

**Table 15.6.15 Road Networks in Kalimantan**

		(unit:km)				
Province	Responsibility	Asphalt	Gravel	Earth	Others	Total
Kalimantan	National	3,401	1,613	192	253	5,459
	Provincial	2,742	1,747	1,678	336	6,503
	District	7,052	4,081	13,301	2,204	26,638
	Municipality	1,549	386	157	-	2,092
	Total	14,744	7,827	15,328	2,793	40,692
Study Area	National	1,915	1,613	192	253	3,973
	Provincial	1,403	819	1,115	92	3,429
	District	3,349	1,608	11,276	1,249	17,482
	Municipality	709	198	101	0	1,008
	Total	7,376	4,238	12,684	1,594	25,892

Source: Statistik Indonesia, 1996

The condition of the road network has improved steadily since rehabilitation began in the early 1980s. In 1995, about 36% percent of the total classified road network was reported paved (62 percent of national roads, 42 percent of provincial roads, 26 percent of district roads, and 74 percent of municipal roads).

The condition survey indicated that about 57 percent of the road network is in good or fair condition, while 42 percent of the district roads are in good or fair condition in Kalimantan. In the study area, 52 per cent of the roads is classified as in good or fair condition, while 64 per cent of roads is in good or fair conditions in Indonesia. Therefore, the road development in the region is left behind in terms of length and quality of roads.

Road conditions in Kalimantan are shown below:

**Table 15.6.16 Road Conditions in Kalimantan**

		(unit:km)				
Province	Responsibility	Good	Fair	Poor	Bad	Total
Kalimantan	State	3,401	1,613	192	253	5,459
	Province	3,625	1,590	755	533	6,503
	District	5,467	5,755	7,279	8,137	26,638
	Municipality	777	918	197	200	2,092
	Total	13,270	9,876	8,423	9,123	40,692
Study Area	State	1,915	1,613	192	253	3,973
	Province	1,105	1,186	605	533	3,429
	District	3,121	3,697	4,402	6,262	17,482
	Municipality	588	352	64	4	1,008
	Total	6,729	6,848	5,263	7,052	25,892

Source: Statistik Indonesia, 1996

**Road Networks of the Study Area**

The road network in the West Kalimantan has expanded rapidly in recent years, from 3,782.5 km in 1981 to a total of about 9,191.2 km in 1995. (national roads: 1,468 km or 16 %, provincial roads: 2,056 km or 22 %, and district roads: 7,538 km or 82 %). More than 34 % of all roads is paved by asphalt and some 59 % of the road network is reported in good or fair condition. The length of national and provincial roads was 2,901 km in 1995 and 81 % was paved by asphalt, while 77 % of the roads is in good or fair condition. The road network in Central Kalimantan has been expanded from 2,227 km in 1981 to 7491.4 km in 1995. (national roads: 382 km, provincial roads: 823 km, district roads: 5,955 km). More than 34 % of the road network is paved by asphalt and 48 % of the road network is reported in good or fair condition.

The road network in the study area is shown in Table 15.6.17.

**Table 15.6.17 Road Networks and Conditions by District**

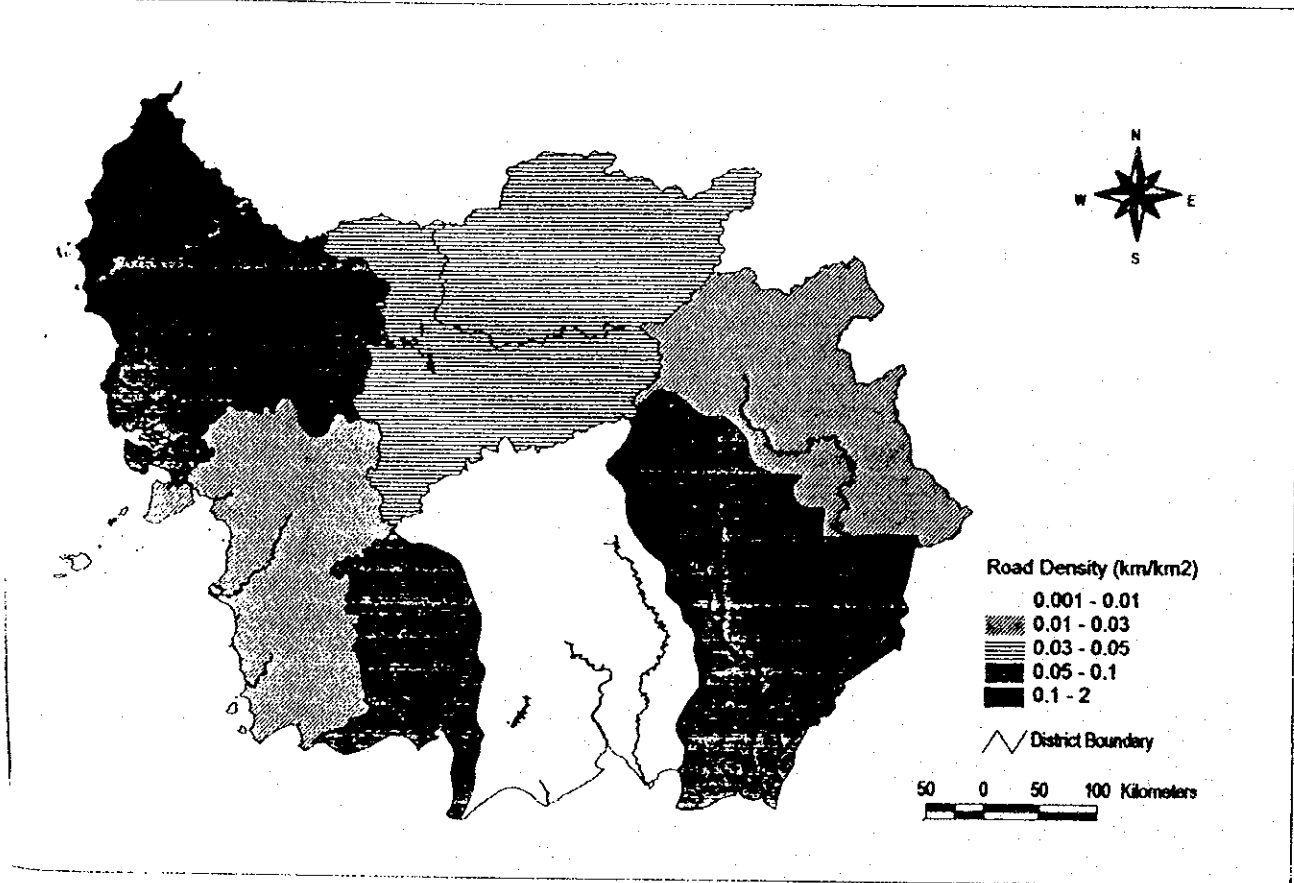
(Unit : Km)

		National Road		Provincial Road		District Road		Municipality		Total	
		Length	%	Length	%	Length	%	Length	%	Length	%
Pavement Type	West Kalimantan	1995									
	Asphalt	1,016.1	20	1,343.8	35	1,915.8	45	-	-	3,103.5	100
	Gravel	0.0	0	117.3	20	1,266.3	80	-	-	950.1	100
	Earth	0.0	0	424.1	7	5,367.8	93	-	-	5,137.5	100
	Other	0.0	0	0.0		0.0		-	-		
	Total	1,016.1		1,885.2		8,549.9		-	-	9,191.1	
	Central Kalimantan	1995									
	Asphalt	318.9	12	489.8	19	1,496.4	58	265.5	10	2,570.6	100
	Gravel	63.1	7	229.8	25	570.1	63	43.65	5	906.7	100
	Earth	0.0	0	104.3	4	2,193.1	95	20.72	1	2,318.1	100
Other	0.0	0	0.0	0	1,696.1	100	0.0	0	1,696.1	100	
Total	382.1		823.9		5,955.6		329.9		7,491.4		
Road Conditions	West Kalimantan	1995									
	Good	675.2	66	807.5	43	1,387.1	22	-	-	2,869.8	100
	Fair	170.7	17	582.3	31	733.4	12	-	-	1,486.4	100
	Poor	32.3	3	81.3	4	3,741.3	60	-	-	3,854.9	100
	Bad	137.9	14	414.1	22	329.4	5	-	-	881.3	100
	Total	1,016.1		1,885.2		6,191.1		-	-	9,092.5	
	Central Kalimantan	1995									
	Good	370.6	14	519.0	19	1,651.7	60	189.7	7	2,731.0	100
	Fair	11.5	1	225.9	12	1,488.4	81	121.1	7	1,846.9	100
	Poor	0.0	0	0.0	0	666.4	97	17.25	3	683.7	100
Bad	0.0	0	79.0	2	2,149.2	51	2,000.00	47	4,228.2	100	
Total	382.1		823.9		5,955.7		2328		9,489.7		

Source: Kalimantan Barat Dalam Angka, 1996  
Kalimantan Tengah Dalam Angka, 1996

Road expansion occurred mainly on district roads resulting more from the inclusion of logging roads rather than new construction. In Central Kalimantan, only 9 % of national and provincial roads are in good or fair condition.

Figure 15.6.4 Road Density by District



Source: The JICA Study Team

Road density in the area ranges from 0.2 km/km<sup>2</sup> in Sambas district to 0.008 km/km<sup>2</sup> in Kotawaringin Timur. The figure shows that the road density in West Kalimantan is relatively high compared to that of Central Kalimantan. The middle part of Central Kalimantan recorded the lowest road density.

### Traffic Volume

The existing traffic volume in the study area is relatively low about 1,000 vehicles per day on the national highway and less than 500 vehicles per day on the provincial and district roads. The composition of vehicles data shows that 29 % are motorcycles, 35 % are passenger cars and vans, 12% are of buses, 15 % are trucks and 9 % are non motorized traffic at the survey

point near Pontianak. It means that more than 38 % of the traffic is motorcycles or non motorized traffic. Traffic volume in Central Kalimantan is relatively low being less than 500 vehicles/day in most of sections (see Figure 15.6.5).

### **Road Maintenance and Rehabilitation**

Since mid-1980, highway expenditure programs have shifted towards more in improved maintenance and rehabilitation. The DGH has developed a comprehensive and integrated road management system (IRNS), to plan, program, budget and design betterment and periodic maintenance work programs and has collected periodically, key data such as traffic and road conditions for the national and provincial highways. District officials have primary responsibility for making district road programs based on guidelines and within a budget envelope determined by the central government. Local governments, the provincial Bina Marga and Dinas Bina Marga, have responsibility for all aspects of road maintenance on the provincial and district road networks.

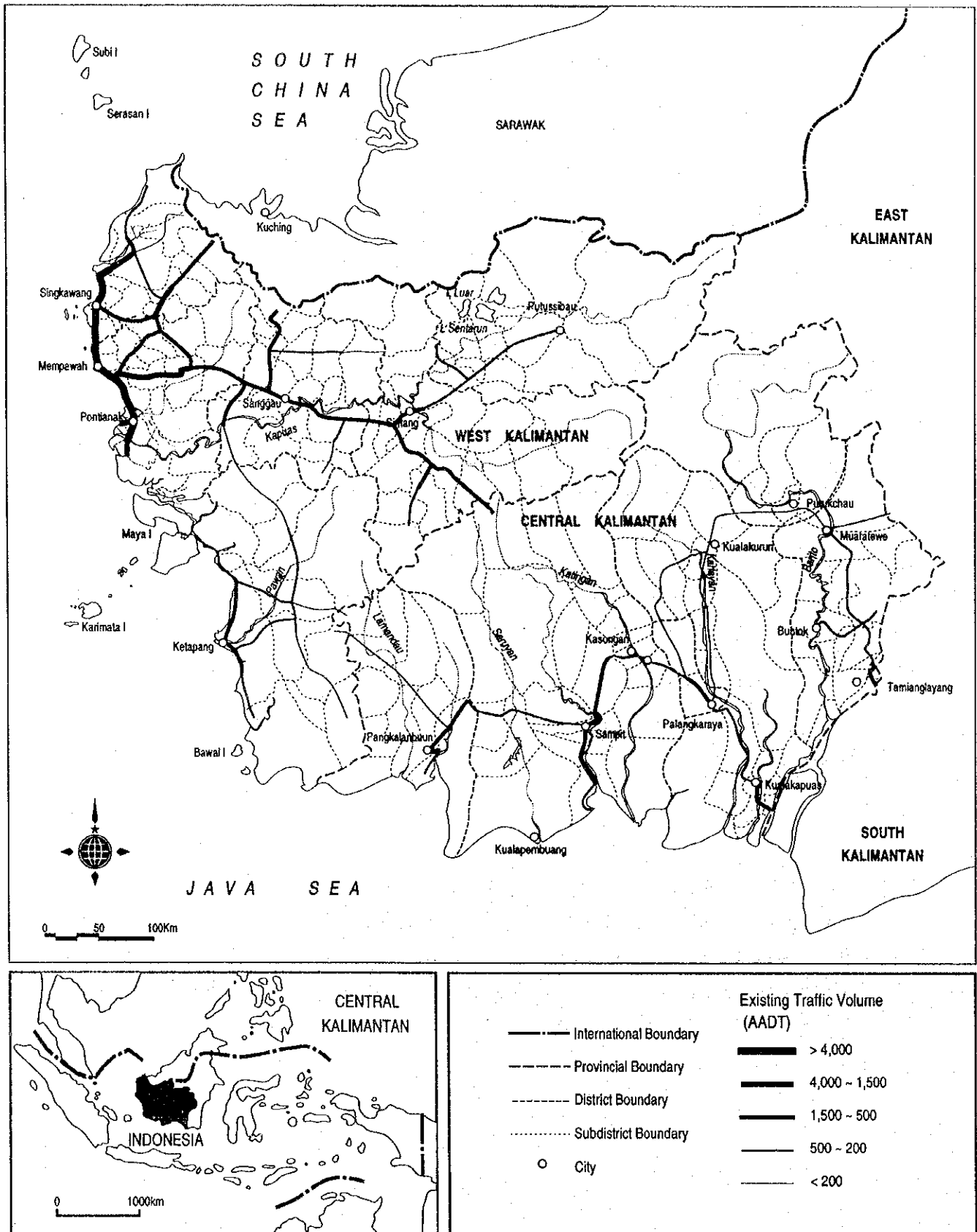
The provincial governments also put emphasis on the maintenance and rehabilitation of provincial and district roads. In 1995, maintenance and rehabilitation shared 67% of the provincial budgets for roads in the study area. The maintenance and rehabilitation of provincial and districts roads has been constrained by the lack of funding and equipment. The central government sets criteria for workshops and equipment management. Private contractors also have been faced with difficulties in performing their jobs because of poor equipment.

### **(3) Road Transport**

#### **Vehicle Registration**

The registered fleet of four-wheel motor vehicles was estimated at 40,357 in 1995. Commercial vehicles, buses and trucks, accounted for 51 percent of the total registered four-wheel vehicles. Motorcycles numbered 208,261 or 83 percent of registered vehicles in 1995. The amount of registered vehicles in West Kalimantan is three times as many as that of Central Kalimantan. Registered vehicles have grown rapidly, averaging around 10 percent in both provinces, yet the growth rate of Central Kalimantan is even higher than that of West Kalimantan.

Figure 15.6.5 Existing Traffic Volume in the Study Area



**Table 15.6.18 Number of Registered Vehicles in the Study Area**  
(Unit: Number)

Regency/Municipality	Kinds of Vehicles				Total
	Motor-cycles	Passanger Cars	Buses	Trucks	
<b>West Kalimantan</b>					
1. Sambas	28,061	848	711	1,824	31,444
2. Pontianak	8,216	633	469	1,231	10,549
3. Sanggau	7,201	255	279	461	8,196
4. Ketapang	13,156	276	87	455	13,974
5. Sintang	6,725	406	89	383	7,603
6. Kapuas Hulu	1,579	51	71	84	1,785
7. Kodya Pontianak	87,463	12,997	971	8,206	109,637
<b>Total</b>	<b>152,401</b>	<b>15,466</b>	<b>2,677</b>	<b>12,644</b>	<b>183,188</b>
<b>Annual Growth Rate (%) (1992-1995)</b>	<b>10.0</b>	<b>9.7</b>	<b>5.4</b>	<b>6.0</b>	<b>9.7</b>
<b>Central Kalimantan</b>					
1. Kotawaringin Barat	9,570	721	33	923	11,247
2. Kotawaringin Timur	15,298	1,161	50	919	17,428
3. Kapuas	0	0	0	0	0
4. Barito Selatan	3,938	72	6	238	4,254
5. Bariro Utara	4,501	253	43	221	5,018
6. Palangkaraya	22,553	2,048	1,206	1,686	27,493
<b>Total</b>	<b>55,860</b>	<b>4,255</b>	<b>1,338</b>	<b>3,987</b>	<b>65,440</b>
<b>Annual Growth Rate (%) (1992-1995)</b>	<b>10.0</b>	<b>18.5</b>	<b>34.3</b>	<b>9.9</b>	<b>10.7</b>

Source: Kalimantan Barat Dalam Angka, 1996  
Kalimantan Tengah Dalam Angka, 1996

### Road Passenger Transport

Bus services are operated by private operators and there is no government intervention except tariff regulations. Interurban bus services are operated by the private sector. Tariffs are regulated by the local government but this has not been a major problem for the level of services. Bus services on district roads are provided by privately owned minibuses.

### Road Freight Transport

Trucks have become a dominant mode of freight transport due to road network expansion. Trucks consist of public carriers, for hire services and own-account operations by private sector firms and Government corporation. The ease of entry into the trucking market and the relatively flexible enforcement of regulations allow for trucks to expand at a rapid pace.

(4) River Transport

River Traffic

River traffic used to be the only available mode of transport in the region. The settlement pattern in the region has been developed along rivers. There are 25 navigable rivers in the study area, of which 14 are situated in West Kalimantan. The Kapuas, the largest river in West Kalimantan, covers 70 % of West Kalimantan. Those rivers are used for transporting goods and passengers for long distances.

**Table 15.6.19 Navigable Rivers in West Kalimantan**

No.	River Name	Length of Navigatable River (Km)	Condition		
			Good (Km)	Fair (Km)	Poor (Km)
West Kalimantan					
1.	Kapuas	870	190	600	80
2.	Landak	162	95	29	54
3.	Sekayam	110	0	110	0
4.	Melawi	227	0	227	224
5.	Ketungan	105	0	41	64
6.	Ambawang Besar	52	52	0	0
7.	Kubu	38	38	0	0
8.	Punggur Besar	73	73	0	0
9.	Batu Ampar	100	100	0	0
10.	Mendawak	53	53	0	0
11.	Sambas	208	183	25	0
12.	Jelai	125	30	0	105
13.	Pawan	107	50	20	20
14.	Kendawangan	68	30	0	38

Source: Kalimantan Barat Dalam Angka, 1996

In Central Kalimantan, since road density is relatively low and road development is relatively new, river transport is still the dominant mode of transport. River transport provides 80 % of the transportation services in Central Kalimantan. In Central Kalimantan, river transport is still important in the area of the KAKAB river basin and upstream rural areas.

**Table 15.6.20 Navigable Rivers in Central Kalimantan**

No.	River Name	Length of Navigatable River	Number of River Ports
Central Kalimantan			
1.	Jelai	100	1
2.	Arut	190	2
3.	Lamandau	250	2
4.	Kumai	100	1
5.	Seruyan	300	1
6.	Mentaya	270	3
7.	Katingan	520	4
8.	Sebangau	150	1
9.	Kahayan	500	9
10.	Kapuas	420	4
11.	Barito	780	12

Source: Kalimantan Tengah Dalam Angka, 1996

There are eight channels in Central Kalimantan to connect rivers as shown Table 15.6.21. The eastern part of the Central Kalimantan is connected by channels. Since river transportation still the dominant mode of transport in Central Kalimantan, channel maintenance and development should be in good condition until the completion of the road network. Those channels constructions have determined the transportation network as well as spatial structure in Central Kalimantan. It is classified as a soft soil area where road construction is difficult.

**Table 15.6.21 List of Channels in Central Kalimantan**

Name of Channel	Length (km)	Width (m)	Depth (m)
Tambang Nusa	25	15	6-4
Simpur	2	20	5-3
Kelampan	14.6	20	2.3-1.5
Basarang	24.6	30	2.3-1.5
Terusan Raya	18	20	2.3-1.5
Batu Raya	6	6	2.3-1.5
Serapat	28	35	2.3-1.5
Tamban	22	20	2.3-1.5

Source: Perhubungan Dalam Angka 1994/1995

However, river transport is limited during low water levels, during the dry season and in small stream. It also has problems of long transport times and damage to transported goods. Recently, the road network expansion to the deep river basin has shifted basin's distribution pattern from river to road. River transport has deteriorated as the road network has expanded. Table 15.6.22 shows the number of ships in the study area.



It shows that the number of the ships has not changed during five years, yet the activities of the ships have been deteriorating recently. It is partly because expansion of road network to upstream areas and modes of transport have changed from river to road.

**Table 15.6.22 Number of Ships in West Kalimantan**

Type of Boat	1990	1991	1992	1993	1994	1995
1. Bandung	139	1,041	1,042	2,040	1,026	1,077
2. Bandung without motor	486	492	493	492	352	370
3. Ship	10,669	10,685	10,689	10,689	10,687	11,221
4. Lighter (Bing) (Tongkang Gandeng)	1,325	1,325	1,325	1,298	1,073	1,127
5. Lighter (Kapal Tunda)	88	88	92	89	78	82
6. Tanker	47	49	49	51	51	54
7. Tanker without motor	203	206	206	20	201	211
8. Long Boat	2,715	2,718	2,689	2,689	2,682	2,816
9. Speed Boat	778	792	783	751	742	779
10. Kapal Penyeberangan	4	4	4	5	6	5

Source: Kalimantan Barat Dalam Angka, 1996

### Ferry Facilities in the Study Area

The major national highways have increased traffic volume in the study area. The ferries have been replaced by bridges in high traffic sections, yet it is still important to connect the road networks in some sections. There are five ferry facilities in West Kalimantan. River ports are situated in the Kapuas river basin. Table 15.6.23 shows the major river port facilities. The list of ferry services in the study area is shown below:

**Table 15.6.23 List of Ferry Facilities in West Kalimantan**

	River Crossing	River Port	Main Terminal For River Boat
West Kalimantan	Sekura	Sambas	Sei Raya
	Pontiakak	Pontianak	
	Tayan	Sanggau	
	Pasau Jaya	Singtang	
	Tl. Batang	Semitau	
		Putussibau	
		Nang Pinoh	
		Ketapang	

Source: Perhubungan Dalam Angka, 1994/1995

There are three ferry facilities which are still utilized for river crossings. Since river transportation has played an important role in Central Kalimantan, there are many river crossing facilities at the district level. The list of river crossing facilities in Central Kalimantan is shown below:

**Table 15.6.24 List of River Crossing Facilities in Central Kalimantan**

River Crossing Ports	River Ports	
	Name of District	Number of Port
Central Kalimantan		
Pulang Pisau	Palangkaraya	5
Pulau Telo	Kapuas	17
Kapuas	Barsel	4
	Barut	4
	Kotim	7
	Kobar	6

Source: Perhubungan Dalam Angka, 1994/1995

The important ferry routes include Pontianak city, Rs. Jaya-Tl. Batang, and Telok Bating-Ketapang in West Kalimantan.

**Table 15.6.25 Ferry Traffic Data in West Kalimantan**

Name of Route	Length (km)	Crossing Time (minute)	Number of Boat (s)	Trips	Total Passengers
West Kalimantan					
1. Sintan-Bardan	-	15	1	19,840	489,085
2. Bardan-Siantan	-	15	1	20,114	492,020
3. Rasau Jaya-Ketapang	350	960	1	107	35
4. Ketapang-Rasau Jaya	350	960	1	104	16
5. Tl. Kalong-Tj. Harapan	-	15	1	5,532	48,169
6. Tj. Harapan-Tl. Kalong	-	15	1	5,517	46,494
7. Tayan-Teraju	-	15	1	2,589	3,218

Source: Perhubungan Dalam Angka, 1994/1995

The ferry services are provided by the public and private sectors. The major ferry services in Central Kalimantan are shown below:

**Table 15.6.26 Ferry Traffic Data in Central Kalimantan**

Name of Route	Passenger	4-wheel vehicles	Motorcycles
Central Kalimantan (1996)			
1. Pulang Pisau-Kelawa	6,984	15,917	6,824
2. Pulau Telo-Maluen	11,600	43,214	9,721

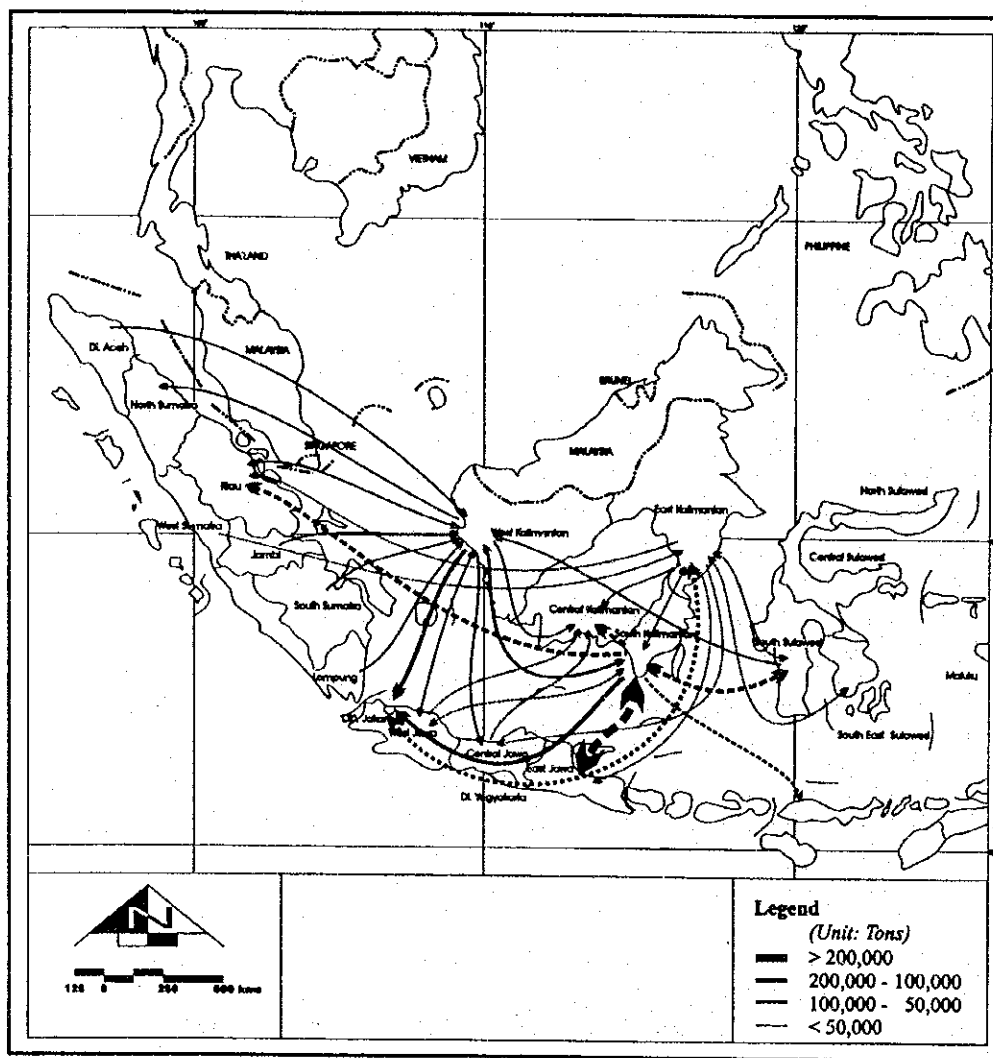
Source: Perhubungan Dalam Angka, 1997/1998

**(5) Ports and Shipping**

The structure of ports in the national transportation system is divided into three categories; international trunk ports, major trunk ports, and minor trunk ports. Feeder ports are further divided into regional feeder and local feeder ports. A international trunk port functions as an international sea cargo port as a hub in international sea transport network system. A major trunk port services national and limited international sea cargo. It functions as a hub of national and limited international sea transport network system. A minor trunk port serves regional and national sea cargo. Feeder ports handle small volumes and cover a relatively small service area.

Figure 15.6.6 shows Inter-Provincial cargo transport volume. The figure shows that the study area has strong linkages with Java cities, Jakarta and Surabaya especially. Pontianak port covers Sumatra and Java, while Banjarmasin and Balikpapan ports have links with Surabaya and Sulawesi.

**Figure 15.6.6 Inter-Provincial Cargo Volume**



Source: Statistik Pengapalan Barang, 1996

## Port Development in Kalimantan

Shipping in Kalimantan has historically been a primary mode of transport to link the other islands and a dominant mode of transportation. In the era of a river basin economy, major city centers are developed downstream of the river to transport goods and commodities to other islands. To enhance the region's economic activities, provision of its efficient ports and shipping systems are essential in Kalimantan because it can not support their economic activities without linkages to other islands. The government selected 15 major ports in Kalimantan of which six are located in the study area. The port classification in Kalimantan is shown in Table 15.6.27.

**Table 15.6.27 Port Classification in Kalimantan**

Function of port	Name of Port	Location	Remarks
1. Class II	Banjarmasin	Central Kalimantan	Study Area
2. Class III	Pontianak	West Kalimantan	Study Area
	Sampit	Central Kalimantan	Study Area
	Balikpapan	East Kalimantan	
	Samarinda	East Kalimantan	
	Lhok Tuan	East Kalimantan	
	Tanjung Laut	East Kalimantan	
3. Class IV	Pemangkat	West Kalimantan	Study Area
	Pangkalanbun	Central Kalimantan	Study Area
	Pulang Pisau	Central Kalimantan	Study Area
	Kotabaru	South Kalimantan	
	Lingkas Tarakan	East Kalimantan	
	Tanjung Santan	East Kalimantan	
	Sangata	East Kalimantan	
	Tanah Grogot	East Kalimantan	

Source: Pemantapan Rencana Tata Ruang Pulau Kalimantan

The government has selected 25 strategic ports in Indonesia of which four ports, in Pontianak, Banjarmasin, Balikpapan, and Samarinda located in Kalimantan, are to promote regional development, while there is no strategic port in Central Kalimantan.

### Port Development in the Study Area

There are six major ports in West Kalimantan and five ports in Central Kalimantan. All ports in the study area are located on rivers. Only Pontianak and Sampit ports are managed by Pelindo II and III and other ports are managed by the MOC's regional office. Ports in the study area have been developed to handle goods and commodities born in the river basin where the port is situated. The size of ports is determined by the area of the river basin.

In West Kalimantan, Pontianak port, located 32 km from the sea, is classified as a regional port to serve feeder lines with other islands. Only Pontianak port is operated by the Pelindo II which is a public corporation for port management. Since Pontianak port is situated in the city center, it is an obstacle to the city as well as to port expansion. The port in its present location hinders city development. The other ports in the study area are classified as feeder ports and cover relatively small areas.

The existing port facilities are summarized below:

**Table 15.6.28 Existing Port Facilities in West Kalimantan**

Description	Name of Port					
	Pontianak	Ketapang	Sambas	Singkawang	Sintete	Telok Air
1 Port Class	II	V	V	V	V	V
2 Management	Perindo II	Perhubungan	Perhubungan	Perhubungan	Perhubungan	Perhubungan
3 Location	River	River	River	River	River	River
4 Channel from Sea						
Length (m)	32,500	10	2,000	2,413	16,000	3,512
Width (m)	80	60	8	25	50	1,852
Depth (m)	5	3	6	1	2	6
5 Ship maneuvering						
Area (Ha)	280,000	3,600	1,669	17,500	0	12
Depth (m) Min/Max	7/12	3.5/12	6/12	1.2/2.4	2.5/7.5	5/12
6 Quay						
Length (m)	9,388	280	296	280	120	0
Built in	1936	1975	1966	1948	1983	
Constructed with	Wood	Wood	Wood	Wood	Wood	
7 Storage Facilities						
Area (m <sup>2</sup> )	1,710	1,302	200	72	450	
Constructed with	Wood	Wood	Wood	Wood	Wood	
Built in	1935	1975	1966	1948	1975	
8 Passenger						
Area (m <sup>2</sup> )	1,600	1,000	0	0	400	0
Constructed with	Concrete	Asphalt	0	0	Asphalt	0
Built in	1989	1985	0	0	1975	0
9 Passenger Area (m <sup>2</sup> )	800	120	120	0	93.75	0

Source: Perhubungan Dalam Angka, 1994/1995

Pontianak port has 938 m of quay with wood and a new passenger terminal of concrete completed in 1989. Since all ports in the study area are located on rivers, the channels should be maintained at their present depth and width by dredging. The government should spend Rp 26,000 million annually for dredging in Pontianak port.

In Central Kalimantan, ports are relatively small compared to those of West Kalimantan due to river catchment areas. Sampit port, the largest port in Central Kalimantan, is classified at level III, which is a regional feeder port and serves the western part of Kalimantan. It has 316 m of quay with concrete and 1,128 m<sup>2</sup> of storage facilities. The other ports have relatively small facilities.

**Table 15.6.29 Existing Port Facilities in Central Kalimantan**

Description	Name of Port				
	K.Bengkirai	Sampit	P. Pisau	Kapuas	Pangkalanbun
1 Port Class	V	III	IV	V	IV
2 Management	Perhubungan	Perhubungan	Perhubungan	Perhubungan	Perhubungan
3 Location	River	River	River	River	River
4 Channel from Sea					
Length (m)	113	35,000	15,000	19	22
Width (m)	-	50	80	-	-
Depth (m)	1.0	4.8	4.5	-	0.6
5 Area (ha)					
Ship manoeuvre	-	232,633	1,669	17,500	0
Land	-	14.7	6/12	1.2/2.4	2.5/7.5
6 Quay					
Length (m)	-	316	90	100	86
Built in	-	1994	1974	-	1981
Constructed with	Wood	Concreat	Wood	Wood	Wood
7 Storage Facilities					
Area (m2)	-	1,128	1,000	-	500
Constructed with	-	Wood	-	-	Wood
Built in	-	1974	1974	-	1979
8 Passenger					
Area (m2)	-	3,000	780	0	1000
Constructed with	-	Concreat	Gravel	0	Gravel
Built in	-	1994	1974	0	1984
9 Passenger Area (m2)	-	1,053	-	-	-

Source: Perhubungan Dalam Angka, 1994/1995

Cargo handling volumes in West Kalimantan's port are shown in Table 15.6.30.

Total handling volume in West Kalimantan has not changed over the last five years handling about 3.8 million tons of goods annually. The Pontianak port, the dominant port in West Kalimantan, handles 3 million tons of goods annually and the share of Pontianak port was 87 % in 1996 and has not changed over five years. Pontianak port can handle general and liquid cargo as well as container cargo. The handling of container cargo has increased dramatically as much as 70 times during the 1991-1996 period. The other ports have no container handling facilities.

Telok air port, located 70 km south of Pontianak, is expected to expand its capacity yet it is situated in the peat soil areas. Further expansion of the port is questionable because it is very difficult to construct an access road. Without road access, the development of port will not be feasible.

Sintete port, located on the northern side of Pontianak, is expected to handle goods and logistics to supply Nutuna island development. In this case further expansion will be required.

**Table 15.6.30 Port Handling in West Kalimantan**

		1991	1992	1993	1994	1995	1996
<b>Pontianak</b>							
General Cargo	Ton	2,441,603	2,593,318	2,319,633	2,013,715	1,817,511	2,093,113
Bagged Cargo	Ton	154,740	148,842	207,228	166,920	181,326	166,217
Liquid Cargo	Ton	576,126	609,165	686,498	697,808	711,784	762,121
Sub-Total	Ton	3,172,469	3,351,325	3,213,359	2,878,443	2,710,621	3,021,451
Container Cargo	Ton	4,267	22,384	36,765	119,299	266,583	291,765
	Box	568	2,516	4,026	12,260	24,068	20,708
	TEUs	604	2,838	4,854	13,768	26,166	44,140
<b>Total</b>	<b>Ton</b>	<b>3,176,736</b>	<b>3,373,709</b>	<b>3,250,124</b>	<b>2,997,742</b>	<b>2,977,204</b>	<b>3,313,216</b>
<b>Ketapang</b>							
General Cargo	Ton	178,174	155,355	202,015	97,931	25,271	35,110
Bagged Cargo	Ton	19,145	15,855	22,871	14,610	22,521	36,818
Liquid Cargo	Ton	-	-	-	-	-	-
Palet	Ton	93,505	89,832	87,458	77,366	80,651	79,165
<b>Total</b>	<b>Ton</b>	<b>290,824</b>	<b>261,042</b>	<b>312,344</b>	<b>189,907</b>	<b>128,443</b>	<b>151,093</b>
<b>Sintete</b>							
General Cargo	Ton	76,414	80,706	105,661	132,129	118,096	100,679
Bagged Cargo	Ton	88,923	55,353	45,251	41,552	67,002	71,824
Liquid Cargo	Ton	0	0	0	0	1,350	1,445
Palet	Ton	15,913	16,461	15,083	24,536	14,350	18,025
<b>Total</b>	<b>Ton</b>	<b>181,250</b>	<b>152,520</b>	<b>165,995</b>	<b>198,217</b>	<b>200,798</b>	<b>191,973</b>
<b>Telok Air</b>							
General Cargo	Ton	0	0	0	0	0	0
Bagged Cargo	Ton	0	0	0	0	0	0
Liquid Cargo	Ton	0	0	0	0	0	0
Palet	Ton	166,834	171,996	174,782	168,807	161,533	124,968
<b>Total</b>	<b>Ton</b>	<b>166,834</b>	<b>171,996</b>	<b>174,782</b>	<b>168,807</b>	<b>161,533</b>	<b>124,968</b>
<b>Grand-Total</b>	<b>Ton</b>	<b>3,815,644</b>	<b>3,959,267</b>	<b>3,903,245</b>	<b>3,554,673</b>	<b>3,467,978</b>	<b>3,781,250</b>

Source: Pelindo II Data

In Central Kalimantan, total handling has increased from 1.6 million tons to 3.0 million tons during 1991-1996. Sampit port handles 43 per cent of the provincial total handling followed by Pangkalanbun port of 24.4 per cent and Pulang Pisau port of 17 per cent. Major handling commodities are forestry goods for export and daily necessities as import goods.

In Central Kalimantan, Banjarmasin port has played an important role to transport goods and commodities from/to the study area. Banjarmasin port, located in South Kalimantan, covers large areas of both South and Central Kalimantan. Banjarmasin port is controlled under Pelindo III and has 1,218 m of reinforced concrete deck as well as 70m of berth for passenger vessels. It handled 9.5 million tons of general cargo and 51.6 thousand TEUs of container cargo in 1995 and the second largest port in Kalimantan followed by Balikpapan port. Recently, port handling has increased at the rate of 27 percent annually during 1992-1995 for all cargoes. Banjarmasin, however, has incurred for dredging costs of Rp. 38,818 million annually, which is recorded the highest dredging costs in Indonesia.

Cargo handling in Central Kalimantan is shown below:

**Table 15.6.31 Port Handling in Central Kalimantan**

	(Unit: Ton)					
	1991	1992	1993	1994	1995	1996
<b>Sampit</b>						
Domestic Cargo						
Unloading	184,621	167,712	152,295	207,796	242,454	228,575
Loading	757,756	754,500	842,368	932,067	596,804	988,525
International Cargo						
Export	56,672	101,633	79,828	83,178	78,785	107,981
Import	40	500	1,211	-	-	1,054
Total	999,089	1,024,345	1,075,702	1,223,041	918,043	1,326,135
<b>Pulang Pisau</b>						
Domestic Cargo						
Unloading	137,497	142,729	108,915	118,492	137,964	163,115
Loading	225,794	122,794	111,999	96,004	238,796	266,236
International Cargo						
Export	1,111	525	89	291	83	-
Import	58,212	49,158	525	38,973	67,210	72,797
Total	422,614	315,206	221,528	253,760	444,053	502,148
<b>Kuala Kapuas</b>						
Domestic Cargo						
Unloading	43,466	30,721	12,901	12,709	227,560	53,137
Loading	52,454	77,927	160,522	176,954	426,007	210,563
International Cargo						
Export	52,043	50,234	44,764	35,452	91,429	-
Import	-	-	-	-	83	-
Total	147,963	158,882	218,187	225,115	745,079	263,700
<b>Pangkalanbun</b>						
Domestic Cargo						
Unloading	-	31,050	38,371	71,583	65,215	93,052
Loading	-	148,370	133,529	109,386	114,886	417,842
International Cargo						
Export	-	217,529	183,589	204,166	200,665	210,861
Import	-	6,034	8,891	6,777	6,000	-
Total	-	402,983	364,380	391,912	386,766	721,755
<b>Kerang Bengkirai</b>						
Domestic Cargo						
Unloading	8,670	9,590	7,160	6,020	5,808	13,511
Loading	2,450	65,100	73,710	6,001	81,293	130,540
International Cargo						
Export	-	-	-	-	-	-
Import	-	-	-	-	-	-
Total	-	74,690	80,870	12,021	87,101	144,051
Grand Total	1,569,666	1,976,106	1,960,667	2,105,849	2,581,042	2,957,789

Source: Pelindo III Data

## Shipping

During the 1980s, the government decided to deregulate maritime transport to participate in the private sector in this field. As a result, maritime transport has improved significantly in service and the reduction in rates on trunk domestic routes. There are three categories of shipping companies in Indonesia:

1. State owned operators, such as PT. Pelni



2. The main private operators, which belong to INSA (Indonesia National Shipping Organization)
3. Rakyat operators which belong to PELLA

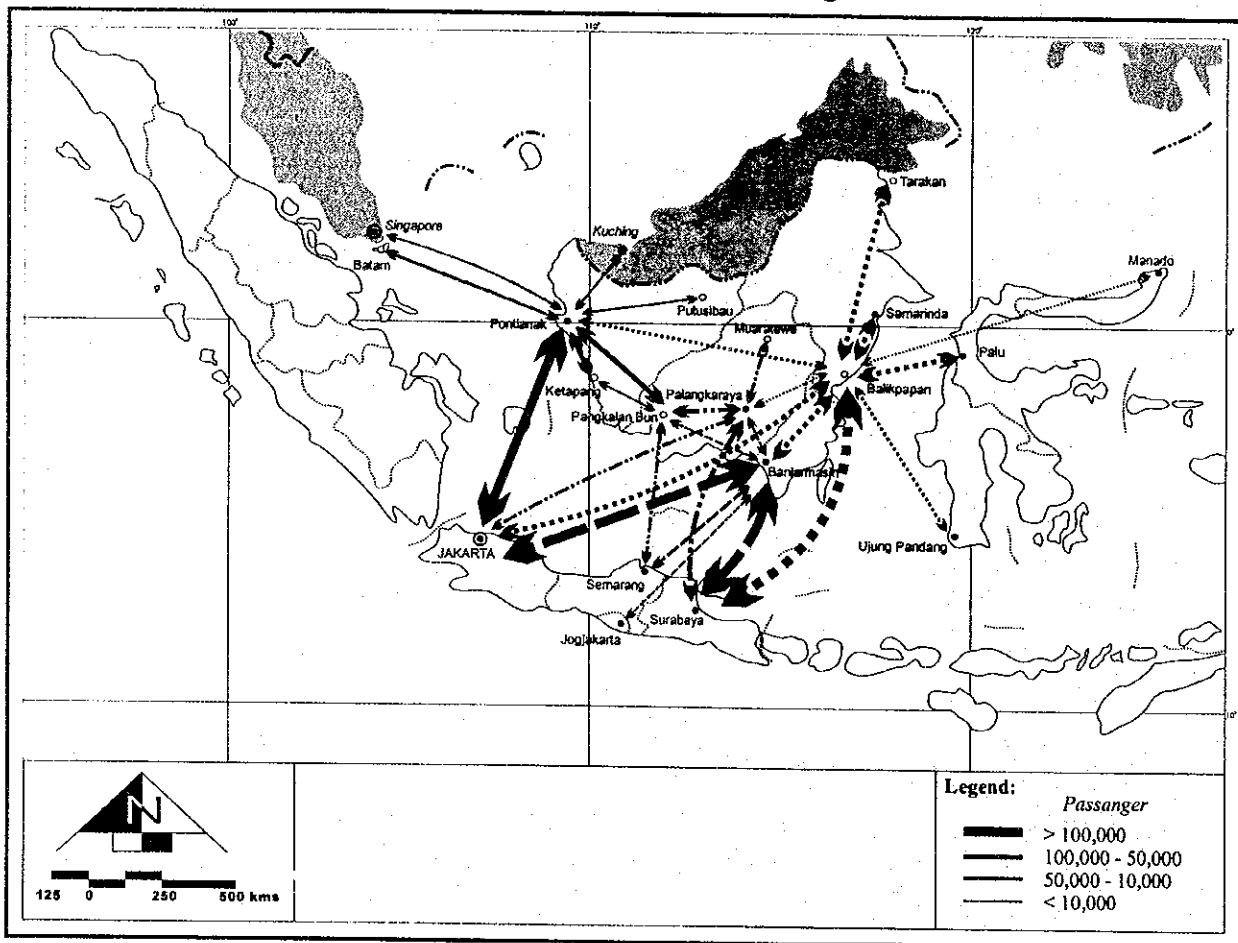
The restrictions on vessel imports have constrained the ability of private national lines to compete with regional services.

**(6) Airport**

**Airport development in Kalimantan**

There are 533 airports and airstrips in Indonesia of which 146 airports are integrated into the civil aviation network. The government selected 40 strategic airports in the country of which six airports, Balikpapan, Banjarmasin, Pontianak, Palangkaraya, Sampit and Ketapang, are selected from Kalimantan. Those airports are classified as Balikpapan for primary, Banjarmasin and Pontianak for secondary and the others for tertiary airports. The air passenger traffic for Kalimantan is shown in Figure 15.6.7.

**Figure 15.6.7 Annual Air Passenger Traffic**



Source: Statistik Angkatan Udara, 1995

## Airports in study area

There are 16 airports in the study area. Pontianak airport is the only international airport and has routes to Malaysia and Singapore. Palangkaraya has a class II airport which connects major cities in other islands. The list of facilities is shown below:

**Table 15.6.32 List of Airport Facilities**

No.	Location (Airport Name)	Class	Elevation (m)	Runway			Taxiway		Apron		Terminal	
				Length (m)	Width (m)	Airplane Type	Pave- ment	Length (m)	Width (m)	Length (m)	Width (m)	Area (m <sup>2</sup> )
<b>West Kalimantan</b>												
1.	Pontianak (Supadio)	I	3	1,850	30	F-28	AC	75	18	147	80	6,499
2.	Ketapang (Rahadi Osman)	III	10	1,400	30	CN-235	A	75	15	120	40	640
3.	Sintang (Susilo)	IV	30	1,300	30	C-212	A	75	15	60	40	540
4.	Putussibau (Pangsuma)	IV	90	1,004	23	C-212	A	120	18	80	45	240
5.	Nanga Pinoh	IV	31	1,000	23	C-212	A	75	15	60	40	100
6.	Liku (Paloh)	IV	15	750	23	DHC-6	SG	75	15	-	-	60
7.	Singkawang II	IV	16	970	30	DHC-6	S	75	15	60	40	50
<b>Central Kalimantan</b>												
1.	Palangkaraya (Tjilik Riwut)	II	25	1,850	30	F-28	AC	113	20	138	80	1,700
2.	Sampit (H.Asan)	III	3	855	23	C-212	AC	75	15	60	40	400
3.	Pangkalanbun (Iskandar)	III	23	1,650	30	F-27	AC	95.5	18.6	94.4	77.5	750
4.	Muaratewh (Beringin)	IV	38	900	23	C-212	A	75	15	74	40	240
5.	Buntok (Sanggu)	IV	7	750	23	C-212	A	61.5	12	40	60	200
6.	TumbangSamba	V	62	650	23	BN-2a	A	75	15	60	40	50
7.	Kotawaringin Timur (Kuala Pembuang)	V	4	850	23	C-212	A	75	15	60	40	100
8.	Kuala Kurun	V	30	750	23	C-212	A	75	15	60	40	120
9.	Dirun		135	850	23	C-212	G	75	18	6	40	-

Note: A: Asphalt

AC: Asphalt Concrete

SG: Sand Gravel

S: Sand

G: Gravel

Source: DGAC data

## Air traffic in the study area

Pontianak airport is the dominant airport in West Kalimantan sharing 97 % of air passengers in 1995. The air passengers have increased at a rate of 5 % per year in Pontianak airport, while the three other airports, Sintang, Putussibau and Nanga Pinoh, have decreased during 1990-1995 period. It implies that air passengers have shifted to road traffic as road networks have expanded to the upper stream of the Kapuas river.

Palangkaraya is the major gateway to Central Kalimantan by air and its share of the air traffic is 56 % of the total air passengers in Central Kalimantan. Pangkalanbun, the second most important airport in the province, shares 21 % of the total air passengers which include tourists to Tanjung Puting National Park. Sampit airport, however, lost half its air passengers to

become 26 thousand in 1995 because of passengers shifting to road transportation. The handling of air cargo has changed only a little during the last ten years.

**Table 15.6.33 Airport Activities in the Study Area**

Location Airport name	Number of Take-off/ Landings	Passengers	Baggage (kg)	Aircargo (kg)	Airmail (kg)	
<b>West Kalimantan</b>						
Pontianak Supadio (Domestic)						
1985	13,460	281,733	3,317,821	2,913,122	219,202	
1990	14,650	373,148	3,925,997	3,922,948	379,556	
1995	13,210	457,063	5,711,462	3,261,374	342,446	
Pontianak Supadio (International)						
1985	0	0	0	0	0	
1990	0	0	0	0	0	
1995	513	13,935	166,105	106,583	0	
Sintang Susilo						
1985	706	4,595	33,350	8,502	10,933	
1990	1,615	7,112	27,017	2,759	11,497	
1995	426	623	507	24	0	
Putusibau Pangsuma						
1985	732	4,743	38,023	2,937	7,305	
1990	1,526	9,046	64,268	13,870	5,014	
1995	480	2,040	10,860	3,776	1,406	
Ketapang Rahadi Usman						
1985	3,125	24,051	145,160	44,964	11,628	
1990	4,074	30,539	151,288	88,627	13,606	
1995	4,560	34,069	156,962	49,450	10,258	
Nanga Pinoh						
1985	320	2,027	18,573	8,825	1,911	
1990	346	2,054	16,937	12,884	985	
1995	173	324	3	0	0	
<b>Total</b>						
1985	14,898	291,071	3,389,194	2,924,561	237,440	
1990	17,791	389,306	4,017,282	3,939,577	396,067	
1995	14,629	473,661	5,888,934	3,371,757	343,852	
Growth Rate (1985-1995)		0%	5%	6%	1%	4%
<b>Central Kalimantan</b>						
Palangkaraya						
1985	11,671	128,421	723,459	621,626	68,092	
1990	10,376	131,086	784,613	850,155	200,734	
1995	5,864	171,325	1,280,685	860,364	296,996	
Pangkalanbun Iskandar						
1985	5,360	46,122	262,714	159,180	13,954	
1990	6,314	80,574	468,036	201,990	32,524	
1995	5,657	63,712	291,870	221,734	43,160	
Sampit HASAN						
1985	7,147	48,931	254,628	52,838	31,575	
1990	7,918	80,627	368,564	221,508	40,128	
1995	2,992	25,771	123,489	77,052	20,604	
Muaratewh Beringin						
1985	2,214	12,981	87,642	5,956	23,419	
1990	1,598	13,822	52,240	74,676	20,496	
1995	789	11,265	66,313	5,792	18,284	
<b>Total</b>						
1985	29,837	262,533	1,492,176	893,389	150,579	
1990	30,626	338,702	1,841,678	1,449,640	308,473	
1995	20,035	306,466	1,919,322	1,214,392	389,302	
Growth Rate (1985-1995)		-4%	2%	3%	3%	10%

Source: DGAC data

## **Airline industry**

Six airlines, state-owned Garuda Indonesia Airlines and its affiliated Merpati Airlines, private Sempati, Bouraq, Mandala, and Dirgantara Airlines, operate scheduled domestic flights. There are small commuter airline companies for irregular flight services and charter flights.

Four airlines, Garuda Indonesia Airlines, Merpati nusantara Airlines, Sempati Air Services, and Bouraq Airlines, are operating 416 international scheduled flights per week on 161 air routes.

## **Airline Safety**

The accident rate on regular freight services is extremely high in Indonesia about 10 times higher than that of the world. The main reasons for the high accident rate are poor airport facilities, poor maintenance of aircraft, poor technical level of pilots, etc. Comprehensive safety measures are required to overcome this problem.

## **15.7 POTENTIAL AND CONSTRAINTS**

### **15.7.1 Development Constrains**

The region's economy can be characterized by a forest and agricultural based economic structure. The region has heavily depended upon river transport, and the road infrastructure development started in 1970s, when logging companies established logging camps in the upper stream areas of the river basins. Logging roads were installed from logging camps to extraction sites. Logs are transported by the trucks from forest to river and floated to downstream cities. Port facilities are also developed at the major city centers of the rivers to export logs to other islands. Therefore, the level of infrastructure services is relatively low, yet it is appropriate in the present economic situation. There are several structural reasons for the low infrastructure level. The development of the transport system has been constrained by socio-economy, institutional, and natural conditions of the study area.

#### **(1) Socio-economic Constrains**

##### **Low population density**

The peculiar feature of the study area is the low population density of 17.5 persons/km<sup>2</sup>, which is far below the national average of 100.5 persons/km<sup>2</sup> in 1995. In Central Kalimantan, the population density is 10.6 persons/km<sup>2</sup> which is the lowest among the four Kalimantan

provinces. In 1995, the study area had 5.3 million of people of which 68% live in West Kalimantan. The population is dispersed in the study area with little population concentration. The level of urbanization is 22.7 per cent in both provinces, which are far below the national average of 36 per cent in 1995. The settlement accumulations are found along the coastal and the inland river basins, yet most of the areas account for a population density of less than 50 persons/km<sup>2</sup>. Pontianak, the most populous city in the study area, has more than 400 thousand people followed by Palangkaraya of 100 thousand. The other urban centers are found to be less than 100 thousand people. It means that the transportation infrastructure provision has always questioned whether it is economically feasible because installation of the facility requires a large amount of capital investment yet it generates few benefits. Therefore, the region's infrastructure level is low compared to other areas of Indonesia.

### **Economic activities**

The region's economy has been characterized as a forest based economy which accounts for around 30 % of the GRDP. The major export commodities are forestry and its products account for more than 80 % of the total export. The forest based industry, especially logging operations, is heavily dependent upon the river for transporting logs from site to city, where the forest related industries are located. Road development was started by the logging companies to transport logs from forest to river. However, road development has had a limited impact on the regional economy and transportation pattern, because it is classified as a private road and exclusively used by the logging company. There is little need for the establishment of a road transportation system and the level of infrastructure in the study area is almost appropriate for the level of economic activity. However, consulting the economic development plans to be implemented in the near future, infrastructure should be provided especially to plantation development areas as well as other agricultural development areas.

### **(2) Institutional Constrains**

#### **Administration**

The transportation administration in Indonesia is dispersed among several ministries and agencies, and there is no coordination body of the integrated transportation system in the central government as well as the local governments. At local level, some functions are overlapping between central and local governments. Since 1993, KANWIL has decentralized its implementation function to the provincial government and has focused on the coordination and monitoring of the central government's funded projects. It is the first step to resolve part of the problem.

## **Financing**

Government expenditure on the transport sector accounts for 20 % for the central government's budget, more than 30 % for provincial government's budget and more than 25 % for local government's budget. The total amount of investment, however, has not met with the requirement of transportation infrastructure provision as well as maintenance and rehabilitation. Consequently, the road conditions of Central Kalimantan show that 50 % of road is classified as being in poor condition. New road construction is also constrained by a shortage of funds.

### **(3) Natural Constrains**

#### **High construction costs**

There are two reasons for driving up the construction costs, peat soil and lack of construction materials. Peat soil, covering 15 percent and 30 percent of West and Central Kalimantan, hinders the construction of transport facilities because of its low bearing capacity. The study done by the Bina Marga in Central Kalimantan shows that the California Bearing Ratio(CBR) ranges between 0-2.5, which is classified as soft soil area. Soil treatments are required to construct roads and other transportation facilities. Bina Marga has carried out a research project for the construction of the roads on peat soil areas, yet there is a need in the future improvement of road construction technology.

The lack of construction materials in Central Kalimantan is another reason. Road construction in coastal areas has been faced with the lack of construction materials like crushed stone and sand. These construction materials are imported from other islands such as Sulawesi. Since those material costs are included in transportation costs, the construction of asphalt paved roads is up to 30 % higher than in other areas.

#### **Conservation Areas**

Demands for flexible transport have increased the dependence on road transport. This dependence tends to raise the aggregate energy consumption, generate air pollution and other environmentally adverse effects. More importantly, road network expansion has increased accessibility to the area where there is environmentally sensitive areas that account for 15% and 30% of the land area in West and Central Kalimantan, respectively. It could damage habitats by crossing primary forests and peat swamp areas. In fact, illegal logging is frequently found near a new road development areas and open lands are abandoned due to low yield of crops. Protection of those areas is a matter for development policy to limit access to road construction. It is crucial that roads and other transport facilities should not be built unless there is a policy framework for mitigating these problems.

#### **(4) Spatial Constrains**

##### **Bridge construction**

Road development has been constrained by bridge construction which requires a large amount of capital and technology. As mentioned in the previous section, the study area has many long and great width rivers because of high construction costs and low traffic volume. Road network expansion has constrained by bridge construction on those rivers because of high construction costs and low traffic volume. Ferry services are complemented to cross rivers, yet their service level is low such as long waiting and crossing times. Consequently, the road network has been utilized only short distance sections and spatial linkages have not been improved between primary cities and village areas.

##### **Poor Accessibility**

The Western part of Kalimantan is characterized by poor accessibility from other islands by air and sea transport, especially in Central Kalimantan. There are several flight services from/to the study area to other islands, yet the capacity is relatively low. Air transport is constrained by bad weather and forest smoke during the dry season. The recent economic crisis has made the airline industry not profitable because of high spare parts casts and difficulty in increasing air fares. There are no ferry services to connect the study area to major cities on other islands.

##### **Poor International Connections**

Despite its proximity to Malaysia and Singapore, the region is constrained by the lack of port facilities of both sea and air. This seriously limits access to local and international markets. The region, however, has location advantages for the international economic integration which is in progress with neighboring countries. The Growth Triangular(SIJORI), in which Singapore, Johore and Riau and the establishment of East ASEAN Growth Area (BIMP-EAGA) has already agreed on the member countries. The study area has to play an important role to connect transport links among the countries by air and sea transport. To achieve international integration, it is essential for the governments to improve in the transport and communication sector facilitating regional growth.

Pontianak is the only city in the study area to provide international connection flights to Singapore and Malaysia. In 1995, about 14,000 passengers utilized this airport for international travel. The northern part of the West Kalimantan is located on the Malaysian border with a road connecting Sarawak, Malaysia. Central Kalimantan has no international access point within the province. International connection is very limited partly because of low economic activities and the low infrastructure level of the province.

## (5) Transportation Modes

### Roads

The following sections, the constrains of roads can be summarized into a primary network (Trans-Kalimantan Highway) and rural roads (kabupaten, kecamatan and desa roads).

#### Trans-Kalimantan Highway

Despite two decades of road construction efforts, there is no road connection among the four provinces of Kalimantan. The government intends to construct three routes of the Trans Kalimantan highway. The provincial governments of Kalimantan agree that priority should be given to the southern route which connects the major city centers of Kalimantan, yet some parts of the highway have not yet finished construction, especially around the border of West and Central Kalimantan. Faced with the difficulty of construction on soft soil areas and lack of construction material, crushed stone, road development in the region has always questioned whether road construction is economically viable. The traffic demand in the region is less than 500 vehicles/day in most sections. Maintenance costs in soft soil areas require high costs and frequent repairs. However, the construction of the highway is very important to promote not only economic activity but also social development in the study area.

#### Rural Road Development

Rural roads in the study area are limited in total length and quality, effecting rural communities. Kabupaten roads have to be maintained regularly and have expanded their total network length to serve remote villages. The central government provided a specific grant through the Ministry of Home Affairs in the form of the *INPRES Jalan* which targets for provincial and kabupaten roads. The amount of investment, however, is not enough to cover all the required costs for maintenance. Rehabilitation works are always constrained by inappropriate design and construction skills.

The primary concern for rural roads is basic accessibility to health, school, jobs, markets and other local facilities as well as a primary road network. Road development also provides space for public utilities such as electricity and telecommunications. The priority of spending on rural roads should be maintenance of a core network. There is a need to have local community participation in the maintenance and rehabilitation of rural roads.

#### Traffic Safety



Road traffic accidents are a serious socio-economic problem in Indonesia. The limited data available indicates that fatality rates are almost forty times higher than in most industrialized countries in West Kalimantan (see Table 15.7.1). The reasons for the high accident rate can be divided into three reasons: lack of traffic safety devices, weak physical features of roadways and lack of driver discipline. It is difficult to the decrease accident rate in a short time, yet a comprehensive approach is needed to decrease accident rate.

**Table 15.7.1 Comparison of Traffic Accidents**

Country	Number of Vehicles per 1,000 pop.	Number of Death per 1 million	Number of Death 100,000 vehicles	Remarks Surveyed year
West Kalimantan*	8.2	73.7	887.3	1996
USA	746.7	154.5	20.6	1992
UK	430.7	75.5	17.5	1992
Japan	507.9	107	20.9	1993

Note: \* West Kalimantan 1996

Source: White paper on Traffic Safety 1993

## Rivers

Although the road network expansion to upper river basin has facilitated a decline in the river transport system, it should play an important role as part of the transport system in the region. River transport has an advantage of transporting heavy and bulk goods, for instance palm oil, bauxite and coal from mining sites to ports and is still an important means of transport in the upstream village areas. How to integrate the river transport system into the comprehensive transport network in the region will be a key issue in the study area. The river transportation system should maintain its function for the future.

## Ports

The major ports in Kalimantan are situated along rivers and require annual dredging to keep channels passable. Those ports are constrained by long approaches from the sea, the shallow water depth and the lack of vacant hinterland. There are several port development proposals from the local governments because the development of ports determine region's distribution system. The question of port development is how many public commercial ports are required to handle goods and containers with limited investment funds. Ports development should justify the change of regional economic structure stimulated by the recent road transport network expansion.

In Central Kalimantan, the central government intended to develop Banjarmasin port to cover Southern and Central Kalimantan, yet it is not feasible to construct new port. There is a strong demand from provincial government to build new port in Ujungpandaran, located some 50 km south of Sampit and Bahaur, located in 50 km west of Banjarmasin port, to redirect commodity

flows to Banjarmasin. In West Kalimantan, Pontianak port's functions will be relocated to Telok Air, 60 km south east of Pontianak, to handle container and general cargo.

### **15.7.2 Development Potentials**

#### **(1) Regional Economy**

The region has changed its economic structure from a natural resource based one to a plantation type of one. In the river-based transportation system, the economic activities are dominated by the forestry industry and its associated products where logging roads and river transport are an appropriate means of transport. As the road network expands, the agricultural plantation has also increased its coverage in the areas. The study team has estimated that the area would produce more than four million tons of palm oil annually by 2019 and that plantation agriculture will share about 10 percent of the regional economy. There are some roads, however, which have not been suitably planned in the plantation/agricultural areas and should be reviewed on the basis of future plantation activities in the region. Forestry development will also continue on a small scale as well as HPH activities. Mining development, especially bauxite development, will start in Tayan, West Kalimantan and coal development has progressed in Central Kalimantan.

At the national level, the Indonesian economy is faced with an economic crisis which impacts the study area. The socio-economic framework of the study area shows that the regional economy will grow at the rate of 3.6 percent over 20 years, while a zero per cent growth rate is forecast in the next five years.

#### **Agricultural Development**

##### Agricultural plantation development

Oil palm plantation development has become a booming economic activity in the area. That palm oil plantation development, progressing both provinces, will shape the provincial economic activities after logging operations have ended. It has progressed along roads by changing land use from forestry to plantation. In West Kalimantan itself, some 1.3 million hectares of land will be converted to oil palm plantation. Palm oil plantations expect to use 4.8 per cent of the land area in the study area. It means 4.3 million tons of crude palm oil will be produced by 2018 sharing 30% of the regional economy. Palm oil plantations, however, need good road network systems to transport fruit to extraction plants. Additional port facilities for handling crude palm oil are also required.

**Table 15.7.2 Palm Oil Production in the Study Area**

Area	Unit	Kapuas River Basin		Upland Area		KAKAB basin		Total	
		2008	2018	2008	2018	2008	2018	2008	2018
Planted Area	000 ha	323	655	250	500	137	273	710	1,428
CPO Production	000 ton	1,002	2,004	765	1,530	418	835	2,185	4,369
Population	thousand	4,059	4,575	1,294	1,645	1,682	2,146	7,035	8,366

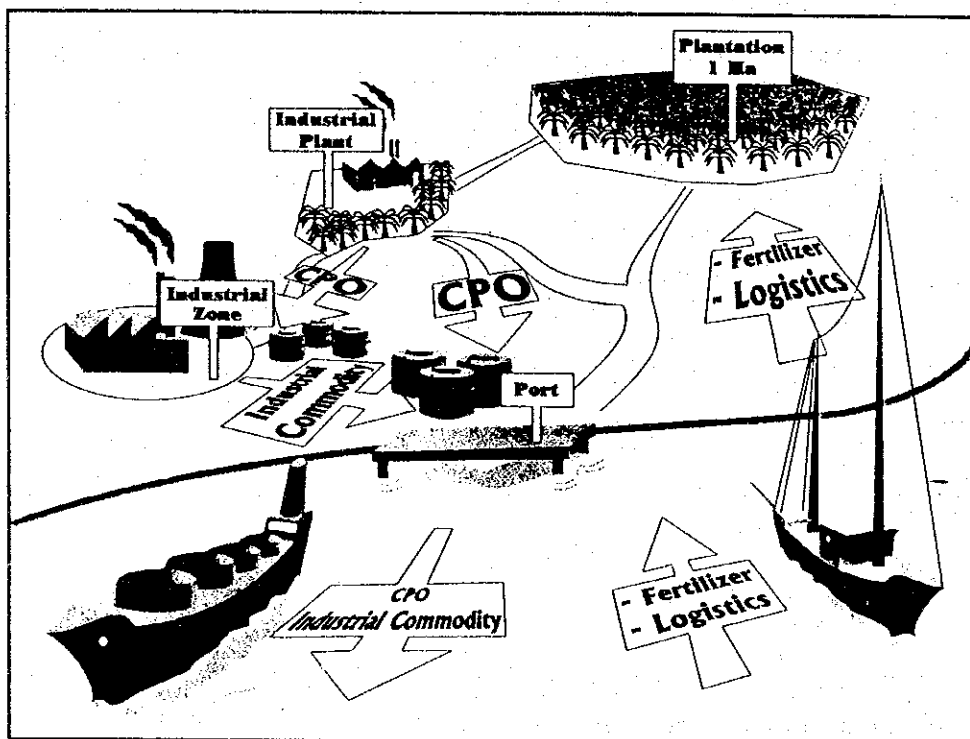
Note: Upland Area includes the southern part of West Kalimantan and western part of Central Kalimantan

KAKAB basin includes KAKAB area and Kec. Kotawaringin Timur

Source: The JICA Study Team

Palm oil plantation operation is illustrated as follows:

**Figure 15.7.2 Illustration of Oil Palm Plantation**



Source: The JICA Study Team

Palm oil plantations require inputs, fertilizer and logistics, from ports to produce FFB (Fresh Fruit Bunch) of palm oil and the FFB requires transport to extraction plants which produce CPO. From extraction plants, CPO will be transported to industrial zones for CPO processing or shipping to other islands for processing. Table 15.7.3 shows the per hectare input and output from oil palm production.

**Table 15.7.3 Per Hectare Output and Input for a Typical Palm Oil Plantation**

Items	Weight (kg)	Mode of Transport	Traffic (2 ton of truck)		Remarks
			Attraction	Generation	
1. Fertilizer	1,200	Road, River	0.6		
2. Logistics	200	Road, River	0.1		
3. FFB	18,000	Road		9	
4. CPO	2,700	Road, River		1.35	

Source: The JICA Study team

Oil palm plantations require a good infrastructure basis of roads and ports for transporting fertilizer, logistics, FFB and CPO. The road network system should be reviewed and port systems should be restructured in line with recent oil palm development.

The palm oil plantations will generate approximately one million long trips from ports to plantation sites and 15 million short trips from plantation sites to extraction factories. Those traffics expect to use roads and rivers. In ports, the handling of commodities will change from forestry products to liquid commodities. The handling of palm oil and related commodities in each port is summarized as follows:

**Table 15.7.4 Port Handling**

Area	Unit	(Year 2018)			Total
		Kapuas River Basin	Upland Area	KAKAB basin	
<b>Import</b>					
Fertilizer	000 tons	786	600	328	1,714
Logistics	000 tons	213	106	82	401
<b>Export</b>					
Crude Palm Oil	000 tons	2,004	1,530	835	4,369
<b>Total</b>		<b>3,003</b>	<b>2,236</b>	<b>1,245</b>	<b>6,484</b>

Source: The JICA Study Team

Approximately 6.5 million tons of CPO and related goods are expected to be handled by year 2018 in the whole study area. Each river basin will require ports to facilitate oil plantation activities.

### Forestry Development

The forestry sector and forestry related industries, for example plywood and molding factories, are the most important sectors which generate 35 per cent of the GRDP in the study area. After 24 years of logging operations, the area has produced 155 million cubic meters of logs which accounts for 27 per cent of the log production in Indonesia. The forest resources, however, will be exhausted before 2018, if no strong measures are taken by the government (see Chapter

7 Forestry and Forest Conservation). For transportation planning purposes, it is estimated that forestry resources will diminish sharply and the study area will lose logging and plywood companies. It means that the port handling will decrease sharply because one third of the handling is forestry commodities and there is little impact on road transportation.

Although the area will lose logging activities, HTI areas will be expected and become a promising industry. It is expected to implement about 78 thousand ha of which 26 per cent is pulp plantation. HTI pulp, however, has reported to be damaged by forest fires in 1997, which accounts for 23 thousand ha in West Kalimantan. Therefore, the success of the project is uncertain.

### **Mining Development**

The study area has rich mineral resources although they have not been exploited partly because of poor infrastructure levels. The major mineral resources include, coal, bauxite, quartz sand, and kaolin. The coal mining is in progress in the eastern part of Central Kalimantan. The most promising mining is the bauxite development project at Tayan in West Kalimantan. It is expected to excavate 800 thousand tons of bauxite for the annual production of 300 thousand tons of alumina, which will be transported by the river from Tayan to Pontianak by ship and other inputs, input materials, supplies and workers, will be brought by road.

The other minimal resources are exploited by small local companies and shipped to the other islands. The future excavation volume of the such mineral resources is not available.

### **Industrial Development**

The characteristic of manufacturing sector is the concentration in wood processing related industries which accounts for more than 65 per cent in West Kalimantan and 96 per cent of the industrial sector's value added. As log production declines in both provinces, those manufacturing sectors may diminish over the next 20 years.

The oil palm extraction plants and oil palm related industries will expand their activities for the next 20 years because the study area produces 4 million tons of crude palm oil annually. This amount exceeds the volume of palm oil related industries for secondary processing. The desirable locations can be identified in Kumai, Ketapang and Pontianak where the palm oil processing industries will be concentrated.

Another potential is the development of Natuna island where West Kalimantan is expected to supply food and logistics. Sintete port, on the northern coast of the West Kalimantan, is selected to be a port for supplying logistics to the those areas.

## **(2) Spatial Structure**

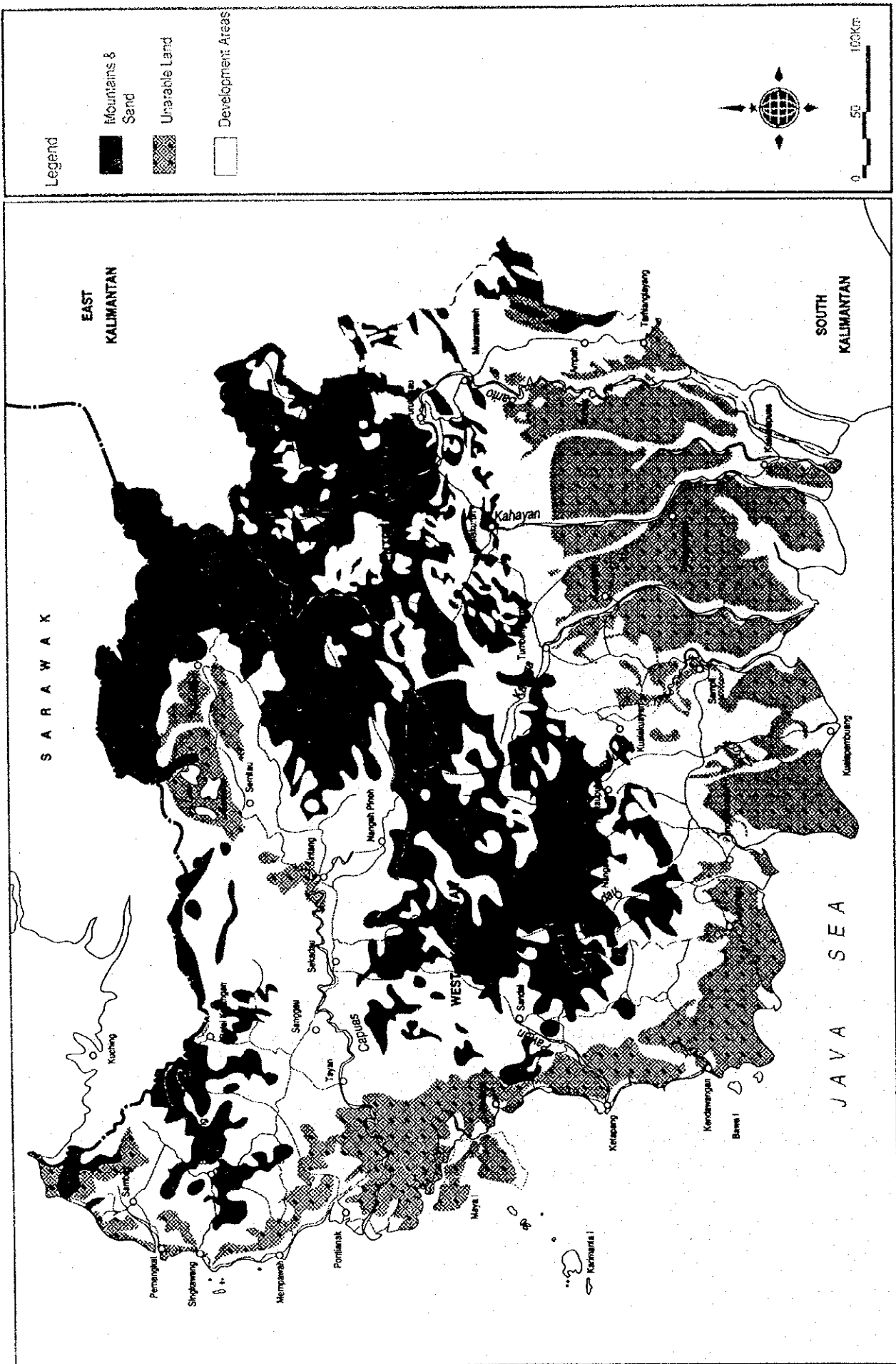
As pointed out, the region has changed in spatial structure from river-based to road-based. In the Kapuas river basin, the major city centers are already connected by roads. The road transport brings new means of transportation such as trucks and motorcycles which reduce transporting times. In the river transportation system, the spatial system of the region was not well developed in the areas of urban hierarchy system, performing specialized functions, widely dispersed but linked together in a mutually beneficial system of production and exchange. The development of the road transportation system will develop two spatial processes, which are concentration and regional specialization. It means that the primary centers will have many urban functions, while the local centers will lose their status according to their location advantages. The population will be concentrated at several urban centers. In the road-based spatial structure, the transportation facilities, therefore, should be built at appropriate points.

## **(3) Natural Conditions**

In accordance with development potential, the region's soil conditions are classified into two categories, development and protected areas. The development areas have potential for agricultural and plantation development and the protected areas are comprised of areas unsuitable for agricultural development and environmental sensitive areas. The detailed discussion is shown in section of the main report. Figure 15.7.2 shows the development potential in the region. The white area has potential for agricultural development, while the colored area has to restrict usage or protected areas.

Roads may damage natural habitats and the biodiversity of environmentally sensitive areas where located in mountainous and peat soil areas. The mountainous and peat soil areas should restrict development activities to maintain the "Kalimantan system" which is proposed by the study team. The mountainous areas, located in the middle of the island, should be utilized only in a very restricted manner in order to be limited only to small scale logging and related forestry activities so that forestry resources can be conserved. The study team estimated that the degradation of log production has continued because of resource depletion and estimated log production in the area decreased by 50 percent of the existing level after 10 years. Forest depletion affects the regional economy and the environment. The construction of only a transportation system in the environmentally sensitive areas should not be built unless there is a policy framework for mitigating problems.

Figure 15.7.2 Natural Conditions



#### **(4) Social Objectives**

The people who live in the remote areas incur high costs in time and money in marketing outputs and accruing goods, especially during the dry season. The upstream villagers have no means of transportation services to access basic public facilities, education, health services and employment. The dominate concern for those people is basic accessibility to the local facilities and to the primary network of both river and road. A rural road program or project will reduce rural poverty by providing low prices of the goods. The provision of transport infrastructure in rural areas will improve efficient linkages to other market centers. To fulfill the basic needs of the rural people, the provision of rural roads would be a primary concern, yet road construction has been constrained by lack of funding and poor maintenance.

### **15.8 ON-GOING PROJECTS AND EXISTING PLANS**

#### **15.8.1 Ongoing Projects**

##### **(1) Roads**

##### Trans-Kalimantan Highway

The lack of adequate linkages in the island, especially in West and Central Kalimantan, has resulted in poor economic activities among the provinces. The proposed Trans-Kalimantan highway is very important to stimulate economic activity and to improve the social prospect of local communities. REPELITA VI shows priority development sections of the southern route. The DGH has invested much in the 2,400 kilometers of roads and bridges. However, additional work is required in 300 km of new construction and 200 km of improvement of existing highways.

##### Rural roads

The rehabilitation and maintenance of district roads in the study area has been carried out by the third and fifth District Roads project, financed by IBRD. The project is intended to improve the existing roads. The OECF has also provided funds for maintenance and rehabilitation of district roads.

##### One million Hectare project



The central government has anticipated to develop rice paddy fields in the northern part of Palangkaraya a peat swamp area. To cope with the large scale irrigation scheme, road development plans inside the projected area are being implemented by the Ministry of Public Works.

**(2) Port**

**Telok Air Port**

The provincial government intends to develop Telok Air port as a deep sea port. Telok Air, some 30 km south-west of Pontianak, has a existing port for small capacity.

**(3) Airport**

**Pontianak Airport Upgrading**

The major gateway to the study area will be upgraded to accommodate the capacity of A-300 airplanes. ADB will finance the project.

**15.8.2 Development Proposal**

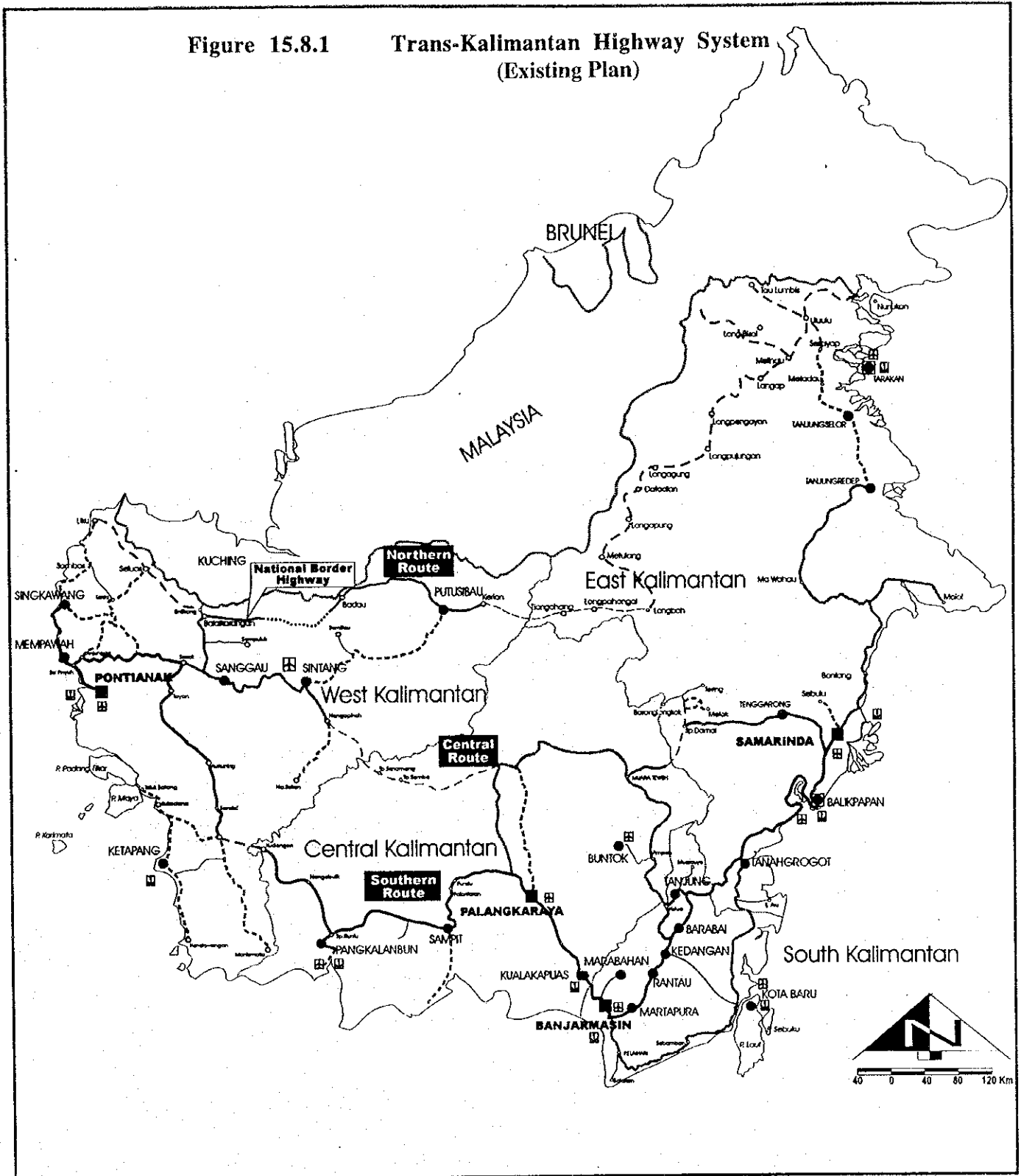
**Trans Kalimantan Highway**

There are three routes of the Trans-Kalimantan Highway. The southern route, a priority route, has been constructed by the government. In 1997, 80% of the highways has been built, but the condition of the roads is not good or even fair in some parts, especially along the border of West and Central Kalimantan.

The central route is a second priority project to connect the middle of the island. This route will provide easy access to provincial capital towns with the improvement of some parts of Central Kalimantan. Less maintenance and rehabilitation costs are expected, compared with the southern route. This route, however, crosses environmentally sensitive natural forests.

The northern route will connect West and East Kalimantan by the shortest distance. In West Kalimantan, the highway has already been constructed except for the 70 km in the eastern part of the province. This route will pass through a national park and environmental protection measures are needed for the conservation of forests.

**Figure 15.8.1 Trans-Kalimantan Highway System (Existing Plan)**



**LEGEND:**

- |  |                        |  |                      |
|--|------------------------|--|----------------------|
|  | Arterial Road          |  | Provincial Capital   |
|  | Collector Road 1       |  | Municipality Capital |
|  | Collector Road 2       |  | Kabupaten Capital    |
|  | Collector Road 3       |  | Kecamatan Capital    |
|  | International Boundary |  | Airport              |
|  | Provincial Boundary    |  | Harbour/Port         |

Source: Bina Marga

The both central and northern routes will pass environmentally sensitive maintenance areas as well as national park. Therefore, it is important for the governments to establish a policy to mitigate environmentally adverse effects caused by the road construction after opening the national road.

### Road Connection to the Malaysia border

This route will connect the west and east direction of the Malaysian border for the purpose of security reasons. The route again has to be carefully designed because it crosses a national park and peat swamp areas which are environmentally sensitive.

### Ujungpandaran Port

The Central Kalimantan government intends to develop the Ujungpandaran port, some 50 km south of the Sampit port, to expand port handling capacity because the existing Sampit port has limited port facilities and needs periodic dredging. The new Ujungpandaran port will be located outside the river.

### Airport

The airport improvement plan has been determined by the REPELITA VI. The development plan has no financial sources.

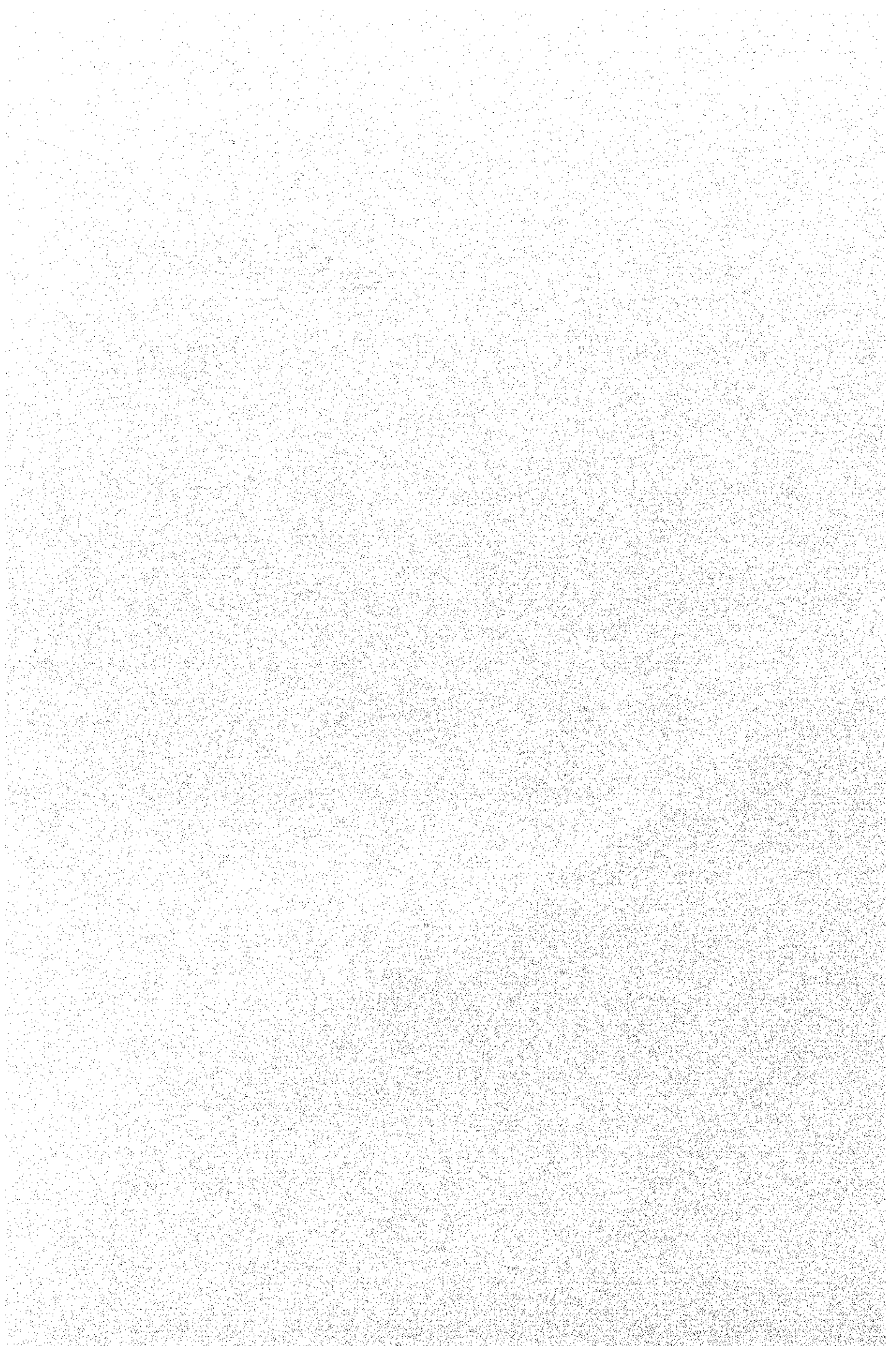
**Table 15.8.1 List of the Airport Improvement Plan during REPELITA VI**

Airport Location	Airport Name	Class	Existing Facilities		REPELITA VI			
			Runway	Maximum Aircraft Size	Airport	Aircra ft size	Navigation Equipment	Hub airport
<b>West Kalimantan</b>								
1. Pontianak	Supadio	I	1850x30	F-28	*	B737	*	*
2. Ketapang	Rahadi Osman	IV	1400x30	CN-235	*		*	
3. Sintang	Susilo	IV	1300x30	TRANSAL/C-130				
4. Nanga Pinoh	Nanga Pinoh	IV	1000x23	CASSA-212			*	
5. Putussibau	Pangusma	IV	1004x23	TRANSAL/C-130		CN235	*	
<b>Central Kalimantan</b>								
1. Palangkaraya	Tjilik Riwut	II	1850x30	F-28	2200m	B737	*	*
2. Palankalabun	Iskandar	III	1400x30	F-27/CN-235	1650m	N250	*	
3. Sampit	H. Asan	III	855x23	C-212/DHC-6	1200m	CN235	*	
4. Muaratweh	Beringin	IV	900x23	C-212/DHC-6	*		*	
5. Buntok	Sunggu	IV	750x23	C-212/DHC-6	*	CN235	*	
6. Kuala Pembuang	Kuaka Pembuang	V	850x23	C-212/DHC-6				
7. Tumbang Samba	Tumbang Samba	V	650x23	BN 2A				
8. Kuala Lurun	Kuala Lurun	V	750x23	C-212/DHC-6			*	

Source: REPELITA VI

# **CHAPTER 16**

## **UTILITY**



## CHAPTER 16 UTILITIES

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This chapter is about urban infrastructure except transport facilities. Items to be discussed are water supply, sanitation, garbage disposal, electricity, telephone and mail services.

### 16.1 ISSUES

Urban centers in Kalimantan were formulated based on the past river based transport system and size of the catchment area. The size of urban centers and their distribution or location depends on the size of the river catchment area. Therefore, there are many small urban centers located dispersedly over large areas, except for some service towns located at the down stream areas of major rivers. This is one of the reasons for the under development of the urban infrastructure in Kalimantan.

#### 16.1.1 Water Supply

The service coverage of water supply to the urban household in West and Central Kalimantan is rather low as compared to other regions of Indonesia.

The water supply service coverage ratio in rural areas is one tenth that of urban areas. Water supply to rural areas is the most significant issue in the Study Area.

The urban water supply service coverage ratio in the Kabupatens Pontianak, Ketapang and Kotamadya Pontianak in West Kalimantan, and Kotawaringin Barat, Kapuas and Palangkaraya in Central Kalimantan are lower than other Kabupatens in the Study Area. They are 1/5 to 1/2 of other urban areas.

Direct usage of rain water, ground water and river water is other water sources instead of the piped water supply system in the urban areas. More than 50 % of urban households are using these water sources. Rain water is the main water source in West Kalimantan, while ground water is the main water source in Central Kalimantan.

The major constraints of water sources in the Study Area are acid ground water in peat swamp areas, and saline water intrusion of river water.

The high water loss in the water supply system is caused by water leakage by the deterioration of systems, and the existence of illegal water users.

#### **16.1.2 Sanitation**

There is no treatment plant for waste water and the drainage system in the Study Area, even in the main cities of Pontianak and Palangkaraya.

The usage ratio of toilets (with or without septic tanks) in the urban area is 92 % in West Kalimantan, and 73% in Central Kalimantan. It can be said that the usage ratio of toilet is high but some households without toilets still exist. In the rural area, it is 24 % in West Kalimantan and 16 % in Central Kalimantan. The majority of the rural population use rivers and fields as toilets. This causes river water pollution in the down stream areas especially in the dry season.

The quality of well water is also affected by the sanitation system. Wells located closer than 15 m from cesspool are considered to have chance of water pollution. There are 57 thousand of such wells in West Kalimantan, and 62 thousand in Central Kalimantan.

#### **16.1.3 Solid Waste**

There are designated collection points and containers for solid waste collection in urban areas, and regular collection and haulage are carried out. However, intermediate treatment is seldom done.

Final disposal sites are not designated. Therefore, the collected wastes are disposed of in open fields in the fringe areas of the urban areas and even in the rivers.

There is no solid waste collection service in rural areas. Each household disposes its solid waste by dumping, burning or burying in the ground near homes. Dumping to the river is also common in rural areas.

#### **16.1.4 Electricity**

Almost half of the households in the Study Area are using electricity. More than 90 % of households are using electricity in the urban areas, but only 36 % of rural households use electricity.

However, in case of West Kalimantan, PLN (State Electricity Company) supplies 31 % of total households in the Study Area. This is 65 % of households who use electricity. The remaining

35% use portable generators for electricity. Most of the households which use portable generators are in rural areas.

The PLN power plants are located in or in the vicinity of urban centers and there are no power plants located in rural areas. Therefore, power supply to rural areas depends on the distribution from these urban centers.

The power lines are usually laid out along roads. Villages not connected to urban centers by road have no power supply from PLN.

#### **16.1.5 Telephone and Mail**

Telephone subscribers per 100 persons are 1.1 in both West and Central Kalimantan. This is almost half of national average of 2.1.

Capacity of exchangers, the number of subscribers and public pay telephones are increasing steadily in the Study Area, but mainly in the urban areas.

On the other hand, access to telephone is limited in the rural areas. Because, there is no telephone office and very limited numbers of telephones are available in rural areas. Disperse location of human settlement also causes difficulties in service expansion in rural areas.

A considerable number of public pay telephones both card and coin are installed in the urban areas. Due to the poor operation and maintenance more than half of coin type telephones are not usable.

A regional main post office is located in each kabupaten center while most of the sub-district centers have supplemental post offices. Urban inhabitants have sufficient access to postal services.

On the other hand, a large part of the rural population has difficulty accessing postal services because of no local post office at the desa level, unless the rural communities are located near an urban center or have good access by road.



## 16.2 OBJECTIVES

The following objectives are identified based on the existing conditions and issues of urban infrastructures ;

- To secure and increase convenience in the daily lives of the people
- To support regional development in all aspects of economic, social and spatial development
- To secure access to clean and safe water and expand the water supply service coverage.
- To expand usage of toilets for the improvement of the living environment and sanitary conditions.
- To provide appropriate solid waste disposal systems for better living conditions and natural environment conservation.
- To expand the coverage of rural electrification for the improvement of living conditions and production efficiency.
- To increase the number of telephones for the improvement of access to telecommunications.
- To improve accessibility to postal services.

### **16.3 STRATEGIES**

Strategies for the urban infrastructure development are as follows;

#### **16.3.1 Basic**

- 1) The government or the public sector should provide the necessary urban infrastructures.
- 2) Private enterprises should provide infrastructures for their own business operations. Infrastructure provision should be in accordance with the other development plans, such as those for spatial development and economic development.
- 3) Rehabilitation of the existing infrastructure should be given the first priority rather than new development.
- 4) Development of urban infrastructure at tertiary urban centers in the Upland Development Corridor should be given higher priority.

#### **16.3.2 Water Supply**

- 1) Improvement and rehabilitation of existing water supply systems and the expansion of service area by new construction
- 2) To provide a water supply system to secure access to clean water which is appropriate to the local water source conditions.

#### **16.3.3 Sanitation**

- 1) To extend the usage of toilets with septic tanks
- 2) To expand the usage of toilets

#### **16.3.4 Solid Waste**

- 1) To introduce a solid waste collection system with separation of garbage by type for reduction of waste volume and recycling, especially in urban areas
- 2) To provide final disposal sites in consideration with minimum impact to the social and natural environments

#### **16.3.5 Electricity**

- 1) To expand the service coverage areas by construction of new power plants at the tertiary urban centers
- 2) To provide village access roads from tertiary urban centers
- 3) To encourage the installation of portable generators for rural households

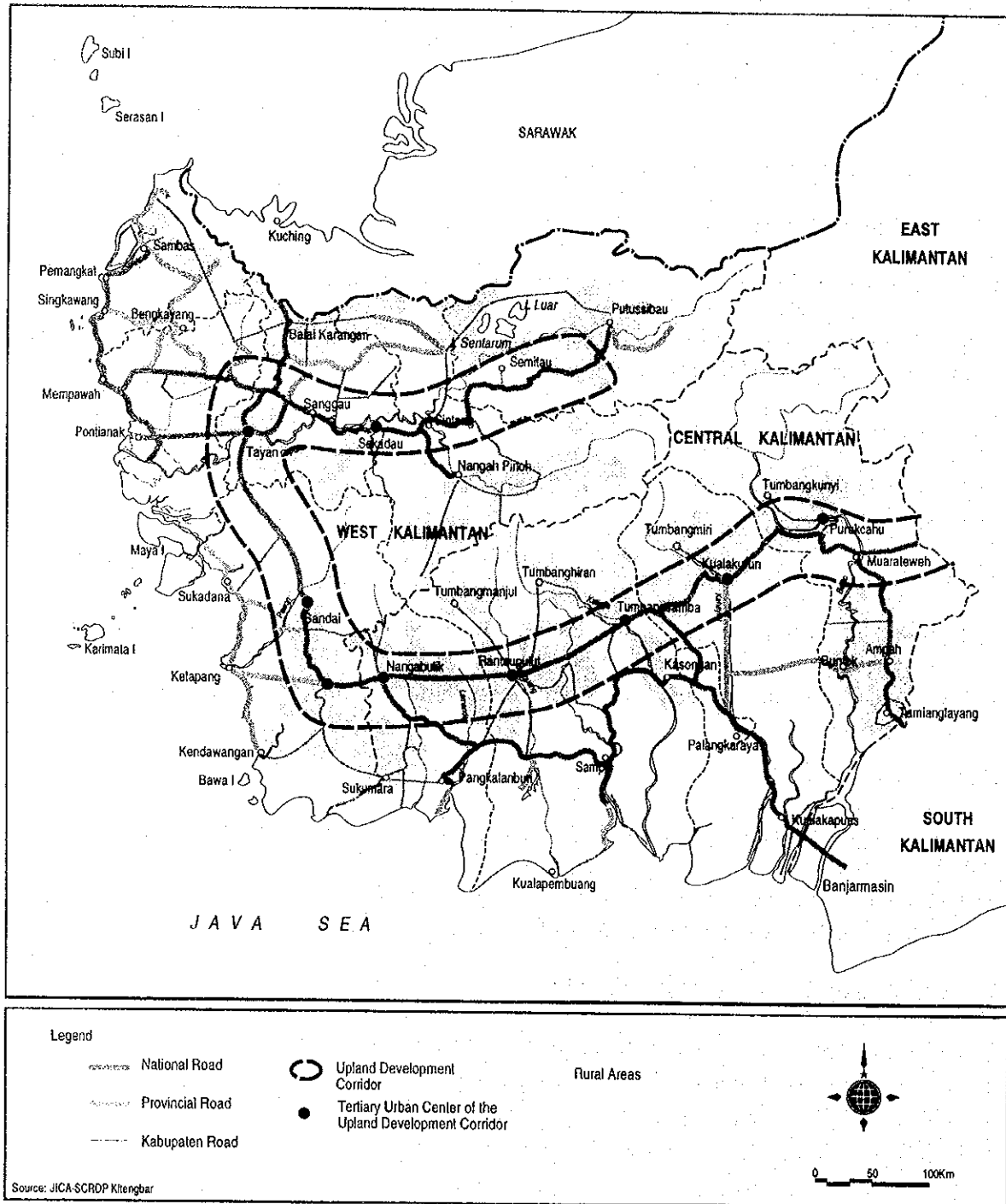
#### **16.3.6 Telephone and Mail Services**

- 1) To increase the capacity of existing telephone exchanges
- 2) To provide Local Exchangers at Tertiary urban centers
- 3) To install wireless telephones at the village level
- 4) To provide village access roads from tertiary urban center

### 16.4 PRIORITY PROJECTS

Tertiary urban centers (West Kalimantan – Sandai, Tumbangtiti, Central Kalimantan - Nangabulik, Rantauputut, Tumbangsamba) and rural areas within the Upland Development Corridor are given higher priority for urban infrastructure development.(see figure 16.4.1)

Figure 16.4.1 Priority Area of Urban Infrastructure Development



### 16.4.1 Water Supply

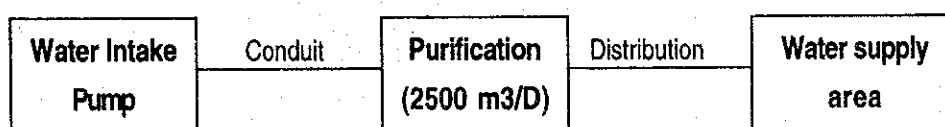
To construct water supply systems in the tertiary urban centers for provision of clean water for the urban population and to extend water supply system to the surrounding rural areas, if possible

To facilitate simple clean water supply systems same type as ADB loan project (see Figure 16.4.2) to use available water sources such as stream water, rainwater and ground water in the rural areas where water supply from an urban center is not possible

#### (1) Clean Water Supply Development Project

- Planned area – Tertiary urban centers and their surrounding rural areas
- Diffusion rate of water supply – 50 %
- Population of water supply – 15,000 (including rural areas)
- Volume of water supplied – 150 l/head/day
- Source of clean water – River
- Water supply facilities include the following:
  - Water intake– Pump, Water Conduit
  - Water purification plant – Concrete water tank (condensation, sedimentation, filtration)
  - Volume of purification – 30 l/sec (2500m<sup>3</sup>/D)
  - Water distribution – Service reservoir (650 m<sup>3</sup>) Distribution pump, Water service pipe
  - Rainwater tank (5.5m<sup>3</sup>) – For households not supplied with clean water

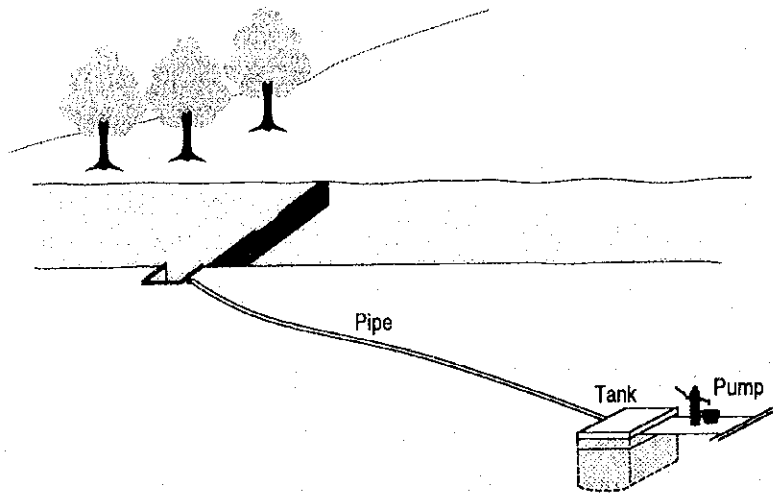
**Figure 16.4.1 Rough Flow of Water Supply**



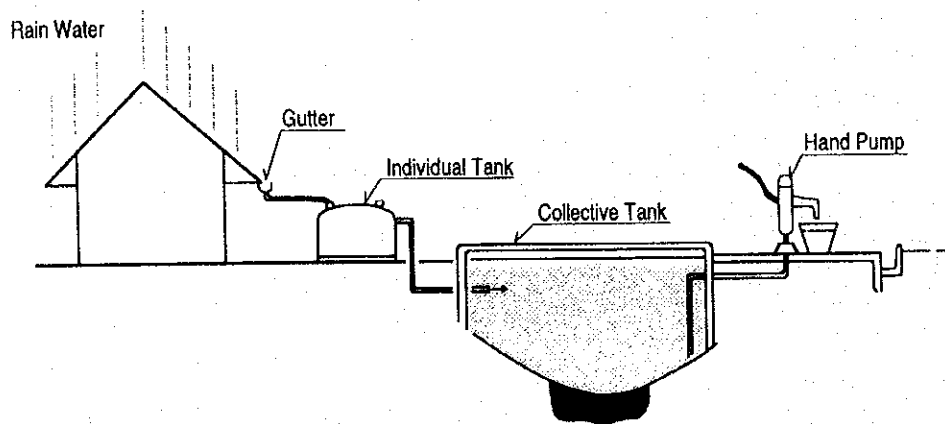
#### (2) Simple Clean Water Supply Development Project (same type as ADB loan project)

- Planned area – Rural areas
- Volume of water consumption – 120 l/head/day
- Planned households – All the household in rural area
- Source of water – River, Rainwater, Ground water
- Method of water intake – Individual and/or Public
- Water intake facility
  - from river – Pump, Pipe, Tank,
  - from rainwater – Tank
  - from underground – Well, Pump
- Combination of facilities
- One or plural suitable water intake facilities will be adopted in consideration of the characteristics of each rural areas.

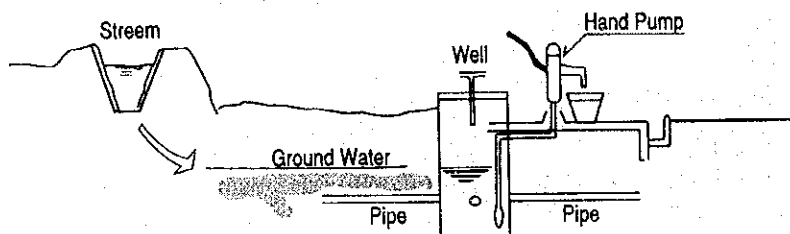
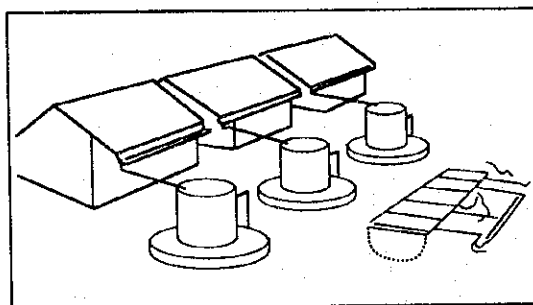
**Figure 16.4.2 Simple Clean Water Supply System at Rural Area**



**(1) Raw Water from River at Under-developed Small Village**



**(2) Raw Water from Rain at Under-developed Small Village**



**(3) Raw Water from Ground Water at Under-developed Small Village**

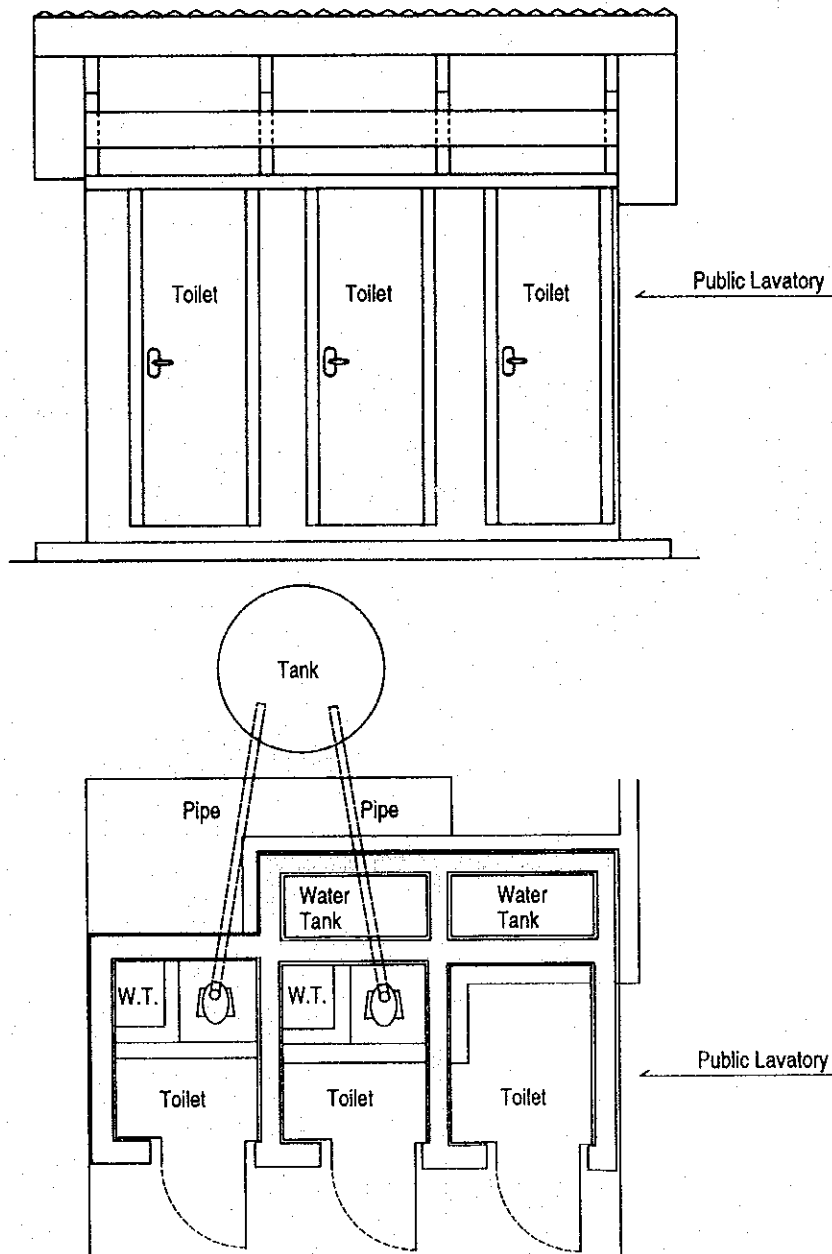
### 16.4.2 Sanitation

The construction project of public toilets which has been carried out by ADB should be expedited to avoid using rivers and fields as toilets (see Figure 16.4.3).

Public lavatory Construction Project (same type as the ADB loan project)

- Planned area -- All the rural areas
  - Toilet facility -- A public lavatory with 3~4 toilets and 1~2 water tanks
- One public lavatory per 10~15 households

**Figure 16.4.3 Public Lavatory at Village**



### 16.4.3 Solid Waste

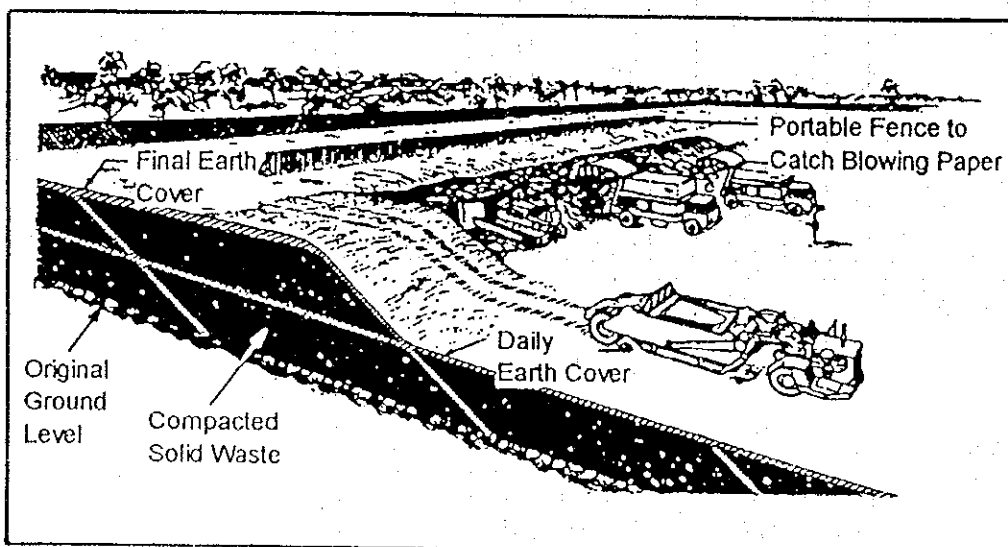
Provide appropriate solid waste disposal systems in the tertiary urban centers, especially around the public market areas for keeping the urban environment safe and clean.

#### (1) Solid Waste Management Project

- Planned area – Tertiary urban centers
- Facilities and equipment for solid waste discharge, collection and haulage -  
Solid waste discharge and storage points with Containers  
Final disposal sites with necessary facilities at adequate places  
Vehicles for collection, haulage and at final disposal sites
- Enlightenment of residents of how to discharge solid waste
- Provision of programs for the operation-management of final disposal

Image of final disposal site (Sanitary Landfill) is shown in Figure 16.4.5.

**Figure 16.4.5 Image of Final Disposal Site (Sanitary Landfill)**



Source: Solid Waste management for Economically Developing Countries

#### **16.4.4 Telephone and Mail Services**

To install village telephones to secure communications between rural areas and urban centers in case of emergency. To improve village roads to connect tertiary centers and rural communities, for the provision of access to social services such as postal service, medical and health care, education and so on.

##### **(1) Telephone and Mail Services Improvement Project**

- Planned area -- Tertiary urban centers and all rural areas
- Facilities and equipment:
  - Local exchange at each tertiary urban center
  - A radio telephone at each village
  - Village roads with minimum width of 4m to tertiary urban centers



## **16.5 OTHER PROJECTS**

Recommended programs and projects other than described as priority projects are listed in the following:

### **16.5.1 Water Supply**

- Improvement, extension and/or renewal project of existing water supply plants to satisfy increasing future water demand
- Regional water resources development and supply program at Pontianak-Sambas area to secure a future water supply

### **16.5.2 Sanitation**

- Construction project and operation-management program of a septic sludge disposal site at major urban centers except at Pontianak and Palangkaraya city
- Extension program of toilets with and/or without septic tanks at all urban centers to improve the living and natural environments

### **16.5.3 Solid Waste**

- Construction project and operation-management program of a final disposal site at major urban centers except at Pontianak and Palangkaraya city

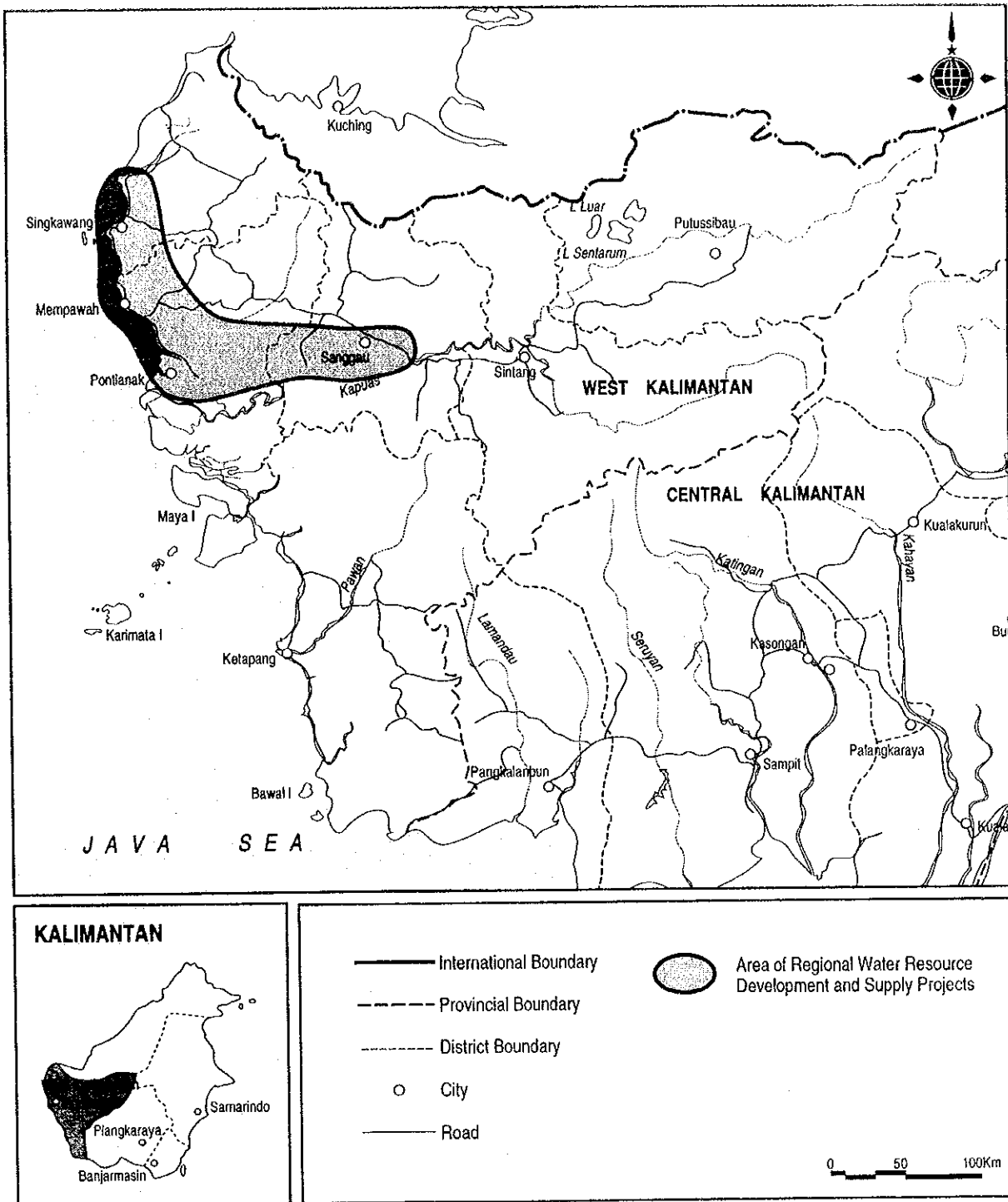
### **16.5.4 Electricity**

- Program of village electrification promotion at all rural areas
  - Extension and promotion of portable generators
  - Construction of village roads to the nearest urban center for electricity supply from urban centers
- Project of the electricity industry propulsion to supply electricity to all households at urban centers
  - Maintenance, renewal and expansion of power plants, power transmission facilities and power distribution facilities

### **16.5.5 Telephone and Mail**

- Project of expansion and/or renewal of existing exchanges and switching to increase the expansion ratio of telephones to 2.0 sets per 100 persons at urban centers
- Expansion project and maintenance program of public telephones at urban centers
- Construction project of new post offices at a main urban center in sub districts

Figure 16.5.1 Area of Regional Water Resources



## 16.6 EXISTING CONDITIONS

### 16.6.1 Water Supply

Water supply works in the Study Area are done by PDAM. The main source for drinking water in West and Central Kalimantan is from rivers. The other is from underground water (see Table 16.6.1).

**Table 16.6.1 Number of Water Supply Establishment of PDAM by Source**

Area	Source	Unit	1991	1992	1993	1994	1995
West	River	place	8	8	7	7	7
	Well	"	3	3	4	3	2
	Artesi Well	"	0	0	0	0	0
Central	River	place	14	14	11	6	6
	Well	"	0	0	1	2	3
	Artesi Well	"	1	1	1	0	0
4 Prov.	River	place	38	39	37	32	31
	Well	"	3	4	6	6	8
	Artesi Well	"	2	2	2	0	2

Source: Water Supply Statistics 1991-1995

Capacity and effective of water supply and consumption of water are increasing year by year. Operation rate of plants is 80~90%. Water consumption, however, is only 50~70% of water supply (see Table 16.6.2). Water leakage by the deterioration of water distribution facilities – especially water mains – and/or no payment of water charge by existence of illegal water users are main reasons for high water loss.

**Table 16.6.2 Capacity, Production and Percentage of Water Supply of PDAM in Kalimantan by Province**

Area	Item	Unit	1991	1992	1993	1994	1995
West	1. Capacity	lit/sec	737	737	1,041	867	1,190
	2. Production	"	662	657	718	785	957
	3. Consump	"	397	437	513	563	557
	4. 2/1	%	90	89	69	91	80
	5. 3/2	"	60	67	71	72	58
Central	1. Capacity	lit/sec	313	312	359	356	448
	2. Production	"	273	282	286	319	402
	3. Consump	"	99	146	141	166	189
	4. 2/1	%	87	90	80	90	90
	5. 3/2	"	36	52	49	52	47
4 Prov.	1. Capacity	lit/sec	2,952	3,209	4,336	3,959	5,010
	2. Production	"	2,658	2,889	3,100	3,241	3,786
	3. Consump	"	1,567	1,777	2,009	2,196	2,338
	4. 2/1	%	90	90	71	82	76
	5. 3/2	"	59	62	65	68	62

Source: Water Supply Statistics 1991-1995

The water supply service coverage ratio to households by PDAM is increasing year by year. Increasing ratio in West Kalimantan is about 13% and about 10% Central Kalimantan from year 1994 to 1995. Only about 6% of the water supply service ratio to households in West and Central Kalimantan is lower than 9% in hole Kalimantan and 8% in Indonesia (see Table 16.6.3). Reasons of low service ratio are shortage of volume of water supply by lack and deterioration of plants, saline water intrusion to river water, acid groundwater in peat swamp area, shortage of water at inland in dry season. Lack of finance for expansion of facilities except Pontianak and Palangkaraya cities is another big season.

**Table 16.6.3 Number and Percentage of Household which Receive Water Supply Services**

Area	Item	Unit	1991	1992	1993	1994	1995
West Kalimantan	1 *	number	661,720	683,697	706,404	729,865	754,105
	2 *	"	18,039	21,137	39,085	41,931	47,531
	3 2/1	%	2.7	3.1	5.5	5.7	6.3
Cent. Kalimantan	1	number	318,072	330,840	344,121	357,935	372,304
	2	"	16,810	18,854	21,556	22,452	24,632
	3 2/1	%	5.3	5.7	6.3	6.3	6.6
Total of Kalimantan	1	number	2,017,592	2,096,010	2,177,662	2,262,691	2,351,246
	2	"	140,059	154,609	186,087	200,327	219,540
	3 2/1	%	6.9	7.4	8.5	8.9	9.3
Indonesia	1	number	40,816,161	41,971,305	43,161,722	44,388,578	45,653,084
	2	"	2,242,075	2,608,276	2,885,353	3,192,157	3,505,297
	3 2/1	%	5.5	6.2	6.7	7.2	7.7

1\*: Total No. of Household

2\*: No. of Household which PDAM supply water

Source: Water Supply Statistics 1991-1995

Number of households and water supply service ratio by piped water in West Kalimantan are 73,195 and 10%, and 48,262 and 13% in Central respectively (see Table 16.6.4 Result of year 1995 Census). These show 1.5 and 2.0 times of households supplied by PDAM respectively. 52,725 households at urban and 20,470 households at rural area in West use piped water and 33,919 at urban and 14,343 at rural in Central. This means that households get piped water not only from PDAM but also from others and water supply service by PDAM concentrations to urban area not to rural area.

**Table 16.6.4 Households by Source of Drinking Water**

**West Kalimantan**

Regency/Municipality	Area	Pipe		Pump or Well		River		Rain		Spring/Other		Total	
Sambas	Urban	17,457	71.9%	3,542	14.6%	0	0	2,783	11.5%	506	2.1%	24,288	100%
	Rural	8,260	5.5%	35,105	23.2%	29,500	19.5%	72,865	48.2%	5,310	3.5%	151,040	"
	Total	25,717	14.7%	38,647	22.0%	29,500	16.8%	75,648	43.1%	5,816	3.3%	175,328	"
Kabupaten Pontianak	Urban	7,531	26.6%	0	0	0	0	20,821	73.4%	0	0	28,352	"
	Rural	2,871	2.0%	6,003	4.2%	54,288	38.2%	73,863	52.0%	4,959	3.5%	141,984	"
	Total	10,402	6.1%	6,003	3.5%	54,288	31.9%	94,684	55.6%	4,959	2.9%	170,336	"
Sanggau	Urban	3,780	62.5%	0	0	945	15.6%	567	9.4%	756	12.5%	6,048	"
	Rural	2,768	2.8%	8,996	9.0%	75,428	75.7%	8,650	8.7%	3,806	3.8%	99,648	"
	Total	6,548	6.2%	8,996	8.5%	76,373	72.3%	9,217	8.7%	4,562	4.3%	105,696	"
Ketapang	Urban	984	18.8%	4,100	78.1%	0	0	164	3.1%	0	0	5,248	"
	Rural	2,835	3.7%	33,885	43.7%	22,815	29.4%	15,120	19.5%	2,970	3.8%	77,625	"
	Total	3,819	4.6%	37,985	45.8%	22,815	27.5%	15,284	18.4%	2,970	3.6%	82,873	"
Sintang	Urban	4,872	87.5%	0	0	696	12.5%	0	0	0	0	5,568	"
	Rural	2,496	2.8%	18,408	20.5%	63,648	70.8%	4,680	5.2%	624	0.7%	89,856	"
	Total	7,368	7.7%	18,408	19.3%	64,344	67.4%	4,680	4.9%	624	0.7%	95,424	"
Kapuas Hulu	Urban	2,325	96.9%	0	0	75	3.1%	0	0	0	0	2,400	"
	Rural	1,240	3.5%	372	1.0%	32,488	91.0%	1,054	3.0%	558	1.6%	35,712	"
	Total	3,565	9.4%	372	1.0%	32,563	85.4%	1,054	2.8%	558	1.5%	38,112	"
Kotamadya Pontianak	Urban	15,776	20.1%	0	0	1,496	1.9%	61,064	78.0%	0	0	78,336	"
	Rural	0	0	0	0	250	3.1%	7,750	96.9%	0	0	8,000	"
	Total	15,776	18.3%	0	0	1,746	2.0%	68,814	79.7%	0	0	86,336	"
Total of West	Urban	52,725	35.1%	7,642	5.1%	3,212	2.1%	85,399	56.8%	1,262	0.8%	150,240	"
	Rural	20,470	3.4%	102,769	17.0%	278,417	46.1%	183,982	30.5%	18,227	3.0%	603,865	"
	Total	73,195	9.7%	110,411	14.6%	281,629	37.3%	269,381	35.7%	19,489	2.6%	754,105	"

**Central Kalimantan**

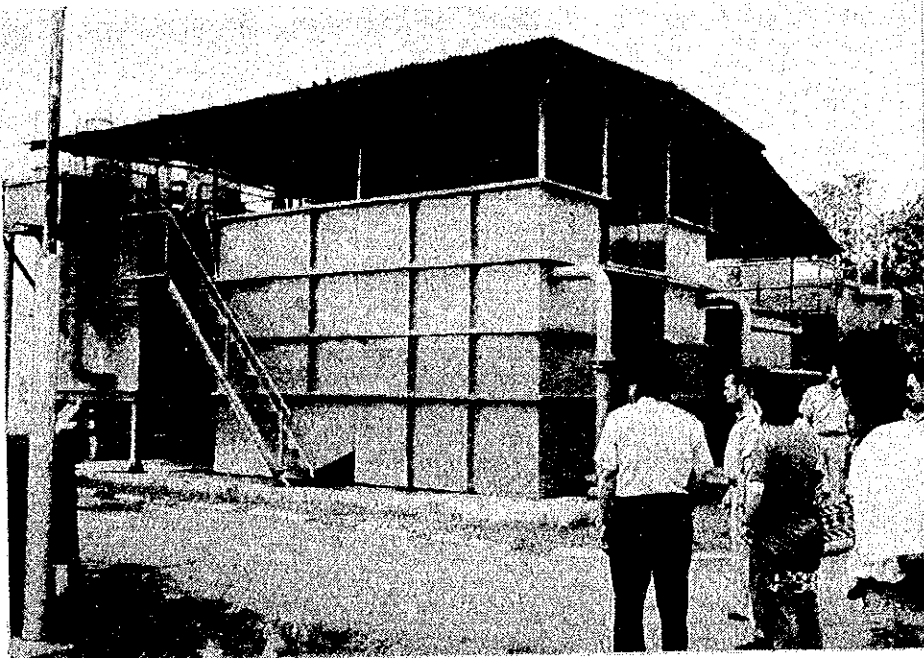
Regency/Municipality	Area	Pipe		Pump or Well		River		Rain		Spring/Other		Total	
Kotawaringin Barat	Urban	816	6.3%	10,472	80.2%	0	0	0	0	1,768	13.5%	13,056	100%
	Rural	1,700	4.9%	22,440	64.5%	8,160	23.4%	2,176	6.3%	340	1.0%	34,816	"
	Total	2,516	5.3%	32,912	68.8%	8,160	17.0%	2,176	4.5%	2,108	4.4%	47,872	"
Kotawaringin Timur	Urban	10,370	54.5%	6,120	32.1%	1,700	8.9%	850	4.5%	0	0	19,040	"
	Rural	0	0	15,582	19.8%	47,700	60.5%	15,423	19.6%	159	0.2%	78,864	"
	Total	10,370	10.6%	21,702	22.2%	49,400	50.5%	16,273	16.6%	159	0.2%	97,904	"
Kapuas	Urban	3,108	37.5%	0	0	4,662	56.3%	259	3.1%	259	3.1%	8,288	"
	Rural	5,310	4.9%	8,673	8.1%	77,703	72.2%	15,045	14.0%	885	0.8%	107,616	"
	Total	8,418	7.3%	8,673	7.5%	82,365	71.1%	15,304	13.2%	1,144	1.0%	115,904	"
Barito Selatan	Urban	4,970	72.9%	852	12.5%	994	14.6%	0	0	0	0	6,816	"
	Rural	4,851	15.0%	7,497	23.2%	18,711	58.0%	63	0.2%	1,134	3.5%	32,256	"
	Total	9,821	25.1%	8,349	21.4%	19,705	50.4%	63	0.2%	1,134	2.9%	39,072	"
Barito Utara	Urban	6,075	84.4%	225	3.1%	900	12.5%	0	0	0	0	7,200	"
	Rural	2,356	7.4%	868	2.7%	27,528	86.7%	682	2.1%	310	1.0%	31,744	"
	Total	8,431	21.6%	1,093	2.8%	28,428	73.0%	682	1.8%	310	0.8%	38,944	"
Palangkaraya	Urban	8,580	28.7%	20,735	69.3%	605	2.0%	0	0	0	0	29,920	"
	Rural	126	4.7%	1,176	43.8%	1,302	48.4%	0	0	84	3.1%	2,688	"
	Total	8,706	26.7%	21,911	67.2%	1,907	5.8%	0	0	84	0.3%	32,608	"
Total of Central	Urban	33,919	40.2%	38,404	45.5%	8,861	10.5%	1,109	1.3%	2,027	2.4%	84,320	"
	Rural	14,343	5.0%	56,236	19.5%	181,104	62.9%	33,389	11.6%	2,912	1.0%	287,984	"
	Total	48,262	13.0%	94,640	25.4%	189,965	51.0%	34,498	9.3%	4,939	1.3%	372,304	"

Source: 1995 Census

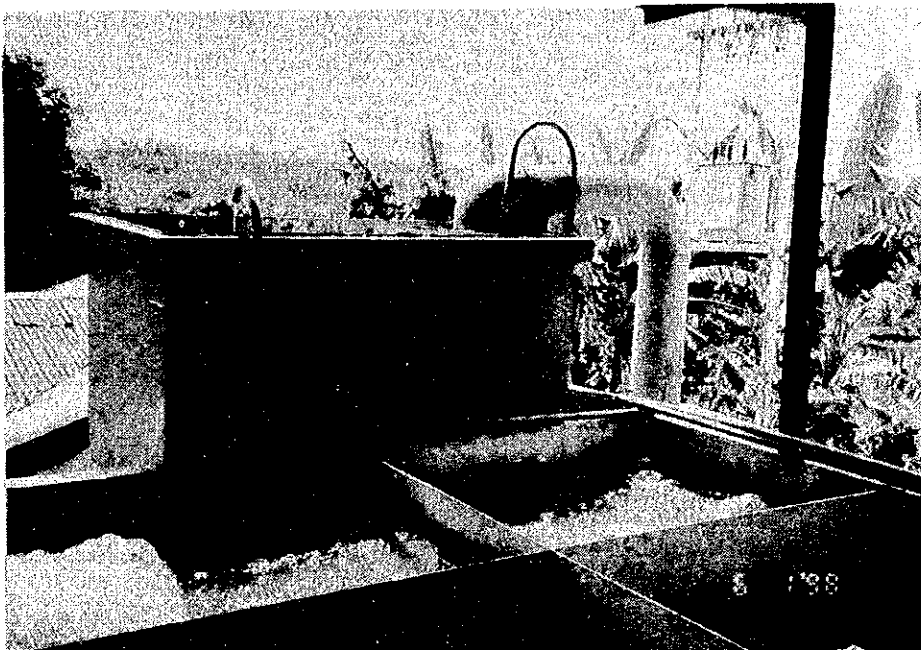
Pipe: Purified water supplied by PDAM or other supplier

Pump or Well: Raw underground water

**Photo 16.6.1** Water Treatment Plant at Muarateweh



**Photo 16.6.2** Water Treatment Plant at Muarateweh



Utilization ratio of piped water at Kabupaten Pontianak, Ketapang, Kotamadya Pontianak in West and Kotawaringin Barat, Kapuas, Palangkaraya in Central is very low because of less development of water supply facilities compared with other regencies in both provinces.

Other source of drinking water is from rivers and rainwater in West, and from rivers and underground in Central. Even in urban areas more than 50% of households are using these water directly for drinking without any treatment.

New water supply plant construction and expansion of supply area project is now being implemented at Pontianak and Palangkaraya cities as the KUDP aided by World Bank.

Another project is simple water supply at about 660 villages in West and Central Kalimantan implemented as ADB loan project from 1995 to 1999.

### **16.6.2 Sanitation**

There is no waste water treatment plant and sewer system even at major cities in the study area. A waste water treatment plant, therefor, is now being constructed at Pontianak and Palangkaraya cities as the KUDP aided by World Bank.

Waste water from each households and buildings is collected by private sectors what have been left in charge of by the public sector by vacuum trucks and is discharged to rivers far from collecting areas. This is one of big causes for degradation of river water quality.

8.5% of total households (22.6% at urban area and 5.0% at rural area) in West Kalimantan and 14.1% (38.6% at urban area and 6.9% at rural area) in Central has a private toilet with septic tank respectively.

28.9% of total households (69.1% at urban area and 14.7% at rural area) in West and 14.7% (34.1% at urban and 9.0% at rural) in Central use shared and public toilets without septic tank.

Utilization of toilet facility both with and without septic tank is 91.7% at urban and 23.8% at rural in West Kalimantan and 72.7% at urban and 15.9% at rural in Central respectively. Usage ratio of toilet at rural area is remarkably low compared with at urban area. People having no toilet facility uses cesspools, rivers and fields near their houses as a toilet (see Table 16.6.5).

**Table 16.6.5 Households by Toilet Facility**

**West Kalimantan**

Regency/Municipality	Area	Priv. Toil.with Septic Tank		Without Septic, Shared & Public		Cesspool		River/Stream		Forest/Yard/Pond & Others		Total	
Sambas	Urban	16,445	67.7%	4,807	19.8%	1,012	4.2%	0	0	2,024	8.3%	24,288	100%
	Rural	12,685	8.4%	26,255	17.4%	20,060	13.3%	36,580	24.2%	55,460	36.7%	151,040	"
	Total	29,130	16.6%	31,062	17.7%	21,072	12.0%	36,580	20.9%	57,484	32.8%	175,328	"
Kabupaten Pontianak	Urban	12,847	45.3%	15,062	53.1%	0	0	0	0	443	1.6%	28,352	"
	Rural	6,264	4.4%	38,367	27.0%	19,053	13.4%	52,983	37.3%	25,317	17.8%	141,984	"
	Total	19,111	11.2%	53,429	31.4%	19,053	11.2%	52,983	31.1%	25,760	15.1%	170,336	"
Sanggau	Urban	1,890	31.3%	2,457	40.6%	1,512	25.0%	189	3.1%	0	0	6,048	"
	Rural	3,633	3.6%	8,304	8.3%	12,802	12.8%	69,892	70.1%	5,017	5.0%	99,648	"
	Total	5,523	5.2%	10,761	10.2%	14,314	13.5%	70,081	66.3%	5,017	4.7%	105,696	"
Ketapang	Urban	0	0	4,428	84.4%	164	3.1%	492	9.4%	164	3.1%	5,248	"
	Rural	2,025	2.6%	19,845	25.6%	11,475	14.8%	29,430	37.9%	14,850	19.1%	77,625	"
	Total	2,025	2.4%	24,273	29.3%	11,639	14.0%	29,922	36.1%	15,014	18.1%	82,873	"
Sintang	Urban	1,218	21.9%	3,306	59.4%	870	15.6%	174	3.1%	0	0	5,568	"
	Rural	2,808	3.1%	13,416	14.9%	22,932	25.5%	48,048	53.5%	2,652	3.0%	89,856	"
	Total	4,026	4.2%	16,722	17.5%	23,802	24.9%	48,222	50.5%	2,652	2.8%	95,424	"
Kapas Hulu	Urban	225	9.4%	1,575	65.6%	150	6.3%	450	18.8%	0	0	2,400	"
	Rural	992	2.8%	2,604	7.3%	10,788	30.2%	17,112	47.9%	4,216	11.8%	35,712	"
	Total	1,217	3.2%	4,179	11.0%	10,938	28.7%	17,562	46.1%	4,216	11.1%	38,112	"
Kolamadya Pontianak	Urban	1,360	1.7%	72,216	92.2%	3,536	4.5%	272	0.3%	952	1.2%	78,336	"
	Rural	1,750	21.9%	5,000	62.5%	750	9.4%	0	0	500	6.3%	8,000	"
	Total	3,110	3.6%	77,216	89.4%	4,286	5.0%	272	0.3%	1,452	1.7%	86,336	"
Total of West	Urban	33,985	22.6%	103,851	69.1%	7,244	4.8%	1,577	1.0%	3,583	2.4%	150,240	"
	Rural	30,157	5.0%	113,791	18.8%	97,860	16.2%	254,045	42.1%	108,012	17.9%	603,865	"
	Total	64,142	8.5%	217,642	28.9%	105,104	13.9%	255,622	33.9%	111,595	14.8%	754,105	"

**Central Kalimantan**

Regency/Municipality	Area	Priv. Toil.with Septic Tank		Without Septic, Shared & Public		Cesspool		River/Stream		Forest/Yard/Pond & Others		Total	
Kotawaringin Barat	Urban	3,536	27.1%	2,040	15.6%	2,448	18.8%	4,896	37.5%	136	1.0%	13,056	100%
	Rural	6,936	19.9%	3,740	10.7%	12,104	34.8%	10,472	30.1%	1,564	4.5%	34,816	"
	Total	10,472	21.9%	5,780	12.1%	14,552	30.4%	15,368	32.1%	1,700	3.6%	47,872	"
Kotawaringin Timur	Urban	8,330	43.8%	5,780	30.4%	1,020	5.4%	3,570	18.8%	340	1.8%	19,040	"
	Rural	4,929	6.3%	4,611	5.8%	20,193	25.6%	38,319	48.6%	10,812	13.7%	78,864	"
	Total	13,259	13.5%	10,391	10.6%	21,213	21.7%	41,889	42.8%	11,152	11.4%	97,904	"
Kapas	Urban	777	9.4%	3,108	37.5%	0	0	4,403	53.1%	0	0	8,288	"
	Rural	3,717	3.5%	9,204	8.6%	42,834	39.8%	50,268	46.7%	1,593	1.5%	107,616	"
	Total	4,494	3.9%	12,312	10.6%	42,834	37.0%	54,671	47.2%	1,593	1.4%	115,904	"
Barito Selatan	Urban	2,698	39.6%	852	12.5%	852	12.5%	2,414	35.4%	0	0	6,816	"
	Rural	2,457	7.6%	3,717	11.5%	3,780	11.7%	19,467	60.4%	2,835	8.8%	32,256	"
	Total	5,155	13.2%	4,569	11.7%	4,632	11.9%	21,881	56.0%	2,835	7.3%	39,072	"
Barito Utara	Urban	3,450	47.9%	1,950	27.1%	225	3.1%	1,575	21.9%	0	0	7,200	"
	Rural	1,612	5.1%	3,844	12.1%	2,976	9.4%	23,126	72.9%	186	0.6%	31,744	"
	Total	5,062	13.0%	5,794	14.9%	3,201	8.2%	24,701	63.4%	186	0.5%	38,944	"
Palangkaraya	Urban	13,750	46.0%	15,015	50.2%	220	0.7%	880	2.9%	55	0.2%	29,920	"
	Rural	336	12.5%	924	34.4%	378	14.1%	924	34.4%	126	4.7%	2,688	"
	Total	14,086	43.2%	15,939	48.9%	598	1.8%	1,804	5.5%	181	0.6%	32,608	"
Total of Central	Urban	32,541	38.6%	28,745	34.1%	4,765	5.7%	17,738	21.0%	531	0.6%	84,320	"
	Rural	19,987	6.9%	26,040	9.0%	82,265	28.6%	142,576	49.5%	17,116	5.9%	287,984	"
	Total	52,528	14.1%	54,785	14.7%	87,030	23.4%	160,314	43.1%	17,647	4.7%	372,304	"

Source: 1995 Census

Shared & Public Toilet: Toilet without septic tank



This causes deterioration of river water quality and living environment especially in dry seasons.

Quality of underground water is also affected by this sanitation system. There exist about 57 thousand in West Kalimantan and about 62 thousand of pumps or wells for drinking water located within 15m distance from cesspool. Almost all of them locate at rural area in West Kalimantan, however, about half of them exist at urban area in Central Kalimantan. 18,865 (91%) of 20,735 pumps or wells exist at urban area in Palangkaraya city (see Table 16.6.6).

Waste water in cesspool leaks to underground water and causes water pollution. This is a big problem to people who uses underground water as drinking. Construction of public toilets for improvement of living condition is now being implemented at about 660 villages in West and Central Kalimantan from 1995 to 1999 as ADB loan project.

**Table 16.6.6 Households which Use Pump or Well for Drinking Water and Distance between Pump or Well and Nearest Cesspool**

**West Kalimantan**

Regency/Municipality	Area	Distance between Pump or Well and the nearest Cesspool (M)										Total	
		< 6		6 - 10		11 - 15		>16		others			
Sambas	Urban	253	7.1%	253	7.1%	0	0	3,036	85.7%	0	0	3,542	100%
	Rural	4,130	11.8%	6,785	19.3%	6,195	17.6%	17,110	48.7%	885	2.5%	35,105	"
	Total	4,383	11.3%	7,038	18.2%	6,195	16.0%	20,146	52.1%	885	2.3%	38,647	"
Kabupaten Pontianak	Urban	0	0	0	0	0	0	0	0	0	0	0	"
	Rural	0	0	1,044	17.4%	1,566	26.1%	1,566	26.1%	1,827	30.4%	6,003	"
	Total	0	0	1,044	17.4%	1,566	26.1%	1,566	26.1%	1,827	30.4%	6,003	"
Sanggau	Urban	0	0	0	0	0	0	0	0	0	0	0	"
	Rural	1,557	17.3%	2,941	32.7%	1,384	15.4%	3,114	34.6%	0	0	8,996	"
	Total	1,557	17.3%	2,941	32.7%	1,384	15.4%	3,114	34.6%	0	0	8,996	"
Ketapang	Urban	0	0	164	4.0%	984	24.0%	2,460	60.0%	492	12.0%	4,100	"
	Rural	2,835	8.4%	7,020	20.7%	7,020	20.7%	12,150	35.9%	4,860	14.3%	33,885	"
	Total	2,835	7.5%	7,184	18.9%	8,004	21.1%	14,610	38.5%	5,352	14.1%	37,985	"
Sintang	Urban	0	0	0	0	0	0	0	0	0	0	0	"
	Rural	2,184	11.9%	6,864	37.3%	3,120	16.9%	6,240	33.9%	0	0	18,408	"
	Total	2,184	11.9%	6,864	37.3%	3,120	16.9%	6,240	33.9%	0	0	18,408	"
Kapas Hulu	Urban	0	0	0	0	0	0	0	0	0	0	0	"
	Rural	0	0	310	83.3%	62	16.7%	0	0	0	0	372	"
	Total	0	0	310	83.3%	62	16.7%	0	0	0	0	372	"
Kotamadya Pontianak	Urban	0	0	0	0	0	0	0	0	0	0	0	"
	Rural	0	0	0	0	0	0	0	0	0	0	0	"
	Total	0	0	0	0	0	0	0	0	0	0	0	"
Total	Urban	253	3.3%	417	5.5%	984	12.9%	5,496	71.9%	492	6.4%	7,642	"
	Rural	10,706	10.4%	24,964	24.3%	19,347	18.8%	40,180	39.1%	7,572	7.4%	102,769	"
	Total	10,959	9.9%	25,381	23.0%	20,331	18.4%	45,676	41.4%	8,064	7.3%	110,411	"

**Central Kalimantan**

Regency/Municipality	Area	Distance between Pump or Well and the nearest Cesspool (M)										Total	
		< 6		6 - 10		11 - 15		>16		others			
Kotawaringin Barat	Urban	1,496	14.3%	2,448	23.4%	2,312	22.1%	3,808	36.4%	408	3.9%	10,472	100%
	Rural	1,360	6.1%	3,332	14.8%	7,208	32.1%	8,908	39.7%	1,632	7.3%	22,440	"
	Total	2,856	8.7%	5,780	17.6%	9,520	28.9%	12,716	38.6%	2,040	6.2%	32,912	"
Kotawaringin Timur	Urban	340	5.6%	1,190	19.4%	2,210	36.1%	2,380	38.9%	0	0	6,120	"
	Rural	636	4.1%	3,180	20.4%	6,678	42.9%	5,088	32.7%	0	0	15,582	"
	Total	976	4.5%	4,370	20.1%	8,888	41.0%	7,468	34.4%	0	0	21,702	"
Kapas	Urban	0	0	0	0	0	0	0	0	0	0	0	"
	Rural	1,593	18.4%	885	10.2%	2,124	24.5%	3,363	38.8%	708	0	8,673	"
	Total	1,593	18.4%	885	10.2%	2,124	24.5%	3,363	38.8%	708	0	8,673	"
Barito Selatan	Urban	0	0	355	41.7%	355	41.7%	142	16.7%	0	0	852	"
	Rural	252	3.4%	2,583	34.5%	1,260	16.8%	2,457	32.8%	945	12.6%	7,497	"
	Total	252	3.0%	2,938	35.2%	1,615	19.3%	2,599	31.1%	945	11.3%	8,349	"
Barito Utara	Urban	0	0	0	0	0	0	225	100.0%	0	0	225	"
	Rural	620	71.4%	248	28.6%	0	0	0	0	0	0	868	"
	Total	620	56.7%	248	22.7%	0	0	225	20.6%	0	0	1,093	"
Palangkaraya	Urban	3,190	15.4%	11,385	54.9%	4,290	20.7%	1,760	8.5%	110	0.5%	20,735	"
	Rural	84	7.1%	336	28.6%	378	32.1%	378	32.1%	0	0	1,176	"
	Total	3,274	14.9%	11,721	53.5%	4,668	21.3%	2,138	9.8%	110	0.5%	21,911	"
Total	Urban	5,026	13.1%	15,378	40.0%	9,167	23.9%	8,315	21.7%	518	1.3%	38,404	"
	Rural	4,545	8.1%	10,564	18.8%	17,648	31.4%	20,194	35.9%	3,285	5.8%	56,236	"
	Total	9,571	10.1%	25,942	27.4%	26,815	28.3%	28,509	30.1%	3,803	4.0%	94,640	"

Source: Census 1995