CHAPTER 3. OUTLINE OF TRAFFIC IN IRIAN JAYA AND MALUKU

3.1 Sea Transportation

3.1.1 Present Situation of Ports in Maluku and Irian Jaya

1) Location and Classification of Ports

There are 46 ports in Maluku and 36 ports in Irian Jaya. Table 3.1.1. shows the names and classification of ports in Maluku and Irian Jaya and Fig. 3.1.1. shows their location.

In Maluku, 2 ports out of 46, i.e., Ternate and Ambon, are controlled by Directorate General of Sea Communications (DGSC) and users must pay a charge when they use these ports. Other 44 ports are also controlled by DGSC but the utilization of these ports is free of charge.

In Irian Jaya, 36 ports are classified into 4 categories by type of administration.

(i) The 6 major ports, that is, Jayapura, Biak, Manokwari, Sorong, Fak-Fak and Merauke are controlled by the central government and the budgets for administration and new construction of facilities are supplied from the central government and an income of each port is sent to the central government directly.

(ii) The second category, namely, 8 ports, including Kaimana, Nabire and so on, is controlled by DGSC through the major ports. The budgets and incomes are fully administrated by DGSC through the major ports.

(iii) The third category, into which 19 ports are classified, is controlled by local governments. The budgets of these ports are supplied by local governments, but these ports are free of charge.

(iv) The fourth category is special ports for loading of the mining products. Kasim, Selle and Salawati are the loading port of crude oil and Tembagapura is a loading port of copper. (Port of Tembagapura consists of 2 ports, that is, Kokonau and Mimika). These ports are controlled by private companies.

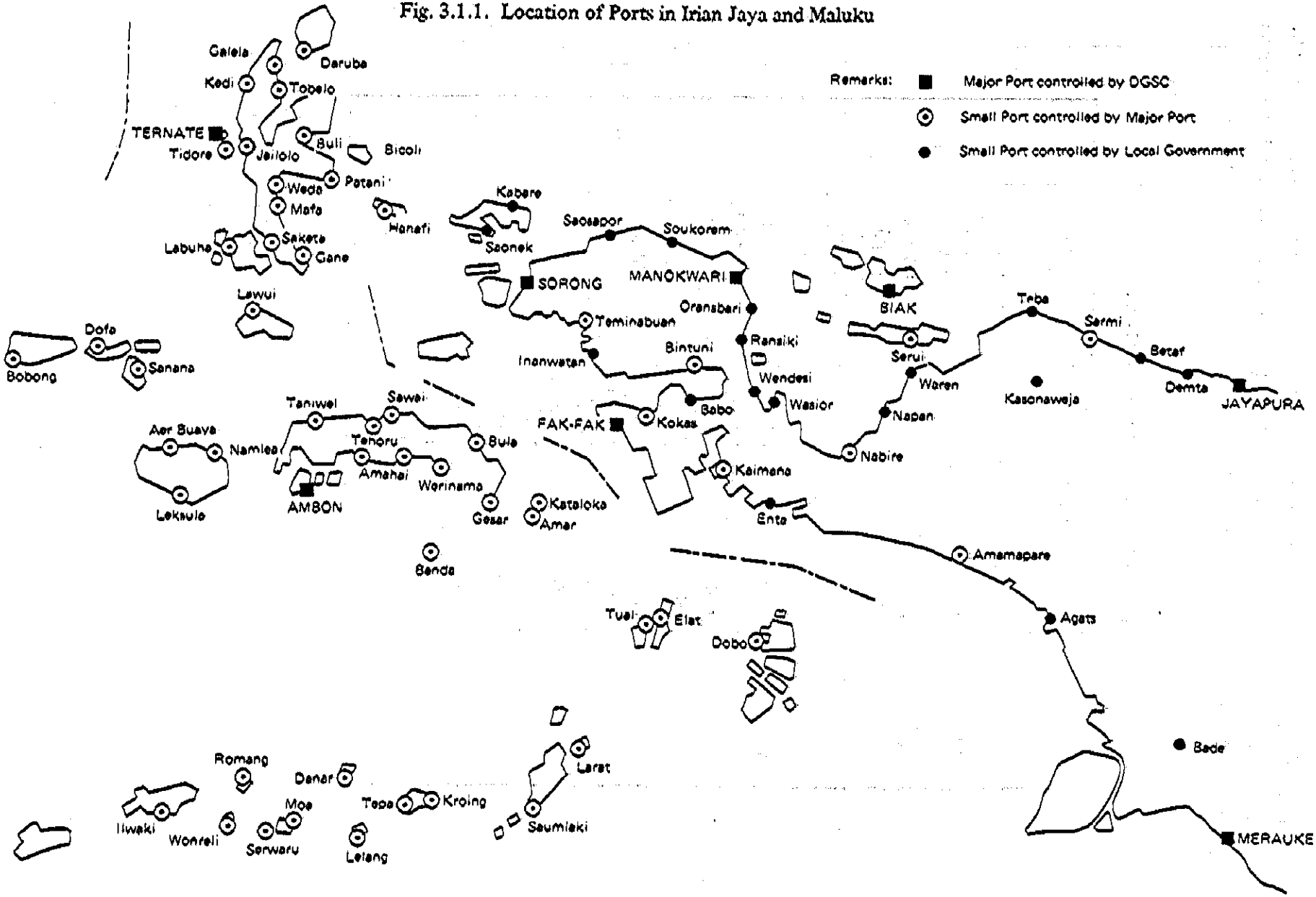
Table 3.1.1. List of Ports in Maluku and Irian Jaya

Administration	Maluku	Irian Jaya
Major Port (Controlled by DGSC)	1. Ternate 2. Ambon	1. Jayapura 2. Biak 3. Manokwari 4. Sorong 5. Fak-Fak 6. Merauke
Samll Port-I (Controlled by Major Port)	(North Maluku) 1. Daruba/Morotai 2. Galela 3. Tobelo 4. Buli 5. Bicoli 6. Patani 7. Weda 8. Mafa 9. Hanafi 10. Gane Timur 11. Saketa 12. Kedi 13. Jailolo 14. Soa Siu 15. Labuha 16. Lawui 17. Dofa 18. Bobong 19. Sanana (Central Maluku) 20. Aer Buaya 21. Namlea 22. Leksula 23. Taniwel 24. Wahai 25. Bula 26. Kataloka 27. Amar 28. Gesar 29. Werinama 30. Tehoru 31. Amahai (Southeast Maluku) 32. Banda 33. Tual 34. Elat 35. Dobo 36. Larat 37. Saumlaki (South Maluku) 38. Kroing 39. Tepa 40. Lelang 41. Moa 42. Serwaru 43. Wonreli 44. Ilwaki	1. Sarmi 2. Serui 3. Nabire 4. Teminabuan 5. Bintuni 6. Kokas 7. Kaimana 8. Amamapare
Small Port-II (Controlled by Local Government)		1. Demta 2. Betaf 3. Kasonoweja 4. Teba 5. Waren 6. Napan 7. Wasior 8. Wendesi 9. Ransiki 10. Oranbari 11. Saukorem 12. Saonek 13. Inanwatan 14. Babo 15. Enta 16. Agats 17. Sosapor 18. Bade 19. Kabare
Special Port		1. Kasim (Crude Oil) 2. Selle (") 3. Salawati (") 4. Tembagapura (Copper)

Sources: 1. Data from DGSC
2. Gubernur KDH Tingkat I Maluku/10 tahun Maluku Membangun.

Note: DGSC = Directorate General of Sea Communications.

Fig. 3.1.1. Location of Ports in Irian Jaya and Maluku



Out of 82 ports, there are 48 ports which have harbour masters. These ports are classified by the grade of harbour master as shown in Table 3.1.2.. Only 9 ports in Table 3.1.3. have a port administrator (ADPEL) or a chief of port (KEPPEL).

Table 3.1.2. Grade of Harbour Master

Grade	Maluku		Irian Jaya
I			
II	Ambon		Jayapura
III	Ternate		Sorong Biak
IV	Dobo		Fak-Fak Merauke Manokwari Amamapare Serui
V	Bandanaira	Leksula	Bintuni
	Gesar	Larai	Kaimana
	Tual	Wonreli	Klamono
	Saparua	Saunlaki	Sarmi
	Morotan	Kairatu	Teminabuhan
	Elat	Bula	Nabire
	Tobelo	Taulahu	
	Jailolo	Laiwai	
	Weda	Ilwaki	
	Sanana	Kataloka	
	Sabuba	Tepa	
	Soa Siu	Kisar	
	Asahai	Teboru	
	Ha boa	Tabiwel	
	Piru	Hitu	
	Wahai		

Table 3.1.3. Grade of Port Administrator or Chief of Port

Grade	Maluku	Irian Jaya	Remarks
I			Port Administrator (ADPEL)
II	Ambon	Jayapura	"
III	Ternate	Sorong	Chief of Port (KEPPEL)
IV		Biak Manokwari	"
V	Bandanaira	Merauke Fak-Fak	"

2) Facilities of Major Ports

The present situation of the basic facilities and equipment of the major ports are shown in Tables 3.1.4. – 3.1.7..

(1) Wharfs (Table 3.1.4.)

In Irian Jaya, the Ports of Jayapura, Biak and Sorong have one or two deep water wharfs. The present physical conditions of these wharfs, however, are not good because of insufficient maintenance efforts.

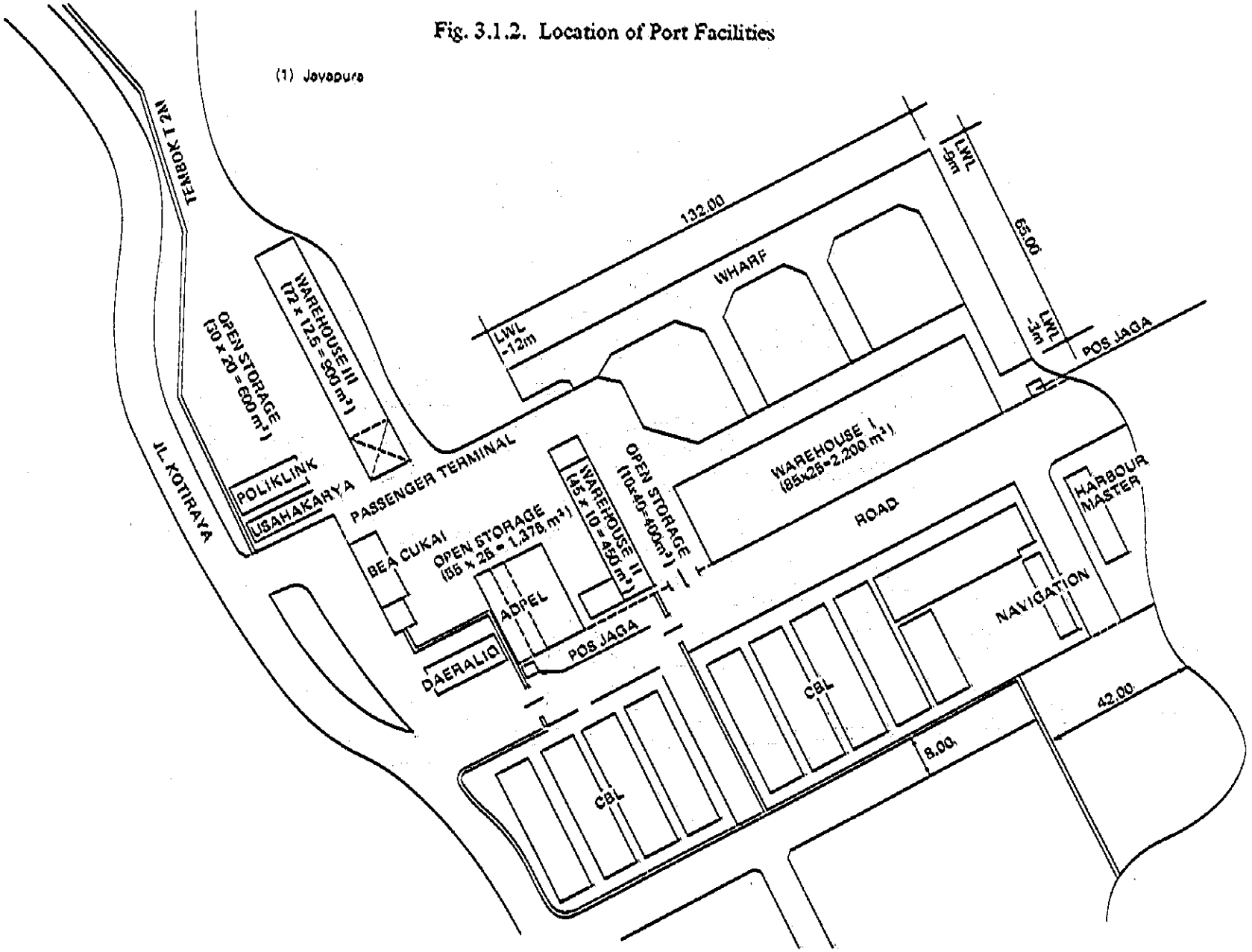
(2) Equipments (Table 3.1.5.)

In Irian Jaya, there are 32 units of cargo handling machines at the 6 major ports. But 18 units out of these are damaged and can not be used and they suffer from the constant lack of spare parts.

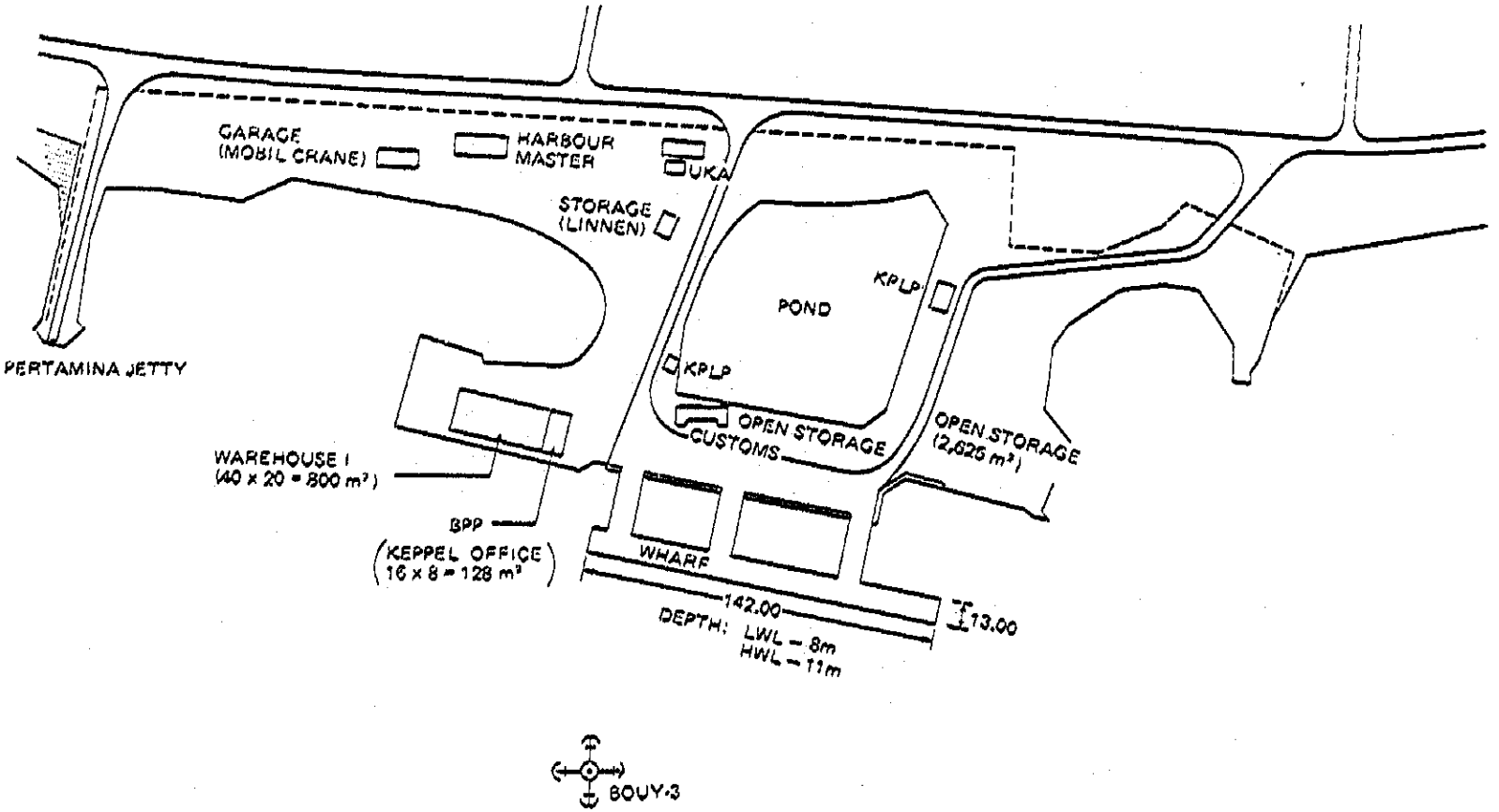
Table 3.1.4. Existing Quay at the Major Ports

Port	Jayapura	Biak	Manokwari	Sorong			Fak-Fak		Merauke
				Wooden Wharf	Concrete Wharf	Doom Wharf	A	B	
Structure Type	φ40 cm steel pipe pile containing light-weight concrete	ditto	Steel sheet pile	φ30 cm steel pipe pile containing light-weight concrete	φ40 cm steel pipe pile containing light-weight concrete	ditto	φ40 cm steel pipe pile	coconut tree's pile	φ40 cm steel pipe pile
Protection	No cathodic protection or covered pile			No protection	Cathodic protection and covered pile	No protection	Cathodic protection		
Slab									
Type	RC	RC	Concrete	Wood	RC	RC	RC	Wood	RC
Length x Width	A : 132 x 9 m A': 65 x 9 B : 33 x 6	142 x 13 m	75 m	132 x 11 m	120 x 12 m	40 x 8 m	45 x 6 m	25 x 5 m	40 x 12 m
Capacity	A, A': 2.5 t/m² B : 1.5 t/m²	2 t/m²		1.5 t/m²	2.5 t/m²	1.0 t/m²	2 t/m²	0.5 t/m²	
Fender	A, A': horizontal wood fender (30 x 40 cm) B: Wood fender	rubber fender + I beam + wood (30 x 40 cm) + I beam + chain	horizontal & vertical wood fender (30 x 40 cm)	horizontal wood fender (30 x 40 cm)	both end: rubber fender middle part: tractor tire fender	wood fender (30 x 40 cm)	rubber fender + horizontal I beam + I beam pile + wood (30 x 40 cm)	coconut tree	
Depth	A : 9 – 12 m A': 3 – 9 m B : 5 – 6 m	8 – 11 m	4 – 5 m	10 – 12 m	9 – 15 m	5 – 7 m	4 – 6 m	3 – 4 m	
Hight of Slab from LWL	A, A': 3.75 m B: 3.25 m	4.0 m	3.75 m	4.0 m	3.75 m	3.75 m	3.75 m	3 m	
Year of Construction	A, A': 1960 B : 1969	1960	1960	1959 (Repair 1978)	1978	1956	1974	1960	
Present Condition	• Steel pipe piles are corroded badly. • Some back parts of slabs are damaged. • The steel bars of slab are corroded.		• Steel sheet piles are heavily damaged by corrosion • Fenders are also heavily damaged.	• Steel pipe piles are corroded badly.		• Steel pipe piles are corroded badly. • Slabs are also damaged. • Many fenders fell down.			

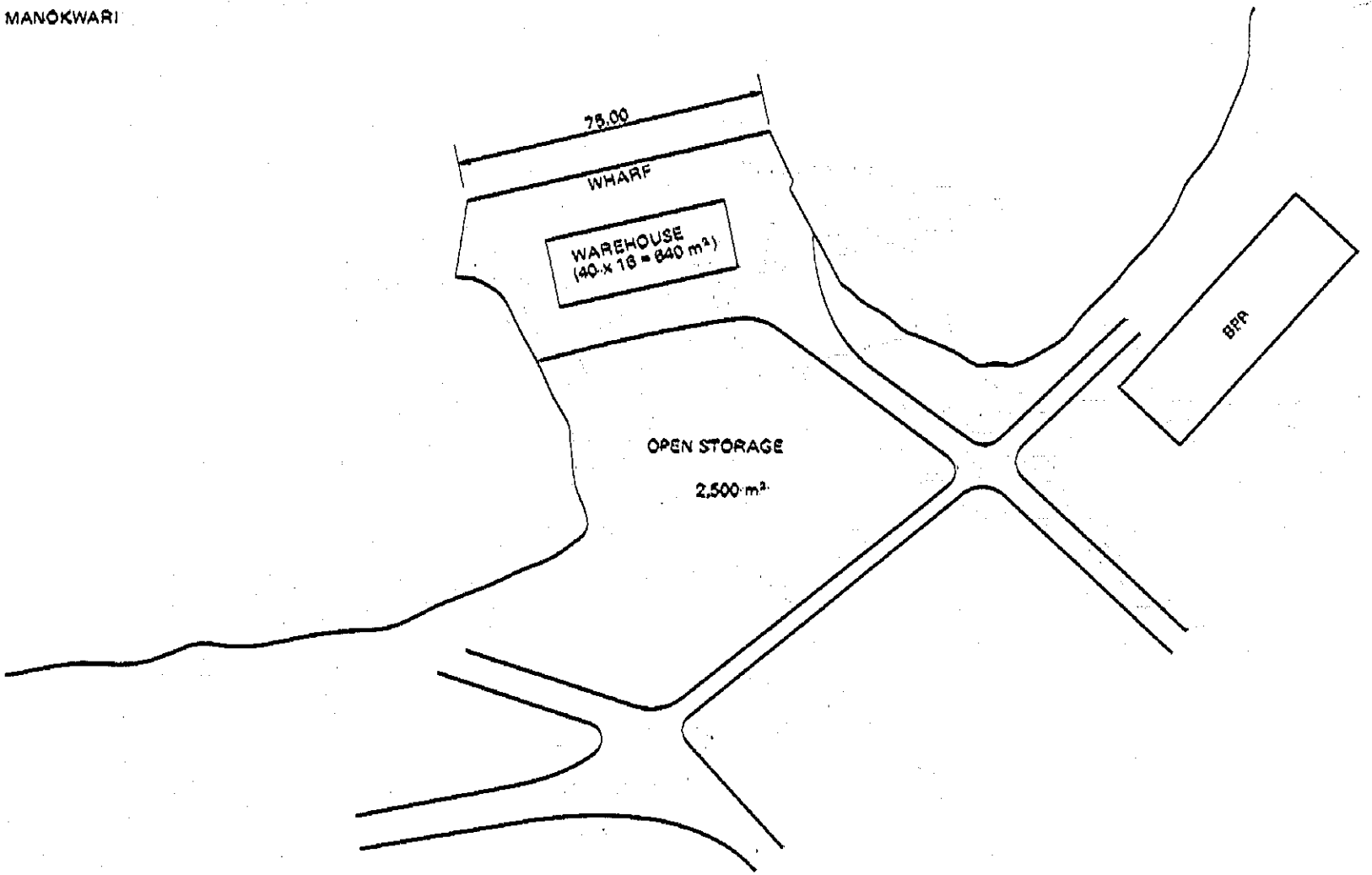
Fig. 3.1.2. Location of Port Facilities



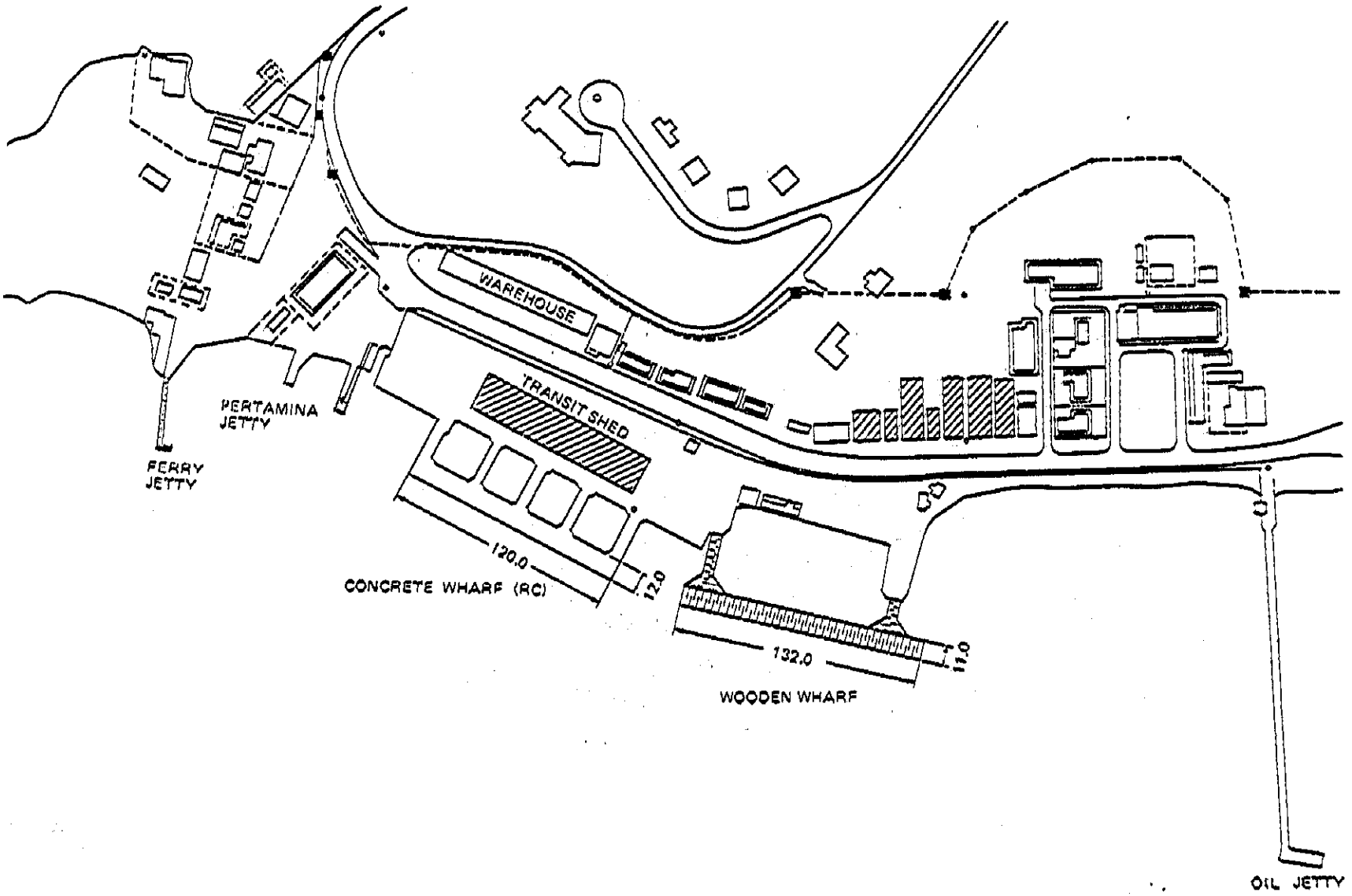
(2) BIAK

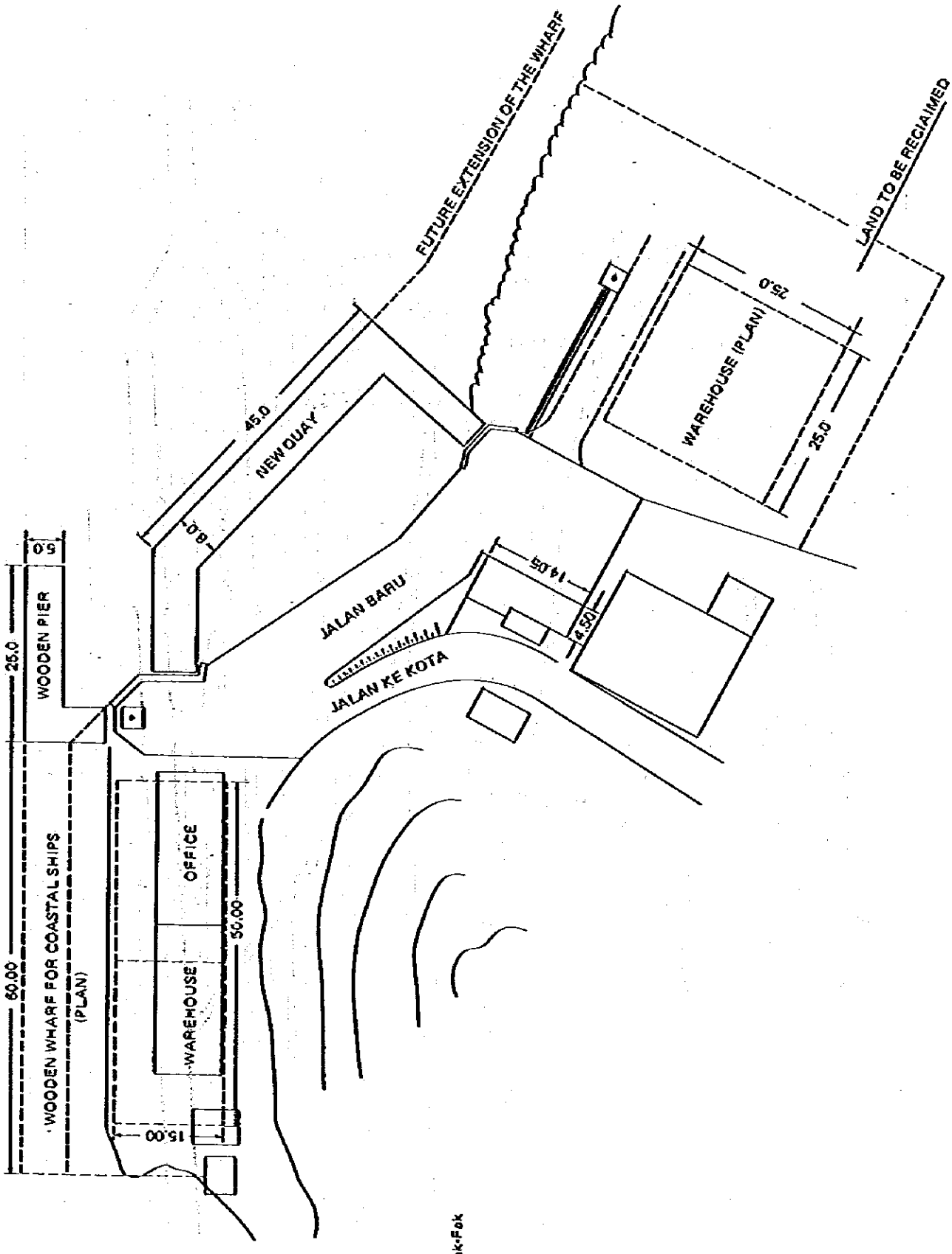

GARAGE
(MOBIL CRANE)
HARBOUR
MASTER
UKA
STORAGE
(LINNEN)
POND
KPLP
KPLP
PERTAMINA JETTY
OPEN STORAGE
CUSTOMS
OPEN STORAGE
(2,625 m²)
WAREHOUSE I
(40 x 20 = 800 m²)
BPP
(KEPPEL OFFICE
16 x 8 = 128 m²)
WHARF
142.00
13.00
DEPTH: LWL – 8m
HWL – 11m
BOUY-3

(3) MANOKWARI



(4) SORONG


WAREHOUSE
TRANSIT SHED
PERTAMINA JETTY
FERRY JETTY
120.0
12.0
CONCRETE WHARF (RC)
132.0
11.0
WOODEN WHARF
OIL JETTY


FUTURE EXTENSION OF THE WHARF
LAND TO BE RECLAIMED
45.0
NEW QUAY
8.0
WAREHOUSE (PLAN)
25.0
25.0
JALAN BARU
14.50
4.50
JALAN KE KOTA
5.0
WOODEN PIER
25.0
60.00
WOODEN WHARF FOR COASTAL SHIPS
(PLAN)
OFFICE
WAREHOUSE
50.00
15.00

(5) Fak-Fak

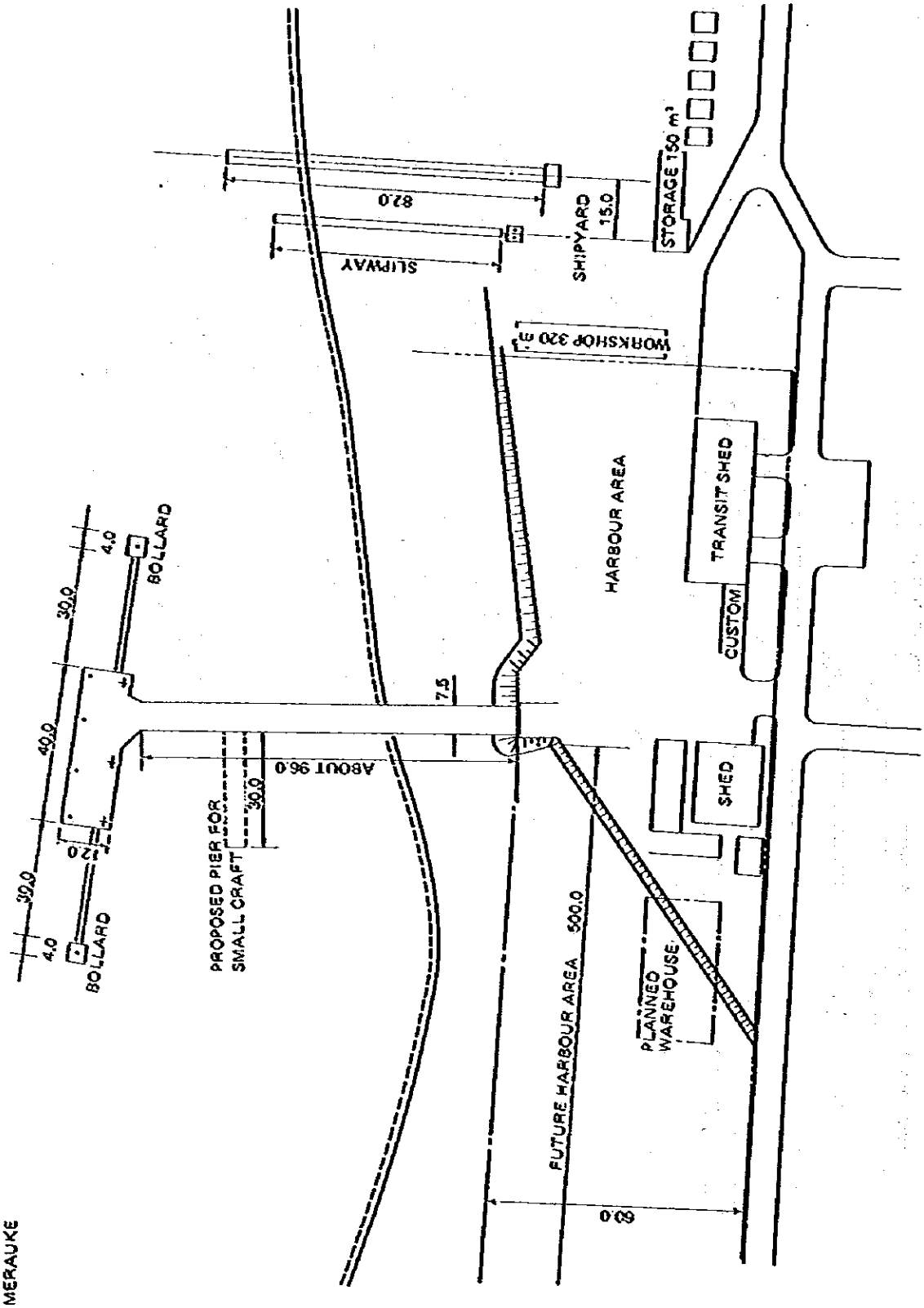

(6) MERAUKE
82.0
SLIPWAY
SHIPYARD
15.0
STORAGE 150 m²
WORKSHOP 320 m²
HARBOUR AREA
TRANSIT SHED
CUSTOM
7.5
ABOUT 96.0
30.0
PROPOSED PIER FOR SMALL CRAFT
40.0
30.0
4.0
BOLLARD
2.0
30.0
4.0
BOLLARD
SHED
PLANNED WAREHOUSE
FUTURE HARBOUR AREA
500.0
60.0

Table 3.1.5. Existing Equipments (1979)

Port	Kind of Equipment	Maker	Buy on (year)	Capacity (tons)	Number	Condition	Remarks
Jayapura	FORKLIFT	I.H.	1963	2.0	2	damage	No spare parts
		HYSTER	1963	5.0	1	damage	"
		TCM	1969	3.6	1	damage	"
		CLARK	1973	2.5	1	damage	"
		YALE	1972	1.8	2	damage	"
	TRACTOR	I.H.	1969	1.5	1	work	"
	TRAILER	I.H.	1970	3.5	2	work	"
	MOBIL CRANE	FUSO	1969	4.8	1	work	"
	MOBIL PMK	TOYOTA	1970	5.0	1	work	"
Biak	FORKLIFT	T.C.M.	1970	3.5	1	damage	"
		I.H.	1968	2.0	1	damage	"
	TRACTOR	I.H.	1973	–	1	damage	"
	TRAILER	I.H.	1973	1.5	1	damage	"
	MOBILE CRANE	FUSO	1970	4.8	1	work	"
Manokwari	FORKLIFT	T.C.M.	1969	3.0	1	work	"
		INTER-NATIONAL	1967	–	1	damage	"
	MOBIL CRANE	FUSO	1970	4.8	1	work	"
Sorong	FORKLIFT	HYSTER	1966	5.0	1	damage	"
		INTER-NATIONAL	1968	2.5	1	damage	"
		T.C.M.	1970	3.0	1	damage	"
		CLARK	1977	7.0	1	work	"
	MOBIL CRANE	FUSO	1970	4.8	1	work	"
Fak-Fak	MOBIL CRANE	FUSO	1970	4.8	1	work	"
Merauke	FORKLIFT	T.C.M.	1970	3.5	1	work	"
	TRACTOR/ TRAILER	I.H.	1970	2.0	1	damage	"
	MOBIL CRANE	FUSO	1970	4.8	1	work	"

Table 3.1.6. Existing Open Storage (1979)

Port	Area (Length x width)	Pavement	Capacity (t/m²)	Year of Construction
Jayapura	55 x 25 m	asphalt	2.07	1960
	30 x 20 m	"	1.2	1960
	40 x 10 m	"	1.5	1947
	53 x 27	"	1.5	1976
Biak	2,625 m²	stone	1.5	1975
Manokwari	40 x 18 m	asphalt	2.0	1960
	16 x 4 m			
Sorong Doom	2,800 m²	asphalt	5.0	1959
	4,015 m²	"	5.0	1959
	7,073 m²	"	12.0	1978
Fak - Fak	331 m²	stone	1.0	1950
Merauke	70 x 35 m	stone/asphalt	1.5	1958

Table 3.1.7. Existing Warehouses (1979)

Port	Length x width (m)	Construction				Capacity of floor (t/m²)	Year of Construction
		Roof	Frame	Wall	Floor		
Jayapura	88 x 25 m	Zink	Wood	Zinc			
				Concrete	Concrete	2.5	1960
	45 x 10	Zink	Steel	Concrete	Concrete	2.0	1960
	70 x 12.5	Zink		Rock	Concrete	2.0	1947
Biak	48 x 20	Ardek	Wood	Zinc	Concrete	1.5	1958
Manokwari	40 x 16	Zink	Wood	Plank	Concrete	1.5	1960
Sorong	97.5 x 20	Ardek	Steel	Spandek	Concrete	5.0	1978
Doom	46.5 x 16	Zink	Wood	Concrete	Concrete	2.0	1959
Fak-Fak	24 x 10	Zinc	Wood	Concrete	Concrete	1.5	1950
Merauke	40 x 16	Ardek	Wood	Zinc	Concrete	1.6	1957
	20 x 12	Zinc	Wood	Plank	Concrete	0.6	1945
	12 x 6	Zinc	Wood	Zinc	Concrete	0.18	1935

3.1.2. Port Activities

1) Cargo Volume Handled at Ports of Indonesia

(1) Loading and Unloading

Table 3.1.8. and Fig. 3.1.3. show the cargo volume of loading and unloading at ports in Indonesia. The Figure also shows the trend of GDP of Indonesia. Unfortunately the data of 1979 is not available for some ports. Therefore, it is better to use the data from 1970 to 1978.

The cargo handled at ports amounted to 155.1 million tons in 1978: 76 percent of the total cargo is loading and 24 percent is unloading. The shares of these two categories have remained almost unchanged in the last few years. In 1978, about 44 percent of the total cargoes were handled in Sumatra, and about 26 percent in Kalimantan. Maluku and Irian Jaya occupied only 5 percent of the total cargoes.

Fig. 3.1.3. Trend of Cargo Volume in Indonesia

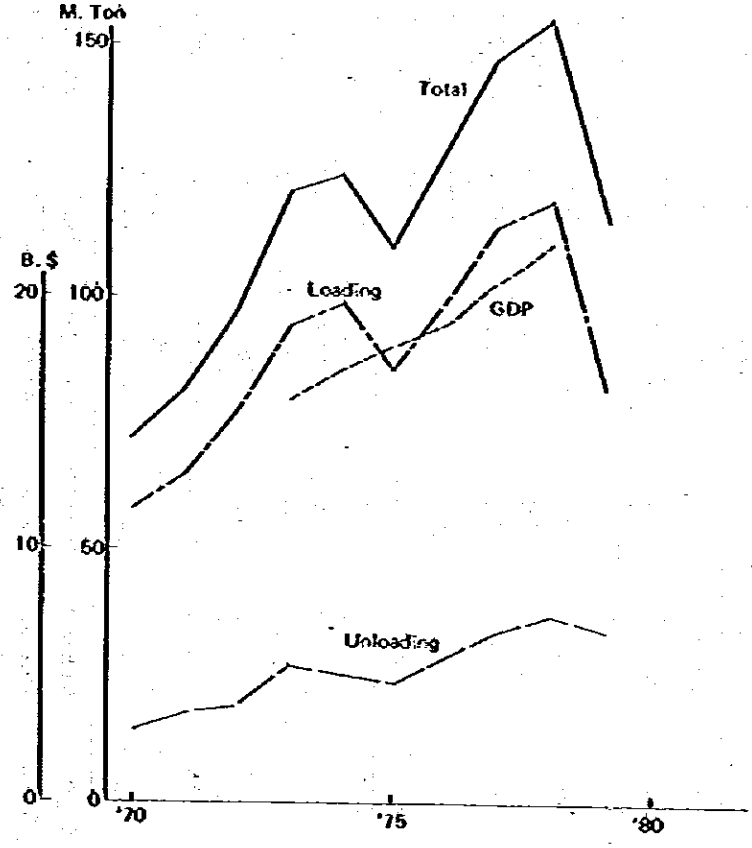


Table 3.1.8. Cargo Loading and Unloading at Ports in Indonesia

(x10³ M. Tons)

		1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Jawa and Madura	L	2,334.2	3,399.3	5,785.3	8,205.1	12,481.7	9,368.2	12,700.2	16,913.3	15,578.9	7,808.8
	UL	5,605.4	6,071.9	8,002.7	11,200.1	12,671.1	12,935.1	15,457.1	17,303.3	16,525.4	16,880.5
	T	7,939.6	9,471.2	13,788.0	19,405.3	25,152.8	22,303.3	28,157.3	34,216.6	32,104.3	24,689.3
Sumatra	L	47,423.1	51,133.0	57,754.8	66,435.3	64,825.3	56,081.8	56,330.7	56,407.3	55,494.6	50,713.0
	UL	6,525.5	6,829.3	6,758.2	10,872.3	8,231.7	7,579.1	8,007.7	8,857.8	12,067.5	9,941.5
	T	53,948.6	57,962.3	64,513.0	77,307.6	73,057.0	63,660.9	64,338.4	65,265.1	67,562.1	60,654.5
Kalimantan	L	6,048.2	7,030.6	9,344.3	16,554.1	17,049.7	16,166.9	24,105.9	33,429.9	37,329.3	17,038.7
	UL	711.4	2,864.3	3,055.4	2,829.5	2,765.5	1,548.5	2,155.9	4,580.0	3,704.2	3,701.7
	T	6,759.6	9,894.9	12,399.7	19,383.6	19,815.2	17,715.4	26,261.8	38,009.9	41,033.5	20,740.4
Sulawesi	L	806.6	1,321.3	1,514.5	1,692.5	1,772.5	1,601.7	2,355.7	2,304.8	2,139.1	1,326.2
	UL	407.7	449.7	760.3	1,368.7	1,060.8	1,209.8	2,460.5	2,214.3	2,930.6	2,145.0
	T	1,214.3	1,771.0	2,274.8	3,061.2	2,833.3	2,811.5	4,816.2	4,519.1	5,069.7	3,471.2
Bali and Nusa Tenggara	L	133.0	102.9	142.2	226.6	158.6	171.3	237.2	182.6	266.2	224.9
	UL	150.3	169.6	260.7	437.1	388.0	457.4	458.2	558.4	808.4	776.1
	T	283.3	272.5	402.9	663.7	546.6	628.7	695.4	741.0	1,074.4	1,001.0
Maluku and Irian Jaya	L	556.6	881.1	1,276.8	1,398.4	2,593.3	2,867.4	3,763.2	4,607.8	7,564.2	4,625.8
	UL	8.4	28.9	172.4	279.9	237.6	146.6	429.1	434.6	669.9	702.8
	T	565.0	910.0	1,449.2	1,678.3	2,830.9	2,014.0	4,192.3	5,042.4	8,234.1	5,328.6
Total Indonesia	L	57,301.7	63,868.2	75,817.9	94,512.0	98,881.1	86,257.3	99,493.0	113,845.6	118,372.9	81,727.4
	UL	13,408.7	16,413.7	19,009.7	26,987.6	25,354.7	23,876.6	28,968.5	33,948.4	36,705.8	34,147.6
	T	70,710.4	80,281.9	94,827.6	121,499.6	124,235.8	110,133.9	128,461.5	147,794.0	155,078.7	115,875.0

Source: Foreign Trade; 1970 – 1978 CBS/Foreign Trade Statistics
1979 Port and Dredging, Bina Usaha
Domestic Trade; 1970 – 1977 CBS/Port Statistics
1978 – 1979 Port and Dredging, Bina Usaha

Note: The figures in 1979 are based on a prompt report.

(2) Foreign Trade and Domestic Trade

Table 3.1.9. and Fig. 3.1.4. show the foreign trade cargo and the domestic trade cargo handled at the Indonesian ports. The Figure also shows the GDP of Indonesia. In 1978, foreign trade amounted to 114.6 million tons and domestic trade 40.5 million tons. The ratio of these two trades is 73.9 percent to 26.1 percent.

As for Maluku and Irian Jaya, foreign trade amounted to 7.5 million tons and domestic trade amounted only to 0.7 million tons. The share of these two trades in the whole trade of Indonesia is 6.6 percent for foreign trade and 1.8 percent for domestic trade.

Fig. 3.1.4. Trend of Cargo Volume and GDP in Indonesia

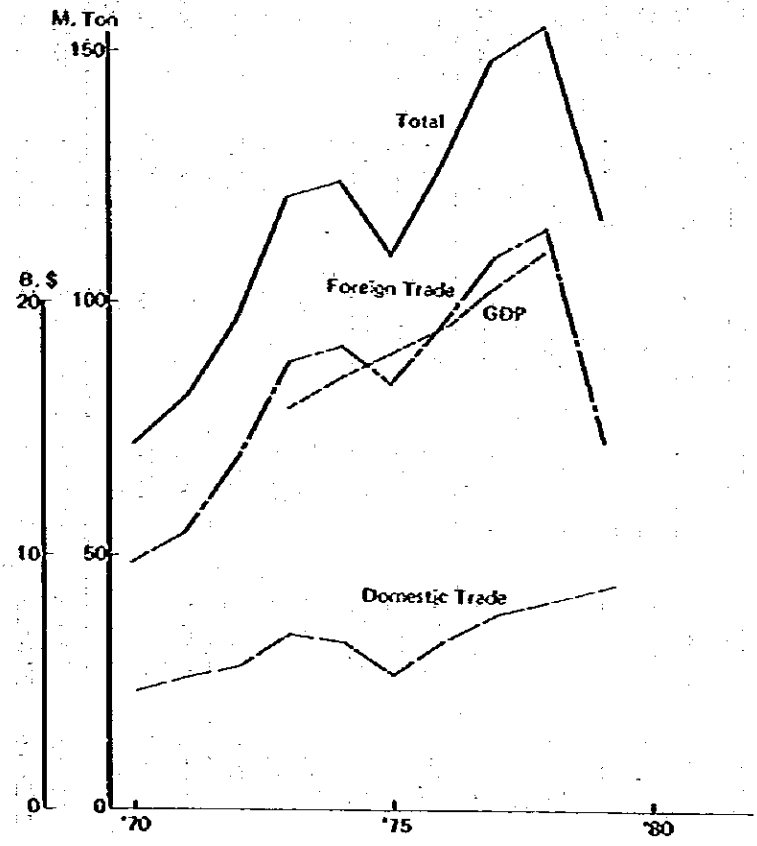


Table 3.1.9. Foreign and Domestic Trade Cargo Flows in Indonesia

(x10³ M. Tons)

		1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Jawa and Madura	F	3,709.3	4,910.5	8,177.6	12,654.8	17,279.1	13,664.8	18,413.7	23,281.5	21,204.0	9,028.3
	D	4,230.3	4,560.7	5,610.4	6,750.5	7,873.7	8,638.5	9,743.6	10,935.1	10,900.3	15,661.0
	T	7,939.6	9,471.2	13,788.0	19,404.3	25,152.8	22,303.3	28,157.3	34,216.6	32,104.3	24,689.3
Sumatra	F	37,994.7	41,059.5	47,772.9	56,518.2	53,606.8	49,324.1	48,903.0	48,859.1	49,289.5	44,207.9
	D	15,953.9	16,902.8	16,740.1	20,789.4	19,450.2	14,336.8	15,435.4	16,406.0	18,272.6	16,446.6
	T	53,948.6	57,962.3	64,513.0	77,307.6	73,057.0	63,660.9	64,338.4	65,265.1	67,562.1	60,654.5
Kalimantan	F	4,732.5	5,965.8	8,582.6	15,383.1	15,656.9	15,765.8	22,187.3	30,456.3	34,492.5	14,487.2
	D	2,027.1	3,929.1	3,817.1	4,000.3	4,158.3	1,949.6	4,075.5	7,556.3	6,541.0	6,263.2
	T	6,759.6	9,894.9	12,399.7	19,383.6	19,815.2	17,715.4	26,262.8	38,012.6	41,033.5	20,740.4
Sulawesi	F	753.2	1,159.7	1,319.6	1,594.2	2,097.8	1,820.8	2,374.0	1,971.5	2,004.0	592.4
	D	461.1	611.3	955.2	1,467.0	735.5	990.7	2,442.2	2,547.6	3,065.7	2,878.8
	T	1,214.3	1,771.0	2,274.8	3,061.2	2,833.3	2,811.5	4,816.2	4,519.1	5,069.7	3,471.2
Bali and Nusa Tenggara	F	63.7	46.0	69.3	110.5	65.0	74.8	131.4	92.7	117.0	34.5
	D	219.6	226.5	333.6	553.2	481.6	553.9	564.0	648.3	957.6	966.5
	T	283.3	272.5	402.9	663.7	546.6	628.7	695.4	741.0	1,074.6	1,001.0
Maluku and Irian Jaya	F	555.7	895.8	1,294.3	1,455.8	2,644.3	2,961.5	3,768.4	4,568.6	7,508.4	4,599.4
	D	9.3	14.2	154.9	222.5	186.6	52.5	423.9	473.8	725.7	729.2
	T	565.0	910.0	1,449.2	1,678.3	2,830.9	3,014.0	4,192.3	5,042.4	8,234.1	5,328.6
Total Indonesia	F	47,809.1	54,037.3	67,216.3	87,716.8	91,349.9	83,611.9	95,777.8	109,227.0	114,615.8	72,949.7
	D	22,901.3	26,244.6	27,611.3	33,782.8	32,885.9	26,522.0	32,683.7	38,567.0	40,462.9	42,925.3
	T	70,710.4	80,281.9	94,827.6	121,499.6	124,235.8	110,133.9	128,461.8	147,794.0	155,078.7	115,875.0

Source: Foreign Trade; 1970 – 1978 CBS/Foreign Trade Statistics
1979 Port and Dredging, Bina Usaha
Domestic Trade: 1970 – 1977 CBS/Port Statistics
1978 – 1979 Port and Dredging, Bina Usaha

Note: The figures in 1979 are based on a prompt report.

(3) Export and Import

Table 3.1.10 and Fig. 3.1.5. show the volume of export and import. In 1978, the foreign trade cargo amounted to 114.6 million tons, 101.3 million tons of export and 13.3 million tons of import. The ratio of export and import is about 8 : 1 in 1978.

As is seen in Table 3.1.11, about 60 to 70 percent of exports is crude oil, and the share of other commodities decreased from 1973 to 1976, and then began to increase. The export of Maluku and Irian Jaya occupied 7.3 percent of whole Indonesia's export, and it was increasing sharply.

As for the import of Maluku and Irian Jaya, it was about 90,000 – 110,000 tons in the past few years and increased sharply in 1978, although its share was only around 1 – 2 percent of whole Indonesia in this period.

Fig. 3.1.5. Trend of Foreign Trade Cargo Volume in Indonesia

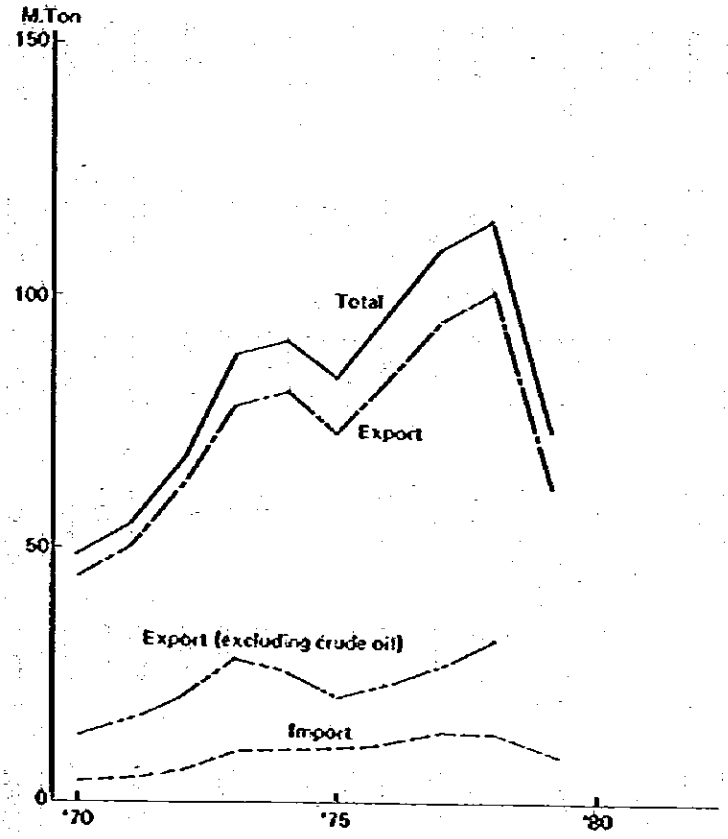


Table 3.1.10. Foreign Trade Cargo Flows in Indonesia

(x10³ M. Tons)

		1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Jawa and Madura	Ex	1,239.1	2,167.5	4,333.4	6,374.7	10,637.2	7,613.8	10,691.5	12,940.4	11,484.8	2,848.1
	Im	2,470.2	2,743.0	3,844.2	6,280.1	6,641.9	6,051.0	7,722.2	10,341.1	9,719.2	6,180.2
	T	3,709.3	4,910.5	8,177.6	12,654.8	17,279.1	13,664.8	18,413.7	23,281.5	21,204.0	9,028.3
Sumatra	Ex	36,964.6	39,757.5	46,104.1	53,926.0	50,853.5	46,444.5	46,248.5	46,623.8	47,111.1	41,128.9
	Im	1,030.1	1,302.0	1,668.8	2,592.2	2,753.3	2,879.6	2,654.5	2,235.3	2,178.4	3,079.0
	T	37,994.7	41,059.5	47,772.9	56,518.2	53,606.8	49,324.1	48,903.0	48,859.1	49,289.5	44,207.9
Kalimantan	Ex	4,661.1	5,813.1	8,288.0	14,977.5	15,309.2	15,115.8	21,813.6	29,843.7	33,989.3	13,948.0
	Im	71.4	152.7	294.6	405.8	347.7	650.0	373.7	609.9	503.2	539.2
	T	4,732.5	5,965.8	8,582.6	15,383.3	15,656.9	15,765.8	22,187.3	30,453.6	34,492.5	14,487.2
Sulawesi	Ex	616.1	1,045.6	1,161.5	1,056.7	1,486.3	1,119.3	1,231.0	1,339.0	1,229.8	241.9
	Im	137.1	114.1	158.1	537.5	611.5	701.5	1,143.0	632.5	774.2	350.5
	T	753.2	1,159.7	1,319.6	1,594.2	2,097.8	1,820.8	2,374.0	1,971.5	2,004.0	592.4
Bali and Nusa Tenggara	Ex	57.7	39.4	54.6	75.7	50.3	62.1	79.5	74.4	68.8	34.5
	Im	6.0*	6.6	14.7	34.8	14.7	12.7	51.9	18.3	48.2	0
	T	63.7	46.0	69.3	110.5	65.0	74.8	131.4	92.7	117.0	34.5
Maluku and Irian Jaya	Ex	555.7	878.6	1,244.5	1,352.3	2,555.0	2,859.6	3,658.2	4,481.1	7,382.9	4,426.0
	Im	—	17.2	49.8	103.5	89.3	101.9	110.2	87.5	125.5	173.4
	T	555.7	895.8	1,294.3	1,455.8	2,644.3	2,961.5	3,768.4	4,568.6	7,508.4	4,599.4
Total Indonesia	Ex	44,094.3	49,701.7	61,186.1	77,762.9	80,891.5	73,215.1	83,722.3	95,302.4	101,267.2	62,627.4
	Im	3,714.8	4,335.6	6,030.2	9,953.9	10,458.4	10,396.8	12,055.5	13,924.6	13,348.6	10,322.3
	T	47,809.1	54,037.3	67,216.3	87,716.8	91,349.9	83,611.9	95,777.8	109,227.0	114,615.8	72,949.7

Souce: 1970 – 1978 CBS/Foreign Trade Statistics
1979 Port and Dredging, Bina Usaha

Notes: 1. 1970 – 74 Gross weight
1975 – Net weight
2. 1979 Prompt Report
3. * includes Maluku and Irian Jaya

Table 3.1.11. Export (crude oil and other commodities)

(x10^3 M. Tons)

Year	Total	Crude Oil	Other Commodities
1970	44,094.3	31,038.4 (70.4%)	13,055.9 (29.6%)
1971	49,701.7	34,022.4 (68.5)	15,679.3 (31.5)
1972	61,186.1	40,706.6 (56.5)	20,479.5 (33.5)
1973	77,762.9	49,438.1 (63.6)	28,324.8 (36.4)
1974	80,891.5	54,634.8 (67.5)	26,256.7 (32.5)
1975	73,215.1	52,412.0 (71.6)	20,803.1 (28.4)
1976	83,722.3	60,267.5 (72.0)	23,454.8 (28.0)
1977	95,302.4	68,030.0 (71.4)	27,272.4 (28.6)
1978	101,267.2	69,560.2 (69.7)	31,707.0 (31.3)

Source: CBS/Foreign Trade Statistics.

(4) Domestic Trade

Table 3.1.12. shows the domestic trade for loading and unloading.

In 1978, the loading cargo amounted to 17.1 million tons and the unloading cargo amounted to 23.4 million tons. These two Figures do not tally because of lack of response from several ports and because unloading includes sea products.

Only in Sumatra (and in Kalimantan as an exceptional case) the loading cargo is usually larger than the unloading cargo, but in other provinces the loading cargo is smaller than the unloading cargo. In Maluku and Irian Jaya, the unloading cargo is two or three times larger than the loading cargo.

Table 3.1.12. Domestic Trade Cargo Flows in Indonesia

(×10³ M. Tons)

		1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Jawa and Madura	L	1,095.1	1,231.8	1,451.9	1,830.4	1,844.5	1,754.4	2,008.7	3,972.9	4,094.1	4,960.7
	UL	3,135.2	3,328.9	4,158.5	4,920.0	6,029.2	6,884.1	7,734.9	6,962.2	6,806.2	10,700.3
	T	4,230.3	4,560.7	5,610.4	6,750.5	7,873.7	8,638.5	9,743.6	10,935.1	10,900.3	15,661.0
Sumatra	L	10,458.5	11,375.5	11,650.7	12,509.3	13,971.8	9,637.3	10,082.2	9,783.5	8,383.6	9,584.1
	UL	5,495.4	5,527.3	5,089.4	8,280.1	5,478.4	4,699.5	5,353.2	6,622.5	9,889.1	6,862.5
	T	15,953.9	16,902.8	16,740.1	20,789.4	19,450.2	14,336.8	15,435.4	16,406.0	18,272.7	16,446.6
Kalimantan	L	1,387.1	1,217.5	1,056.3	1,576.6	1,740.5	1,051.1	2,292.3	3,586.2	3,340.0	3,090.7
	UL	640.0	2,711.6	2,760.8	2,423.7	2,417.8	898.5	1,782.2	3,970.1	3,201.0	3,162.5
	T	2,027.1	3,929.1	3,817.1	4,000.3	4,158.3	1,949.6	4,074.5	7,556.3	6,541.0	6,263.2
Sulawesi	L	190.5	275.7	353.0	635.8	286.3	482.4	1,124.7	965.8	909.3	1,084.3
	UL	270.6	335.6	602.2	831.2	449.3	508.3	1,317.5	1,581.8	2,156.4	1,794.5
	T	461.1	611.3	955.2	1,467.0	735.5	990.7	2,442.2	2,547.6	3,065.7	2,878.8
Bali and Nusa Tenggara	L	75.3	63.5	87.6	150.9	108.3	109.2	157.7	108.2	197.4	190.4
	UL	144.3	163.0	246.0	402.3	373.3	444.7	406.3	540.1	760.2	776.1
	T	219.6	226.5	333.6	553.2	481.6	553.9	564.0	648.3	957.6	966.5
Maluku and Irian Jaya	L	0.9	2.5	32.3	46.1	38.3	7.8	105.0	126.7	181.3	199.8
	UL	8.4	11.7	122.6	176.4	148.3	44.7	318.9	347.1	544.4	529.4
	T	9.3	14.2	154.9	222.5	186.6	52.5	423.9	473.8	725.7	729.2
Total Indonesia	L	13,207.4	14,166.5	14,631.8	16,749.1	17,989.6	13,042.2	15,770.7	18,543.2	17,105.7	19,100.0
	UL	9,693.9	12,078.1	12,979.5	17,033.7	14,896.3	13,479.8	16,913.0	20,023.8	23,357.2	23,825.3
	T	22,901.3	26,244.6	27,611.3	33,782.8	32,885.9	26,522.0	32,683.7	38,567.0	40,462.9	42,925.3

Source: 1970 – 1977 CBS/Port Statistics
1978 – 1979 Port and Dredging, Bina Usaha
Note: 1979 Prompt Report

(5) Average Annual Growth Rate of Cargo Volume

Table 3.1.13. shows the average annual growth rate of cargo volume. From 1970 to 1973, the cargo increased sharply, and then it slowed down. In 1974 and 75, cargoes decreased temporarily, presumably due to the world wide recession. The average growth rate from 1970 to 1978 is 10.3 percent and it is 5.0 percent from 1973 to 1978. Meanwhile, the GDP of Indonesia increased at the average annual growth rate of 6.8 percent from 1973 to 1978. All of the cargo growth rates are smaller than the GDP growth rate.

Table 3.1.13. The Average Annual Growth Rate of GDP and Cargo Volume

(%)

Period		1970 – 1978	1973 – 1978
GDP (A)		–	6.8
Cargo Flow (B)	Foreign Trade	11.5	5.5
	Domestic Trade	7.4	3.4
	Total	10.3	5.0
(B)/(A)	Foreign Trade	–	0.81
	Domestic Trade	–	0.50
	Total	–	0.73
Cargo Flow (C)	Loading	9.4	4.6
	Unloading	13.4	6.3
	Total	10.3	5.0
(C)/(A)	Loading	–	0.68
	Unloading	–	0.93
	Total	–	0.73

2) Cargo Volume Handled at Ports of Irian Jaya

(1) Available Data

Data on cargo loading and unloading at ports of Irian Jaya are provided by several sources, two of which are particulary useful in analysing of port activities in Irian Jaya. One is "Annual Report of PELITA II" published by KANWIL IX. The figures in this report are quite consistent. Another is annual reports which were published by each KEPPEL or ADPEL based on reliable STP.

Table 3.1.4. shows the trend of cargo volume in Irian Jaya.

The main data source of this table is Annual Report of PELITA II. But in the top panel of the table, the figures of the Ports of Sorong, Jayapura and Biak are taken from the figures of their annual reports. The bottom panel of the table shows the figures by commodity. In this table, the figures of Crude Oil are taken from the figures in the Annual Report of the Port of Sorong.

There are some minor inconsistencies in the table. For example, the total volume of unloading cargo is smaller than the total cargo volume by commodities. Fortunately, however, they don't seem to have much bearing on the overall trend of cargo handling.

Table 3.1.14. Trend of Cargo Volume Handled at Ports of Irian Jaya

(M. Tons)

	1974		1975		1976		1977		1978		1979	
	UL	L	UL	L	UL	L	UL	L	UL	L	UL	L
Total	385,778	1,709,707	326,719	3,397,427	386,362	4,069,695	398,579	4,325,564	426,759	5,797,353		
6 Major Ports	273,767	1,486,154	281,020	3,162,698	347,904	3,814,733	339,269	4,135,304	367,384	5,591,297		
Sorong	108,985	1,434,440	121,265	3,073,703	129,842	3,718,975	121,162	4,041,841	137,716	5,446,235	174,700	5,392,578
Manokwari	12,955	13,176	15,533	11,353	19,660	13,005	39,904	13,271	16,283	16,099	19,649	64,618
Jayapura*	68,492	8,669	66,513	10,755	92,773	12,032	88,868	10,848	102,153	10,106	74,348	5,439
Merauke	14,280	3,614	9,834	10,356	16,465	12,132	15,199	34,211	19,211	52,454		
Biak*	62,246	24,703	63,001	54,042	79,144	53,425	63,807	30,206	80,052	60,129	72,873	66,613
Fak-Fak	6,809	1,552	4,874	2,489	10,020	5,164	10,329	4,927	11,969	6,274	11,995	10,037
Main Commodities												
Rice	32,754		36,673		49,442		35,939	8,318	54,433	7,649		
Sugar							4,860		5,832			
Other Agricultural Products		254					648	1,492	1,626	1,640		
Fish/shrimp				2,596	2,531	1,906	2,863	2,854	6,234	5,332		
Log		12,213		20,313		24,515	211	42,289		82,236		
Fuel oil	101,636		117,896		169,723	15,152	158,395	8,452	142,309	13,019		
Crude oil*		1,421,120		3,063,303		3,705,867		4,017,435		5,418,613		
Refined copper		223,553		234,279		254,964		183,125		201,430		
General Cargo	275,957	52,813	172,687	39,655	222,614	36,284	162,321	53,558	117,405	41,745		
Cement	6,200		18,109		8,000		5,207	62	12,092			

Sources: 1. These figures are mainly based on "Laporan Pelita II" Kanwil Hubla IX
2. But "By Port", the figures of Sorong, Jayapura and Biak are based on the annual report of each port and "Total" is corrected by these figures.
3. By commodity, only the figures of crude oil are replaced by the figures in the Annual Report of Port of Sorong.
4. 1979 is based on Kanwil Hubla IX.

(2) Loading and Unloading

The top panel of Table 3.1.14. gives the amount of the cargoes (total and 6 major ports) by loading and unloading and Fig. 3.1.6. shows the trend of these cargoes.

In 1978, Irian Jaya's cargo amounted to 6.2 million tons, of which 0.4 million tons is unloading and 5.8 million tons is loading. The unloading cargo rose on the average 7.1 percent and the loading cargo increased by 34.0 percent compared with 1977. More than 90 percent of 6.2 million tons cargo is loading cargo, and more than 90 percent of the loading cargo is crude oil.

6 major ports (Sorong, Manokwari, Jayapura, Merauke, Biak and Fak-Fak) handled 86.1 percent of the unloading cargo, and 96.4 percent of the loading cargo. As is seen in Table 3.1.15. and Fig. 3.1.7. these figures fluctuate slightly from year to year.

At Sorong Port, the average annual growth rate of the loading cargo was 39.6 percent from 1974–1978, while the unloading cargo increased by 6.0 percent. If the crude oil is excluded, the loading cargo at Sorong Port increased by the annual average growth rate of 20.0 percent. Sorong Port handled 28 – 37 percent of the unloading cargo and 83 – 94 percent of the loading cargo of Irian Jaya.

Fig. 3.1.6. Trend of Cargo Volume Handled at Ports of Irian Jaya (Loading and Unloading)

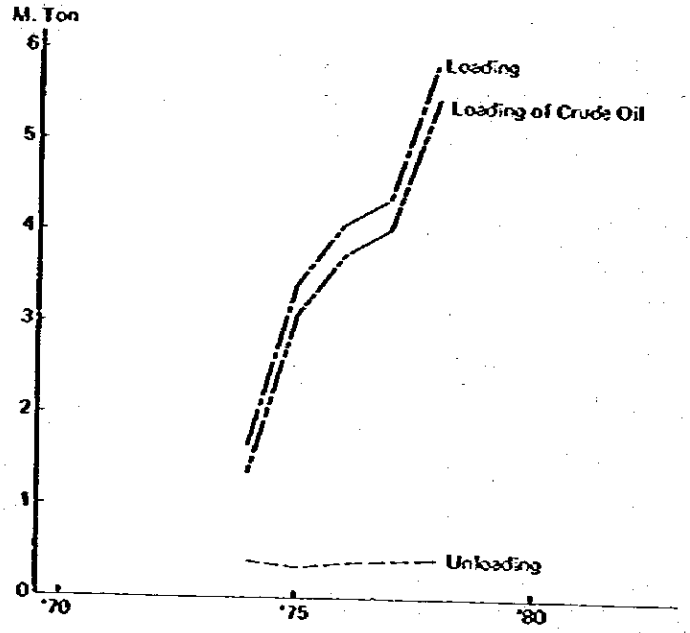
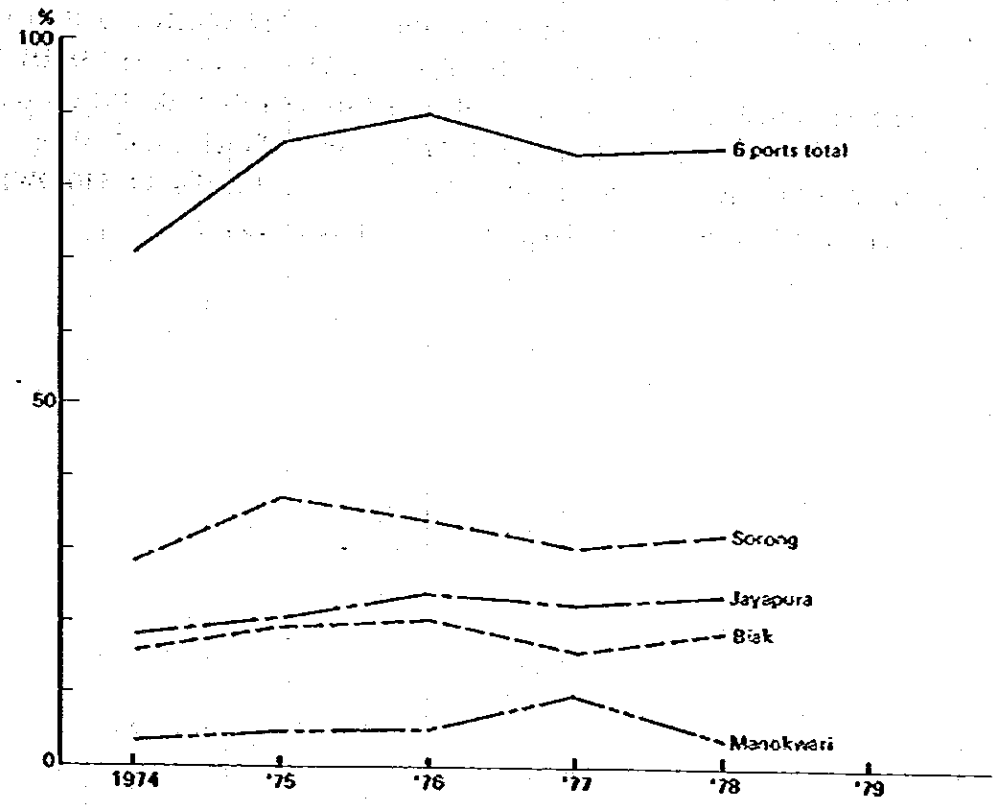


Table 3.1.15. Percentage of Cargo Volume at Major Ports in Irian Jaya (1974 – '79)

(%)

	1974		1975		1976		1977		1978	
	UL	L	UL	L	UL	L	UL	L	UL	L
Irian Jaya	100	100	100	100	100	100	100	100	100	100
6 Major Ports	71.0	86.9	86.0	93.1	90.0	93.7	85.1	95.6	86.1	96.4
Sorong	28.2	83.9	37.1	90.5	33.6	91.4	30.4	93.4	32.3	93.9
Monokwari	3.4	0.8	4.7	0.3	5.1	0.3	10.0	0.3	3.8	0.3
Jayapura	17.8	0.5	20.4	0.3	24.0	0.3	22.3	0.3	23.9	0.2
Merauke	3.7	0.2	3.0	0.3	4.3	0.3	3.8	0.8	4.5	0.9
Biak	16.1	1.4	19.3	1.6	20.5	1.3	16.0	0.7	18.8	1.0
Fak-Fak	1.8	0.1	1.5	0.1	2.5	0.1	2.6	0.1	2.8	0.1

Fig. 3.1.7. Percentage of Cargo Volume at Major Ports (Unloading Cargo)



(3) Commodities

The bottom panel of Table 3.1.14. shows the amount of the cargoes by main commodities.

The three main commodities of the unloading cargo are general cargo, fuel oil and rice. These three occupy about 88 percent of the unloading cargo in 1978. Rice shows an increasing tendency except in 1977 and its average annual growth rate is about 13.5 percent in this period. Fuel oil decreased from 169.7 thousand tons in 1976 to 142.3 thousand tons in 1978. General cargo fluctuated in the range of 160 to 280 thousand tons.

The main commodities of the loading cargo are crude oil and refined copper. Crude oil amounted to 5.4 million tons and refined copper 0.2 million tons in 1978. These two commodities occupied more than 96 percent of the whole loading cargo in Irian Jaya (refined copper occupied 53.2 percent of the loading cargo excluding crude oil). Crude oil is loaded at Sorong Port and refined copper is loaded at Tembagapura (Port of Mimika and Kokonau). Logs are also one of the main commodities of Irian Jaya, they amounted to 82 thousand tons in 1978, and occupied 1.4 percent of the loading cargo (21.7 percent of the loading cargo excluding crude oil).

3) Ship Call in Irian Jaya

Table 3.1.16. (1) – (3) show the data of ship calls and the cargo amount by kinds of shipping. In 1978, 1,662 vessels called on the Port of Sorong, in which 228 vessels were foreign trade ships and their volume amounted to 176,694 DWT. The average volume of foreign trade ship is estimated to be about 775 DWT per vessel.

In the Port of Jayapura, the number of calling ships was 227 vessels and their volume 396,830 DWT in 1979, in which the foreign trade ships were 21 vessels and 75,258 DWT. The average volume of foreign trade ship is estimated at about 3,580 DWT. In Biak, 381 vessels called on the port and their volume amounted to 412,743 DWT in 1979. Foreign trade ships were 19 vessels, 124,002 DWT and the average volume of the ships is estimated at about 6,530 DWT.

Table 3.1.17 (1) – (3) show the average DWT and the average cargo volume.

Table 3.1.16. Ship Call and Cargo Amount by Kinds of Shipping in Major Ports (1974 – '79)

(1) Sorong

			1974	1975	1976	1977	1978	1979*
Ocean Shipping	Ship Call	No.	6	12	17	9	7	9
		DWT	39,290	92,691	89,300	33,468	59,524	49,210
	Cargo	UL	11,009	22,109	21,806	11,811	15,425	5,995
		L	1,200	–	–	500	1,400	18,006
S'pore Shipping	Ship Call	No.	82	79	25	39	31	20
		DWT	222,304	90,862	26,678	67,100	57,201	34,896
	Cargo	UL	46,088	39,718	12,881	24,298	19,437	8,325
		L	127	1,233	299	3,092	588	288
Transport Udang/Ikan (Sorong-S'pore)	Ship Call	No.	–	–	5	12	22	15
		DWT	–	–	2,000	6,600	19,349	7,600
	Cargo	UL	–	–	–	–	670	5
		L	–	–	–	2,040	4,448	2,489
Transport Udang/Ikan (Sorong-Japan)	Ship Call	No.	35	29	31	50	45	32
		DWT	12,533	15,079	12,484	23,096	38,075	12,450
	Cargo	UL	790	556	1,114	1,096	656	415
		L	2,326	2,596	2,941	2,908	3,511	2,238
Tanker (Export CO)	Ship Call	No.	42	93	91	96	123	59
		DWT	1,703,427	4,436,427	5,350,880	4,518,353	2,545,497	2,737,297
	Cargo (L/T)	L	1,421,120	3,063,303	3,705,867	4,017,435	5,418,613	3,395,929
Nusantara (RLS & Non RLS)	Ship Call	No.	106	128	160	95	142	93
		DWT	224,254	141,032	309,402	223,310	326,056	186,855
	Cargo (Sapi: ekor)	UL	14,061	20,764	32,041	32,390	31,045	18,906
		Sapi	+334		+581	+589	+515	+235
		L	1,572	2,519	3,800	6,128	4,498	3,963
	Passenger (Orange)	Dis.	2,405	3,617	3,039	2,020	2,447	1,463
		Em.	2,016	2,298	2,000	1,165	680	470
Local	Ship Call	No.	153	495	230	496	559	354
		DWT	32,786	26,226	36,254	29,170	38,459	16,740
	Cargo	UL	3,874	4,805	1,666	2,485	1,753	1,688
		L	7,947	574	5,513	4,781	5,817	2,516
	Passenger	Dis.	1,805	2,237	1,208	1,686	1,420	1,411
		Em.	820	3,171	2,692	2,588	2,023	1,458
Rakyat	Ship Call	No.	130	161	137	41	52	19
		DWT	2,244	3,826	1,411	607	705	426
	Cargo	UL	308	165	129	37	79	27
		L	148	1	1	2	2	–
	Passenger	Dis.	–	228	77	113	–	–
		Em.	–	30	27	8	–	–
Perintis	Ship Call	No.	nil	41	32	46	46	36
		DWT		10,800	15,300	31,923	19,533	27,182
	Cargo Sapi (Ekor)	UL	nil	257	2,148	686	401	964
		L		3,477	2,301	4,400	3,801	3,307
	Passenger	Dis.	nil	1,157	1,410	1,712	2,773	4,723
		Em.		1,285	1,271	1,721	2,968	3,851

– continued –

			1974	1975	1976	1977	1978	1979*
Shrimp Catching Boat	Ship Call	No.	207	275	280	353	344	229
		DWT	33,197	40,283	121,435	161,544	188,472	160,857
	Cargo	UL	2,372	2,967	2,540	3,189	3,676	1,942
		L	nil	nil	253	555	1,157	387
Tanker (Minyak Jadi)	Ship Call	No.	12	12	20	21	36	22
		DWT	67	103	1117	101	189	79
	Cargo (L/T)	UL	30,349	29,864	54,936	44,581	62,235	43,123
Special Ship	Ship Call	No.					255	230
		DWT					180,476	97,130
	Cargo	UL					1,822	845
		L					2,400	1,673
Total	Ship Call	No.	773	1,334	1,028	1,258	1,662	1,118
		DWT	568,378	425,342	619,732	581,437		
	Total Cargo	UL	108,851	121,265	129,261	120,573	137,499	82,235
		L	13,320	10,400	15,108	24,406	27,622	34,867
	Inter-national (exclude CO)	UL	57,887	62,443	35,801	37,205	36,188	26,669
		L	3,653	3,829	3,240	8,540	9,947	60,722
	Inter-island	UL	50,964	58,822	93,460	83,368	101,011	37,641
			+134		+581	+589	+517	+235
		L	9,667	6,571	11,858	15,866	17,675	16,201
	Passenger	Dis.	4,210	7,239	5,734	5,531	6,640	10,134
		Em.	2,836	6,784	5,990	5,482	5,671	7,999

Source: Badan Pengusahaan Pelabuhan Sorong "Laporan Posisi S/D Bulan Agustus Tahun 1979"

Note:
1. 1979 is from Jan. to Aug.
2. UL: Unloading L: Loading Dis: Disembarkation Em: Embarkation
3. DWT of shrimp catching boat and special ship in 1978 and 1979 and Rakyat in 1979 estimated from Isi Kotor (M^3). (1 DWT = $1.5M^3$)

(2) Jayapura

			1974	1975	1976	1977	1978	1979*
Samudra	Ship Call	No.	45	12	15	17	21	12
		DWT	169,015	76,535	100,313	109,180	104,730	75,258
	Cargo	UL	34,430	13,737	21,099	25,560	31,265	11,947
		L	220	3,926	6,921	1,608	55	–
	passenger	Dis.	7	–	–	–	–	20
		Em.	15	–	–	–	–	20
Nusantara	Ship Call	No.	50	79	82	49	70	79
		DWT	106,916	159,073	171,596	112,923	166,012	174,220
	Cargo	UL	13,457	34,661	45,616	40,775	40,641	36,591
							+1,736	+903
		L	3,648	4,581	3,253	7,567	6,499	3,875
	Passenger	Dis.	4,734	4,820	5,658	4,090	4,141	5,613
		Em.	2,464	4,792	2,907	2,797	2,346	3,399
Local/ Rakyat	Ship Call	No.	93	60	56	46	51	75
		DWT	8,833	6,400	4,940	4,990	3,340	3,106
	Cargo	UL	2,611	987	288	476	539	633
		L	4,801	2,247	1,359	1,353	1,245	988
	Passenger	Dis.	1,834	1,908	1,117	1,056	828	445
		Em.	1,456	1,245	1,026	1,193	760	388
Khusus (Tanker)	Ship Call	No.	9	16	10	19	24	21
		DWT	44,576	57,751	70,707	64,453	107,793	127,029
	Cargo	UL	17,118	16,190	24,059	20,235	27,749	25,101
		L	–	–	–	–	1,889	–
	Passenger	Dis.	–	–	–	–	–	1,500
		Em.	–	–	–	–	–	3,400
Perintis	Ship Call	No.			14	12	26	40
		DWT			2,100	–	10,321	17,217
	Cargo	UL			71	–	221	622
		L			499	–	418	958
	Passenger	Dis.			733	851	1,929	2,948
		Em.			690	752	1,801	3,808
Total	Ship Call	No.	197	167	187	142	192	227
		DWT	329,940	301,764	349,656	296,569	329,196	396,830
	Cargo	UL	67,617	65,575	91,132	87,065	100,416	74,894
			+875	+938	+1,641	+1,803	+1,737	+903
		L	8,659	10,755	12,032	10,848	10,106	5,821
	Passenger	Dis.	6,575	6,728	7,508	6,007	6,898	10,526
		Em.	3,935	6,037	4,623	4,742	4,907	11,015

Source: 1974 – 1978 Administrator Pelabuhan Jayapura, 20 Feb. 1980
1979 "Laporan Tahunan 1979" Badan Pengusahaan Pelabuhan Jayapura

(3) Biak

			1974	1975	1976	1977	1978	1979
Samudra	Ship Call	No. DWT	53	34	28	23	21	19 124,002
	Cargo	UL L	13,953 35	13,883 1,079	17,026 5,482	15,229 7,558	16,088 30,550	12,329
Nusantara	Ship Call	No. DWT	99	76	78	53	66	62 135,390
	Cargo	UL L	16,900 8,177	23,379 41,247	16,734 31,157	14,426 2,647	20,380 9,781	21,057 10,016
	Passenger	Dis. Em.	1,952 1,123	2,104 1,241	1,461 869	835 474	994 437	1,154 502
Local/ Rakyat	Ship Call	No. DWT	316	237	212	285	253	206 22,098
	Cargo	UL L	6,891 16,491	5,411 10,378	7,182 13,301	6,187 16,472	8,672 15,820	5,991 13,611
	Passenger	Dis. Em.	933 860	664 800	462 171	461 257	257 128	60 56
Perintis	Ship Call	No. DWT	–	74	79	59	90	78 28,600
	Cargo	UL L	– –	213 1,338	336 3,485	2,463 3,529	1,521 3,978	1,165 1,607
	Passenger	Dis. Em.		620 471	806 567	697 400	960 869	2,436 2,066
Tanker (Khusus)	Ship Call	No. DWT	14	10	17	14	13	16 102,653
	Cargo	UL	24,502	20,115	37,866	25,502	33,391	31,341
Total	Ship Call	No. DWT	482	431	414	434	443	381 412,743
	Cargo	UL L	62,246 24,703	63,001 54,042	79,144 53,425	63,807 30,206	80,052 60,129	71,883 63,938
	Passenger	Dis. Em.	933 860	3,388 2,512	2,729 1,607	1,993 1,131	2,211 1,434	3,650 2,624

Table 3.1.17. Average DWT and Cargo Volume by Ship

(1) Sorong

			1974	1975	1976	1977	1978	1979*
Ocean Shipping	Ship	DWT	6,548	7,724	5,253	3,719	8,503	5,468
	Cargo	UL	1,835	1,842	1,283	1,312	2,204	666
		L	200	–	–	55	200	2,001
S'pore Shipping	Ship	DWT	2,711	1,150	1,067	1,721	1,845	1,745
	Cargo	UL	562	504	515	623	627	416
		L	2	16	12	79	19	14
Transport Udang/Ikan (Sorong-S'pore)	Ship	DWT	–	–	400	550	880	507
	Cargo	UL	–	–	–	–	30	–
		L	–	–	–	170	202	166
Transport Udang/Ikan (Sorong-Japan)	Ship	DWT	358	520	403	462	846	389
	Cargo	UL	23	19	36	22	15	13
		L	66	90	95	58	78	70
Tanker (Export CO)	Ship	DWT	40,558	47,704	58,801	47,066	20,695	46,395
	Cargo (L/T)	L	33,836	32,939	40,724	41,848	44,054	57,558
Nusantara (RLS & Non RLS)	Ship	DWT	2,116	1,102	1,934	2,351	2,296	2,009
	Cargo	UL	133	162	200	341	219	203
		L	15	20	24	65	32	43
	Passenger (Orang)	Dis.	23	28	19	21	17	16
		Em.	19	18	13	12	5	5
Local	Ship	DWT	214	53	158	59	69	47
	Cargo	UL	25	10	7	5	3	5
		L	52	1	24	10	10	7
	Passenger	Dis.	12	5	5	3	3	4
		Em.	5	6	12	5	4	4
Rakyat	Ship	DWT	17	24	10	15	14	22
	Cargo	UL	2	1	–	–	2	1
		L	1	–	–	–	–	–
	Passenger	Dis.		1	–	3	–	–
		Em.		–	–		–	–
Perintis	Ship	DWT		263	478	694	425	755
	Cargo	UL		6	67	15	9	27
		L		85	72	96	83	92
	Passenger	Dis.		28	44	37	60	131
		Em.		31	40	37	65	107
Shrimp Catching Boat	Ship	DWT	160	146	434	458	548	702
	Cargo	UL	11	11	9	9	11	8
		L			–	2	3	2
Tanker (Minyak Jadi)	Ship	DWT	5	5	6	5	5	4
	Cargo (L/T)	UL	2,529	1,422	2,747	2,123	1,729	1,960
Special Ship	Ship	DWT					708	422
	Cargo	UL					7	4
		L					9	7
Total	Ship	DWT	735	319	603	462		
	Cargo	UL	141	91	126	96	83	74
		L	17	8	15	19	17	31
	Inter-national (exclude CO)	UL	75	47	35	30	22	24
		L	5	3	3	7	6	54
	Inter-island	UL	66	44	91	66	61	34
		L	13	5	12	13	11	14
	Passenger	Dis.	5	5	6	4	4	9
		Em.	4	5	6	4	3	7

(2) Jayapura

			1974	1975	1976	1977	1978	1979
Samudra	Ship	DWT	3,756	6,378	6,686	6,422	4,987	6,272
	Cargo	UL	765	1,145	1,407	1,504	1,489	996
		L	5	327	461	95	3	–
	Passenger	A	–	–	–	–	–	1.7
		A	–	–	–	–	–	1.7
Nusantara	Ship	DWT	2,138	2,014	2,093	2,305	2,372	2,205
	Passenger	UL	269	439	556	832	581	463
		L	73	58	40	154	93	49
	Passenger	Dis.	95	61	69	83	59	71
		Em.	49	61	35	57	34	43
Local/ Rakyat	Ship	DWT	95	107	88	108	65	41
	Cargo	UL	28	16	5	10	11	8
		L	52	37	24	29	24	13
	Passenger	Dis.	20	32	20	23	16	6
		Em.	16	21	18	26	15	5
Khusus (Tanker)	Ship	DWT	4,953	3,609	7,071	3,392	4,491	6,049
	Cargo	UL	1,902	1,012	2,406	1,065	1,356	1,195
		L	–	–	–	–	79	–
	Passenger	Dis.	–	–	–	–	–	71
		Em.	–	–	–	–	–	162
Perintis	Ship	DWT			150	–	397	430
	Cargo	UL			5	–	9	16
		L			36	–	16	24
	Passenger	Dis.			52	72	24	74
		Em.			49	63	69	95
Total	Ship	DWT	1,675	1,807	1,870	2,089	2,043	1,748
	Cargo	UL	345	393	487	613	523	330
		L	44	61	64	76	53	26
	Passenger	Dis.	33	40	40	42	36	46
		Em.	20	36	25	33	26	49

(3) Biak

			1974	1975	1976	1977	1978	1979
Samudra	Ship	DWT						6,526
	Cargo	UL	263	408	608	662	766	649
		L	–	32	196	329	1,455	2,037
Nusantara	Ship	DWT						2,184
	Cargo	UL	171	308	215	272	309	340
		L	83	543	399	50	148	162
	Passenger	Dis.	20	28	19	16	15	17
		Em.	11	16	11	9	7	8
Local/ Rakyat	Ship	DWT						107
	Cargo	UL	22	23	34	22	34	29
		L	52	44	63	58	63	66
	Passenger	Dis.	3	3	2	2	1	–
		Em.	3	3	–	–	–	–
Perintis	Ship	DWT						367
	Cargo	UL	–	3	4	42	17	15
		L	–	18	44	60	44	21
	Passenger	Dis.		8	10	12	11	31
		Em.		6	7	7	10	26
Tanker (Khusis)	Ship	DWT						6,416
	Cargo	UL	1,750	2,012	2,227	1,822	2,569	1,959
Total	Ship	DWT						1,083
	Cargo	UL	129	146	191	147	181	189
		L	51	125	129	70	136	168
	Passenger	Dis.	2	8	6	5	5	10
		Em.	2	6	4	3	3	7

4) Passenger Flow in Irian Jaya

Sea Transportation is an important means of passenger traffic in Irian Jaya, because of the lack of an inter-city road.

The number of passengers who landed ashore (disembarkation) at Irian Jaya ports was 32,700, and who went on board (embarkation) was 25,417 in 1978. The embarkations were about 7,300 people less than the disembarkation in 1978. The differences between embarkation and diembarkations amounted to 22,760 people from 1974 to 1978.

Fig. 3.1.8. shows the fluctuation of passenger flows by month. It is clear in Sorong, Jayapura and Manokwari that there are two peaks of passenger flows in a year. One is from June to September and another is in Christmas and New Year time. According to the research which was carried out at Serui by the staff of Kanwil Hubla IX, the purposes of trips of these passengers are: (1) visiting families (40 percent), (2) school (20 percent), and (3) business trips (20 percent).

Table 3.1.18. Trend of Passenger Disembarking/Embarking in Irian Jaya

(People)

	1974		1975		1976	
	Dis.	Em.	Dis.	Em.	Dis.	Em.
Irian Jaya	14,727	10,138	25,827	21,229	21,725	18,033
6 Major Ports	14,727	10,138	25,827	21,229	21,725	18,033
Sorong*	4,210	2,836	7,239	6,784	5,734	5,990
Manokwari	1,480	1,400	4,385	2,882	2,564	2,754
Jayapura*	6,575	3,935	6,728	6,037	7,508	4,623
Merauke	441	483	1,764	691	1,088	1,460
Biak*	993	860	3,388	2,512	2,729	1,607
Fak-Fak	1,088	624	2,323	2,123	2,102	1,599
	1977		1978		1979	
	Dis.	Em.	Dis.	Em.	Dis.	Em.
Irian Jaya	24,503	21,905	32,700	25,417		
6 Major Ports	19,362	16,867	24,739	19,328		
Sorong*	5,531	5,482	6,640	5,671	10,690	6,980
Manokwari	3,008	2,576	3,847	3,135	4,346	4,014
Jayapura*	6,007	4,742	6,898	4,907	9,115	9,406
Merauke	956	1,297	2,374	2,036		
Biak*	1,993	1,131	2,211	1,434	3,606	2,375
Fak-Fak	1,867	1,639	2,769	2,145		

Source: 1. These figures are mainly based on "Laporan Pelita II" Kanwil Hubla IX.
2. The figures of Sorong, Jayapura and Biak are based on the Annual Report of each port. Irian Jaya's total is corrected by these figures.
3. The figures of 1979 are based on STP of each port.

Note: Dis: Disembarkation
Em: Embarkation

Table 3.1.19. The Differences between Embarkation and Disembarkation

(People)

	1974	1975	1976	1977	1978	1979
Irian Jaya	4,589	4,589	3,692	2,598	7,283	
6 Major Ports	4,589	4,589	3,692	2,495	5,411	
Sorong	1,374	455	▲256	49	969	3,710
Manokwari	80	1,503	▲190	432	712	332
Jayapura	2,640	691	2,885	1,265	1,991	▲291
Merauke	▲ 42	1,073	▲372	341	338	
Biak	73	876	1,122	862	777	1,231
Fak-Fak	464	200	503	228	624	

Source: See Table 3.1.18.

Note: ▲ means that the embarkation is bigger than disembarkation.

Fig. 3.1.8. Trend of Passenger Flows in Irian Jaya

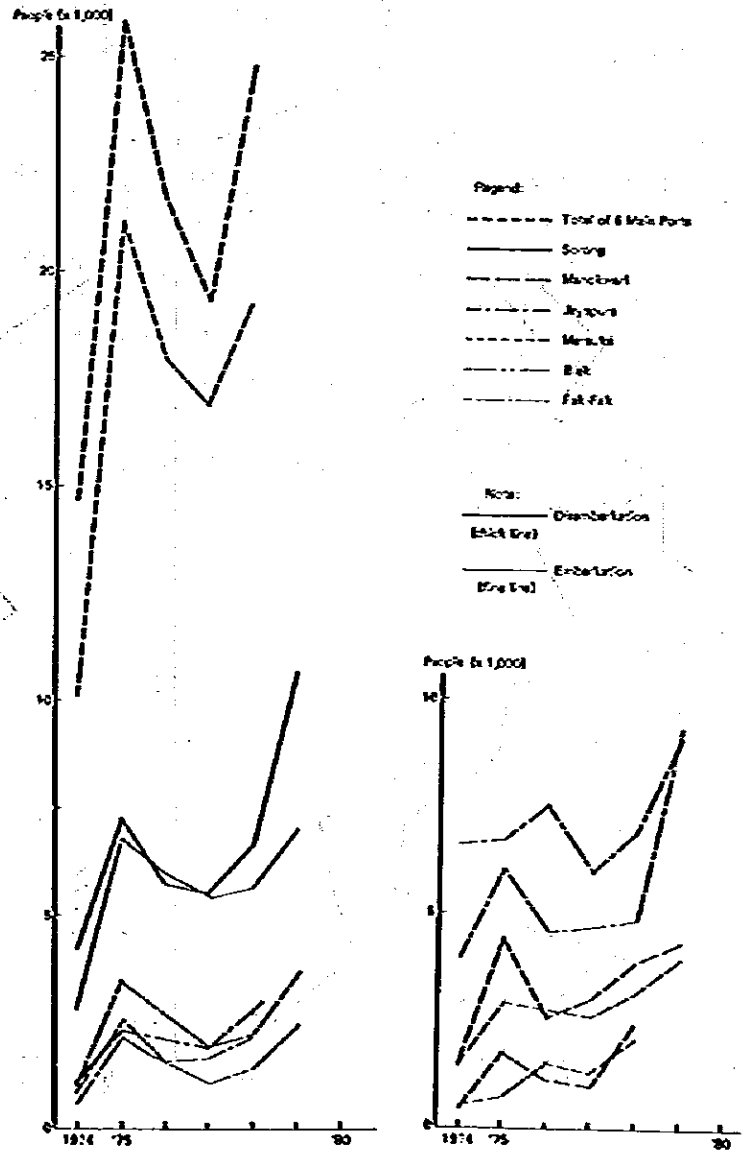
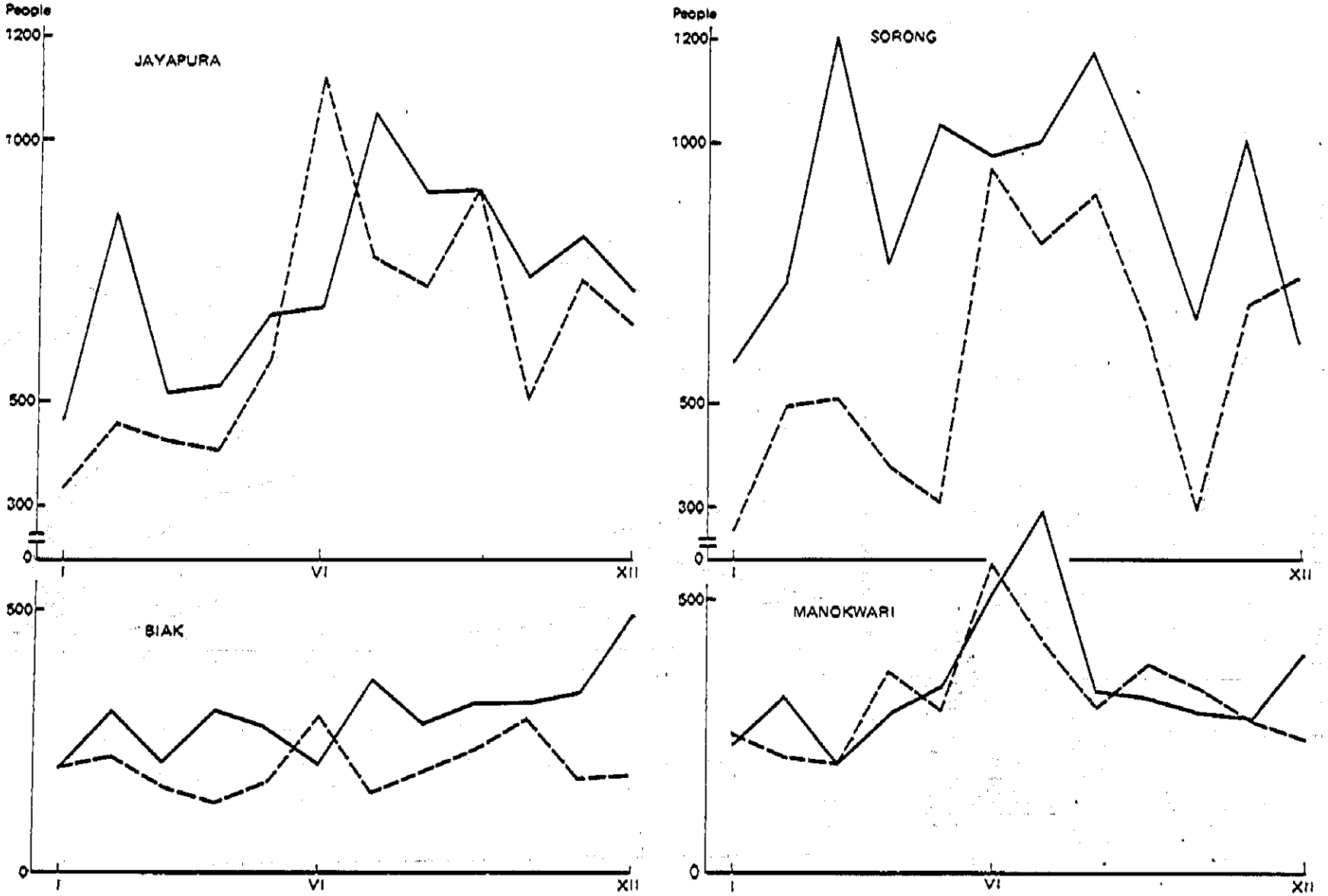


Fig. 3.1.9. Fluctuation of Passenger flows by Month



3.1.3. Shipping Activities in the Study Area

1) Sea Transportation Net Work in the Study Area

As the Republic of Indonesia is composed of many islands, sea transportation plays an extremely important role, especially in the freight transportation system.

In the study area of Irian Jaya and a part of Maluku, there are many shipping routes which can be divided into the following categories:

(i) For general cargo; Interisland Ship (Regular Liner Service, PLS), Pioneer Ship (Perintis), Local Ship and People Ship for domestic trade and Singapore route for foreign trade.

(ii) For special cargo: Tramper route

Mineral oil, logs and timber, fishery products, estate crop products, mining and exploiting equipment and others.

However, most of the shipment of the special cargoes is related to the industrial sectors, which provide their own port facilities in general. Therefore, it is only the shipping routes for general cargo, especially RLS and Perintis, that need to be reviewed for making clear the present situation of sea traffic in the study area. Their operations seem very reliable and efficient under the supervision of Directorate General of Sea Communications (DGSC) and, therefore, vital role for passenger and cargo flow in the area.

(1) Regular Liner Service (RLS)

In Indonesia, main domestic shipping routes are formed by RLS. DGSC has set up Susunan Trayek Pelayaran Nusantara Tetap dan Teratur (1979 – 1983) as a new system of RLS for sea transportation of passenger and cargo in Indonesia.

According to this system, there are three groups of shipping routes; 47 N-routes, 7 P-routes and 20 S-routes. N-routes are the main domestic routes and divided into two sub-groups; 23 for the western region and 24 for the eastern region. P-routes are for special shipping such as for passenger only, coconut's cooking oil, fuel, asphalt and so on. S-routes are shipping routes connected to Singapore.

In the study area, there are 14 routes as shown in Table 3.1.20. and Fig. 3.1.10 (1) and 3.1.10 (2), where the figures in parenthesis show the number of shipping services available per year.

Table 3.1.20. RLS Shipping Routes in the Study Area

Route No. (Frequency)	Calling Ports	Remarks
N-26 (62)	TANJUNG PRIOK – (Surabaya) – (Ujung Pandang) – Parepare/Donggala/ Pantoloan) – BITUNG – (Ternate dsk) – (Siau dsk) – (Tahuna dsk) – (Bitung) – (Manado) – (Tolitoli) – (Donggala) – Ujung Pandang) – (Surabaya) – TANJUNG PRIOK	
N-28 (15)	TANJUNG PRIOK – UJUNG PANDANG – (Ambon) – (Sorong) – (Manokwari) – BIAK – JAYAPURA – (Biak) – (Manokwari) – (Sorong) – (Ambon) – Kendari dsk) – (Ujung Pandang) – (Surabaya) – TANJUNG PRIOK	
N-36 (50)	SURABAYA DSK – (Ujung Pandang) – (Pare Pare) – (Donggala) – BITUNG – (Siau dsk) – (Tahuna dsk) – (Ternate dsk) – (Bitung) – (Manado dsk) – (Tolitoli) – (Donggala) – (Ujung Pandang) – SURABAYA DSK	
N-43 (43)	SURABAYA DSK – (Tual) – AMBON DSK – TERNATE DSK – (Baubau/Selayar) – (Ujung Pandang) – SURABAYA DSK	
N-44 (7)	SURABAYA – UJUNG PANDANG – (Cattle Ports) – (Ambon dsk) – SORONG – MANOKWARI – BIAK – JAYAPURA – (Biak) – (Sorong) – (Kendari dsk/Baubau) – UJUNG PANDANG –SURABAYA	
N-45 (8)	SURABAYA DSK – UJUNG PANDANG – (Ambon) – (Sorong) – (Fak-Fak) – MERAUKE DSK – AGATS – (Ambon) – (Ujung Pandang) – (Cattle Ports) – SURABAYA DSK	
N-46 (–)	UJUNG PANDANG – JAYAPURA – SORONG – UJUNG PANDANG	
N-47 (–)	UJUNG PANDANG – (Ambon) – FAK-FAK – MERAUKE DSK – (Agats) – UJUNG PANDANG	
P-4 (1)	TANJUNG PRIOK – SURABAYA – UJUNG PANDANG – DONGGALA – (Tolitoli)– BITUNG – TERNATE DSK – (Bitung) – (Manado) – (Tolitoli) – DONGGALA – UJUNG PANDANG – SURABAYA – TANJUNG PRIOK	Cargo/ Passenger
P-5 (15)	TANJUNG PRIOK – SURABAYA/UJUNG PANDANG – AMBON – SORONG – BIAK – JAYAPURA – (Manokwari) – (Sorong) – (Ambon) – (Baubau) – UJUNG PANDANG – (Surabaya) – TANJUNG PRIOK	Cargo/ Passenger
P-6 (22)	SURABAYA – UJUNG PANDANG – (Teluk Bone dsk) – (Kendari dsk/ Luwuk dsk/Banggai dsk) – (Posso dsk/Parigi dsk/Gorontalo dsk) – BITUNG – (Sangir Talaud dsk) – TERNATE DSK – BITUNG – (Balikpapan) – (Tolitoli dsk/Donggala dsk/Parepare dsk) – (Ujung Pandang) – SURABAYA	Fuel distribution
P-7 (11)	BANABUNGI/BAUBAU – ALL PORTS IN INDONESIA – BANABUNGI/ BAUBAU	Asphalt transportation
S-18 (4)	JAYAPURA – (Biak) – (Sorong) – (Fak-Fak) – (Ambon) – (Ternate) – (Bitung) – (Parepare) – UJUNG PANDANG – SINGAPURA – (Tanjung Priok) – (Ujung Pandang) – (Ambon) – SORONG – (Manokwari) – (Biak) – JAYAPURA	
S-20 (–)	SORONG – SINGAPURA – SORONG	

Source: DGSC/Susunan Trayek Pelayaran Nusantara Tetap dan Teratur (1979 – 1983), July 1979.

Notes: 1. The figures in parenthesis show the annual frequencies.
2. DSK – dan sekitarnya = and its vicinity.
3. ( ) show an irregular calling port.

Fig. 3.1.10. (1) RLS Shipping Routes in the Study Area
(N-Routes)

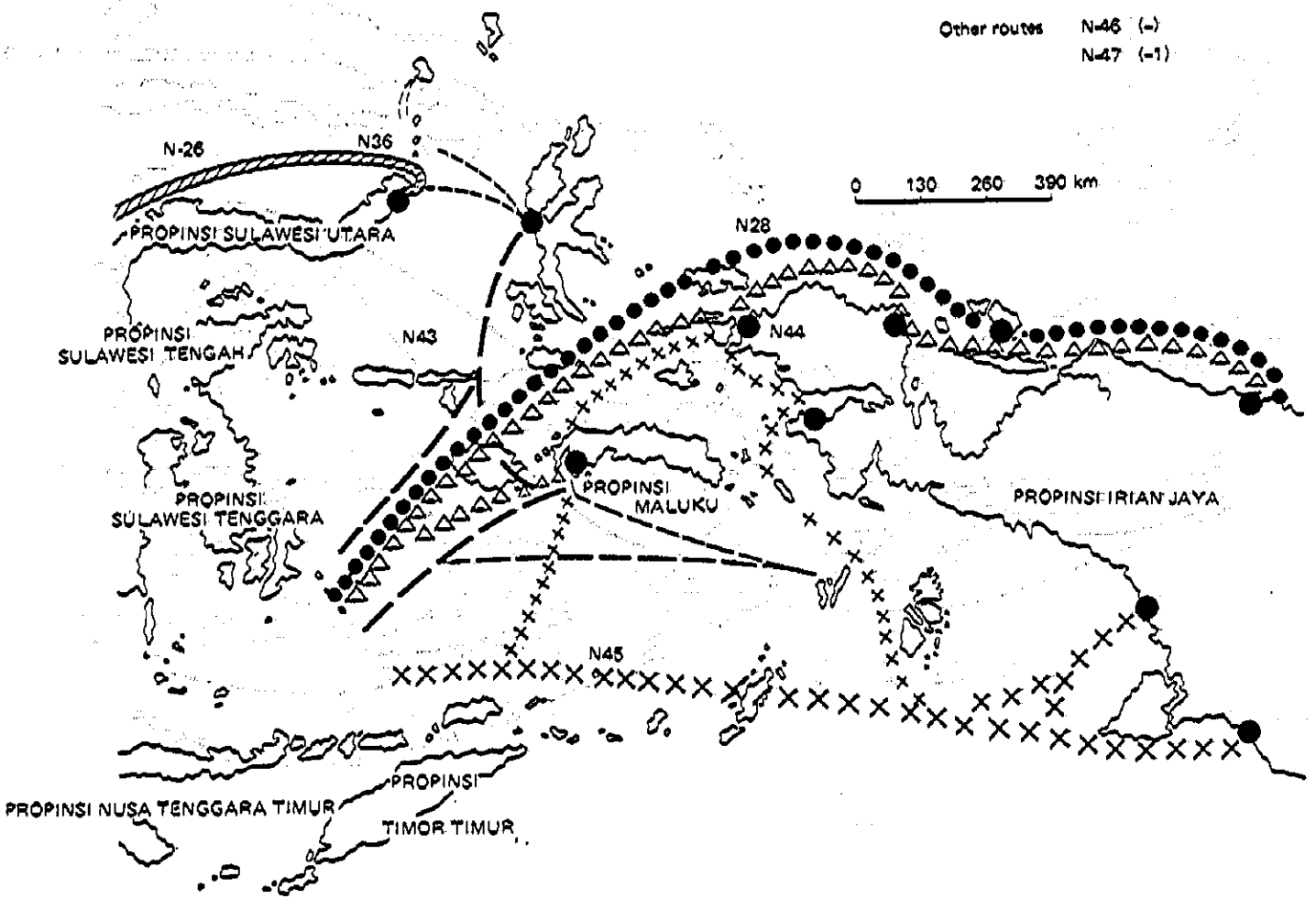
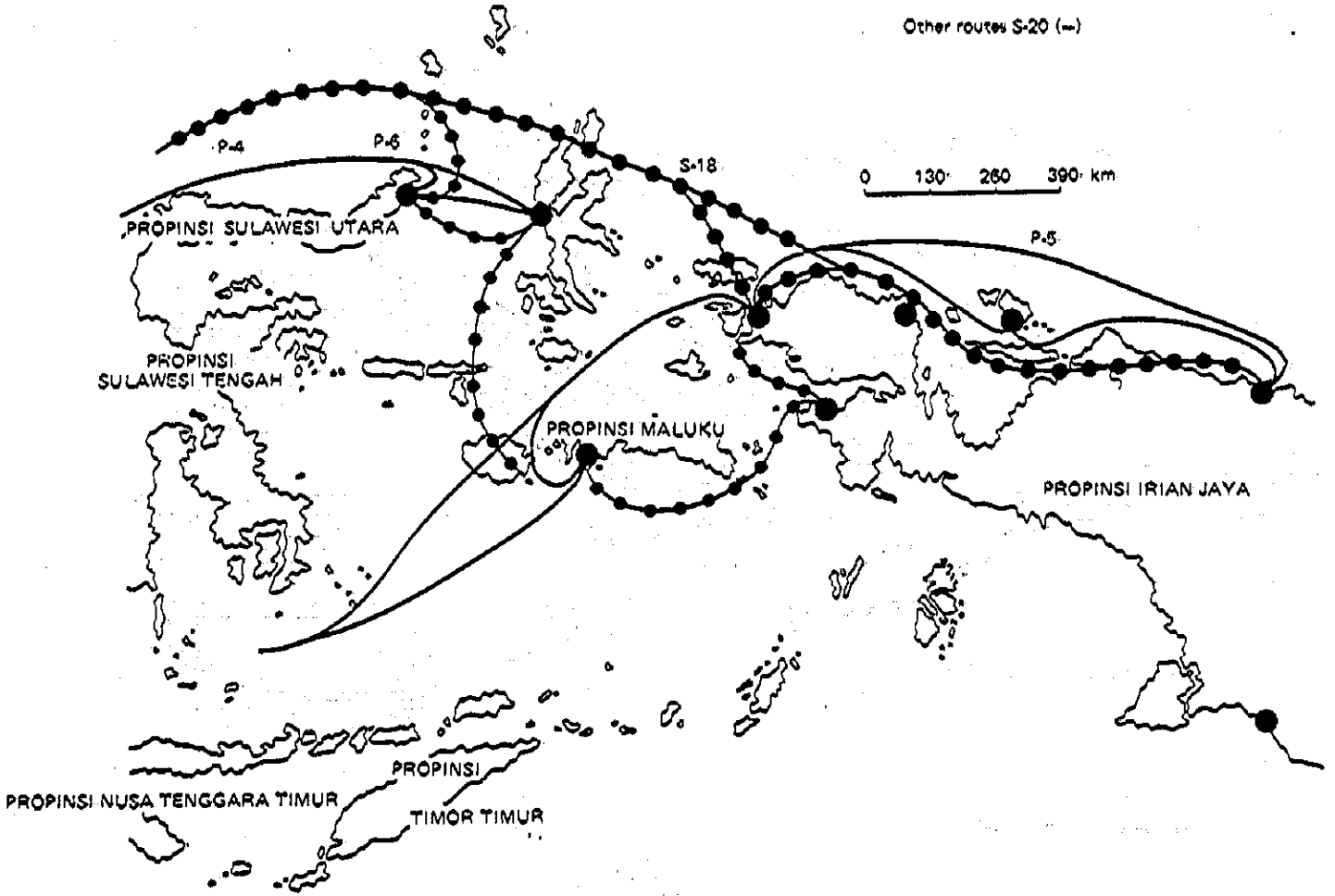


Fig. 3.1.10. (2) RLS Shipping Routes in the Study Area
(P and S -- Routes)



(2) Perintis

In Indonesia, domestic shipping consist of main inter-island shipping and feeder shipping. The former is provided by RLS and the latter by three types of local shipping: Pioneer (Perintis), Local ship and People ship.

In rural areas far from Jawa, it is often difficult for private enterprises to successfully do business because of sparse and irregular cargo. Therefore, DGSC established the Pioneer (Perintis) shipping system several years ago to promote socio-economic development in rural areas, and it now has 32 routes.

Among these routes, there are 12 routes in the study area, which are shown in Table 3.1.21. and Fig. 3.1.11.(1) and 3.1.11.(2).

Table 3.1.21. Perintis Shipping Routes in the Study Area

(1) MALUKU

No.	Base Port	Distance	Route
21.	AMBON	1,561 mile, clockwise and counter-clockwise from TEPA	Ambon –132– Banda –197– Tual –225– Kroing –32– Tepa –45– Lelang –55– Lakor –20– Moa –20– Leti –36– Kisar –48– Ilwaki –70– Romang –76– Damar –81– Tepa –93– Tual –197– Banda –132– Ambon
22.	AMBON	1,303 mile, clockwise and counter-clockwise from TUAL	Ambon –132– Banda –197– Tual –26– Elat –109– Dobo –176– Larat –127– Saumlaki –207– Tual –197– Banda –132– Ambon
23.	AMBON	707 mile, clockwise and counter-clockwise	Ambon –80– Namlea –95– Taniwel –60– Sawai –28– Wahai –75– Bula –87– Kataloka –20– Amar –37– Geser –66– Werinama –28– Tahoru –56– Amahai –75– Ambon
24.	AMBON	1,773 mile	Ambon –111– Leksula –90– Namlea –57– Airbuaya –66– Sanana –159– Bobong –87– Dofa –142– Laibui –57– Laboha –45– Kayoa –40– Tidora –10– Tarnate –10– Tidora –40– Kayoa –45– Labuha –57– Laiwui –115– Sanana –72– Dofa –87– Bobong –159– Sanana –66– Airbuaya –57– Namlea –90– Lakrula –111– Ambon
25.	AMBON	2,136 mile	Ambon –80– Namlea –110– Sanana –115– Laiwui –57– Labuha –45– Kayoa –40– Tidore/ Gota –10– Ternate –59– Kedi –64– Daruba –50– Bare Bare –65– Galela –15– Tobelo –60– Pare Pare –50– Dorube –120– Ternate –10– Tidore/Gota –75– Suketa –40– Gane –94– Mafa –30– Weda –55– Patani –72– Bicoli –23– Buli –100– Sanefi –230– Tidore/Gota –10– Ternate –10– Tidore/Gota –40– Kayoa –45– Labuha –57– Laiwui –115– Sanana –110– Namlea –80– Ambon

(2) IRIAN JAYA

No.	Base Port	Distance	Route
26.	SORONG	round trip 4,615 mile	Sorong –320– Ternate –157– Bitung –157– Ternate –320– Sorong –236– Bintuni –75– Kokas –90– Fak-Fak –182– Kaimana –140– Tual –305– Kokonao –122– Agats –213– Bado –386– Merauke
27.	SORONG	round trip 2,138 mile	Sorong –66– Sausapor –164– Manokwari –180– Nabire –100– Serui –120– Biak –120– Serui –180– Sarmi –139– Jayapura
28.	SORONG	round trip 2,560 mile	Jayapura –317– Serui –120– Biak –129– Manokwari –237– Sorong –320– Ternate –157– Bitung
29.	JAYAPURA	1,968 mile	Jayapura –139– Sarmi –18– Serui –180– Nabire –161– Biak –161– Nabire –100– Serui –180– Sarmi –18– Wakde (Fac) –84– Demta (Fac) –45– Jayapura
30.	JAYAPURA	1,566 mile	Jayapura –317– Serui –120– Biak –161– Nabire –180– Manokwari –180– Nabire –161– Biak –120– Serui –180– Sarmi –18– Wakde (Fac) –84– Demta (Fac) –45– Jayapura
31.	JAYAPURA	2,568 mile	Jayapura –139– Sermi –180– Serui –120– Biak –45– Korido –30– Yenggarbun –45– Kamare –50– Manokwari –50– Kamare –45– Yenggarbus –30– Korido –45– Biak –161– Nabire –161– Biak –120– Serui –65– Waren –63– Napan –25– Nabire –110– Wasier –26– Windesi –55– Ransiki –16– Oransbari –35– Manokwari –35– Oranabari –16– Ranoiki –55– Windesi –25– Wasior –110– Nabire –25– Napan –63– Waren –65– Serui –120– Biak –120– Serui –180– Sarmi –139– Jayapura
32.	MERAUKE		Merauke –386– Bade – – Ganteniiri – – Tanah Merah – – Bade – – Kepi – – Yauaskor – – Agats –213– Bade –334– Merauke

Fig. 3.1.11. (1) Perintis Routes in Maluku
(Base Port: Ambon)

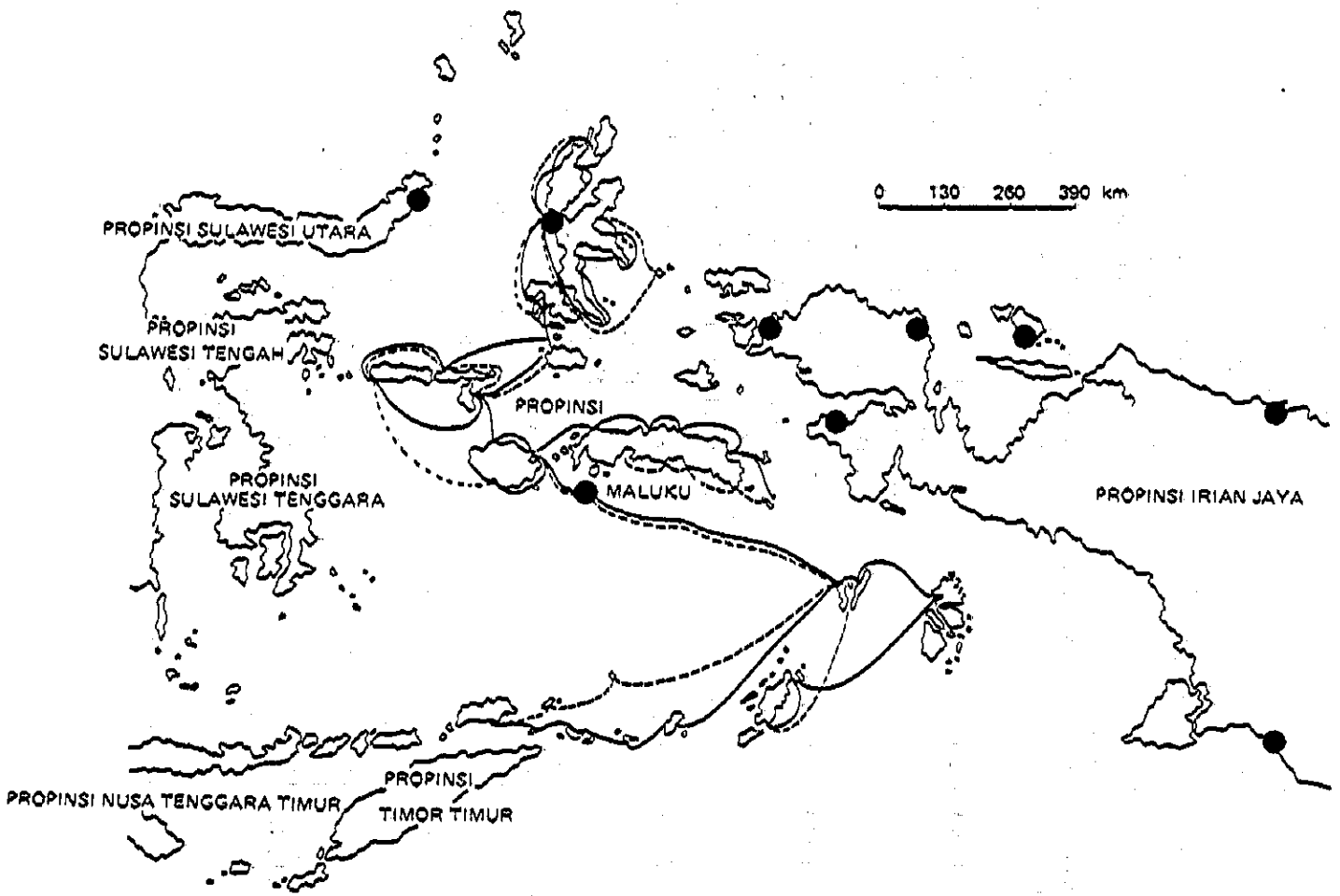
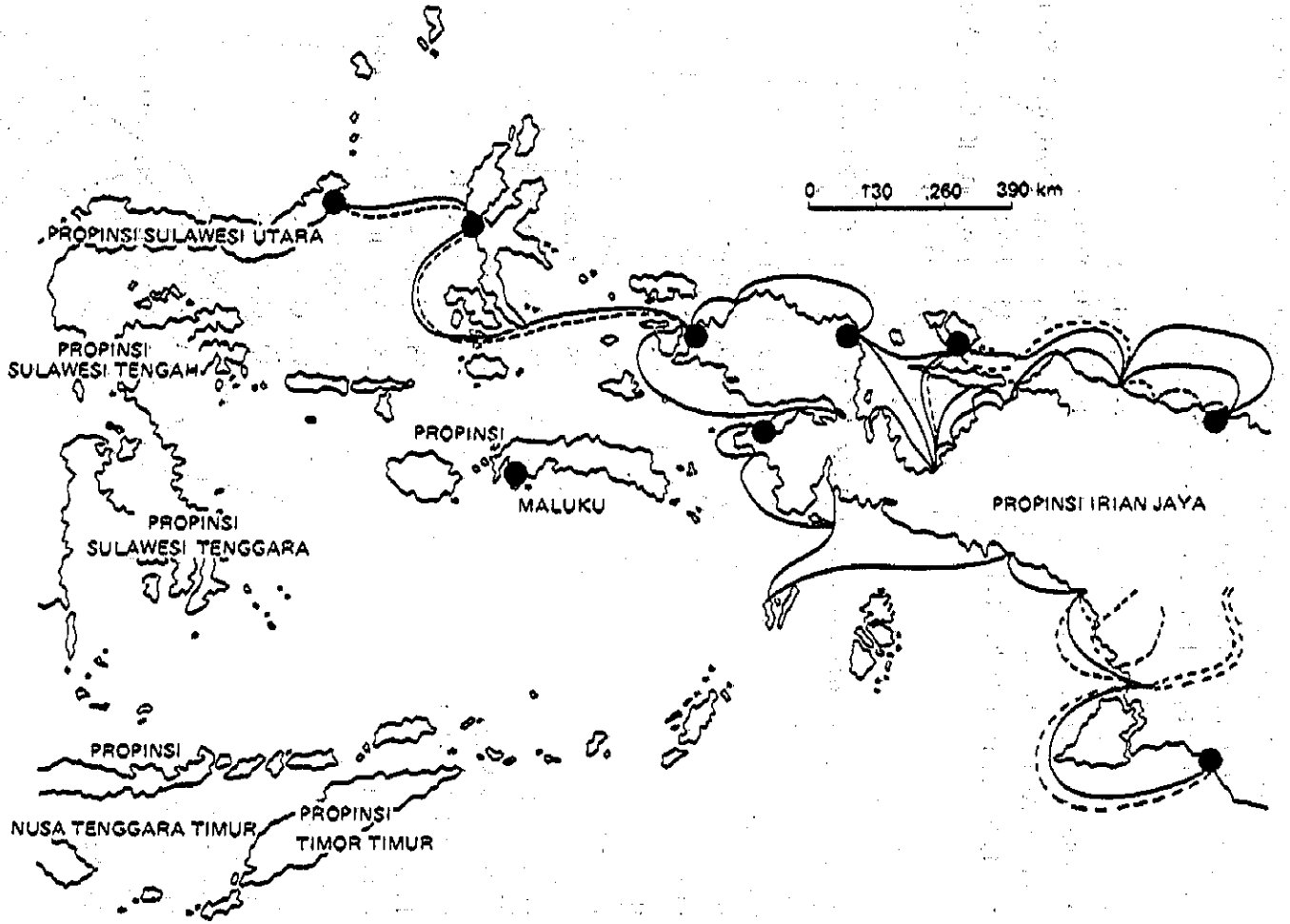


Fig. 3.1.11. (2) Perintis Routes in Irian Jaya
(Base Port: Jayapura, Sorong, Merauke)



2) Interregional Cargo Flow in the Study Area

(1) Available Data

In order to clarify cargo flow in the study area, the Angkutan Laut Barang – Minyak Bumi, Antar Pulau Pahun 1977, which is the newest data on origin/destination of cargo in Indonesia, was reviewed.

Directorate General of Sea Communications (DGSC) divides the whole country into 50 regions (Fig. 3.1.12.) and also classifies cargo into 35 commodities.

There are 19 ports called by RSL vessels in the study area:

(KANWIL VIII)

Region 40: Tobello, Ternate, Labuha
41: Namlea, Ambon, Gesar
42: Banda Naira, Tual, Dobo, Tolehu

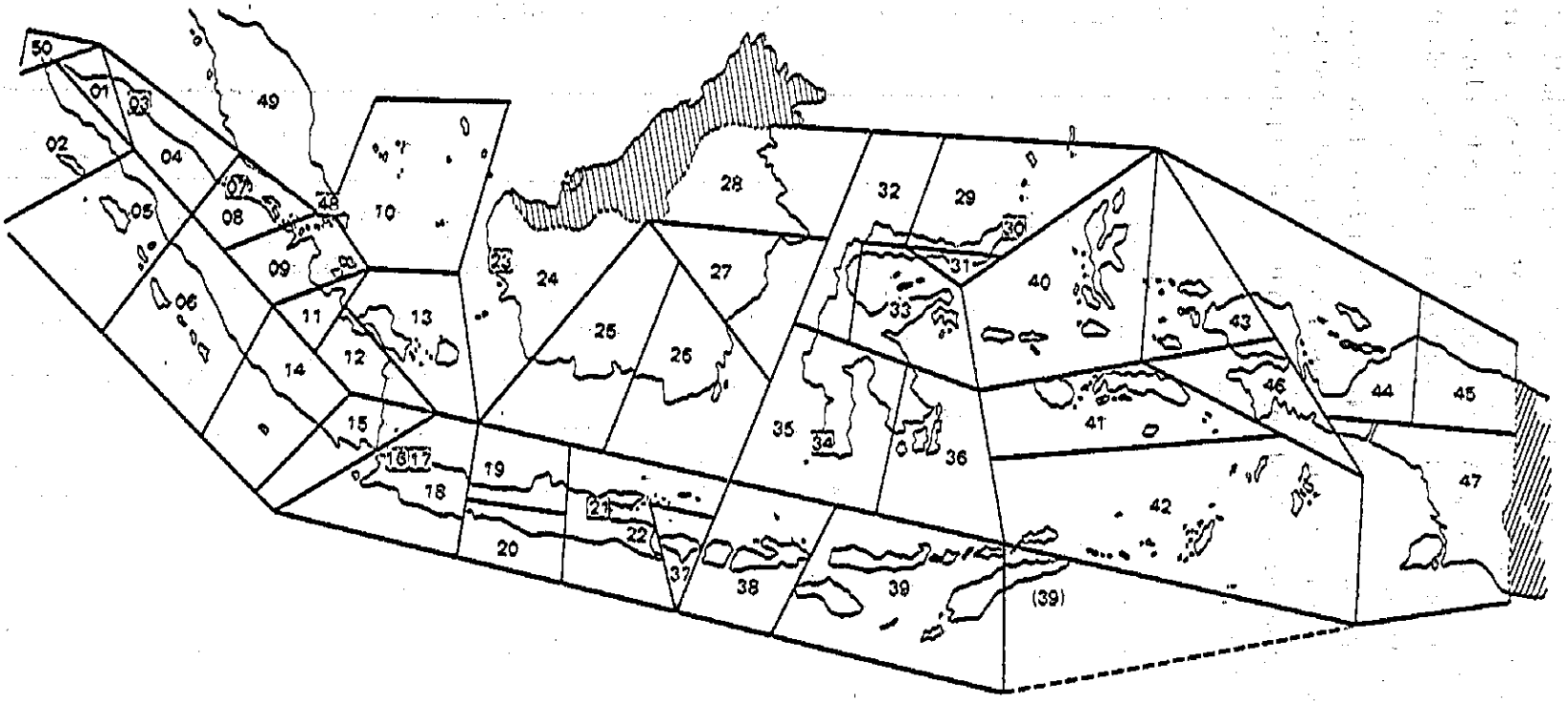
(KANWIL IX)

Region 43: Sorong
44: Manokwari, Biak, Serui
45: Jayapura
46: Fak-Fak, Kaimana, Kokonau
47: Merauke

The following classification of cargo is adopted by DGSC for cargo flow study.

1. Livestock
2. Meat
3. Fish
4. Rice
5. Wheat Flour
6. Sugar
7. Maize
8. Coffee/Tea/Spices
9. Cigarette/Tobacco
10. Fooder
11. Other food
12. Copra
13. Cooking Oil
14. Other oil
15. Fertilizer
16. Other chemicals
17. Rubber
18. Timber
19. Paper
20. Leather
21. Textile
22. Salt
23. Cement
24. Other nonmetals
25. Precious goods
26. Steel
27. Other metals
28. Machineries
29. Other miscellaneous goods
30. Asphalt
31. Others
32. Crude oil
33. Gasoline
34. Kerosine
35. Other refinery products

Fig. 3.1.12. Statistical Maritime Regions in Indonesia



01 ACEH I
02 ACEH II
03 BELAWAN
04 SUMATRA UTARA I
05 SUMATRA UTARA II
06 SUMATRA BARAT
07 DUMAI
08 RIAU DARATAN I
09 RIAU DARATAN II
10 RIAU KEPULAUAN
11 JAMBI
12 SUMATRA SELATAN I
13 SUMATRA SELATAN II
14 BENGKULU
15 LAMPUNG
16 DKI JAYA I
17 DKI JAYA II
18 JAWA BARAT
19 JAWA TENGAH I
20 JAWA TENGAH II
21 SURABAYA
22 JAWA TIMUR
23 PONTIANAK
24 KALIMANTAN BARAT
25 KALIMANTAN TENGAH
26 KALIMANTAN SELATAN
27 KALIMANTAN TIMUR I
28 KALIMANTAN TIMUR II
29 SULAWESI UTARA I
30 BITUNG
31 SULAWESI UTARA II
32 SULAWESI TENGAH I
33 SULAWESI TENGAH II
34 UJUNG PANDANG
35 SULAWESI SELATAN
36 SULAWESI TENGGARA
37 BALI
38 NUSA TENGGARA BARAT
39 NUSA TENGGARA TIMUR
40 MALUKU UTARA
41 MALUKU TENGAH
42 MALUKU SELATAN
43 IRIAN JAYA UTARA I
44 IRIAN JAYA UTARA II
45 IRIAN JAYA UTARA III
46 IRIAN JAYA SELATAN I
47 IRIAN JAYA SELATAN II
48 SINGAPORE
49 WEST MALAYSIA
50 SABANG

(2) Cargo Flow in the Study Area

Table 3.1.22. shows the inter-regional cargo flow by RLS in 1977. It can be seen in this table that there is a little cargo flow between Maluku and Irian Jaya. In 1977, the cargoes from Maluku to Irian Jaya amounted only to 99.4 tons, and from Irian Jaya to Maluku 128.8 tons. The amounts of arriving cargoes from all regions at two provinces are 69,242.2 tons in Irian Jaya and 152,769.6 tons in Maluku. Consequently, their shares in the total arriving cargoes are only 0.2 percent in Irian Jaya and 0.1 percent in Maluku.

Table 3.1.23. shows the intra-regional cargo flow by Perintis in Irian Jaya. There were 4 Perintis routes in Irian Jaya in 1978 and three of them were based at Sorong and one at Biak. As is seen in this table there was an active intra-regional cargo flow in the northern part of Irian Jaya, but scarecely any in the southern part.

Table 3.1.22. Inter-regional Cargo Flow in the Study Area by RLS (1977)

(Tons)

From \ To	16	21	30	34	40	41	42	43	44	45	46	47	Other Regions	Total Indonesia
16 Tg. Priok	5,577.8	2,919.6	27,709.5	84,308.0	5,316.8	7,491.4	1.6	4,024.8	1,600.0	6,486.4	17.4	15.6	425,375.7	570,844.6
21 Surabaya	443.7	1,781.8	42,089.9	87,167.8	14,121.5	20,449.8	1,650.3	2,563.7	1,446.1	3,105.0	994.9	1,831.6	905,539.7	1,083,185.8
30 Bitung	29,665.8	16,128.2	2,179.0	1,938.3	10,690.8	66.0	8.0	72.5	9.8	23.1			41,454.9	102,236.4
34 Ug. Pandang	13,135.2	53,382.2	32,749.1	1,704.9	6,401.4	17,370.1	742.9	3,717.5	3,669.3	4,027.6	676.7	2,189.1	158,984.6	298,750.6
40 North Maluku	8,381.2	31,023.3	108.6	271.1	22,733.5	611.8	16.2	20.3	0.2	4.9	1.4		1,625.0	64,797.5
41 Central Maluku	125.5	10,950.7		315.0	2,610.3	1,853.1	7,510.8	32.4	21.1	7.3	5.3	6.4	399.6	23,837.5
42 South Maluku	0	559.3		94.4	0.1	59.3	1.3				0.1		100.0	814.5
43 Sorong	30.2	100.8	215.7	357.6	75.9	8.8		1,261.1	473.8	91.5	1,505.1	126.1	553.4	4,800.0
44 North Irian Jaya II	9.7	224.2	3.2	295.0	5.8	1.5		547.9	5,988.9	301.4	10.9	0.4	4,974.4	12,363.3
45 Jayapura													0.9	0.9
46 South Irian Jaya		120.0		740.7		9.1	27.7	18.8	722.5	1.6	803.9	7.2	1.3	2,452.8
47 Merauke														
Other Regions	486,901.7	841,677.8	36,032.0	50,775.5	5,258.1	24,619.9	3,055.8	13,747.5	47.0	1,871.9	32.8	5,111.4	3,810,955.8	5,280,087.2
Total Indonesia	544,270.8	958,867.9	141,087.0	227,968.3	67,214.2	72,540.8	13,014.6	26,006.5	13,978.7	15,920.7	4,048.5	9,287.8	5,349,965.3	7,444,171.1

Source: DGSC/Angkutan Laut Barang – Minyak Bumi, Antar Pulau Tahun 1977

Note: North Maluku/Tobello, Ternate, Labuha. Central Maluku/Namlea, Ambon, Gesar. South Maluku/Banda Naira, Tual, Dobo, Telehu.
North Irian Jaya I/Manokwari, Biak, Serui. South Irian Jaya I/Fak-Fak, Kaimana, Kokonau.

Table 3.1.23. Intra-regional Cargo Flow by Perintis (1978/79)

(Tons)

From \ To		I		IX	VIII		II	III	IV		(III)	V				VI			Maluku		Slawesi	Total
		Jayap	Sarmi	Nabire	Waren	Serui	Biak	Manok	Saosap	Sorong	Bintuni	Kokas	Fak-Fak	Kai-mana	Koko-nao	Agats	Bade	Mera-uke	Tual	Ter-nate	Bitung	
I	Jayapura	31.5	84.2	114.9		67.2	308.9	49.6		49.2											1.0	706.5
	Sarmi	78.6				2.0		1.2	2.0	13.9												97.7
IX	Nabire	19.7	3.6				30.1			4.2												57.6
VIII	Waren																					
	Serui	6.7		1.0																		7.7
II	Biak	0.2	2.0	490.5		191.4		132.7		128.0			200.0					920.0				2,064.8
III	Manokwari	4.8	19.5	5.0	14.8	12.8	254.7			50.8												362.4
IV	Saosapor																					
	Sorong	35.0	7.0	7.0		135.0	1,112.6	16.0			248.1	2.0	4,449.8	15.6		103.7		957.5	1.0	9.9	396.4	7,496.6
(III)	Bintuni																					
V	Kokas																					
	Fak-Fak									30.6				187.6	55.3			48.2	3.0			324.7
	Kaimana									154.4			62.2					57.3				275.9
	Kokonao																					
VI	Agats																					
	Bade																	148.6				148.6
	Merauke									44.9			20.5			271.4	710.9	133.3				1,181.0
M	Tual																					
	Ternate																				6.0	6.0
S	Bitung	35.1					54.5	34.2		211.1												334.9
Total		211.6	116.3	618.4	14.8	408.4	1,760.8	233.7	2.0	687.1	248.1	2.0	4,732.5	203.2	55.3	375.1	710.9	2,264.9	4.0	9.9	403.4	13,062.4

Source: DGSC/Laporan Tahunan Pengoperasian Armada Perintis (1978/1979)

Note: 1. I, II, . . . IX show the number of Kabupaten.

2. M: Maluku, S: Slawesi

3.2. Land Transportation

3.2.1. Length and Density of Roads in Indonesia

The situation of road development in Indonesia differs greatly by province. In Jawa and Madura, the roads are comparatively well developed, while in other provinces the roads are well developed only within city area, and there are scarcely any inter-city roadways.

As to the situation of road development by province, comparatively high road densities are seen in Jawa and Madura, followed by Sumatra.

As for Irian Jaya and Maluku, the road density remains at the lowest level of 0.3 km/100 km^2 in Irian Jaya and 2.4 km/100 km^2 in Maluku.

During the past 5 years, from 1973 up to 1978, additional roads were constructed in each province. The total length of roads was extended from 97,996 km in 1973 to 127,089 km in 1978. The average increase was about 5,820 km per year.

In Irian Jaya, the roads are developed each year. The length increased from 1,066 km in 1973 to 1,138 km in 1978. The average increase was only 14.4 km per year. In Maluku, it was 994 km in 1973, and 1,806 km in 1978. The average increase was 162.4 km a year.

3.2.2. Type and Condition of Road

The road condition in Indonesia is also not particularly good except in Jawa, Madura and Sumatra.

Paved road forms about 43 percent of total length of roads in Indonesia, only 22.9 percent of the whole network belong to the category "Good." This ratio is different for each province. The highest percent is seen in Jawa and Madura, but the share of paved roads is only 11.5 percent in Irian Jaya and 47.5 percent in Maluku. As for the road condition, "Good" category forms only 8.3 percent in Irian Jaya and 14.7 percent in Maluku.

Fig. 3.2.1. is a road map of Irian Jaya and Maluku. As can be seen in this map, there are some inter-city roads in Maluku, but scarecely any in Irian Jaya.

Table 3.2.1. Length and Density of Road in Indonesia

Province	Area (km^2)	Length of Road (km)		Density of Road ($km/100\ km^2$)	
		1973	1978	1973	1978
1. D.I. Aceh	55,392	5,748	6,277	10.4	11.3
2. North Sumatra	70,787	7,332	9,778	10.4	13.8
3. West Sumatra	49,778	5,325	5,383	10.7	10.8
4. Riau	94,562	2,188	2,903	2.3	3.1
5. Jambi	44,924	1,392	3,039	3.1	6.8
6. South Sumatra	103,688	8,157	10,428	6.5	8.4
7. Bengkulu	21,168				
8. Lampung	33,307	2,087	2,405	6.3	7.2
9. D.K.I. Jakarta	588	3,101	2,990	527.4	508.5
10. West Java	45,917	8,851	11,917	19.3	26.0
11. Middle Java	32,037	11,146	11,972	34.8	37.4
12. Yogyakarta	3,193	1,810	1,860	56.7	58.3
13. East Java	47,922	10,104	12,096	21.1	25.2
14. West Kalimantan	146,760	2,027	3,565	1.4	2.4
15. Middle Kalimantan	152,600	414	2,230	0.3	1.5
16. South Kalimantan	37,600	2,418	2,733	6.4	7.3
17. East Kalimantan	202,440	983	1,197	0.6	0.6
18. North Sulawesi	19,023	3,332	4,179	17.5	22.0
19. Middle Sulawesi	69,726	2,726	4,739	3.9	6.8
20. South Sulawesi	72,761	6,498	8,903	8.9	12.2
21. South East Sulawesi	27,686	2,056	2,640	7.4	9.5
22. Bali	5,561	1,744	2,344	31.4	42.2
23. West Nusatenggara	20,177	1,852	2,635	9.2	13.1
24. East Nusatenggara	47,876	4,645	7,934	9.7	16.6
25. Maluku	74,505	994	1,806	1.3	2.4
26. Irian Jaya	421,981	1,066	1,138	0.3	0.3
INDONESIA	1,902,019	97,996	127,089	5.2	6.7

Source: CBS/Statistic Indonesia (1977 – 1978)

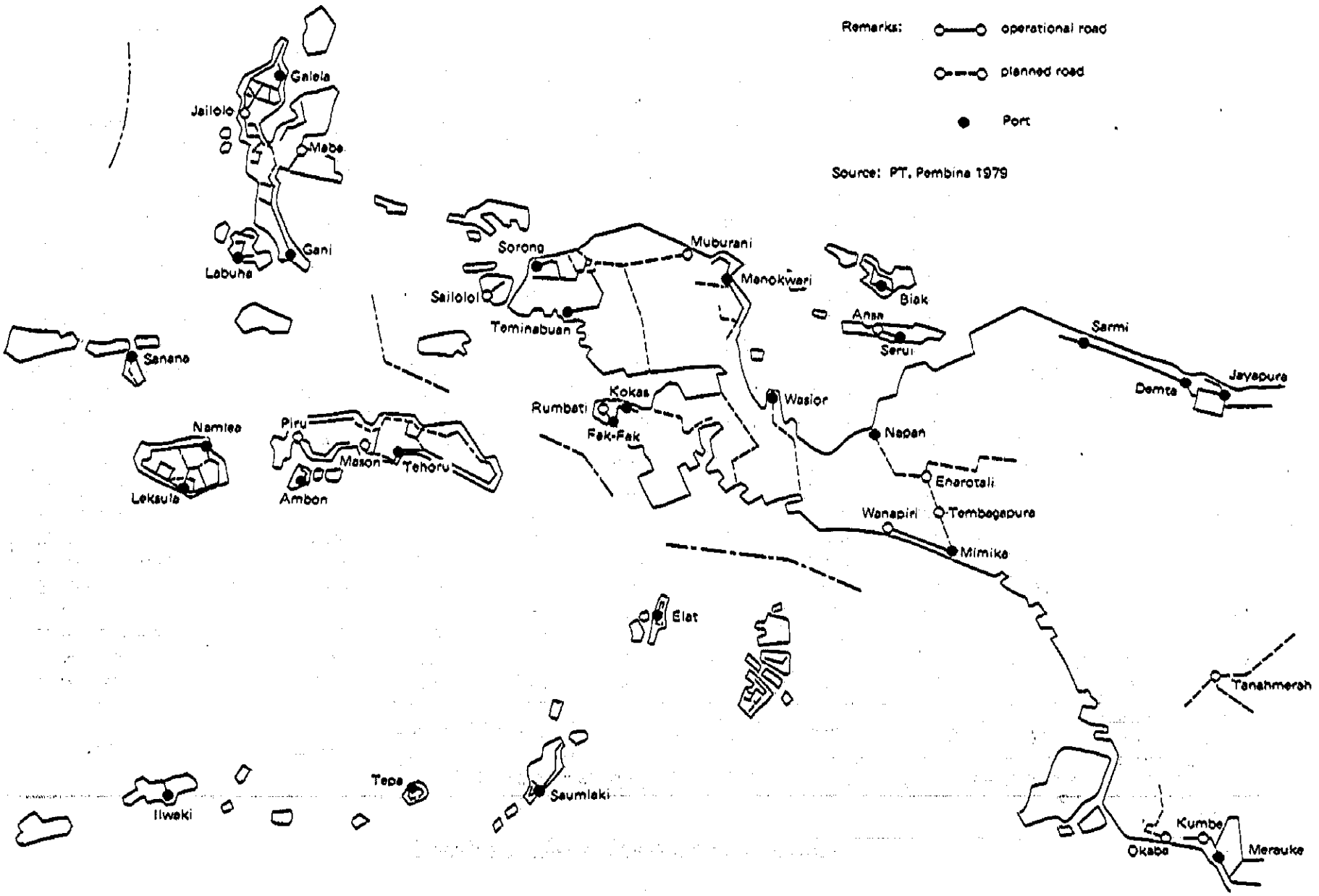
Table 3.2.2. Type and Condition of Road (1978)

(Km)

Province	Total	Type of Surface				Road Condition				
		Asphalt	Gravel	Earth	Un-specified	Good	Moderate	Damage	Heavy damage	Un-specified
1. D. I. Aceh	6,277	764	1,443	3,676	394	402	1,326	2,681	1,868	–
2. North Sumatra	9,778	3,932	2,310	2,410	1,126	2,126	2,785	2,275	1,683	500
3. West Sumatra	5,383	2,029	1,614	1,740	–	747	1,889	2,037	701	9
4. Riau	2,903	352	688	1,538	325	619	861	702	704	17
5. Jambi	3,039	759	1,221	990	69	635	1,605	394	405	–
6. South Sumatra	7,679	3,281	736	2,634	1,028	2,458	2,976	1,470	775	–
7. Bengkulu	2,749	704	844	541	660	229	571	918	1,031	–
8. Lampung	2,405	1,304	384	717	–	198	1,293	524	390	–
9. D.K.I. Jakarta	2,990	2,374	197	257	162	2,432	290	190	78	–
10. West Java	11,917	6,876	1,190	3,838	13	1,684	3,850	1,953	4,427	3
11. Middle Java	11,972	8,259	1,234	2,298	181	4,271	3,882	1,922	1,897	–
12. Yogyakarta	1,860	753	294	450	363	497	355	271	737	–
13. East Java	12,096	8,508	2,221	972	395	4,160	4,239	1,975	1,666	56
14. West Kalimantan	3,565	1,556	113	1,424	472	447	996	808	869	445
15. Middle Kalimantan	2,230	486	104	1,488	152	90	686	534	462	458
16. South Kalimantan	2,733	898	1,106	637	92	293	1,041	767	532	100
17. East Kalimantan	1,197	759	104	317	17	239	461	284	211	2
18. North Kalimantan	4,179	1,693	434	1,114	938	803	1,444	372	1,560	–
19. Middle Sulawesi	4,737	675	921	1,523	1,618	860	1,212	580	2,085	–
20. South Sulawesi	8,903	2,356	2,271	3,407	875	2,454	2,513	2,338	1,402	196
21. South East Sulawesi	2,640	580	341	1,559	160	347	703	1,205	385	–
22. Bali	2,344	1,509	59	757	19	798	525	496	525	–
23. West Nusatenggara	2,635	1,343	283	775	234	672	504	890	569	–
24. East Nusatenggara	7,934	1,444	1,505	4,920	65	925	1,192	2,935	2,882	–
25. Maluku	1,806	857	32	450	467	266	348	811	381	–
26. Irian Jaya	1,138	131	112	861	34	94	160	147	727	10
INDONESIA	127,089	54,176	21,761	41,293	9,859	29,155	37,707	29,479	28,952	1,796

Source: CBS/Statistic Indonesia (1977 – 1978)

Fig. 3.2.1. Location of Roads in Irian Jaya and Maluku



3.3. Air Transportation

3.3.1. Number of Air Passengers in Indonesia

In Indonesia, air transportation has an important part in passenger traffic.

In 1978, domestic flights carried 4,151 thousand people, 600 thousand more than in 1977. From 1972 to 1978 the passengers carried by domestic flights increased at the high average annual growth rate of 24.2 percent (Table 3.3.1.).

In addition to passengers, the domestic flight carries personal baggage, mail and cargoes. But, the freight amounted only to 42,526 tons in the whole Indonesia.

Thus, the volume of air cargoes is too small to be included in the consideration of cargo traffic in general.

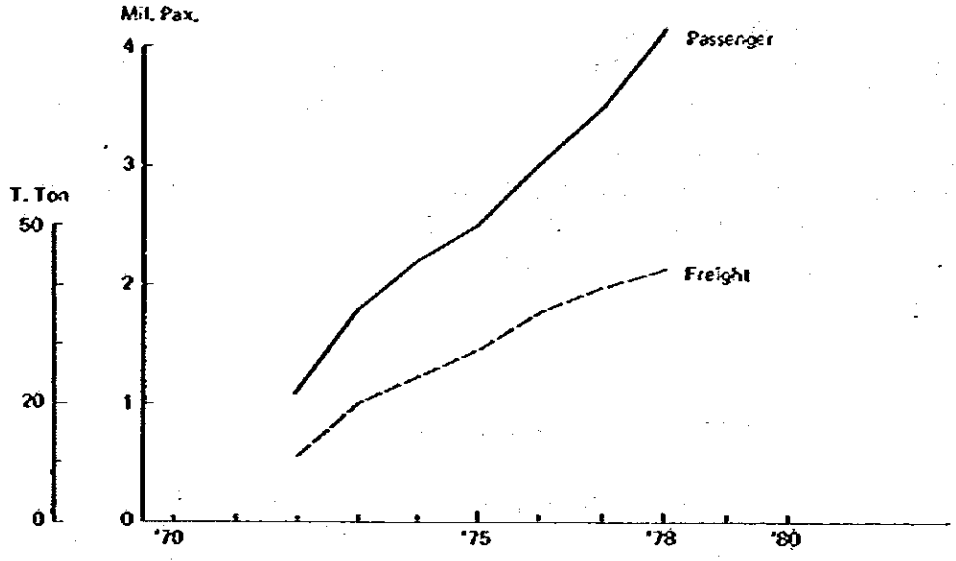
Table 3.3.1. Air Traffic in Indonesia

Year/Month	Passengers (people)			Freight (tons)	
	Departure	Arrival	Transit	Loaded	Unloaded
1972	1,129,226	1,122,597	245,562	11,177	10,111
1973	1,800,360	1,744,480	324,436	20,075	17,263
1974	2,534,205	2,143,563	336,668	23,608	20,286
1975	2,228,519	2,480,418	339,917	29,070	22,317
1976	3,032,730	2,902,139	374,001	35,075	27,295
1977	3,551,346	3,410,342	385,099	39,463	30,178
1978	4,150,610	3,908,825	398,457	42,526	32,522
January	359,742	359,985	45,026	3,350	3,113
February	300,051	284,227	34,181	3,213	2,517
March	292,675	286,242	34,054	3,628	3,010
April	317,328	311,178	29,412	3,803	2,734
May	319,533	301,799	27,411	3,715	2,710
June	829,910	304,546	29,293	3,631	2,732
July	368,588	338,003	34,687	3,675	2,889
August	400,637	366,085	36,468	3,886	3,042
September	414,338	378,091	32,934	3,351	2,461
October	331,287	313,158	29,536	3,667	2,432
November	347,407	323,373	33,656	3,390	2,671
December	369,114	342,138	31,799	3,217	2,211

Source: CBS/Indikator Economi, Maret 1980.

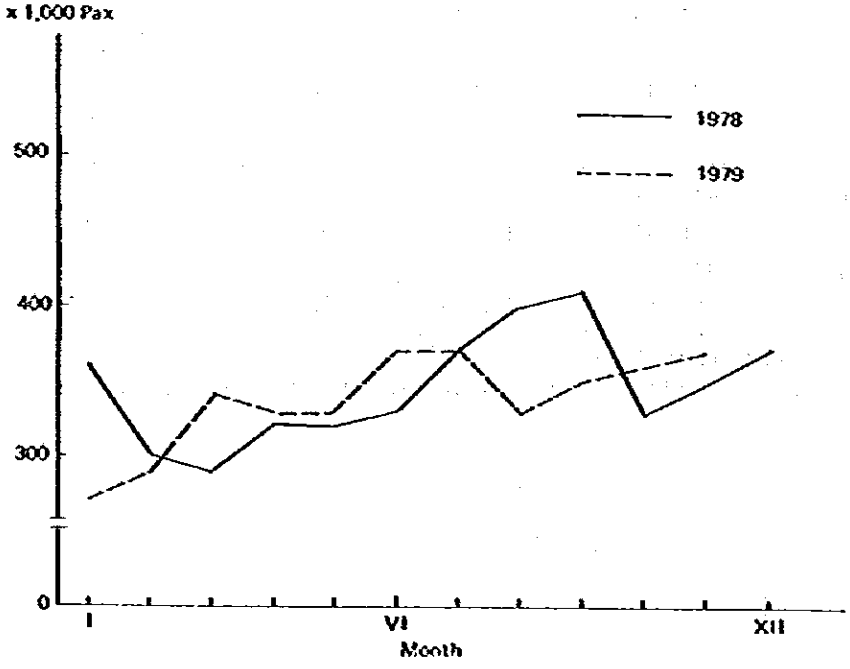
Note: Differences in figures of Departure and Arrival are due to incomplete reports from airports.

Fig. 3.3.1. Air Traffic in Indonesia



Speaking of the fluctuation of passenger flow by month in 1978, there were two peaks. One is from July to September and another is the Christmas and New Year time. This fluctuation pattern is the same as in the passenger flow of sea transportation. For some reason, peaks cannot be distinguished clearly in 1979.

Fig. 3.3.2. Passenger Traffic by Month



3.3.2. Number of Passengers by Province

Table 3.3.2. shows the number of passengers by province in 1978.

Traffic to and from Jawa and Madura accounts for a big part of the passenger flow. It occupies more than 50 percent of the traffic of whole Indonesia. The second is Sumatra which takes about 16 percent of the sum total of passenger flow while Sulawesi is frequented by many transit passengers. Passengers to and from Irian Jaya and Maluku are only a little over 1 percent at the most.

Table 3.3.2. Domestic Air Traffic by Province (1978)

(People, %)

	Departure	Arrival	Transit
Jawa and Madura	2,199,994 (53.01)	2,008,008 (51.4)	54,476 (13.7)
Sumatra	658,786 (15.9)	650,361 (16.6)	79,503 (20.0)
Kalimantan	481,174 (11.6)	472,904 (12.1)	81,147 (20.4)
Sulawesi	362,283 (8.7)	358,201 (9.2)	104,934 (26.3)
Bali and Nusa Tenggara	357,291 (8.6)	331,423 (8.5)	42,736 (10.7)
Maluku	50,271 (1.2)	49,568 (1.3)	31,591 (7.9)
Irian Jaya	39,459 (1.0)	37,030 (0.9)	4,070 (1.0)
Unspecified	1,352 (–)	1,320 (–)	– (–)
Total	4,150,610 (100.0)	3,908,825 (100.0)	398,457 (100.0)

Source: CBS/Air Transport Statistics, Indonesia 1978

Note: Figures of arrival and departure do not tally because of no response from several ports.

3.3.3. Interprovincial Traffic

Table 3.3.3. shows the inter-regional passenger traffic by province (Interprovincial) in 1978. About 1,400 thousand out of 4,150 thousand passengers are intra-regional travellers, and they account for about 34 percent of the whole traffic. The biggest interprovincial traffic of 449,809 passengers is seen in the route of Jawa to Sumatra, and the second beggest is seen in the route of Sumatra to Jawa.

Table 3.3.3. Origin and Destination of Passenger Traffic by Air (1978)

(People)

Origin \ Destination	Sumatra	Jawa	Kalimantan	Sulawesi	Bali and Nusa Tengara	Maluku	Irian Jaya	Unspecified	Total
Sumatra	181,438	359,050	240	–	–	–	–	118,058	658,786
Jawa	449,809	920,085	226,602	150,528	173,026	789	3,702	275,453	2,199,994
Kalimantan	1,104	224,874	87,447	10,237	51	–	–	157,461	481,174
Sulawesi	252	75,803	7,895	100,928	10,810	9,626	9,453	147,516	362,283
Bali &N. Tenggara	1,749	192,360	–	8,146	77,623	–	275	77,138	357,291
Maluku	–	–	8	30,295	1,346	4,182	1,866	12,574	50,271
Irian Jaya	–	3,187	–	2,057	1,120	24	17,162	15,909	39,459
Unspecified	–	–	–	–	–	–	–	1,352	1,352
Total	634,352	1,775,359	322,192	302,191	263,976	14,621	32,458	805,461	4,150,610

Source: CBS/Air Transport Statistics, Indonesia 1978

Note: This table was compiled from two statistical sources, that is, passenger traffic by origin and destination and number of departing passengers by port. The difference of the two sources was adjusted in the "Unspecified."

3.3.4. Air Transportation in Irian Jaya and Maluku

In Irian Jaya and Maluku, the land transportation facilities such as roads and railways are not yet sufficiently developed. Therefore, air transportation, along with sea transportation, plays an important role in not only interprovincial traffic, but also intra-regional passenger traffic.

Table 3.3.4. and Fig. 3.3.3. show the airports in Irian Jaya and Maluku. There are 26 airports in Irian Jaya and 7 airports in Maluku. Irian Jaya and Maluku are divided into 14 Kabupaten and Kotamadya, and each Kabupaten or Kotamadya has one or more airports. But most of them accomodate only aircrafts.

In Irian Jaya and Maluku, the number of air passenger in 1978 amounted to 89,730. About 21,300 persons out of the above number are intra-provincial travellers. As for interprovincial traffic of Maluku and Irian Jaya, the beggest amount of traffic is seen in the route from Maluku to Sulawesi (30,295 passengers) and the next biggest is seen in the intra-regional traffic in Irian Jaya (17,162 passengers).

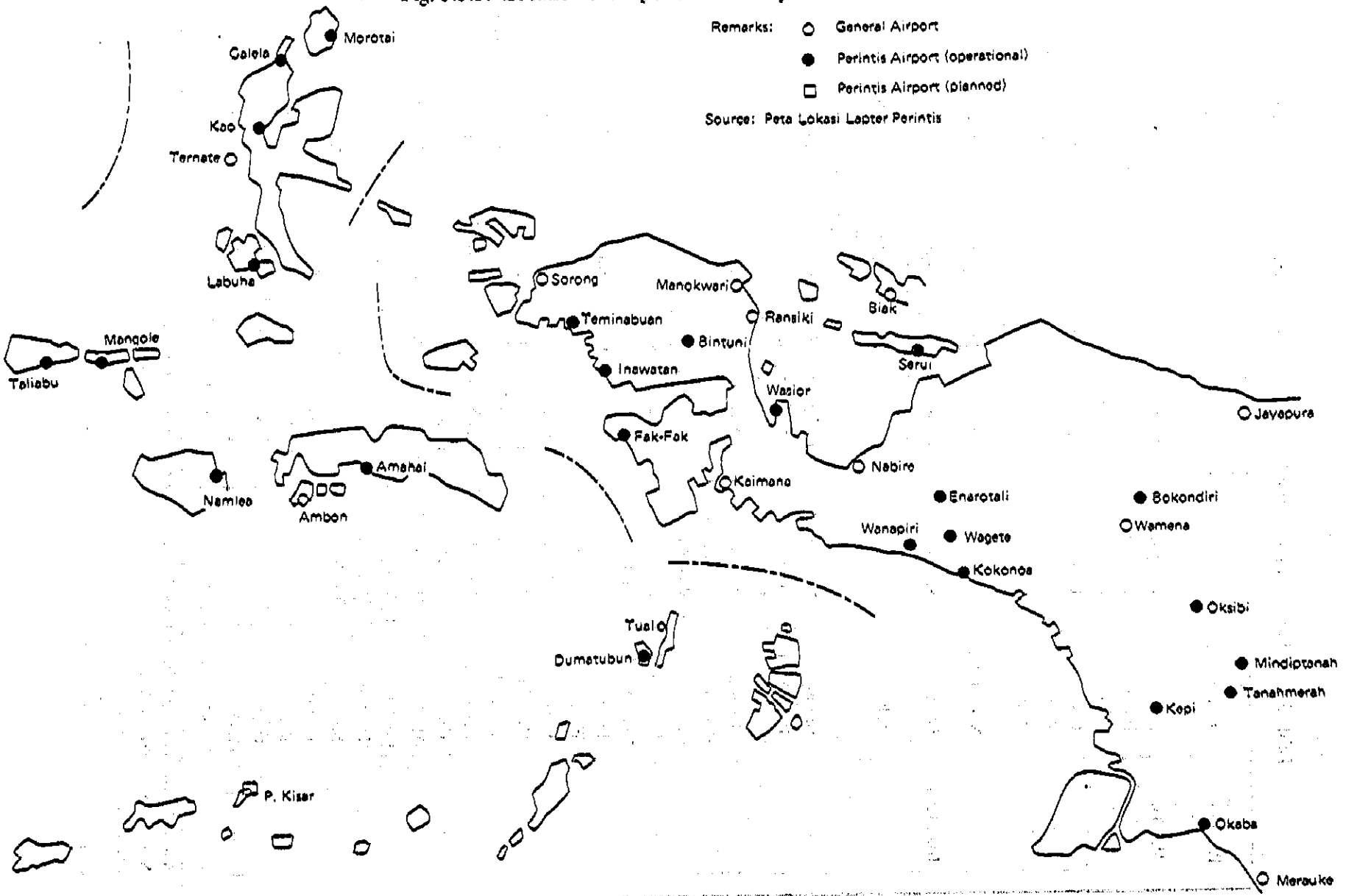
The difference between arrivals and departures amount to 35,650 in Maluku (50,271 departing passengers and 14,621 arriving passengers) and 7,001 in Irian Jaya (39,459 departing passengers and 32,458 arriving passengers).

Table 3.3.4. List of Airports used by Civil Aviation in Irian Jaya & Maluku

Province	City/Town	Airport	Runway			Capacity
			Length	Width	Surface	
Maluku	Tidore	Kuripasi	1,220	30	asphalt	F-27
	Ternate	Babulah	1,220	30	asphalt	F-27
	Ambon	Pattimura	1,850	45	concrete	DC-9
	Tual	Langgur	1,300	60	coral	DC-3
	Namlea		1,400	30	grass	DC-3 (AURI)
	Mamuju		650	18	grass	DHC-6 (Twin otter)
	Naka/Tahuna		850	23	grass	DHC-6
Irian Jaya	Jayapura	Sentani	1,750	30	asphalt, concrete	F-28
	Biak	Mokmer	3,750	45	asphalt, concrete/PC concrete	DC-10
	Sorong	Yesman	1,650	30	asphalt	F-28
	Teminabuan	Teminabuan	520	30	grass	Cessna
	*Fak-Fak	Torea	–	–	–	–
	Manokwari	Rendani	1,200	30	asphalt	F-27
	*Ransiki	Ambaresso				
	*Noonfoor	Noonfoor				
	Kaimana	Utaram	1,500	30	asphalt	F-27
	*Nabire	Nabire				
	Enarotoli	Enarotoli	800	15	grass	Cessna
	Wagete	Wagete	900	23	grass	Cessna
	Kokonoa	Kokonoa	600	45	grass	Cessna
	Merauke	Mopah	1,750	30	asphalt	F-28
	Tanah Merah	Tanah Merah	1,750	30	asphalt	on P.SP. F-28(R)
	Bokondini	Bokondini	710	30	grass	Cessna
	Wamena	Wamena	1,700	30	asphalt	F-27
	Mindiptanah	Mindiptanah	470	30	grass	Cessna
	*Kobar	Wabe				
	*Maomari	Maomari				
	Serui	Yando	450	45	grass	Cessna
	Inawatan		500	45	grass	Cessna
	Kepi		675	45	grass	Cessna
	Okaba		500	25	grass	Cessna
	Waisor		600	30	grass	Cessna
	Oksibil		600	30	grass	Cessna

Source: Civil Aviation Bureau, CBS/Air Transport Statistics, Indonesia 1978
Note: * ..... Private Airport

Fig. 3.3.3. Location of Airports in Irian Jaya and Maluku



Chapter 4.
SORONG AS THE DIRECT HINTERLAND OF THE PORT

CHAPTER 4. SORONG AS THE DIRECT HINTERLAND OF THE PORT

4.1. Outline of Sorong

(1) Kabupaten Sorong

Kabupaten Sorong is situated in the west end of Irian Jaya Province neighboring Maluku Province. The Kabupaten consists of a part of the main island (approximately 70 percent), the islands of Waigeo, Salawati, Misool and many small islands. The 40,549 km^2 land area lies from 0° 30' North to 2° 30' South and from 129° to 132° 30' East.

In the main island of Irian Jaya, the Tamrau mountains, of which the highest peak is 3,000 m above sea level, extend east to west along the north coast. Therefore, the gentle slope on the south side of the Tamrau mountains prevails down south and reaches the huge swampy area on the southern coast.

Rivers are rather short. The longest river of Kumandon forms the main part of the eastern border with Manokwari Kabupaten. The amount of rainfall in Sorong is more than 2,000 mm in a year, which is quite large compared to 1,100 mm in Jakarta area.

The Kabupaten consists of 15 Kecamatans, as shown in Fig. 2.2.2., 11 Kecamatans in the main island, and the other 2 Kecamatans on Waigeo island, and one each on Salawati island and Misool island.

The population of the Kabupaten is 122 thousand in 1978, as shown in Table 2.2.2. and Fig. 2.2.1. and one-third of the population (43 thousand people) is concentrated in Kota (town) Sorong, the capital of the Kabupaten. Other Kecamatans have the population of 10 thousand or less.

Main economic activites in the Kabupaten are related to:

1) Oil and other mineral resources
2) Fishery
3) Forestry
4) Agriculture
5) Port

These are discussed in the next section.

It seems that approximately 75 percent of the land area is covered by natural forests and only 25 percent, mainly in the coastal areas, is used for agriculture, plantation and communities.

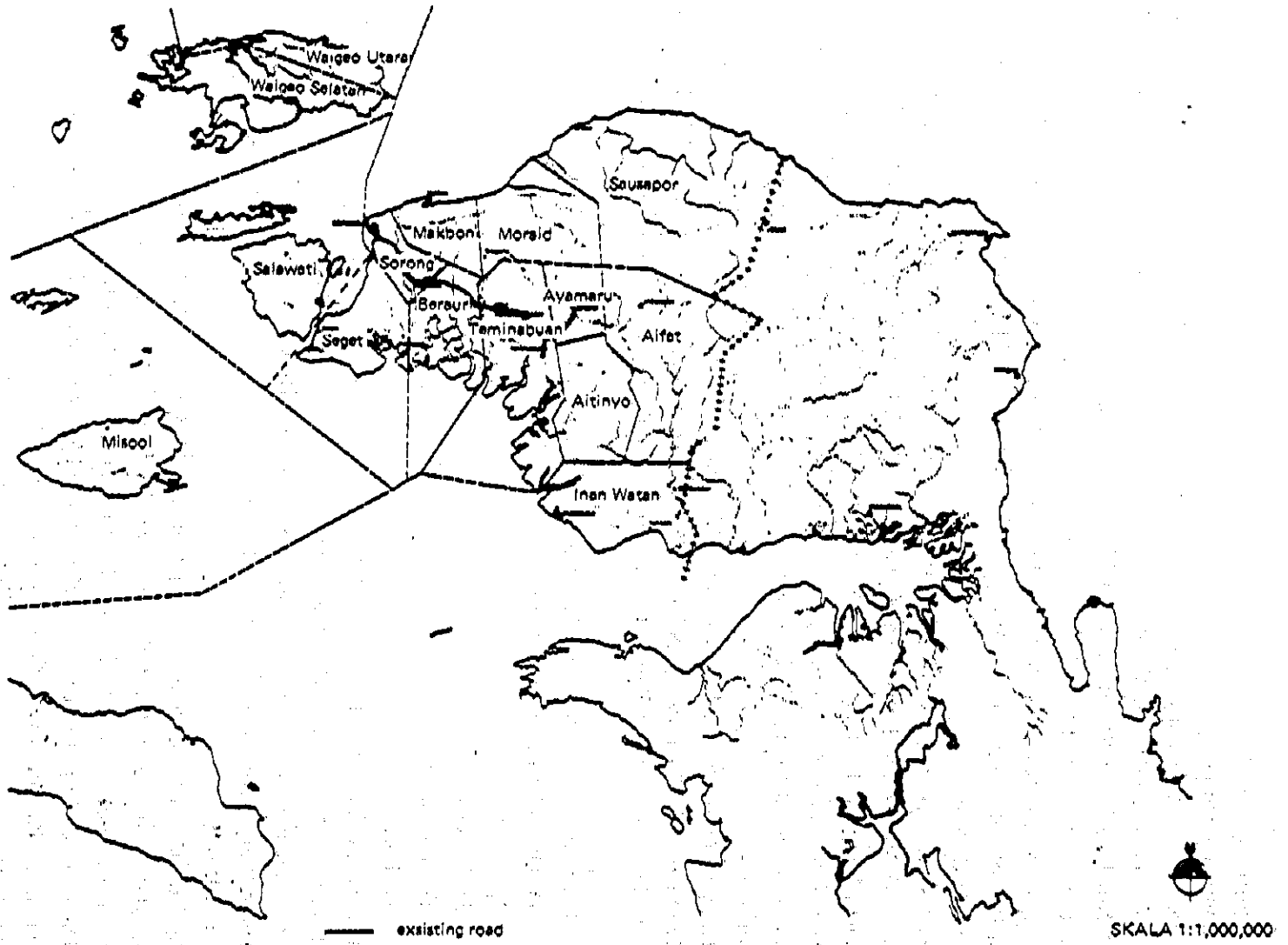
The hill areas are not suited for agriculture, because heavy rains tend to erode land and wash away fertile soil.

Agricultural development also depends on the transportation conditions. The only major transportation means in the Kabupaten, except Kota Sorong, is small boats, and most of the inland area cannot be cultivated easily due to poor road conditions.

There are oil jetties in the ports of Kasim and Salawati. But it is only Kota Sorong which has port facilities. Port of Sorong shall be discussed in detail in Chapter 5.

Road networks exist only in Kota Sorong and its surroundings. Part of the inter – Kecamatan road, connecting Kota Sorong with Southern Kecamatans, was constructed (19 km from the center of Kota Sorong) and the section of 11 km up to Klamono area of Kota Sorong will be completed in the year 1980/81. Construction of other inter-Kecamatan roads, which would greatly promote the development of natural resources, is still in the stage of planning or proposal.

Fig. 4.1.1. Administrative Area in Kabupaten Sorong



Source: Rencana Pengembangan Kota Sorong 1977, Hari Murthi Konsultan Technik.

The only airport in Jefman island is situated in Kota Sorong. There was a new airport project, the site of which was to be near the center of Kota Sorong. However, the project has not been realized.

Fig. 4.1.2. shows the organization chart of Kabupaten Sorong.

(2) Kota Sorong

Kecamatan Sorong (Kota Sorong), the capital of Kabupaten Sorong, consists of 6 Desas (villages).

1) Desa Kampung Baru
2) Desa Klademak
3) Desa Remu
4) Desa Klasaman
5) Desa Aimas
6) Desa Tanjung Kasuari

The first three are in a built up area comprising the main parts of Kota Sorong. Kota Sorong occupies 50.35 km² at the west end of the West Irian; 0° 54' South, 131° 14' East, as shown in Fig. 4.1.3.

According to the data supplied by BAPPEDA in Sorong, the population in Sorong showed an increase during the past few years, as shown in Table 4.1.1.

Table 4.1.1. Population in Kota Sorong by Desa

Desa	1976	1977	1978	1979
Tanjung Kasuari	727	768	790	810
Aimas	551	582	598	613
Klasaman	1,450	1,531	1,574	1,613
Remu	15,039	15,881	16,326	16,734
Kampung Baru	10,241	10,814	11,017	15,292
Klademak	15,178	16,028	16,477	16,889
Total	43,186	45,604	46,782	47,951

An annual growth rate during 1976 to 1979 was 3.6 percent. This high growth rate probably resulted from transmigrants, i.e. social population increase.

There are several reasons for the massive transportation into Sorong: (1) Sorong is the main port in the west part of Irian Jaya, (2) it has a lot of mining and fishery products for export, and (3) it is designated as one of the government-sponsored transmigration place.

Fig. 4.1.2. Organization Chart of Kabupaten Sorong

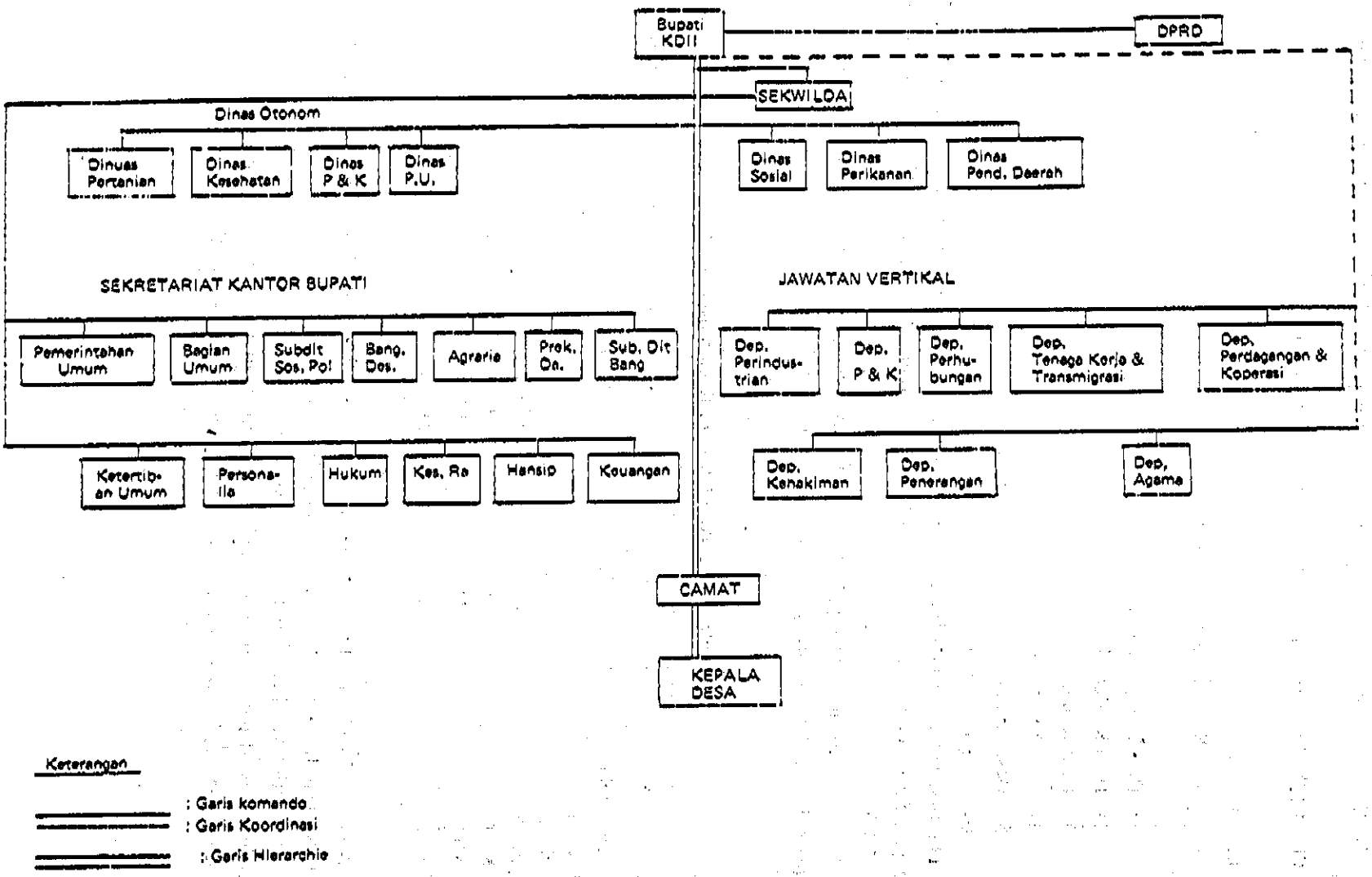


Fig. 4.1.3. Location of Kota Sorong

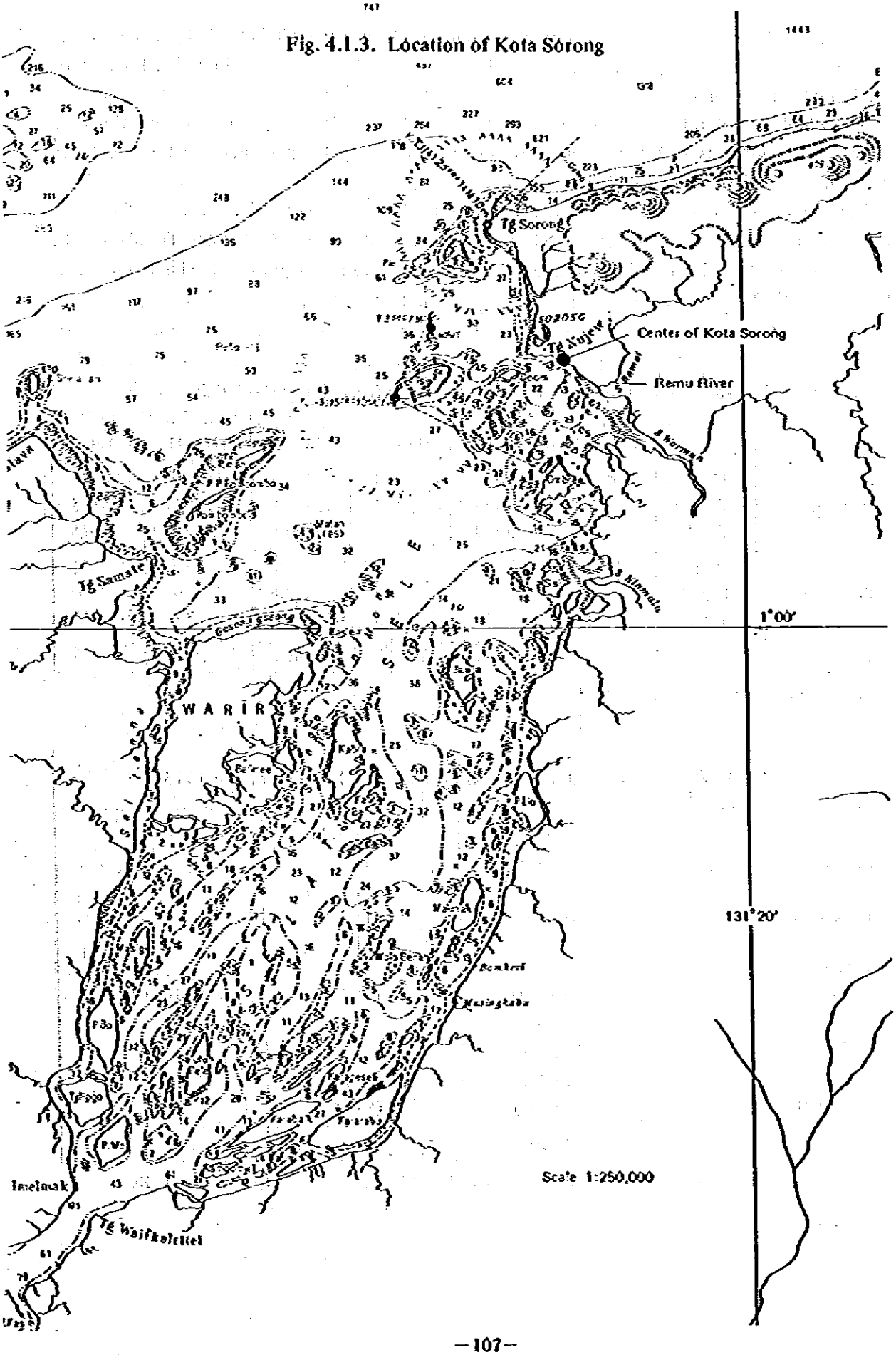


Table 4.1.2. proves the above fact by age structure. The age group of 18 – 40 years old is the major labour force. This age group occupies 50 percent of the population in 1975. Foreigners, mainly male of the same age group, comprise 2 percent.

The employment ratio was 45.2 percent (Table 4.1.3) in 1975. The main occupations are traders and merchants (39.2 percent), government officials (34.3 percent) and farmers (15.8 percent).

Natural resources are said to be rich in Sorong. However, only a few of them are being produced right now; they are oil in Klamono (Pertamina), in Sele (Petromer Trend) and in Salawati (Philips Petroleum), nickel in Gag (Pasifik Nikel) and shrimp and bonito (Usahamina and other companies).

Table 4.1.2. Population by Age Group in Kota Sorong in 1975

		Under 9	10–17	18–25	26–40	Over 41	Total
Indonesian	Male	4,284	5,830	6,840	4,328	1,309	22,591
	Female	3,509	4,773	5,584	3,544	1,075	18,485
	Total	7,793	10,603	12,424	7,872	2,384	41,076
Foreigner	Male	101	33	167	519	52	872
	Female	12	8	21	13	6	60
	Total	113	41	188	532	58	932
Total		7,906	10,644	12,612	8,404	2,442	42,008

Source: Rencana Pengembangan Kota Sorong 1977 p. II-8.

Table 4.1.3. Population by Occupational Condition in Kota Sorong in 1975

	Number	Percentage	Percentage
Officials	6,516	15.6	34.3
Farmers	3,003	7.1	15.8
Traders & merchants	7,432	17.7	39.2
Fishermen	452	1.7	2.4
Builders	1,574	3.7	8.3
(Sub total)	(18,977)	(45.2)	(100.0)
Pensioner	258	0.6	–
Unemployed	4,215	10.0	–
Others	18,558	44.2	–
(Sub total)	(23,031)	(54.8)	–
Total	42,008	100.0	–

Source: Bupati Kepala Daerah Tingkat II Sorong per 15 Maret 1976, in Rencana Pengembangam Kota Sorong 1977 p. II-9.

4.2. Development Potential

Main economic activities in Kabupaten Sorong are described in the following.

(1) Estate Crops

Table 4.2.1. shows estate areas by crop. The dominant crop is coconut and, it occupies 4,804 ha in 1979, which is more than 90 percent of the total estate area (5,169 ha). Clove comes the second, but it is grown in the area of only 223 ha.

Table 4.2.2. shows the area of coconut estates by Kecamatan. The recent annual growth rate of plantation area is 2.1 percent. This low figure is caused by the fact that farmers have been unable to develop many new fields on their own. It is difficult for them to clear up land rights.

In general estate crops are not producted intensively. The plantation is not maintained well, and therefore is productive only in a few years. For this reason, the amount of production is sometimes less than that of the previous year.

As for production of coconuts, the total product was 1,707.35 tons in 1978. 57.60 tons were supplied to coconut oil manufacturers, 780 tons were sold for local consumption, and 269.75 tons were sent to other provinces (Rp. 109 millions). Other crops are consumed locally and no production data is available.

Table 4.2.3. shows the target figures of estate crops in Pelita III.

Table 4.2.1. Area of Estate Crops in Kabupaten Sorong

Crops	1975	Plantation Area (ha)			
		1976	1977	1978	1979
Coconut	4,413	4,424	4,683	4,732	4,804
Cloves	102	143	172	196	223
Nutmeg	186	186	82	57	69
Coffee	36	36	40	39	49
Rubber	8	10	10	11	10.7
Chocolate	3	3	2	2	3
Cashew nut	2	2	10	12	11
Total	4,750	4,804	4,999	5,049	5,169

Source: Dinas Pertanian in Sorong

Table 4.2.2. Area of Coconut Estate by Kecamatan in Kabupaten Sorong (1979)

Kecamatan	Not Productive (ha)	Productive (ha)	Uncultivated (ha)	Total Area (ha)	Number of Owner
Sorong	54	41	7	102	292
Sausapor	83	195	7	285	217
Makbon	7	6	–	13	183
Salawati	315	433	–	748	494
Ayamaru	5	3	–	8	808
Teminabuan	21	20	2	43	273
Inanwatan	7	14	–	21	355
Saunek	171	374	127	672	–
Seget	155	514	73	742	118
Moraid	34	38	8	80	–
Beraur	–	25	5	30	–
Misool	244	1,110	99	1,453	476
Aitinyo	2	6	–	8	–
Aifat	1	2	–	3	288
Kabare	156	413	27	596	–
Total	1,255	3,194	355	4,804	

Source: Dinas Pertanian in Sorong

Table 4.2.3. Planned Estate Crops in Pelita III in Kabupaten Sorong

Year	Crops	Production (ha)	Rejuvenation (ha)	Intensification (ha)	Family	Governmental Plantation (ha)
1979/1980	Coconut	3,245	452	452	4,265	32
	Nutmeg	23	16	8	–	–
	Chocolate	4	13	–	–	–
	Rubber	–	–	–	–	–
	Cloves	5	145	14	–	–
	Coffee	1	5	0.8	–	–
1980/1981	Coconut	3,775	523	523	4,798	32
	Nutmeg	26	22	11	–	–
	Chocolate	7	16	–	–	–
	Rubber	–	–	–	–	–
	Cloves	8	168	17	–	–
	Coffee	4	8	1	–	–
1981/1982	Coconut	3,600	500	500	4,613	32
	Nutmeg	25	20	10	–	–
	Chocolate	6	15	–	–	–
	Rubber	–	–	–	–	–
	Cloves	7	160	17	–	–
	Coffee	3	7	1	–	–
1982/1983	Coconut	3,415	475	475	4,436	32
	Nutmeg	24	18	9	–	–
	Chocolate	5	14	–	–	–
	Rubber	–	–	–	–	–
	Cloves	6	152	15	–	–
	Coffee	2	6	0.8	–	–
1983/1984	Coconut	3,965	550	550	4,990	32
	Nutmeg	27	24	12	–	–
	Chocolate	8	17	–	–	–
	Rubber	–	–	–	–	–
	Cloves	9	175	18	–	–
	Coffee	5	9	1.5	–	–

Source: Dinas Pertanian in Sorong.

(2) Food Crops

The production of agricultural foods in Kabupaten Sorong is not very prevalent compared with the production of estate crops. The amount of production and the farm area in the past 5 years are shown in Table 4.2.4.

The total amount of the main foods produced in Sorong decreased in 1977, but recovered almost to the level of 1976 in 1979. Among the main foods, rice is imported from other island. The amounts of the production of the beans, vegetables and fruits are constant in the past 5 years at 400 to 500 tons, 800 to 1,000 tons and 700 to 900 tons respectively.

The future plan for agricultural production is not yet made because the ability of farmers is yet to be improved and it is difficult to forecast future production. Table 4.2.5. shows the estimation of the demand of main foods and the farm area to meet the demand of Kabupaten Sorong.

The main foods except rice are self-sufficient in Kecamatan Sorong at present.

Table 4.2.4. (1) Agricultural Activity (1975 – 1979)

Main Foods	1975		1976		1977		1978		1979	
	ha	ton	ha	ton	ha	ton	ha	ton	ha	ton
Maize	305	210	837	585	200	140	210	147	230	150
Cassava	737	5,160	998	6,890	668	3,340	700	3,500	750	3,750
Sweet potato	1,105	7,740	2,476	14,850	1,051	7,360	1,300	8,100	1,300	8,100
Black radish	1,200	4,330	1,200	4,330	1,040	4,170	3,007	9,025	3,230	12,921
Total	3,347	17,440	5,511	26,655	2,959	15,010	5,217	20,772	5,510	24,992

Source: Agriculture Sec. Bupati Sorong

Table 4.2.4. (2) Agricultural Activity (1975 – 1979)

Beans	1975		1976		1977		1978		1979	
	ha	ton	ha	ton	ha	ton	ha	ton	ha	ton
Peanut	398	279	486	340	540	350	565	366	570	370
Small green pea	88	44	176	88	42	22	50	25	49	25
Nurishing bean	195	78	–	–	80	32	–	–	–	–
Other nuts	–	–	236	95	–	–	–	–	–	–
Soybean	–	–	–	–	–	–	2	1	4	2
Total	681	401	898	523	662	404	617	392	623	397

Source: Agriculture Sec. Bupati Sorong

Table 4.2.4. (3) Agricultural Activity (1975 – 1979)

Vegetables	1975		1976		1977		1978		1979	
	ha	ton	ha	ton	ha	ton	ha	ton	ha	ton
Onion	17	40	–	–	10	30	20	50	15	38
Spanish pepper	4	6	–	–	9	15	10	15	10	15
Cucumber	16	156	–	–	40	320	50	400	55	440
Night shade	24	48	–	–	38	70	25	50	25	50
Spinach	20	50	–	–	30	90	–	–	–	–
Green vegetable	13	51	–	–	20	80	15	60	18	72
Other vegetable	161	482	–	–	97	300	110	252	110	250
Fresh vegetable	–	–	233	743	–	–	–	–	–	–
Tomato	–	–	–	–	–	–	10	26	15	38
Other beans	–	–	–	–	–	–	25	50	25	50
Total	273	879	233	743	290	985	265	903	273	953

Source: Agriculture Sec. Bupati Sorong

Table 4.2.4. (4) Agricultural Activity (1975 – 1979)

Fruits	1975		1976		1977		1978		1979	
	ha	ton	ha	ton	ha	ton	ha	ton	ha	ton
Orange	6	20	–	–	24	40	24	40	24	40
Mango	10	10	–	–	9	9	10	20	10	20
Pineapple	15	15	–	–	13	10	13	10	13	10
Banana	81	500	–	–	60	600	63	625	63	625
Fruit Jambu (Eugenia)	3	10	–	–	10	20	10	20	10	20
Papaya	–	–	–	–	–	–	9	9	11	11
Fresh fruit	–	–	125	702	–	–	–	–	–	–
Durian	–	–	–	–	5	4	9	9	10	10
Rambutan (Hairy fruit)	–	–	–	–	1	1	–	–	–	–
Langsat (Lansium domesticum)	–	–	–	–	–	–	5	4	5	4
Other fruit	70	145	–	–	70	150	60	130	60	130
Total	185	700	125	702	192	834	203	867	206	870

Source: Agriculture Sec. Bupati Sorong

Table 4.2.5. Demand of Main Foods and Farm Area to Meet the Demand (Estimated in 1979)

Kecamatan	Rice		Sagu		Cassava/ Sweet Potato	
	ha	ton	ha	ton	ha	ton
Sorong	4,053	4,053	–	–	–	–
Makbon	48	48	38	346	–	–
Mega	30	30	36	328	–	–
Sausapor	48	48	–	–	454	1,362
Wanurian	30	30	83	749	–	–
Salawati	480	480	118	1,068	–	–
Seget	72	72	97	874	–	–
Waigama	120	120	85	755	–	–
Waigeo selatan	96	96	151	900	–	–
Waigeo utara	84	84	32	290	120	360
Teminabuan	240	240	137	1,240	206	618
Ayamaru	96	96	–	–	725	2,175
Inanwatan	78	78	156	1,405	–	–
Aitinyo	36	36	55	500	221	662
Aifat	36	36	–	–	501	1,504
Total	5,547	5,547	936	8,464	2,227	6,683

Note: 1. The amount of products corresponds to the population.
(ex.) The consumption of rice is about 8 kg/month person.
2. The farm area necessary for obtaining 1 ton of rice is assumed at 1 ha.

Source: Agriculture Sec. Bupati Sorong.

(3) Forestry

At present, 75 percent of the Sorong district is not yet developed but is still virgin forest. The main kinds of trees growing in Sorong are the "Kayu Kuku" (Pericopsis Sp), "Kayu Besi" (Intsia Sp, iron wood Eng), "Matoa" (Pometia Sp), "Linggoa" (Petrocarpus Sp), "Kayu Cina" (Padocarpus Sp), and "Bintangur" (Callophyllum Sp).

The forest area in Sorong is shown in Fig. 4.2.1. Areas 6 and 7 are now being developed by companies. The others are expected to be opened in the future.

The budget for the development program of the forest and actual wood production in the past 5 years are shown in Tables 4.2.6 and 4.2.7.

The sawn timber are transported to Ambon, Menado, Ujung Pandang, and Surabaya for domestic consumption. On the other hand, most of the logs are exported to Taiwan, Korea, Japan and Singapore from loading points.

Fig. 4.2.1. Forestry Area

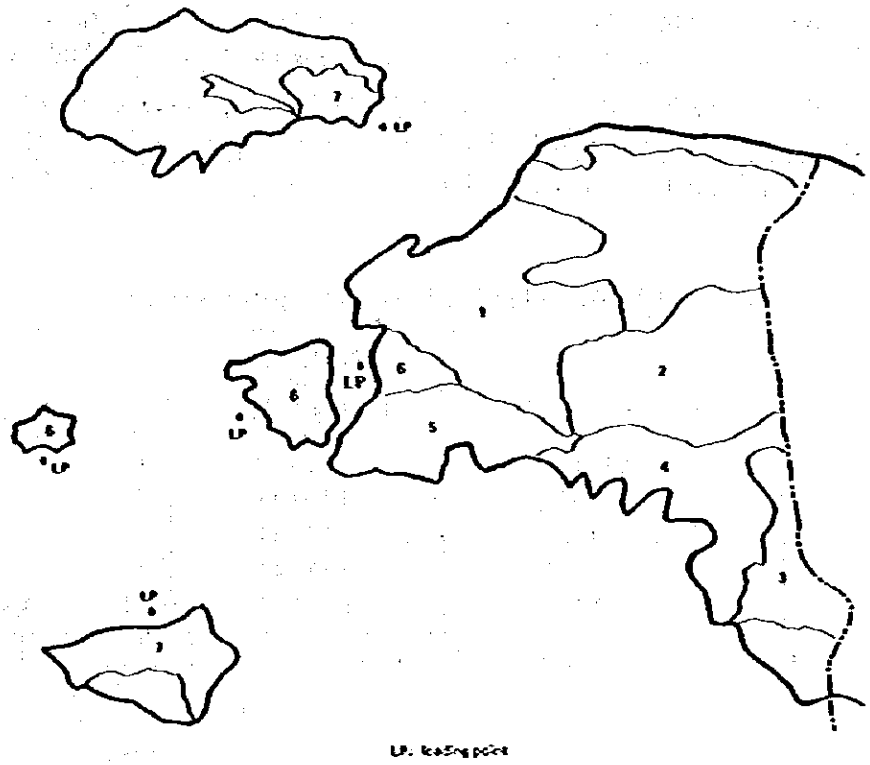


Table 4.2.6. Budget for the Development Program

1975/1976	Rp. 30,000,000 : from the budget for the development of province. Rp. 5,000,000 : fro sawing wood (200 m^3) Rp. 25,000,000 : budget from Pelita II use for the building of office (incharging of the forestry in Sorong).
1976/1977	Rp. 7,597,000 : from the budget for the development of province Rp. 3,539,000 : used for sawing wood (100 m^3) Rp. 4,058,000 : budget from National Development Rp. 1,050,000 : for the upgrading of land (2 ha) Rp. 3,000,000 : for staff training and office equipment
1977/1978	Rp. 6,281,000 : from the budget of development of province, for the upgrading of sea-shore. Rufei sawing (70 m) and sawing wood (100 m^3)
1978/1979	Rp. 18,450,000 : from the budget of development of province Rp. 17,750,000 : for developing roads (1 km) and development Taman Arboretum (public park) for 1 ha. Rp. 700,000 : from Direktorat Perawatan & Pengawetan Alam (Government body incharge or concerning nature) is used for making bird cages.
1979/1980	Rp. 1,476,000 : (from the budget of development of province) used for wood sawing for the plantation of Anggrek.

Source: Kesatuan Pemangkuan Hutan, Sorong, Irian Jaya.

Table 4.2.7. Wood Production in Kabupaten Sorong

Year	Production		
	Sawn timber (m^3)	Log (m^3)	Resin (kg)
1975/1976	4,044.824	3,800.60	–
1976/1977	10,000.424	1,509.73	–
1977/1978	12,800.529	2,946.54	–
1978/1979	7,925.373	5,835.43	–
1979/1980	3,492.188	75,290.77	3,850

Source: Kesatuan Pemangkuan Hutan, Sorong, Irian Jaya.

(4) Fishery

In the Sorong area, the export of fishery products is very active as shown in the following table.

Table 4.2.8. Exports of Marine Products

(tons)

Year	Frozen Bonito	Frozen Shrimp	Total
1975	–	2,602	2,602
1976	600	2,960	3,560
1977	1,830	2,950	4,780
1978	4,278	3,483	7,761
1979	3,296	3,658	6,954

Source: Bupati Sorong

Note: Shrimps for export are handled at the public wharf.

Other kinds of fish, mainly a kind of anchovy, are handled by local fisherman with small scale fishing tools.

According to Sorong County, fishermen in the Sorong area totalled about 3,800 and about 1,000 are in Sorong city and Doom. On the other hand, 6 fishing companies with big scale fishing equipment are located in Sorong city, where they utilize the fishing base camps with 4 cold storage units (400 ton) and with 83 fishing boats (100 GT–900 GT)

Table 4.2.9. Fishery Production at Sorong

(tons)

Year	Total (1)	Export	local (2)	Others
1974	5,996	–	–	–
1975	6,119	2,602	2,241	–
1976	6,176	3,560	2,616	–
1977	8,032	4,780	2,990	–
1978	14,710	7,761	3,271	–
1979	14,030	6,954	3,500	70

Notes: 1. Derived from the data of "Irian Jaya Dalam Angka 1977" and the data from the Country of Sorong.

2. Artificial products by local fisherman.
50–60% of those products are consumed within the local area.

3. Total production of 1978 and 1979 includes wastes of about 25%.

(5) Mining

Refer to the section 2.4. Mining.

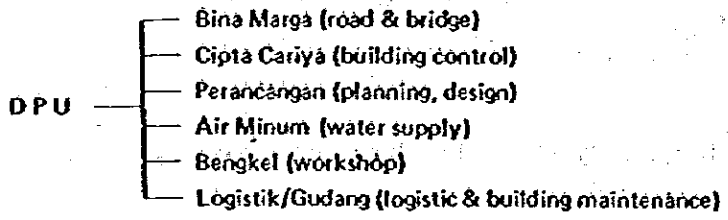
4.3. Town Planning

(1) Outline of Town Planning

The field town planning is supervised by the District Public Works (Dinas Pekerjaan Umum, DPU), as shown in Fig. 4.3.1.

There is no town planning for Kota Sorong at present. In 1976, Hari Murthi Konsultan Tehnik, a town planning consultant, made a survey for Kota Sorong and compiled a report.*) Also Central Government sent officials of the Ministry of Public Works and made a survey in 1979, and are preparing for the inauguration of town planning for Kota Sorong.

Fig. 4.3.1. Organization Chart of District Public Works (DPU)



(2) Town Planning Survey by Hari Murthi

A town planning survey was conducted by Hari murthi Konsultan Teknik in 1976 at the request of Badan Perencanaan Pembangunan Daerah (BAPPEDA) in Irian Jaya province and Bupati in Sorong. The survey was compiled in a three-volume report "Rencana Pengembangan Kota Sorong, Irian Jaya 1977"; A. Data Complilation and Analysis, B. General Planning and C. Structure of Residential Area.

On the basis of their analysis, of the report they chose the follows as fututo functions of Kota Sorong in the Kabupaten area (ibid. p. III-21):

1) Development center
2) Governmental center of Kabupaten Sorong
3) Center of sea traffic (port) and air traffic (airport)
4) Trade and distribution center
5) Industrial center

The planned period from 1976 to 1996 is divided into 4 five-year terms. Three case population forecasts in each target year of these five year terms were studies on the basis of past trend (ibid. p. III-47–III.-53).

The population in Kota Sorong was forecast as 296,485 in 1991 in the high growth case (13 percent annual growth), 190,825 in the medium case (13 percent up to 1985 and 5 percent after 1985) and 91,577 in the low case (5 percent annual growth).

The population of Kabupaten Sorong excluding Kota Sorong is forecast 121,316 in 1991, for which only of 3 percent annual growth was adopted. Thus, the total population of Kabapaten

*) Rencana Pengembangan Kota Sorong, Irian Jaya, 1977, Hari Murthi Konsultan Tehnik.

Sorong in 1991*) is forecast 417,997 in the high growth case (8.8 percent increase), 310,141 in the medium growth case (6.2 percent) of 212,893 in the low case (3.6 percent).

On the basis of these population forecasts, the scale of Kota Sorong in 1991 was estimated: 32,000 – 49,000 houses, 9,000 ha land area and so forth.

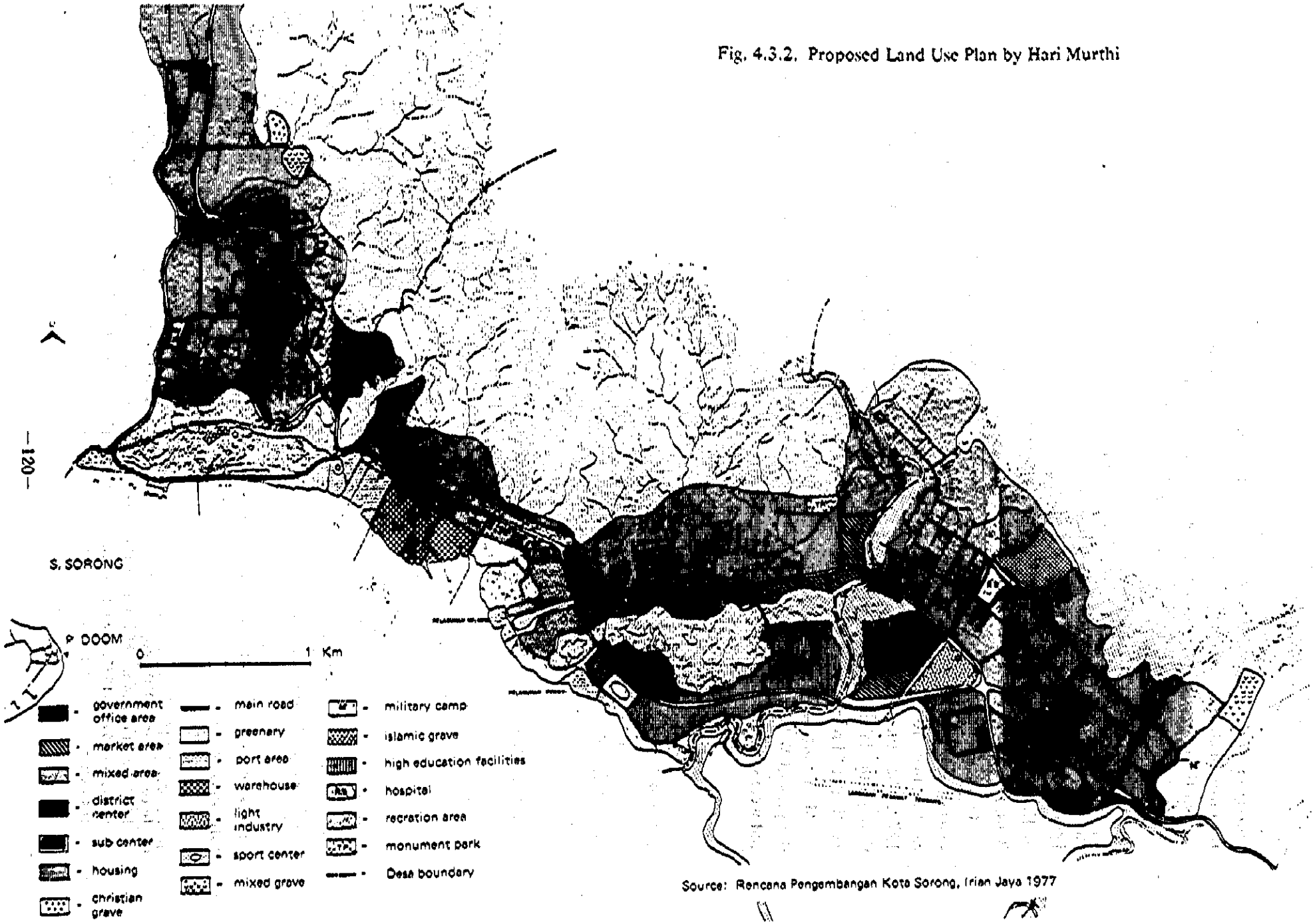
The flat inland area on the east side of the Remu river, was selected to be the main development area, as shown in Fig. 4.3.2. After examining the characteristics of sub-districts, areas of 15 ha – 200 ha with similar geographical features, existing land use and so forth, future land use of Kota Sorong was planned. It was proposed that each area consist of 3 districts (Kampung Baru, Klademak and Remu) and to be installed with various convenience facilities.

Construction of two main roads was proposed to supplement the existing main road extending from east to west through the built-up area. One road runs southward from the existing main road to connect the new extension area to Klademak. This road was completed in 1979. The other road is planned in the northwest area to connect Kampung Baru to Klademak through the inland hill areas, without making a detour through Tg. Nujew (Nujew point) of the existing main road.

Main port facilities were planned to be built in the western coastal area from Tg. Nujew to the present W.I.F.I. jetty. A fishing port and a ferry port were laid out in the eastern coastal area and were surrounded by a wide coastal recreation area up to the estuary of the Remu river.

*) In comparison with the population forecast of 172,000 (for 1990) by the survey team, these figures are quite large. This is due to the high annual growth rate of 13 percent, which was actually experienced during the 4 years from 1971 to 1975. The recent annual growth rate (1976 – 1979) was 3.6 percent as shown in the previous section.

Fig. 4.3.2. Proposed Land Use Plan by Hari Murthi



Source: Rencana Pengembangan Kota Sorong, Irian Jaya 1977

(3) Land use

Kota Sorong mainly comprises a large hilly area, narrow flat coastal areas and gentle slopes of the eastern inland forest area. The hilly area is in the mountain side of Tamrau mountains and some hills are steep and bold.

Present built-up areas of Kota Sorong are approximately 600 ha and are mainly located in the narrow flat area, between hills and the shoreline.

Desa Kampung Baru: Western coastal area ±1 km width and 2 km length,

Desa Klademak: Southwestern coastal area ±0.5km width and 2.5 km length,

Desa Remu and Eastern part of Desa Klademak: Eastern area long the Remu river 2 – 3 km width and 3 km length.

The Kota Sorong needs to be expanded to accommodate the new housing demand which is expected to increase sharply in the near future. However, in view of these geographical conditions, possible extension sites could be found only in the eastern forest area.

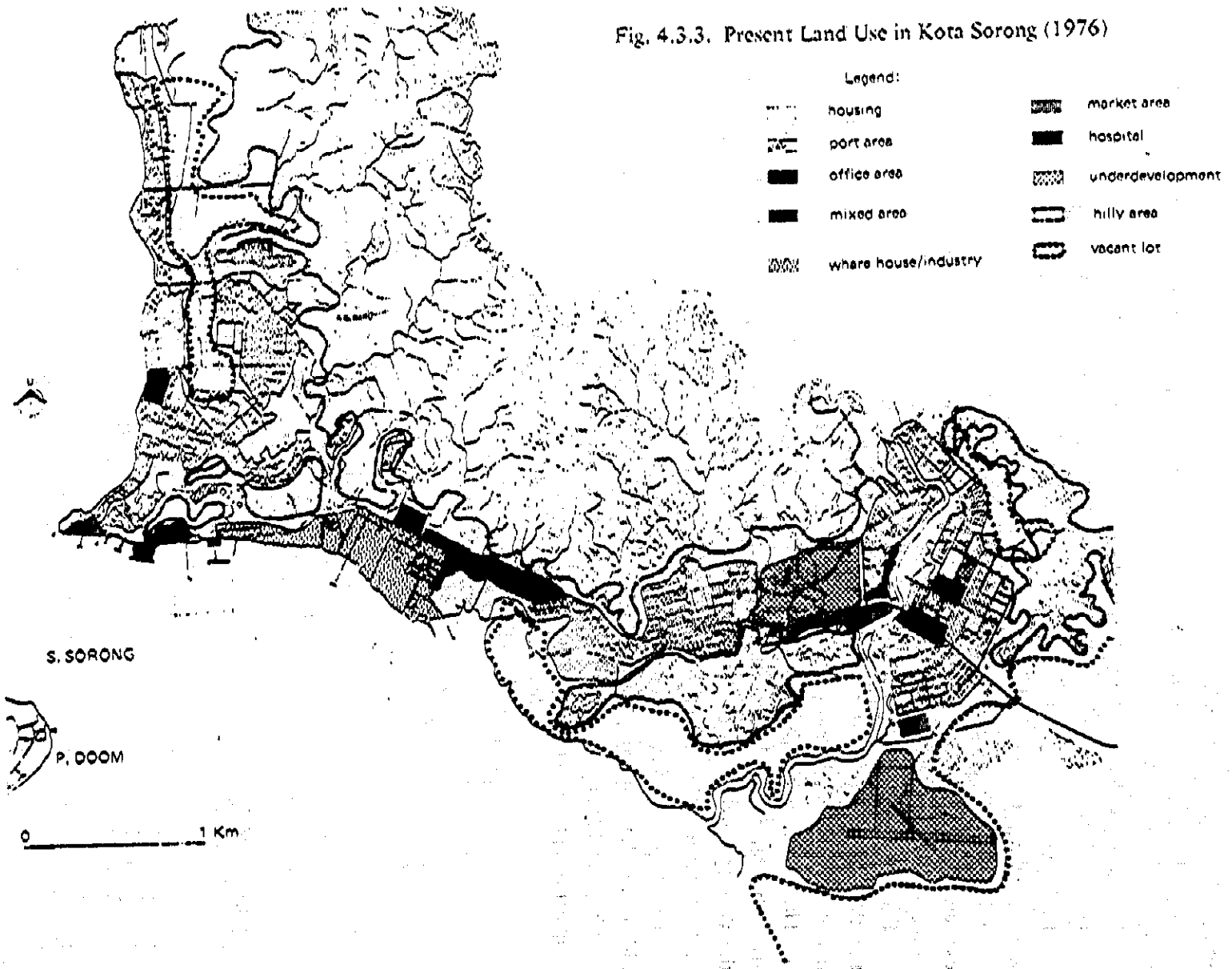
Fig. 4.3.3. shows the present land use (1976). The sites of main economic activities, such as the Port of Sorong, Pertamina and fishery companies, are concentrated in the south-eastern narrow area of Desa Klademak.

These economic activities, all of which depend on port facilities, are carried out in the coastal area. The flat coastal areas is quite narrowly enclosed by hills, especially since the width around the Port of Sorong is only 50 m – 150 m. As such the back area for the port will certainly become inadequate, even if it is sufficient at present.

The housing areas occupy large parts of Desa Kampung Baru, Klademak and Remu. Fishermens' housing area, not in good condition, is in the coastal area of Klademak.

Shops and markets are situated in Kampung Baru and Remu. A large governmental office (Bupati) complex was newly constructed in Remu.

Fig. 4.3.3. Present Land Use in Kota Sorong (1976)



Source: Rencana Pengembangan Kota Sorong, Irian Jaya 1977.

(4) Road Network

Fig. 4.3.4. shows the present road network. There are two classes of roads; roads of Irian Jaya province and those of Kabupaten Sorong. There are two provincial roads which are the main roads of Kota Sorong: one extends from Tg. Nujew through the built-up area of desa Klademak and Remu to Klamono (all the Kabupaten roads start from this old province road); the other one was newly constructed in 1979 and runs parallel to the old province roads from the center of Klademak to the east side of the Remu river.

The length of roads by class and by kind of pavement is shown in Table 4.3.1. Only 40 percent of the provincial roads are paved with asphalt pavement; however, there are only a few roads of other classes that are paved with asphalt.

The heaviest traffic is observed in the central part of the old province road between Tg. Nujew and DPU's office. The traffic in the new provincial road was observed to be rather light.

Tables 4.3.2. and 3. and Figure 4.3.5. show the results of traffic surveys by DPU at the old province road made in September 1979, and of a check survey by the Japanese Study Team in June 1980. These surveys indicate the present traffic volume in the peak hours (9–10 or 10–11) is less than 900 vehicles.

Table 4.3.1. Length of Roads in Kabupaten Sorong (1979)

(km)

	Class of road				
	Nation	Province	Kabupaten	Others	Total
Asphalt	0	20.3	23,503	0	43,503
Gravel	0	0	67,840	0	67,840
Unpaved	0	31.6	16,170	311,004	358,774
Total	0	51.6	107,517	311,004	470,117

Source: DPU in Sorong

Fig. 4.3.4. Present Road Network in Kota Sorong

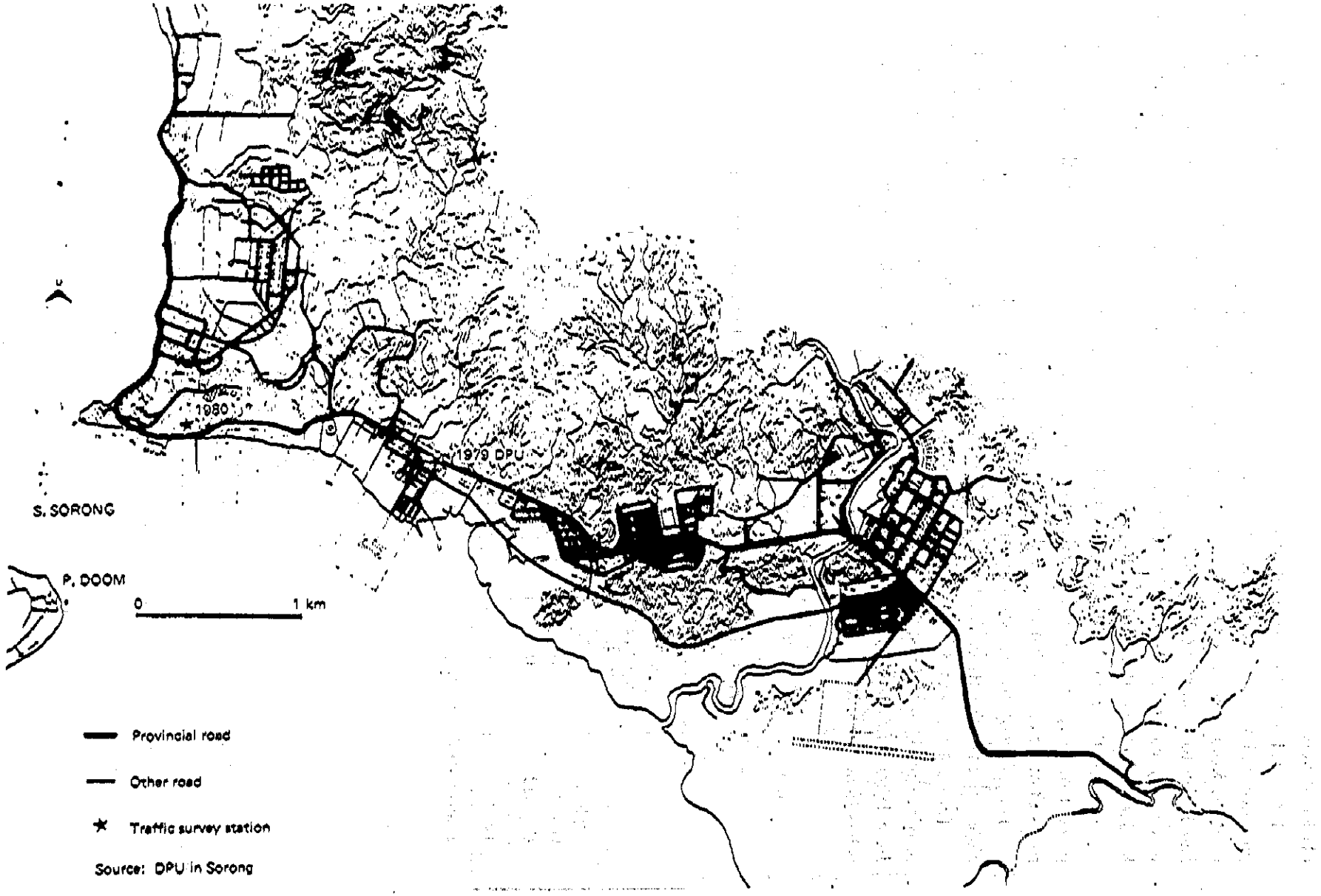


Table 4.3.2. Traffic Survey in front of DPU on Monday, September 10, 1979

(vehicles)

Hour	Total	Car & Taxi	Medium Truck	Heavy Truck	Trailer
06:00 – 08:00 08:00 – 09:00	886	845	18	19	4
09:00 – 10:00	646	612	10	22	2
10:00 – 11:00	710	658	19	30	3
11:00 – 12:00	768	700	20	40	8
12:00 – 13:00	743	692	21	28	2
13:00 – 14:00	697	657	17	15	2
14:00 – 15:00	625	578	19	23	5
15:00 – 16:00	324	280	13	29	2
16:00 – 17:00	335	290	15	48	2
17:00 – 18:00	267	251	8	8	–
18:00 – 19:00	501	479	12	10	–
19:00 – 20:00	409	389	8	12	–
20:00 – 21:00	257	241	5	11	–
Total	7,912	7,392	197	290	33
Percentage (%)	10	94	2	4	0

Source: DPU in Sorong.

Table 4.3.3. Traffic Survey in front of DPU on Tuesday, September, 11, 1979

(vehicles)

Hour	Total	Car & Taxi	Medium Truck	Heavy Truck	Trailer
06:00 – 07.00	321	316	–	5	–
07:00 – 08:00	545	523	4	18	–
08:00 – 09:00	706	661	12	30	33
10:00 – 11:00	879	800	31	44	4
11:00 – 12:00	741	700	22	16	3
12:00 – 13:00	851	797	16	34	4
13:00 – 14:00	627	504	15	23	5
14:00 – 15:00	705	655	14	35	1
15:00 – 16:00	557	527	12	18	–
16:00 – 17:00	491	462	9	20	–
17:00 – 18:00	492	458	7	21	–
18:00 – 19:00	552	516	17	19	–
19:00 – 20:00	408	394	10	4	–
20:00 – 21:00	396	385	4	7	–
21:00	352	350	2	–	–
Total	8,896	8,401	175	300	20
Percentage (%)	100	95	2	3	0

Source: DPU in Sorong

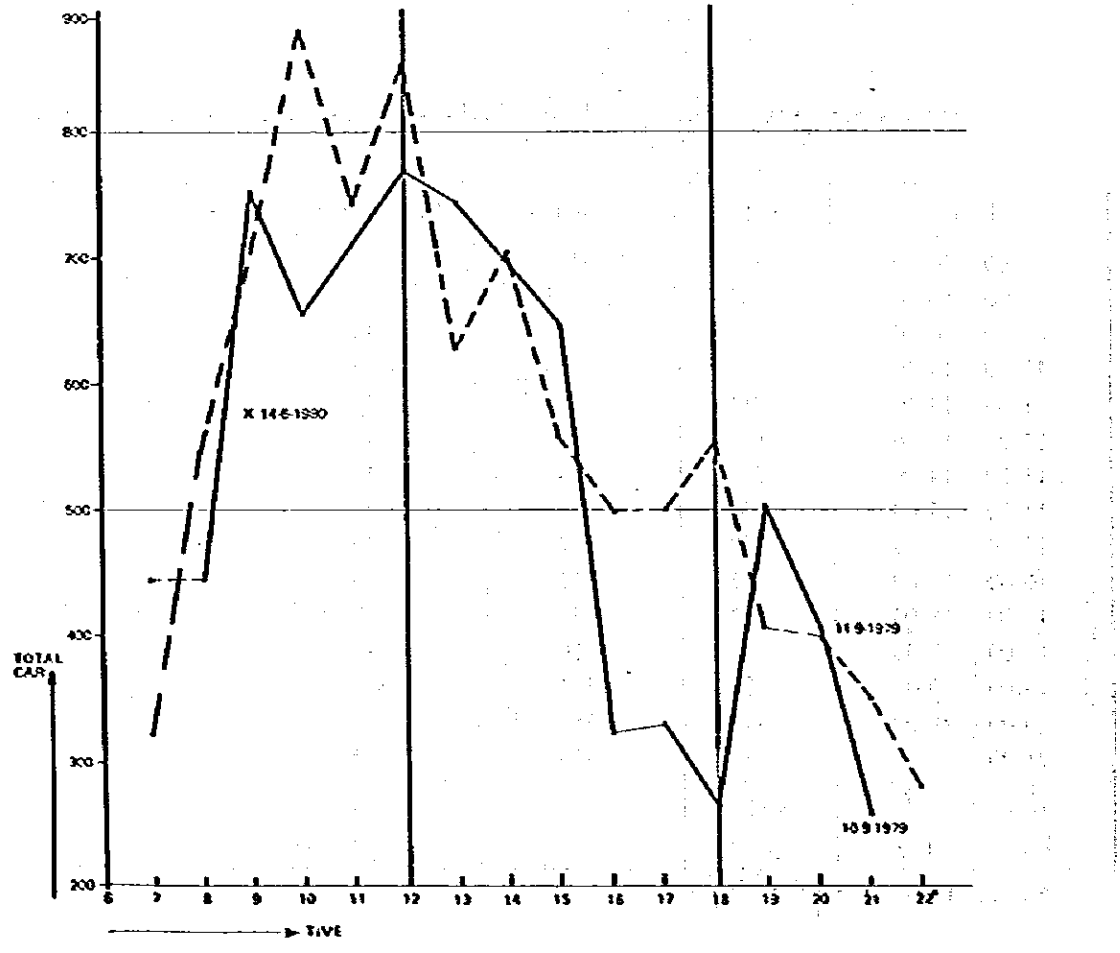
Table 4.3.4. Traffic Survey in front of BPP on Saturday, June 14, 1980

(vehicles)

Hour	Car	Jeep	Van Pick-up	Medium Truck	Heavy Truck	Taxi (Mini mobile	Total Auto-Cycle	Motor Cycle	Total	By half hour
7:30 – 7:45	0	10	4	6	1	91	112	20	132	279
7:45 – 8:00	2	9	5	4	1	88	109	88	147	
8:00 – 8:15	2	10	6	2	2	64	86	40	126	
8:15 – 8:30	1	18	3	3	0	76	101	43	144	582
8:30 – 8:45	1	7	13	4	2	75	102	46	148	(293x2)
8:45 – 9:00	2	13	19	3	2	80	119	45	164	
9:00 – 9:15	5	16	6	7	1	68	103	61	164	
9:15 – 9:30	3	13	9	7	2	77	111	63	174	
Total	16	96	65	36	11	619	843	356	1,199	1,191
Percentage (%)	2	11	8	4	1	74	100			

Source: The Study Team.

Fig. 4.3.5. Traffic Distribution by Hour



A practical traffic capacity of a 2-lane road is calculated by the following formula:

$$C_V = C_B \cdot \gamma_L \cdot \gamma_C \cdot \gamma_T \cdot \gamma_I$$

C_B: basic traffic capacity. This is the traffic capacity in the ideal situation, and 2,500 pcu*) per hour is considered appropriate referring to experience in Japan.

γ_L : lane width coefficient.

lane width (m)	3.50	3.25	3.00	2.75
coefficient	1.00	0.94	0.85	0.77

γ_C : shoulder width coefficient

shoulder width (m)	1.75	1.50	1.25	1.00	0.75	0.50	0
one side less than 1.75 m	1.00	0.98	0.96	0.93	0.91	0.88	0.85
both sides less than 1.75 m	1.00	0.96	0.92	0.86	0.81	0.75	0.70

γ_T : heavy truck coefficient

$\gamma_T = 100/(100-P_T+E_T P_T)$

P_T : proportion of heavy truck in percentage

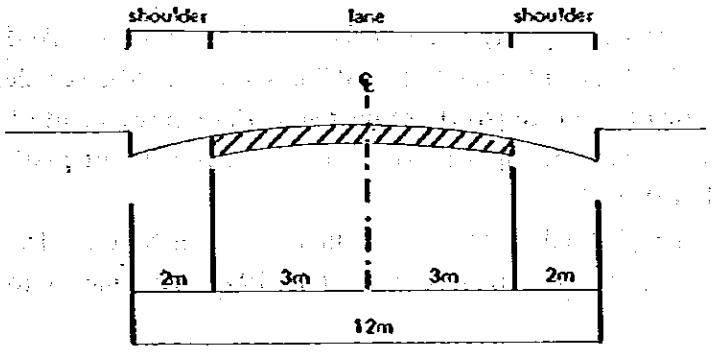
E_T : equivalent passenger car unit

γ_I : Environment condition coefficient. This coefficient evaluates the frequency of vehicles coming into/going out of a road

area	rural	medium	urban
coefficient	1.0-0.9	0.9-0.8	0.8-0.7

Fig. 4.3.6. shows the structure of the old provincial road around the survey station. The practical traffic capacity of the road can be estimated as follows:

Fig. 4.3.6. A Structure of the Old Provincial Road



*) PCU: equivalent passenger car unit. This is shown in Table 4.3.5.

Table 4.3.5. Equivalent Passenger Car Unit

Vehicle Type	Equivalent Passenger Car Unit
Pedal Cycle. Tricycles and Motorcycles	0.5
Motor-car Station Wagon Taxi Kit-Car or Pick-up Jeep Land Rover Light Delivery Van Minibus	1
Trailer attached to above	Add 1
2-Axle Truck Class Lorry inc. Timber Lorry Truck Mammy Wagon Petrol Tanker	2
Trialer attached to above	Add 1
3 to 5 Axle Combination Tractor Trailer inc. Low Loader Petrol Tanker Bus (Excluding Municipal)	3
Municipal Bus More than 5 Axle Combination	4

The lane width coefficient is 0.85 and the shoulder width coefficient is 1.00. The proportion of heavy trucks during the peak hours is considered at most 5 percent. The coefficient is calculated as $0.95[100/(100-5+5\times 2)]$. The environmental condition of the road is considered as medium.

$$C_V = 2{,}500 \times 0.85 \times 1.00 \times 0.95 \times 0.9 \fallingdotseq 1{,}800 \text{ (pcu/hr)}$$

Thus, the practical traffic capacity is estimated 1,800 pcu per hour. And the main road with two lanes is considered sufficient for the traffic of approximately 900 vehicles in the peak hours.

However, considering the future growth of port activities improvement of the inland sub-road seem critical, since it connects Kampung Baru and Klademak without passing through the port area as planned by Hari Murthi.

Table 4.3.6. shows registered car ownership in Kabupaten Sorong. The number of cars in 1980 is 939 vehicles, 3 percent increase over that in 1979. This means to 7 vehicles per one thousand persons.

Table 4.3.6: Present Car Ownership in Kabupaten Sorong (1980)

(vehicles)

	1979 Total	General 1980		Special 1980		1980 Total	Percentage
		government	private	government	private		
I. Passenger Vehicle							
Sedan	76	–	–	18	51	76	
Jeep	80	–	–	61	22	83	
Public Vehicle	392	–	340	21	46	407	
Station Wagon	8	–	–	6	2	8	
Three wheel cycle	–	–	–	–	1	1	
Ambulance	–	–	2	–	–	2	
Total	558	–	349	106	122	577	61%
II. Wagon & Truck							
Wagon	151	–	74	51	31	156	
Small Wagon	6	–	1	3	2	6	
Pick-up	129	–	–	32	101	133	
Tractor	11	–	–	11	–	11	
Fire engine	2	–	–	2	–	2	
Oil Truck	11	–	–	10	1	11	
Fork Lift	5	–	–	5	–	5	
Total	315	–	75	114	135	324	35%
III. Bus							
Bus	30	3	–	12	15	30	
Small bus	8	–	–	3	5	8	
Total	38	3	–	15	20	38	4%
Car Total	911	3	424	235	277	939	100%
IV. Motor Cycle							
Motor Cycle	1,173	–	–	197	1,015	1,212	
Small motor cycle	25	–	–	4	23	27	
Scooter	80	–	–	11	71	82	
Total	1,279	–	–	212	1,109	1,321	

Source: 1. Daerah Kepolisian XVII Irian Jaya
2. Komando Resort Kepolisian 1707 Sorong

(5) Other Infra-structure

The water supply capacity of DPU in Sorong is 25 liter/sec. DPU supplies water by ϕ6" main pipe (18,450 m) in the built-up area at the following prices in 1980:

Government office, church, hospital and army camp	Rp 15/m³	45 units
Private house	25	1192
Factory and shop	75	167
The port	150	1

The intake is in the high reach of the Remu river, with its catchment area of 25 – 30 km². The water is not treated well and sometimes becomes slightly muddy in rainy seasons. DPU is now constructing a water treatment and distribution centre. Fig. 4.3.7. shows the water distribution network of DPU.

Besides the DPU facility, Pertamina has its own water supply system with capacity of 10 liter/sec. However, the water supply from these facilities is not sufficient and some houses use shallow wells.

Perusahaan Umum Listrik Negara (PLN) X in Sorong supplies electricity to the whole built-up area in Sorong. The equipment is not well maintained and stopages of electricity sometimes occur. Table 4.3.7. shows electricity generating capacity of PLN.

Besides, these generators, Pertaimina and fishery companies have their own generators to maintain a stable supply of electricity.

Table 4.3.7. Electricity Generating Capacity of PLN X of Sorong

Location	Number of Generators	Operating Capacity (km)	Designed Capacity (kW)
Klademak	10	2,220	4,308
Doom	3	170	445
Fak-Fak	5	570	729
Kaimana	2	50	104

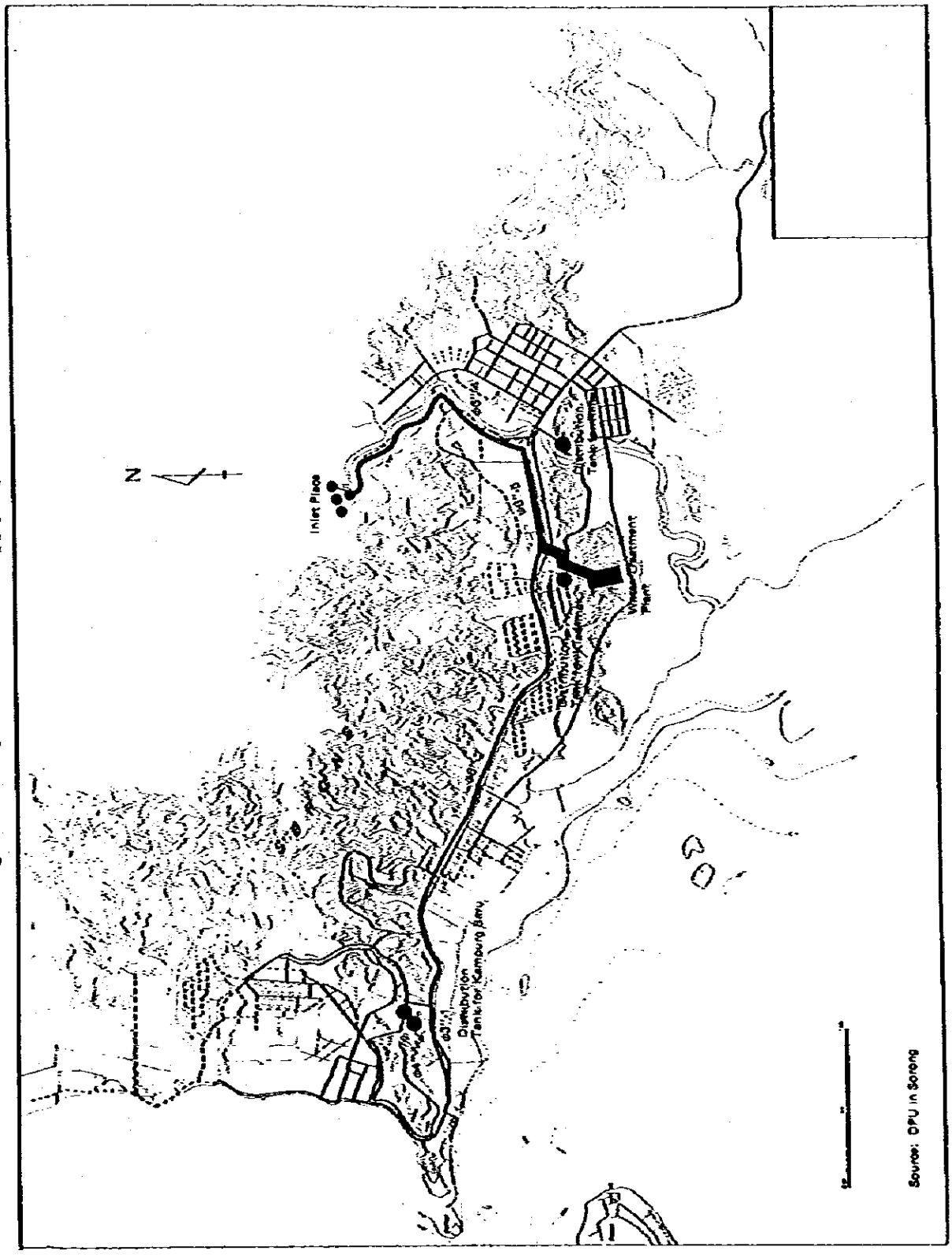


Fig. 4.3.7. Alignement of Water Supply Pipes

Chapter 5.
PORT OF SORONG

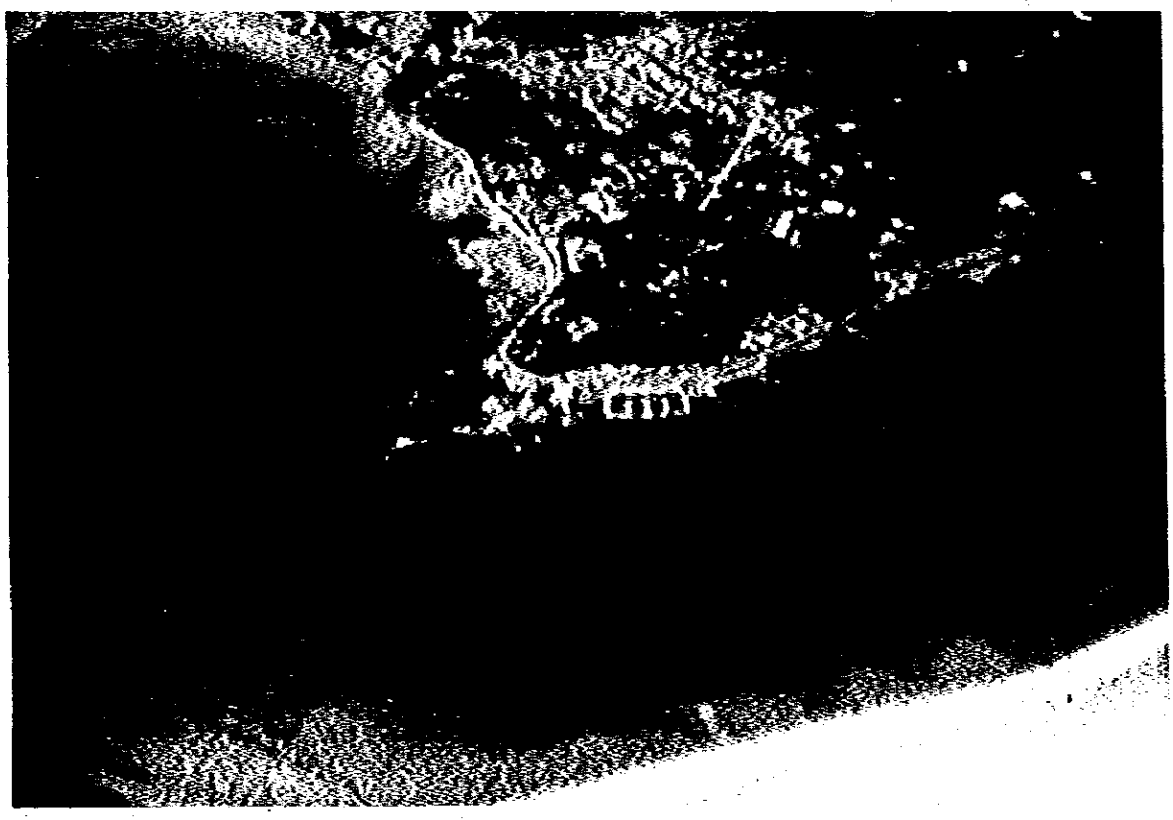
CHAPTER 5. PORT OF SORONG

5.1. Management and Operation

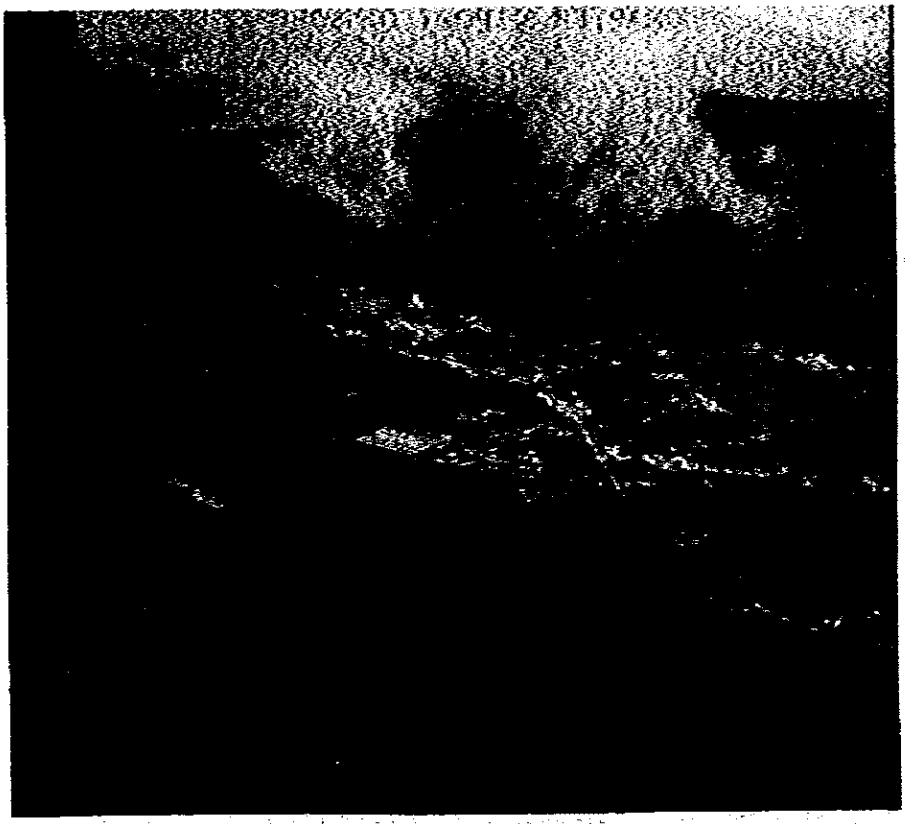
5.1.1. Administration

In Irian Jaya, there are four kinds of ports: the major ports (Jayapura, Manokwari, Biak, Sorong, Merauke and Fak-Fak totaling six) controlled by DGSC; small ports controlled by the major ports; other small ports controlled by local governments, and special ports operated by Pertamina and other private industries (fishery companies, etc.).

The Port of Sorong under Region IX DGSC at Jayapura is rated as third class. The Chief of Sorong Port (KEPPEL) is responsible for control, administration, maintenance of the public wharfs and port facilities and port operations (allocation of berths, clearance of vessels, etc.).

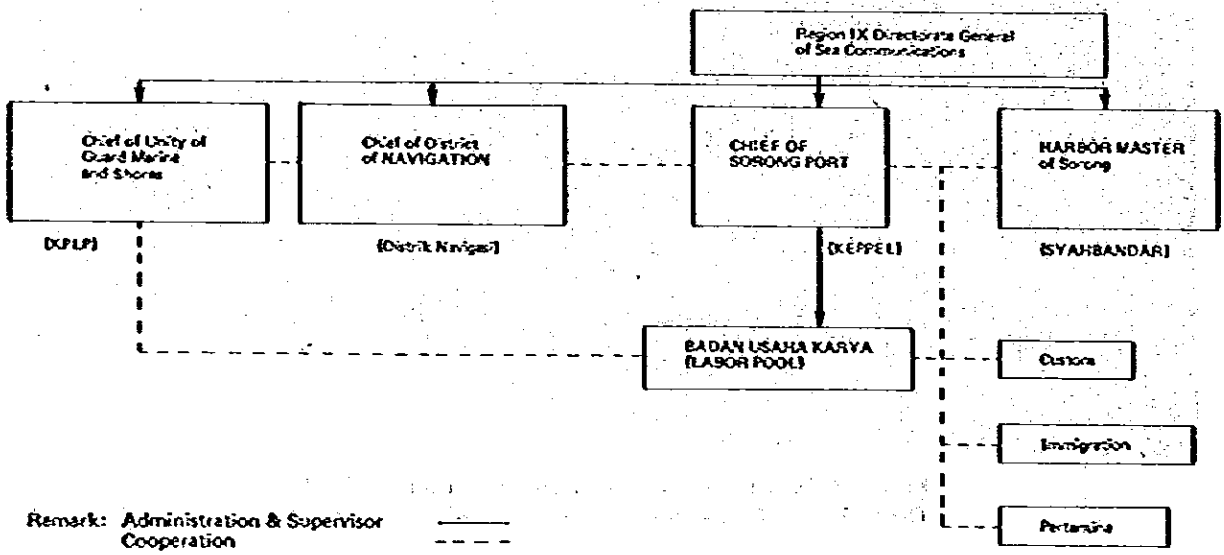


Kampung Baru, Tg. Nujew and the port area, from south side.
The back area of the port is delimited by hills.



Desa Remu area, from southwest side.

Fig. 5.1.1. Chart of Affiliated Organizations of Port Operations at the Port of Sorong



KPLP: Safety control at marine and coastal guard.
Distrik Navigasi: Navigation control with the system and maintenance of navigation aids.
Syahbandar: Issues the Port Clearance for the Certifications;
- Ship Technical conditions
- Certification approved to health
- Cargoes charged by Customes
- Immigration letter
- Harbour Dues and Port Dues to BPP, etc.

In the Sorong area, the oil jetty and the floating barge operated by Pertamina and the jetties operated by fishery companies are both located near the public wharfs.

Control of the Pentamina-owned jetties is entrusted to Pertamina by agreement between the Chief of Sorong Port and Pertamina. However, the fishery jetties are entrusted to fishery companies by agreement between the county of Sorong (Bupati Sorong) and those companies.

There are some other loading facilities in the Sorong area: namely, the loading facilities for crude oil of Philips at Salawati and of Trend at Kasim, and the loading points for logs at Salawati, Batanta and Misol. The organization affiliated with port operations are shown in the following figure.

5.1.2. Port Operation and Cargo Handling

The cargo and ships that use the public wharfs are controlled by the Port of Sorong. The following table shows the number of employees by job function.

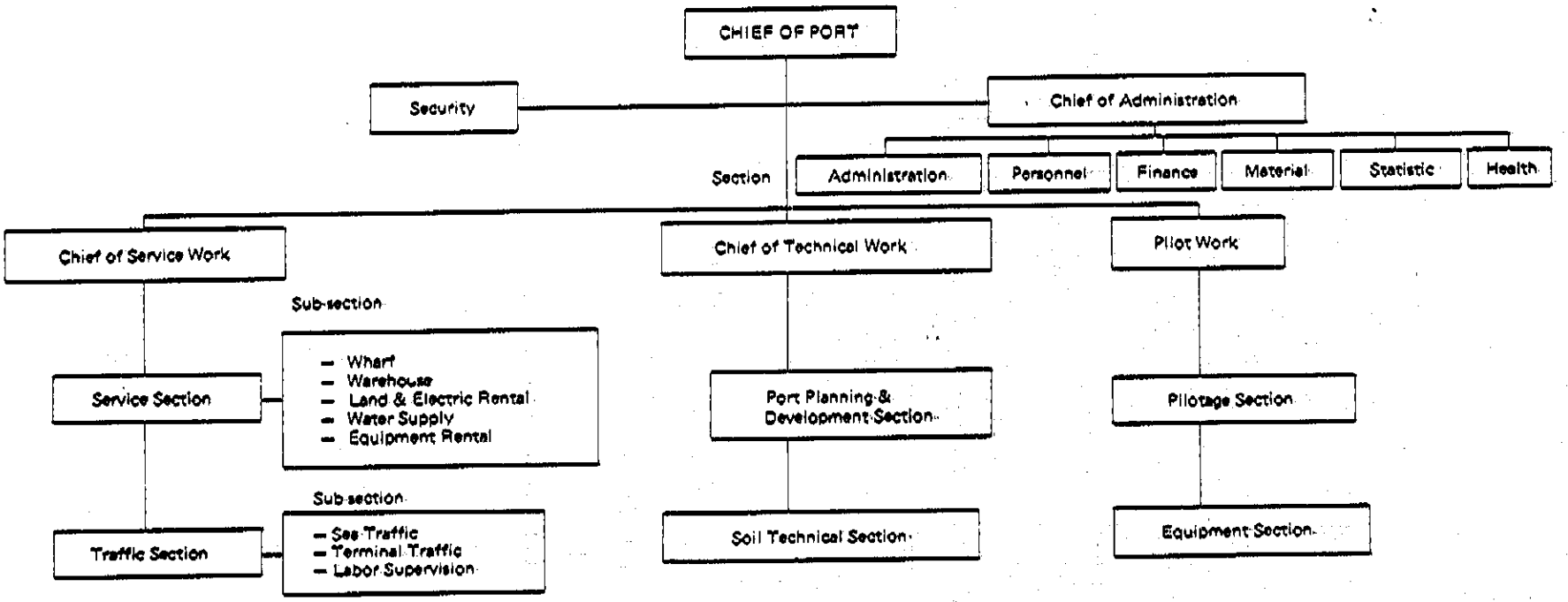
Table 5.1.1. Number of Employees at the Port of Sorong

Division	Number
Chief of port	1
Administration	19
Service work	20
Technical work	9
Pilot work	18 (Pilot 6, Crew 8)
Total	67

Source: KEPPEL of Sorong

The organization of the Port of Sorong is shown in the following figure;

Fig. 5.1.2. Organization Chart of Sorong Port Administration



Cargo handling at the port is carried out by Badan Usaha Karya (UKA-Labor Unit: registered habor workrs, numbered 425 as June 1980).

Cargo handling work is divided into stevedoring consisting of 15 workers per gang, cargodoring consisting of 15 workers per gang and delivery consisting of 30 per gang. Their working time is 10 hours including resting time of one hour. Their handling capacity is as follows:

Stevedoring : 10–15 tons per hour/gang
Cargdoring : 20 "
Delivery : 30 "
(Source: the Port of Sorong)
General cargo : 10 tons per hour/gang
Packed cargo : 15 " "
(rice, sugar etc.)
(Source: P.T. Pelni)

The number of gangs required for cargo handling is reported to UKA by shipping agents, who determine the number based on cargo type and volume. Therefore, shipping agents always keep detailed past records of cargo handling at the port.

5.1.3. Port Charge

The current main port charges at the Port of Sorong are summarized in the following table:

Table 5.1.2. Main Port Charge

Kinds	Application
1. Basin fee	Tariff x per m^3 by ship
2. Mooring charge	Tariff x day x per meter by ship
3. Towage	Tariff x HP x per hour
4. Pilotage	Tariff x per m^3 by ship
5. Open storage	Tariff x day x cargo ton
6. Warehouse storage	Tariff x day x cargo ton
7. Direct transport	Tariff x cargo ton
8. Equipment rental	Tariff x cargo ton
9. Water supply	Tariff x m^3
10. Cargo handling charge	Tariff x cargo ton (paid to UKA)

Source: BPP Sorong.
Note: 1. Some charges are not applicable to Perintis.
2. BPP Sorong has no tugboats; towing is carried out by Pertamina's tugboats and 10 percent of the towage is paid to BPP.

5.1.4. Financial Control

The table 5.1.3. shows the revenue and expense of the Port of Sorong. However, all revenues from port charges are paid to the Department of Finance and the expenses are covered by DGSC in the form of the annual budget.

Table 5.1.3. Revenue & Expense of Sorong Port

($\times 10^3$ Rp.)

Item	1977	1978	1979
Mooring charge	23,109	33,207	45,146
Basin fee	25,202	10,892	21,703
Towage	394	3,757	2,144
Pilotage	49,750	68,457	76,873
Open storage	82	351	948
Warehouse storage	–	4,000	9,165
Direct transport	1,732	2,021	3,302
Equipment rental	852	666	1,413
Water supply	1,510	2,252	2,685
Others	2,897	3,849	4,437
Revenue total	105,528	129,452	167,816
Personnel cost	23,868	28,762	32,331
General administration	6,004	5,979	7,379
Operation cost	4,094	3,909	7,590
Maintenance cost	17,485	16,392	35,254
Tax	(non)	(non)	(non)
Expense total	51,451	55,042	82,554
Net Income	54,077	74,410	85,262

Source: BPP Sorong

The budget system which is based on the fiscal year is called ICW (Indische Comptabiliteit Wet). A budget proposed by the DGSC needs the approval of the Department of Finance. This budget system is still applied to the ports in Irian Jaya.

5.2. Facilities and Utilization

5.2.1. Present Condition of Port Facilities

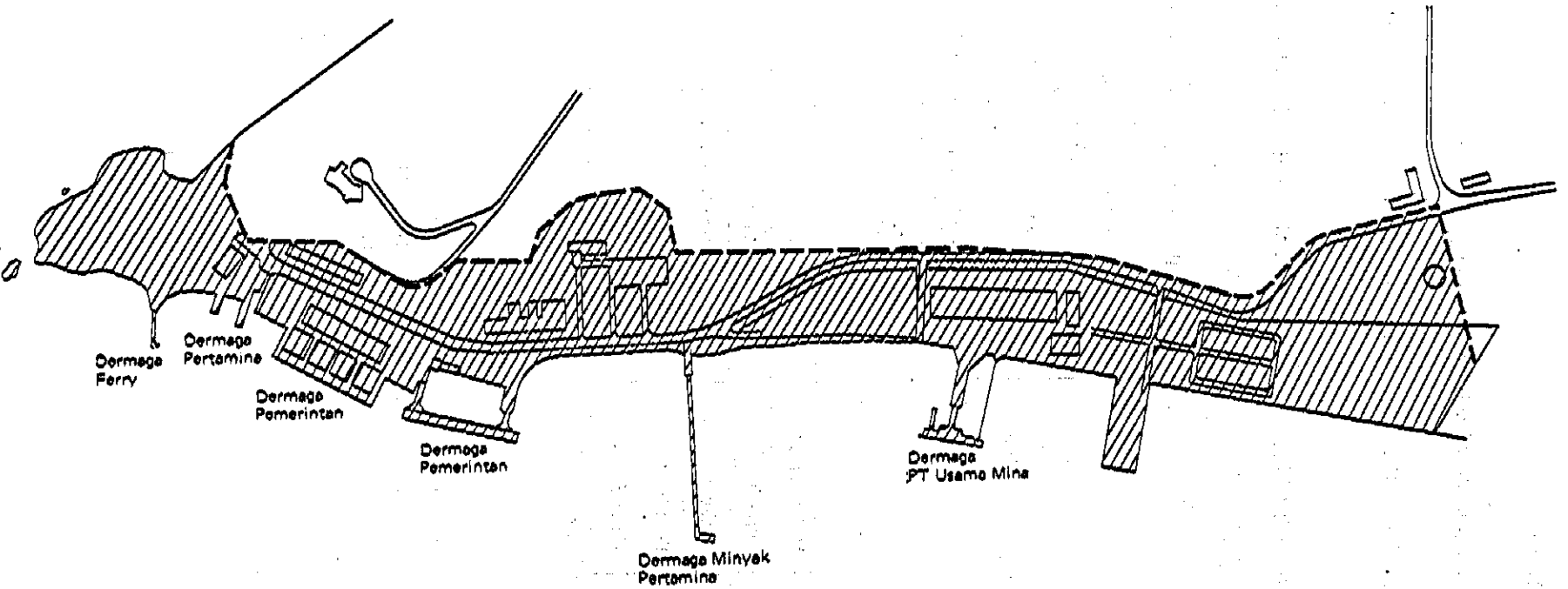
The present condition of the main public port facilities are as follows:

Table 5.2.1. Present Condition of Main Public Port Facilities

Name of Facilities		Quantity, Capacity, etc.
Channel		1. Width: about 500 m, Water Depth: -21 m to -37 m Length: about 4 km 2. Width: about 700 m, Water Depth: -14 m to -23 m Length: about 2 km
Mooring Basin		About 1.5 sq km with over -20 m depth within the harbour
Berthing Facilities		1. 307 m, -3 m to -15 m depth 2. 55 m, -3 m depth (Non B.P.P.) 3. 40 m, -15 m depth (Non B.P.P.)
Transit Sheds		2,782 m²
Open Storage Yard		5,833 m²
Cargo Handling Equipment	Mobile Cranes	1, each 3 t lift
	Forklift	3, each 3 t lift
Service Vessels	Tugboat	2, each 1,600 HP (Pertamina)
	Pilot Boat	2, each 125 HP
Others	Water Truck	—

Source: KEPPEL of Sorong

Fig. 5.2.1. The Port Area at the Port of Sorong



5.2.2. Approach Channel

Fig. 5.2.2. shows the port area and approach channel in the Port of Sorong.

The Port of Sorong has two approach channels:

1) From the south between Ombree island and Nanah island, the directions are In Port 32 S, Out Port 212 S.
   Present depth of channel is –21.0 m to –37.0 m
2) From the west between Doom island and Dofior island, the directions are In Port 102 S, Out Port 282 S.
   Present depth of channel is –14.0 m to 23 m.

Beacons are located in four places in the Port of Sorong. They cover the following directions:

I. VA : 00° – 53' – 21".5 S, 131° – 53' – 22".4 T
II. SIS : 00° – 53' – 07".970S, 131° – 15' – 22".176 T
III. DOP : 00° – 52' – 47".602S, 131° – 14' – 09".617 T
IV. TUN : 00° – 52' – 44".517S, 131° – 15' – 36".204 T

There is a calm and wide water area with –20.0 m water depth in the Port of Sorong, and this water area is used for anchorage.

5.2.3. Mooring Facilities

Table 5.2.2. and Fig. 5.2.3. show the mooring facilities in the Port of Sorong.

Fig. 5.2.2. The Port Area and Approach Channel

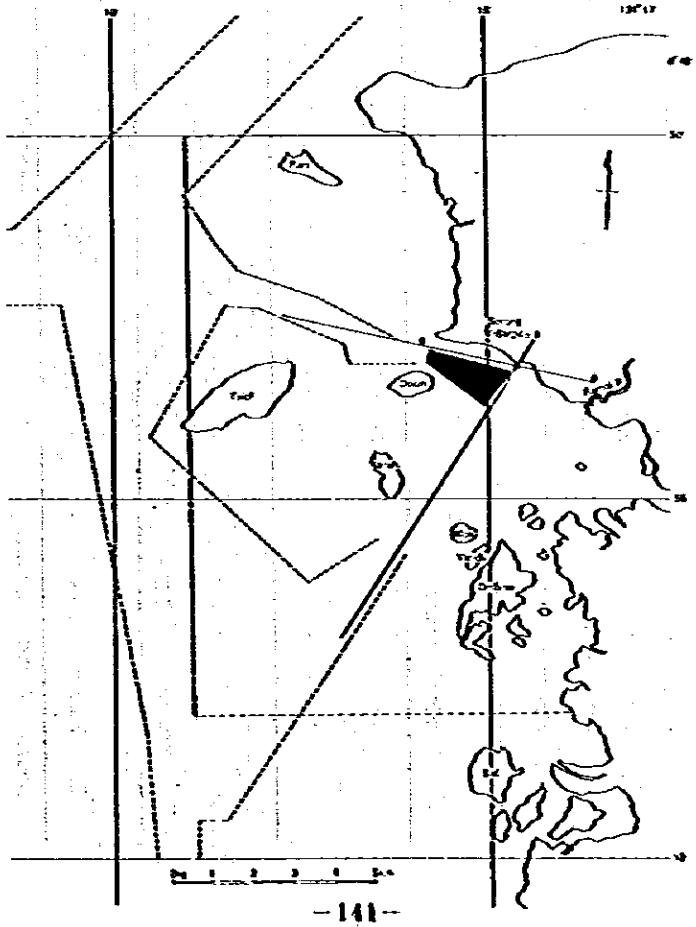


Table 5.2.2. Mooring Facilities in the Port of Sorong

(A) Keppel of Sorong

No.	Name	Location	Length (m)	Width (m)	Depth (m)	Surcharge (ton/m²)	Type of Structure	Utility	Facility Condition	Year Built
1.	Concrete Wharf	Sorong	120	12	15	3	Steel pile with concrete floor	–	100%	1978
2.	Wooden Wharf	Sorong	132	12	11	1,5	Steel pile with wood floor	–	70%	1950
3.	Ferry Jetty	Sorong	15	3	3	0,2	Wood quay	–	%	1975
4.	Doom Wharf	Doom	40	8	10	3	Concrete	–	50%	1959
5.	Mooring Buoy	Mooring basing	–	–	–	4	–	–	40%	1950

(B) Private Company

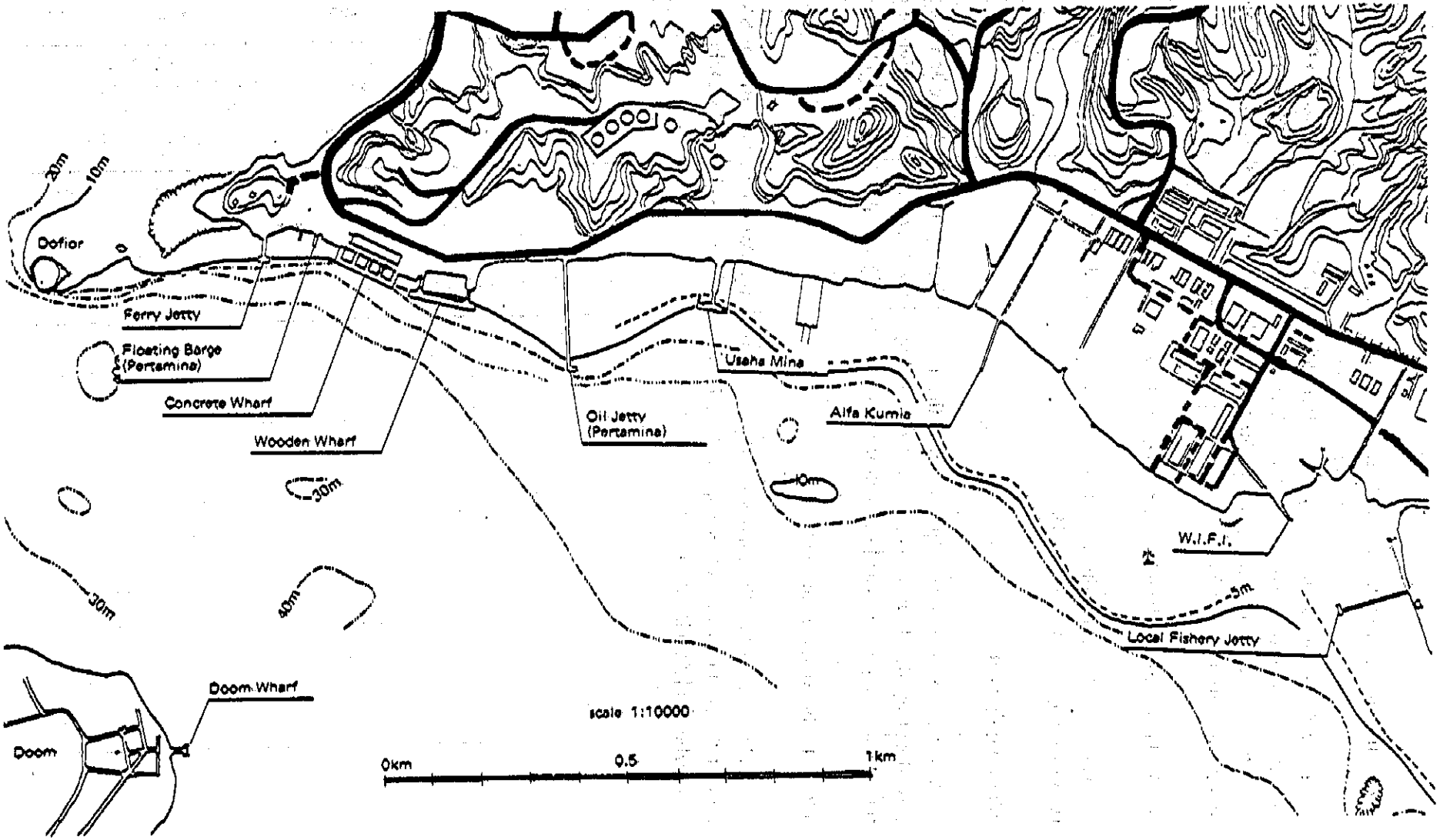
1.	Usaha Mina	Sorong	25	3	8	0,2	Steel pile with wood floor	–	75%	–
2.	W. I. F. I.	Sorong	15	3	3	1,5	Steel pile with wood floor	–	75%	–
3.	Alfa Kurnia	Sorong	15	3	2	0,2	Wood	–	70%	–

(C) Pertamina

1.	Oil Jetties	Sorong	40	5	15	–	Steel pile	–	90%	–
2.	Floating barges	Sorong	30	7	–		Steel	–	65%	–

Source: KEPPEL of Sorong

Fig. 5.2.3. Existing Port Facilities



5.2.4. Revetment, Bulkhead and Slipway

Table 5.2.3. shows the slipway in the Port of Sorong. The Port of Sorong has no revetment or bulkhead. Two private companies have their own slipways. Pertamina offers repair service for small boats, but the capacity is only 250 tons. Usaha Mina owns a slipway for her small boats, and its capacity is only 50 tons.

5.2.5. Transit Sheds, Warehouses and Open Storages

Table 5.2.4. shows the transit sheds, warehouses and open storages in the Port of Sorong (private companies are included).

5.2.6. Equipment

Table 5.2.5. shows the equipment in the Port of Sorong. Cargo loading and unloading are carried out by the derrick crane on the ship and by a mobile crane. Transportation of cargoes to transit sheds, warehouses and open storages is carried out by manpower, forklifts and trucks.

5.2.7. Tugboats and Pilot Boats

Table 5.2.6. shows the tugboats and pilot boats in the Port of Sorong. BPP of Sorong (the Port of Sorong) owns no tugboats, but they have two pilot boats (125 HP x 2). Pertamina owns two tugboats (1,600 HP x 2).

Table 5.2.3. Revetment, Bulkhead and Slipway at the Port of Sorong

No.	Name	Location	Length (m)	Width (m)	Depth (m)	Surcharge (ton/m²)	Type of Structure	Capacity Used	Year Built
1.	Dock Karim (Pertamina D. Yard)	Karim Island	25	12.5	3.2	250	Slipway from sheet pile with concrete floor	–	–
2.	Usaha Mina Slipway	Sorong	100	4		50	Slipway sheet pile with concrete pile	–	–

Source: KEPPEL of Sorong

Table 5.2.4. Transit Sheds, Warehouse and Open Storage at the Port of Sorong

No.	Name	Location	Scale			Surcharge (ton/m²)	Type of Structure	Remarks	Capacity Used	Year Built
			Length (m)	Width (m)	Depth (m)					
1.	Transit Sheds A	Sorong	97.5	20	1950	2.5	Steel frame with aluminium sheetwall		100%	1978
2.	Transit Sheds D	Doom	52	16	832	2	Steel frame		40%	1959
3.	Open Storage A	Sorong	–	–	3750	3	Asphalt pavement		100%	1978
4.	Open Storage B	Sorong	–	–	1475	1.50	Asphalt pavement		40%	1950
5.	Open Storage D	Doom	30,4	20	608	1.50	Asphalt pavement		40%	1959
6.	CV. VOA	Sorong	45	16	720	1.2	Wood frame	Non BPP Sorong	75%	
7.	Pemda Warehouse	Sorong			300		Wood frame	"		
8.	Forestry W. Houses	Sorong			240		Wood frame	"		
9.	Dolog	Sorong			2000		Steel frame	"		

Source: KEPPEL of Sorong

Table 5.2.5. Equipment (Mobile Crane, Forklift, Water Truck) at the Port of Sorong

No.		Capacity	Number	Owner	Capacity Used	Remarks
1.	Mobile Crane	3	1	B.P.P.	60%	–
2.	Forklift	5	1	B.P.P.	60%	–
3.	Hyster	3	2	B.P.P.	40%	–
4.	Mobile Crane	2,5	1	PT. Nindya Karya	–	–
		2,5	1	PT. Ponco Jaya	–	–
		5	2	Pertamina	–	–
5.	Forklift	2,5	1	Pertamina	–	–
		2,5	1	PT. Ponco Jaya	–	–
		2,5	1	PT. EMKL Cendraya	–	–
		2,5	2	PT. Usaha Mina	–	–
		3	2	PT. EMKL Irson Jaya	–	–

Source: KEPPEL of Sorong

Table 5.2.6. Tugboats and Pilot Boats at the Port of Sorong

No.		Power	Number	Owner	Capacity Used	Remarks
1.	Tugboats	1,600 HP	2	Pertamina	75%	–
2.	Pilot Boats	125 HP	2	BPP	60%	–

Source: KEPPEL of Sorong

5.2.8. Water Supply Facilities

Water supply to the vessels is operated by PAM/DPU. The capacity is limited because water supply by the city of Sorong is small.

5.2.9. Bunker Oil Supply Facilities

Bunker oil is supplied by Pertamina.
The capacity of supply at its jetty is only 50 tons per hour.

5.2.10. Electric Power Supply Facilities

The electricity for the Port of Sorong is supplied from PLN, but the new wharf is equipped with a power generator.

5.2.11. Repair Facilities

The Port of Sorong has no slipway.
Two private companies have their own slipways. Pertamina offers the repair service for small boats, but its capacity is only 250 tons. Usaha Mina owns a slipway for her small boats, and its capacity is only 50 tons.

5.2.12. Radio Communication Facilities

In the Port of Sorong, BPP of Sorong and Pertamina both have a radio communication facility.

5.2.13. Port Traffic Facilities

The waterfront area administered by the Port of Sorong has no dock road or railway.
There is one road which runs across the port to the city of Sorong.

5.2.14. Medical Facilities

The Port of Sorong has a port clinic which provides medical services. In addition, there are two large hospitals in the city of Sorong.

Chapter 6.
NATURAL CONDITIONS

CHAPTER 6. NATURAL CONDITIONS

6.1. Geographical Features

The Port of Sorong is located at the westernmost part of the main island of Irian Jaya at 0°53'S and 131°15'E.

There are many small and big islands such as Doom, Tsiof, Nanah, Moe, Ombree, Mar, Rombombo and Sarawati around the port. These islands prevent wave action from adversely effecting the port.

There are two rivers flowing into the port. The Klademak River, whose width is approximately 20 m at most, is very shallow and is becoming even shallower with the sedimentary soil. On the other hand, the Remu River, which runs into the south east part of the port, seems to transport much soil from the mountain area to the bay. The depth of the sea around the river mouth is shallow due to sedimentation of sandy soil.

The land around the port consists of a hilly land and a flat area. The hilly land rises from the flat area to several tens of meters high and countinues to the mountainous area. The flat area between the seashore and the hills is very narrow and its width is less than about 500 m at the port area.

The depth of the sea suddenly increases from 5 m to 20 m within less than about 200 m from the seashore.

6.2. Meteorological Conditions

(1) Wind

Fig. 6.2.1. shows the prevailing wind directions and the wind speeds in knots (monthly average). During January to February the prevailing wind direction is the north west and it gradually changes to the west or the north-northwest during March to April. After the north northwest wind in May, the wind direction varies within the range of the south east and the south-south west. In November, it changes to the south-west, and to the west in December.

The wind speed at Sorong is not so high, with the monthly average of less than 20 knots. However, as shown in Table 6.2.1., winds with the speed of 34 to 40 knots were observed twice during the period from 1965 to 1975 at the Yefman airport. The duration of the wind wasn't gauged at the Yefman airport.

The team installed an anemovane at the top of the roof of the passenger terminal on June 23, 1980 so that the detailed analysis could be carried out after collecting wind data.

Fig. 6.2.1. Wind Direction and Speed

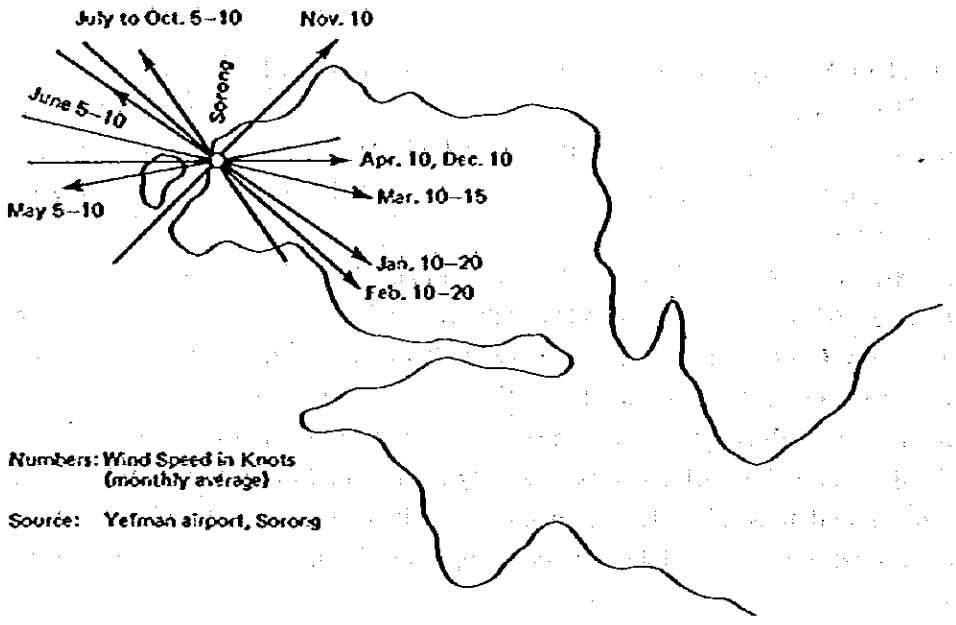


Table 6.2.1. Frequency of Wind by Speed (1965–1975)

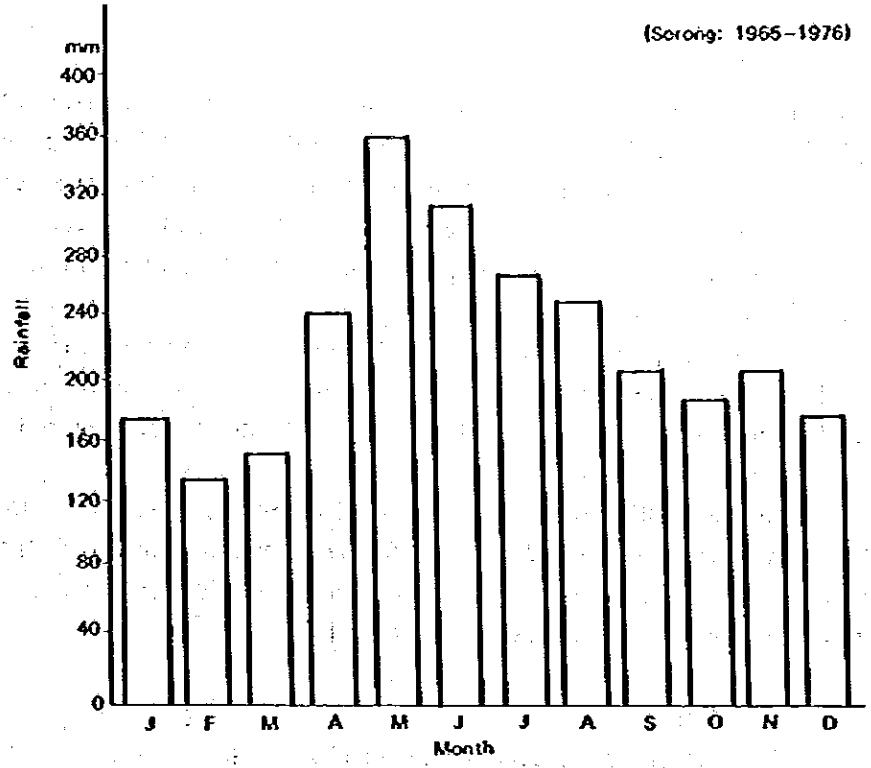
Speed (knots) / Month	Calm	1–3	4–6	7–10	11–16	17–21	22–27	28–33	34–40
Jan.	21	9	37	25	6	1	1		
Feb.	18	7	34	27	10	2	1	1	
Mar.	24	9	30	26	9	2			
Apr.	30	11	31	23	4	1			
May	25	8	36	22	7	1	1		
Jun.	15	7	33	27	13	2	1	1	1
Jul.	15	5	26	26	16	6	4	1	1
Aug.	12	12	32	26	11	3	2	1	
Sept.	18	17	22	25	10	5	2	1	
Oct.	23	12	32	24	7	1	1		
Nov.	33	5	35	19	5	1	1	1	
Dec.	27	13	37	18	3	1	1		

Source: Yefman airport, Sorong

(2) Rainfall, Temperature, Humidity and Atmospheric Pressure

The monthly average rainfall at Sorong from 1965 through 1976 is shown in Fig. 6.2.2. Temperature, humidity and atmospheric pressure are shown in Table 6.2.2.

Fig. 6.2.2. Average Monthly Rainfall



Source: Pelabuhan Sorong, Laporan Hydro-Oceanografi
Survey Dan Penelitian, Jawatan Hidro-Oceanografi, 1977

Table 6.2.2. Atmospheric Pressure, Temperature and Humidity (1966 – 1975)

Month	Atmospheric pressure (mb)	Temperature					Absolute humidity (%)		
		Daily average	Average		Absolute value		Local time		
			Max.	Min.	Max.	Min.	0600	1200	1800
Jan.	1009.6	27.4	30.4	24.8	32.8	20.8	89	76	81
Feb.	1008.9	27.4	30.4	24.8	35.0	19.3	88	75	81
Mar.	1008.9	27.4	30.8	25.0	33.5	20.2	89	76	81
Apr.	1009.0	27.3	31.0	25.8	33.8	20.8	92	75	83
May	1009.3	27.3	30.8	24.5	34.1	19.7	91	79	84
Jun.	1009.8	27.4	30.5	24.5	35.8	20.3	91	78	84
Jul.	1010.0	26.6	29.9	24.2	34.2	20.2	90	79	84
Aug.	1010.0	26.5	30.6	24.1	33.8	20.2	91	80	82
Sept.	1009.6	26.9	30.3	24.8	34.0	19.2	90	77	83
Oct.	1009.4	26.9	30.6	24.8	34.2	22.6	90	75	83
Nov.	1009.2	27.1	30.8	24.8	33.8	21.2	90	76	82
Dec.	1008.8	27.1	30.8	24.8	33.7	21.3	90	77	82
Average	1009.4	27.1	31.4	24.8	35.8	19.2	90	78	82

Source: Yefman airport, Sorong.