficient number have sold to increase hulling capacity by 9,000 tons of paddy per hour during the period 1968-72, probably doubling existing capacity.

#### Modernization and Expansion

15. The consultants for the Rice Study were asked, inter alia, to prepare a development plan for the storage, handling, marketing and distribution of rice over the next decade. Their recommendations on the storage and processing side were based on the premise that there would be an increase in rice production of about 37% in 1975 over 1970, equivalent to about 8 million tons of paddy, which implies an average annual increase in production of 6.5%. This estimate does not appear to be reasonable; however, assuming the target rate of growth of rice production of 4.0% per

year for the development strategy recommended in this report (Vol. I, para 177), a 37% increase in rice production over 1970 would be achieved by 1978. The bulk of this increase would continue to be handled by the private millers, but the Study considers that a further 0.4 million tons paddy storage capacity would be required, as detailed in Table 2. Bulk terminals and satellites would account for about half the storage capacity, and four-fifths of the estimated total costs of US\$61.5 million equivalent. The units would have a combined milling capacity of almost 400 tons paddy/hour, and drying capacity of about 500. The bulk terminals would each have a milling capacity of 4 to 4.5 tons paddy/hour, and the bulk satellites 1 ton/hour. An alternative proposal in the Study would include more storage but less milling and drying capacity. The Study gives priority to construction in South Sulawesi and East Java.

Table 2: ESTIMATED NEW STORAGE BY 1978

	<u>Number</u>	<u>Paddy Capacity</u> <u>'000 tons</u>	<u>Share of Total Capacity</u> <u>%</u>	<u>Cost</u> <u>US\$ Million</u> <sup>/1</sup>
15,000 t bulk terminals	9	135	35	22.6
4,500 t bulk satellites	59	65	17	26.7
Japanese type mills with storage	122	92	24	11.1
Flat warehouses	<u>31</u>	<u>93</u>	<u>24</u>	<u>1.1</u>
<b>Total</b>	<u>221</u>	<u>385</u>	<u>100</u>	<u>61.5</u>

<sup>/1</sup> At US\$1 = Rp 380.

Source: Rice Study (for 1975).

16. In addition to the US\$61.5 million storage proposals above, the Study recommends a further US\$47.1 million be spent on complementary and supporting facilities, making a total cost of US\$108.6 million, as set out in Table 3. These facilities would include: (a) about 420 new flash/husker mills with polisher/pearlers to meet the increase in demand for small-scale custom milling; (b) about 1,200 new 1-ton and 4-ton trucks to meet the increased transportation demand; (c) replacement of about 2,500 hullers with Japanese type mills, and improvement of a further 600 huller mills; (d) a new working capital fund of US\$21.1 million in local currency to provide much-needed working capital for the milling industry (see Annex 7); and (e) governmental supporting programs in training, extension, technical services, market information, grading, and standardization.

Table 3: MODERNIZATION AND EXPANSION TO 1978

	<u>Foreign Exchange</u>	<u>Local</u>	<u>Total Cost</u>
	US\$ million /1		
Storage facilities (Table 2)	42.7	18.8	61.5
New flash/husker units	0.8	3.1	3.9
New trucks	5.1	-	5.1
Up-dating existing mills	7.3	1.7	9.0
Working capital fund	-	21.1	21.1
Supporting programs	8.0	-	8.0
<b>Total</b>	<b>63.9</b>	<b>44.7</b>	<b>108.6</b>

/1 At US\$ 1 = Rp 380.

Source: Rice Study (for 1975).

17. Under the supporting programs, Government would advise storage operators of methods of overcoming losses by birds, insects and rodents. BULOG would be urged to set up a program for repair of its own warehouses, and to insist on repair of rented storage.

18. With exception of the supporting programs, the Study envisages that all the expansion would be carried out by private enterprise. The general problems facing the financing of private enterprises in Indonesia, including agroindustries, are brought out in Annex 7,; the modernization and expansion of rice storage and milling would meet these same problems.

19. Most of BULOG's stocks are presently in milled rice, which begins to deteriorate after a few months in storage. Properly dried paddy, on the other hand, can be stored for a year or more. The Study suggests that year-to-year price stabilization would be better accomplished through storing paddy rather than rice, and proposes that BULOG should change over to paddy storage. This would be more in keeping with modern food grain storage practice, but would mean a relocation of BULOG's storage facilities closer to the rice growing areas, and the provision of sufficient processing capacity nearby for regular normal paddy withdrawals. The cost of this to BULOG has not been estimated.

### Conclusions

20. The levels of production and demand projected in the Rice Study for 1975 appear high. Furthermore, even if the terminal year is taken as 1978 rather than 1975, the proposed milling, storage and handling expansion program seems excessive in terms of Indonesia's projected needs. Since the field work done by the Rice Study, there has been a sharp increase in the number of rubber roller hullers and current needs are probably substantially lower than those estimated in the study. Moreover, the addition of rubber roller hullers to existing mills has probably improved the capacity to turn out higher quality rice. In any event, the milling and processing proposals

in the Rice Study may be more sophisticated than the present needs of Indonesia call for. Export quality rice milling does not appear to be a major need of Indonesia. Facilitating the availability of credit to the milling industry, and permitting it to play a more active part in rice marketing and movement could be expected to produce significant results without a major government effort to construct mills. There were also some other significant developments in the milling industry, such as the reported acquisition of 20 large mills for South Sulawesi, which were not explicitly dealt within the Rice Marketing Study.

### B. Rubber

#### Background

21. The primary processing of natural rubber as it comes from the tree in the form of latex did not change from the beginning of the century until after World War II. Basically the latex was coagulated, then passed through rollers to expel the liquid, then dried in smokehouses, and afterwards baled and exported. During the sixties, new processing methods were developed, which convert the latex into granular form by rapid, continuous, flow-line techniques. These processes will handle cup lump and other partially dried and solidified rubbers. In their final form the granules are compressed into solid blocks and packaged into polythene wrapped bales of about 34 kg each. The product is commonly called block of crumb rubber.

22. There are three basic processes; crumbling, pelletizing and granulating. The rubber is sold under a variety of names, and can be divided into groups according to technical specifications. There are several advantages of the processes. They take hours instead of days to process the latex; market acceptance is enhanced by the product's improved chemical and physical properties, thereby commanding a premium; the bales can be fed straight into end-product factory mixers without prior cutting or examination; and they are graded on technical instead of visual specifications, as in the past.

#### Smallholder Processing

23. Smallholder rubber, which comes mainly from Sumatra and Kalimantan, is invariably of low quality, largely because of primitive and improper coagulating procedures. Frequently smallholders cannot afford to buy the usual coagulant (formic acid), and so use any convenient acidic material, including banana stalks, or wait for the latex to coagulate naturally after some days. To hold the latex, they use either a shallow pan or scoop a hole in the ground, and pay little attention to cleanliness. This method produces a slab with a dry rubber content of around 40 to 50%, usually contaminated with dirt, sticks, stones, and other deleterious material. This contamination is removed by reworking the slab ("remilling" it) and converting the rubber into an exportable but low grade of crepe rubber mixed with better quality material into technically specified crumb rubber. Cup lump, scrap, and other rubber oddments are similarly remilled.

The remillers, who are private businessmen, obtain the smallholder rubber through a chain of middlemen, and export directly or through an agent.

24. Recognizing the need to increase the export volume of higher grade rubber, the Government sought to improve smallholder rubber quality by making finance available to the crumb rubber industry. In 1969 the Ministry of Industry imported machinery and equipment and supplied it through a licensing system on credit to entrepreneurs, some of whom were remillers. In the beginning, few private operators came forward for loans, as it was a new and untried process in Indonesia, so Government arbitrarily appointed and licensed some entrepreneurs. In three years, 83 licenses were issued, and 612 plants began operations. The licenses issued were sufficient to process around 430,000 tons of crumb rubber a year, compared with total annual exports of smallholder rubber of around 600,000 tons. Too many licenses were issued in some areas, leading to excess capacity. Consequently, the factories found themselves competing for the available scrap, and many were operating at a loss and had to close down. Also the creditworthiness of some licenses proved to be questionable. Early in 1972, the Minister decided that further licenses and credit would only be granted after much more rigorous and realistic preinvestment studies.

25. The scheme was formulated to process smallholder rubber as traditionally prepared. The quality and value of smallholder rubber can only be marginally improved if adulteration and spoilage has occurred before the rubber reaches the processing plant. Significant improvements and reduction of costs would require establishment or development of other means for preliminary processing by farmers to improve the quality of latex sheets or block rubber delivered to the plants.

26. Such projects could be started by selecting smallholder areas near good roads (all-weather, if possible) connected to existing plants, which should be able to handle latex as well as coagulated rubber. A small tank truck would visit groups of smallholders daily on a pre-arranged rotation, and collect primarily the latex, but also any scrap, cup lump, tree lace and other oddments as they occurred. The scheme is already operating on some PNPs with crumb rubber processing plants, but needs to be tried in a predominantly smallholder area. The recent IDA Project in North Sumatra includes a program to assist 16,000 smallholders to improve the primary processing of their rubber through 800 local coagulating centers.

#### National Estate Enterprises (PNPs <sup>1/</sup>)

27. Of the 28 government-owned estates (PNPs) 14 currently produce rubber on a total of about 225,000 ha. Efforts to rehabilitate estates started in 1966, following a FAO survey of the rubber sector which recommended inter alia, the establishment of crumb rubber plants at three selected national estates:

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<sup>1/</sup> PNP = Perusahaan Negara Perkebunan (National Enterprise).

- (a) PNP II, Tanjung Garbus, North Sumatra;
- (b) PNP V, Soengei Silau, North Sumatra;
- (c) PNP VI, Sukamaju, West Java.

28. PNP II: This enterprise includes eleven rubber estates of about 21,700 ha, and produced over 9,400 tons of rubber in 1969. The center of the complex is about 50 km from the port of Belawan. In March, 1971, the Asian Development Bank approved a loan of US\$7.4 million for rehabilitation of rubber and oil palm in this enterprise, including processing. <sup>1/</sup> Oil palm processing is discussed below. In early 1972, out of PNP II's eleven existing rubber processing units, only seven were currently operating. Of these, one unit (Tanjong Keliling) produces centrifugal (concentrated) latex, and the other six smoked sheet and crepes by conventional processes. Machinery and equipment are very old, most of it over 30 years. About three fourths are in urgent need of rehabilitation, and some buildings require repairs. ADB's estimated investment for rubber processing, 1971 through 1976, was US\$0.95 million, of which about 87% was foreign exchange. Crumb rubber will be mainly produced, but the concentrated latex plant will continue to operate.

29. A crumb rubber factory was constructed on one of PNP II's estates (Tanjung Garbua) with British aid, producing 10 tons per 24 hours. Cost was about US\$0.15 million. The factory is stated to be profitable selling crumb rubber at Rp 86/kg fob Belawan (early 1972).

30. PNP V: This enterprise covers 12 rubber estates of about 27,000 ha. It is included in the IDA North Sumatra Oil Palm and Rubber Rehabilitation Project (155-IND, June 1969, total IDA Credit US\$16.0 million). Prior to this project, production was mainly crepe, smoked sheet and concentrated latex, but after rehabilitation future processing will be concentrated on the three existing latex plants, while one existing pilot crumb plant will be enlarged (Sungei Purih), and two new crumb rubber plants will be constructed (Rambutan and Sungei Dadap). The cost of this, together with some enlargement of the three latex plants, improved storage tanks and quality control laboratory equipment, is about US\$0.90 million.

31. PNP VI: This enterprise covers eight rubber estates of about 29,000 ha, and produced 18,000 tons in 1969. Its crop is processed into sheet and crepe rubber in its own factories, by private sector remillers, and at a concentrated latex plant owned and operated by the Goodyear Company. This PNP is also included in the IDA project above (para 30). Provision is made in the project for conversion of two of the PNP's own factories to crumb rubber, as and when present arrangements with the private remillers and Goodyear became inadequate to process the increased crop, at a cost of up to US\$1 million.

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<sup>1/</sup> Asian Development Bank, Appraisal of North Sumatra Rubber and Oil Palm Project, Report No. IND: Ap-5, March, 1971.

32. Other PNPs: A number of comprehensive studies have been made of other rubber PNPs. In every case, processing to produce crumb rubber has been recommended.

#### Private Sector

33. This sector appears to have moved forward with the establishment of crumb rubber plants at a satisfactory rate, but there is no statistical data available to estimate the total private sector rubber processed by this method, nor the future trend rate.

#### Conclusions

34. An overhaul and expansion of rubber industry is an urgent necessity, including further rehabilitation of estates, but concentrating heavily on stimulating smallholder production and improving the processing and marketing of smallholder rubber.

35. In remote areas where marketing is difficult and preparation of the latex is poor, collection centers should be established, some of which could be mobile. Collective processing and marketing of ribbed smoked sheet would be especially effective in increasing the net return to farmers.

36. In the more accessible areas, particularly where block rubber factories have already been set up to process smallholder rubber, assistance should take the form of price incentives to growers to improve the quality of their rubber, or of developing an efficient latex collection, purchasing and delivery system.

37. Nucleus estates, owned or managed by foreign and local enterprises, should be developed which would provide both a source of improved clonal material and production methods and especially a processing and marketing outlet for smallholders.

### C. Sugar

#### Background

38. At the end of the 19th century, Indonesia was the world's second largest producer of sugar, after Cuba. At the end of World War II, cane area was only half of its immediate pre-war level, and post-war efforts to rehabilitate the industry have met with limited success. Sugar production is essentially in two forms; commercial sugar produced in factories of various sizes, and smallholder sugar produced in small, simple mills in crude, brown non-centrifuged form. Each of these products is sold in markets which are virtually separate from each other. At present, commercial production meets only about 95% of domestic demand for white sugar and from very meager statistics, brown sugar probably accounts for less than one-third of total production.

39. In 1970, IBRD retained a consortium of consultants to prepare a study of the sugar industry. Its principal objective was to prepare a 10-year program to enable Indonesia to meet its internal demand for sugar at the least cost of its economy. The consultants reported in March 1972, <sup>1/</sup> and their study is discussed below (para 46).

Present Situation

40. There are currently 55 commercial sugar mills in the country, of which 48 are state-owned, and seven owned by so-called private companies. Only one of these is entirely owned by private shareholders; the other six all have some state participation. Eight PNPs are concerned only with sugar, cultivating about 70,000 ha of the 125,000 ha total in 1971. Virtually all the cane is grown on Java, where all but one of the mills are located.

41. Estimated sugar production and consumption over the past six years are given in Table 4. Prior to 1966, Indonesia was a large exporter of sugar; in 1966 net sugar exports were down to about 4,000 tons. Since then imports have increased rapidly, reaching about 150,000 tons in 1971. For the four years 1966 through 1969, smallholder production was relatively constant, and averaged 28% of the total.

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<sup>1/</sup> The consortium was Tate and Lyle Technical Services Ltd., Bookers Agricultural and Technical Services Ltd., in association with the Economist Intelligence Unit. Their report is "Indonesian Sugar Study", March, 1972, referred to throughout this Annex as the "Sugar Study".

Table 4: ESTIMATED SUGAR PRODUCTION AND CONSUMPTION

	1966	1967	1968	1969	1970	1971
	-----('000 tons)-----					
<u>PRODUCTION</u>						
White sugar (factory grown)	558	616	556	670	642	na
" " (smallholder grown)	<u>47</u>	<u>44</u>	<u>45</u>	<u>62</u>	<u>73</u>	<u>na</u>
Total white sugar	605	660	601	732	715	833
Brown sugar (smallholder grown)	<u>193</u>	<u>206</u>	<u>158</u>	<u>223</u>	<u>na</u>	<u>na</u>
Total production	798	866	759	955	na	na
of which smallholder	<u>240</u>	<u>250</u>	<u>203</u>	<u>285</u>	<u>na</u>	<u>na</u>
<u>CONSUMPTION</u>						
White sugar	586	739	677	812	844	983
Brown Sugar /1	<u>193</u>	<u>206</u>	<u>158</u>	<u>223</u>	<u>na</u>	<u>na</u>
Total consumption	<u>779</u>	<u>945</u>	<u>835</u>	<u>1003</u>	<u>na</u>	<u>na</u>
<u>RATIOS</u> -----percent-----						
Production: white to total	75	76	79	77	na	na
" : smallholder to total	30	29	27	30	na	na
White production to white consumption	103	89	89	90	85	95
Total production to total consumption	<u>102</u>	<u>92</u>	<u>91</u>	<u>94</u>	<u>na</u>	<u>na</u>

/1 Assumes all consumed in year of manufacture.

Sources: Various tables in Sugar Study  
Central Bureau of Statistics and Directorate of Estates

42. By modern world standards, all but a few of the mills are small, but their operational efficiency is good, considering their size and the condition of the machinery. Nearly all mills were built 40 or more years ago, have had no major replacements, and have suffered from a lack of even routine maintenance since 1941. Indeed, it is a tribute to the skill and care of the staffs concerned that some of the mills can operate at all. The major requirement is for either large rehabilitation expenditures or complete rebuilding and replacement.

43. The average mill throughput is about 1,300 tons of cane by working day. Appendix 2 is a histogram showing the 1970 distribution by capacity of the mills, most of which produce between 5,000 and 15,000 tons of sugar each crop year. Appendix 3 is a histogram showing 1970 sales of each mill. The harvesting period is 112 days, which is relatively short, due to the lack of late-maturing varieties. The mills are thus unable to make full use of their capacity, and this is a major problem when considering future policy for the industry.

### By-Products

44. Molasses, the final residue after extraction of the crystallized sucrose, is produced in the ratio of about 365 tons per 1,000 tons of sugar of normal production grades. There are seven commercial distilleries in Java; two are attached to sugar mills, the rest are independent. Current annual molasses output is about 300,000 tons, of which 240,000 are exported and 60,000 tons used by distilleries.

45. Bagasse, the cane fiber remaining after extraction of the juice, is currently used as fuel for mill boilers and estate railway locomotives. It could be used as raw material for paper and hardboard manufacture if fuel oil were substitute in existing factory boilers and locomotives, but would probably only be economically possible if existing boilers were replaced by more efficient ones under rehabilitation plans.

### The Sugar Study

46. The main findings of the Sugar Study, insofar as they affect production, are given in the paragraphs which follow. As to whether, in the conditions of land scarcity in Java, it would be more advantageous to cease local production and import all Indonesian requirements from abroad, the Study recommends continued local production. The main reason is that cost/benefit calculations indicate the industry is at present making a sizeable profit on the basis of current market and administered prices, and if these are correct, and shadow prices used for foreign exchange and wages, the surplus actually increases. Future viability calculations were made using 1972 average costs and revenues, and adjusting these for social costs and benefits, and assuming: (a) that government sugar pricing policy will remain substantially as in 1971; and (b) that the free market price of international sugar will not be lower than late 1971 prices for the next 10 years. The Study concludes that the industry is capable of expanding sufficiently to meet anticipated consumption over the next 10 years at operating costs (including capital charges) not exceeding the probable average cost of importing sugar, and with net benefit to the national economy, and an increase in the total employment in the industry.

47. Calculations are based on an estimated production of 1.90 million tons in 1982. Of this total: 38% would be existing (1970) production; 11% would come from increased yield of 30% from existing areas; 30% would come from an extension of area near existing mills; 5% from production from new areas in Java, and 16% from production from new areas in the Outer Islands.

48. To meet this increase in production, investment in some new factories and rehabilitation and expansion of existing factories would be required. Improvement in mill extraction efficiency, whether by modification of current technical practices or by installing new equipment, is possible, but unlikely to add more than 3 or 4% to the total sugar currently extracted. The effective annual capacity of existing factories could be raised by lengthening the normal crop period, but this would require field research to develop suitable cane varieties.

49. The Study includes a detailed analysis of processing capacity requirements, and proposals covering the factories to be rehabilitated, expanded and consolidated, on the basis of the largest incremental sugar output for the basic necessary investment. The estimated capital cost of the whole 10-year program would be about Rp 235 billion (US\$566 million equivalent), and is detailed in Table 5. The study calculates that on completion of the program, the return on the new capital invested, after allowing for depreciation at 5%, would be of the order of 28%.

Table 5: ESTIMATED CAPITAL COST OF 10-YEAR SUGAR PROGRAM

	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
	-----Rp Billions-----		
Rehabilitation, expansion and consolidation of existing PNP's	46.7	93.9	140.6
Rehabilitation, etc. of private mills	5.7	11.5	17.2
Total rehabilitation, etc.	<u>52.4</u>	<u>105.4</u>	<u>157.8</u>
New units in Java	6.0	10.5	16.5
New units elsewhere	24.3	36.5	60.8
Total new units	<u>30.3</u>	<u>47.0</u>	<u>77.3</u>
Total capital cost	<u>82.7</u>	<u>152.4</u>	<u>235.1</u>
(Percent)	(35)	(65)	(100)

Source: Sugar Study.

50. In framing the 10-year program, the study took into consideration the availability and limitations of current engineering, planning, and managerial resources. The Study praises existing management for performing well under adverse circumstances in the past, with the admonition that there is still room for considerable improvement in the general organization and management of the industry.

51. The Study recommends the industry be reorganized to provide a central sugar corporation; exercising control over major finance, investment, research, and policy matters, but delegating full operating authority to the factory units through four intermediary executive groups in place of the existing 8 PNP's. The central corporation would be concerned solely with the production of sugar and its by-products, and would have no interest in any other estate crops. It would also be responsible for all major equipment purchases, to ensure technical suitability and, where possible, to encourage standardization. It should also ensure optimum use of existing machinery and equipment made available through factory closures.

52. The four intermediary executive groups would each be responsible, both technically and managerially, for the success of the state-owned factories under their control, whose annual production would be from around 250,000 to 400,000 tons. Units of this size are considered necessary to justify employment of a group of high calibre technologists and experts, who would advise on group field and factory operations. In turn, each group would delegate clearly defined operational responsibilities to individual

factory managements, to allow more scope for local initiative. Specific proposals are made for job responsibilities at various levels so as to define individual tasks and objectives; for instance, it is proposed one man should be personally responsible for factory operation (both milling and processing).

53. The Study recommends the private factories and the proposed new developments should be considered separately. Nothing should be done to frustrate the management initiative which is found in some private factories. However, in the interests of the industry as a whole, they should be subject to a degree of control by the proposed central sugar corporation, to ensure integration of their development plans into the overall policy for the industry. The new developments might best be undertaken by separate agencies, with access to overseas technical expertise and, possibly, capital, but subject to a degree of central control and coordination.

#### Summary

54. The Sugar Study is a complete appraisal of the needed improvements in the Indonesian sugar industry. The Study probably overestimates the growth in demand for sugar during this decade, and it gives undue weight to optimal natural growing conditions in its recommendations for expanded area. However, it provides for careful experimentation prior to expanding production in new areas.

55. The Study thoroughly analyzes the principal weak points of current growing methods: short term land leases which do not allow the practice of ratooning; high water table in many areas which while favorable for rice, are detrimental for cane growing; excessively high percentage of the land devoted to nurseries; poor quality of the cuttings; and heavy sugar losses due to pests and mosaic.

56. A first stage three year project is recommended in the Study, consisting of (a) major capital schemes at three locations -- Jatiroto and Pesantren (East Java) and Sragi (Central Java) -- (estimated costs Rp 21.9 billion); (b) general factory rehabilitation (Rp 7.1 billion); and (c) technical assistance (Rp 1.1 billion). Total estimated cost is Rp 30.1 billion (US\$72.3 million). The project has since been financed by IDA and ADB with some modifications. Major rehabilitation and expansion of existing facilities will probably be more economic than the establishment of new factories. The projects now provide for a more thorough rehabilitation and some expansion of six factories in addition to major rehabilitation and expansion of six factories (2 by ADB).

#### D. Vegetable Oils and Fats

##### Background

57. The more important oleaginous crops are oil palm fruit and kernels, coconuts, groundnuts, soybeans, sesame, castor seed; and rice bran. Palm

oil, palm kernels, and copra are mainly exported, while coconut oil leads domestic consumption. While the cultivation of these crops is diverse, their end-use is similar. Because of their importance to the economy, both government and external aid-giving institutions have given higher priority to rehabilitation and expansion of the principal oil-bearing crops. The current situation of the processing of the more important of them is discussed below.

### Oil Palm Products

58. Oil palm cultivation is exclusively a plantation industry, and confined to 6 PNPs, all in Sumatra. Total productive area is currently about 86,000 ha, of which more than three-fourths are on two PNPs. Production reached a peak of 227,000 tons of palm oil in 1938, declined to about half in the 1950s, and by 1970 almost regained the 1938 level. Yields are currently less than 2 tons per ha, a decline from about 3 tons in 1938, due mainly to policies imposed on the PNP's during the early 1960's. Yields are expected to improve to over 3 tons in the future. Table 6 gives basic data on the industry since 1965. Production has increased by over 40% during the 7-year period.

Table 6: PALM PRODUCTS, PRODUCTION AND EXPORT

<u>Production</u>	<u>Unit</u>	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>
Palm Oil	'000 t	157	174	174	188	189	214	226
Palm Kernels	"	33	35	35	40	42	48	52
<u>Export</u>								
Palm Oil (quantity)	'000t	126	176	133	152	179	101	na
" " (value)	\$m	27	33	24	20	23	29	na
Palm Kernels (quantity)	'000t	33	32	39 <sup>/1</sup>	37	43	28	26 <sup>/2</sup>

<sup>/1</sup> probably includes carry-over stocks.

<sup>/2</sup> first nine months.

Sources: Central Bureau of Statistics, and Ministry of Trade.

59. In 1969 and 1970, IDA approved two credits (155-IND and 194-IND) totalling US\$33 million for PNP oil palm and rubber rehabilitation in North Sumatra. These included rehabilitation of existing processing plant and the construction of new.

60. The Deli Tank Installation at the port of Belawan is the sole bulk shipping outlet for all palm oil exports, which are shipped to it from the 6 PNPs in railway tank wagons. This installation will shortly be unable to handle the increasing exports, expected for some years to come, and further tank storage and pumps are required at the port. Space around the installation is fully used, so that further storage may have to be at

some distance from the present installation, necessitating steam heated pipelines, and more powerful pumps. More railway tanks cars and diesel locomotives may also be required. Dredging at the present site would accommodate larger vessels at the present berths, if needed for bigger individual shipments. The feasibility of expanding present port facilities is currently under study.

### Palm Kernels

61. Output of kernels at the mills varies from 3% of the fresh fruit bunches from young trees to 4% from mature trees, giving a yield of between 600 to 800 kg/ha. In the past all kernels have been exported for oil extraction in other countries (Table 6), but a new 150 tons per day kernel processing plant should start operations in late 1972. This modern solvent extraction plant can process all of North Sumatra's current kernel output annually. 1/ It has no plans for refining any of its output, but intends to export it all as crude oil. At the time of the mission's visit (March, 1972), the management had not made any arrangements to sell the crude kernel oil or the by-product meal, and may need some professional marketing assistance to break into the overseas markets for these products.

62. Kernel oil is different from palm oil as an edible, having similar chemical and physical characteristics to coconut oil. If marketed in a well refined condition, it would be an acceptable substitute for coconut oil. Some palm oil is used by commercial vegetable oil products manufacturers (Unilever, Procter and Gamble, and local firms) for margarine and soaps. A new firm in North Sumatra is trying to introduce liquid refined palm oil and its heavy fraction as margarine in the domestic market, but without much success. Naturally pink, both the lighter liquid and heavier paste are insufficiently decolorized to make a product competitive with coconut oil, although the palm product is cheaper. 2/ The refiner could make a more acceptable product at little extra cost.

### Copra and Coconut Oil

63. Declining copra production, a marked domestic preference for coconut oil for food to the exclusion of all others, and an excessive consumption for soap making, have resulted in greatly reduced exports in recent years. The estimated annual domestic consumption of coconut oil is about 300,000 tons, of which the local 150 to 200 soapmakers use 200,000 tons.

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1/ Solvent extraction plants do not have the flexibility of expellers, and for economic results this factory should be operating continuously for up to 350 days a year. It could thus handle up to about 52,500 tons kernels a year compared with the 1965 through 1970 annual average production of 34,000 tons.

2/ Jakarta retail prices of refined oils were (March 1972): palm Rp 80/kg, coconut Rp 105-115/kg, and groundnut Rp 125/kg (Unilever quotations).

64. Most of the commercial oil expellers are in Sulawesi. Manado is the principal copra production area, with current output of around 360,000 tons. With the exception of Unilever, Procter and Gamble, and other large commercial extractors, most of the oil is produced in medium and small sized factories.

65. Copra cake is an important by-product. There are two firms in Surabaya that purchase cake from oil expellers, pelletize it, and ship in bulk to a single buyer in Europe, who distributes it for livestock feeding, largely to dairymen. One firm, which exported 180,000 tons in 1971, is installing a solvent extraction plant to de-oil the cake which has been purchased from oil mills that use expellers or mechanical pressers. The residual oil in the cake averages more than 5%, while some lots purchased have up to 10% residual oil. The capital invested should be repaid in a short time at the current price of coconut oil.

66. In August, 1971, the Minister of Trade issued policy proposals for improving the copra trade. Short-term suggestions included: (a) reduction of the copra rehabilitation tax from Rp 4 to Rp 1 per kg; (b) halving the cess to Rp 2.50 per kg; (c) elimination of the Surveyor's Report (costing Rp 150 per ton); (d) payment of transportation subsidies; and (e) construction of copra warehouses by the Government. The longer term suggestions included: (a) phasing out copra exports, permitting oil exports only; (b) reducing domestic coconut oil consumption by substituting animal fat and cheaper vegetable oils; and (d) encouraging investment in facilities for production of coconut oil, dessicated coconut and for processing shells and coir.

#### Groundnuts

67. Groundnut production has averaged over 400,000 tons over the past 5 years. The main production area is East Java, but the product is sub-standard both in kernel size and oil content. There is a strong domestic demand for this desirable oil, which in the refined state sells in Jakarta for Rp 125/kg, some Rp 10 to 15/kg above the price of coconut oil.

68. All oil is extracted by mechanical means. Most of the plants use either hydraulic or screw presses. The shelled and husked kernels are placed in baskets without prior preparation and the oil pressed out. The resulting "virgin" oil is used for cooking and direct consumption without further processing. The cake can be heat treated and repressed, giving an oil of poorer quality. Some of this is refined by commercial refiners and used for margarine manufacture, or sold as liquid oil.

#### Rice Bran Oil

69. The country's 20 million tons of paddy each year holds a large potential of valuable by-product; 160,000 tons of rice bran oil. This cannot at present be extracted, as the collection of the bran from all the small scattered mills would be impracticable as well as excessively expensive. Scale considerations suggest the minimum size for a bran extraction mill would be 100 tons bran per day for viable operation. This would require

about US\$400,000 in fixed capital and about US\$300,000 in working capital, and would produce annually about 4,000 tons of crude oil and 22,000 tons of defatted meal.

70. There is a solvent extraction plant in the Karawang area that has been operating since September, 1969. Its capacity is about 1.5 tons of bran/hour and extraction rate for crude oil, 14%. It pays Rp 5/kg fob mill for bran during the harvest, and up to Rp 10 during the off season. Intermittently, when bran is not available, it uses copra. It has not operated at full capacity, being unable to obtain sufficient bran and it is operating at a loss. It is located on a poorly maintained secondary road, and when a mission member attempted to visit it during the rainy season, the road was impassable to a passenger automobile.

#### Summary

71. The demand for fats and oils will continue to grow rapidly in Indonesia in the years ahead. It is not likely that either animal fats or palm oil will markedly reduce the demand for coconut oil in the foreseeable future. Therefore, improvements in small-scale processing facilities for coconuts are needed throughout the country, since it is a basic crop produced in most parts of the country exclusively by smallholders. Such improvements have been neglected, in part apparently, because of the interest in palm oil.

72. The modern solvent extraction plant in North Sumatra which is to start operating in late 1971 should be able to handle the crude oil processing requirements of the area for some time. Consideration should be given, however, to combining with this plant or establishing separately, refining equipment to convert crude to refined palm oil to improve both the exported product and the competitiveness of palm oil with coconut oil domestically.

73. Consideration should be given to improving and expanding the Deli Tank Station at the port of Belawan. It will shortly be unable to handle increased production in the region. Such expansion may include storage, dredging and other improved port facilities and transport equipment.

74. Technical assistance will be needed, not only in expanding and developing the facilities mentioned above, but also in assisting Indonesia to develop its export market for palm oil.

### E. Cotton

#### Background

75. The spinning industry in early 1972 comprised 18 mills with 380,000 spindles, and consumed about 97,000 bales of cotton in 1969, of which all but 1,000 were imported. Yarn from these mills is sold to hundreds of

weavers producing a wide range of fabrics. Total annual capacity of the estimated 250,000 hand looms is about 400 million meters, and of the 25,000 power looms about 115 million meters. Annual per capita consumption is about 7.5 meters. The industry contains well-equipped modern mills, as well as some old machinery. A 1967 USAID technical study considered the immediate need of the industry was to improve the quality of its output on its present equipment; only in few instances would updating or additional machinery be required. A follow-up USAID study in 1969 noted some improvement, both in plant upkeep and quality of output. Ownership of the mills is mixed, and includes the central and regional governments, cooperatives and private enterprise.

76. An increase in spinning capacity of 912,000 spindles (more than twice the present capacity) has been projected for 1975. This would consume around 410,000 bales of cotton, 101,000 of cellulose fiber and 166,000 of synthetics. Of the cotton requirements, 54% would be short staple (up to 1 inch), 42% medium (1 1/32 to 1 1/8 inches), and 4% long (Egyptian).

77. The industry is almost wholly dependent on imported cotton, which for some years has been supplied from the USA under PL 480. Government is currently considering a plan to expand cotton production, to compensate for the likely cessation of PL 480 imports.

#### East Java

78. Most cotton grown in Indonesia in the past has been of medium staple lengths. Cotton is currently grown on East Java, near Assambagus, where about 1,000 ha are under cultivation, and where yields of seed cotton are expected to be from 1.0 to 1.2 tons/ha. At a ginnery yield of 35%, this would be around 1.6 to 1.9 bales (of 220 kg net weight each) per ha.

79. A new modern ginnery has been built close to the Assambagus cultivation, capable of ginning 2.5 tons of seed cotton per hour. On the basis of a seed cotton yield of 1.0 tons/ha, the production from 1,000 ha could be ginned in 400 hours. Running at 20 hours per day, the ginnery could gin all the current production in 20 days. A normal ginning season in other countries is from 120 to 180 working days, so that for a start this ginnery will be working at around one-sixth to one-eighth of its capacity. Present seed cotton storage capacity is very limited. By the time cotton cultivation reaches 3,000 ha, further capacity will be required.

#### Lombok

80. Irrigated and rainfed cotton has been grown on Lombok since 1965. About 800 ha were planted in 1971. Cotton is currently being ginned on outdated machinery, and production is restricted by the size of the baling press. Since the planned area to be planted by 1975 is 6,000 ha, a more modern ginnery has been transferred from Sumbawa to Lombok. When installed and renovated, it is expected to have sufficient capacity to process the estimated output from the 6,000 ha.

Conclusions

81. Cotton cultivation is not at present on a commercial scale, and existing facilities are adequate for handling current and immediate future crops. Obviously if cultivation is expanded greatly, adequate ginning capacity, suitably located, will be required. A commercial size ginney, working 120 days at 20 hours per day could produce under Indonesian conditions about 30,000 bales a year. At a seed cotton production of 1.2 tons/ha it could process the output from 15,000 ha. Installed cost of such a ginney would be around US\$0.5 million.

82. At present the volume of cotton seeds, as a by-product of ginning, is insufficient to justify investment in crushing, extracting and refining plant. However, seed products (oil, meal, linters, and hulls) have a value as food, feed, and raw material for cellulose-based industries. Plant for processing seed should be planned concurrently with gineries when it becomes apparent that cotton seed production would justify the investment.

F. FibersBackground

83. Indonesia produces and exports about a dozen agricultural products which require fiber sacks. Sugar and rice producers are the major users. Coffee, copra, copra cake, pepper, spices, groundnuts, palm kernels and maize producers also use fiber sacks. A summary of sack usage since 1963 is given in Table 7. Estimated total sack consumption in 1975, at 34,500 tons, would be about a 50% increase over the annual 1967 through 1969 average of 23,400 tons. These figures refer to the first use of new sacks only, and do not cover the considerable re-use of used sacks throughout the country.

Table 7: SACK CONSUMPTION BY COMMODITIES

Commodity	Annual Average			
	1961-63	1964-66	1967-69	1975
	----- thousand tons -----			
Sugar	7.6	2.0	7.9	10.9
Rice	6.5	3.1	7.4	15.0
Coffee	2.3	2.9	3.4	3.5
Copra and cake	2.4	2.2	2.1	2.1
Others	2.1	2.1	2.6	3.0
Total	20.9	12.3	23.4	34.5

Source: Monthly Bulletin of Agricultural Economics and Statistics  
- FAO Vol. 20, June 1971.

84. Local sack production, which currently accounts for about a half of consumption, has been rising steadily, whereas imports have been somewhat

erratic. Most imports come from India, Pakistan and Thailand. Bulk handling facilities are non-existent at present, but a number of elevators and silos may be constructed by 1975 to handle government purchases. There is no data from which to determine their impact on the demand for sacks.

### Local Production

85. Local manufacture comes from three factories, all owned and operated by PNP XVII, and all on Java. The raw material is rosella, eastern hemisphere kenaf (*hibiscus sabdariffa*), grown by the PNP currently on about 6,750 ha. Production has increased from an annual average of 4,500 tons in 1961-63 to 15,000 tons in 1968-70. Yields range from 2.5 to 4.0 tons/ha of dry retted fiber, which is of fairly good quality.

86. The three mills have a combined capacity of 272 looms, whereas under current practice in Thailand and India, the average size of an economic mill would be around 500 looms. Working three shifts, only about half the total installed capacity is at present in use, partly because of a shortage of spare parts, which are either locally made or imported. These are required for overdue renewals and maintenance. The cost of the fiber is high, mainly due to heavy debt servicing charges by PNP XVII. Processing costs are high, partly due to low mill productivity. The man-hours required for one sack vary from 1.28 to 2.25 at the three mills, and these are exceptionally high. The waste factor of 14% (fiber to bag) is about twice the normal. High fiber cost at mill gate, excessive fiber waste, and low productivity indicate a need for improvement in mill efficiency, to lower the cost per bag.

87. A summary of the average cost per bag at the three mills in 1969 is given in Table 8. These figures compare with an average landed cost of about Rp 113 for an imported jute bag.

Table 8: 1969 AVERAGE COST PER BAG  
(Rp)

<u>Mill</u>	<u>Delaggi</u>	<u>Surabaja</u>	<u>Petjangan</u>
Processing	22	23	17
Fiber	86	95	87
Contingencies	<u>1</u>	<u>2</u>	<u>1</u>
TOTAL	110	120	105

Source: PNP XVII

### Other packaging materials

88. Other materials are also used for packaging. These include grass matting for salt and exported tobacco, and multiwall paper bags for fertilizer and cement. None of these are likely to be replaced by fiber bags.

### Synthetic Bag Production

89. Synthetic bag production started at a single factory in 1967, and in 1969 it produced about 2 million bags from an import of about 1,500 tons of polypropylene polymer. They sold in the local market in competition with local rosella bags at about Rp 112 average, and imported jute bags at Rp 113. However, output is largely absorbed by Pertamina's imported fertilizer bulk-breaking plant, leaving only a small number to compete with rosella sacks.

90. The imported polymer for this factory should be substituted by locally produced polymer in 1973. This should be cheaper, and should strengthen the competitiveness of synthetic sacks in the local market. However, to replace the natural fiber product, some consumer resistance in the rice and sugar markets would have to be overcome, chiefly because of the high re-use value of the natural fiber sacks. Moreover, much of the local polymer output is planned for textile manufacture, and for production of fertilizer bags, leaving comparatively little left over for the rest of the bag market.

### Conclusions

91. Production of rosella could be increased to meet the projected requirement of 34,500 tons of new sacks in 1975. On the basis of 1970 average yields of 2.27 tons/ha, a total of 15,500 ha would be required for cultivation, or about 8,800 ha more than at present, assuming some improvement in mill productivity. To what extent smallholders could be brought in through credit programs to provide some of the increased fiber, it is difficult to say, due to the lack of data, but the possibility should be studied.

92. However, some of the increased production may be met from two new mills at present in the planning stage. One would be in East Java, and set up by Indonesian and Japanese interests, producing ultimately 18 million sacks a year from its own rosella cultivation. The second reportedly would be with Pakistani interests, but its capacity is not yet known.

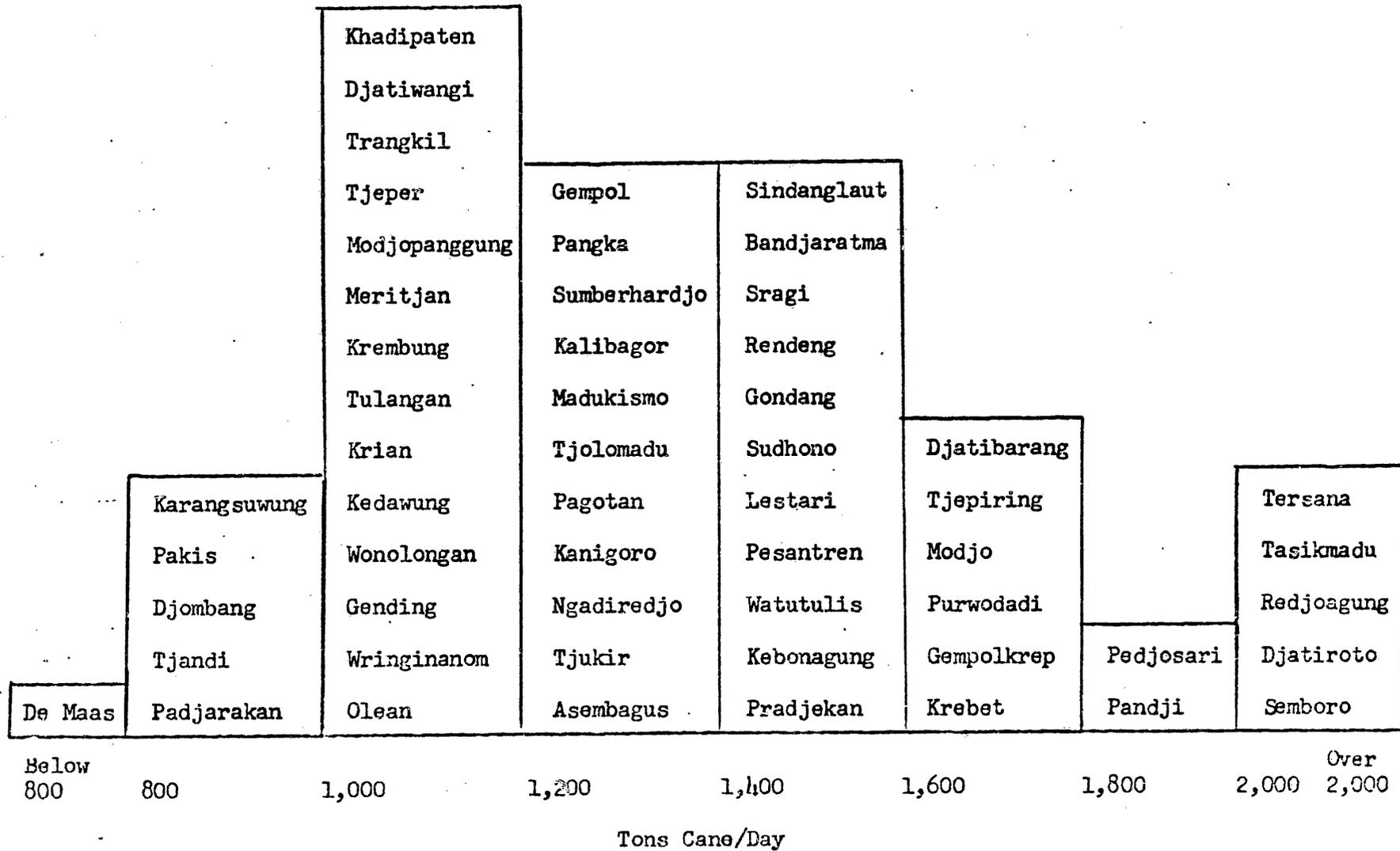
93. As to the existing three mills, funds to purchase urgently required spare parts and to replace certain obsolescent machines is required before mill efficiency can be improved. The mills should also be expanded to bring them up to economic size, each to produce at least 6,800 tons of sacks a year. A study would be necessary before the cost could be estimated. It seems also PNP XVII's financial structure would require some adjustment.

## EXISTING WAREHOUSE AND GODOWN STORAGE, BY PROVINCE

INDONESIA, 1971

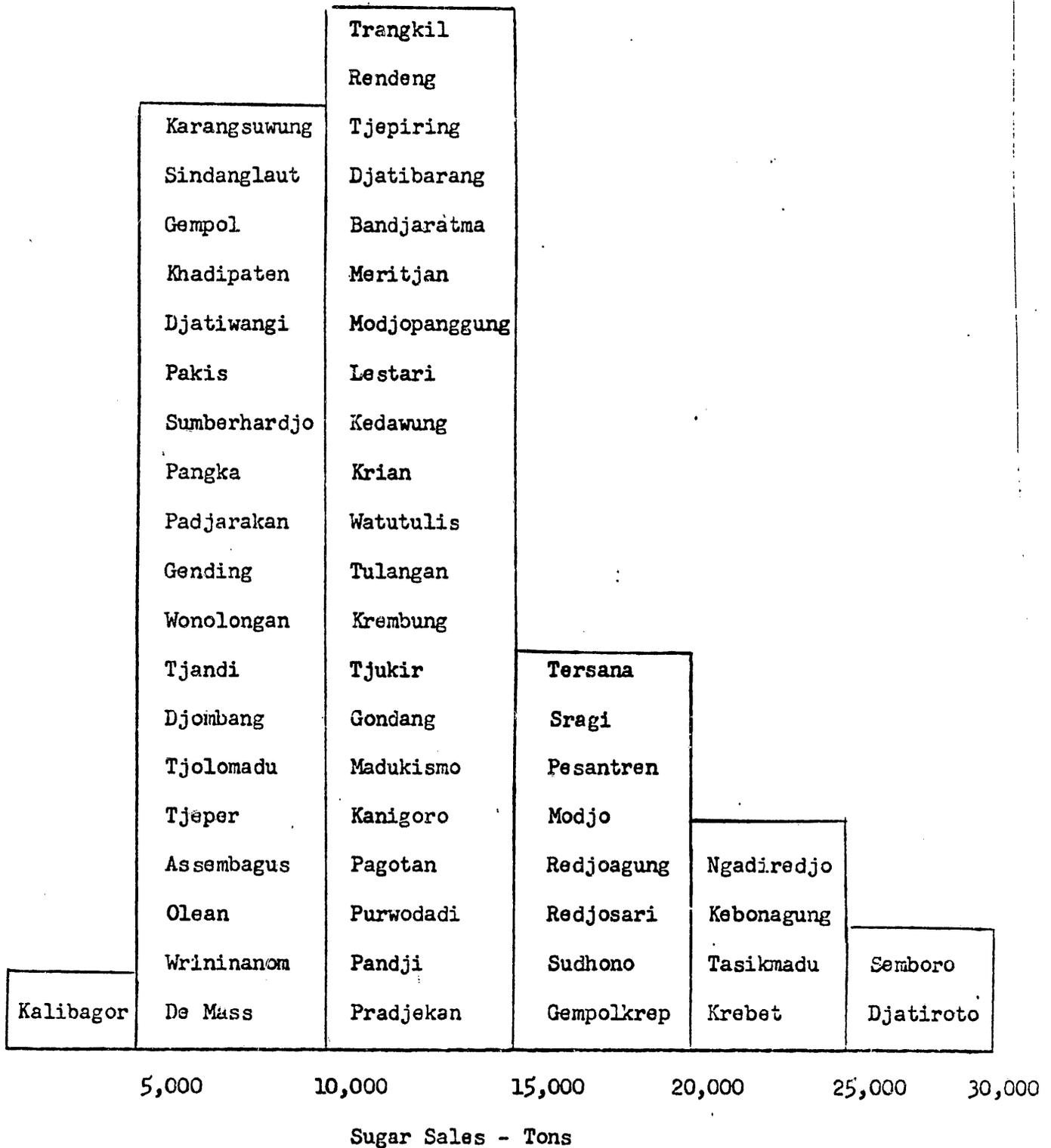
Province	Warehouses As Reported by BULOG, July 1, 1971			Estimated Additional Existing Storage			Total Existing Storage 1971	
	Owned by BULOG	Others	Total	Rice Mill Storage	Huller Storage	Godown And Retail Storage		
	(1,000 tons of padi)							
Atjeh	2.4	3.9	6.3	7.8	3.6	9.1	26.8	
North Sumatra	13.1	15.0	28.1	0.8	18.1	26.3	73.3	
West Sumatra	--	9.3	9.3	3.2	10.5	11.2	34.2	
Riau	--	11.7	11.7	0.2	0.5	6.2	18.6	
Djambi	--	5.3	5.3	0.2	2.5	4.1	12.1	
South Sumatra	--	26.2	26.2	3.6	14.9	13.8	58.5	
Lampung	3.9	2.6	6.5	8.5	5.9	8.4	29.3	
Djakarta	9.7	144.4	154.1	0.1	0.2	67.2	221.6	
West Java	0.5	106.5	107.0	197.1	12.9	71.1	388.1	
Central Java	6.4	75.9	82.3	32.1	5.1	53.2	172.7	
Jogjakarta	--	6.4	6.4	1.3	1.7	5.3	14.7	
East Java	4.2	109.4	113.3	35.4	15.3	62.0	226.0	
West Kalimantan	--	11.9	11.9	0.3	3.2	7.8	23.2	
Central Kalimantan	--	--	--	--	2.1	3.1	5.2	
East Kalimantan	0.4	10.6	11.0	--	1.1	2.8	14.9	
South Kalimantan	--	8.1	8.1	2.4	5.9	7.2	23.6	
South Sulawesi	47.6	7.1	54.7	4.9	10.4	13.4	83.8	
Bali	--	2.3	2.3	--	1.1	6.4	9.8	
West Nusa Tenggara	1.0	1.4	2.4	1.6	--	6.7	10.7	
Other Provinces								
Bengkulu	--	--	--	--	--	2.2		
North Sulawesi	6.0	32.2	38.2	--	--	4.4		
Central Sulawesi	--	2.6	2.6	--	--	2.5		
South-East Sulawesi	--	3.0	3.0	--	2.0	2.5	21.8	
East Nusa Tenggara	--	3.8	3.8	--	--	7.0		
Maluku	0.6	4.6	5.2	--	--	0.6		
West Irian	--	33.4	33.4	--	--	0.6		
<b>INDONESIA</b>	<b>95.8</b>	<b>637.3</b>	<b>733.1</b>	<b>299.5</b>	<b>117.0</b>	<b>405.5</b>	<b>822.0</b>	<b>1,555.1</b>

AVERAGE GROSS TONS CANE/DAY HISTOGRAM 1970  
(assuming no mill stops)



Source: Sugar Study

1970 SUGAR SALES HISTOGRAM



Source: Tate & Lyle, op cit.

SUGAR PRODUCTION FROM EXISTING PRODUCTION UNITS IN ORDER OF INCREASING CAPITAL INVESTMENT REQUIRED

Capital Cost Rp m/ton Sugar	Production Unit Categories			Sugar Production		Production Related to Consumption			
	Combrad Rehabilitation and Expansion of Factory	Full Use of Existing Area Plus Rehabilitation	Expansion of Area and Factory	Tons for Unit	Total Accumulated Production in Tons	Year	Forecast Consumption	Production Suggested New Area	Hence Production Required Expanding Existing Java Area
16		Madukismo		24,600	24,600				
34		Semoro		33,900	58,500				
37		Kedawung		17,500	76,000				
38				94,500	170,500				
40		Trangkil		17,900	188,400				
42		Kebonagung		32,500	220,900				
43			Semoro	45,900	266,800				
44		Pagotan ) Kanigoro )		28,600	295,400				
52		Krebet Baru		32,300	327,700				
53		Tasikmadu		31,200	358,900				
54		Sudhono ) Purwodadi ) Redjosari )		58,000	416,900				
54			Tasikmadu	8,900	425,800				
58		Meritjan ) Lestari )		35,200	461,000				
58		Modjopanggung ) Ngadiradjo ) Pesantren )		69,200	530,200				
58	Redjoagung			37,600	567,800				
					cf. 567,800				
62	Tjandi			12,700	580,500				
63		Modjosragen		24,600	605,100				
64	Pradjekan			27,200	632,300				
62			Kedawung	3,700	636,000				
75		Rendeng		17,000	653,000				
71			Trangkil	2,100	655,100				
76			Madukismo	22,100	677,200				
76			Modjosragen	7,900	685,100				
86		Djombang ) Tjukir )		31,700	716,800				
94		Gemolkrep ) Kremlung ) Tulangan ) Watutulis ) Krian )		81,500	798,300				
93	Tjepiring			23,600	821,900				
97		Sragi		23,300	845,200				
99		Wringinanom ) Olean ) Pandji ) Asembagus )		54,500	899,700				
100	De Haas			10,400	910,100				
101			Kebonagung	36,600	946,700	1971	946,000		
					cf. 946,700				
107	Tersana Baru ) Karangwung ) Sindanglaut )			83,000	1,029,700	1972	1,012,000		
112	Gondang Baru ) Tjeper Baru ) Tjolomadu )			79,200	1,108,900	1973	1,083,000		
113			Pagotan ) Kanigoro )	4,600	1,113,500				
116		Bandjaratna ) Djatibarang )		26,300	1,139,800				
116	Kadhipaten ) Djatipangi ) Gempol )			63,000	1,202,800	1974	1,159,000		
117	Pangka ) Sumberhardjo ) Wonolangan ) Gending ) Padjarakan )			87,000	1,289,800	1975	1,240,000		
125				83,600	1,373,400	1976	1,327,000		
126			Bandjaratna ) Djatibarang )	43,500	1,416,900				
131			Sragi	62,600	1,479,500	1977	1,420,000	50,000	1,370,000
132			Djombang ) Tjukir ) Gemolkrep ) (Extensions )	74,800	1,554,300	1978	1,505,000	100,000	1,405,000
					cf. 1,554,300				
140			New Factory ) S. Malang & ) Minor Ext. ) Krebet Baru ) Modjopanggung ) Ngadiradjo ) Pesantren )	45,600	1,599,900	1979	1,596,000	150,000	1,446,000
150			Krebet Baru ) Modjopanggung ) Ngadiradjo ) Pesantren )	126,800	1,726,700	1980	1,691,000	250,000	1,441,000
155			Krebet Baru ) (Old Site ) Wringinanom ) Pandji ) Olean ) Asembagus )	Alternative (140)	1,726,700				
159			Sudhono ) Purwodadi ) Redjosari ) Krebet Baru ) (New Site )	19,600	1,746,300				
163			Rendeng ) Gemolkrep ) Kremlung ) Tulangan ) Watutulis ) Krian )	29,800	1,818,100	1981	1,793,000	300,000	1,493,000
182				14,100	1,832,200				
189					cf. 1,832,200				
203			Meritjan ) Lestari )	43,500	1,875,700				
210	Kalibagor			47,300	1,923,000	1982	1,901,000	400,000	1,501,000
237	Pakis Baru			10,400	1,933,400				
						1985	2,255,000	800,000	1,455,000
						1990	2,961,000	1,500,000	1,461,000
						1991	3,127,000	1,650,000	1,477,000
						1992	3,302,000	1,860,000	1,502,000

Note: In column 1, Rp m/ton Sugar denotes thousand rupiahs per ton of sugar.

PRODUCTION AND IMPORTS OF GUNNY SACKS (NEW)

	<u>Domestic Production</u> a/			<u>Imports</u> b/		<u>Total Available</u>	
	<u>Million Sacks</u>	<u>Thousand Tons</u>	<u>%</u>	<u>Million Sacks</u>	<u>Thousand Tons</u>	<u>Million Sacks</u>	<u>Thousand Tons</u>
Average 1961-1963	1.8	2.1	9	17.1	20.5	18.9	22.6
1964	2.3	2.8	26	6.8	8.0	9.1	10.8
1965	2.6	3.1	36	4.5	5.4	7.1	8.5
1966	5.2	6.3	52	4.9	5.9	10.1	12.2
1967	6.8	8.1	32	14.4	17.3	21.2	25.4
1968	6.8	8.1	46	8.6	10.3	15.4	18.4
1969	9.3	11.1	39	14.6	17.5	23.9	28.6
1970	11.0	13.2	51	10.4	12.5	21.4	25.7

a/ Sack production consists of A-Twills 44 x 27 in. x 2.634 pounds (1.2 kg) for bagging sugar and Heavy Cees 44 x 29 in. x 2.647 pounds (1.2kg) for rice. (Source: Poetiray, P., "Kenaf and Its Prospects for 1975, Monthly Bulletin of Agricultural Economics and Statistics, Vol. 20 June 1971, FAO.)

b/ Imports are given in tons and converted on the basis of 1.2 kg per sack.

INDONESIAAGRICULTURAL SECTOR SURVEYAGRICULTURAL EDUCATION, EXTENSION AND RESEARCHA. Education <sup>1/</sup>General Education

1. There is no effective centralized control of education. The Ministry of Education is responsible for overall planning, for the curriculum of primary and non-vocational secondary schools, and for the administration of the latter. The Ministry of Religion runs many primary and secondary Islamic schools. Other Ministries run their own educational and training programs at secondary level and above. Provincial governments administer the public primary schools. There are numerous private schools, which often use the staff and facilities of the public schools.

2. Enrollments at primary level have grown recently at about 4.5% annually, and in 1970 were estimated at 13.4 million, or around two-thirds of the 7-12 age group. Although over four-fifths of the children receive two years of primary education, less than half of them finish Grade 6. Around one-fifth of them are estimated to be in private schools. The supply of teachers has not increased since about 1967, when further hiring of civil servants was prohibited. Only about one-fourth of existing teachers are qualified.

3. In 1970 about 2.04 million were enrolled at secondary level; about one-eighth of the 13-18 age group. Students can opt to take general, vocational, technical or agricultural courses at the junior secondary level, and additionally teacher training at the senior level. In 1970, about three-fourths were taking the general courses, and about 1% the agricultural courses. Most schools lack sufficient equipment, books and teaching materials. About 35% of the junior and at least 40% of the senior students are enrolled in private schools.

4. At the higher level, total enrollment in 1970 was about 127,000, of which 28,000 were studying teacher training, 37,000 science, and the remainder the arts and humanities.

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<sup>1/</sup> Most of this section has been compiled from the Appraisal Report of the Second Education (Agriculture) Project--Report No. PE-40, December, 1971.

### Formal Agricultural Education

5. The Ministry of Agriculture is responsible for formal agricultural education, except at the universities. At the junior secondary level, 101 agricultural schools (SPMA's) enrolled 10,000 students and graduated about 2,500 in 1970. These schools are generally administered by the provincial agricultural services. They are supported financially mainly by provincial governments, but operate on extremely limited budgets, and have very poor facilities; teaching materials and textbooks are in most cases nonexistent. Because the schools are unsatisfactory, they are gradually being phased out. According to current official thinking, some of them may be converted into "youth training centers" or "Rural Extension Centers".

6. At the senior secondary level, 14 agricultural schools (16 state, 51 provincial and 27 private) train middle-level technicians, primarily for service in the Ministry of Agriculture (87 agriculture, 4 animal husbandry, 1 inland fishery and 2 marine fishery). In 1972 total enrollment was 10,390, with 1,947 graduates. The curricula of these schools is divided equally between academic subjects, agricultural subjects and practical work. Although many courses are specialized, most of the schools operate with almost no instructional equipment or suitable areas for practical courses. In addition, most of the staff are inadequately trained, and only about a quarter of the 900 teachers work full time. Graduates from these schools are poorly trained, with virtually no practical experience, and are ill-fitted for extension work.

7. At the post-secondary level, six academies offer a three-year training course. In 1970, their enrollment was about 800, and they graduated 136. Interest in the academies has declined, because their graduates do not enjoy the same status as university graduates who have completed a similar three-year course. As a result, the Government has decided to phase them out, except for one offering specialized training in marine fisheries.

8. The 49 faculties of agriculture at the universities are under the administration of the Ministry of Education. They offer three to five year courses. In 1970 they enrolled about 5,000 students, but graduated only about 400. This is an indication of the inefficiency of student flows at this level. A demand for agricultural graduates exists, but the academic education they receive does not adequately prepare them for the work they should be doing. Few faculties have proper physical equipment or land for practical instruction, and their staff is often poorly trained. In 1969, Government started an improvement program to upgrade the agricultural faculties, under which the better faculties of IPB and UGM (pemlina faculties) are giving technical assistance to the poorer (non-pemlina) faculties under the guidance of the Consortium for Agricultural Science.

### The Ministry of Agriculture

9. The Ministry of Agriculture employs about 44,000. Most are in the five operational divisions: Agricultural Services (18,000), Forestry

(11,000), Animal Husbandry (6,500), Fisheries (5,000), and Plantations (1,000). Prior to 1966, the latter four divisions were separate Ministries. Since then some coordination of their activities has been achieved, but they continue to enjoy a high degree of autonomy. This shows up particularly in their separate training activities, where there is duplication of effort, with its consequent underutilization of teachers and facilities, and in many cases uneconomically small training institutions.

10. Of the total Ministry staff, one-third (14,000) are administrative, and about 29,500 are technicians. The educational level is low; three-fifths have completed only primary school, and one-fifth the secondary level. Among the technicians, where one would expect higher qualifications, three-fourths have not reached senior secondary school level. The Ministry recognizes that before it can upgrade farmers' skills it must improve the technical level of its own staff, and upgrade its training institutions from which it obtains much of its staff.

#### Ministry Staff Training

11. To improve the technical level of its staff, the Ministry has developed two in-service courses. One is a three to six-month course for high level officials in its central and regional offices. The other is a one to two-week course for field technicians. Much remains to be done to improve the quality of these courses and in systematizing their presentation. The courses for high level officials were started about two years ago at the Agricultural Training Institute, Bogor, but substantially more equipment and extensive building renovation are required before they can be fully effective. The short courses for technicians have operated on an ad hoc basis, usually in borrowed premises and without equipment, and are unsatisfactory.

#### Farmer Training

12. There are 310 village education centers (which provide nonformal farmer training) registered with the Ministry, but many are inoperative, and the remainder are greatly handicapped by lack of funds. They are maintained by the provincial governments and administered by the Ministry's provincial services. The meager training offered is handicapped by lack of facilities, equipment, and funds to hire teaching staff. These centers, as junior secondary schools are expected to be converted into young farmer training centers (para 5) or Rural Extension Centers.

#### Training Requirements

13. An increased rate of agricultural development requires the support of improved training programs, which need to be upgraded and expanded, both for the farmers and for present and future employees of the Ministry. For the farmers, courses are required to encourage the adoption of improved techniques in farming, animal husbandry, and in-land fish culture. While the training needs of farmers are tremendous, the inadequacies of the existing training centers are unlikely to improve until the appropriate

technical and administrative infrastructure within the Ministry is developed and staffed, and becomes capable of assessing and implementing plans to meet these needs.

14. In 1972 the estimated minimum annual demand over the next 10 years for trained technical staff, including extension workers, for agriculture, animal husbandry and inland fisheries was estimated to be about 900--about 500 to replace middle-level staff attrition, 200 for development projects and provincial needs, and the rest for agricultural banks, government estates and the private sector. The expected supply from state secondary schools was expected to meet over 80% of this demand, while the balance were to come from the better provincial and private schools. However, given the rapid expansion of BIMAS programs and extension services, the government now believes that 10-15 provincial or private SPMA's may need to be upgraded in addition to the 14 SPMA's included in the Second IDA Education Project.

15. In forestry, trained workers are required for government supervision of logging operations, and for operations by private firms. The annual average demand for technicians for supervision and for forest development, marketing, surveying and mapping is estimated at 250. As the annual output from the only existing forestry training center should be 80 by the end of 1972 and 150 by 1975, there will be a serious shortfall unless new training centers can be provided.

16. In fisheries, trained manpower is needed for local crews for government and joint ventures, and personnel to train local fishermen in new techniques. The existing training capacity is sufficient to meet the foreseeable requirements for mates, master fishermen and boatswains, but improvements are required in the courses to catch up better with existing employment opportunities.

#### Development Strategy for Training

17. The first IDA education project 1/ did not include agricultural training because of its unsatisfactory state, and the lack of sufficient information on existing training programs and institutions. It was then agreed that a study of agricultural training should be made to find out the existing situation and recommend appropriate remedial action, and this was done by an FAO mission, which reported in September, 1971. 2/

18. Following the recommendations of the FAO mission, the government has formulated a phased strategy to meet its agricultural training needs. The first phase consists essentially of measures required (a) to upgrade

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1/ Credit No. 219--IND was signed November 1970, and provided US\$4.6 million to help finance five technical training centers for improving the quality of technical secondary education.

2/ FAO/IBRD Cooperative Program Report No. 9171 INS. 6.

the administrative and technical staff of the Ministry and (b) to develop selected training institutions for which the Ministry is responsible, so as to improve the quality of graduates, particularly for employment within the Ministry. The second phase comprises measures to: (a) reorganize the existing fragmented extension services into one integrated service, thereby improving operational efficiency; and (b) improve the methods, and consequently the effectiveness, of introducing new techniques to farmers.

19. The first and most important step to implement the above strategy has been the recent creation (February, 1972) of a single agency responsible for all Ministry training. It is called the Agency for Agricultural Education and Training, and has been established by Presidential decree. It has been given broad powers to rationalize training programs. It will correct the current misallocation of resources in establishing and operating training facilities. It will identify and rank training priorities consistent with national objectives, and in liaison with the Directorates of the Ministry and other appropriate agencies, it will develop and implement short and long term training plans. It will also establish standards of accreditation for the provincial and private agricultural schools, in effect supervising and controlling their growth so as to eliminate the current oversupply of their graduates.

20. The Ministry intends to bring its middle-level technical staff at least up to the level of graduates of agricultural senior secondary schools (a) by replacing regular attrition and by meeting requirements for new development projects with graduates of such schools, and (b) by upgrading its own staff through much improved in-service training. For this replacement strategy to work, the agricultural senior secondary schools will first have to be improved by offering more practical training related to the real needs of farmers, and by upgrading their teaching staff. The government has therefore decided: (a) to construct and equip laboratories, workshops and farm buildings necessary to implement the new curriculum starting with the 14 national agricultural senior secondary schools and (b) to expand the teacher upgrading programs.

21. Instead of allowing separate schemes to be run by each Directorate, all middle-level in-service training will be consolidated into 13 existing training centers, although the Directorate of Plantations will continue to conduct its own in-service training programs.

22. The Agricultural Training Institute at Ciawi, which has given in-service training courses to senior staff of the Ministry for the past two years, will be renovated and re-equipped to improve the quality and broaden the range of courses offered, and to double the number of trainees per year. Laboratories and workshops will be added to enable it to offer agricultural secondary school teacher training, which is presently carried out in an agricultural secondary school. The present teacher training has greatly benefitted from improved curriculum planning and better teaching materials as a result of assistance from the Government of the Netherlands.

23. To meet the shortfall of technicians and supervisory staff in the forestry sector, the government intends to expand enrollments at the Madiun forestry training center and to construct a new center in Samarinda, both areas of high forestry activity. The curriculum in these institutions will be revised to facilitate the graduates' entry into the labor market.

24. No major expansion of training facilities for fisheries technicians is anticipated until the results of ongoing training programs are evaluated, and the needs for personnel for various types of commercial fishing are better defined. In the meantime, with UNDP assistance, curricula of existing institutions are being improved and short training courses for local fishermen are being provided.

#### Finance for Education

25. Central government allocations to education and training have increased to Rp 82 billion, or 16% of total expenditure in 1971/72, as compared with Rp 41 billion or 13% in 1969/70, the first year of the development plan. Central government capital expenditure on education and recurrent expenditure Rp 73 billion or 20% of the total. About 54% of recurrent expenditure was transferred to regional authorities to pay the salaries of the public primary school teachers. There is a chronic shortage of funds for teaching materials and for maintenance of equipment and buildings; close to 90% of recurrent expenditure is spent on teacher salaries. In most schools, annual fees ranging from Rp 80 to Rp 800 per student are levied and collected by parent/teacher associations. These funds marginally supplement the very low teacher salaries and complement the meager supplies of teaching materials. External aid plays a significant role in the financing of education (para 27). Estimated total private expenditure on education is about one-fifth of the central government's total.

26. The Ministry's training program, although sizeable in absolute terms, is small in comparison with government's total educational program. In 1970, the Ministry's recurrent training expenditure was only 0.2% of government's recurrent expenditure and its capital training expenditure 4% of government's capital funds to training. This share is low. The budgetary allocation for agricultural training has not varied much in the first three years of the five-year plan, as most of the Ministry's training is routine. Despite this, however, the duplication of physical facilities has continued, paradoxically at a time when sufficient funds have not been available to operate existing facilities efficiently. This situation will be corrected by the Agency for Agricultural Education and Training, since it is empowered to coordinate training and to ration the limited financial resources among priority programs.

27. Agricultural education and training projects financed with external aid include: a project for upgrading higher agricultural education (USAID US\$2.3 million); a recently signed UNDP/FAO project strengthening fisheries training (UNDP contribution: US\$924,000); a teacher upgrading

project for the agricultural senior secondary schools (Netherlands, US\$200,000), and a seed inspector's training and farm mechanization project (Japan, US\$100,000). A number of additional projects have also been undertaken in extension services, fisheries, forestry, and animal husbandry.

28. The implementation of the first phase of the agricultural education development strategy would require annual operational funds of the order of Rp 560 million by 1975, or about double those presently allotted for this purpose. The estimates, in 1971 prices, include an average 150% supplement to the current earnings of the teaching staff (Rp 75 million), being almost a third of the project increases in expenditure. However, similar salary adjustments are likely by 1975 for all civil servants. The rest of the additional recurrent expenditure would be for teaching materials, maintenance of grounds and equipment, upkeep of animals, and trainees' transportation and boarding costs. Disregarding possible savings from the proposed consolidation of training through the Agency, the additional recurrent funds required, Rp 200 million, would be provided through the central budget. They would be small in comparison with expected government revenues, which were Rp 380 billion in 1970 and are expected to grow at about 13% per annum by 1975/76.

#### The Second Education Project (Agricultural Education)

29. This project, for which an IDA credit of US\$6.3 million has been approved (Credit 288-IND), will cost about US\$12.3 million. It will provide over about four years: (a) furniture and equipment for the Agency for Agricultural Education and Training; (b) the construction and equipment of three new and 27 expanded training institutions; and (c) technical assistance for the Agency and institutions.

30. The project will include: (a) the consolidation of all middle-level in-service training into the 13 existing centers as proposed under the development strategy for training (para 20), and (b) the proposed expansion of forestry training (para 23). Additionally it will include a project implementation unit at Ministry headquarters. Eight specialists will assist the Agency in its early formative years, while overseas training fellowships will be given to local staff to train as counterparts for the specialists, and as leaders of the institutions assisted by the project. It will thus be a few years before the Agency becomes fully functional.

#### Conclusions

31. The main problems confronting agricultural education are:

- (a) its poor quality, due to inadequately trained teaching staff, the acute shortage of equipment and lack of practical field work; and

- (b) a general underqualification of the staff of the Ministry of Agriculture, due partly to (a) above, and the consequent poor quality of the services supplied by the Ministry.

32. The phased strategy formulated by the Ministry to meet agricultural training needs should go far to surmount these problems, provided it is pursued with tenacity and vigor. The first phase, covering upgrading of the Ministry's staff and the development of selected training institutions, should make an important contribution. In particular, the Agency for Agricultural Education and Training promises to make a major impact on the rationalization of education and training. The IDA credit of \$6.3 million for this first phase will materially help both with finance and with institution-building, which in the past have been among the major factors limiting improvement of education.

33. The second phase, covering measures to reorganize and integrate the extension service and to improve technical instruction at farm level, is of equal importance and of equal urgency to the first. Implementation of this phase will be possible only after further study, and the requirements for such a study are at present under priority review by the Bank's Resident Mission Jakarta. The study is further discussed below (para 44).

#### B. Extension <sup>1/</sup>

##### Background

34. A clear-cut extension service as such does not exist. In practice there are technical agricultural services supplied by the various directorates within the Ministry of Agriculture, and these are collectively referred to have as the "extension service". About 29,500 of the Ministry's staff are classified as technicians (para 10). The present allocation of technical staff among the various directorates adversely affects the administration of the extension service and the performance of the staff in the field. Because of limited availability of transport, low allowances, and a pre-occupation with data collection, the staff spend little time on advising farmers. Additionally there is no effective system of keeping staff up-to-date on new technical developments.

35. The preceding section brought out the underlying educational problems confronting the extension services. The proposals for the second phase of the government's strategy for training (para 18) will cover reorganization and integration of the extension service, which is essential for its efficient operation.

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<sup>1/</sup> Most of this section has been compiled from data in the FAO/IBRD Cooperative Program Report No. 9/71 INS6 of 9/20/71: INDONESIA: Survey Mission on Agricultural Education and Training.

### Directorate of Agricultural Services

36. This Directorate is in charge of the farming section, and employs about 18,500 staff, of which about 13,000 are classed as technical. At headquarters, separate sections have been set up for: main crops, secondary crops, horticulture, soil fertilization and water control, mechanization, education, extension, processing, marketing, economic studies, statistics, and planning. There are no sections specifically dealing with credit, farm inputs, or irrigation. Corresponding bureaus have been set up at province and district levels. Each section operates separately through a vertical flow of letters and there is no horizontal coordination. At the subdistrict level, each bureau is represented, but usually by a single officer, although occasionally one officer represents two or more bureaus. The extension section is represented by three or four officers in each province and sometimes only one in each district.

37. The system is incomplete, since it does not reach the village level, where all the agricultural services are represented by the mantri, sometimes helped by one or two assistants. More than half of them are of primary school level and only 8% of senior secondary level. Mantris receive instructions from all the head office sections through the vertical flow system, and send back monthly reports. Nominally they also provide services to the farmers and supervise the work of the BIMAS agents (below). The basic problem is whether the separate representation of each section at province, district and subdistrict levels is justified, and whether horizontal integration of staff at provincial level and below would not be more efficient. This must be considered under phase two of the government's training strategy (para 18).

### BIMAS

38. The BIMAS program is discussed in Annex 7. At present about 2,300 village units are functioning, and are covered by about 3,000 extension workers, who are additional to the mantris. They are mainly occupied in supervising demonstration plots, and are assisted by selected "contact farmers" in each village.

### Other Directorates

39. The technical services of the other Directorates in the Ministry of Agriculture (Animal Husbandry, Fisheries, Forestry and Plantations) are discussed in the relevant Annexes.

Technical Staff

40. Of the technical staff of the Ministry of Agriculture, at the middle of 1971, only 6% have a university education, while just over one-half are at primary level (Table 1).

Table 1: EDUCATIONAL LEVEL OF MINISTRY TECHNICAL STAFF, MID-1971

	<u>Primary</u>	<u>Secondary</u>	<u>University</u>	<u>Total</u>
General Secretariat	211	222	177	610
Agric. Services <u>/1</u>	5,733	6,537	625	12,895
Animal Husbandry	3,046	1,050	327	4,423
Fisheries <u>/2</u>	1,442	1,325	236	3,003
Plantations	243	233	43	519
Forestry	<u>5,202</u>	<u>2,429</u>	<u>340</u>	<u>7,931</u>
Total	<u>15,877</u>	<u>11,796</u>	<u>1,748</u>	<u>29,421</u>

/1 Includes BIMAS.

/2 Includes both Sea and Inland Fisheries.

Source: FAO Mission Report--data from Ministry of Agriculture.

41. A breakdown for the Directorate of Agricultural Services by location (Table 2) shows the very low numbers of extension workers at village level. With the BIMAS staff they are only 1,800. The total number of crop farmers in Indonesia is estimated at 18 million, so that at village level there is an average of only one extension worker per 10,000 farmers, an impossibly low ratio to have any significant impact on improved farm production. Only about 14% of the technical staff of this directorate is actually employed at village level, which confirms the considerable over-staffing at the middle and upper levels, mainly due to the current vertical flow operational system. However, some subdistrict officers do visit the villages.

Table 2: LOCATION OF TECHNICAL STAFF OF DIRECTORATE OF AGRICULTURAL SERVICES, MID-1971

Central Office (Djakarta)	653
Central Office (Outstation) <sup>/a</sup>	905
Total Central Staff	<u>1,558</u>
Provinces	1,600
Districts	2,773
Subdistricts	4,116
Seed gardens and trials	1,003
Village extension workers	601
Total provincial staff <sup>/b</sup>	<u>10,093</u>
BIMAS headquarters	44
BIMAS village units	1,200
Total BIMAS paid staff <sup>/c</sup>	<u>1,244</u>
Total Directorate staff	<u><u>12,895</u></u>

- /a Working outstation but paid by central government.  
/b Paid by provincial and local governments.  
/c Paid from BIMAS budget (all temporary staff).

Source: FAO Mission Report--data from Ministries of Agriculture and Interior, and provincial governments.

42. For the total staff of the Ministry of Agriculture (technical and administrative), the regional distribution is roughly proportional to population distribution. Overall, 68% of the Ministry staff are technicians, which means that the administration of two technicians requires on average the services of one administrative officer. Since almost all administrative posts in the Ministry deal only with internal management and have very little contact with the outside, the Ministry is heavily overstaffed with administrators, a situation not uncommon in other Ministries.

#### Major Problems

43. Major problems which the proposed second phase study should consider include the following:

- (a) ways and means of providing a completely integrated extension service within the Ministry;
- (b) the importance of increasing the technical staff at village level, both quantitatively and qualitatively, before extension can make a significant impact on increased production;
- (c) the requirements for greater mobility of staff at middle and lower levels;

- (d) the advisability of reinforcing higher and middle-level staff with expatriates for a period until the Ministry's in-service training program produces sufficient up-graded staff;
- (e) the provision of more funds for staff, and rather less for buildings than is presently apportioned;
- (f) methods to ensure that the results of applied research reach village and farm levels;
- (g) the possibilities of providing more intensive and higher quality extension services in a selected province or district to measure the impact of such improved services.

### Conclusions

44. No early improvement in the extension services can be expected. The in-service staff training program should gradually improve the quality of the technical staff, while the study under phase two of the Ministry's agricultural training program should point the way towards overcoming the major organizational problems brought out above. The urgent need for the study cannot be overemphasized, and it should be started as soon as possible. Extension and research are closely related, and below (para 55) the mission proposes that the organizational problems of extension and research should be dealt with simultaneously by the same team.

45. While gradual improvement in the extension service can be expected in due course, some immediate advantage could be obtained by utilizing the technical services of existing plantations, particularly PNP's, to help neighboring smallholders improve the quality of their farms. In particular, smallholder rubber growers could be materially assisted with their replanting programs by nearby PNP's, both in planting techniques and in obtaining improved clonal seedlings. Such assistance would have to be organized at provincial level to be effective, and the Ministry of Agriculture should encourage its staff in provincial governments to study the possibilities of such assistance in their provinces.

### C. Research

#### Background

46. This section deals with the organizational and administrative aspects of research as a whole, and makes no attempt to consider technical questions dealing with specific crops. These are discussed in the separate annexes covering the various crops.

47. Research suffers from fragmented overstudy of specific problems. That is, in the past five years or so, there have been numerous studies

of research on different crops, but each has suggested certain organizational and administrative structures for the particular research in question with little regard as to how such structures would fit into overall organization of research. These studies have included the following:

I. Specific Research Studies

- (a) Organization, Systems and Requirements for Research in Agriculture and Related Industries - (Joint Agricultural Research Survey Team 1969);
- (b) Study on the Improvement of Plantation Crop Research in Indonesia (Royal Tropical Institute 1971);
- (c) Sugar Research Requirements in Indonesia (Royal Tropical Institute 1971);
- (d) Tea Research Recommendations (Royal Tropical Institute 1971);
- (e) Report on Indonesian Tea Research and Advisory Service. (James Lamb, U.K. Technical Assistance 1972);
- (f) Rubber Breeding Recommendations (IDA-financed FAO Consultant);
- (g) Oil Palm Breeding Recommendations (IDA-financed IRHO Consultant).

II. Other Reports Which Have Wider Objectives but Include Substantial Proposals on Research

- (a) Study and Evaluation of Rice Production Intensification Programme in Indonesia (IDA-financed Study);
- (b) National Fertilizer Study (IDA-financed Study);
- (c) Indonesia Sugar Survey (UNDP-financed Bank Executing Agency Study);
- (d) Tea Industry Survey (IDA-financed CDC);
- (e) FAO/IBRD Preparation Mission and Bank Appraisal Reports leading to:
  - (i) Agricultural Education Project;
  - (ii) Seeds Industry Development Project;

- (f) Review of Certain Aspects of the Forestry Program and Organization in Indonesia (U. S. Forest Service, 1971);
- (g) Various papers and reports on Agricultural Research and Extension Services by USAID.

#### Research Institutes

48. A list of the principal agricultural research institutes and their major functions is included as Appendix 1. Little research is done at universities, where in general research groups are handicapped by lack of funds, low levels of training and consequent low staff morale. None are at present first class research institutions. Much remains to be done in establishing the universities as well-equipped teaching institutions. One aspect is to strengthen and develop the research capabilities of the universities, an essential ingredient of an adequate graduate level study program.

49. The majority of research institutes are at Bogor. Some have subcenters or experimental stations in other parts of the country, where regional trials are made. Many devote a high proportion of their time to routine testing of products, the preparation of vaccines, and diagnosis of plant and animal diseases. Sometimes routine duties take up almost all the time of the scientific staff (e.g. vaccine production at the Animal Diseases Research Institute). A large proportion of research staff spends much time in meetings and conferences, and on administrative procedures, leaving relatively little time for actual research. Since equipment is generally in short supply, many research projects take the form of farm surveys undertaken by students, and other simple activities not requiring much equipment. The general low level of salaries means that many staff members take a second job to help their income, and staff morale is generally fairly low. In institutes supported by levies on estate crops there is a better atmosphere for research, since salaries are higher and laboratories are better equipped.

50. Each directorate of the Ministry of Agriculture is responsible for the research institutes dealing with subjects within its portfolio. Many of the problems of the extension services are paralleled in research, in particular the lack of coordination between the directorates. As a result, there is much duplication of work, overlap of objectives, waste of manpower and poor efficiency. Also, the low levels of training of staff is as much a handicap in research as it is in extension.

51. The most important shortcoming of current research is that applied research is lacking, and thus the research institutions are not providing the extension services with data on improvements in techniques or farm inputs to be passed on to the farmers.

Joint Agriculture Research Survey

52. The survey team reported to Government in July, 1971, and made recommendations designed to develop an organizational structure which would provide the maximum utilization of available talent and resources, and enable identification of high priority research problems. For effective long-term development of research, it emphasized the following:

- (a) Present fragmented research work must be coordinated and integrated into a unified and balanced problem oriented program, making efficient use of available scientific manpower and the limited facilities and funds;
- (b) Such a program will require centralized guidance and assistance, but research must be sufficiently decentralized to serve the needs of the various agroclimatic regions;
- (c) The research system must be appropriately integrated with educational and extension programs;
- (d) Staff salaries and financial incentives must be raised to levels which permit scientists to work full time on research;
- (e) The planning, programming and budgeting of research must be flexible and subject to continuing reappraisal to take advantage of changing internal and external conditions;
- (f) Foreign assistance must be directed and coordinated to make the maximum effective use of it.

53. The report then went on to make specific recommendations, including setting up an overall research organizational at national level and experimental stations in the provinces, together with plans for research to improve major crops and to improve training.

Conclusions

54. In the mission's view, no further studies are required at the present stage. The immediate need is for a small but highly experienced team of research scientists with considerable experience of the organisation and administration of research: (a) to devise and recommend a suitable national organisational and administrative structure for agricultural research and extension; (reference being made to the Joint Agriculture Research Survey Report); (b) to consider the research proposals which have been made in the various studies listed in para 47 and elsewhere and draw up a phased 5-year plan for future development, identifying research priorities and outlining research programme requirements (this would be the first phase of a long-term programme). When the team had agreed the national research organisational structure and the priorities for first phase programmes with Government, it would draw up the terms of reference

of an immediate follow-up project preparation mission to prepare in detail, projects suitable for financing. These would be based upon the structure and research priorities already agreed with Government and should deal with plantation crop research, food crop research and with extension.

55. The Government has requested that IDA provide a team to carry out the above work and IDA has agreed to arrange this. There is much urgency in this matter, since until research is properly organised, and coordinated, the expenditure and effort on it, both local and foreign, will continue to be largely wasted. 1/

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1/ Since this annex was written, two IDA missions have visited Indonesia and identified a project for IDA consideration. The Government on its side has decided to carry out a major reorganization of agencies involved in agricultural research to bring all agencies under one organization in the Ministry of Agriculture. The new agency is to be headed by a presidential appointee with the rank of a director general. This proposed change should make it possible to eliminate the substantial amount of overlapping, waste and inefficiency resulting from the past proliferation of agencies. Government is also planning a consolidation and rationalization of research budgets and staffs and has initiated a system for annual review of research priorities and funding. Within this new framework IDA is considering a project to help establish several regional centers for important groups of crops and to assist Government in its reorganization efforts.