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INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
 INTERNATIONAL DEVELOPMENT ASSOCIATION

CURRENT ECONOMIC POSITION

AND PROSPECTS

OF

INDONESIA

(in two volumes)

VOLUME II - SECTORS

October 1, 1968

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1 Million Rupiahs	=	U. S. \$ 3,333.

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CORRIGENDUM

Volume I

Page 4, paragraph 9, lines 5 and 6. (CBS) instead of (BPS).

Page 23. Insert 87 as paragraph number for second paragraph this page.

Page 27, paragraph 96, line 5. Substitute "385-390" for "285-290".

Page 28, paragraph 99, line 4. Read "fiber" for "fiver". Line 5, "D.P." for "D.C." Change location of footnote entry 1/ from end of paragraph 101 to end of paragraph 103.

Page 51, paragraph 176. Replace second sentence with "The proposed composition of this request for non-project assistance is different in only a few respects from the estimated actuals in 1968; the most important difference is the increase in the required amount of non-food PL 480 commodities, notably raw cotton and yarns."

Page 62, paragraph 191 (4), line 6. Change "such as" to "other than".

Appendix Table 38. Last total, last column should be \$173.86 million.

Appendix Table 41. Change heading of second column from "Category A" to "Category B".

Volume II

Page 3, paragraph 6, line 4. Change "to" to "of".

Page 4, paragraph 6. Delete in last sentence starting "when negotiations ... completed" and substitute "by an IDA credit of \$5 million".

Page 15. Add paragraph number 36.

Page 25, paragraph 63, line 10. Delete "to be undertaken" and replace by "completed".

Page 45, paragraph 32, line 10. Delete the first "at".

Page 47, paragraph 40, line 2. Change "were" to "are".

Page 103, paragraph 34, line 10. Change "as" to "than".

This report was prepared by a mission that visited Indonesia in July 1968. The members of the mission were:

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The preparation of this report was originally scheduled for a meeting of the Intergovernmental Group on Indonesia that was to be held on November 11, 1968. This rescheduling has limited the time available for the drafting and editing of this report.

VOLUME II

TABLE OF CONTENTS

<u>Chapter</u>		<u>Page</u>
1	Agriculture	1
2	Industry	39
	Annex 1 - Progress and Execution of the 1968 Project Program	59
	Annex 2 - Retarded Projects	62
	Annex 3 - Possible Industrial Projects for the Five-Year Program	65
3	Power	78
4	Transport, Communications and Water Supply	95

CHAPTER 1

AGRICULTURE

Production

(a) Food Crops

1. Table 1 hereunder records the production, area and yield of the principal food crops over the period 1960-61 and 1966-67.

Table 1

Production, Acreage and Yield of Principal Food Crops

PRODUCTION ('000 m. tons)	1960	1961	1966	1967
Rice	8,767	7,268	8,920	9,320
Maize	2,460	2,283	3,220	2,960
Cassava	11,376	11,189	13,350	12,950
Sweet Potatoes	2,669	2,463	2,274	2,160
Soya bean (shelled)	443	426	375	363
Groundnuts (shelled)	256	252	263	242
AREA ('000 hectares)				
Rice	7,284	6,877	7,781	7,574
Maize	2,639	2,462	3,503	2,670
Cassava	1,417	1,478	1,523	1,450
Sweet Potatoes	394	366	412	416
Soya bean	651	625	661	621
Groundnuts	377	365	405	389
YIELD (100 kg/ha)				
Rice	12.0	12.1	11.7	12.4
Maize	9.3	9.3	9.2	11.2
Cassava	80.0	76.0	87.6	89.0
Sweet Potatoes	68.0	67.0	55.1	52.0
Soya bean	6.8	6.8	5.7	5.8
Groundnuts	6.8	6.9	6.5	6.2

Source: Bappenas.

2. The 1967 food crop position in production, acreage and yield is similar to the situation in 1960, save for rice. For the latter crop, there has been an increase in area of 290,000 ha (which has occurred mainly outside Java) and an increase in production of 550,000 metric tons. The area under cassava has remained constant and yields have increased by 20 per cent compared with 1960.

3. No decrease in production of major food crops is expected during 1968. On the contrary, rice production is expected to rise by at least half a million metric tons in view of the expansion of the Bimas-Inmas programs and the favorable weather conditions experienced during the 1967-68 wet season and at the beginning of the 1968 dry season. Although no estimates were available, other than samples taken in Central Java, there is little doubt that Indonesia experienced a good 1967-68 wet season rice harvest and yields appeared to have been better than average. This view is confirmed to some extent by the fact that Badan Urusan Logistik (BUL), towards the end of July, has purchased the equivalent of 566,000 metric tons of rice on the local market and expects to complete the purchase of its target of 600,000 metric tons in August, all of which is to be obtained from the 1967-68 wet season crop. This would be the first occasion on which BUL has been able to procure its target requirements from the wet season crop, as can be seen from Table 2 below.

Table 2

Rice (Milled) Imports - Domestic Procurement, 1960-1968
('000 tons)

Year	Target	Actual Imports	Domestic Procurement		
			Target	Actual Purchase	Actual Purchase as percentage of target
1960	952	894	545	278	51.0
1961	1,014	1,064	555	262	47.2
1962	1,128	1,096	1,783	520	29.2
1963	1,086	1,076	1,098	443	40.3
1964	1,018	1,025	400	342	85.5
1965	190	193	525	318	60.6
1966	307	306	760	641	84.3
1967	430	347	597	507	84.9
1968	600	352 *	600	506 *	84.3 *

* (to end June, 1968)

Source: Bureau of Logistics.

N.B: According to BUL, at the end of July, 566,000 metric tons of rice had been procured locally at an average price of Rupiahs 41:10 per kg without bags at the buying center. It was expected that the target for 1968 would be completed during August.

4. From observation and report, weather conditions were abnormally wet at the beginning of the 1968 dry season crop, and if conditions so continue, a larger crop than usual can be anticipated. The Government rice production target for 1968 was set at five per cent above the 1967 production, namely 9.8 million metric tons of rice. The following rough estimates of production for 1968 are based on present information of the areas planted in the 1967-68 wet season and the proposed plantings for the 1968 dry season.

Table 3

<u>Season</u>	<u>Area Cultivated</u> (in ha)	<u>Yield of Rice</u> (metric tons/ha)	<u>Production of Rice</u> (metric tons)
<u>Bimas</u>			
W/S 67-68	465,761	2.25	1,047,962
D/S '68	413,500	2.25	930,375
<u>Bimas-Baru</u>			
W/S 67-68	250	3.0	750
D/S '68	21,500	3.0	64,500
<u>Inmas</u>			
W/S 67-68	524,946	1.5	787,419
D/S '68	200,000	1.5	300,000
<u>Other</u>			
	5,821,750	1.15	6,695,012
Total	<u>7,447,707</u>		<u>9,826,018</u>

5. It would appear from the above table that there is strong likelihood that the Government target for rice production in 1968 will be met or exceeded. It is possible that yields of rice per ha in areas outside the Bimas and Inmas programs, because of favorable conditions, would realize an average return somewhat greater than the present estimate of 1.15 metric tons of rice per ha. There is also the possibility that with a rice price favoring the farmer, which he has enjoyed during 1968, coupled with an unseasonably wet dry season, the areas planted for the 1968 dry season crop may be greater than presently estimated.

6. The fertilizer/rice price ratio during 1967 effectively discouraged the use of fertilizers by rice farmers. However, with the change in policy which freed mills from a number of restrictions, combined with a fertilizer/rice price structure moving in favor to the farmer at the end of 1967, there has been a renewed interest by rice farmers in fertilizer inputs. A recent survey by USAID reports the downward trend in fertilizer

use by farmers has been arrested, and there will be an increasing demand for fertilizers in the immediate future. The full benefit of fertilizer and other inputs, used with locally improved or Philippine rice varieties, will not be fully realized until such time as they can be applied to rice fields adequately supplied with irrigation facilities. This, in turn, depends on the rehabilitation of the irrigation systems of the country. A start is about to be made on the rehabilitation of three irrigation systems covering 170,000 ha of rice land, about 10 per cent of the irrigated rice area, when negotiations for an IDA credit by the Government of Indonesia have been completed.

7. It is said, in Indonesia, that in every odd year dry weather conditions can be expected, and it is a curious fact that the production of maize over the period of 1960-67 is higher in the even years than in the odd. If this trend continues, maize production - particularly with favorable weather conditions extending into August - could be expected to be greater than 1967. Another factor favoring an increase in maize production in 1968 is the marked demand for maize in Japan, and the interest that that country is manifesting in maize production in Indonesia. As evidence of this interest, a survey has been carried out in Lampung province of Sumatra, and there is a proposal to build water storage reservoirs for irrigation systems in return for concessions on which to produce maize for export to Japan. Improved varieties of maize, soya beans and groundnuts are available in limited amounts, and are capable of giving yields of three tons of maize per hectare and two tons of groundnuts and soya beans per hectare, provided improved varieties are planted and the necessary agricultural inputs supplied. The expansion of maize, soya bean and groundnut production is hampered by an inadequate extension service which is preoccupied with rice production and, to a large extent, is lacking in experience in cultivating, fertilizing, etc., the improved varieties. There is also a lack of demonstration areas for these crops in the farming communities. There is no provision for the large scale credit necessary if maize production is to be increased markedly by the use of improved varieties. Another constraint on the production of soya beans and groundnuts is the current practice of planting these crops immediately following the harvesting of the wet season rice crop without any pre-sowing cultivation. This is done on the grounds that there is insufficient time to cultivate prior to sowing, if advantage is to be taken of the moisture remaining in the soil at the end of the wet season. This is coupled with the reputed general belief of farmers that the sowing of these crops without pre-tillage is still the most economical way of producing legumes for home consumption. With the start of artificial rice production in Bandung, a new market has been developed in this area for cassava and maize to supply this factory. Subsequently, markets for these two crops should also develop in Jogjakarta and Surabaya if the planned artificial rice plant for the latter area is constructed. With the favorable weather conditions that pertained in 1968 up to August, there should be no shortage of minor food crops.

8. In food production and, in fact, in respect of many other aspects of economic policy, rice is the major concern of the Government; self-sufficiency in rice is the goal. However, in spite of the efforts that have been made over the past few years to increase it, at the end of 1967, rice production was about keeping pace with population growth. Consumption has equalled 83 kg per capita per annum for the three years ending in 1967. The area harvested, production and yield of rice in Java and outside Java is given in Table 4, together with the annual growth rates for Java, outside Java and all of Indonesia.

Table 4

Area Harvested and Milled Rice Production

In Indonesia 1953/1967 *

YEAR	<u>Area Harvested</u>			<u>Production</u>			<u>Yield</u>		
	Java	Outside Java	Indonesia	Java	Outside Java	Indonesia	Java	Outside Java	Indonesia
	(millions of ha)			(millions of tons)			(tons/ha)		
1953	4.02	2.45	6.47	4.43	2.88	7.31	1.10	1.18	1.13
1954	4.16	2.46	6.61	4.82	3.02	7.84	1.16	1.23	1.18
1955	4.19	2.38	6.57	4.59	2.92	7.51	1.09	1.23	1.14
1956	4.30	2.40	6.70	4.76	2.84	7.60	1.10	1.18	1.13
1957	4.31	2.49	6.80	4.74	2.89	7.63	1.10	1.16	1.12
1958	4.39	2.60	6.99	4.95	3.03	7.98	1.13	1.16	1.14
1959	4.33	2.82	7.15	5.05	3.24	8.29	1.17	1.15	1.16
1960	4.32	2.96	7.28	5.06	3.70	8.76	1.17	1.25	1.20
1961	3.99	2.87	6.86	4.80	3.47	8.27	1.20	1.21	1.21
1962	4.09	3.19	7.28	5.14	3.75	8.89	1.26	1.17	1.22
1963	3.65	3.08	6.73	4.44	3.49	7.93	1.22	1.13	1.18
1964	3.66	3.32	6.98	4.37	4.05	8.42	1.19	1.22	1.21
1965	4.19	3.42	7.61	4.87	3.97	8.84	1.16	1.16	1.16
1966	4.11	3.67	7.78	4.66	4.48	9.14	1.13	1.22	1.17
1967	4.15	3.43	7.58	5.12	4.20	9.32	1.23	1.22	1.23

Annual Rates of Growth (in %)

	<u>1953/4-1959/60</u>	<u>1959/60-1966/67</u>
Area Harvested - Java	0.9	-0.7
Outside Java	2.8	3.0
Indonesia	1.6	0.9
Production - Java	1.5	-0.5
Outside Java	2.8	3.3
Indonesia	2.0	1.1
Yield - Java	0.6	0.1
Outside Java	-0.1	0.2
Indonesia	0.4	0.2

Source: Leon Mears and Saleh Afiff, Bappenas from Bureau of Statistics (Java 1953/64): Agricultural Extension Service estimates after 1964 are adjusted to Bureau of Statistics trend for Java.

* Totals may not add due to rounding. Qualified observers suggest that some of the production figures may be biased on the high side, especially from 1960 to 1965.

9. Falling and low rice yields are the principal problem of peasant agriculture in Indonesia. This is of particular importance in Java, with its dense rural population and the small size of individual paddy fields. There is substantial evidence that on at least 1.9 million hectares of irrigated rice, yields have fallen over the past 30 years as the result of deterioration of the irrigation systems through lack of maintenance, and these yields continue to fall slowly. In Java, there is no idle rice land which can be brought into cultivation to offset stagnant yields. The problem is, therefore, how to increase productivity per hectare. A prerequisite for optimum rice yields is an adequate supply of water in sufficient quantity at the right time. Yields can then be further increased by the application of inputs such as improved varieties, fertilizers, insecticides, fungicides, rodenticides, coupled with adequate extension advice. Even if irrigation is less than optimum, some increases in yield can be obtained by the application of the above-mentioned inputs.

10. With the aim of increasing productivity per hectare, the Government has developed a scheme from the "paddy centra" program, which was organized in 1960 to increase rice yields and was abandoned in 1964, popularly known as the Bimas scheme, the areas selected are those where there is an adequate water supply throughout the growing season. Bimas involves extension advice and the application of a package of inputs consisting of seed of improved varieties, urea and double or triple superphosphate, insecticides to control stemborers and other pests, zinc phosphide for rat control, spraying equipment and the necessary credit for the purchase of these inputs from the Bank Negara Indonesia (BNI Unit II) for seven months at an interest rate of three per cent per month. The recommended amounts of urea and fertilizer used has varied from crop to crop. The present recommendation for the 1968 dry season crop is 100 lbs of urea and 50 lbs of triple superphosphate per hectare. Farmers remain in the Bimas program from one to two years following which they can leave the program or elect to join the Inmas program, which is identical to the Bimas program save that BNI Unit II credit is not available and has to be obtained from other sources at much higher interest rates.

11. In the 1968 dry season, an extension of the Bimas program, known as Bimas-Baru or "new Bimas", was devised, involving increased credit. In the Bimas-Baru program, the Philippine varieties PB5 or PB8 are planted, which require increased quantities of fertilizers to obtain optimum yields. The 1968 dry season fertilizer recommendations are 150 kg per ha of urea and 75 kg per ha of triple superphosphate. All other inputs and conditions remain the same as in the Bimas program. In due course, as seed of PB5 and PB8 become available, the Bimas-Baru program will probably be extended into an Inmas-Baru program, which will be similar to the Inmas program save for the fact that the Philippine varieties will be grown and increased inputs of fertilizers will be required in consequence.

12. There is little doubt that the Bimas, Inmas programs have had a considerable effect on increasing rice production. The area planted under Bimas has risen to 466,000 ha in the 1967-68 wet season and the program was extended in this season by the inclusion of 525,000 ha receiving the Inmas inputs. For the 1968 dry season, some 21,000 ha have been planted under Bimas-Baru.

13. The high initial yields obtained from small areas under the Bimas program, have naturally fallen as much larger areas were brought into production. However, they have remained higher than in non-Bimas areas. Table 5 hereunder records the target and realized areas planted to Bimas, Inmas and Bimas-Baru, together with average yields up to the 1966-67 wet season. Sample yields for Bimas and Inmas, taken in Central Java in May, indicate yields of the order of 4.34 metric tons per hectare of dry stalk paddy, equivalent to 2.17 metric tons of milled rice per hectare. In the same area, yields outside Bimas and Inmas were 2.9-3.3 metric tons per hectare of dry stalk paddy, equivalent to 1.55 metric tons per ha of milled rice.

Table 5
Summary Evaluation of Bimas 1963/1969

<u>Year and Season</u>	<u>Hectarage</u>		<u>Yield (m. tons stalk paddy/ha)</u>		<u>Yield Increase (Bimas over Control)</u>	
	Target	Realized	Bimas	Control	m. tons/ SP/ha	m.tons rice/ha @ 52% outturn
1963/64 Wet	100	105	6.66	4.30	2.36	1.2
1964/65 Wet	11,000	9,985	7.26	3.35	3.91	2.0
1965/66 Wet	150,000	172,488	5.43	2.94	2.48	1.3
1966 Dry	200,000	172,529	4.53	2.50	2.03	
1966/67 Wet	480,000	463,090	4.89	3.18	1.71	0.9
1967 Dry	15,000	10,855				
1967/68 Wet B*	491,000	465,761)	4.34**	3.10**	1.24**	0.6**
I	487,000	524,946)				
1968 Dry B	413,500					
BB	26,500					
I	200,000					
1968/69 Wet B	270,000					
BB	380,000					
I	850,000					

Source: Bappenas

* B = Bimas; BB = Bimas-Baru; I = Inmas

** Based on samples in May in Central Java.

14. In the 1968-69 wet season, it is proposed to put 1.5 million hectares under the Bimas, Bimas-Baru and Inmas programs, of which 380,000 hectares will be under the Bimas-Baru program. For reasons discussed below, it is likely that the yield per hectare for the Bimas and Inmas areas will continue to fall to a point where the increase in yield, compared to that obtained in areas not receiving the Bimas and Inmas inputs, may drop to 0.5 metric tons of rice per hectare. However, it is likely that the average production from all three programs will be raised on account of the 380,000 hectares to be planted under the Bimas-Baru scheme.

The combined effort of the Bimas inputs and the improved rice varieties should be to increase yields by 50%.

15. In addition to the 1½ million hectares planned for the 1968-69 wet season, for the Bimas, Inmas programs, the Government of Indonesia has entered into an agreement with the Swiss chemical firm of CIBA Limited, to provide the Bimas inputs on 300,000 hectares of rice, including the responsibility to apply adequate insecticides to this area. CIBA Limited will be responsible importing and supplying the farmer with the correct type and quantities of fertilizers, insecticide, rodenticides, applying the insecticide (Dimecron 100) by ultra low volume aerial spraying as and when necessary, generally managing and operating the project, and carrying out the extension work amongst the farmers. They will be paid U.S. \$40.00 per hectare for these services by the Government who, in turn, will collect this from the farmer after harvest. In consequence, the planned area receiving the Bimas, Bimas-Baru and Inmas inputs for the 1968-69 wet season is projected to be 1.8 million hectares.

16. In spite of imperfections in the rice statistics available, it is possible to evaluate the effect of Bimas on increasing the production of rice in Indonesia. Using the yield increase in Bimas areas compared with controlled areas for the period 1964-67, the increased production attributable to the Bimas operation is as follows:

<u>Year</u>	<u>Metric Tons of Milled Rice</u>	<u>Percentage of Total Indon. Production</u>
1964	130 tons	-
1965	20,500	0.2
1966	431,000	4.5
1967	412,000	4.5

17. There is no doubt that the Bimas, Inmas and Bimas-Baru programs, as they expand, will continue to have a beneficial effect by increasing yields, but as the area expands, so will the increment of yield tend to fall. This will probably be checked, however, as the Bimas-Baru program is expanded in relation to Bimas proper. In due course no doubt an Inmas-Baru program, utilizing the PB5 and PB8 varieties and increased inputs will, in turn, replace the present Inmas program. In the immediate future, other factors will tend to reduce the increases in yield that could be expected from these programs. The major factor is the expansion of the programs into areas with less effective irrigation facilities. Weather conditions during the growth of the crop have great influence on yield, and as the areas under the various schemes are expanded this will not be offset until irrigation schemes are rehabilitated and lack of an adequate water supply during the growing season is overcome. There is considerable evidence that the farmers are not applying the recommended rates of nitrogenous and phosphatic fertilizers, and this is aggravated as the areas are expanded and supervision becomes less. In some cases, no phosphate is applied, while in others, not even the full amount of nitrogen is applied. Moreover, failure to provide fertilizer and insecticide inputs to the farmer, within reasonable distance of his farm, and at the right time, is a further constraining factor. There is little doubt that

the credit available from official sources for the 1968-69 wet season will be insufficient to meet the targets set and recorded in Table 5, if all farmers participating in the programs apply the recommended inputs of fertilizer and insecticides.

(b) Cash Crops

18. Cash crops (mainly but not entirely for export) are produced by both estates and smallholders. The production and area of the principal cash crops have remained more or less the same as in 1966. There was an eight per cent increase in the production of palm oil and a 24% increase in tobacco production, the bulk of the latter increase occurring in the estate sector.

19. Table 6 records the production, area and exports of the principal cash crops in Indonesia over the period 1960-61 and 1966-67, together with the average percentage produced by smallholders.

Table 6

Estimated Production, Area and Exports of Principal Cash Crops

Production ('000 m. tons)	1960	1961	1966	1967	% Produced by	% Produced by
					Smallholders 1960/61	Smallholders 1966/67
Sugar	967	883	1,074	1,073	30	43
Tea	83	81	76	80	46	58
Coffee	98	97	136	136	80	86
Rubber	679	699	699	695	63	76
Palm Oil	141	145	159	171	-	-
Palm Kernels	33	34	31	35	-	-
Cocoa	1	0.9	0.4	0.4	-	-
Tobacco	69	82	96	119	83	84
Fibers	20	17	8	8	-	-
Copra	1,239	1,361	1,350	1,320	100	100
Kapok	21	20	26	27	100	100
Spices (Bl. & Wh. Pepper)	12	24	49	49	100	100
(Nutmeg)	5	6	5	6	100	100
(Cloves)	6	7	19	19	100	100
Area ('000 m. tons)						
Sugar	96	95	156	150	37	48
Tea	128	112*	123	125	53	50
Coffee	270	281	315	330	85	88
Rubber	1,855	1,867	1,904	1,922	79	80
Oil Palms	88	89	93	94	-	-
Cacao	5	5	4	4	-	-
Tobacco	163	206	213	229	88	95
Fibers	10	4	3	5	-	-
Coconuts	1,610	1,540	1,904	1,972	100	100
Kapok	139	146	141	112	100	100
Spices (Bl. & Wh. Pepper)	34	35	40	43	100	100
(Nutmeg)	10	12	16	21	100	100
(Cloves)	37	43	73	73	100	100

Table 6 (cont'd.)

Exports ('000 m. tons)	1960	1961	1966	1967	% Produced by Smallholders 1960/61	% Produced by Smallholders 1966/67
Sugar	186	143	28	-	-	-
Tea	39	36	28	39	-	-
Coffee	43	67	98	82	88	76
Rubber	468	657	680	620	73	68
Palm Oil	109	118	177	125	-	-
Palm Kernels	34	33	32	32	-	-
Tobacco	19**	20	19	8**	-	-
Fibers	16	13	4	9	-	-
Copra	169	251	119	316	100	100
Kapok	3	3	N/A	N/A	100	-
Spices (Bl. & Wh. Pepper)	13	19	21	22	100	100
(Nutmeg)	5	3	N/A	N/A	100	-

Source: Bappenas

* Some 18,000 hectares of tea, affected by Blister Blight, resulting in no plucking hence reduction in area harvested.

** Figures are incomplete.

20. The above table is compiled from data from both the estate and smallholder sectors of the economy. Certain crops are not grown by smallholders and vice versa, while others, such as sugar and tea, although grown by both groups, the smallholder production is solely for local consumption.

21. The relationship in the field of production has shown some change, the production of smallholders generally rising at the expense of the estates over this period, save that smallholder sugar production fell by 10 per cent in 1967 compared with 1966. The production of crops produced solely by smallholders, such as pepper and cloves, have shown marked increases while copra and nutmeg production has remained stagnant.

22. There has been an increase in the area under sugarcane, mainly in the smallholder sector and in the area planted to coconuts.

23. Since 1960, there has been an overall increase in exports by weight of 16% for all crops excluding tobacco, kapok and nutmeg, for which data is incomplete. If the sugar exports in 1960 are excluded, the overall rise is 40%. In the export sector, the only crops that both estates and smallholders sell abroad are rubber, coffee and tobacco. Since 1960, the percentage by weight of the export trade in rubber and coffee attributable to estates has increased from 18 to 28%. Estate rubber exports have increased from 19% in 1960 to 35% in 1966, but fell to 29% in 1967. In mid-1968, the general opinion appears to be that, as

a result of the favorable rice prices that have pertained during 1968, there has been a fall-off in smallholder production of rubber. The exports of copra have greatly increased in 1967 compared with 1966, while smallholder coffee exports have decreased by 24% over the same period. Since 1960, there has been a 40% increase by weight in the export of smallholders rubber, copra, coffee and pepper.

24. There is little likelihood that there will be any major improvement in the production of cash crops during 1968 for the reason that the conditions restricting the development of this sector of the economy in recent years continued to apply during 1968. The abolition of the Ministry of Estates and its absorption into the Ministry of Agriculture, bringing the estate and smallholders sectors together with their supporting research organizations under the policy direction of a single minister, should have beneficial effects on production and exports in due course. The stagnation in the estate and smallholder sectors save in estate tobacco and, to a lesser extent, the oil palm industry, appears due to lack of management and modern technological skills, lack of production inputs linked with the non-availability of credit, and a general running down of the plantations because of shortage of finances. The rubber, palm oil and tea industries seem faced with structural problems which are not at all adequately recognized by the authorities, and without a broad-based program for rehabilitation their yield is bound to decline. Because of the structural difficulties, inflation, failure to replant overage plantations, and lack of inputs such as fertilizers, the estate sector has failed to generate sufficient revenue to pay for needed inputs. If the estate sectors are to resume development, large scale local currency assistance and, to a lesser extent, foreign exchange will be required, coupled with technical assistance for a number of years until such time as the estates are able to generate sufficient revenue to pay for inputs and development.

25. Efforts are being made in the estate sector to rectify the backlog of required replanting in the oil palm and rubber industries. Some progress has been made, more in the oil palm industry than in rubber. Oil palm areas are being replanted with locally produced seed of good oil potential; at Bah Djambi, yields of 3.8 tons per hectare have been obtained. Overage rubber is being replanted with budded seedlings of reasonable potential, but there is a lack of fertilizer for both immature and mature plantations. On some estates, fertilizers are being applied to the immature plantations, and because of lack of fertilizer and/or the funds to purchase it, fertilization stops when production commences. This lack of fertilizer is even more serious when estates replanting rubber intercrop the immature plantation with rice or maize for one to two years following planting without fertilizing the food crop. This practice has only recently been commenced with a view to producing some of the food required for rations on the estate. If intercropping must be practised, it is essential that the annual food crop be liberally fertilized to avoid adversely affecting the perennial crop. Food legumes, properly fertilized, should be grown in preference to rice or maize.

26. The tea estates appear to require extensive in-filling and, in some areas, replanting because of the sparse stands of tea, but such rehabilitation activities will take a length of time to carry out. An immediate improvement in the earnings of the export tea industry may be possible by ceasing the current practices of (a) "rough" or "coarse" plucking, done with pruning shears, on some estates, and (b) so-called "medium" plucking (a bud and three leaves and sometimes four leaves), which was started by ministerial direction on government estates in the latter half of 1967. If these plucking practices were replaced by rigid adherence to "fine plucking" (a bud and two leaves), the industry should obtain a much higher quality product.

27. In one area, there was evidence that, after the changeover from "rough" to "medium" plucking, the average prices of tea rose by about US 15 cents per kilo. In another area, the price differential in favor of "medium" as against "coarse" plucking was US 6-9 cents per kilo. The value of tea exports for the first six months of 1967, exclusive of over-price, was \$5.2 million while, for the same period in 1968, the value was \$7.7 million or an increase of 48 percent. The average price of tea on the London auctions over the same period of time was 47.1 d. per lb. in 1967 and 47.7 d. per lb. in 1968, an increase of 1.2 percent. Since this difference in the value of exports cannot be attributed to a major fluctuation in tea prices, the difference must be largely due to the change from "rough" to "medium" plucking.

28. The arguments against upgrading the standard of plucking are that yields would fall, and therefore foreign exchange earnings, and that labor might not be persuaded to undertake "fine" plucking because of the greater amount of work involved in fulfilling the daily plucking task of 40 half-kilos. Undoubtedly, the total weight will fall, but the prices received for tea made from fine-plucked leaf would be higher. Tea yields per hectare are low in any case, but proper annual fertilizer applications would serve to improve this situation. As for the labor argument, no other country producing tea for export, as far as is known, produces tea from leaf other than that which is "fine" plucked.

(c) Fish

29. The fish consumed in Indonesia is contributed by both the inland and sea fisheries. With the recent ministerial reorganization, responsibility for sea fisheries has been given to the Ministry of Agriculture and amalgamated with inland fisheries. Thus, both the sea and fresh water fisheries are now under single management, which should be beneficial for both.

30. The present output per capita is 11 kg. per annum, made up of 6.6 kg. of fish from the sea and 4.4 kg. from inland waters. The territorial waters of Indonesia are about $5\frac{1}{2}$ million km². The potential of this area of comparatively shallow seas should enable Indonesia to enjoy consumption of fish of 25 kg. per capita per year, as well as permit exports such as tuna and shrimps. Government estimates of sea fisheries production

for the three years ending in 1967 were 661,000 metric tons, 721,000 metric tons, and 790,000 metric tons respectively. Since sea fisheries production appears to be rising, with the recently negotiated agreements with foreign fishery interests, production for export should also increase.

31. Government estimates there are some 919,000 fishermen, which together with dependents would be about 5 percent of the total population. These fishermen are skilled in traditional fishing techniques, but their productivity is low. This is probably due to these techniques, and to the fact that their fishing vessels only enable them to operate within a short distance of the coast. The vast majority of fishing craft are sail boats, which number about 233,000 units and comprise 90 percent of the fishing fleet. The remaining 10 percent of the fleet is made up of 23,300 motor boats, including 1,550 fishing vessels equipped with outboard engines. Other constraints on the expansion of the industry include a lack of modern fishing gear, inadequate inland transport from ports, poor marketing and storage facilities, and lack of credit.

32. The following table gives the estimated production in 1966 of sea and inland fisheries, and annual per capita consumption by island. In over-populated Java and Madura, as well as in Bali, the availability of fish is much less than in other areas which have lower population densities but better access to sea fisheries.

Table 7

Production and Consumption of Sea and Fresh Water Fish in 1966

<u>Area</u>	<u>Population in '000</u>	<u>Sea Fish Production m. tons</u>	<u>Fresh Water Fish Produc- tion m. tons</u>	<u>Total Production m. tons</u>	<u>Average Consump- tion per capita per annum in kg.</u>
Sumatra	17,800	288,777	75,443	364,220	20.5
Java/Madura	70,800	162,100	152,759	314,859	4.4
Kalimantan	4,620	88,600	206,087	294,687	63.8
Sulawesi	7,860	132,200	133,908	166,108	21.1
Nasa Tenggara	6,150	24,940	2,692	27,632	4.5
Maluku	1,000	19,819	8,393	28,212	28.2
Irian	1,000	4,700	470	5,170	5.2
<u>Total</u>	<u>109,230</u>	<u>721,136</u>	<u>479,746</u>	<u>1,200,882</u>	<u>11.0</u>

(d) Forestry

33. Negotiations are taking place with foreign concerns with a view to exploiting the considerable timber resources of Indonesia. It is expected that these negotiations and agreements will lead to a considerable increase in exports of timber within the next few years. At the present time, it is estimated that the present relatively small exports of timber in relation to resources will double in 1968 compared with 1967, rising from \$10 million to \$20 million. The production of teak and its related products is expected to remain similar to that of recent years.

Problems of Increasing Production in Agriculture

34. The problems concerned with increasing agricultural production in Indonesia are varied, but have some features in common as between food and export crops. There is a general lack of credit and experienced manpower, equipment and adequate transportation. The lack of coordination between and within the research and extension organizations dealing with a single crop or group of crops is also a common characteristic of food and export crop production. Factors not in common are market prices. Until quite recently, the market price of rice was controlled, while export crops are subject to world prices. However, a major factor affecting the profitability of export crops, which is not common to food crops, is the export tax paid. As explained in the first volume, the differences of overprice percentages between commodities and between categories vary considerably without any apparent reason, and vary widely on average by as much as 30 percent between Category A and Category B exports. Crops under each category are as follows:

<u>Category A</u>	<u>Category B</u>
Rubber	Tea
Copra	Sugar
Tobacco	Hard Fiber
Coffee	Hides
Pepper	Rattan
Palm Oil	Mace, nutmeg
Palm Kernels	Lumber
Tin	Other Food
	Other Spices
	Other Commodities

Food Crops

35. During the past 25 years, the Central Research Institute of Agriculture (CRIA) has recommended nine improved varieties of rice for commercial production, as well as four varieties of maize, five varieties of soya bean, and three varieties of groundnuts. From the recent introductions of rice varieties from the International Rice Research Institute in the Philippines (IRRI), the CRIA has recommended the release of the varieties IR-5 and IR-8, subsequently renamed PB-5 and PB-8, for commercial production. However, the existing system of seed production is unable to produce pure seed of any one variety for sale to the farmers. Once the foundation seed leaves the control of the CRIA, it is bulked on the 300 stock seed farms of the extension service, where there is less supervision and facilities for the continued maintenance of seed purity are inadequate. The stock is then distributed to seed farms (with total area of about 33,000 ha) at the village level and to private seed growers, where facilities for maintenance of purity and germination quality are even more inadequate. The result is that farmers may receive impure varieties of low germination quality. If using seed other than that which they have harvested themselves, farmers

apparently plant about 50 kg per ha in their seed nurseries because of their fear as to germination quality. This is a gross waste of seed in a country chronically short of rice.

Some 21,000 ha of the rice varieties PB-5 and PB-8 were planted in the 1968 dry season to produce seed for the 1968-69 wet season crop, which should provide more than sufficient seed to plant the planned 380,000 ha. This seed is being produced on village seed farms and by private farmers. There are only 90 seed inspectors trained by the CRIA in the field. The last batch of 30 inspectors completed their training well after the dry season crop had been planted. It seems safe to assume that the seed of PB-5 and PB-8, which will be made available to farmers to plant the planned 1968-69 wet season crop, will not be of a high standard of purity, and if the wet weather continues, germination percentage may also be adversely affected in the absence of artificial drying facilities. Seed fields of PB-5 and PB-8, inspected by the mission in the field within two weeks of harvest, showed the presence of off-types. The farmer stated that he had no intention of uprooting these, although admitting he had been told by the extension service to uproot the rogues when they appeared. The shortage of staff and transport makes it impossible to inspect these seed-producing farms as frequently as necessary to ensure seed purity. Since this is now occurring with PB-5 and PB-8, which can be easily differentiated from local varieties, the problem would be even greater with improved local varieties.

37. Another problem in producing PB-5 and PB-8 seed of good germinating quality concerns the drying of seed. Because of the crop's 110-120 day growth cycle, it will be ready for harvest during wet weather. If there are no artificial drying facilities, the germination quality of the seed can be jeopardized.

38. The farming community may ultimately accept the varieties PB-5 and PB-8, because of their yield characteristics, even if the flavor does not altogether match popular taste. It seems probable, however, that the speed with which the area under these varieties increases will depend largely on the initial yields which farmers obtain. For this reason, it is essential that steps be taken to ensure that pure seed of good germination ability be made available to farmers. The present system of seed production cannot ensure that good quality pure seed is produced consistently for use by farmers. The proposed seed producing farm, primarily for rice, to be developed in West Java near Sukamandi, should be extended to provide for similar farms, one each in Central Java, East Java and Sumatra, and eventually extended to other islands as the need arises. These farms, assuming a total production from some 7,000 ha per annum of fully irrigated rice, should be able to provide seed to plant 1½ million ha annually. Because of the critical nature of the timing of harvesting activities, the farms should be fully equipped for mechanical cultivation, harvesting, seed cleaning and drying, and should be adequately staffed to ensure purity of varieties and germination quality. The direction of these seed farms should preferably be under the same direction as that producing the improved varieties and foundation seed. These farms would reduce the seed production duties of the already over-extended and scarce extension staff in the field, and would

enable the rapid production of any new improved varieties released for commercial production. It is understood that there are several promising IRRI varieties under test, and some show promise of being an improvement on PB-5 and PB-8.

39. These proposed seed farms, although in the first instance concentrating on rice seed production, would also have the facilities to rapidly increase and improve the production of the improved maize, soya bean and groundnut varieties, and any new varieties of these or other food crops produced in the future.

40. Facilities for seed production on the improved varieties of maize, soya beans and groundnuts, are also quite inadequate. Further, if pure seed of reasonable germination quality is to be made available to farmers in sufficient quantity to make any real impact on production, there is also need for supporting extension staff to educate the farmers to realize the potential of these varieties. For example, 10 percent of the maize area of 3 million ha may be planted with improved varieties. Similarly, over 50 percent on the 650,000 ha planted in soya beans and 30 percent of the 350,000 ha in groundnuts are under improved varieties. The fact that yields have not shown any major increase, particularly in soya beans and groundnuts, indicates that the potential of the improved varieties is not being realized. This is partly due to the fact that farmers do not couple the use of these varieties with improved husbandry and the required fertilizer and insecticide inputs. In the case of the soya bean crop, although about 50 percent of the planted area is under the improved variety No. 29, yields are still low because of the situation noted above, i.e. that farmers continue to plant soya beans immediately following the rice crop without any pre-sowing tillage.

Credit

41. Bimas and Bimas-Baru farmers are able to obtain credit from BNI Unit II for a period of 7 months at an interest rate of 3 percent per month for inputs required by these programs. They also receive a cost-of-living allowance, which is paid in cash. Repayment of the loan is in cash. The Inmas program farmers, on the other hand, use the same inputs as Bimas farmers, but have to arrange for credit from other sources at interest rates often of the order of 10-15 percent per month. With interest rates of this magnitude, it is rather surprising that the Inmas program has been as successful as it appears to have been. Credit from the private sector is not unlimited and, in consequence, in the 1967-68 wet season only about one-eighth of the rice farmers were apparently able to obtain credit from private sources. For the planned 1968-69 program, if farmers plant in full the planned targets for the three programs and apply the full recommended package of inputs, the provision made for credit through BNI Unit II would be inadequate. The present plan apparently takes into account the fact that, on the basis of past experience, farmers taking part in these programs do not apply the full package of inputs.

42. There is a need to liberalize the present conditions which farmers must satisfy before obtaining loans. Some discretion could be given to credit units in the field, to permit them to give second loans to farmers before first loans are repaid. For example, if a wet season crop is to be followed immediately with a dry season crop, it is unlikely that a farmer will have disposed of sufficient of his wet season harvest to repay his loan before he must apply for a fertilizer loan for the dry season crop. With farmers growing the Philippine varieties, however, this problem would not be so acute owing to the shorter growing period of these varieties.

43. Present BNI Unit II loan conditions restrict loans to farmers who own their own land. In consequence, sharecroppers or tenant farmers are precluded from obtaining loans for the purchase of the necessary inputs. At present, farmers are permitted loans to a maximum of 60,000 rupiahs, which is about one-third of the estimated value of the crop per hectare. This limit should be raised if farmers cultivate the PB-5 and PB-8 varieties to enable them to purchase the increased inputs required by these varieties.

44. The present restrictions on production, particularly in rice, occasioned by the limited amount of credit available and the restrictions thereon, if remedied, would be of considerable assistance in increasing rice production and would, in turn, if extended to crops such as maize, soya beans and groundnuts, have a considerable impact on increasing production, always assuming that the rice/fertilizer ratio was maintained in the farmer's favor as well as similar ratios for the other crops mentioned. If farmers are to be persuaded to apply additional inputs to any crop, the very minimum increase in crop yields required to encourage the application of inputs would be 20-25 percent.

Price Policy

45. The U.S. A.I.D. mission has prepared a report on Indonesia's fertilizer requirements which contains clearly valuable data on rice/fertilizer price ratios. Table 8, which is based on official figures supplied by P.N. Pertani, indicates clearly there was no incentive to the rice farmer to use urea or any other fertilizer during 1967. The importance of the rice/fertilizer price ratio has been stressed previously by other writers, particularly the Asian Development Bank team, Dr. Leon Mears and Dr. Saleh Afiff. If rice farmers are to be encouraged to use improved varieties and the inputs necessary to obtain optimum yields, it seems essential that the price of fertilizer and the minimum price of rice be guaranteed at a ratio which encourages fertilizer application. Such decisions should be widely disseminated some weeks prior to the first nurseries being planted for any given rice crop, and the ratio maintained throughout the crop. If the production of maize is to be encouraged for export, similar maize/fertilizer price ratios could be established prior to each crop. There is little doubt that the frequent changes which have characterized the rice/urea price ratio, as illustrated in Table 8, have had a deleterious effect on fertilizer use and rice production.

Table 8

<u>Cost Ratio Price of Rice to Urea</u>			
<u>Date of Price Decree</u>	<u>Rice Price Rp./Kg.</u>	<u>Urea Price Rp./Kg.</u>	<u>Ratio Rice to Urea</u>
May 5, 1963	56.67	8.50	6.7
May 10, 1963	55.00	17.50	3.2
Oct. 10, 1963	85.00	25.00	3.4
Sept. 30, 1964	210.00	69.00	3.0
Aug. 17, 1965	450.00	200.00	2.3
Nov. 25, 1965	1,700.00	575.00	2.9
Jan. 16, 1966	3,250.00	2,500.00	1.3
Oct. 21, 1966 ^{1/}	7.50	12.00	0.6
Mar. 21, 1967	12.50	26.00	0.5
Apr. 24, 1967	11.60	18.00	0.6
May 24, 1967	10.00	18.00	0.5
June 24, 1967	11.00	18.00	0.6
July 24, 1967	12.13	18.00	0.7
Sept. 24, 1967	20.00	18.00	1.1
Oct. 24, 1967	21.00	18.00	1.2
Nov. 24, 1967	30.00	18.00	1.7
Dec. 24, 1967	31.50	18.00	1.8
Jan. 24, 1968	55.00	18.00	3.1
Feb. 1, 1968	70.00	18.00	3.9
Feb. 21, 1968	57.50	18.00	3.2

^{1/} New rupiah.

Source: USAID Mission Report, June 1968, "Indonesia's Fertilizer Requirements."

Research

46. There is an urgent need to increase by severalfold the variety, fertilizer and pest control experiments throughout the rice and maize producing areas of Indonesia. These could be coupled with field demonstrations to show farmers the benefits that could accrue from the use of improved varieties and other inputs. To strengthen the research and extension services will require, as an obvious first step, an increase in qualified staff and financial resources to support these services.

Marketing

47. The marketing infrastructure throughout Indonesia leaves much to be desired, and in certain areas, provincial actions restrict trade between provinces and thus act to restrain production. In the past, certain provinces have refused to release rice for sale to other parts of Indonesia because they feared this would raise local rice prices, and this must have had some depressing effect on production. While these restraints are no longer supposed to apply, in practice they still do. Present efforts to increase rice production must therefore be coupled with continuing efforts to improve marketing and transport facilities.

48. Many of the trading restrictions applying to rice mills have recently been removed, with a consequent marked increase in trading by the mills. However, this trend may be limited by high interest rates and shortage of credit. From what is now observable in the rice marketing system, as production increases serious efforts will have to be made to centralize and modernize rice mills, and to provide adequate storage and drying facilities for an expanding paddy crop. A strategic course of action for early attention would be to construct modern central mills, with adequate storage facilities, where irrigation systems are to be rehabilitated. Such mills could be integrated into the proposed system of unified irrigation management, and in due course, might provide the credit requirements against crop deliveries from farmers in each such scheme. This would also be consistent with the eventual emergence of cooperatives in such areas. It is difficult to obtain a reasonable estimate of the losses currently occurring in storage and milling, but these must be considerable. Some serious effort will also have to be made to improve the efficiency of existing mills by providing spare parts and assistance in rehabilitating the mills, and reasonable weather-proof storage.

Other Factors

49. In addition to the loss in rice production caused by the run-down condition of the irrigation systems, there is loss of rice and other food crops due to the serious flooding that occurs in most of the major river systems of Java each year. A major cause of flooding is the deforestation of the catchment areas of the main river systems, coupled with the cultivation of steep slopes and even the tops of hills without any attempt at soil conservation. While it would not be possible to reforest and stabilize the catchment areas of the major river systems prior to the rehabilitation of

irrigation systems and the start of construction of dams for water storage and flood control, these works should be carried out together. Steps must therefore be taken to prepare working programs for the major river systems.

Fish

50. In 1966 the ratio of sea to inland fish for local consumption in Indonesia was two to one. Sea fishery production is based on traditional techniques of fish traps and hand lining, and is centered in the coastal waters of the islands of the archipelago owing to the fishermen's reliance on sailing craft. In consequence, the catch per fisherman day^{1/} is low, and the considerable resources of the shallow seas of Indonesia are unavailable to the fishermen and the country. Only approximately 10 percent of the fishing fleet is motorized. An increase in this percentage, coupled with instruction in improved techniques for catching fish, should result in an increased catch per fisherman day and in total supplies to the consuming centers. However, there is an absence of adequate marketing facilities for landing the catch and distributing it to centers of consumption, and only limited storage. There is no credit for motorizing the fishing fleet or creating the necessary marketing infrastructure for potentially large consuming centers such as the major towns. It is reported that in North Sulawesi, the fishing fleet frequently lands a catch in excess of local requirements but because of lack of storage and transport facilities, this surplus cannot be transported to other consuming centers or to major centers of population. Even if transport were available, there would still be inadequate cold storage facilities at the receiving center.

Export Crops

51. Production in the estate sector has seriously declined because of:
- (a) The nationalization of estates and the departure of experienced personnel;
 - (b) A shortage of working capital which has adversely affected the replanting of overage perennial crops, the application of fertilizers and other inputs, and factory maintenance;
 - (c) The lack of managerial skills and knowledge of the considerable technical advances in the major export crops that have occurred elsewhere.

^{1/} Catch per fisherman day refers to the actual weight of fish caught in a single day's fishing and not to the average caught throughout the year.

52. Research work and plant introduction has been restricted, and in some cases it has practically ceased. The lack of staff, finance, and facilities of all types has resulted in a reduction in research work on the major export crops to the point where the industries are even unable to utilize the advances made elsewhere.

53. Given current depressed world prices and the present tax structure affecting exports, plus the neglect of plantations in the immediate past, the various export producing industries are unable to generate sufficient revenue to make an effective attack on the backlog of neglect. The immediate problem, therefore, is to bring about a reduction in this backlog of replanting in the rubber and oil palm industries and tea plantations, and supply the necessary fertilizer inputs for immature and mature plantations over a period of at least 4-5 years. Following this, producers should be better able to generate sufficient revenue to finance themselves an adequate maintenance program and the purchase of optimum levels of inputs. At the end of 1966, 48 percent of government rubber estates and 60 percent of non-government rubber estates were over 25 years of age. The age distribution of smallholder rubber is not known, but a very high proportion of the 1½ million ha. must be overage. The backlog of replanting in the oil palm industry is not as serious as in rubber -- 24 percent of the planted area was over 20 years of age at the end of 1967 as compared with 34 percent in 1963. The respective figures for areas under 5 years of age were 17 and 18 percent. In the estate tea industry, which was developed at the beginning of the century, 91 percent of the area planted is over 30 years of age, 6 percent is between 10-30 years, and 3 percent is under 10 years.

54. As replanting proceeds and fertilization of mature plantations is provided, assistance may be needed to modernize and expand the factories, but such need will not arise until about the third year of operation. The estates and for that matter smallholders at their present levels of production, cannot obtain credit for these purposes. The estates themselves are generally in debt to a degree that additional credit is unobtainable. Unless the estates, in particular, can obtain the necessary capital, their production will continue to decline.

55. Surplus sugar available for export has declined steadily since 1960, and there was no export in 1967. Yields of cane per hectare have also seriously declined compared with pre-War yields, and even with yields in 1957. Smallholder yields are also lower than estate yields. Eighty-five percent of the planted area is under two varieties released before the War. Up to a few months ago, the price of sugar on the local market was controlled at an unrealistic low figure, with the result that the sugar estates accumulated massive debts. The current sugar prices will not enable the sugar estates to service these debts, much less accumulate resources for the rehabilitation of the 55 small sugar factories equipped with machinery installed during the first three decades of this century.

56. Development of all aspects of the sugar industry - field, factory and management - would benefit from study of how, and to what extent, they could make a developmental contribution to Indonesia's growth. Any substantial improvement would have to include rehabilitation of the once-famous sugar research organization in terms of staff, land and equipment.

57. The current practice of estates being supplied with budgets just sufficient to meet their operating expenses, and not receiving the full return for their produce, has prevented most estates from carrying out essential replanting, maintenance, and the purchase of essential inputs, in sufficient quantity for both mature and immature crop requirements. The centralization of accounting systems and the fact that estates, up to quite recently, often did not know the prices realized for their produce, were not conducive to good management. Under the present reorganization, however, estate groups will be directly responsible for their own administration, accounts and sales.

58. During the short period spent in the field, some estates were observed which had efficient administrative and technical management, as well as estates which did not. In general, however, the field staffs have been divorced from contact with similar thriving industries elsewhere in the tropics, and because of this isolation both research and estates staff are not fully aware of the considerable technical advances made since the war in the rubber, oil palm, tea, sugar, coffee and coconut industries. If steps are to be taken to rehabilitate the export crops of Indonesia, it is essential that not only the research and extension staff, but estate, field and factory staff be brought into contact with new techniques and technical advances made in the production and processing of the crops with which they are working. The research services, in particular, should be able to procure on a regular basis technical literature and equipment, without which their research work is handicapped.

59. Another problem faced by the estates sector is the lack of incentive to the labor force. For example, an individual operating a heavy tractor receives about the same pay as a teaplucker or a factory janitor. Under these conditions, there appears to be little incentive to acquire greater skills, or to operate and maintain equipment in the most efficient manner. Similarly, the emoluments paid to staff, both research and in the field, are so low that to make ends meet people generally have two or more occupations, and their whole time and effort is not available to any single industry. There appears to be no incentive throughout the estate sector for increased efficiency, and when such occurs there appears to be no tangible reward for merit. The staff of efficiently run estates, for example, do not appear to derive any material reward for their efforts compared with less efficient organizations.

60. In North Sumatra, efforts are being made to diversify production on estates with criollo-type cacao clones introduced from Java. Some 400 hectares have been planted, and the early plantings (now some seven years old) appeared very promising. The inter-planting of overage oil palms with cacao is being tried, and shows promise. Cacao shows some promise for crop diversification in North Sumatra, and appears to be comparatively free of major diseases and pests at the present time. Consideration could also be given to increasing coconut production in North Sumatra and in the outer islands, using improved planting material which would probably have to be imported from overseas. In Sumatra, where there are considerable areas suited to oil palm, cooperative smallholder production of palm oil could provide a useful cash crop for resettlement schemes.

Agricultural Rehabilitation and Development

(a) 1968 Agricultural Project Program The following table outlines the position in July, 1968 in respect of the agricultural projects recommended by last year's Bank mission. It indicates the expected disbursements during the Indonesian 1968 financial year, which has recently been extended to the end of March, 1969.

Table 9

<u>Project</u>	<u>Organization and/or Country Concerned</u>	<u>Proposed</u>	<u>Total Foreign Exchange in US\$'000</u>		<u>Expected Disbursements(1968)</u>
			<u>Committed</u>	<u>or Under Negotiation</u>	
Production of Improved Seed	USAID	200	260		260
Vehicles for Agricultural Extension Service	USAID	250	280		280
Small Irrigation Pumps	-	600	-		-
Aerial Spraying against Stemborer	-	2,000	-		-
Replacement of Boilers in Sugar Factories	Holland	1,125	1,125		200
Brantas River Basin Development	Japan	13,100	13,100		4,118
Tjimanuk River Basin Development	-	750	-		-
Rehabilitation and Completion of Irrigation Systems in Java and S. Sumatra	IDA	1,400	5,000		2,500
Rehabilitation of River and Canal Dredgers	USAID	250	650		650
Sempor Irrigation Project	-	750	-		-
T O T A L		<u>20,425</u>	<u>20,415</u>		<u>8,008</u>

61. It will be noted that four projects, totalling US\$4.1 million, have not been taken up. Of these, donor countries have shown an interest in two projects, namely, small irrigation pumps and aerial spraying. In the former case, it was discovered that engines were required to drive locally made pumps, and it was suggested that the project might be offered to another country making the type of engine required. Although interest was shown in the aerial spraying project, the magnitude of the project is such that the countries interested were unable to contemplate the project. The Directorate of Water Resources of the Ministry of Public Works and Power has continued preliminary studies of the Tjimanuk River basin which will involve the re-forestation, erosion and water control of the upper regions of two river systems, the construction of three dams for water storage for irrigation and flood control, possible generation of hydroelectric power, and protection of Indramaju town from flooding. The Sempor project was inspected by the International Bank for Reconstruction and Development (IBRD) and U.S. A.I.D., and both concluded that before consideration could be given to taking up this project, the project (including the design of the dam) should be examined by consultants.

62. The project for the production of improved seed calls for the provision of agricultural machinery and equipment and seed cleaning and drying machinery for the 4,500 ha Sukamandi seed station. The station is to be used in the first instance for the production of seed of improved rice varieties, particularly the Philippine varieties released for cultivation in Indonesia. Subsequently, the farm will be used to bulk improved varieties of maize, soya bean, groundnuts and other food crops. USAID has examined the project. USAID had also examined the need for vehicles for the agricultural extension service in Java.

63. The Government of The Netherlands has agreed to take up the sugar boiler project which calls for three boilers to be distributed to two factories. A mission is shortly to visit Indonesia to determine the number and types of boilers required. The Government of Japan has agreed to continue financing the Brantas River Basin development project, which it has been financing in the past, and the necessary agreement was signed in June. The project dealing with the rehabilitation and completion of irrigation systems in Java and Sumatra was appraised by IBRD in March, and negotiations with IDA were to be undertaken in August; the \$5 million credit includes a provision of \$1 million for consultants' services throughout the life of the project. The request for spare parts to continue the rehabilitation of river and canal dredgers was studied by a USAID mission in July.

(b) 1969/70 Agricultural Project Program

64. The program in Table 10 has been devised in the context of the Government's plans for a five-year development program commencing in 1969. No project is likely to be completed in the 1969 financial year, although, in the case of a few, it should be possible to complete the expenditure of the foreign exchange element if the projects are taken up early in the year. The majority of the projects will extend over the five-year period and some will go beyond 1973.

65. The projects listed were selected from various proposals of the Ministries of Public Works and Power and Agriculture. Certain of the projects are brought forward from the 1968 program. Others, such as those for rehabilitation of export crops and river basin development will have to be subdivided into sub-projects to facilitate their execution. A few of the projects or sub-projects are ready for appraisal, while others await the completion of feasibility studies and other project preparation.

Projects to be Executed by the Ministry of Public Works and Power

66. Brantas River Basin. This is a continuing project which it is now proposed to expand by the addition of the foreign exchange component of the Kali Porong sub-project. The sub-project would be commenced in 1970/71 on the completion of the Karang Kates and Sidoredjo dams in the upper part of the basin. The estimated foreign exchange cost of the Kali Porong sub-project is \$5 million, of which provision has been made in the 1969/70 program for \$1.6 million for the period 1970/73. The total cost of the sub-project is estimated to be equivalent to \$11 million.

67. To complete the rehabilitation of the Brantas river basin, it will be necessary to carry out the Kali Porong sub-project which involves the replacement of the Leng Kong dam on the Kali Porong river, the dredging of the river between the dam and the sea with the building up of the levees and the straightening of the river course with a view to preventing the frequent serious flooding of the fertile delta area, which is the granary of East Java. The Nippon Koei Company has carried out a feasibility study of this sub-project. If full advantage is to be taken of the increased supply of irrigation water from the two dams mentioned heretofore, and the new Leng Kong dam, it will be necessary to rehabilitate the irrigation and drainage systems on the 40,000 ha in the delta area, presently intensively cultivated with some 30,000 ha of rice, 6,000 ha of sugarcane plus other food crops. This rehabilitation has been provided for as a sub-project of the rehabilitation and extension of irrigation systems project.

68. Tjimanuk River Basin. This project comprises the three river basins of the Tjimanuk, Tjipanas and Tjiwaringin rivers, and the Indramaju plain covering 500,000 hectares. It involves flood control and water storage by dams for all year round irrigation of 130,000 hectares and the generation of electricity, the strengthening of river levees and the construction of a by-pass canal for the mouth of the Tjimanuk river to remove the flood threat to Indramaju town as well as the rehabilitation of the irrigation and drainage systems and hydraulic structures. Three major dams and three minor dams are proposed. The reforestation and soil erosion control of the catchment areas of this complex is provided for in a Ministry of Agriculture project.

69. The 1968 IDA credit has provided for the rehabilitation of the Rentang irrigation system which covers 90,000 hectares of the 120,000 ha of the Indramaju plain. Any further rehabilitation sub-projects for irrigation systems in the area would be in Project 3 on the 1969/70 list.

Table 10

1969 Agricultural Project Program
(In US\$ '000)

	<u>Total Foreign Exchange Element</u>	<u>Committed by 1968</u>	<u>Commitment Requested by the Indon. Gov't for '69</u>	<u>Commitment Recommen- ed by the Mission</u>
Ministry of Public Works and Power				
1. Brantas River Basin	14,700	13,100	1,600	1,600
2. Tjimanuk River Basin	1,000	-	1,000	1,000
3. Rehabilitation and Extension of Irri- gation Systems	13,000	5,000	8,000	8,000
4. Rehabilitation of River and Canal Dredgers	2,050	250	1,800	1,800
5. Sempor Irrigation & Dam	4,800	-	4,800	4,800
6. Tidal Irrigation	2,000	-	2,000	2,000
7. Dredging of River Mouths	3,550	-	3,550	1,000
8. Tadjum Irrigation	650	-	650	650
9. Hydraulic Institute	1,400	-	1,400	1,400
10. Solo River Basin	22,000	-	1,500	1,500
11. Volcanic Debris Control	1,000	-	1,000	1,000
12. Flood Control of Rivers	2,700	-	2,700	1,200
Total	68,850	18,350	30,000	25,950
Ministry of Agriculture				
1. Production of Improved Seed	1,100	-	1,100	900
2. Small Irrigation Pumps	600	-	600	600
3. Vehicles & Boats for Extension Service	550	-	550	550
4. Rehabilitation of Sugar Industry	3,125	1,125	2,000	1,200
5. Rehabilitation of Rubber & Oil Palm Estates	18,500	-	18,500	12,000
6. Rehabilitation of Small- holder Rubber	5,000	-	5,000	-
7. Rehabilitation of Tea Estates	10,000	-	10,000	4,000
8. Rehabilitation of Catch- ment Area of Brantas River	2,500	-	2,500	2,500
9. Rehabilitation of Catch- ment Area of Tjimanuk River	2,500	-	2,500	2,500
10. Rehabilitation of Catch- ment Area of Dratuneseluna River	2,500	-	2,500	2,500
11. Mechanization of Fishing Boats	500	-	500	500
12. Service & Storage Facilities Tuna Fishing	2,000	-	2,000	2,000
Total	48,875	1,125	47,800	29,450

70. A feasibility study for this project has not yet been carried out. Although some data has been collected, this is not sufficient to enable a feasibility study to be undertaken. Provision was, therefore, made for \$1 million of foreign exchange to enable the necessary surveys and studies to be undertaken with a view to the preparation of a feasibility study.

71. Preliminary estimates for the period 1969/73 are \$20 million for foreign exchange and rupiahs 20,000 million. The foreign exchange required for 1969 was \$1 million and rupiah expenditure 400 million. The benefits to be expected are double cropping of 97,000 ha (presently only some 33,000 ha are double cropped), the obtaining of crops from some 20,000 ha annually lost because of floods, plus other benefits of flood control, and some 350 million KWH.

72. Rehabilitation and Extension of Irrigation Systems. This is an expansion of a 1968 project which was the subject of the IDA credit of \$5 million. Twelve sub-projects have been proposed, two each in the provinces of East, Central and West Java, Lampung and Atjeh, and one each in North and South Sulawesi. About 365,000 ha are to be rehabilitated and 65,000 ha added by the extension of certain of the irrigation systems. The preliminary estimates involve the expenditure of \$8.7 million in foreign exchange and rupiahs 6,735 million. In consequence, the foreign exchange estimate has been raised by \$8 million to \$13 million. None of the sub-projects are at the feasibility study stage. It should be possible for this stage to be reached for one to three sub-projects in the second half of 1969, with the assistance of the consultants to be employed with the IDA credit mentioned heretofore. The rehabilitation of irrigation systems should be given the highest priority.

73. Rehabilitation of River and Canal Dredgers. This is an extension of the 1967 and 1968 projects which were financed by USAID, and provides for additional spare parts to complete the rehabilitation of dredgers in South Kalimantan and South Sumatra and the provision of workshop and slipway facilities in both areas at a foreign exchange cost of \$1.8 million and a local currency cost of rupiahs 4,750 million.

74. USAID provided spare parts under a 1967 request. In July, it was understood that the 1968 request for further spare parts was about to be accepted and the mission, which made this recommendation, agreed that workshop and slipway facilities, in that order, were also necessary for the rehabilitation and subsequent maintenance and servicing of the dredger fleet. In consequence, the foreign exchange cost of the project has been raised to \$2,050 and local cost by rupiahs 4,750 million.

75. Sempor Irrigation and Dam. The foreign exchange cost is estimated at \$4.8 million and local costs at rupiahs 4,500 million. The Sempor dam has been re-designed and should be ready for examination by consultants towards the end of the year. It is also recommended that the dam site should also be examined by consultants as well as the need for spare parts to recondition the equipment on site and to determine what additional equipment is necessary, following which the project can be offered for commitment.

When considering additional equipment for the project, account should be taken of the equipment to be purchased for project No. 8 Tadjum Irrigation. The latter project has been included in the list on the understanding that all equipment to be ordered under this project will be moved to the Sempor project when the irrigation system of Tadjum has been rehabilitated, which is estimated to take one year.

76. The project is situated on the south coast of Central Java and should enable the double cropping of 16,000 ha of rice land together with flood control. The Government has already expended considerable sums on the project, which was brought to an abrupt halt when the cofferdam overtopped and broke in November, 1967.

77. Tidal Irrigation. For some years, the Government of Indonesia has been undertaking the reclamation of swamp areas in the river deltas of South and Central Kalimantan and South Sumatra and has recently extended this work to West Kalimantan. The work involves the cutting of primary canals cum drains from one river to the adjacent river, with secondary canals cum drains at right angles to the primaries, the tertiaries being dug by the settlers who are also responsible for clearing their farms. Some 120,000 ha have been opened up in this way in recent years and have been settled mainly by the indigenous population and to a lesser extent by transmigrants from Java. The project proposed envisages the reclamation over the next 15 years of some five million hectares of swamp, with a target of 1½ million ha for the five-year period 1969-73. The methods to be used are to dig the primaries and secondaries with dredgers, land clearance both for the canals and for the reclaimed land to be done by bulldozers and, according to the suggested program, by the end of 1973, 145 - 12" dredgers and 1,545 bulldozers would be in operation. The total cost of the project is estimated at US\$203 million in foreign exchange, the local currency requirement being rupiahs 235,500 million.

78. No topographic or reconnaissance soil surveys have been conducted prior to clearing, although it is known that the areas being developed are covered in tropical peat within a short distance of the river banks, the depth of peat varying from area to area, but in general increasing with distance from the river banks. In South Kalimantan, the peat depth was generally stated to average about 75 centimeters, increasing as one proceeds away from the river, to a depth of 1-2 meters. In West Kalimantan, a survey of a primary canal indicated that in the center of the canal between two rivers, the depth of peat reached nine meters. In the Tjintamanis scheme in South Sumatra, the depth of peat appeared to be in the vicinity of 100 centimeters. No experiments had been undertaken to determine whether bulldozers could operate economically in these inundated areas with varying depths of peat. Helicot dredgers have operated satisfactorily provided vegetation is cleared from the canal line prior to digging. In South Sumatra, small draglines fitted with hydraulic grabs have successfully cut secondary canals.

79. The operating principle is based on the ebb and flow of the tides, the commanded areas being drained and irrigated as the tide rises and falls with the addition of rainfall. No control structures are used to retain in or keep out water from the paddy fields.

80. The primary and secondary canals, 20 and 10-15 meters wide respectively, have been dug to date in a square cross section to a depth up to four to six meters, on the principle that the top triangle will slide into the bottom triangle of the cross section thereby giving a canal with an adequately graded side. There was ample evidence in both South and West Kalimantan and South Sumatra that this theory does not work, and the slippage of the primary and secondary canals was such that some of the former were practically impassable at low water. The authorities now appreciate the fact that the primary and secondary canals must be properly designed and cut with sloping sides to prevent slippage of the banks. The soils of the areas are suitable for rice cultivation with careful management, and fruit trees and other food crops can be grown on the canal embankments. Once the very acid water of the swamps has been flushed away, there is a danger of developing toxicity if the soils are dried out for long periods of time, hence the need for careful management as well as for the provision of gates on the secondary canals as well as on the tertiaries, when these discharge into the primary canals.

81. One of the tidal irrigation settlements which was developed some twenty years ago and was previously under rubber is supporting peasant farmers growing a single crop of rice per annum plus food and tree crops on embankments. Cultivation stops when the peat layer becomes too deep, and farmers indicated that rice yields decreased as the depth of peat increased to a point where it was no longer profitable to plant rice. Yields of rice are comparatively low in the second year after clearing, but within 4-5 years increased to the average for the area which is estimated to be about one ton of rice per ha. The provision of gates on the secondary canals and/or small pumps to supplement tidal action would undoubtedly improve yield and could permit the cultivation of two crops per year using varieties with a shorter growing period. With little additional expenditure, existing settled areas could be developed into rudimentary empolders which in time could be consolidated. The cost of fully empoldering these swamps would be prohibitive. In the long term, however, working empolders, albeit not perfect, could be achieved provided the swamps were drained, the drainage system being utilized for irrigation, supplemented by portable pumps operating from barges in the primary canals and provided the secondary canals and tertiaries were equipped with gates for water control.

82. The project, as currently envisaged, raises difficult problems. There is a need for the development of the vast swamps in Indonesia and a practical and economic method of draining and developing these swamps must be developed. In consequence, the suggestion was made that two pilot areas should be selected, one in South Kalimantan and one in South Sumatra, on which various types of machinery could be tested and practical techniques worked out for the development of these swamps. This would involve the employment of experienced consultants in swamp reclamation to assist the

young and energetic staff of the tidal irrigation section of the Directorate General of Water Resources, in ordering machinery for test purposes and devising techniques for trial in the field. \$2 million in foreign exchange has been proposed for this purpose, the experimental period being 1-2 years, the assumption being that the bulk of the machinery would be ordered and received during the 1969 financial year. Early steps should also be taken to send overseas two or three of the senior staff concerned with this project, to study methods in use for reclaiming similar land elsewhere.

83. Dredging of River Mouths. It is estimated that the major rivers in Java, Sumatra and Sulawesi have silted up to such a degree that steps to clear them will have to be taken in the immediate future. Preliminary rough estimates indicate that 160 million cubic meters of silt will have to be moved, which would then facilitate discharge of the rivers during times of flood. Detailed investigation and surveys of the major river mouths have not been conducted, primarily because of the absence of the necessary expertise and sea-going equipment. Preliminary estimates indicate that the total cost would be of the order of \$3.55 million, of which \$1 million would be required for surveys and investigation, the rupiah cost being respectively 500 million and 5 million.

84. In the absence of dredging equipment capable of operating in river mouths and in the coastal waters outside the rivers, it is suggested that this work be undertaken by contractors. Provision has therefore been made for \$1 million in foreign exchange for the employment of a suitable contracting firm to undertake the surveys and investigations required. On the results of this work, the total foreign exchange cost of the project will probably have to be revised following which it can be offered for commitment.

85. This project is linked with river basin development and rehabilitation of irrigation systems and flood control, as well as the rehabilitation projects for the reforestation and stabilization of catchment areas of the main river systems.

86. Tadjum Irrigation. This project is situated on the south coast of Central Java and caters for some 4,000 hectares of rice land presently rain fed. Water is taken from the Tadjum River by a semi-permanent weir made of bamboo and timber, which was constructed in 1943 and which is presently being replaced by a permanent weir scheduled for completion in 1970. Application is made for the equipment and materials required to construct 17 hydraulic structures, 29 kilometers of primary canal, etc., to complete the scheme at a foreign exchange cost of \$650,000, the local rupiah cost being 700 million.

87. The project has been included because of the fact that the weir, financed entirely by the Government, is nearing completion and on the understanding that the equipment to be ordered with the foreign exchange suggested, will be moved to the Sempor irrigation and dam project on completion of irrigation works at Tadjum. The work at Tadjum is expected to be completed within one year of the equipment arriving on the site.

88. Hydraulic Institute. Assistance is being received from the UNDP to prepare a plan and estimates for the reorganization and development of the Institute of Hydraulic Engineering, the services of which organization are essential for the future work of the Ministry of Public Works and Power. The estimates involve buildings, equipment and materials for laboratories, river gauges and other measuring devices, office equipment, vehicles, 21 man-years of foreign experts and 75 man-months of fellowships. The cost is estimated in foreign exchange to be \$1.4 million and the local rupiah costs are 554 million. It is understood that revised estimates, which are likely to be similar to those given above, should be available in the near future, prepared with the assistance of the UNDP expert working with the Directorate General of Water Resources.

89. Solo River Basin. In the expectation that the major works on the Brantas River basin will be completed in 1971 save for the Kali Porong sub-project, and that Indonesian resources and manpower will be available for the rehabilitation and development of another major river system, this project has been accepted on the understanding that provision is only made for preliminary preparation work and studies with a view to the Djipang multipurpose sub-project being commenced in 1971-72. The Bengawan Solo River basin development project has been studied by the Nippon Koei Company and can be sub-divided into four sub-projects which will have to be coupled with an agricultural project for the rehabilitation of the catchment area of the Bengawan Solo River basin. It is understood that the latter project is to be the subject of an application to the UNDP.

90. The Nippon Koei Company has undertaken a feasibility study of the Djipang multipurpose sub-project which includes the construction of the Djipang dam, the rehabilitation and expansion of the irrigation and drainage systems in the lower Bengawan Solo river basin below the dam, together with flood and river control. They have also studied the Gadjah Mungkur multipurpose sub-project, which would provide flood control and improved irrigation facilities to the upper Bengawan Solo River basin. This latter study is incomplete. Moreover, the development of the upper Bengawan Solo River basin should be coupled with the reforestation and erosion and water control of the catchment area. Bearing in mind that the Djipang multipurpose sub-project will take some eight years to complete and a start will not be made until 1971-72, it was considered that this sub-project could be included in the program being limited to preliminary preparation and study in 1969. It should enable the control of the extensive flooding that presently takes place in the lower Bengawan Solo River basin, with consequential crop loss, together with the opportunity to grow two crops of rice per year on 130,000 ha. of suitable rice land. The area of the lower Bengawan Solo River basin, which is flooded annually, is about 40,000 ha., and the water level of the river itself is often higher than the level of the surrounding land for long periods during the wet season. Of the 222,000 ha. of rice land presently under cultivation, only seven percent is capable of producing two crops per annum.

91. The total cost of the project is presently estimated to be the equivalent of \$60 million, of which the foreign exchange element would be \$22 million. The Nippon Koei Company have estimated the benefit from

flood control as \$5.8 million, and that from two crops of rice per year as \$25.3 million, giving a total net annual benefit of \$30 million. Subject to further study, the net benefit attributable to rice is considered to be on the high side.

92. Volcanic Debris Control. Following eruptions of volcanoes in Indonesia, serious siltation problems have developed in some of the major river systems such as the Brantas and Bengawan Solo, caused by large quantities of ash being washed into the river systems during the rainy season. This problem requires a study by experts in this field, with a view to devising techniques to prevent the heavy washing of ash into the river systems following eruptions. A proposal is made for a study of the problem, and funds to purchase equipment and materials for experimental work in connection therewith. US\$1 million in foreign exchange is proposed, to be expended over two years.

93. Flood Control of Rivers. Owing to the deforestation and extensive cultivation of the catchment areas of the river systems in Indonesia, in particular in Java, coupled with volcanic eruptions, the rivers have become silted up and the beds have been raised to such a degree that valuable farming land has had to be protected by levees. With the continuing silting up of the rivers, these levees have to be raised and there is the constant danger to the population living on the plains. Moreover, water intakes for irrigation systems as well as dams are being silted up, and the canals of the irrigation systems throughout the country have to be rehabilitated because of the siltation problem and prolonged lack of maintenance. Provision has been made in this project for \$2.7 million in foreign exchange to be spread over two years, for a study of the main river systems, with a view to planning their systematic improvement and determining the best methods to achieve this. Funds are provided not only for supplies and equipment, but also for consultants' services. This work would have to be integrated with plans for the reforestation and soil and water control of the catchment areas of the main river systems, which projects would be the responsibility of the Ministry of Agriculture.

Projects to be Executed by the Ministry of Agriculture

94. Production of Improved Seed. The 1968 project has been expanded to provide for the setting up of three additional seed farms, each of about 1,000 ha, one each in Central and East Java and one in Sumatra, to produce, in the first instance, seed paddy of improved varieties, particularly the Philippine varieties, and subsequently improved varieties of maize, groundnuts and soya beans as well.

95. The present system of rice seed production is unsatisfactory and there is an urgent need to ensure that seed of improved varieties sold to farmers is pure and true to type. In the absence of commercial seed farms and with the possibility of further improved varieties from IRRI, requiring quick bulking of seed, urgent steps need to be taken to provide the means

of rapidly multiplying improved varieties when released and ensuring the quality of the seed delivered to the farmer. The four seed farms, when fully developed, should be able to produce sufficient seed to plant 1-1/2 million ha annually, assuming that the farms have year-round irrigation facilities enabling two crops per annum, and are equipped for mechanized cultivation, harvesting and drying.

96. The present estimated foreign exchange cost of equipment for the West Java seed farm is \$316,000. The foreign exchange cost of the seed farm project has been increased to \$1.1 million and this could be disbursed in 1969 if the Government is able to earmark for this purpose suitable estates in Central and East Java and Sumatra.

97. Small Irrigation Pumps. On further investigation of this 1968 project, it was determined that the request was for engines to drive locally manufactured seven-inch centrifugal pumps. The project has been retained as the use of small pumps in rice producing areas to supplement rainfall would materially benefit yields. The foreign exchange cost is estimated to be \$0.6 million.

98. Vehicles and Boats for Extension Service. In July, the 1968 project had been examined and it was understood that an offer was about to be made to the Government of the foreign exchange necessary to provide each regency in Java with a jeep plus five demonstration vehicles. The project has been expanded to provide vehicles and boats where necessary for extension service personnel in Indonesia, outside Java. The foreign exchange has therefore been increased by \$0.3 million to \$0.55 million.

99. Rehabilitation of the Sugar Industry. In 1968, a proposal was made to purchase urgently needed boilers for two sugar factories, and this proposal was accepted by the Government of the Netherlands. A proposal was made to expand this project in 1969, involving the expenditure in foreign exchange of \$30.5 million on purchasing new machinery for 22 factories over the period 1969-73. A further series of proposals were received for the rehabilitation of eight groups of sugar factories comprising 46 mills, involving expenditure on cultivation, transportation equipment, factory machinery and equipment for manufacturing paper and particle board from bagasse and monosodium glutamate requiring foreign exchange expenditure of \$17.7 million in 1969 and \$56.4 million over the period 1969-1973.

100. The 55 sugar factories in Indonesia are all small by modern standards and, for practical purposes, there has been no new machinery installed in them since the 1930's. The production of sugar by smallholders has markedly increased over the past few years and this inefficient production should be faded out in the interests of increasing the efficiency of land use. Before expenditure of this magnitude could be considered, the Government needs to define its policy as to the future of the sugar industry. Is an effort to be made to re-enter the export market, or should the country aim at self-sufficiency in sugar production and its by-products, planning

the rehabilitation and modernization of the industry to cater for population growth? It is suggested that in the context of world sugar production, the latter policy should be considered. Once the policy is determined, a small team of experts should be invited to survey the sugar industry and make recommendations for its rehabilitation both in the field and factory, and in management. Consideration should be given to centralize mills and their expansion, concentrating on sugar production in areas most suited to this crop, the expansion of the research and extension services serving the industry and the local marketing of the crop, including the price at which sugar is sold. Following consideration of the mission's findings, a revised project can be formulated.

101. In consequence, the expanded project request for foreign exchange was reduced to \$2 million of which it is suggested that \$1.2 million be disbursed in 1969 to meet the cost of the mission and to purchase any urgently needed equipment condemned as unsafe, such as boilers.

102. Rehabilitation of Rubber and Oil Palm Estates. With the absorption of the Ministry of Estates by the Ministry of Agriculture, the estates have been regrouped and their administration has been decentralized. The new groups are multi-crop rather than mono-crop as heretofore and, in consequence, it appeared desirable to link rubber and oil palm into a single project as each sub-project would probably be confined to a single estate group. These crops are also linked by the fact that for ecological or other reasons, it may be desirable to replant overage rubber with oil palms or vice versa. Some replanting of both overage rubber and oil palms has taken place in recent years, but the neglect of the past has built up a backlog of replanting which the present resources of the estates are unable to make good. It would appear that more attention has been paid to replanting overage oil palms than rubber; in 1963, 34% of about 105,000 ha under oil palms were over 20 years of age while in 1967 this had been reduced to 24%. In the 504,000 ha under rubber, the position is worse in that, in 1966, 48% of the rubber planted on Government estates (242,000 ha) was over 25 years of age and 60% of that on non-government estates (262,000 ha) in 1965; 34% or about 170,000 ha of all estate rubber was over 30 years of age. Declining production in both crops is not only due to senility of plantations, but to lack of financial resources to purchase fertilizers and other necessary inputs. It is therefore necessary to finance not only the purchase of such inputs as fertilizer, but also the replanting of overage plantations. The greater part of the cost of rehabilitation will be local currency costs. If this project is to be undertaken, part of the local currency cost of the project will have to be obtained by the sale of foreign currency because of the shortage of local currency finance available to the estates.

103. A project to replant all estate rubber over 30 years of age, costing the equivalent of \$4.5 million, was unofficially submitted together with a tentative project to increase the number of Hevea crumb factories presently being installed, which number 10. Assistance was also sought to finance the inter-cropping of newly planted rubber on estates with upland

rice; rice is an essential ingredient of the daily ration given to the labor force. The inter-cropping of newly planted rubber, with rice, even if adequately fertilized, is not to be encouraged, save in a major emergency such as war. It would be preferable to formulate a rice project designed to produce rice for estates rather than accept intercrop production with the low yields that will be obtained.

104. In the oil palm sector, four projects in North Sumatra and Atjeh were suggested, involving the replanting and/or extension of oil palms on a total of 21,000 ha at a cost of \$7 million. The extension of oil palms on 5,000 ha of one of the estates in these proposals has been the subject of an application to the Asian Development Bank in August.

105. A broad based project was finally proposed and included in the program, which would permit of flexibility in the designing of sub-projects. This involved a foreign exchange cost of \$18.5 million over the period 1969-73, a part of which will be used to buy rupiahs to finance part of the local costs. This was subsequently reduced to \$12 million for commitment in 1969 when detailed sub-projects have been worked out for selected estate groups. Such sub-projects should be designed to make good the backlog of replanting on both the rubber and oil palm estates including the provision of fertilizers to mature plantings for a period of 3-4 years, and should provide for factory expansion as required by the replanting program. A careful study of the rubber and oil palm estates will be necessary before sub-projects can be prepared.

106. Rehabilitation of Smallholder Rubber. It is estimated that smallholder rubber covers 1,520,000 ha and accounts for 70% of the country's rubber production. Yields are very low, 200-300 kg/ha and the quality is poor, as manufacturing conditions are primitive.

107. Various unofficial proposals were made, including the planting of 15,500 ha annually for five years of new land belonging to smallholders and/or eroded land, the purchase of equipment to re-equip processing plants, together with supplies of formic acid and to convert remilling plants to crumb rubber production as well as the erection of new crumb rubber plants to serve smallholders.

108. The rehabilitation of the smallholder rubber industry will be a complex problem and will require detailed planning and the active cooperation of the people concerned. There is no doubt that the problem has to be tackled, but the return will be much slower than in the estate sector. Assuming that costs of establishment will be lower, because of the smallholders' active participation in any replanting scheme as already proposed, a foreign exchange provision of \$5 million for five years has been included, a considerable proportion of which will be used to finance local expenditure. No provision has been made for a commitment in 1969 as the time factor and need for detailed preparation of any sub-project, together with the people's agreement, would preclude firm proposals being put forward in the near future.

109. Rehabilitation of Tea Estates: It is estimated that 65,000 ha of tea are under the control of estates, of which about 38,500 ha are Government-owned. The estimated production for 1968 is 39,000 metric tons, of which 6,000 tons will be sold locally. Yields are low because of lack of fertilizers, other inputs, and the fact that the average stand of tea on the few estates visited is probably not more than 80%. The quality is well below pre-war standards occasioned, in large measure, by the "course" and "medium" plucking in use. An almost immediate increase in foreign exchange earnings could be obtained if the industry commenced to "fine" pluck and adequate fertilizers were consistently applied annually. For example, on one estate over the period 1964 to 1967, the fertilizers applied to tea were 51, 22, 81 and 100% of the annual requirements.

110. Four unofficial proposals were received, the major one of which was to supply fertilizer, insecticide and fungicide inputs to 45,000 ha of tea annually over three years, at a cost of \$18 million. The other three projects involved the uprooting and replanting of 2,000 ha of tea on Java with stumps from a clonal nursery to be established and the expansion and re-equipping of factories to cater for the increased yields expected from the 2,000 ha replanted.

111. If the Indonesian export tea industry is to recover and be placed on a firm foundation for the future, it will be necessary to inject substantial working capital into the industry over the next five years, which the industry is incapable of generating. In consequence, a project has been suggested which will enable sub-projects to be devised dealing with the rehabilitation of tea estates in any locality. The rehabilitation of a tea estate will, amongst other things, require:

- (a) The in-filling of tea gardens where the stand is such as to warrant such action;
- (b) The replanting of tea gardens where the stand is so sparse as not to justify in-filling;
- (c) Adequate fertilization of not only the immature but also the mature tea coupled with adequate pest and disease control;
- (d) The replacement of such items as bamboo slatt withering trays in factories;
- (e) The expansion, re-equipping and modernization of tea factories when justified by increasing field production. Consideration should be given when replacing machinery to rotovane and/or CTC manufacture, reversible withering troughs, etc.
- (f) Improvement of husbandry, particularly pruning, plucking and soil conservation and the provision of good quality planting material.

112. The foreign exchange suggested for this project is \$10 million, of which \$4 million should be committed in 1969. Any commitment should be linked to the procurement of at least two tea field experts for the life of the sub-projects, to assist the authorities concerned and train counterparts in the management, operation and rehabilitation of the estates. Also, the full benefit of rehabilitation will not be reaped unless the industry resorts to "fine" plucking and any commitment should require this to be implemented on the tea areas in the sub-project.

113. Rehabilitation of the Catchment Area of the Brantas River. This project is complementary to the Brantas River basin project being carried out by the Ministry of Public Works and Power, and should have been put in hand before the development of the river basin. The reforestation of the catchment area, both public and private land and erosion control is necessary to stabilize the basin development. The preliminary proposal involves the reforestation and replanting under perennial cover of some 80,000 ha coupled with soil conservation work on dry-farmed areas at a foreign exchange cost of \$2.5 million, including local rupiah costs over the period 1969-73. No doubt this project will be expanded and revised if expert assistance, which it is understood is about to be requested from UNDP, is obtained.

114. Rehabilitation of the Catchment Area of the Tjimanuk River. This project is complementary to the Tjimanuk River basin project of the Ministry of Public Works and Power, and would in time affect the maintenance of the irrigation systems in the basin, one of which is presently being rehabilitated with an IDA credit. Of the 353,000 ha in the upper river basin, it is estimated that 13,000 ha are seriously eroded, 44,000 ha severely eroded, 7,000 moderately eroded and 12,000 ha of forest requires replanting. An indication of the erosion can be obtained from measurements of soil losses made in 1911-12 on the Tjilutung River, a tributary of the Tjimanuk, which were 821,000 tons per annum compared with estimated losses of 1,790,000 tons per annum in 1934-45. Since then, much of the remaining timber has been removed and cultivation has extended on to the steeper slopes. The preliminary project involves reforestation and soil conservation and the foreign exchange cost including local costs for 1969-73 is \$2.5 million. Again, this project will be subject to expansion and revision if assistance is received from the UNDP.

115. Rehabilitation of the Catchment Area of the Dratunseluna River. This project is complementary to the rehabilitation of irrigation systems sub-project in East Semarang, presently being financed with an IDA credit. The catchment area of the river has been denuded of forest and is subject to severe erosion. It is estimated that some 36,000 ha require to be replanted, coupled with soil conservation measures on dry farmed land. The foreign exchange cost for 1969-73, including local costs, is estimated to be \$2.5 million. This project will be subject to expansion and revision if assistance is received from the UNDP.

116. Mechanization of Fishing Boats. Some 90% of the fishing fleet of 256,000 boats are small sailing craft whose use is limited to the coastal waters of the country. Ten percent is motorized and, of these 23,000 boats, some 1,500 are equipped with outboard engines. There are about 900,000 fishermen who, with their dependents, number some five million. In 1966, it was estimated that the combined production of the fresh water and sea fisheries was about 1.2 million metric tons which, with a population of some 115 million, gives a per capita consumption of just under 11 kg per annum. In a country short of animal protein and with abundant untapped resources in the extensive waters of the archipelago, there is an urgent need to increase the harvest from the sea. It should be possible to achieve this by mechanizing the fishing fleet thereby increasing their range, reducing the non-fishing time between the fishing grounds and markets and increasing the catch per fisherman day. As mechanization proceeds, additional projects will be required to improve the landing, servicing facilities of the fleet, and the marketing and distribution of the catch, including storage. It is proposed to commence the mechanization of the inshore fishing fleet feeding the major centers of population by the installation of engines in the sailing boats coupled with training of crews in the servicing and operation of the engines. At the same time, a study should be made of the marketing, distribution and storage requirements for the major centers of population and trials conducted to improve fishing techniques. A preliminary estimate of the foreign exchange element of the first year's cost of this project is \$0.5 million. This will enable a start to be made while a more comprehensive long-term project is developed.

117. Service and Storage Facilities for Tuna Fishing. Tuna is found in commercial quantities in the eastern waters of the archipelago around Sulawesi, the Molluccas, the Lesser Sunda islands and West Irian. At the present time, motorized fishing vessels, operating out of northern Sulawesi, are reported to be unable to sell their catch, save at very low prices, and are also unable to stay at sea because of the lack of cold or chilled storage facilities on board. A preliminary project is proposed to equip the North Sulawesi boats with suitable storage facilities and to provide cold storage facilities ashore together with servicing facilities for the fleet. The estimate of \$2 million in foreign exchange is tentative pending the drawing up of detailed proposals which will have to include proposals for transporting the frozen catch to the main consuming centers on other islands. In the first instance, this may have to be in portable refrigerated containers carried by the inter-island shipping service. Provision has been included for the necessary expert assistance to help draw up the project which should be regarded as a pilot operation.

CHAPTER 2

INDUSTRY

General Problems of the Sector

1. Overall, there has been a modest improvement in industrial production in 1968 over 1967, by an estimated 4-5 percent, principally as a result of improvements in the textile and tobacco industries. Supplies of raw cotton and yarn have increased, and with the pipeline filled, fuller use of the installed capacity can be expected. Some companies have been returned to their previous owners, equipment rehabilitated and working capital increased with improvements in the rate of production. In few, if any, industries were there any serious setbacks in output.

2. Nevertheless, a large amount of under-utilized capacity persists as a result of one or more of the following factors which will be described more fully later in this report:

- (a) The continuing recession in general economic activity;
- (b) Loss of position in the domestic market by some companies as a result of larger imports having lower costs and/or better quality;
- (c) Lack of aggressive marketing efforts by domestic manufacturers;
- (d) Imbalances and inadequacies in taxes and tariffs;
- (e) Lack of adequate working capital which affects, among other things, acquisition of necessary spare parts and raw materials;
- (f) Obsolescence and ineffectiveness of certain processing equipment.

3. In recent months a rehabilitation program has been carried out to raise the operations of some state enterprises to the original design capacity through equipment acquisition or spare parts replenishment. However, in many instances, adequate attention has not been given to the economics of the enterprise when so rehabilitated.

4. The factors, which led to the present structure of the manufacturing sector and in particular to the choice of individual plant capacities, need not be dwelt upon here, as it was commented in last year's Bank report. It is important, however, for private entrepreneurs and government authorities to keep firmly in mind the importance of economics of size, not only with respect to new ventures but in connection with existing units. With new enterprises, this can be done when applications are made under the Domestic and Foreign Investment Laws. Concerning existing units, the private and government spinning facilities are an excellent example of the need to expand existing establishments (to lower average production costs) before constructing new plants.

5. The mission has previously stressed the shortage of personnel engaged in the industrial planning activities. Until this deficiency is corrected, industrial development will suffer. Presently, there is limited coordination among related agencies of the Government. There must be more

joint planning, for example, between the Departments of Agriculture and Industry on fertilizer and insecticides; between Forestry and Industry on upgrading of timber to lumber, plywood and paper; between BAPPENAS and Provincial governments; between BAPPENAS and the Foreign Investment Commission - just to mention a few.

6. Management Training. There continues to be a large and urgent need for trained managers at all levels of management. Nowhere in Indonesian circles does there appear to be a recognition of the size, scope and duration of the program required to meet the present deficiency and provide for the expected expansion in the economy. Unless a broad management training program is established, the desired rate of development of the industrial sector will not be achieved. Men possessed of management capabilities and experience are required even before the money and materials for any proposed enterprise.

7. The authorities should encourage and support training programs for all levels of lower, middle and top management. This activity is of immense importance to Indonesia at its present stage of development. It is a program that will need to be sustained indefinitely. Not only are the long-term management courses at universities required, which lead to bachelor and advanced degrees, but even more compelling is the need for medium and short-term courses. The mission feels that the earliest gains will come from the short-term activities such as "workshops" of the type carried on successfully by the American Management Association in the United States, and at its branches in Sao Paulo, Brazil, and Brussels, Belgium. Because attendance at such "workshops" is comprised of men currently holding identical assignments in industry (plus those designated for promotion to such jobs), such one-week workshops would have a considerable impact on the improvement in industrial operations. These courses, which are a form of on-job training, permit a beneficial cross pollination of ideas and experiences. Medium courses of 4-12 weeks' duration, using the case study method, would also prove very helpful.

8. There are a number of well-run manufacturing operations in Indonesia, and in almost every industrial sector it is possible to find individual manufacturing operations being performed at a rate and in a quality comparing favorably with international standards. Unfortunately, these instances are limited. Their existence, however, points up the fact that complicated processing operations can be carried out successfully. There is a need to mount an industry-wide, two-pronged program designed to produce universally articles of acceptable international quality, and to bring operations to levels of design capacity, thereby lowering costs and contributing more substantially to economic growth through exports and import substitution.

9. Excess Capacity. As mentioned earlier, there is a substantial under-utilization of facilities in almost all segments of Indonesian industry, when measured against design capacity. This condition stems from a variety of causes which will be discussed in the subsequent paragraphs. Two outstanding exceptions are the urea plant at Pusri and the cement plant at Gresik, which have operated consistently at near capacity.

10. Together with the excess capacity of capital equipment, the difficulty of adjusting the labor force to actual requirements aggravates the problem of making industrial establishments economically viable. Present labor laws and national policy make it difficult to decrease the numbers on the payroll. Present labor criteria and customs are a long-standing inheritance which the present Government will be able to modify only gradually. It is important to recognize that the question of surplus labor is localized and must be assessed on a company-by-company basis. It is more pronounced in public sector companies, as private enterprises have more latitude in eliminating redundant personnel.

11. There exists a general recognition of the financial burden that the excess labor force constitutes. More and more industries are establishing well-defined schedules of their labor needs in various categories, and therefore, the number of surplus in each category. However, only in a few cases have corrective measures been initiated. As could be expected, surpluses are generally more pronounced in the overhead and unskilled categories.

12. The main deterrent to decreasing the staff to current needs is based upon the requirement that severance pay equal to 12 months' service must be paid to a discharged worker. Before taking action, the management must seriously consider such factors as the availability of working capital, the extent and cost of training invested in the employee, and the possibility of increasing sales as a result of improving economic conditions. Generally, it is the lack of working capital, and the high cost of borrowing, which deters the severance.

13. The general recovery of the economy will, of course, alleviate this problem, but it is reasonable to forecast that generally the number of direct and skilled workers in industry are less than the number that will be required as soon as either a modest improvement in industrial activity takes place, processing difficulties are solved, or rearrangement of production activities accomplished. Three examples can be cited:

- (1) Rearrangement of operations in the public sector engineering (which is now in progress) is expected to result in increased specialization by these companies, the creation of an effective marketing organization, and the competitive supply of articles and services now being imported, which, taken together, can produce a substantial increase in volume;
- (2) The paper-mills now operating from rice straw and bamboo are presently plagued with processing problems that appear to be possible of early resolution;
- (3) The situation in the textile industry will improve (a) through the new schedule of balanced tariffs for various types and grades, which should decrease imports and raise domestic production, and (b) by a planned expansion in the size of spinning mills, to approach self-sufficiency.

14. Other expansions based on last year's project aid are in an advanced stage, and for those industries the burden of excess workers in the direct category will soon disappear. A determined plan of action will have to be followed by each of the individual industries to bring the indirect workers to an acceptable level wherever the ratio is out of line.

15. Working Capital. Throughout the industrial field there exists a serious and universal lack of working capital. Actually, this condition which existed at the time of the first Bank mission in 1966, has not materially changed except for those specific companies which have recently been able to obtain limited short-term financing through BAPINDO out of the national development budget. Such financing arrangements have only recently been completed and withdrawals have not yet taken place in amounts adequate to accomplish substantial results, although the rate of disbursement is accelerating.

16. The present mission came to the conclusion that one of the difficulties of industry in obtaining funds (and in the bank controlling the use of the funds) stemmed from the fact that the term "working capital" is too loosely defined. Unfortunately, this terminology had been used in the past as an "umbrella", which made it difficult for the lender to control the use of the funds, particularly since large sums were expended on new or uncompleted plant construction. In discussions with financial authorities, bankers, and the industries concerned, it became apparent that both sides could more easily assess the cost/benefit aspects of a particular request if the use of the money was more specifically defined. The mission recommends working capital financing be provided only for:

- (1) raw material inventories;
- (2) finished goods inventory;
- (3) accounts receivable;
- (4) purchase of spare parts;
- (5) other current operating expenses.

17. In most cases, financing for these purposes should have priority over financing new construction. An exception would be financing for a particular item of equipment required to balance existing plant.

18. When sub-divided as suggested in the preceding paragraph, several of these requirements become "bankable" because the lending institution can control the use of the money and return of the funds.

19. One of the most important aspects of the sub-division suggested above, is to prevent the diversion of money to unauthorized construction. Where inflation has been of considerable proportions for many years, it is understandable that industrial operators would divert available funds into fixed assets whenever possible. In some cases, particularly in the government corporations, buildings have been erected with no assurances that equipment loans could be obtained to fill the buildings. Such buildings were erected in the hope of making a prima-facie case for allocation

of funds for equipment, and frequently these hopes materialized. As could be expected, these same companies are short of working capital to finance such essentials as spare parts and raw materials.

20. The Government itself has been a factor in creating an abnormality in the availability of funds by failing to pay promptly for goods and services received. Of all the industries visited, the mission knows of only one that is not owed substantial sums of money by other public corporations and government departments. The one exception seems to be the Gresik Cement Company, which sells to all consumers on a cash and carry basis, f.o.b. their plant.

21. The result of this slow pay procedure is that many companies must borrow money from government banks at substantial interest rates to carry on their day-to-day operations, while waiting months or years for payment from government entities with the rupiah losing value day by day. One state corporation, however, raises the value of receivables monthly in accordance with the rate of inflation.

22. One of the most serious offenders appears to be the Government Railroads, which, for example, have not paid the Ombalin Coal Mines since 1966 for any of the coal delivered to them regularly for their operations in West Sumatra, and perhaps elsewhere. As a result, the Mines have borrowed Rp. 60 million at 3 percent a month to install equipment now at the site.

23. The mission urges that an acceptable procedure to clear the accounts receivable by all companies of past-due government obligations be formulated and instituted immediately.

24. The mission is convinced that state corporations will do little, if anything, in connection with the acquisition of sorely needed spare parts unless the funds for such acquisition are specifically assigned to such purchases and their disbursement adequately controlled. The tendency will be to divert the money to the purchase of raw materials or other uses, even though sacrificing profitability through continued under-utilization of design capacity. This view is based on the fact that practically no rupiahs have been spent on spare parts for spinning mills since October 1966.

25. The Rationalization of Plants in the Public Sector. The Government has announced its desire to sell existing public sector plants, and/or to convert them into joint ventures. In reviewing the policies regarding these public corporations, three factors must be kept in mind. Many of the public corporations result from take-over from the Dutch. Others were built on credits available on government guarantee and placed in the public sector in conformance with past industrial policies. Finally, the Government has never made a clear statement of its policies and the line of demarcation between the public and private sectors.

26. The mission suggests that the Indonesian Government issue a clear statement detailing the industries and services reserved for operation through government corporations or government departments. Such a statement would clearly demarcate private and public industrial operations, since all areas not specifically reserved to the Government would be available to private enterprise. Such a well-drawn line would naturally place a number of the existing government corporations in the private field. More interest and consideration from private companies, domestic and foreign, with respect to acquisition or joint ventures would result from this sharper focus. This line of demarcation should also apply to industries now operated by provincial governments. However, if there are special and justifiable situations where this line cannot be made to apply to provincial activities, there should be separate statements issued by the respective provinces establishing the differences and indicating the concurrence of the Central Government in such differences.

27. The mission finds wide concurrence among policy makers that the activities retained in the public sector should be minimal. Based on present Indonesian conditions and long-term experience elsewhere, eventually the public sector could well be limited to public utilities and industries closely related to defense or other vital public functions.

28. There are evidences that the Government is intent on converting each public sector company, particularly those that will lie on the private sector side of the above-mentioned line, into a so-called P.T. company operating under customary company statutes and practices. In mining, the Government has completed the consolidation of all tin mining activities into one P.T. company with its own board of directors, and the coal mines into another.

29. The mission believes that such a program should be accelerated, since it will encourage and simplify the take-over of prospectively profitable public sector companies by private investors. Whenever reasonable offers are available, the individual companies should be prepared in some cases to spin-off specific units and not insist on the entire company being purchased. Furthermore, this program will initiate the process of severing the threads of control from the government departments and transferring such control to a properly selected board of directors.

30. The mission urges, however, that transfers as indicated in the preceding paragraph should entail not only the transfer of responsibility to the elected board of directors, but also the transfer of an equal amount of authority. With respect to a number of government "P.N." corporations, the mission has noticed a tendency on the part of government officials to transfer much or all of the responsibility, but very little of the authority. Such a practice represents poor management practices. As the sole owner of these companies, the Government should act as a normal shareholder and look to the Annual Meeting as a time for approving the actions of the Board through re-election, or by showing its dissatisfaction through the nomination and election of others. Government (and its

officials at all levels) should not expect to take part in the day-to-day operation of the companies. If it does so, it will certainly defeat the entire program and prevent the possibility of these companies succeeding through the private initiative of the management. Whereas the company shares may continue to be held in the Ministry of Finance (or one of its agencies), the mission suggests that the voting privileges and review of performance should be vested in the Departments of Industry, Mining, etc., since the latter are better versed in the respective fields of endeavor.

31. Since the Government is anxious to sell most of these companies, it is also understood that these transactions should be concluded at a fair value. Therefore, the companies must be converted into profitable operations under normal business criteria, since the purchase price of these companies will certainly, in the minds of prospective buyers, have a direct relationship to current earnings. In cases where government-owned corporations find that adequate staff is not available to attain this aim, or where the Government, as the sole owner, concludes that they are poorly managed, consideration should be given to entering into a management contract with a competent private domestic or foreign organization for a precise period of time. Such contracts should include the training of local staff which should be able to take over if the initial contract is not extended.

32. Quite obviously, the Government needs to make an exhaustive exploration of its position to determine the acceptable basis against which it will entertain or earnestly seek offers for the respective manufacturing units. Will it sell the physical assets and itself wind up the company affairs, or will it require a buyer to purchase the share capital and accept all the existing company liabilities? Will the Government take the obligation for any surplus labor that exists or will it materially reduce or contribute to severance obligations? If it is willing to sell assets, how will the current value be determined? Will time payments be permitted, and if so, at over how long a period, and at what interest, if any? If the sale is on a joint venture basis, what is the minimum and maximum equity position the Government will accept? Will it take all of its participation in preferred shares and leave the management solely to the new owners? The mission recommends that the Government name a committee to study this matter and suggest criteria for such a disinvestment policy. The best solution may be the employment of an internationally recognized firm of appraisers to establish a fair present value for each plant which the Government intends to sell.

33. It is appropriate here to draw attention to the suggested program for improving the utilization of installed capacity. As indicated, such a program, while necessary and advantageous, will require substantial amounts of rupiahs from government sources to government corporations at a time when availability of rupiahs are severely limited. For this added reason, early progress in selling companies is a matter of urgent importance.

Power Rates and Supply

34. The subject of power rates and the supply of power will be extensively covered in Chapter 3 of this report, and only brief comments will be made here.

35. In most instances, individual companies, both State and privately owned, are producing their own power from captive generating equipment. This situation has developed over the years because PLN was unable to assure power due to its lack of generating equipment or lack of adequate distribution facilities.

36. From past reports it will be recalled that this captive power problem arises partly because power rates to industry were disproportionately high when compared with schedules in industrial countries for large blocks of power. While some advantage for the captive generation has existed in the past, it is now obvious that the rising price of fuel oil towards world market levels, and the modest steps already taken to bring industrial power rates into better balance, are removing some of the advantages of self-generated power.

37. However, almost universally, industry finds itself doubting the ability of public power sources to assure continuity of delivery, and particularly so when discussing future requirements. One fact stands out. There is need for much greater and more constant exchange of views between PLN and individual industrial users, to assure that the future planning of both parties will be appropriately coordinated.

38. The mission feels therefore that industry should know the policies of the Government with respect to the development of distribution lines, and the installation of additional power generation facilities. It is quite obvious that large-scale power generation will prove more economic over the longer run rather than innumerable captive generating facilities. Quite obviously, doubts must be dispelled if this laudable goal is to be attained.

Import Policy and Quality Standards

39. The mission's views on tariff policy are discussed in Annex II of Volume I. There would seem to be justification for a continued and careful study of this matter during this turn-around period. Duties considered excessive might decrease gradually over a specified period of time, which would afford temporary protection, yet permit for necessary corrective actions by the individual industries concerned. An example is cotton yarn. Improved practices, substantial purchases of spare parts, and planned expansion of existing enterprises will combine to substantially reduce costs and the corresponding need for excessive protection.

40. As the stabilization program progresses and the free market conditions are maintained, a number of changes were prompted in import regulations and in the various exchange rates and the rules applicable thereto. We believe that there are instances where these have worked to the disadvantage of maximum production in well-managed domestic plants.

41. There is at least one procedure that would have both a stabilizing effect and assure increased use of indigenous material and labor by reasonably efficient domestic plants. Pending the review of the customs tariff, government departments and public corporations might be required to purchase Indonesian products at all times unless the buying organization can prove that the domestic article is unusable and/or that the price of the domestic article exceeds by some margin (say, 10-15 percent) a bona fide offer for a comparable imported article landed with duty and charges paid. If the Director General finds sufficient justification to issue an exception, he is required to take immediate steps to correct such deficiencies in the Indonesian production and to withdraw the exception when these corrective measures have been accomplished.

42. There have been a number of comments to the effect that imported articles are invoiced at higher than international values, thereby accomplishing a flight of capital. Such capital can be returned in whole or in part through the D.P. market or other avenues at higher gain. The changes in foreign exchange policies proposed elsewhere in this report would largely eliminate the D.P. market as an outlet for such foreign exchange earnings. The mission understands that it has become quite common practice for the Indonesian purchaser to insist that pro forma quotations eliminate normal trade and confidential discounts. Other governments confronted with these conditions have required appropriate statements on documents certifying that the price reflected in the invoice is valid.

43. It is imperative that Indonesia emphasizes the production of goods meeting internationally accepted standards of quality, while bringing production up to design capacity. Only when both of these conditions are met will domestic production be able to compete satisfactorily, even for the home market. During the period of "guided democracy", quality as well as the economics of operations suffered. It may be necessary to face up to the fact that some specific units or even entire enterprises will have to be shut down either because they are obsolete or uneconomical.

44. Where foreign plants have been returned to previous owners, quality and production is being rapidly improved and equipment modernized and expanded. Due to the shortage of local currency in recent months, it was often more advantageous for companies to purchase articles and equipment abroad if credit could be arranged. There have been a large number of instances, therefore, where finished articles have been purchased abroad which could have been made domestically. An even greater number of instances exist where certain parts of foreign produced equipment could have been successfully produced and the complete unit assembled in Indonesian facilities. The effects have been disadvantageous to Indonesian industry and have added to the under-utilization of capacity.

45. On the part of some large buyers, purchasing practices could certainly be improved, enhancing the prospects for better utilization of existing facilities, and greater specialization among the operating companies. One example comes to mind, namely the pumps used regularly by the government-owned tin company. These pumps are purchased from several companies and on a basis of a fixed number per order. It would seem that the number of producers could be considerably reduced without eliminating competition. It is suggested that an order might be placed for nine months' requirements and at the end of the sixth month, an additional order issued for another six months' deliveries, and the process repeated quarterly so long as the need existed and the deliveries remain satisfactory in price and quantity. Such an assured continuity would encourage the manufacturer to spend time and effort redesigning the product to improve performance and concurrently permit him to plan production with improved economies. Other repetitive requirements can benefit from similar arrangements.

46. A quantity of the equipment connected with new projects and new investments could be produced by local manufacturers in the engineering industry. To direct attention to this possibility, it is recommended that all foreign and domestic investors seeking approval under the respective investment laws, or seeking other governmental permits, be required to use Indonesian products and services to the maximum extent justified by quality, delivery and a price. The Investment Commission could, as has been done in other developing countries, require the applicant to state the articles and the definite value of the domestic goods to be used. In many instances, such an approach could benefit the investor, who would find through this investigation a permanent source of equipment and of repair facilities.

47. As has been indicated earlier, one of the greatest deterrents to the full utilization of existing equipment is the lack of spare parts plus a reasonable inventory of spares to support continued operations. An outstanding example of this condition exists in the government-owned spinning plants of the textile industry. Under credit facilities granted to the previous government, a number of plants were built without any inventory of spare parts. Furthermore, the installation of a number of these facilities was delayed for various reasons after arrival of the equipment with the result that some integral parts were damaged and others lost through pilferage or corrosion. Cannibalization has been necessary to keep as many spindles operating as possible. From the visits of the mission to a number of these plants, and from the studies made by the Director General of Textiles, the number of spindles presently out of operation amounts to approximately 67,000 (10 percent of total) and is constantly increasing. This number is equivalent to two of the standard 30,000 spindle plants which the Government has installed in a number of locations. While there has been a recent and welcome grant from the United Kingdom for these spare parts, the total need will not have been fulfilled.

48. An indirect advantage which arises from the planned increase in supply of spare parts will also be that pressures can be exerted on the plant managers to produce, not only at design capacity, but equally importantly, at internationally acceptable standards and at competitive prices.

49. There are two excellent sources of available equipment in Indonesia which are presently inadequately utilized - the army workshop at Bandung and the navy workshop at Surabaya. In both cases the military management is anxious to accept civilian assignments, which would afford a basis for carrying the large staff now on the payrolls. The equipment is excellent, operates at close tolerances, and is able to turn out a wide variety of operations in substantial volume.

50. Sub-contracting the manufacture of parts or sub-assemblies to other producers is not a widespread practice in Indonesia. This procedure, so beneficial in developed countries, should be widely adopted throughout Indonesian industry. It would permit better utilization of machines, more specialization and a wider list of products required by the growing economy.

The Implementation of the New Foreign Investment Law

51. Under the new Foreign Investment Law, enacted on January 10, 1967, liberal tax incentives, transfer guarantees, land use and arbitration of dispute in the event of nationalization are granted to new foreign investors. As a result of this law, private foreign investors showed increasing interest for investment in Indonesia and a number of substantial investments have been sanctioned or are at various stages of consideration.

52. Table 1 shows the ranking of projects according to their field of investment. The investment in the mining sector is the largest, with 55 percent of the total registered capital of U.S.\$285 million. It is followed by manufacturing and forestry which account for 20 and 8 percent of the total investment respectively. Most of the investment in the manufacturing sector is concentrated in the Djakarta area and to a lesser extent in other regions of Java, while investment in mining, fisheries, and forestry is attracted to the outer islands.

53. The most important investment in the manufacturing sector is a contract with Goodyear Company Ltd., which provides for U.S.\$13 million of new investment to accompany the return and modernization of its tire plant. Another large contract in the order of U.S.\$ 7 million is with Philips N.V. for the manufacturing of electrical goods.

54. In the field of mining, three large contracts have been approved. The contract with Freeport Sulphur Company may involve an investment of U.S.\$75 million for the exploration and exploitation of copper in West Irian. The most recent contract of considerable importance is with International Nickel, which provides a foreign investment of U.S.\$75 million for

Table 1

Foreign Investment Projects, 1967 to July 15, 1968

	Approved by the Cabinet		Reviewed by Foreign Investment Board		Total	
	No. of Projects	Total Amount in Mn. U.S.\$	No. of Projects	Total Amount in Mn. U.S.\$	No. of Projects	Total Amount in Mn. U.S.\$
1. Manufacturing	23	48.31	5	6.98 ^{1/}	28	55.29
2. Mining	3	158.50	-	-	3	158.50
3. Fishery	7	11.50	-	-	7	11.50
4. Forestry	7	15.58	2	8.00	9	23.58
5. Communication	3	6.24	1	2.50	4	8.74
6. Pharmacy	3	8.25	1	1.20	4	9.45
7. Commerce	1	1.10	-	-	1	1.10
8. Public Works, Real Estate, etc.	2	3.30	3	0.24	5	3.54
9. Plantation	<u>2</u>	<u>13.40</u>	<u>-</u>	<u>-</u>	<u>2</u>	<u>13.40</u>
Total:	51	266.18	13	18.92	64	285.10

^{1/} The intended capital investment refers only to 5 projects.
Source: Foreign Investment Board.

the exploration and mining of nickel in the Surabaja region. An investment in tin mining in the order of U.S.\$ 7 million is anticipated by the N.V. Billiton Maatschepij. Negotiations are at present underway with Alcoa for a possible U.S.\$120 million investment for the exploitation and processing of bauxite in North Sumatra.

55. It should be noted that the foreign companies, whose assets were returned to them since the present Government came into power, have in general fulfilled their undertakings with respect to additional investments, and have improved the performance of their regained companies. Most of these organizations have plans for further expansion. Additional progress and accomplishments will doubtless be recorded. The continued success of these companies will do much to encourage new investors to participate in Indonesia's development.

Private Domestic Investment

56. In order to mobilize domestic savings, the Government approved on July 3, 1968, a new Domestic Capital Investment Law. This law provides substantially the same tax benefits to domestic investment as those provided by the Foreign Investment Law to foreign investors.

57. However, the Domestic Investment Law does not provide against the risks of nationalization. It distinguishes between "national enterprises" and "foreign enterprises", the latter being enterprises with less than 40 percent of the capital in the hands of Indonesian nationals. "Foreign enterprises" have to be changed to "national enterprises" or their capital has to be transferred to Indonesian citizens by 1977 if they are operating in trade, and by 1997 if they are in industry.

58. Compared with many other developing countries, the basic conditions for industrial investment, especially of foreign origin, have been improved considerably after the new foreign and domestic capital investment laws were passed by the Government. This favorable situation is impaired to an extent by the continuation of a number of impediments, especially with regard to domestic investment activity, embodied in rules and regulations still in force and dating back to previous regimes, clearly bearing the imprint of economic policies based on comprehensive public controls. Fortunately, many of these conditions lend themselves to early corrections, and a serious effort is being made to institute the necessary changes. Meanwhile, some of the desired benefits are being incorporated by special arrangements in investment agreements.

59. A major reliance has to be placed on private domestic as well as foreign investment for the bulk of the industrial investment. It must, however, be realized that foreign as well as domestic investment for the industrial sector can only be forthcoming at the required level if Central and Provincial governments provide the climate and infrastructure which is imperative for investment and demonstrate their capability to resolve such conflicts as may arise between private and national priorities.

60. To further improve the investment climate, it is again recommended that revisions in the tax law be considered, which would permit a periodic revaluation of fixed assets as well as a revaluation of raw and finished goods inventories during continuation of inflation. In addition, a longer loss carry-forward period should be permitted. An important obstacle to private domestic investment in Indonesia is the legal system under which an investor, irrespective of the number of shares owned in a corporation, can only exercise a maximum of six votes. It is important that fair and reasonable voting privileges acceptable to domestic and foreign investors be introduced. Also, the law in Indonesia does not permit financial institutions or foreigners to obtain adequate security by holding mortgages on the debtors' property. These laws will have to be changed in order to permit industrial finance companies to operate effectively.

61. It is apparent also that the exchange risk is still a formidable obstacle to the repatriation of capital despite the availability of the D.P. market for this purpose. The consensus in the private sector seems to be that not much new private domestic investment in industry can be expected without greater financial stability.

62. The sector seems to feel that the rehabilitation and refinancing of existing enterprises should have priority over the establishment of new enterprises.

Coordination of Planning

63. From field trips by mission members, it is evident that more planning activity is necessary at the provincial level, and equally important, the correlation of these requirements with the national planning by BAPPENAS. As an example, considerations affecting several industries in West Sumatra point up this need.

64. In the program for electric power production presented by PLN, one finds a hydroelectric project of 10 megawatts to be built at Batangagam. This project has been under consideration since 1961. Only a limited amount of site clearance has been accomplished. A small project staff is at the site awaiting subsequent activities. It is reasonable to question whether the proposed expenditures at this location are wise.

65. Presently, the Ombilan Coal Mine at Sawahanto is in economic difficulties because the sale of coal has gradually decreased over recent years. Unless something constructive is done rather quickly, it is doubtful if this operation can continue without increasing annual losses. A new 12 megawatt generating plant supplied under a Polish credit and delivered to Sawahanto some two years ago is now being installed. The Polish supervisors are at the site, and a credit of Rp. 60 million has been arranged from the development fund administered by BAPINDO. This replaces, and is considerably larger than, the old equipment on which breakdowns are expected at any time which would shut down the mine

operations. The equipment consists of one 6 megawatt generating set and two 3 megawatt sets. The need of the mine and the adjacent city is stated to be approximately 4 megawatts.

66. The production and sale of coal at present is well under 100,000 tons, with about 24,000 tons annually going to the railroad and approximately 20,000 tons sold to a variety of users. This power plant of 12 megawatts was purchased on the expectation that the mine operations would be expanded immediately to 300,000 tons annually and at a later date to 500,000 tons. It would appear that these levels are unattainable in the light of current sales possibilities.

67. From the social standpoint, it is difficult for the Government to permit the shutdown of this mine which is the sole support of the surrounding town and of a wide trading area. Certainly, such a shutdown could not be considered until some new type of employment was created in the area, and any such step would appear to be in the distant future. Fortunately, there would seem to be a reasonable solution to this dilemma but it will require careful planning and firm decisions on the part of the Central Government as well as concurrence and support from the Provincial Government.

68. As a first step, consideration should be given to abandonment, or long-term postponement, of the plans to construct the small hydroelectric plant at Batangagam. Secondly, the capacity operation of the new power plant at the coal mine should be studied. The consumption of the coal for power at the mine site will reduce the cost of production of power. In turn, the economics of the mine operation will be helped because the power plant at full capacity is estimated to consume some 24,000 tons of coal annually. But, to consume all this power it would be necessary to install a small grid northwest toward or to Bukittingga with connections to Batusangkar and other power-deficient villages east to Sidjungjung and southwest to Solok. This grid would be useful on a permanent basis because it could be tied into a larger grid over a whole of Sumatra if and when that develops. On the basis of the rapid increase in power consumption whenever made available, one can expect that the need for this surplus power will develop over a brief period. Later, if additional power is needed in Padang, the expansion of generation at the mine could be considered.

69. As a third factor, the cement plant at Padang is presently considering substituting oil for coal in order to gain economies in their cement operation. While this possibility may be more apparent than real, based upon the increasing prices of oil, it nevertheless is a matter which the cement company should properly study in detail. If a case can be made for oil substitution, attention should be given to the possibility of lowering coal prices to prevent loss of sales. It is unfortunate that over the years, the power generating units using oil instead of coal were installed at Padang.

70. It should be mentioned in passing that the cement plant at Padang has what appear to be righteous complaints about the variations in the quality of coal deliveries. The most serious complaint is directed toward the railroad, whose coal cars are not equipped with covers, resulting in a high percentage of water in the coal delivered during the rainy months. Arrangements should be made to properly equip a sufficient number of cars for this service.

71. Fourthly, certain possibilities for the export of coal to Chittagong in East Pakistan and to Hong Kong have existed over the years and may be possible to revive. Small steamers built for this service are understood to be presently unused in the PELNI fleet.

72. In summation then, studies should be completed to determine a reasonable level of operation at the mines to assure at least breakeven, which appear to be somewhere between 100-130,000 tons per year. If it is determined that the mine must continue for social reasons, then consumers for this level of coal should be developed and retained. In the event that this level cannot be obtained by suggested consumption in West Sumatra (plus appropriate exports), consideration should be given to directing a limited number of those existing plants equipped to use either coal or oil to transfer over to coal.

73. The description of these problems has been made in considerable detail to point out the fact that independent decisions by different agencies without full knowledge of conditions can cause extensive difficulties. It points up the need for integrated planning.

Surveys and Technical Assistance in Progress and Required

74. In the past year, a number of surveys have been commenced on a variety of important projects, and a number of others are now in course of negotiation. These are essential to the substantial development in the industrial field, and the final reports will be awaited with great interest. The subjects being currently explored are fertilizer, cement, gas for additional fertilizer production, expanded caustic-chlorine production. Some progress has been made in expanding the availability of technical assistance. A number of specialists are to be provided by UNIDO to work in various industrial fields. Several donor countries have made funds available for other specialists to investigate particular problems and industries. The International Executive Service Corps has mounted its program in Indonesia and has several specialists functioning presently on particular projects. They serve to answer in part the needs for technical help and management assistance stressed frequently by the several missions.

75. In connection with surveys and technical assistance, it is important to emphasize the need for a careful analysis of the apparent and underlying problems. There is an equally important need to recognize that time is an important factor in Indonesia.

76. The shortage of funds in Indonesia produces an inclination to search out the source of free technical assistance. The process consumes

a large amount of time and the net cost is high through failure to stop production losses or to achieve import substitution earlier. This technical help when obtained is for a period of years and on a general industry-wide basis. Actually, many of the problems delaying progress in Indonesian industry are problems of very specific nature and scope. In these cases, there is a need to obtain the services of a talented specialist in that specific field and activity. Such requirements are of short service duration. They possess, however, very high cost-benefit ratios.

77. As an example, the paper industry can very well use a general paper expert over an extended period, as a means of improving present operations and in laying plans for the expansion of this industry. However, the present crying need is for two men of particular talent - one who is experienced in the production of the pulp for paper manufacture from whole rice straw, and the other, a specialist in the design and operation of the sulphite recovery unit when producing pulp from bamboo.

78. With the increasing amount of finance to support surveys, and the increasing amount of technical assistance being made available, there devolves upon the Department of Basic Light, Chemical and Aeronautic Industries, together with BAPPENAS and other agencies, to work out initially and to modify frequently the assignments, scope of work, type of report, and so forth, necessary to fulfill the needs of the various governmental agencies, governmental corporations, and private enterprises. Furthermore, only through disciplined effort by the upper echelons on the Indonesian side can the maximum results be obtained from these technicians.

79. Several groups of Indonesian engineers and economists are now planning to join forces and offer comprehensive services in the field of feasibility studies and management consulting services. As these organizations develop experience and acquire personnel with expertise in various fields required, they will help to fill the rapidly growing need for such services. Foreign organizations which undertake such studies will doubtless find it useful and economical to search out these budding operations. The latter will benefit from such temporary and even more so from permanent association with experienced overseas firms with broad experience in this field.

Industrial Finance

80. BAPINDO. In addition to its normal lending activities, BAPINDO has served an additional and useful purpose as the disbursing agency for the industrial development fund set aside in the budget for 1968. This money had been earmarked for those projects approved as essential, and for which equipment had been provided through donor countries' credits. At the time the total of rupiahs provided was deemed adequate to complete the designated projects. Due to inflation, it remains to be seen whether this estimate proves adequate.

81. BAPINDO has been called upon recently to handle the financing of raw cotton as imported under the PL 480 program and distributed to various spinning mills, private and State-owned, throughout the country. From

this operation this bank has gained considerable experience in the handling of raw material financing and the mission understands it will continue to operate in this field as required.

82. BAPINDO is anxious to take all necessary steps to improve its operation, both internally at the headquarters and in the several branches throughout the provinces. To this end, it has arranged for two specialists to assist in an appraisal of their operations, and to recommend possible improvements. One of these specialists will concern himself with the overall organization of BAPINDO, its relations to its branches, and its control of operations. The other specialist will review the project appraisal group within the bank. He will establish procedures and train staff to evaluate projects in a comprehensive manner. It is also understood that representatives of the International Finance Corporation will visit Indonesia for discussions with BAPINDO in connection with possible assistance and collaboration.

83. The clearance procedures in BAPINDO between its various branches and its clients, is unduly slow, and particularly so for a country where the availability of operating funds is so limited. Some enterprises who use BAPINDO branches throughout the country as depositories for accounts receivable payments, wait 10-12 days to receive the use of these funds, and meanwhile are forced to borrow from BAPINDO at substantial interest rates. The mission suggests two points for consideration:

- (1) Attention should be given to means of speeding up the transfer of branch deposits to the client's principal account;
- (2) Where the client maintains in BAPINDO over an extended period of time a substantial amount of float throughout its branches, a line of credit should be established at very reasonable interest equaling a substantial percentage of the estimated float.

84. In planning the project aid for 1969/70, it became evident that there are a substantial number of industries requiring credit for overseas purchases of equipment in amounts which are too small to consider as individual project negotiations. The amounts in question run from \$50,000 to \$500,000. As a practical solution to this problem, the mission is recommending as one element of project aid a sum of money in the order of \$15 million which would be disbursed by BAPINDO to predetermined priority projects under appropriate terms and conditions. Contributions to this fund would, of course, be necessary from as many of the donor countries as possible to permit wide selection of equipment.

85. For the performance of its duties and obligations with respect to the afore-mentioned \$15 million foreign credit fund, BAPINDO will require temporarily additional specialized talent to review the characteristics of the equipment requested, and the forecast of cost-benefit ratios. This specialized talent will also be helpful in prescribing the limiting conditions to be imposed upon the borrower to assure successful installation and

performance. The principal industries which will participate in this fund are three in number - metallurgical, textile, and paper. The mission suggests that in preparation for the fulfillment of these duties, BAPINDO attempt to obtain this temporary assistance from the technical assistance personnel now being made available from different countries and agencies for other specified duties. If this proves to be impossible, then it is suggested that special personnel be obtained on a direct basis for a limited period of time to handle the loan requests. It is essential that preparations be made early, so that funds when available can be promptly disbursed and the desired benefits accrue to Indonesia as soon as possible.

86. Anticipating the creation of this special credit, BAPPENAS has undertaken (with the respective industry units) to assemble precise listing of the equipment required, for presentation to BAPINDO in order to accelerate the contemplated improvement in production and earnings.

87. Questions concerning the availability of funds from Indonesian investors for industrial development invariably draw pessimistic replies. The mission believes that the possibilities are considerably better than generally forecast and rapidly improving. Progressive stabilization will decrease the flight of capital. Rearrangements of import duties and classifications will decrease the advantage of imports over domestically produced articles. Revisions in company law will encourage widespread distribution of shares; distributors and retailers will find it advantageous to support new industries to assure supplies. Many entrepreneurs, fully aware of the rapidly changing conditions, are laying plans to take advantage of the opportunities now being created. It is a fair assumption that projects of sound concept and preparation will find adequate financing, but not without the usual efforts.

Oil Industry

88. The revival of activity in the oil sector is not only indicated by an increase of its output in 1968 by 11 percent but also by a significant increase of investment expenditures by the foreign oil companies. A large part of new investment is for exploration purposes, largely in offshore areas. Several new concessions were granted during 1967 and 1968 and negotiations with interested parties are taking place. These explorations will probably not contribute to output and export before 1972, but still may start contributing at a time when production from the existing fields may begin to decline.

89. The present arrangements with foreign oil companies have been described extensively in last year's mission's report. No major changes have occurred and it seems that the production sharing arrangement which governs the new contracts as distinct from the contract of work arrangements with the now producing companies seems to be acceptable to foreign parties as several of those contracts have been concluded already.

Projects

90. The status of the projects in the industrial field suggested by last year's mission is reviewed in Annex 1, and of the so-called "retarded projects" in Annex 2 to this chapter. The remainder of this chapter will consider projects for 1969/70 and subsequent years.

91. The key personnel in the industry field at BAPPENAS and in the Departments of Industry and Mining have been fully engaged in completing all aspects of industrial items included in the 1968 Project List (see Annex 1). For this reason, there has been insufficient time to prepare for consideration by this mission a list of development projects in the industrial and mining fields. In addition to the review of the limited project list presented, it was suggested that the mission undertake the preparation of a broader list which might require a period of five years to complete. It was specified that this broader list should be limited specifically to those activities needed to achieve Indonesia's principal goals of improving food supply, infrastructure, exports, housing and clothing. This comprehensive program, which was developed with the help and assistance of BAPPENAS and the Departments is described in Annex 3.

92. As for the projects for which commitments could be made in 1969/70, there are three items which, if full commitments are required for their entire foreign exchange costs, would pre-empt all the allocation that the mission feels might reasonably be made for the industrial and mining sector in that year. These projects are as follows:

Projects Proposed for Financing in 1969/70
(In millions of dollars)

<u>Project</u>	<u>Foreign Exchange Cost</u>
1. Urea Fertilizer - Pusri	35.0
2. Cement - Gresik	5.0
3. Tin	
(a) Rehabilitation of Power Plant - Bangka	3.5
(b) Rehabilitation of Dredgers	3.5
(c) One (1) New Tin Dredger	<u>5.0</u>
Sub-total	52.0
Industrial Finance Institutions	<u>20.0</u>
Total	<u>72.0</u>

The present estimates of the total cost of the Pusri project is \$50 million. We would hope that a way could be found possible to "segmentize" the Pusri project so that only a maximum of \$35 million would have to be committed in 1969/70. In Annex 3 we have listed a number of additional projects that might be included in the Five-Year Industrial Program.

ANNEX 1

PROGRESS AND EXECUTION OF THE 1968 PROJECT PROGRAM

In the 1968 Project Program there were included 12 projects in the industrial field. A brief comment on each follows in the succeeding paragraphs.

Gowa Paper Project

The design for the desired pipeline to a nearby reservoir is nearing completion by the Department of Public Works, and Japan has indicated a willingness to consider this project and determine its views of the justification for the expenditure as compared with the original basic plan to use water at a convenient point on a nearby river.

Pematang-Siantar Paper Project

The new generator described in this item is being supplied under the Japanese credit. The other work in connection with the water supply is being carried on independently with Indonesian funds and substantial progress has been made at the time of the mission's recent visit.

When this work is completed, a complete review of company operations and its future program is indicated. Present output is writing paper instead of newsprint as originally planned. Part of the equipment for an expansion is at the site. Additional funds are needed for raw material acquisition and seasoning.

Tonassa Cement Project

The necessary trucks to fulfill the transportation requirement for this project have been supplied from available units in Indonesia. The original request has been revised to cover a needed bag plant since Gresik cement will require all its bag capacity when an additional kiln is added there.

Caustic Soda-Chlorine Project, Waru (East Java)

The project has been discussed under the Japanese credit and further exploration is in progress with Japanese suppliers.

Palembang Tire Project

The government power organization, PLN, is bringing on stream additional generating capacity in the area and will supply the needs of this tire factory for which the additional generating set was originally planned. The request has now been withdrawn.

Rehabilitation and Replacement of Salt Barges

The organization and responsibilities of the government salt entity on Madura is being presently reviewed in government circles. Meanwhile, some modest amounts of steel plate have been obtained but active solicitation of credit for this entire request is postponed.

Tin - Bangka Island

The funds have been supplied for the rehabilitation of the smelter and this work completed. The Netherlands provided credit for part of the materials required to rehabilitate two of the scheduled dredges. The balance will be carried forward into the new program for 1969. No commitment has been undertaken by any of the donor countries in connection with the request for two new dredges; however, the supply of one such unit is under discussion with A.I.D. If uncommitted in 1968, both of these dredges will be carried forward into 1969, since they will contribute substantially to the maintenance of tin production and foreign exchange earnings. The equipment for the electrical mines has not been taken up by any of the donor countries and will be included in part in the 1968 program. The suggested credit for a new slipway is withdrawn since it is now planned to rehabilitate an equal number of dredges concurrently at Bangka and Billeton in existing slipways.

Pusri-Urea Fertilizer

In the 1968 project program it was recommended that this project be undertaken with a 1968 disbursement of \$1 million for detailed engineering, with a general fertilizer study running concurrently. Meanwhile, a comprehensive study on fertilizers with particular reference to the proposed urea expansion at Pusri has been undertaken by A.I.D., the contractor is already in Indonesia, and it is expected that his work will be completed in the near future. Certain decisions within Indonesian government circles have been taken assuring a high priority for this project which is directly connected with the food program. This project is included in the 1969 project list.

It is now suggested that provision be made to reserve (and to strip when needed) the C₂ and C₄ fractions in the gas streams for proposed production of polyethylene and polyvinyl chloride.

Gresik Cement Plant

Under a program supported by A.I.D., a feasibility project is in the final stages of completion. Present indications are that the report will favorably support this project in the size originally contemplated but that the cost will be somewhat higher than originally indicated by the mission.

Spinning Mill and
Electric Power, Makassar

There have been no commitments in connection with either of these projects by any of the donor countries. The matter of additional spinning capacity for Indonesia is included in the requirements for 1969.

Bandjaran Spinning Mill

The equipment required for the control of temperature and humidity has been withdrawn from the request for credit since the equipment was obtained by direct purchase through the B.E. market.

ANNEX 2

RETARDED PROJECTS

In the report of the 1967 mission, considerable attention was given to the possible solution of problems affecting several so-called "retarded projects". A brief review of the current situation follows:

1. Trikora Steel Project at Tjilegon

A great deal of attention has been given in recent months to finding a proper and reasonable solution to this retarded project. A number of foreign companies have made independent investigation without any concrete results to date. One foreign company is still completing its studies and hopes to indicate its interest by the end of October when its exclusive option expires. A group of steel technicians from ECAFE has also made studies and urged an early decision to utilize the wire mills and later the rolling mill for bars and simple shapes. This project is also being reviewed by two groups now studying the feasibility of an area approach to steel manufacture on a large-scale and economic basis.

One aspect that requires early resolution is to obtain a reliable estimate of the efficacy and cost of the proposed infrastructure necessary to support steel production at this presently proposed site. The Directorate General of Basic Industries is planning to have the study of the aspect completed promptly. When this data is available, a decision can be taken whether the Government will complete this infrastructure and install the equipment at Tjilegon or move it elsewhere as has been proposed by some parties.

2. Road Roller Projects, P.N. Barata

This project entailing a partial manufacture in Indonesia and the final assembly of Yugoslavian road rollers is well underway. Some 300 have been completed to date, leaving approximately 1,700 to be completed in the future months to complete the original contract. Meanwhile, Barata has discontinued the manufacture of its own version of a road roller. The mission recommends that, for the present, all direct import of rollers by the Department of Public Works of the Central and Provincial governments be discontinued until Barata completes this contract.

3. Diesel Assembly Project, P.N. Bisma and P.N. Indra

This equipment is being produced in modest quantities by these companies. The subject will be studied in connection with the general reorganization of the State-owned metallurgical companies. Some consolidation of the operations can be expected. In addition, the manufacture of a broader line of diesel pumps and diesel generator useful in the agricultural field and rural areas is planned.

4. Petrochemical Complex, Gresik

Work on this substantial project using a credit from Italy has been resumed and is being actively pursued for scheduled completion in early 1970. Later, studies will be undertaken to determine what actions are required to modify the product mix, based on the needs of agriculture if such should prove desirable. While the name of the project may prove confusing, all of the products to be produced are in the fertilizer category.

5. Superphosphate, Tjilatjap

Discussions have been carried out between the Indonesian Government and the U.S.S.R. (who supplied this plant) to determine whether the remaining items can be supplied to complete the plant and whether the U.S.S.R. can now supply equipment to produce at Tjilatjap triple-phosphate instead of single-phosphate as originally contemplated. Final reply is expected during August and decisions can then be made as to the actions necessary to complete this unit.

6. Sulfur Project at Warnaradja

Studies will be instituted by the Directorate General of the Chemical Industries, under technical assistance from UNIDO to determine whether this project is practical.

7. Aluminum Project at Mabar, North Sumatra

The Foreign Investment Commission is discussing the development of bauxite and aluminum production in Indonesia with several companies, and until those discussions are concluded, little progress can be expected in connection with this project. In any event, a long period of prospecting and development of bauxite deposits will necessarily precede the establishment of any aluminum smelter in Indonesia.

8. Electric Bulb Project in Semarang

Based on careful studies by Indonesian authorities, the project has been discontinued.

9. Welding Rod Plant, Djakarta

A small amount of activity in this product has been carried forward. Again, this matter will come under review in the reorganization of the metallurgical industry now in progress.

10. Shipyard, Makassar, South Sulawesi

The mission is not informed on the progress, if any, on this project.

11. Electric Motors and Generators, P.N. Metrika

Some small motors and generators have been fabricated but not in substantial numbers. Again, this matter will be reviewed in the reorganization of the metallurgical industries now in progress.

12. Paper Projects - Martapura, Atjeh and Batang

No material progress has been made in connection with these projects. It is expected that the entire question of substantial paper production will be resolved within the limits of the large-scale concessions for timber now under discussion by the Foreign Investment Commission with several substantial companies specializing in wood and paper products.

13. Plywood Project, Palopo; Citronella Project; Tawangmangu

The mission is uninformed in connection with these projects.

POSSIBLE INDUSTRIAL PROJECTS FOR THE FIVE-YEAR PROGRAM

In Table 1 the mission has listed the industrial projects that seem to fit best into the priorities established by the Indonesian Government for its longer range development program. For the items listed, whether they would fall in the public or private sector will depend, inter alia, upon the industrial policy adopted by the Indonesian Government. The mission of course recommends maximum participation by the private sector.

There follows a discussion of each category of items listed:

Fertilizer. In last year's report comments were made on the progress connected with the expansion of urea production at Pusri; the construction of the Gresik complex; the completion and modernization of phosphate production at Tjilatjap and the possible use of sulfur in the crater at Warnaradja. Additional comments may be helpful in connection with the projected fertilizer plant at Tjirebon in West Java (Item 3) and the modifications which seem necessary at the Gresik complex to permit the most beneficial results under present circumstances.

There are indications of substantial natural gas supplies in the area of Tjirebon and confirmatory exploration is being carried out by an international company under contract with Permina. It is expected that this exploration work will be completed early in 1969 and, based upon the preliminary views expressed by experts in this field, it seems reasonable to expect that the gas will be firmed up in quantities sufficient to justify the construction of a substantial fertilizer plant having a minimum annual capacity of about 150,000 tons of nitrogen. Estimates of future national consumption of fertilizers indicate that such a unit will be required.

The fertilizer survey, which is now being carried on with particular emphasis to the Pusri expansion, will certainly point up much of the necessary data required for decision in connection with Tjirebon. Indications of market needs that come from these studies should have the continued attention of the agricultural authorities both as to quantity and type of fertilizers to assure that the information is updated periodically. Because Tjirebon is a coastal city on the Island of Java convenient to the largest rice and sugar growing areas, it would be logical to consider the production of compound fertilizer at this site, since phosphorous and potash must be imported. The composition of the fertilizer required will dictate the processes selected and the particular component products manufactured for these compounded products.

It is planned that this substantial unit will be organized and constructed in the private sector; International Finance Corporation has indicated its interest in this project. It is hoped that accumulation of pertinent data and the present investor interest will afford a suitable

basis for a commitment on this important priority project in the year 1970 and production of substantial quantities in late 1972.

In connection with the Gresik complex, it is recommended that studies be carried on during the forthcoming year to determine with the agricultural authorities whether the original product mix represents the best which can be manufactured there to meet the present needs of the country. Because the plant is located adjacent to harbor facilities, it would seem wise to consider diverting the sulfuric acid production to the manufacture of triple phosphate or phosphoric acid from imported phosphate rock. If phosphoric acid is selected, it might well be converted to ammonium phosphate completely eliminating the low concentration fertilizer-ammonium-sulfate as now planned. It would also seem possible to consider the production of appropriate compound fertilizers at this location.

As will be discussed in connection with caustic chlorine production (Item 60) in the neighborhood, it is hoped that facilities will be installed (or existing equipment modified) to make possible the production of a limited amount of ammonium chloride for a brief period of years on a declining basis until the increasing country's needs consume temporary surpluses of chlorine. Total quantity of ammonium chloride will be relatively small in comparison with the overall requirements for nitrogenous fertilizers and no material difficulty should be experienced in distributing such a product.

Cement and Other Infrastructure. Studies are currently being concluded in connection with the expansion of Gresik Cement (Item 6) by the addition of a fourth kiln to produce an added 125,000 tons annually, raising the total at this location to about 500,000 tons. A commitment on this project has been scheduled for 1969. Geological studies are underway at Tjibenong near Bogor to firm up the availability of lime stone and shale and to select a proper and satisfactory plant site. International Finance Corporation has taken an interest in this project and present indications are that a plant with a production capacity of some 800,000 to 1 million tons will be built in the private sector in two stages, with the first stage committed and construction started in 1969 and the second phase undertaken in 1970. This plant should substantially take care of the requirements in the Djakarta, Bogor, Bandung areas for the next several years. Together with the Gresik expansion, this new plant will make a substantial contribution to the economy through import substitution, since approximately 95 percent of the raw material and labor is indigenous.

The cement plant at Tonasa (Item 9) near Makassar, South Sulawesi, will be on stream in the next few months operating initially with bags produced for them at Gresik. With the proposed expansion at Gresik, they will have no surplus capacity for the production of bags. Therefore, the purchase of a small bag plant for Tonasa is recommended.

The cement plant at Padang (Item 10) was built in 1910 with a normal capacity of 120,000 tons annually. Considerable War damage has been repaired out of the limited funds available.

Improvements have been made to the plant which has raised the production to the annual rate of 150,000 tons. It is estimated that production could be balanced with the apparent kiln capacity at 220,000 tons annually.

With the construction of the additional production facilities at both Gresik and Tjibenong, there is little justification to consider any substantial rehabilitation or expansion at Padang which will then lose its Djakarta sales. It should, however, be possible for this plant to take care of the nearby markets and in fact to supply most of the Island of Sumatra whose needs are expected to grow. Certainly the plant should continue to operate because the product is needed, the operation is producing at profit, and in any case, the new facilities elsewhere will take several years to construct. For that period and perhaps longer, the output of this plant will be essential.

As a result of working back into their deposits, there now arises a need for modernization and changes in the quarrying operations at Padang. Several pieces of earthmoving equipment are required. In the opinion of the mission, these items are fully justified in order to maintain operations at this location and have been covered in the project list.

When these foregoing cement projects are completed, there will still be, in the mission's opinion, an inadequate domestic production by 1975 to meet the anticipated growth in consumption. Presently, the consumption per capita is one of the lowest in the world. With the anticipated improvements in the economy and the inputs in the agriculture and infrastructure fields, one can readily envision a strong increase in demand. For these reasons, the mission has suggested a new project (Item 8) for commitment in approximately five years for the production of a minimum of 1 million tons a year in the first phase at some sea-board location. From such a location, the movement of cement in bulk to various consuming centers in the archipelago could be economically carried out, thereby assuring the availability of reasonably priced cement from indigenous raw materials.

With the program of road building and road improvement, the large quantities of asphalt now imported will increase since domestic crudes do not generally produce asphaltic residues. Two facilities now exist in Indonesia for the production of asphalt, each of which requires some expenditures to bring them to their designed capacity. The mission urges that these matters be studied promptly and that a determination be made regarding the proper program of plant improvement which should be undertaken.

Even with such improvements, however, there will doubtless be an inadequate quantity of asphalt available. The mission, therefore, proposes a new plant to be established at a suitable location which would

permit ready import of crudes from the Persian Gulf area, and the economic distribution of the product. A feasibility study for location and plant design will need to be undertaken promptly.

Paper, Lumber and Plywood. The three plants at Pandalaran, Letjes and Blabak are designed to operate on rice straw as the raw material, with an admixture up to 20 percent of imported wood pulp, depending on the type of paper being produced. The straw customarily used is the upper portion of the stalk which is harvested with the rice. The supply in the vicinity of the plants is inadequate to maintain capacity production and transportation cost from other areas is excessive. It is now planned to utilize the entire rice stalk as is done in some other countries. This will require the establishment of suitable baling stations in each producing center to assure collection and storage of the straw at the time of harvest. It will also require some modernization of the equipment in these three plants to assure improved cleaning since the whole straw will carry more dirt.

In any modernization of small paper plants, Indonesia must be certain that the economics are sound and that due consideration has been given to the impending production from wood pulp as large timber reserves are opened.

Rather than attempt concurrent improvements at all three plants, the mission urges the completion of the new unit now being installed at Letjes and scheduled for production in June 1969. This plant is supplied under credit from West Germany and contains provisions for the proper processing of the whole straw based on the experience demonstrated at a larger unit near Alexandria in the U.A.R. While no guarantees of performance were included in the supply contract made some time ago, the present plant management feels certain that the equipment will produce the desired types of paper successfully and efficiently from this whole rice straw. The mission considers it prudent, however, that decisions respecting the other plants of Blabak and Pandalaran be postponed until this new unit operates, since start-up is relatively near.

To assure that Letjes (Items 12) has adequate supply of straw, the mission includes in the 1969 project list \$60,000 to purchase 12 additional baling machines.

When the new units for Letjes was purchased for some DM 20 million, it was pointed out that the capacity could be increased from 20 tons per day to 30 tons per day for an additional expenditure of DM 750,000. Unfortunately, the additional funds were not available at that time for this economic increase in production. During the construction and installation of the new unit now being carried forward, provisions are being made for the later addition of this incremental equipment. The mission recommends that the funds for this incremental equipment (Item 13) be made available in 1970 and suggests this delay to assure no interference with the installation on schedule of the new plant.

When the new unit operates a determination must be made as to whether the old existing plant at Letjes should be modernized or the plant scrapped and the usable equipment moved to a production line paralleling the new unit. Meanwhile, the mission has included in the 1970 schedule a provision of \$800,000 as now requested for the suggested modernization (Item 14).

The same problems that face Letjes on straw and its processing also face Blabak which is presently operating below capacity. As soon as the successful operation of the new unit in Letjes has been demonstrated, which should be in mid-1969, the mission suggests that Blabak (Item 15) be modernized by the addition of appropriate equipment. This plant will also require balers and, in addition, will need funds for the improvement of its artesian well unless added water has been provided in the meantime. A provision of \$860,000 has been included in the 1970 schedule.

Because Pandalaran is quite an old plant, its future should be reviewed when the above experiments are completed. A proposal was made to add a small unit of 5 tons per day to improve economics by the manufacture of high-grade qualities of paper, particularly the type required for cigarette production. As indicated earlier, the large population of Indonesia with increasing demands for paper should look to wood pulp as a raw material and to larger size producing units to gain economies of scale.

In addition, the recovery unit (Item 16) at this plant must be redesigned and rebuilt to make production at designed capacity possible, using the original process. It is assumed that this study will proceed during this year and that the necessary funds will be required in early 1970. Certainly, this money should be made available and the work completed promptly when the redesign work has been finished. The Gowa plant is also having some difficulties in obtaining adequate supplies of bamboo (Item 17) under its contract with the Forestry Department and the latter's contractors. The mission believes that the ultimate solution will lie in the Gowa plant being given full responsibility for its own raw material supplies. Therefore, \$100,000 has been incorporated in the 1969 project list for harvesting and transportation equipment.

At the new plant being constructed at Banjuwangi to produce paper from bamboo, a type of recovery unit similar to Gowa has been supplied. It is not known whether similar difficulties will be experienced in Banjuwangi as had been recorded at Gowa. For purposes of protection, however, the mission has included \$100,000 for the rebuilding of this unit (Item 18) if this should become necessary. It is assumed that the redesigning would then follow the successful revision of the Gowa unit.

In the last year's report the mission pointed out the advantages in making the Banjuwangi plant responsible for the harvesting of its bamboo. It is recommended that this matter be thoroughly studied in the next two or three months to assure adequate supplies for the plant. Provision has been included in the 1969 project of \$100,000 for harvesting equipment (Item 19) should this be required.

Several large companies with wide experience in the lumber, plywood and paper field are negotiating log concessions with the Foreign Investment Commission. It is expected that these concessions will include a schedule under which the contractor will initiate activities with logging, moving then on a prescribed schedule into upgrading activities such as production of lumber, plywood and paper. It is conjectured that plants of economic size can be justified which will produce paper competitively for the domestic requirements and for export sales (Items 20, 21 and 22). It will also be observed that logging and plywood plants have been scheduled for installation by the private sector in the later years of the forthcoming five-year period (Items 23 through 28).

Metallurgical Industries. The Directorate-General of Basic Industries is considering the consolidation of the several government-owned metallurgical plants into one operating entity for the purpose of increasing specialization, and improving the utilization rate of installed equipment. Specialists are collaborating in the development of this program. Some specific machines and equipment may be needed based on suggestions by these specialists (Item 29).

The steel-making equipment now on site at Tjilegon continues to be a source of great concern. A number of studies have been made and a decision must soon be taken either to install the equipment at this site or to move part of it for installation elsewhere (Item 30). With the increase in inputs in the infrastructure field, it is obvious that Indonesia can readily utilize the designed capacity of 100,000 tons of reinforcing bars, simple shapes and wire products. A substantial solution to Indonesia's steel requirements will have to be made at a later date. Irrespective of location chosen, the plant can be supplied with billets from an integrated steel mill when built, and from imports during the early years of operation.

There is a need to at least double the present capacity of spindles in Indonesia for the purpose of balancing spinning capacity to effective weaving capacity. The net result is that more than 100,000 additional spindles will have to be supplied each year over the five years if that goal is to be accomplished. Following suggestions in last year's report, studies are now in progress to determine whether underutilized equipment already available in Indonesia can successfully manufacture spinning equipment and looms under license from a renowned foreign manufacturer. Assuming that the answer will be favorable, provision has been made in the 1968 project list (Item 31) for the expenditure of \$300,000 for any special machinery needed to achieve this goal.

The mission is convinced that a great deal of equipment needed for the continuing rehabilitation and repair of tin dredges can be produced indigenously, and the Minister of Mines has agreed to encourage placing of the maximum orders possible with local producers. Provision has been made in the 1969 program (Item 32) for \$100,000 in case some special pieces of equipment are needed at the machine shops.

The existing metallurgical plants can probably produce under license the rice milling equipment required (Item 33) for installation with silos at the site of the large rice development projects. A similar program is proposed for the manufacture of rock crushers (Item 34) to speed the road-building program and for the manufacture of larger numbers of improved diesel pumps and generators (Item 35) for use throughout the country. A small provision for additional equipment and machinery for these increased activities has been made in the 1969 program.

Two foreign investors are creating joint ventures for the production in the Djakarta area of black and galvanized steel pipe up to 4 inches in diameter in a quantity of 36,000 tons per year at each plant. Hoogovens of The Netherlands have joined with Bakrie Brothers (Item 38), while Toyo Menka of Japan has joined with Binelogen (Item 39). It is expected that these plants will be in production late in 1969 or early in 1970. With the rehabilitation program being implemented, there will doubtless be a need for an additional production of these articles and an expansion to larger diameters. Assuming that the two present plants are operating at capacity, new units are scheduled for installation at Palembang in 1971 (Item 40) and at Surabaja in 1972 (Item 41), although these could be reversed if conditions dictate.

When funds become available for the improvement of the water supply in various large cities, it will prove necessary to coat and wrap the water pipe, particularly the larger diameters, to provide added years of service. A coating plant (Item 42) is suggested in the private sector. In connection with additional types and quantities of coated wire and cable (Item 44) the present producer, PT Tranka of Djakarta may need to augment his present production. Similarly with respect to electric switches, etc., (Item 45) the two producers, Fadjare Electric and Karya Harapan may need to be expanded.

The need for investments in the remaining items in this group is linked directly to the acceleration of the development program.

Other Industries. Based on the progress of recent years in connection with wood impregnation, it appears desirable to install such a unit and this has been suggested for the year 1969. Limited facilities for pressure impregnation with creosote are said to exist at the Government Railway. The capacity for this work will require expansion for the treatment of piling for harbor improvements and building foundations. In addition, several treatments with various chemical must be carried on to provide construction timber treated to resist annai and termites, timber treated to resist combustion and woods treated for dimensional stability.

As the emphasis increases on self-sufficiency in food of all types and in the manufacture of an increasing variety of industrial and consumer items, there will be a growing need for corrugated paper cartons. Initially, these would be produced from imported Kraft paper but would

later be supplied from a domestic mill. These plants (Items 51 through 54) need to be installed on approximately the suggested schedule starting 1969 in order to fill the expected increase in demand for cartons while concurrently creating the market for the Kraft paper from the large-scale unit anticipated in Item 20.

Again as food production increases there will be a rising need for tin cans and two plants (Items 55 and 56) have been included in the schedule. Initially, the tin plate would be imported and at some future date a tin plate unit could be installed in an integrated steel plant when constructed. Additional facilities will be needed very shortly to provide the increasing requirements for glass (Item 59) in the form of bottles and jars for beverages and also flat glass for building construction.

While a carbon black plant is being completed, it is reported unable to produce the types of carbon black required by the tire manufacturers. It is suggested that this matter be studied to determine whether the existing plant can produce or be modified to produce the types required and, if not, whether satisfactory raw materials can be acquired and suitable arrangements made to produce these items indigenously (Item 57).

Presently the installed capacity for the production of tires is below current needs. The shortfall will increase with improvements in the economy and in the road system. At the same time, of course, there is need to increase the use of native rubber. A 50 percent increase in present production (Item 58) is suggested for 1971 if not earlier installed by existing plants or by a new installation.

While the operation of the State-owned salt producing unit on Madura faces economic difficulties, the fact remains that the country's needs for caustic and soda ash are not being filled domestically at the present time. This question is receiving careful study in government circles and a feasibility study is being carried forward under a grant from the United Kingdom. Because of the rising demand in Indonesia for caustic and soda for paper and glass manufacturing, one can expect that the production of salt by evaporation will be continued not alone to fill this industrial need but also to provide work for the people of the area. Technical assistance will be required to assure the adoption of the most economic means of producing this salt in the desired quality and quantity.

While the normal inclination in a developing country is to consider soda ash production to avoid the disposal problem of the chlorine produced concurrently with caustic soda, few, if any, soda ash plants have been built in the recent 15 or 20 years, because as development progresses chlorine consumption has been rising at a considerably faster rate than the consumption of caustic and soda ash.

Fortunately for Indonesia, the Gresik complex is located close to Madura and, with the cooperation of the agricultural authorities, ammonium chloride could be produced for use as a fertilizer on rice and act as a temporary safety valve to dispose of the excess chlorine. The quantity of ammonium chloride produced would decrease as new and expanding uses for chlorine in Indonesia are created. For planning purposes, therefore, it is suggested that a plant (Item 60) having a production of 120,000 tons of caustic a year be constructed in Madura. It is again suggested this year that the governmental authorities be required to purchase chlorine and/or bleaching powder from this new unit at Madura or from the existing unit at Waru. In this way, imports of these products would decrease while the consumption of locally produced chlorine products increased producing obvious benefits for the Indonesian economy.

To fill the country's needs for plastic materials for food packaging and other consumer needs and to consume the chlorine, a poly-vinyl chloride plant (Item 61) has been scheduled to produce 45,000 tons. It is believed that the most suitable location would be at Madura where the chlorine would be generated. In turn, this would require the transportation of ethylene from a stripping unit which, it is recommended, be installed at a suitable location in the Palembang area; either at the expanded Pusri urea plant, or at one or both of the refineries. A small pressurized tanker (Item 64) would be required for this transportation service.

It is assumed that PLN will include provisions in its program to supply the needed power for these projects on Madura.

The availability of ethylene would naturally lead to the production of polyethylene and such a unit (Item 62) has been included in the plan. With basic materials available, units for the production of poly-vinyl and polyethylene pipe (Item 65) and for plastic bottles (Item 66) and film will be useful additions.

Tin Mining. An increase of production of tin is an important consideration in the country's export schedules. Since the two new dredges (Item 67) recommended last year have not as yet been provided, they are included in the 1969 program with disbursements (based upon early 1969 commitment) of \$1 million in 1969 and \$9 million in 1970 when the two dredges would be delivered. Whereas last year's program scheduled the rehabilitation of four old dredgers, only two were committed in part and a carry-over of \$400,000 is included to finish the commitment partially undertaken last year. We continue to schedule the rehabilitation of four dredgers per year (Item 68) as a minimum number since it will require 9 years on this basis to finish the fleet of thirty-six units. However, we are assuming that a considerably larger portion of the equipment required for this rehabilitation can be produced in Indonesia. Studies and negotiations in this direction are already under way. For the year 1969 and each of the succeeding years, a commitment and expenditure of \$1.6 million and Rp. 360 million are provided for this purpose.

It will be recalled that in last year's report, the new boilers and rehabilitation of power plant and electric mines were postponed. This year a commitment of \$3.5 million for the year 1969 (Item 69) has been included with the disbursement schedule of \$0.5 million for 1969 and \$3 million for 1970.

Textile Industry. Earlier in this report it was pointed out that over 67,000 spindles are out of operation awaiting spare parts. Correction of this condition is necessary immediately. Item 70 schedules \$4 million in 1969 for this purpose and to establish an appropriate reserve to maintain capacity operations.

In addition to improvements in quality that will come from putting vacuum cleaning and temperature-humidity control equipment in the several plants back to working order, the mission looks for substantial reductions in costs from the increased production as a result of this spare parts input. The mission believes that the planned expansion in spinning capacity will produce the greatest economies if installed at existing plants instead of creating new establishments. Not only will this use up some or all of the surplus labor that may exist at these locations but will also decrease the relative impact of overhead on unit production costs. It has therefore been assumed that the production level of each government spinning plant would be raised to 60,000 spindles and the schedule on which this could be accomplished has been set forth under Items 74 through 86. Obviously, any particular plant can be interchanged with a plant in a different year if there are advantages in such a rearrangement. All of these additions to existing spindle capacity are assumed to be equipment manufactured in Indonesia under license from a world renowned producer of such equipment.

In addition to expansion of the existing spinning plants, we have included an integrated textile plant (Item 71) with 50,000 spindles to be built in the private sector and which is being studied currently by the International Finance Corporation. An early decision on this project may be possible and this large-scale unit should establish norms of quality and efficiency for the balance of the industry.

Also listed are the proposed spinning plants at Makassar (Item 72) and Pedang (Item 73) each with 30,000 spindles. It will be recalled that previous national policy entailed the establishment of spinning plants in the different parts of the archipelago with the purpose that the yarn produced would be utilized by the weavers in the vicinity. Several of the plants in this program were built, but these remaining two were scheduled to be supplied from Mainland China. The unit for Makassar was included in the last year's program but no commitment was obtained. Because of the large demand for funds in 1969 these projects have been scheduled for 1970 on the original basis of equipment imports under a donor country credit. The Directorate-General of Textiles has been requested to tabulate the amount of weaving and knitting equipment and the yarn requirements in these two areas to determine whether plants

of this size are justified or adequate. With this information a decision can be made as to whether these plants are based on economic grounds or whether they should be built partly on political considerations. In view of the fact that the earliest availability of funds would appear to be in 1970, it may prove possible in either case to produce this equipment indigenously and make corresponding reductions in the foreign funds required.

Private enterprise is planning to install in 1969 the first crumb rubber plant in Indonesia. This type of rubber is rapidly increasing in demand over conventional forms in which natural rubber has been sold.

Table 1

Suggested Five-Year Industrial Development Plan
(In Millions of Dollars or Rupiahs)

<u>Project</u>	<u>Total</u> (\$ Mln.)
<u>Fertilizer</u>	
1. Urea Fertilizer - Pusri	15.00
2. New Fertilizer Complex - Tjirebon	65.00
3. Modification - Gresik Petrochemical Complex	15.00
4. Completion & Modernization - Tjilatjap	4.00
5. Sulfur Production - Warneradja	5.00
<u>Cement and Other Infrastructure Industries</u>	
6. New Cement Plant - Tjibinong	14.00
7. New Cement Plant - Seaboard location	16.00
8. Addition of Bag Plant - Tonasa	0.12
9. New Asphalt Plant - Java	5.00
<u>Paper Lumber and Plywood</u>	
10. Havesting Equipment - Letjes	0.08
11. Expansion New Unit - Letjes	1.00
12. Modernization Old Unit - Letjes	0.80
13. Modernization - Blabak	1.00
14. Rebuilding Recovery Unit - Gowa	0.10
15. Havesting Equipment Gcwa	0.10
16. Rebuilding Recovery Unit - Banjuwangi	0.10
17. Harvesting Equipment - Banjuwangi	0.10
18. New Kraft Plant #A - New Location	40.00
19. New Newsprint Plant #B - New location	40.00
20. New Writing Paper Plant #C - New location	30.00
21. Logging-Lumber Project A - New location	3.00
22. Logging-Lumber Project B - New location	3.00
23. Logging-Lumber Project C - New location	3.00
24. Plywood Project A - New location	3.50
25. Plywood Project B - New location	3.50
26. Plywood Project C - New location	3.50
<u>Metallurgical Industries</u>	
27. Equipment Additions at Various Metallurgical Plants	1.00
28. Wire, Reinforcing Bars & Angles (Tjilegon installed or moved in part)	2.00

Table 1 (page 2)

<u>Project</u>	<u>Total</u> <u>(\$ Mln.)</u>
29. Production of Diesel Pumps & Generators	0.15
30. Production or Assembly Small Tractors	1.00
31. Black & Galvanized Pipe to 4"dia.	4.00
32. Black & Galvanized Pipe - Palembang	4.00
33. Production of Small Electric Motors & Generator Fans	2.00
34. Production (or expansion) of Coated & Insulated Wire	5.00
35. Production of Welding Rod	0.20
36. Production of Agricultural Sprayers	0.25
37. Wood Impregnation Plant	1.00
38. Corrugated Paper Cartons	6.00
39. Tin Can Manufacture	3.00
40. Carbon Black Production	2.00
41. Expansion of Tire Production	5.00
42. Flat Glass & Glass Bottles	3.00
43. Caustic & Chlorine	20.00
44. Polyvinyl Chloride	15.00
45. Polyethylene	15.00
46. Ethylene Stripping Unit	1.40
47. Polyvinyl & Polyethylene Pipe	1.60
48. Rehabilitation 4 Dredgers Annually	8.40
49. Spare Parts for Spinning Mills	4.00
50. New Integrated Textile Plant	10.00
51. New Spinning Plant - Makassar	5.60
52. New Spinning Plant - Padang	4.60
53. Additional 30,000 Spindles - GKBI	0.75
54. Additional Spindles - Other	7.00
55. Crumb Rubber	2.00

CHAPTER 3

POWER

Resume of the Supply and Demand Situation

1. The past and present status of the electricity supply industry in Indonesia was described in some detail in Report AS-132a dated February 12, 1968 and it is not proposed to repeat the subject in this report.
2. Since the end of 1967, gas turbine units each of 14,000 kw capacity have been commissioned at Medan (Sumatra), Palembang (Sumatra), and Semarang (Central Java). Commissioning dates were January 3, March 12, and May 13, 1968, respectively. These units have brought much needed relief to these areas. Other minor additions to the system of PLN (Perusahaan Listrik Negara) during the course of 1967 were 24 diesel units with an aggregate capacity of about 3,500 kw. As of June 30, 1968 the total installed generating capacity throughout Indonesia was 651,054 kw comprising 307,599 kw hydro, 125,194 kw steam, 181,511 kw diesel and 36,750 kw gas turbine. There are 68 individual hydro units, 18 steam, 516 diesel and 3 gas turbine units housed in 197 separate power stations. Further details of generating capacity in each region are given in Table 1. Map 1 shows the location of all generating facilities which have an installed capacity exceeding 5,000 kw. The total available firm capacity is about 336,800 kw. Energy generated by public utility stations in 1967 was 1,609 million kwh, of which it is estimated that about 1,156 million kwh were sold. Table 3 gives details of units generated and sold for each region during 1967. It will be noted that for Regions V, VIII and XI precise sales figures for 1967 are not yet available. The above figures do not take into account the considerable number of captive plants which exist, particularly in industry. No reliable statistics of the capacity of these plants is available but it is estimated to amount to about 200,000 kw. Table 3 also indicates for each region the percentage of units generated which are used in auxiliaries, lost in transmission and distribution or are otherwise unaccounted for. The overall percentage of losses for the whole of PLN's system is 28, which is high, but in the case of the four regions in Java the figures vary from 27% for East Java to an extremely high figure of 35% for West-West Java. Although the dilapidated transmission and distribution systems must account for a large proportion of these losses, the mission believes that a high proportion is due to the theft of electricity and would indicate that a complete overhaul of PLN's metering and billing procedure is called for.
3. Apart from local distribution networks associated with individual generating stations, there are no transmission networks of any consequence except on the island of Java, which has four isolated systems (see Map 2). The highest transmission voltage now in use is 150 kv connecting the Djatiluhur hydroelectric project in East-West Java with the cities of Djakarta Djakarta and Bandung. Other voltages in use are 70 kv, 30 kv, 25 kv and 15 kv. Interconnection of the four separate systems in Java may not be appropriate at this time but the possibility of future interconnected operation should now be receiving attention to ensure the best utilization

of the larger generating stations now under construction or contemplated. It is expected that the terms of reference for the power survey for Java and Sumatra will include a study of this question.

4. Table 2 shows the energy generated in each region during the period 1962 through 1967. With the exception of three of the four regions in Java where a little surplus generating capacity is available and where further growth can be expected as transmission and distribution networks are rehabilitated and strengthened, there has been little or no growth - in some regions, particularly in Sumatra, there has been a continuing and steady decline over the last two or three years in the number of units generated and sold. The mission believes that lack of growth in these regions has been almost entirely due to the absence of new generating capacity and the inability of existing capacity to continue to meet existing demands. Some improvement may be expected during 1968 in Regions I, II and X following the commissioning of the gas turbine units in Medan, Palembang, and Semarang earlier this year. Significant improvements may also be expected towards the end of 1969 in Regions II and VI following the commissioning of 25,000 kw steam stations in Palembang and Makassar.

5. Projects now under construction or planned for completion during the next five years include the following:

<u>Project</u>	<u>Location</u>	<u>Type</u>	<u>Capacity</u> (kw)	<u>Anticipated</u> <u>Date of</u> <u>Completion</u>
* Makassar	Sulawesi	Steam	25,000	1969
* Palembang	Sumatra	Steam	25,000	1969/70
Medan	Sumatra	Steam	25,000	1971
Semarang	Java	Steam	60,000	1971
Tandjung Priok III	Java	Steam	50,000	1971
Tandjung Priok IV	Java	Steam	50,000	1972
Djakarta	Java	G/Turbines	30,000	1970
Pontianak	Kalimantan	Steam	20,000	1972
* Riam Kanan	Kalimantan	Hydro	20,000	1971
* Karang Kates	Java	Hydro	70,000	1971
* Batang Agam	Sumatra	Hydro	10,000	1972

* Construction in progress.

6. Also proposed for initiation in the near future is the Asahan hydro project in North Sumatra. Further consideration of the project awaits the completion of a feasibility study which is now in progress and a decision regarding the establishment of an aluminum smelter in the area of Medan (see 1969 Electrification Program).

Recent Adjustments in Rate Structure

7. Earlier this year PLN was instructed to so modify its rates as to enable it to balance its operating revenues and expenditures. The new rate schedule, effective May 1968, is detailed in Table 4. The rates shown are applicable to all regions throughout Indonesia. The new tariffs represent considerable increases, in all categories except industrial, over those previously in force. Further, in an effort to make the tariff more attractive to industry, the extremely high surcharge imposed on users of power during peak load periods has been eliminated. Industrial tariffs are, however, still high and the team which is presently carrying out the first phase of the electric power survey propose to examine the new tariff schedule to determine what further changes would be appropriate.

1969 Electrification Program

8. The program, prepared by the Directorate General for Power and Electricity, called for commitments in the 1969 Aid Program amounting to US\$163.53 million equivalent. The projects against which these commitments are required to be made are detailed in Table 6. The list of projects includes some which have been transferred from the 1968 Program, particularly those which involve the supply of diesel generators and distribution materials. Also included are some items for which contracts have been signed with suppliers but no financing has been provided, or work on site has been suspended because arrangements for financing have not been concluded. It also includes a number of new projects which are to be undertaken during the period of the first Five-Year Plan (1969-73). The same table shows the commitments which the Directorate estimated would be required together with the amounts recommended by the mission. Details of the 1969 Program are discussed briefly below:

A. Rehabilitation and Reinforcement of Electrification Systems Throughout Indonesia

9. Items A, D and E of the project list for 1968 (see Table 5) covered the rehabilitation and reinforcement of electrification systems in Central and East Java (A), the provision of spare parts and distribution materials for diesel generating units outside Java financed by U.S. AID and Czechoslovakia (D) and distribution materials for diesel electrification projects outside Java other than those included under D (E). The total aid required for these three items amounted to US\$11.5 million. The Government of The Netherlands has agreed to accept a commitment against Items D and E but has limited disbursements through 1968/69 to US\$1.0 million. The whole of the diesel rehabilitation program for 1968, adjusted for the US\$1.0 million of disbursements agreed by The Netherlands, has been moved forward to the 1969 Program and is indicated at Item A(i) and Item A(ii) in Table 6.

10. There appears to have been some reluctance on the part of the donor countries to provide assistance for the diesel electrification program chiefly on the grounds that the supply of individual diesel generating units and distribution materials, including substation equipment, cannot be classed as project aid. The implementation of this program and probably similar programs in 1970 and 1971 is so vitally important to Indonesia at this time that some means must be found to overcome this reluctance. The works which it is proposed should be undertaken are amply justified and the only means available of providing even a limited improvement in the power supply situation in Indonesia until the larger and more efficient generating projects planned for 1971 and beyond are brought into commission.

B. Units III & IV Tandjung Priok Steam Station (2 x 50,000 kw)

11. Units I and II each of 25,000 kw capacity were commissioned in 1962 and 1964, respectively. In 1965 an agreement was signed with Sumitomo of Japan for the construction of Units III and IV each of 75,000 kw capacity. The agreement was never implemented and none of the work covered by the agreement has been started. In its review of the 1968 program, the mission recommended that a unit size of 50,000 kw would be more appropriate than 75,000 kw and the Directorate-General has agreed with this recommendation.

12. The Mission believed that in view of the delay which has already taken place in commencing site work on the extension project, a shortage of generating capacity was likely to develop in West Java late in 1970, some months before Unit III could be commissioned and agreed with the Directorate that it would be appropriate to consider the installation of gas turbine units in Djakarta to meet this probable shortage (see Item 0). It was the Mission's view, however, that if such action was taken it should be possible to postpone Unit IV to the 1970 Electrification Program. The Government of Indonesia has since stated that early agreement is now likely on the implementation of the original Sumitomo contract (but for 50,000 kw units) and it believes that work on site could be started soon and that the commissioning date of Unit III would be such as to restrict the possible power shortage in late 1970-71 to one of short duration. Should this be so, it would be advisable to proceed with a two-unit extension and a commitment of US\$5.0 million has been included in the 1969 Program. However, the Mission is of the opinion that the Government's views on commissioning dates are overly optimistic and would not expect Unit III to be in operation much before the middle of 1971.

C. Riam Kanan Hydro Station (2 x 10 MW)

13. A commitment for US\$5.38 million was agreed by Japan against the 1968 Program for the completion of civil works. A commitment of US\$3.5 million is now required in respect of generating equipment, transmission lines and substation equipment to complete the project.

D. Karang Kates Hydro Station (2 x 35 MW)

14. This is an important multi-purpose project in East Java and on completion, probably in 1971, will provide the next major source of power for the Region. A commitment of US\$13.1 million was agreed by Japan against the 1963 Program for the completion of civil works. A commitment of US\$10.69 million, included in the 1969 Program, is now required to cover the installa-

tion of generating plant and the construction of major transmission lines and substations. If there is to be uninterrupted construction progress it is particularly important that a commitment against this item be taken up as early as possible.

E. Semarang Steam Station (2 x 30 MW)

15. A contract between the Government of Indonesia and the International General Electric Company was signed in March 1963 for the construction of a steam power station at Semarang in the Central Region of Java. The station was to have comprised two units each of 25 MW capacity. Because of difficulties in arranging for external finance, no progress was made on the contract. In October 1967 the contract was revalidated and as a follow-up of this revalidation a new survey of the Region was carried out by Gibbs and Hill Inc. on behalf of I.G.E. The survey report was completed in March 1968.

16. The lack of firm generating capacity and inadequate transmission and distribution facilities have undoubtedly been the cause of the very poor growth rate in this region in recent years. Some improvement may be indicated by the end of this year following the commissioning of a 14 MW Gas Turbine Unit at Semarang in May. The 1969 Program also proposes the installation of 15,500 kw of diesel generating plant (Item A) originally included in the 1968 Program, but much of this capacity will serve only to supply isolated areas and will be of little benefit to the major load centers, particularly Semarang.

17. M/s Gibbs and Hill have suggested a growth rate of 10% per annum for Central Java and using this figure have concluded that it will now be necessary to install two 30 MW steam units at Semarang by mid-1970. The mission believes that even with the substantial improvements planned for the Region's transmission and distribution system during the forthcoming Five-Year Plan (see Item L, 1969 Electrification Program), the estimated rate of growth will prove to be too optimistic. The mission also expressed concern over the size of individual units which it was proposed to install. The addition of two 30 MW steam units to a regional system having an existing firm generating capacity of about 45 MW, all of which is fully committed, is likely to give rise to a number of operational problems and in any event will add only about 40 MW to the firm generating capacity of the system.^{1/} A further point on which the mission expressed concern was the estimated cost of the installation which amounted to US\$17.44 million or US\$291 per kw of installed capacity. These figures are extremely high even for work to be carried out in Indonesia. The commitment requested in the 1969 Program is US\$15.125 million representing the cost of imported equipment and services. The mission recommended that the Directorate, with the assistance of the consultants who will be carrying out the first phase of the Electric Power Survey, should examine carefully the basis on which the need for two 30 MW units has been established, should carefully consider the advisability of installing smaller units at this stage of development

^{1/} The largest existing unit in the system is the recently installed 14 MW gas turbine unit at Semarang.

of the Region's power system and should critically review the estimated costs of the proposed installation at Semarang. The Mission believes that a commitment of US\$10.0 million in the 1969 Program for a new installation at Semarang would be adequate.

F. Batang Agam Hydro Station (4 x 2.5 MW)

18. The project is situated in the northern area of West Sumatra about 100 km north of Padang. Work on the project began in 1961 but has been practically at a standstill since 1966 because of lack of construction funds. The first stage is designed for an installed capacity of 10 MW. The construction of the second stage would add a further 10 MW. The project would supply power to medium and small-scale industries in the Bukittingi area and would enable old and inefficient diesel plant in that area to be shut down. A commitment of US\$5.0 million has been requested to enable the project to be completed. Although on the face of it \$5.0 million may seem a high price to pay for 10 MW of new hydro capacity, some of the investment will cover second stage construction. About 15% of civil works have been completed. However, in view of the availability of coal in the area and its desire to support the coal industry to the extent possible, the Government has decided to postpone further work on the project until a study has been made of the feasibility of constructing a coal-fired thermal station as an alternative to the project. Accordingly, the proposed allocation of US\$5.0 million has not been recommended.

G. Tonsea Lama Hydro Station (1 x 4.4 MW)

19. The requested commitment is to cover outstanding electrical and mechanical components which are required to complete the project. The Mission repeated its recommendation of last year that Indonesia negotiate directly with the supplier of the main generator equipment.

H. Asahan River Hydro Development

20. The Directorate presented two alternatives for consideration by the Mission. Alternative I, based on the conclusions of a feasibility study prepared by Russia, proposed the construction of a hydroelectric project on the Asahan River in North Sumatra with an installed capacity of 160 MW. Alternative II based on a recent Japanese study proposes a station with an installed capacity of 460 MW. The total costs for Alternatives I and II are estimated to be US\$50.0 million and US\$70.0 million, respectively. Both alternatives proposed that the project should supply an aluminum smelter to be constructed in the area of Medan with an annual output of 80,000 tons in the case of Alternative I; and 200,000 tons in the case of Alternative II. The final Japanese report has not yet been issued but a review of the Interim Report indicates that in the case of Alternative II energy could be produced at a cost of around 2 mills per kwh. Neither alternative would be justified at this time unless constructed in conjunction with the proposed smelter. Meanwhile the Government of Indonesia is negotiating with the Aluminum Company of America (ALCOA) for the granting of mining rights and the possible construction of a smelter with Asahan as the source of power.

21. The mission concluded that the development of the Asahan River required special treatment and that further consideration should await the completion of the Japanese study and the outcome of Indonesia's negotiations with ALCOA. It was therefore agreed that the project be removed from the 1969 Program.

I. Garung Hydro Station (2 x 10 MW)

22. This is a new hydroelectric project in Central Java. Preliminary site works have already commenced including the excavation of the diversion tunnel. Although a total commitment of US\$7.5 million has been requested, and this appears to be a reasonable amount, disbursements in fiscal year 1969/70 to cover construction plant and materials are not likely to exceed US\$1.0 million.

J, K and L. Rehabilitation and Reinforcement of Transmission Networks in West, East and Central Java, Respectively

23. The commitments requested for the rehabilitation and reinforcement of transmission and distribution networks in Java in the 1969 Program represent the value of equipment and materials which it is considered PLN can install and erect during fiscal year 1969/70, and represent only a part of the aid which will be required to complete the rehabilitation program which is likely to extend over the next two or three years. In West Java most of the rehabilitation work will be concentrated in and around the city of Djakarta where generating capacity is available and primary distribution at 70 kv is in reasonable order but where distribution stations and substations and associated networks are very much below the capacity required to distribute available power within the city. Some improvements have been made during the last few months and it is essential that this work be given the highest priority.

24. In Central Java work must proceed on the integration of the two isolated networks and the system must be sufficiently improved to enable it to accept power from the proposed thermal station to be built in Semarang, which is expected to be commissioned by 1971 and from the future 120 MW steam station to be built at Tjilatjap.

25. In East Java improvements made to the transmission and distribution network during the last year must continue on a priority basis in order that full use may be made of power from the 50 MW thermal station at Surabaya and from the Karang Kates hydroelectric station which is expected to be in operation in 1971.

26. Commitments requested against the above three items amount to US\$8.05 million. Disbursements during the fiscal year 1969/70 are estimated to be of the order of US\$5.25 million.

M. Rural Electrification for Small Towns and Villages (new schemes)

27. This item covers the installation and commissioning of a number of small isolated diesel and micro-hydro units complete with their associated

distribution systems. The mission is of the opinion that unit prices used in the estimate are high and also believes that the work covered by this item should not enjoy as high a priority as the rehabilitation of diesel systems covered elsewhere in the Program. It was therefore recommended that the requested commitment for diesel units of US\$4.5 million be reduced to US\$2.5 million and that a similar reduction be made in the commitment required for the associated distribution system.

N. Medan Steam Station (2 x 12.5 MW)

28. The City of Medan, which is the principal area of consumption in North Sumatra, has suffered seriously in recent years because of a lack of generating capacity, and the total energy produced by PLN has shown a reducing trend each year since 1963. By the end of 1967, out of a total installed capacity of 16,154 kw, 9,530 kw of capacity had been taken out of service since 1963. Of this, 4,100 kw of plant had been irreparably damaged and 5,430 kw of capacity was awaiting the receipt of spare parts ordered earlier in 1967. Some improvement is expected this year after the commissioning of a 14 MW gas turbine unit on January 3, the expected commissioning of 2 MW of packaged diesel plant early in August and the recommissioning of plant awaiting spares which have now been received. Although the situation at this time is much improved, further power shortages will occur before the end of next year. The Directorate proposed that a new steam station comprising three units each of 12.5 MW should be built in Medan as soon as possible. The mission agreed that new generating capacity was urgently required but proposed that the initial project should comprise two units only, as believed that by the time these two units are being fully utilized, further additions to the station's capacity would warrant larger units. Accordingly, the requested commitment of US\$9.0 million was reduced to US\$7.0 million. It is not expected that disbursements during fiscal year 1969/70 will exceed US\$1.0 million.

O. Gas Turbine Plant for Djakarta (2 x 15 MW)

29. In view of the delay which has occurred in the start of construction operations for Unit III at Tandjung Priok, the Directorate proposed the installation of three 15 MW gas turbine units in the City of Djakarta to meet a shortage of generating capacity in the West Java system which is expected to arise towards the end of 1970. The mission agreed that there was justification in the proposal but recommended that two units only should be included in the 1969 Program, and that further consideration should be given to the installation of a third unit when drawing up the requirements of the 1970 Program. The units would be installed in existing substations in the city and, in addition to meeting the shortfall in generating capacity, which it is believed will occur in the area in late 1970, would help to relieve the distribution bottleneck in the city by producing power in areas where it is immediately required. With the commissioning of Unit III and, later, Unit IV at Tandjung Priok, the units could either revert to peaking duties and thus defer further investment in new generating capacity by at least a year or could be removed and used elsewhere in PLN's system.

Table 1

DIRECTORATE GENERAL FOR POWER & ELECTRICITY
Details of Installed Plant Capacity
(as of June 30, 1968)

Region	Number of Stations	Number of Units & Installed Capacity								Total Installed Capacity KW ^{1/}	Total Firm Capacity KW
		Hydro		Steam		Diesel		Gas Turbine			
		Units	KW	Units	KW	Units	KW	Units	KW		
I NORTH SUMATRA (Medan)	19	2	120	-	-	75	24,245	1	12,250	36,615	16,900
II SOUTH SUMATRA (Palembang)	10	2	1,320	-	-	30	21,206	1	12,250	34,776	14,000
III WEST KALIMANTAN (Pontianak)	8	-	-	-	-	17	4,322	-	-	4,322	2,000
IV NORTH, CENTRAL & SOUTH KALIMANTAN (Bandjarbaru)	10	-	-	-	-	26	7,842	-	-	7,842	3,300
V NORTH SULAWESI (Manado)	8	1	4,440	-	-	16	2,932	-	-	7,372	4,350
VI SOUTH SULAWESI (Makassar)	8	-	-	-	-	18	14,457	-	-	14,457	3,500
II MALAKU (Ambon)	6	-	-	-	-	29	4,292	-	-	4,292	1,050
III NUSA TENGGARA (Denpasar)	21	-	-	-	-	58	6,513	-	-	6,513	3,600
IX EAST JAVA (Surabaya)	25	15	42,722	6	59,482	59	20,567	-	-	122,771	67,000
X CENTRAL JAVA (Semarang)	28	14	42,300	-	-	61	21,593	1	12,250	76,143	45,000
XI EAST WEST JAVA (Bandung)	11	27	182,952	-	-	10	2,614	-	-	185,566	96,000
III WEST WEST JAVA (Djakarta)	11	6	33,675	6	62,700	37	36,861	-	-	133,236	72,000
II ATJEH (Banda Atjeh)	9	-	-	-	-	27	3,742	-	-	3,742	1,750
IV WEST SUMATRA (Padang)	23	1	70	6	3,012	53	10,325	-	-	13,407	6,350
TOTALS	<u>197</u>	<u>68</u>	<u>307,599</u>	<u>18</u>	<u>125,194</u>	<u>516</u>	<u>181,511</u>	<u>3</u>	<u>36,750</u>	<u>651,054</u>	<u>336,800</u>

^{1/} The figures for firm capacity are the sum of firm hydro capacity plus 60 percent of the maximum capability of thermal plant.

August 22, 1968

Table 2

DIRECTORATE GENERAL FOR POWER & ELECTRICITY
Energy Production for the Period 1962-67 (KWH)

<u>Region</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>	<u>1965</u>	<u>1966</u>	<u>1967</u>
I NORTH SUMATRA (Medan)	68,629,536	74,693,792	68,842,695	59,406,095	58,824,785	56,700,416
II SOUTH SUMATRA (Palembang)	90,643,173	105,021,744	113,119,555	82,361,305	78,111,750	73,544,314
II WEST KALIMANTAN (Pontianak)	12,780,972	12,109,699	13,644,078	14,866,682	15,292,742	14,768,294
IV NORTH, CENTRAL & SOUTH KALIMANTAN (Bandjarbaru)	14,563,644	16,367,000	16,366,983	14,333,008	13,900,908	11,949,495
V NORTH SULAWESI (Manado)	17,607,239	18,828,397	22,121,807	22,361,810	20,984,156	21,305,960
II SOUTH SULAWESI (Makassar)	28,405,000	36,627,223	34,110,924	32,473,442	22,171,531	26,482,875
II MALAKU (Ambon)	3,629,917	3,723,790	5,086,804	5,411,012	4,872,896	5,174,631
II NUSA TENGGARA (Denpasar))	257,354,605	260,628,191	276,613,421	13,064,000	11,541,450	12,961,389
X EAST JAVA (Surabaya))				299,671,332	318,955,209	339,581,705
X CENTRAL JAVA (Semarang)	179,180,444	198,003,386	212,695,374	187,976,466	216,807,848	217,153,306
II EAST WEST JAVA (Bandung))	568,024,243	568,441,925	644,111,364	740,952,022	761,311,450	301,010,214
II WEST WEST JAVA (Djakarta))						488,190,334
I ATJEH (Banda Atjeh)	-	-	-	7,827,948	8,131,900	10,481,240
IV WEST SUMATRA (Padang)	-	-	-	32,477,853	30,499,938	29,913,731
TOTALS	<u>1,204,818,773</u>	<u>1,294,445,147</u>	<u>1,406,713,005</u>	<u>1,513,182,975</u>	<u>1,561,406,563</u>	<u>1,609,217,904</u>

Table 3

DIRECTORATE GENERAL FOR POWER & ELECTRICITY
1967 - Kwh Generated and Sold

<u>Region</u>	<u>Kwh Generated</u>	<u>Kwh Sold</u>	<u>Losses %</u>
I NORTH SUMATRA	56,700,416	47,667,294	16
II SOUTH SUMATRA	73,544,314	61,571,570	16
III WEST KALIMANTAN	14,768,294	10,753,860	27
IV NORTH, CENTRAL & SOUTH KALIMANTAN	11,949,495	9,807,540	18
V NORTH SULAWESI	21,305,960	15,200,000 ^{1/}	29
VI SOUTH SULAWESI	26,482,875	22,936,650	14
VII MALAKU	5,174,631	4,367,970	16
VIII NUSA TENGGARA	12,961,389	10,304,920 ^{1/}	20
IX EAST JAVA	339,581,705	248,115,098	27
X CENTRAL JAVA	217,153,306	160,690,347	30
XI EAST WEST JAVA	301,010,214	211,579,835 ^{1/}	30
XII WEST WEST JAVA	488,190,334	317,330,799	35
XIII ATJEH	10,481,240	8,436,017	20
XIV WEST SUMATRA	29,913,731	27,133,844	10
TOTALS	<u>1,609,217,904</u>	<u>1,155,895,744</u>	<u>28</u>

^{1/} Estimated figures only.

^{2/} Expressed as percentage of units generated and includes units used in auxiliaries, transmission and distribution systems and losses unaccounted for.

August 30, 1968

Table 4

DIRECTORATE GENERAL FOR POWER & ELECTRICITY
Schedule of Power Rates
 (Effective May 1968)

Group and division	Connected Load	Fixed Charge	Energy Charge per Kwh		Remarks
			For a Period of	Above the Limit	
<u>CIAL</u>					
S ₁	min. 60 VA max. 200 VA	-	400 hours monthly Rps 3.60	-	For small dwellings
S ₂	min. 250 VA	Rps 4.25 per 25 VA	200 hours monthly Rps 1.70	Rps 5.00	For hospitals, churches, mosques, students, boarding houses, etc.
<u>MESTIC</u>					
R ₁	min. 250 VA max. 2500 VA	Rps 10.50 per 25 VA	250 hours monthly Rps 5.00	Rps 15.00	For medium sized dwellings
R ₂	above 2500 VA	Rps 11.00 per 25 VA	200 hours monthly Rps 5.50	Rps 16.50	For larger sized dwellings
<u>BLIC</u>					
U ₁	-	-	Rps 2.50/kwh	-	For street lighting
U ₂	min. 250 VA	Rps 12.00 per 25 VA	150 hours monthly Rps 4.00	Rps 12.00	For government agencies
U ₃	min. 250 VA	Rps 13.00 per 25 VA	150 hours monthly Rps 4.25	Rps 13.00	For banking institutions, state enterprises, etc
<u>COMMERCIAL</u>					
K ₁	min. 250 VA max. 2500 VA	Rps 22.00 per 25 VA	150 hours monthly Rps 6.50	Rps 20.00	For small businesses (shops, etc.)
K ₂	min. 2500 VA	Rps 28.00 per 25 VA	150 hours monthly Rps 9.00	Rps 20.00	For larger businesses (restaurants, commercial houses, etc.)
K ₃	min. 500 VA	-	minimum of 20 hours Rps 20.00 per kwh	-	For temporary lighting (feasts, etc.)
<u>INDUSTRIAL</u>					
P.	min. 10 KVA	Rps 270.00 per KVA	Rps 5.50 per kwh without limit	-	For all industrial loads. Discounts or special tariffs available for consumers with demand above 500 KVA

Table 5

DIRECTORATE GENERAL OF POWER & ELECTRICITY
Electrification Program for 1968

Name of Project	Requested Allocation (US \$)	Recommended Allocation (US \$)
A. Rehabilitation and reinforcement of electrification systems in Central and East Java:		
i) Diesel units	4,015,000	4,000,000
ii) Distribution material	4,000,000	3,500,000
B. 3-K Projects	6,362,000	1,700,000
C. Tandjung Priok Steam Station: Units 3 and 4	3,774,000	1,000,000
D. AID and Czechoslovakian Diesel Projects (approximately 100 stations). Spare parts and distribution materials	2,500,000	2,000,000
E. Makassar (Sulawesi) Bandjarmasin (Kalimantan Pontianak () Medan () Sumatra Bukittingi () Diesel Electrification Projects	2,000,000	2,000,000
F. Micro hydro-electrification projects	300,000	--
G. Tonsea Lama hydro-electric project Purchase of generator	100,000	--
H. Technical Experts	100,000	--
TOTAL	<u>23,151,000</u>	<u>14,200,000</u>

Table 6

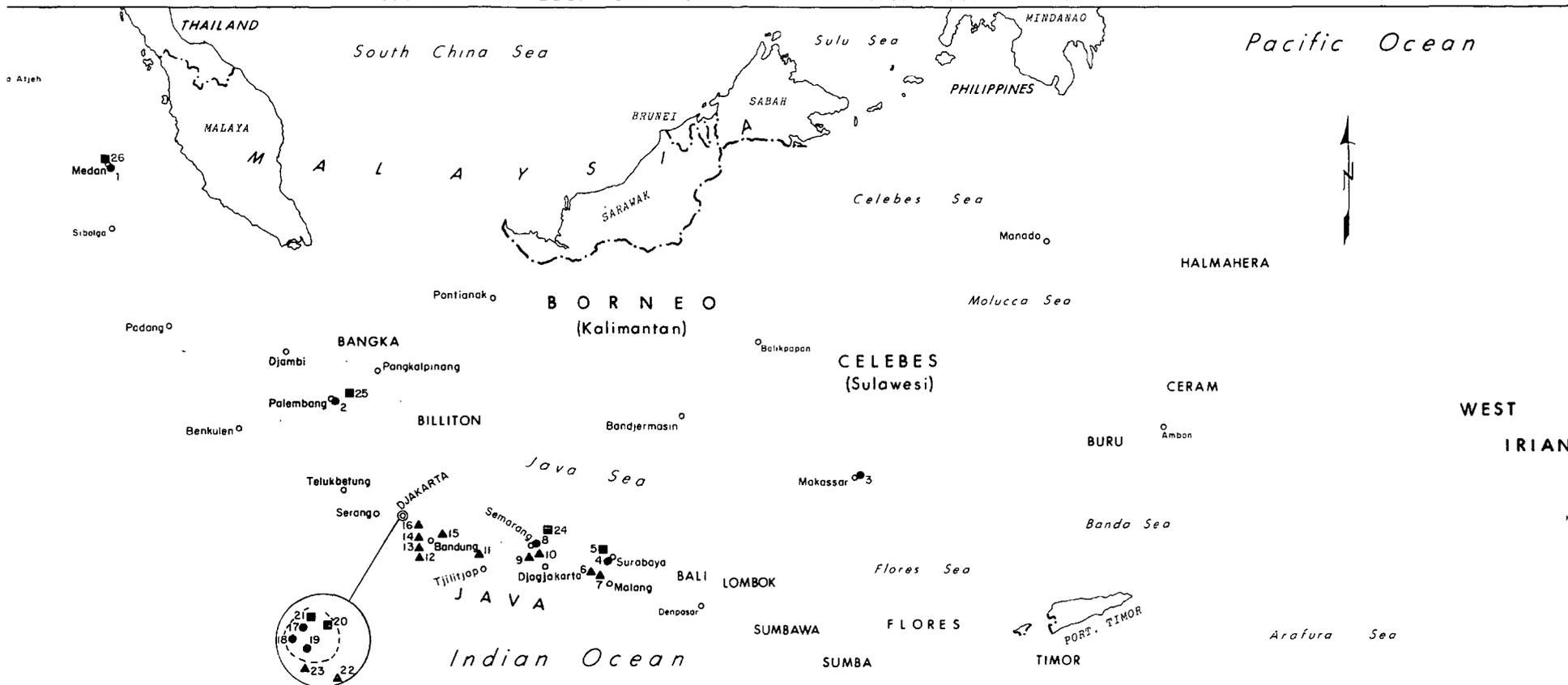
Directorate-General for Power & Electricity
Project Assistance Program for Rehabilitation & Development
1969

(In thousands of U.S. dollars)

<u>Item</u>	<u>Project</u>	<u>Commitment Requested</u>	<u>Commitment Recommended</u>	<u>Remarks</u>
A	<u>Rehabilitation and reinforcement of electrification systems throughout Indonesia</u>			Please see IBRD Report AS-132a, dated Feb. 12, 1968. The combined figure of US\$10.5 million against Items (i) and (ii) covers Items A, D, and E, Table 30 of Annex 4 carried over from 1968 Program less US\$1.0 million provided by the Netherlands against that Program.
	(i) New diesel units for Central and East Java and 62 new units of various capacities for existing isolated systems outside Java	5,000	5,000	
	(ii) Distribution materials for isolated systems in Central and East Java and existing systems outside Java	5,500	5,500	
B	<u>Tandjung Priok Steam Station</u> (Djakarta)			Commitment of US\$7.0 million already made by J in 1968 Program for Unit III.
	Extension to existing station by the addition of Units III & IV (2 x 50 MW)	5,000	5,000 ^{1/}	
C	<u>Riam Kanan Hydro Station</u> (South Kalimantan)			Commitment of US\$5.38 million already made by Japan in 1968 Program for completion of civil wo
	Generating and substation equipment and H.V. transmission line	3,500	3,500	
D	<u>Karang Kates Hydro Station</u> (East Java)			
	Generating and substation equipment and H.V. transmission line	10,690	10,690	
E	<u>Semarang Steam Station</u> (Central Java)			
	New station with two units each of 30 MW capacity	15,125	10,000	
F	<u>Batang Agam Hydro Station</u> (West Sumatra)			
	Four units each of 2.5 MW capacity	5,000 ^{2/}	-	
G	<u>Tonsea Lama Hydro Station</u> (North Sulawesi)			
	Outstanding components to complete installation of 4.4 MW unit	325	-	
H	<u>Asahan River Hydro Power Development</u> (North Sumatra)			Mission believes that this project requires special treatment and recommended that it be removed from the 1969 commitment list.
	Hydro plant with associated H.V. transmission line and substations			
	(i) Alternative I. 160 MW installed	50,000	-	
	(ii) Alternative II. 460 MW installed	70,000	-	
I	<u>Garung Hydro Station</u> (Central Java)			
	Two units each of 10 MW	7,500	7,500	
J	<u>West Java Transmission Network</u> ^{3/}			
	Rehabilitation and reinforcement	3,750	3,750	
K	<u>East Java Transmission Network</u> ^{3/}			
	Rehabilitation and reinforcement	1,800	1,800	
L	<u>Central Java Transmission Network</u> ^{3/}			
	Rehabilitation and reinforcement	2,500	2,500	
M	<u>Rural Electrification</u> (small towns and villages) (New schemes)			Estimate for Items (i) and (ii) considered to be too high.
	(i) Diesel units with total capacity of 8 MW	4,500	2,500	
	(ii) Distribution equipment and materials	4,500	2,500	
	(iii) Micro-hydro power stations	500	500	
N	<u>Medan Steam Station</u> (North Sumatra)			Recommended commitment for two units only.
	Three units each of 12.5 MW capacity	9,000	7,000	
O	<u>Gas Turbine Plant for Djakarta</u>			Recommended commitment for two units only.
	Three units each of 15.0 MW capacity	6,000	4,000 ^{1/}	
P	<u>Survey of Energy Resources</u>			
	(i) Electric power resources	2,000	2,000	
	(ii) Natural gas resources	600	600	
	(iii) Electrical research laboratory	500	500	
Q	<u>Rehabilitation of gas distribution networks and gas equipment repair industry</u>	200	200	
R	<u>Research laboratory for gas industry</u>	40	40	
	<u>Totals with Alternative I)</u> Item H	143,530		
	<u>with Alternative II)</u>	163,530	75,080	

^{1/} The Gas Turbine Plant for Djakarta was accepted on the assumption that the third unit of the Tandjung Priok Steam Station would not be available in time to meet a serious power shortage in Djakarta. If agreement is reached in time for the steam station to be constructed soon, the gas turbine plant may not be necessary.

INDONESIA
**LOCATION OF GENERATING FACILITIES
 WITH INSTALLED CAPACITY OF 5000KW AND ABOVE**



● **DIESEL**

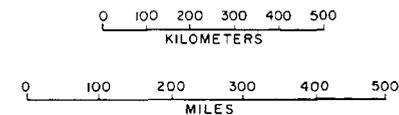
■ **STEAM OR GAS TURBINE**

▲ **HYDRO**

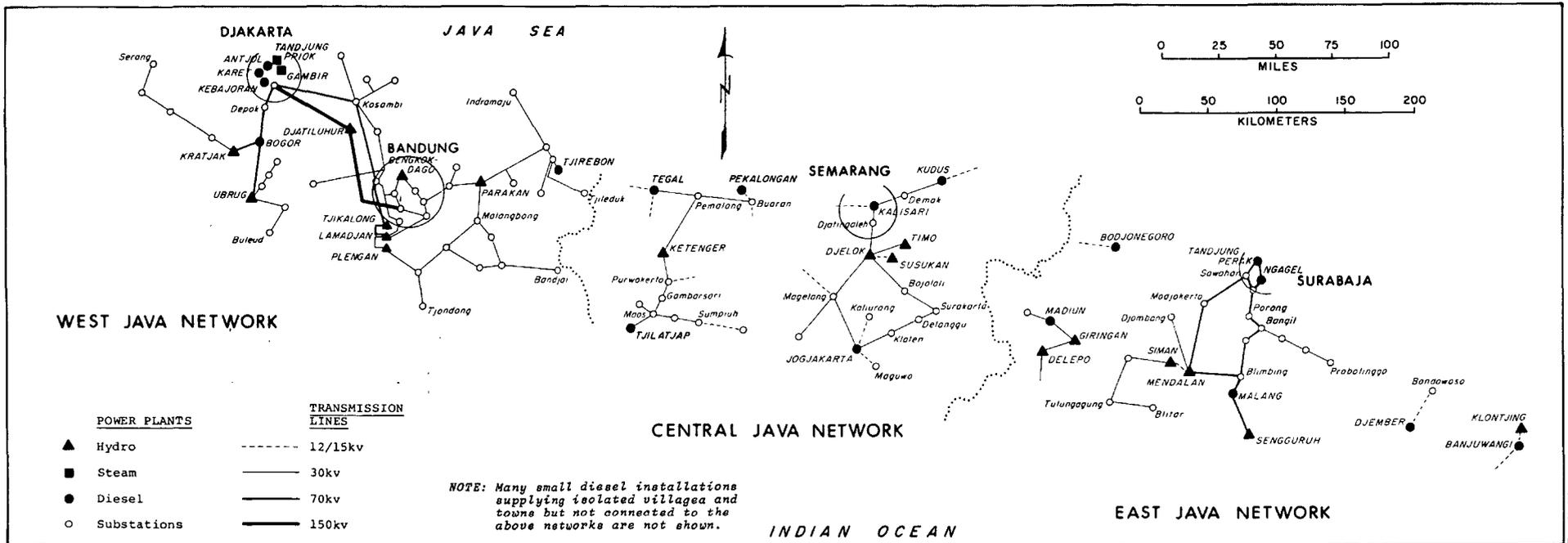
	Installed MW	Max.Cap. MW
Medan	16.2	6.6
Palembang	14.1	5.7
Makassar	13.1	4.4
Ngagel	8.0	8.0
Kalisari	6.0	6.0
Antjol	11.0	9.0
Karet	12.0	10.0
Kebajoran	12.6	12.6

	Installed MW	Max.Cap. MW
5. Tanjung Perak (Surabaya)	50.0	50.0
20. Gambir (Djakarta)	12.7	4.0
21. Tanjung Priok (Djakarta)	50.0	50.0
24. Semarang	12.5	14.0
25. Palembang	12.5	14.0
26. Medan	12.5	14.0

	Installed MW	Max.Cap. MW
6. Mendalan	23.0	23.0
7. Siman	10.8	10.8
9. Djelok	20.5	20.5
10. Timo	12.0	12.0
11. Ketenger	7.0	7.0
12. Plengan	5.2	5.2
13. Lamadjan	19.2	19.2
14. Tjikalong	19.2	19.2
15. Parakan Kondang	10.0	10.0
16. Djabatiluhur	100.0	100.0
22. Ubrug	17.1	17.1
23. Kratjak	16.6	16.6



INDONESIA
SIMPLIFIED DIAGRAM OF
12kv, 30kv, 70kv AND 150kv NETWORKS IN JAVA



CHAPTER 4

TRANSPORT, COMMUNICATIONS AND WATER SUPPLY

Transportation

(1) General

1. Previous Bank mission reports have described and analyzed transport conditions rather elaborately. This report, therefore, places emphasis largely on recent developments.
2. The mission found no reason to modify the basic conclusion of the previous report that, with the exception of the road network, the technical capacity of the transport sector is by and large adequate to handle considerably more than present traffic demand. The problem still lies in unsatisfactory and inefficient operations, leading to financial losses and poor service to the public.
3. Physical deficiencies still affect the efficiency of certain transport operations. Moreover, the removal of these deficiencies is not always within the control of the transport agencies impeded by them. As an example, shipping is adversely affected by poor navigational aids, the improvement whereof would require relatively modest financial outlays.
4. Another general problem, largely outside the direct responsibility of the various transport agencies, is their deplorable financial position. Most of them have large debts, and sometimes large amounts of uncollectable claims, often to or from other state enterprises or agencies. As a result, private or state enterprises which could be called upon to sell supplies to or do work for the transport agencies (such as repairs, making parts, etc.) are not interested in doing so since they might not get paid. This unsatisfactory situation could possibly be improved by either writing off debts which will not or cannot be paid, or by arranging for a moratorium for outstanding debts between government agencies and/or state enterprises. As a result of insufficient working capital little use can be made of available foreign currency for import of urgently needed parts or other commodities. The mission is concerned that without strengthening the financial position of the transport agencies, rehabilitation programs will remain plans on paper only.
5. The mission was glad to observe that the Government has in principle accepted an important recommendation of the previous Bank mission, namely to call upon foreign technical assistance on the managerial level for the various transport agencies. A Dutch team of five shipping experts investigated conditions in inter-island shipping and ports from May to August 1968. Their advice proved valuable in the analysis of the relevant parts of the Five-Year Program. It is intended that this first team will be followed by a larger team for a longer period of time. A similar arrangement with the Dutch Government for technical and managerial assis-

tance by the K.L.M. to the national airline, Garuda, is well advanced, and a request for assistance to the Indonesian Railways has been made to the Government of the Federal Republic of Germany. Large-scale technical assistance in the field of roads, to be financed by a US\$3.5 million grant from the UNDP, is to begin in October 1968.

6. This extensive technical and managerial assistance should be of great help in improving efficiency in the transport sector, not only by assistance in day-to-day operations but also in the preparation of transport projects, and to provide support for requests for foreign financial assistance for such projects. In addition, the various assistance teams should, once established, be in a much better position to give detailed advice on annual budgets and the Five-Year Program and revisions thereof, than is possible by short visits of Bank missions.

7. The mission considers it a step in the right direction that the responsibilities of the previously separate Ministry of Maritime Affairs have recently been brought under the Ministry of Transportation and Communications. This should lead to improved coordination in transport planning and budgeting. In this connection, the Mission wishes to support the conclusions of the UN-ECAFE Port Survey Team which visited Indonesia in mid-1967. Among other things, the team recommended that consideration be given to improving the organizational relations of the various agencies concerned with ports in Indonesia (mainly Port Authorities, Shipping Regions Harbour State Enterprises and the Departments of the Ministry of Transportation and Communications).

(2) The Transportation Sector in 1967-1968

a. Railways

8. The management of the Indonesian State Railways (PNKA) was reorganized and streamlined in mid-1968. Placed under the newly appointed Director-General there are now four directorates: (i) the Directorate of Operations, (ii) the Directorate of Commerce, (iii) the Directorate of Workshops and Supplies and (iv) the Directorate of Personnel. This concentration of the top management responsibilities should facilitate the preparation and execution of the proposed rehabilitation and rationalization program.

9. The downward trend in railway transport activities, which has been observed for many years, continued in 1967. It was particularly evident in freight traffic, as the number of tons loaded decreased by more than 25 percent.

Table 1

Railway Traffic 1962-1967

	Freight		Passengers	
	Tons Loaded ('000)	Ton-Km (Million)	Passengers (Million)	Passenger-Km (Million)
1962	4,418	1,029	165	7,094
1964	3,793	946	135	6,294
1966	2,950	792	95	5,894
1967	2,120	576	74	4,435

10. Statistics presently available do not show the position of the various transport modes in the sector. It is, therefore, not possible to determine exactly to what extent the decline in railway traffic resulted from an overall reduction in traffic demand and/or from a loss to competing modes. The decline in passengers' traffic probably reflects to a considerable degree the introduction of higher fares.

11. As a result, PNKA's technical performance and labor productivity deteriorated again. The turnaround time of freight wagons went up from about 30 days in 1966 to more than 40 days in 1967 and the number of traffic units (ton-km. and passenger-km.) per year per employee fell to a record low of 61,000 in 1967 compared with 79,000 in 1966. Overstaffing, therefore, continues to be one of the most serious problems of the PNKA. The problem is realized by the management and by the ministry, but a large-scale layoff of railway employees would encounter manifold political and social problems.

12. Contrary to the decrease in railway activities, the financial results have improved due to increases in tariffs. Freight tariffs were raised about fifteenfold in December 1966 and passenger rates about eightfold in February 1967. This brought the average revenue per ton-km. to Rp. 2.69 and per passenger-km. to Rp. 0.38 in 1967 and the total revenue to about 98 percent of direct operating expenses, as compared with about 80 percent in 1966. However, this could only be achieved by deferring maintenance and renewal programs. No depreciation is included in the direct operating expenses.

13. In an earlier report the mission expressed its serious reservation whether the rehabilitation of the Atjeh line in Northern Sumatra would be justified at this time. Although no definite steps have been taken until now, this project continues to appear in the PNKA capital budget for 1968. It seems, therefore, appropriate to stress that the performance of the Atjeh line has again deteriorated in 1967: the goods traffic fell to about 30,000 tons in the first half of 1967 and the traffic density for the whole year was as low as 24,000 ton-km. and 106,000 passenger-km. per kilometer of line.

14. PNKA has suffered from lack of funds for maintenance and over-haul programs and has a considerable backlog in the renewal of tracks, bridges, rolling stock, signalling, etc., but there is little doubt that lack of demand for freight services together with a severe regional imbalance in the transport pattern are the key issues for the future of the railway. It is unlikely that the decrease in demand for railway services could be fully explained by the general slowdown in economic activities in Indonesia but seems to show a shift to other modes, mainly road transport, too. This is of particular importance as railway tariffs were and are lower than road tariffs and may partly reflect the unsatisfactory quality of railway service. It is not certain whether railway transport will regain its former share of total traffic, even if the numerous technical bottlenecks are removed. A careful analysis of the future role of the PNKA should, therefore, be undertaken before large-scale investment programs are decided upon.

b. Coastal and Inter-island Shipping

15. Reliable statistics on the development of coastal and inter-island shipping are not available. Such data as could be obtained seem to indicate that the downward trend in inter-island shipping, observed in 1966, did not continue in 1967. It is estimated that the volume of cargo handled by the governmental and private fleet was back to the 1965 level of about 1.2 million tons, compared with 900,000 tons in 1966. This is, however, still far below what it was ten years ago and results in a poor utilization of the inter-island shipping capacity.

16. PELNI, the government-owned shipping company, reduced its fleet from 90 units with 148,000 tons dwt. in 1966 to 85 units with 140,000 tons in 1967. At the same time the private fleet (PELNAS) went up from 112 units with 145,000 tons to 140 units with 162,000 tons. The mission questions the need and justification for this expansion. The inter-island fleet is in poor physical shape but existing statistics do not give a clear picture of its technical conditions. Both PELNI and PELNAS currently report 80-85 percent of the total fleet as in running condition, but a considerable fraction of these ships are not fully used as they have to wait for minor repairs, spare parts, etc. These technical deficiencies, together with extended waiting times in ports and a severe lack of demand, are the major causes of the poor performance of the shipping industry.

17. In view of inadequate statistics on the actual condition of the fleet, the productivity of operations is difficult to evaluate. Related to the tonnage reportedly in running condition the load factor was about 4.5 tons per dwt. capacity in 1967 as compared with about 20 tons achieved in 1956. Even if the operative fleet is only 200,000 tons, there should be ample capacity to handle a considerable increase in freight without any addition to the actual fleet. This, and the possibility to call upon short-term charter capacity to meet unforeseen peaks in demand, should be borne in mind when considering the plans to purchase new ships. It should also be considered when deciding which ships should be rehabilitated and at what costs. Improving the efficiency and the productivity of the operating fleet clearly deserves priority in the immediate future. It has to be recognized, however, that the shipping industry has to rely on numerous

facilities ashore which are beyond its control. Bottlenecks and deficiencies exist in docks, in ports (water and fuel supply) and in the telecommunications field, which adversely affect the inter-island shipping.

18. Statistics on inter-island passenger traffic are only available for the PELNI fleet. Contrary to the development of freight traffic, there was a sharp decrease in the number of passengers transported from 354,000 in 1966 to 222,000 in 1967.

19. Efficient inter-island shipping is of crucial importance for the distribution of domestic industrial products and of food from surplus to deficiency areas, but the difficult financial position of the shipping companies has endangered the economic position of Indonesia's shipping industry. After a tariff increase of 240 percent in February 1967 the rates remained unchanged throughout the rest of the year, although the inflation continued and the productivity did not improve. Shortage of funds, particularly for maintenance and repair works, was the inevitable result. It was only in April 1968 that a new tariff increase was approved by the authorities, but it came too late to satisfy the industry which is operating at high cost. A further increase was under discussion in mid-1968.

c. Road Transport

20. Statistics on road transport are almost non-existent in Indonesia. Road transport is overwhelmingly in the private sector and no data are collected on its activities. Traffic counts have not been carried out for more than 10 years.

21. The Directorate of Road Transport has estimated the vehicle fleet for the whole of the country as follows:

	<u>1965</u>	<u>1966</u>
Passenger Cars	157,500	169,900
Trucks	83,600	102,500
Buses	<u>19,600</u>	<u>19,600</u>
Total	260,700	292,000

The statistics are unreliable, e.g., the increase in trucks is not consistent with import statistics, and may be explained by putting military vehicles to private use. The Directorate estimates, that only 50 percent of the fleet is in operating condition due to lack of spare parts and general obsolescence. On the other hand, foreign currency is freely available for spare parts, and the mission was not able to determine why their procurement apparently meets with difficulties. It is generally admitted that trucking capacity could become a bottleneck if economic activity were to revive considerably.

22. Maximum tariffs for both freight and passenger transport are subject to government regulation but there is little possibility of enforcing them. Freight rates currently quoted are ranging from about Rp. 10 to 14 per ton-km., but there are much wider variations depending on the condition of the road, the possibility to secure return freight, etc.

23. Taxes on road transport are predominantly in the form of import duties on vehicles and spare parts. There are only low taxes on the operating of vehicles (e.g. licenses). Fuel prices are still low despite recent increases. In an inflationary economy, this results in a low participation by the road transport industry in generating funds for highway construction and maintenance. The mission recommends that the taxation system be reviewed with the objective of increasing the amount of funds raised from the road transport sector.

24. In general, it would seem that there is room for a more active role for the Government in the field of road transport, without changing the principle that it remains in private hands. To achieve better utilization of the trucking fleet, for example, the mission suggests that consideration be given to setting up freight forwarder bureaus, either directly by the Government or with Government support to trucking associations. This should lead to reducing empty or part-load trips by helping the small trucking entrepreneur to find suitable freight, particularly for return trips. As to intercity bus transport which is also largely served by small entrepreneurs, better credit facilities are needed as soon as possible particularly to encourage the forming of cooperatives which have proven quite successful in other countries. Such cooperatives may negotiate wholesale arrangements with suppliers of equipment and fuel, run their own workshops, have reserve buses available for the owner-driver who operates only one or a few buses, etc. Routes may be rotated between members, the Government issuing licenses to the cooperatives. Uneconomic competition between members could be eliminated, and better service provided to the public.

d. Civil Aviation

25. Domestic civil aviation is performed by Garuda, Indonesia's national carrier, and Nusantara, a small government-owned company operating feeder lines. Licenses for feeder lines have also been issued to a number of private companies, but so far only a few are being used. Garuda's fleet remained unchanged during 1967 and was composed of the following aircraft:

Dakota	16
Convair 340/440	11
Electra	2
Convair 990	2
DC 8	1

26. Although clearly affected by the general reduction of economic activities in 1966, Garuda succeeded in maintaining its domestic operations at a reasonable level. After a considerable setback in 1966 the number of passengers carried and ton-km. performed increased by 10 percent in 1967. International routes are operated to Europe and to Tokyo. For the European route a pooling arrangement with KLM has been concluded recently.

Table 2

Garuda - Domestic Services

	<u>1962</u>	<u>1964</u>	<u>1966</u>	<u>1967</u>
1. Hours flown (1,000)	23.0	27.1	20.8	27.1
2. Passengers carried (1,000)	314	389	303	334
3. Passenger-km.(million)	239.7	331.6	269.2	292.6
4. Passenger load factor (%)	80	81	79	72
5. Ton-km.(million)	22.5	31.5	24.0	26.3
6. Weight load factor (%)	77	70	68	64

27. Related to the increase in the number of hours flown the load factor decreased for both passengers and freight. This should be viewed as a step towards normalization as too high a load factor for passengers may reflect unsatisfactory service to the extent that demand is not adequately met. The utilization of Garuda's fleet, however, is still insufficient. The two Electras averaged 6.8 hours flight time per day; for the Dakotas and Convairs it was as low as 2.3 hours. This result is not only due to lack of demand. It is also caused by a variety of technical and managerial bottlenecks, shortage of spare parts and sometimes even fuel, and by limitations on the use of airfields (e.g., because of lack of lighting) which are beyond the control of Garuda's management. This low utilization of aircraft represents a reserve in aircraft capacity which should not be overlooked when plans for the purchase of new planes are finalized.

28. Separate figures on the financial results of Garuda's international and domestic operations are not available. The operating account for the whole company for 1966 showed a surplus of Rp. 146 million after allowing for depreciation of aircraft and equipment, but the mission is not convinced that Garuda's accounting system properly reflects the actual situation. Rates were increased drastically in November 1966 and seemingly enabled Garuda to maintain its financial equilibrium in 1967.

(3) Changes in the Rate Structure

29. Except for road transport the Government exercises full control over freight tariffs. In an effort to slow down the speed of inflation the Government has generally been reluctant to authorize increases in rates. This policy created a difficult situation for the transport industry, be it public or private, as it was exposed to a continuous trend of quickly rising costs. Large-scale disinvestments were the inevitable result.

30. Freight rates of the various transport modes were increased at different intervals and in different steps, as may be seen from the following comparison of the index of railroad and interinsular shipping rates:

Table 3

Development of Average Freight Rates

	<u>Railway</u>	<u>Coastal Shipping</u>	<u>Cost of Living Index (Djakarta)</u>
December 1965/January 1966	100	100	100
July 1966	100	110	440
January 1967	1,500	670	828
July 1967	1,500	1,670	1,120
January 1968	1,500	1,670	-
July 1968	3,000	2,500	-

31. From early 1967 until mid-1968, the passenger rates for rail, sea, and air transport went up by more than 200 percent. The 1968 authorized trucking tariffs are about double those authorized in the third quarter of 1967. The following table combines the tariffs of the four transport modes in mid-1968:

Table 4

Official Rates as of June 1968

	<u>Freight</u> (Rp. per ton-km.)	<u>Passengers</u> (Rp. per passenger-km.)
1. Railways	3.10 - 6.70 <u>1/</u>	0.75 - 1.50 <u>2/</u>
2. Coastal Shipping	2.80 <u>3/</u>	2.20 - 6.20 <u>4/</u>
3. GARUDA <u>5/</u>	90.00 - 135.00 <u>6/</u>	10.00 - 17.50 <u>6/</u>
4. Road Transport <u>7/</u>	10.00 - 14.00	1.40

- 1/ Depending on distance and commodity.
- 2/ Depending on distance and class of train.
- 3/ Excluding port handling charges.
- 4/ Depending on class of accommodation.
- 5/ Domestic traffic only.
- 6/ The rates are fixed separately for each route.
- 7/ Only maximum tariffs are fixed by the Government; the rates indicated are only an order of magnitude.

32. For Indonesia as a whole, the various transport modes are more complementary than competitive. There are, however, many areas where strong intermodal competition can be observed. Aviation and interinsular shipping are only to a limited extent competing in the inter-island transport of passengers; but the railway lines are in general paralleled by roads; and one of the central trunk routes on Java, from Djakarta to Surabaya, is served by rail, road, ship and plane. Transport coordination, therefore, is of considerable importance in Indonesia. Heavy distortions in the domestic traffic

pattern would certainly be the result of a transport policy that would fix the tariffs of the various carriers without due regard to their respective economic costs and benefits.

(4) Rehabilitation and Development Program

a. Achievements in 1968

33. The 1968 Project Aid Program for the Transport and Communication Sector, totaled US\$37.7 million, and the Government was able to secure project aid for about US\$26 million during the first half of 1968. Virtually no disbursements had been made up to July 1968, but it is expected that about US\$10-12 million will be disbursed by the end of the fiscal year, i.e., March 31, 1969. Adequately prepared projects and specifications were lacking and this deficiency is likely to continue in the near future. The mission strongly recommends that special attention be paid to this aspect of the development effort. Although aid-giving countries and agencies might be quite willing to provide assistance, they will nevertheless require detailed technical and economic information about the proposed project before a loan can be finally negotiated.

34. Particular difficulties in preparing project aid for the transportation sector are due to the fact that large-scale and clearly identifiable investment projects for which aid is relatively easy to obtain are not of highest priority for the time being. In the near future Indonesia's transport system needs rationalization and rehabilitation rather than enlargement. That means that many small improvement works scattered all over the country demand priority, but they do not lend themselves very well for project aid. Provision of asphalt for highway maintenance, of spare parts for city buses or of rails for the renewal of tracks may be more important as the construction of a new road. It is for this reason that a new category of aid for financing imports of materials, etc., for investment and rehabilitation purposes be provided in 1968 to meet the required needs of Indonesia at this time.

b. Tentative Schedule of Commitments 1969/1970

35. The Government is currently preparing a Five-Year Development Program covering the period 1969-73. The mission received a first draft of the program for the transport sector, representing the still uncoordinated and probably somewhat inflated demands of the various transport branches. Estimated total expenditure for the transport sector was placed at about US\$800 million for the five-year period, of which about US\$300 million would be in foreign exchange.

36. In view of the fluid situation with respect to transport planning and particularly the fact that a number of survey teams and technical assistance schemes are about to take up their activities in Indonesia, the mission does not feel that it is appropriate to comment extensively on the Five-Year Development Program and to compile a definitive list of transport projects for commitment in 1969/70. However, the categories proposed in the Five-Year Program were discussed with Government officials, and the mission agreed that commitments of about US\$52 million in 1969/70 could be used to advantage. The tentative breakdown of this amount is as follows:

Table 5
Transportation ^{1/}
(In million of dollars)

	<u>Suggested Commitments for 1969/1970</u>
<u>City Transport</u>	
Buses (incl. parts and workshops)	1.4
<u>Sea Transport</u>	
Ports	2.5
Rehabilitation of Dredging Equipment	3.0
Dredging - Foreign Firms	5.0
Dock and Repair Facilities	1.2
Rehabilitation of Fleet (PELNI)	3.5
Marine Telecommunications	2.0
Rehabilitation of Navigation Aids	2.0
Marine Safety	<u>1.0</u>
	20.2
<u>Aviation</u>	
Airports and Facilities	5.0
Bali Airport Equipment	<u>1.0</u>
	6.0
<u>Railways</u>	
Trucks and Bridges	3.7
Diesels and Spares	3.0
Telecommunications	0.5
Ferry Service	0.5
Data Processing	<u>0.3</u>
	8.0
<u>Roads</u>	
Asphalt	3.4
Bridge Material	1.2
Road Maintenance Equipment incl. Spare Parts	6.2
Workshop for Maintenance of Equipment	0.8
Foreign Contractors	<u>5.0</u>
	16.6
<u>T o t a l</u>	<u>52.2</u>

^{1/} This represents only a very rough first approach and the list should be reviewed by the managerial Technical Assistance teams expected to be operative before the end of 1968.

37. There are neither detailed project descriptions nor cost estimates that would enable the mission to pass a critical judgment on the technical and economic merits of each individual category. The following comments are, therefore, largely based on information provided by the Government.

City Transportation

38. The mission agrees that better mass transportation in the cities deserves high priority, not only for economic but also for social and political reasons. It emphasizes, in particular, that purchasing of new buses will not solve the problem if, at the same time, no provision is made for repair of presently idle vehicles, for establishing and improving workshops and for training of mechanics.

39. Djakarta, Bandung, Semarang and Surabaya, the four largest cities with a population of about 9 million, are presently operating a fleet of public and private buses of about 500 units only. This is certainly inadequate for the needs of the population, but large-scale investments in this sector would be beyond the financial means of the cities.

40. The proposed project calls for the purchase of about 110 buses to be allocated to Djakarta (40), Bandung (10), Semarang (15), Surabaya (20), Makassar (10) and Medan (15). Workshop equipment and spare parts in an amount of 25% of the price of the buses would be included.

Sea Transportation

41. Although inter-island and coastal shipping is the backbone of Indonesia's national transport system, there is, at present, no need for investment in additional fleet capacity. In this the mission shares the views expressed by the team of Dutch shipping experts which investigated shipping and port conditions in mid-1968. The productivity of the fleet is only about one-third of what it used to be and there should be room to accommodate a considerable increase in freight. There are many ways to improve the productivity of the fleet, but the mission realizes that not all of them are under the industry's control. The mission was glad to observe that pooling arrangements between PELNI and the large number of private shipowners, as well as the reintroduction of regular sailing schedules, are being considered in an attempt to provide better service to the public and to improve the utilization of the existing fleet. The commitments for 1969/70 are for this purpose since, in the mission's view there is, for the time being, no justification for purchasing special vessels for the transport of logs, bauxite, cattle, etc. There is still a considerable number of suitable ships for such transport which are waiting for freight. If need arises, foreign companies or charter arrangements could be found to cover peak demands. In addition, considering the recent decline in passenger travel, the mission is not convinced of the necessity of acquiring additional passenger ships which are apt to incur heavy operational losses.

42. Most of the ports still have ample capacity, the more so since, as the mission learned, port operations have improved in the recent past.

Capital expenditure should, therefore, be restricted to urgent necessities. Ships loading gear, e.g., should be used to the maximum extent for loading and unloading, thus reducing the need for investments in cranes. The mission was informed that insufficient water supply and, in some cases, even fuel distribution cause extended waiting time for ships.

43. The commitment list 1969/70 calls for the procurement of materials and equipment in an estimated amount of US\$2.5 million to carry out repair and rehabilitation works in ports and on port facilities. This includes improvements in water supply facilities in Belawan, Tandjung Priok, Surabaya and a number of smaller ports, rehabilitation of berthing facilities in secondary ports, repair of sheds and godowns, purchase of mobile cranes and mooring boats and rehabilitation of electrical supply facilities.

44. Considerable amounts are earmarked in the draft development program, and in the 1969/70 commitment list for the rehabilitation and replacement of dredging equipment and for contractor dredging works. Estimates of current dredging requirements and of the existing backlog vary greatly and the mission recommends strongly to have a dredging survey undertaken by an independent consultant to prepare a long-term dredging program. To this end the mission left with the Government a draft request for assistance in such a survey. The mission agrees that the dredging backlog could best be removed under contracts with foreign dredging companies.

45. An amount of US\$3.5 million is included in the 1969/70 project list for rehabilitation of the PELNI fleet. Apart from relatively small amounts earmarked for repairs of steel lighters and tugboats, this calls for repair and major rehabilitation works for some 60 motor vessels with a total capacity of approximately 100,000 DWT. Roughly 30 vessels would need major rehabilitation and the Government intends to have the majority of these works carried out abroad.

Aviation

46. The mission appreciates that priority is now being given to domestic services and agrees, in principle, that a rationalization scheme for the domestic fleet is needed. It wishes to emphasize, however, that the purchase of jet aircraft for domestic services will only be economic if the existing low plane utilization can be improved and if the whole operation is carefully coordinated with an improvement and upgrading scheme for airfields and installations.

47. The Department of Aviation has prepared a relatively detailed five-year plan for airports, but the mission lacks the detailed expertise to pass judgment thereon, in particular with respect to the repercussions the purchase of modern aircraft will have on the airfields. Therefore, the mission recommends that these proposals be reviewed by the technical assistance team expected to be available to Garuda and the Government before the end of this year.

Railways

48. The establishment of a realistic rehabilitation and development program for the Indonesian Railways was still at an early stage when the mission left Indonesia. The mission believes that the railway will continue to play an important role in the country's transportation system, but a complete analysis of present railway operations and a forecast of its future share within the country's transport economy will be required before a long-term investment program can be decided upon. The services of the proposed management advisory team should provide a starting point in this direction.

49. For many years, the Indonesian Railways have suffered from lack of funds to carry out repair and maintenance works on tracks and bridges. As a result, tracks have deteriorated progressively and a growing number of speed restrictions became inevitable. This is of particular importance for the Tjirebon-Semarang-Surabaya line (500 km), which is one of the two main arteries of Java carrying the bulk of the freight traffic between Djakarta and Surabaya. The railways are planning to rehabilitate this line completely by strengthening its subbase and ballast, and by renewing the tracks over the whole distance. The total foreign cost of the project is roughly estimated at US\$18.5 million, and a first installment of US\$3.7 million has been included in the 1969/70 commitment list. The whole project is expected to extend over five years.

50. A dieselization program was initiated in 1950 aiming at gradually replacing the old steam locomotives, most of which were bought prior to 1930. The 1969/70 project list includes US\$2.5 million for the purchase of 12 diesel locomotives and parts, as well as US\$0.5 million for the purchase of about 80 freightcars.

Roads

51. A UNDP-financed highway survey, for which the Bank is acting as executing agency, will start in October 1968. This survey will, inter alia, prepare a program for immediate rehabilitation of the existing highways, establish a plan for the development of the highway system in the years 1970-1973 and prepare selected high priority highway project for foreign financing.

52. Considering the needs, the mission believes that the 1969/70 project list sets a relatively modest target. It has, however, to be recognized that this program is tailored to the present productive capacity of the Highway Department's own forces, since there is virtually no fully equipped road construction industry in Indonesia. The mission recommends that steps be taken to increase the scope of work that could be undertaken by contractors in order to relieve the Highway Department from the burden of major construction works.

53. The UNDP highway survey will prepare high priority road projects which could be carried out by foreign contractors. According to the schedule for the consultants' services it cannot, however, be expected that major projects would be ready for commitment in the period 1969/70.

Telecommunications

Organization

54. All the telecommunication services for the public - telephone and telegraph communication within Indonesia and to outside countries - are provided by the Telecommunications Branch of the Posts and Telecommunications Department of Indonesia. This Department is under the Minister of Communications who is also in charge of the departments of Air Communication and Land Communication. Recently, some changes have been made to the P&T organization. For establishing and operating the telecommunications and postal services, two corporations have been formed in the Ministry, viz a telecommunication services public corporation and a postal public corporation.

55. The telecommunication needs of the marine transportation, the railways and the aeronautical services are provided by networks erected and operated by these agencies themselves. The Army and Navy have also their special telecommunication networks.

Historical - development from 1945 to 1966

56. After the Second World War, the development of telecommunications has not been progressing steadily. In the period from 1945 to 1949, the country went through a political revolution and many of the previously existing facilities were destroyed. In the second period, from 1950 to 1960, work on rebuilding of the network as well as a certain amount of expansion and modernizing the services were completed. In the latter part of this period, the expatriate Dutch engineers working in the country decreased in number. Shortages of materials and funds as well as of qualified personnel were formidable obstacles to telecommunication development. Since 1961, the progress made was small in view of general economic and other difficulties in the country. The development plan (1961-69) could not be implemented, and the progress was even slower than in the preceding five years with almost total stoppage of development after 1966.

Existing Telecommunication Network of the P&T

(i) Telephone

57. There are at present 533 telephone exchanges in Indonesia with a total number of 152,304 telephone connections. Of these there are:

Table 7

<u>Type of Exchange</u>	<u>Number of Changes</u>	<u>Number of Telephone Connections</u>
automatic	19	63,700
central battery	24	28,090
local battery or magneto	<u>490</u>	<u>60,514</u>
Total	533	152,304

58. The auto.exchanges are, for the most part, less than ten years old but the manual exchanges and especially the magneto exchanges are older. The percentage of telephones connected to automatic exchanges in Indonesia is among the lowest in the world, while the percentage of telephones connected to the magneto telephones is the highest. Some of the magneto exchanges are very large. Magneto exchanges are not capable of speedy operation and of giving good service. They also require continuous replacement of batteries at telephone subscriber premises. The state of existing exchange systems is thus unsatisfactory.

59. The demand for telephones is quite high in the towns and cities and the expansion has not kept in step with the requirements.

(ii) Interurban telephone service - domestic

60. The interurban network with conventional systems - other than by use of high frequency (HF) wireless systems - mainly consists of a microwave system connecting Djakarta with Bandung in Java and of a small network of open wire routes mostly in Java and in a small part of Sumatra. These open wire routes are equipped with 24 three-channel and 28 twelve-channel carrier telephone systems providing a total of 408 telephone circuits. There are also four short VHF links in operation in Java and Sumatra. Except for the Djakarta-Bandung microwave artery, the capacity of the routes and the number of circuits provided are insufficient for handling the traffic. Further, much of this network is open wire routes which are subject to frequent copper wire thefts causing interruptions and further dislocation to traffic.

61. Except for the above, practically all other communication within Indonesia is by the use of high frequency wireless systems (HF systems). These systems have severe inherent limitations and cannot provide a quality of service comparable to conventional systems. The traffic carrying capacity of these systems is also small. Because of these and other factors, long-distance telecommunication service to most parts of Indonesia - including to and from important ports and towns - is meager and totally inadequate to meet the needs.

(iii) Telegraph service

62. Telegraph facilities have been extended to 720 places in Indonesia. A few telegraph circuits have been leased to parties.

63. Sixteen important cities have also been provided with telex facilities. The total equipped capacity of all the telex exchanges is 660 lines and there are 406 subscribers connected to the network.

64. The telegraph circuits - for the telegraph offices, telex and leased - are, with the exception of the areas in Java and a small part of Sumatra, served by conventional communication systems, provided almost entirely by high frequency wireless circuits. A few of the more important circuits have been equipped with error detecting and correcting equipment.

The telegraph service provided is unsatisfactory. This is also true of telex facilities with some exceptions. The unsatisfactory working is mostly due to the preponderant use of HF facilities.

(iv) International telecommunications

65. Telephone, telegraph and telex facilities are provided from Djakarta and Bandung to a number of cities in all parts of the world. The communication facilities use high frequency wireless systems. The service is reported to be reasonably satisfactory, though there are some difficulties on account of the inadequate number of circuits. The equipment in use is also, in many cases, old.

66. An agreement has been signed with the International Telephone and Telegraphs Corporation for the establishment of a ground terminal near Djakarta for providing satellite communication from Indonesia to other parts of the world. The station is tentatively scheduled for operation late in 1969.

Telecommunication requirements

67. Since the present telecommunication facilities are totally inadequate to meet the requirements in the country, it is absolutely essential to establish a good basic network which will provide satisfactory telephone, telegraph, and telex interconnection between the various places in the country including good inter-island communication. It is necessary to establish cable microwave and VHF routes together with some open wire networks - other than by HF systems to the extent possible - which would interconnect the main ports and cities to form a minimum infrastructure for accelerating immediate economic development. It is also necessary that this interconnection plan be extended further into the hinterland so that the full impact of a good telecommunication service will become effective. The local exchanges will have to be modernized and rehabilitated to provide a good service for this purpose and expanded to meet the demands especially in the larger places.

68. Such a program is fully justified by the considerable benefits conferred to production, trading, and transportation. The telecommunication facilities will make possible reductions in capital investments in shipping and other transportation. Many of the communication requirements of the other users, e.g. marine communication, railways, etc. will be met by this basic network more economically. There will be other direct and indirect benefits, e.g. such as the advantage for public administration and national security, the removal of disincentives to professional men in going to vital but remote areas, the individual feeling of security, the stimulation of growth for viable communities, etc. Considerable savings of time and effort should accrue in dealing with economic, commercial, social and administrative problems, thus speeding up the general economic development of the country. The very inaccessibility of places in Indonesia and the lack of other suitable communications enhance the benefits of telecommunication several fold. Conversely, the absence of good telecommunications has hampered the growth of the economy and of production, especially in the remote areas which are very extensive in Indonesia and are also potentially rich.

Rehabilitation and development

69. The P&T have drawn up a 1969-73 program of expansion. However, in view of the present economic situation and pending a more detailed examination of this program, priority schemes have been selected for taking up in the years 1968 and 1969. The present position in respect of the programs of these two years as well as of the 1969-73 draft program is given below.

1968 Program

70. From out of a small list of priority schemes prepared by P&T, three schemes shown below were picked out finally for being taken up in 1968. These were:

- (i) the extension of the microwave arterial route from Bandung to Semarang - forming part of the Djakarta-Bandung (completed) - Semarang - Surabaya - Den Passar route;
- (ii) the replacement of the existing manual exchange (capacity 3,300 lines) at Semarang by an auto exchange with a capacity of 8,000 lines; and
- (iii) upgrading the inter-island and international communication by installation of additional HF transmitters and associated equipment, and rehabilitation of the telephone and telegraph exchanges and other equipment.

71. The total foreign exchange commitment for these projects is estimated at about US\$4.5 million. Negotiations are in hand with the suppliers for the procurement of the equipment for these schemes.

1969 Program

72. P&T have put forward 47 major schemes for 1969 at a cost of about US\$17.5 million equivalent in foreign currency and a local currency expenditure of Rp. 4,350 million (approximately US\$14.5 million equivalent at US\$1 = Rp. 300) or a total of US\$32.0 million equivalent.

73. These schemes include the expansion of ten exchange systems, the extension of the microwave route from Semarang to Den Passar, a number of troposcatter and VHF schemes, erection of open wire routes, installation of carrier systems, additions to the HF systems network, motor vehicles, and training equipment.

74. Since this program is larger than the foreign exchange availability for this sector, some reductions have been proposed after a quick review based on broad considerations. The main components of the 1969 program and of the revised program, together with the foreign exchange costs are given below:

Table 8

	<u>Foreign Currency Requirements</u> (US\$ equivalent in thousands)	
	<u>P&T Proposals</u>	<u>Revised Program</u>
Local Exchanges	9,514	4,612
Long Distance Schemes - other than HF systems	5,050	3,400
Long Distance Schemes - HF systems	2,340	1,640
Motor Vehicles	440	265
Training	<u>140</u>	<u>140</u>
	17,484	10,057

75. In making these changes, the aid was to restore the imbalance between provision for city services and that for long distance facilities. Bearing in mind the high earning potential of the long distance network generally, the exchange and cable network provision has been reduced. The provision for radio HF facilities has also been reduced pending a closer examination of the problems in the area. Approximately US\$1,000,000 has been taken from the Semarang-Surabaya microwave project in view of the current negotiation for inclusion of this project in the 1968 project list. Provision for motor vehicles has been scaled down to match the operational requirements of a reduced program.

76. The actual details of the 1969 program will be drawn up to conform to the available resources as given above. The Australian P&T Office is starting a study of telecommunications in Indonesia and it is expected that some of the findings of the first phase of this study will be available in time before commitments have to be entered into with the suppliers. Since the mission's visit to Indonesia further work has been done on this program and the latest estimates of requirements are in Table 9. These estimates, of course, have not been evaluated by the mission.

Plans for period 1969-73

77. P&T have drawn up a 1969-73 expansion program. The main features are:

- (i) Addition of 139,000 lines to the telephone exchange capacity and to modernize the exchanges, together with associated programs for cables outdoor plant, buildings, etc.;
- (ii) to complete the long-distance microwave artery from Djakarta to Den Passar and a similar route connecting Djakarta to Passar and a similar route connecting Djakarta to Palembang Djambi, Pakanbaru, and Medan in Sumatra (Djambi to Pakanbaru by troposcatter) as well as a troposcatter link from Bandjarmasin to Makassar;

- (iii) to improve and extend the open wire routes and equip them with three and twelve channel systems;
- (iv) to increase the HF facilities in the country for providing telephone and telegraph facilities by new and more powerful equipment;
- (v) the improvement of telegraph facilities by increasing the number of circuits and by using more error correcting equipment on HF links.

78. The cost of the program has been estimated by P&T at a total cost of about US\$130 million equivalent including about US\$62 million equivalent of foreign currency. P&T are aware that the size and other features of the programs are and can be tentative only at this stage. The size of this program is not, however, too ambitious taking into account the needs and the demand for telecommunication facilities.

79. The development pattern largely follows existing practices in Indonesia and does not take advantage of recent technological advances in the area of long distance communication. It is necessary and possible to utilize microwave, troposcatter, and VHF systems extensively for establishing high quality long distance arteries on a priority basis. These systems have been improved and the costs are lower than some years ago. The high geographical features which are scattered throughout Indonesia particularly favor these systems. The framework of the expansion program requires to be altered in order to exploit these and other developments.

Technical assistance

80. In order to draw up such a program, a comprehensive and intimate knowledge of recent technological developments and of the possibilities of newly available systems, including data on international level of costs are needed. Further, it is desirable to have a clear picture giving not only the best engineering solutions but also of the other aspects of undertaking a massive program of expansion.

81. A study required to organize a sound program of development in any depth or detail is beyond the available capabilities of the Indonesian P&T who have to tackle the problems of development and of operations. It is highly important that these be taken up at this early stage of development so that the full advantages can be realized.

82. The Indonesian authorities have recognized the need for outside technical assistance and have requested - under the bilateral aid program - the Australian Government to undertake studies for meeting these requirements. These studies have been split into two phases.

Table 9

<u>Project</u>	<u>Required Foreign Currency</u> (U.S. Dollars)
<u>1. Telephone Development Project</u>	
a. Local and Trunk Automatic Telephone Exchange together with the Underground Cable Networks for Medan, Malang and North Surabaya	Medan 1,376,000.- Surabaya 3,239,000.- Malang 400,000.- Training facilities 30,000.-
Sub-total:	5,045,000.-
b. As above, but only Underground Cable Network to complete existing exchange equipment in Djakarta, Manado and Djambi	Djakarta 1,230,000.- Manado 350,000.- Djambi 200,000.- Training facilities 30,000.-
Sub-total:	1,810,000.-
<u>2. Long-Distance Transmission Development Project for Telephone, Telegraph and Telex over H.F. Circuits for Sumatra, Kalimantan and South Sulawesi</u>	
	1,670,000.- Facilities 20,000.-
Sub-total:	1,690,000.-
<u>3. Long-Distance Microwave Transmission Project on Java-Bali and First Investment on Sumatra and Kalimantan</u>	
	Surabaya-Denpasar Survey 1,200,000.- Sumatra Survey 160,000.- Kalimantan 60,000.- Training facilities 40,000.-
Sub-total:	1,460,000.-
<u>4. Long-Distance Transmission Project on V.H.F. and Open-wire Carriers in Sumatra, Nusatenggara Region</u>	
	925,000.- Training facilities 20,000.-
Sub-total:	945,000.-
Total:	10,950,000.-

Source: Department of Communications.

83. The first phase study will deal with the program of the next three years. A preliminary team of two experts were in Indonesia in July to set out the terms of reference of the first phase study. Subject to agreement being reached with the Indonesian authorities, the Australians plan to have the study team - consisting of about three experts - in Indonesia in early October and complete the study in six months thereafter. The findings will help to establish quickly a sound program of expansion using modern technology.

84. The second phase study may also be undertaken by the Australian Government but this will be discussed between the two governments at a later date when more information regarding this second phase study will be available.

Water Supply

85. The Indonesian Government feels that there is a pressing social need for improved water supply in a number of urban areas. The mission did not have the necessary expertise to examine this sector but believes that it should not be neglected. Foreign aid is already being provided by France to the port city of Makassar. There is also a scheme for improved flood control facilities in Djakarta, which most visitors to Indonesia would agree is a problem (particularly in the rainy season).

86. We have included \$6 million in the 1969/70 list of possible commitments for water supply and related programs. \$1 million of this would be required for Djakarta flood control.