

## **4. Areal and Social Conditions**



#### 4. Areal and Social Conditions

##### 4.1 Natural Condition

###### 4.1.1 Climate

The climate of Jakarta is a typical tropical climate with high temperature, average 27°C, and high humidity, average 80%. It has a dry season, May to October, and a wet season, November to April. Rainfall in the southern mountain area (Puncak area) is quite high with more than 5,000 mm per year. Bogor, the southern part of Jabotabek, has a name of "the city of rain", where it rains about 4,000 mm per year. Rainfall in the northern seaside area is 1,500 mm per year. The large amount of rain water in the southern mountain area penetrates into the ground and becomes an important water resource for the people of Jakarta.

The presidential decree regarding "the General layout plan for the Puncak Area" restricts the development of this area with a purpose of protecting the subsurface water. Accordingly it is difficult to find a final disposal site for solid waste. Meteorological data for Jakarta and Bogor are shown in Table 4.1-1.

During the last 15 years, the maximum rainfall for a given month was 728 mm in January 1979, and maximum rainfall for a single day was 203.9 mm on 17th January, 1977. This climate of high temperature and high humidity causes rapid decomposition of organic waste.

Characteristic of rainfall in Jakarta is extreme locality both in terms of place and time. For instance, when it is raining cats and dogs in Halim, in Menteng, only few kilometers apart, bright sun is shining. When driving on a road, it often happens that it stops raining all of a sudden and there is no trace of rain.

Wind is fairly mild in Jakarta throughout the year, with an average wind velocity 1.5 m - 1.8 m/sec. There is no strong wind like typhoon.

Table 4.1.1-1 Meteorological Data of Jakarta and Bogor

Meteorological Date	Area	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total/Average
Rainfall (mm)	Jakarta	390	322	242	126	117	87	56	53	68	92	135	180	1,868
	Bogor	460	447	381	403	117	198	224	224	317	370	328	347	3,816
Mean Temperature (°C)	Jakarta	26.3	26.3	26.9	27.5	27.7	27.2	27.0	27.1	27.6	27.8	27.3	26.7	27.1
	Bogor	25.0	25.1	25.4	25.8	25.9	25.8	25.5	25.4	25.8	26.2	25.7	25.6	25.6
Mean	Jakarta	85	85	83	82	80	78	76	74	73	75	79	82	
	Bogor	91	90	88	89	86	82	91	78	90	81	83	86	
Relative humidity (%)	Jakarta	39	47	57	68	70	71	78	83	82	71	56	48	
	Bogor	27	32	51	55	56	51	49	60	63	59	48	41	
Sunshine (%)	Jakarta	NW	NW	NW	E	E	E	E	E	N	N	N	NW	
	Bogor	NW	NW	W	NE	NE	NE	NE	NE	NE	N	N	W	
Wind direction	Jakarta	1.6	1.7	1.5	1.5	1.6	1.6	1.8	1.7	1.8	1.8	1.9	1.5	
	Bogor	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.6	
Wind velocity (m/s)	Jakarta	127	123	149	147	143	129	143	161	171	174	150	140	1,757 (94.0%)*
	Bogor	96	101	130	120	115	99	102	121	132	130	138	121	1,405 (36.8%)*
Potential evaporation (mm) (Penman)	Jakarta	127	123	149	147	143	129	143	161	171	174	150	140	1,757 (94.0%)*
	Bogor	96	101	130	120	115	99	102	121	132	130	138	121	1,405 (36.8%)*

Source: CJC Water Resources Development Plan, Annex D, Sogreah-Coyne & Bellier, 1979 and NEDECO, 1983.

\* : Percentage to annual precipitation

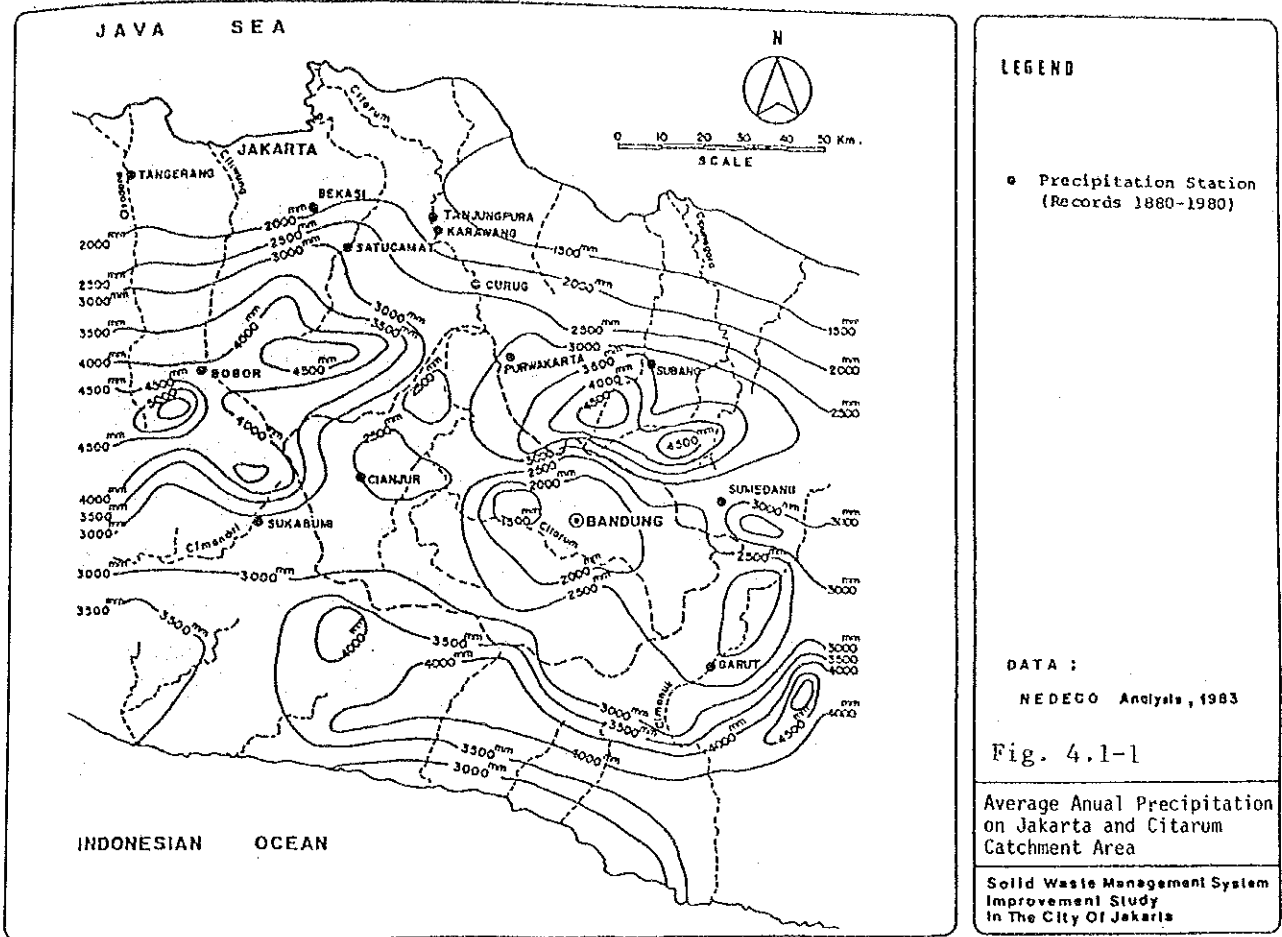


Fig. 4.1-1 Average Annual Precipitation on Jakarta and Citarum Catchment Area

#### 4.1.2 Geography

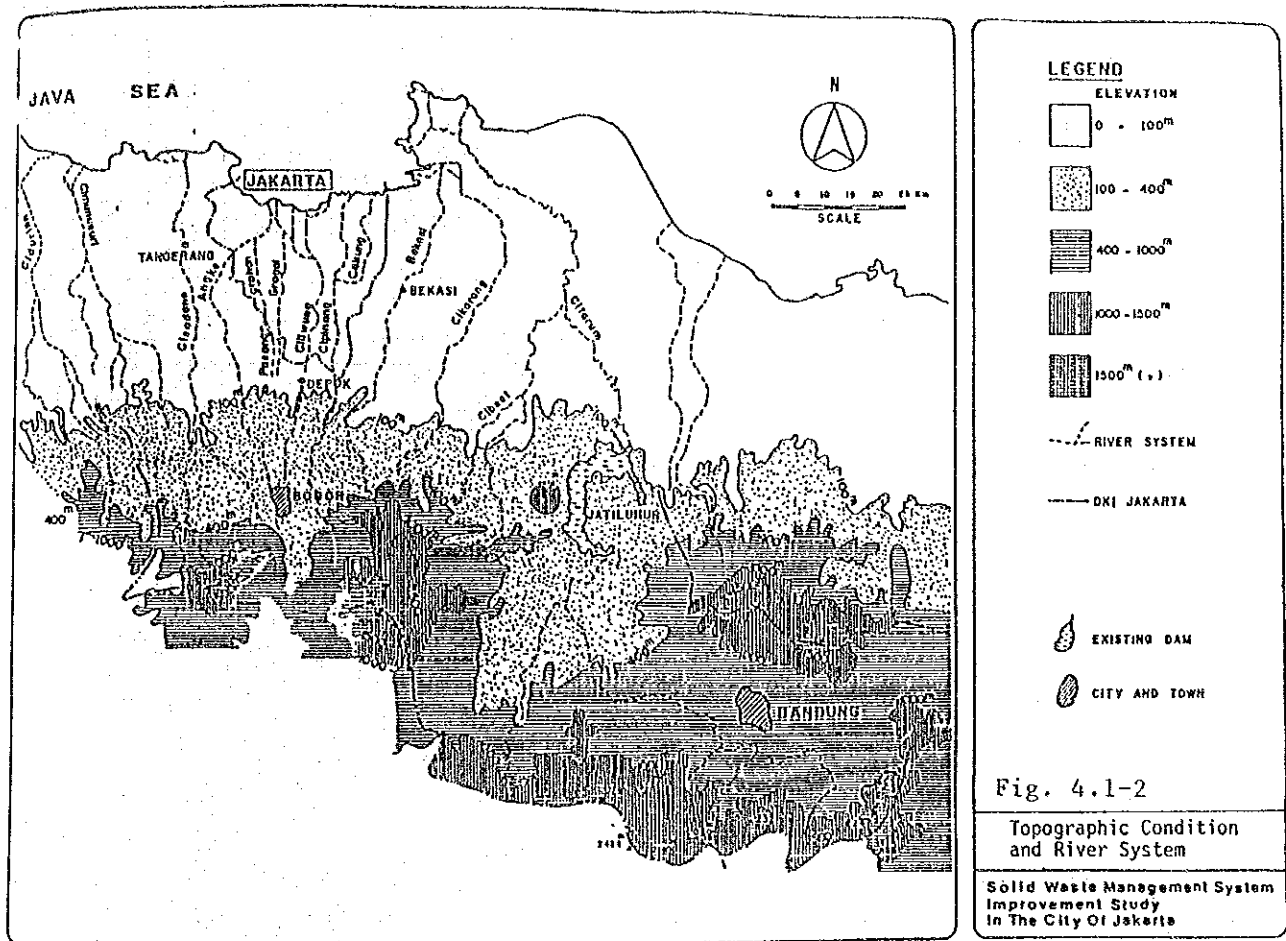
Jakarta is in the delta facing the Java Sea. The altitude of the land ranges from 0 m to 50 m. The low land along the sea has a width of 5 Km to 10 Km, where altitude is less than 10 m and some areas are swampy. The slope of the land is quite gentle with 1.0 m/Km.

The area between the seaside plain and mountain region in the south is not so large, where altitude is between 100 m and 400 m. The Bogor area is at the foot of Mt. Salak (2,211 m) and Mt. Pangrango (3,019 m). This mountain area is about 50 Km from the Java Sea and consists of a group of volcanic mountains higher than 1,000 m. The slope of the mountains are quite steep.

The Jabotabek area and the basin of the Citarm river, which is the largest river in West Java province, are roughly classified into the following three areas:

- 1) Seaside plain including the city of Jakarta
- 2) Hilly region around Bogor
- 3) Mountain region in the south

Topographic conditions and main rivers are shown in Fig. 4.1-2.

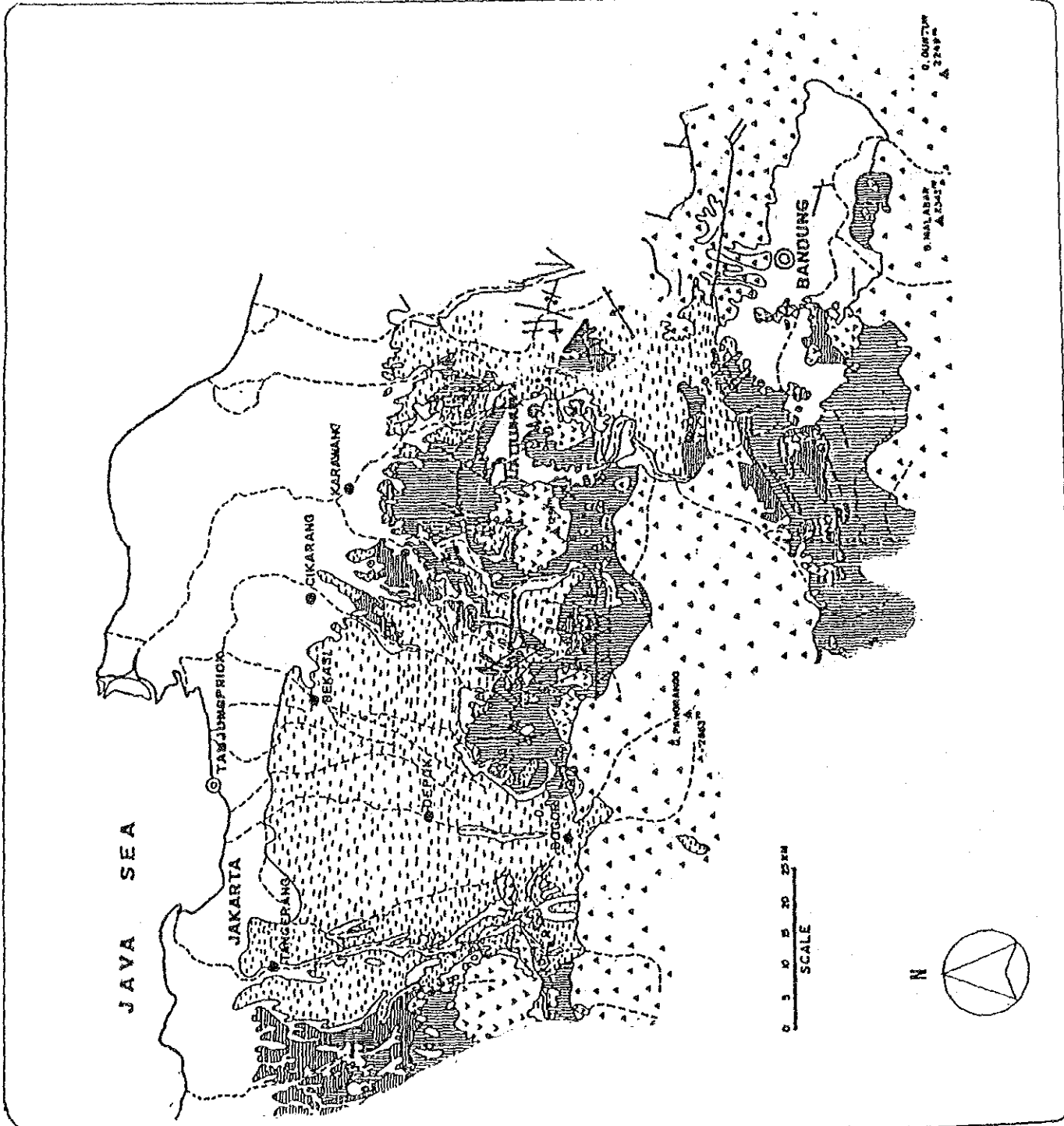


### 4.1.3 Geology

Seaside plain and wet land, including the city of Jakarta, are covered with slick layer of quarternary sediment. The surface of Jakarta is volcanic ash, volcanic clay, silt or sand of a recent epoch which is about 30 m thick. Below that is composed of a quarternary alluvial or dilluvial sediment, which layer is 100 m to 300 m thick. The geological structure is intricate with faults and folds which were developed by repeated movements of the earth's crust.

The area along the Java Sea is penetrated by salt water, which makes the area unsuitable for agriculture. Three existing final disposal sites out of five are situated in this area.

Fig. 4.1-3 shows the surface geology of Jakarta and surroundings.



**LEGEND**

- Althvium
- Pleistocene Sediments
- Pliocene Sediments
- Miocene Sediments
- Oligo - Eocene Sediments
- Granite / Gabbro
- Andesite / Diabase / Basalt
- Quaternary Volcanic
- Anticline
- Fault
- Overthrust Fault

DATA ;  
 Geological Map of Java and Madura  
 West Java, 1953, 1977.  
 Geological survey of INDONESIA.

Fig. 4.1-3

Geological Map

Solid Waste Management  
 System Improvement Study  
 In The City of Jakarta



## 4.2 General Social Factors

### 4.2.1 Customs

The Republic of Indonesia, consisting of more than 13,000 islands, is a typical multi race country. There are about 150 million Indonesians living in Sumatera, Java, Kalimantan, Sulawesi, Maluku islands, Irian Jaya and the smaller islands, including approximately 3.5 million Chinese Indonesians.

The Indonesians share a common view as Indonesian while at the same time have different ways of thinking and customs regarding, for instance, the family system and sense of values.

Even after people move from their native regions to Jakarta these rural customs are inherited and practiced as "old custom of the native town". Among those rural customs "Gotong Royon" is a custom which is commonly practiced and still traditional throughout the country.

This Gotong Royon attributes to the gentleness and the optimistic nature of Indonesian people and it functions as social security at the grass roots level, even though some people say that Gotong Royon tends to take away individual motivation for success in business or to interfere with individual careers.

Generally in Indonesia, in order to maintain good relations and community solidarity, self sacrifice and respect for elder people, ancestors and God is more valued than modern individualism or rationalism.

An attitude to solve problems peacefully through good, long discussions is regarded more important than to decide things by only majority. These "Mushawara" or Mufakat" still function in Indonesian society and are part of the "Pancasila spirit" as well.

#### 4.2.2 Mode of Living

Indonesia urban life that is like the modern European style is much different from the village life or traditional Indonesian style.

According to the census in 1980, urban population is 22.4% in the whole Indonesia, and 24.2% in Java island.

Looking at life from the point of household expenditure in urban and rural areas (Table 4.2-1), in rural areas more than 50% of the people are living on less than 30,000 Rp/month, while in the urban area a considerable number of people are spending more than 75,000 Rp/month. The percentage of households which have T.V. is 47.4 % in Jakarta, while only 2.3% in central Java. This gap in living standard between the rich and the poor tends to be continuing to increase.

In Jakarta there are many rich people whose annual incomes are over ten million rupiah. Living expenses of these rich people or foreigners working in Jakarta are higher than those of other southeast Asian countries, if they want to maintain their accustomed life styles. Prices of cars, daily goods, clothes, and the cost of education are almost the same as those in Japan or sometimes even higher. House rent is highest after Tokyo and Hongkong. On the other hand, majority of people live on low income. They support their families for a month with the amount which rich people easily spend for a dinner in an expensive restaurant.

There is an economic system of amazingly low price which enables low income people to live such an inexpensive life. There is a world where people with income of 150,000 Rp/month can even live with a sense of feeling wealthy. On the other hand in the life style of upper class, white collar workers in a city may suffer from a sense of poverty even with an income of 250,000 Rp/month which is an enviable income for the majority of people.

Rich people tend to have Indonesian style in family relations and beliefs, but in terms of materialistic consumption, they are inclined to maintain a modern western life style.

Table 4.2-1 Percentage of Household Monthly Expenditures in Urban and Rural Areas by Expenditure Groups, 1980

Monthly Expenditure (Rupiah)	Percentage of household		
	Urban	Rural	Total
less than 10,000	1.5	5.7	4.8
10,000 - 14,999	3.8	10.9	9.4
15,000 - 19,999	5.8	14.2	12.4
20,000 - 24,999	7.6	13.7	12.4
25,000 - 29,999	8.3	11.8	11.1
30,000 - 39,999	14.6	16.8	16.4
40,000 - 49,999	12.5	10.2	10.7
50,000 - 74,999	19.8	10.9	12.8
more than 75,000	26.2	5.8	10.2
Total	100.0%	100.0%	100.0%

Source: Biro Pusat Statistik, Sarvei Sosial Ekonomi Nasional, Penselebaran untuk Konsumsi Penduduk Indonesia, Pebruari 1980.

#### 4.2.3 Religion

Indonesia is the largest Islamic country in the world. According to the census in 1980, 88% of the total population is Islam. The rest consists of Catholic, Protestant, Hindu, Buddha and others. Indonesian Islam, however, is different from that in the Middle East.

But the custom of fasting during the month before Lebaran, which is the biggest Islamic holiday, is still observed by many people. During this period many people do not take meals during the daytime. Many restaurants close during the daytime. But people tend to eat big meals after sunset. Some even take larger meal than usual.

In the Lebaran period most of people take 2 - 3 weeks long holidays. Many go back to their native town. Buses and railway terminals in Jakarta are jammed with people coming back to their home towns. On Christmas or New Year's day or Chinese New Year Jakarta is also crowded with people celebrating the holidays.

It is quite popular among people to go out for a picnic with picnic lunch to parks or amusement parks in holidays.

It is an important matter for a man of strong belief to fight with these animistic and supernatural spirits. Because of this mental efforts, it is said that leaders of Indonesian Islam show better understanding towards modern scientific thinking and economic developments.

For Indonesians religion and philosophy are more influential than for Japanese. Indonesian scholars are said to refer to religion and philosophy even when they are speaking on economic development.

Table 4.2-2 Percentage of Population by Religion (%)

Administrative Region	Islam	Catholic	Protestant	Hindu	Buddha	Others	Total
Indonesia	87.1	3.0	5.8	2.0	0.9	1.2	100
DKI Jakarta	84.89	3.11	6.28	0.27	5.45		100
Jakarta Selatan	22.28	0.58	1.14	0.006	0.31		24.38
Jakarta Timur	19.96	0.61	1.46	0.005	0.38		22.46
Jakarta Pusat	15.37	0.73	1.50	0.08	1.34		19.02
Jakarta Barat	14.55	0.70	1.19	0.005	2.49		18.98
Jakarta Utara	12.71	0.49	0.99	0.03	0.93		15.16

Source: Kanwil Dep. Agama DKI Jakarta, 1984, Statistik Indonesia 1984

#### 4.2.4 Education

The objective of education in Indonesia is to raise the people in accordance with the spirit of "Five Principles of the Republic" (Pancasila). This spirit is the national principle in order to unite the Republic of Indonesia which consists of such diverse races and tribes.

Table 4.2-3 shows the number of elementary schools, middle schools and high schools in Jakarta. The number of total pupils in Jakarta is about 20 percent of the total population of Jakarta.

A high level of education is considered a driving force for the economic development, and as for solid waste treatment system, people's level of education is one of the bases to figure out possible community cooperation.

The Indonesian education system is composed of 12 years of schooling, divided into 6, 3 and 3 year schools as in the same case in Japan. However, in Indonesia only elementary school education is compulsory. After high school there are either 3 years "Academi" or 5 years of University.

In 1950 compulsory education was introduced and the elimination of illiteracy was begun by instituting regulation No. 4 1950, regarding the foundation of school education. President Soeharto, with a special budget of "Impress", has promoted construction of elementary schools and distribution of free textbooks. As a result illiteracy has been reduced drastically. The illiteracy rate in 1950 was about 80%, but in 1980 it was reduced to 32.7%. Among a total population of 150 million, about 583,300,000 people, 67.3% of the population over 15 years old, can read and write.

The curriculum of elementary school emphasizes moral and religious education. In each grade of both public and private schools 2 hours a week are allocated for Pancasila education and 2 or 3 hours a week for religious education.

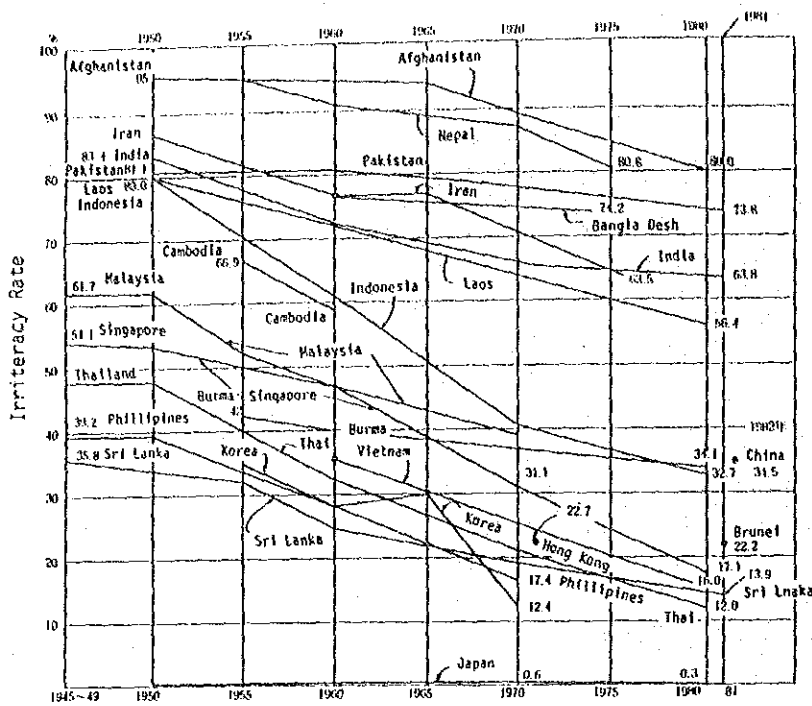
Table 4.2-3 Number of Schools, School Buildings, Pupils and Teachers by School Level and Type of School, DKI Jakarta 1983

School Level and Type of School	School	School Buildings	Pupils	Teachers
Kindergarten	1,200	841	82,850	3,584
Elementary School	3,131	2,186	1,043,147	31,680
Junior High School	729	583	329,663	17,247
Junior Home Economics				
High School	4	4	363	61
Junior Technical High School	14	12	3,202	272
Senior Economic High School	82	69	34,138	1,947
Senior Home Economics				
High School	12	11	2,295	279
Senior Technical High School	68	61	23,566	1,906
Senior High School	319	219	177,442	9,993
Teacher's High School	16	16	7,776	439
Extension Course Junior				
High Level	5	2	1,006	74
Extension Course Senior				
High Level	5	2	1,777	94

Table 4.2-4 Number of Elementary Schools, School Buildings, Pupils, Teachers and Classrooms by Administrative Region

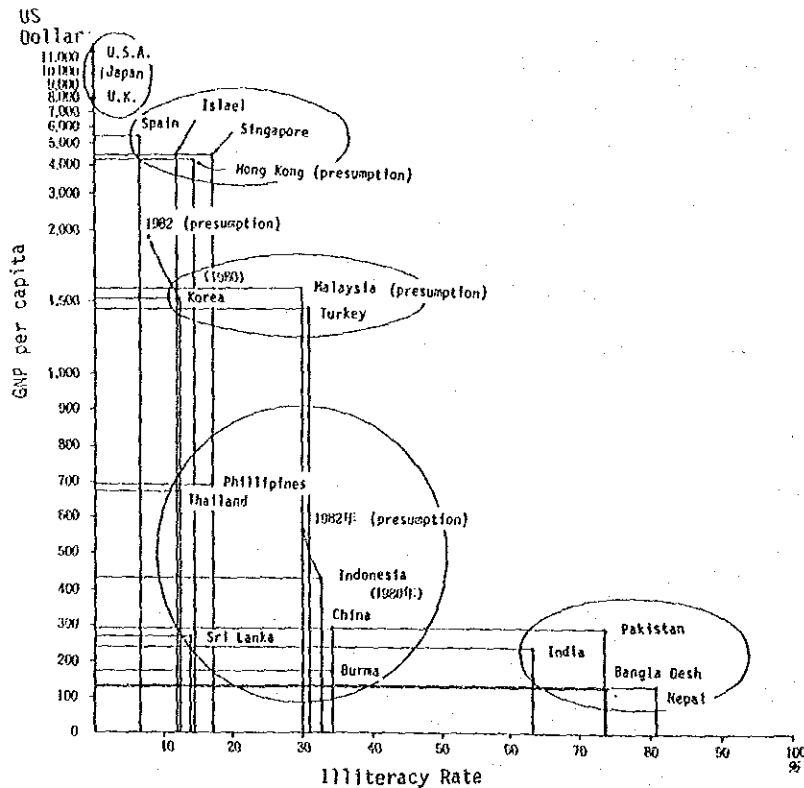
Administrative Region	Schools	School Buildings	Pupils	Teachers	Classrooms
Jakarta Selatan	741	501	244,456	7,850	4,255
Jakarta Timur	767	571	252,596	7,986	4,413
Jakarta Pusat	611	409	187,828	6,127	3,061
Jakarta Barat	603	416	197,324	5,693	3,213
Jakarta Utara	409	289	160,943	4,024	2,531
DKI Jakarta	3,131	2,186	1,043,197	31,680	17,473

Source: Dinas P&P, DKI Jakarta, Jakarta in Figures 1984, Jakarta Statistical office



Source : "Education in Asia" Toshio Toyoda &  
 "Statistical Yearbook" 1984, UNESCO  
 "Education in Indonesia 1985", Tokujiro Majima;  
 THE OECF RESEARCH QUARTELY 1986/3

Fig. 4.2-1 Change in Illiteracy in Asian Countries



Source : "Statistical Yearbook" 1984, UNESCO & "World Development Report" 1984, World Bank  
 "Education in Indonesia 1985", Tokujiro Majima; THE OECF RESEARCH QUARTELY 1986/3

Fig. 4.2-2 Correlation between Illiteracy Rate and GNP per Capita



#### 4.2.5 Squatters

##### 1) Distribution of Squatters

. Squatters can be shown in areas adjoining rivers and railways  
Fig. 4.2-3.

##### 2) Population of Squatters

. The estimated population of squatters in 1984 of about 0.5 million is based on the population census and the population registration, while precise data is not available from the government.

\*) Unregistered population was 1.2 million 1984.

##### 3) Public Facilities of Squatters

. Public facilities such as water supply, road and other facilities are not organized by the Government.

. Electricity is supplied for the squatters as part of family planning by PLN, a semi public organization.

##### 4) Problem Arising from Squattered Areas

. Provision of public facilities for squatters should be taken into consideration by the Government, especially in cases where squatters area the direct cause of polluting the environment, for instance, by throwing garbage into drains and canals causing floods in other areas.

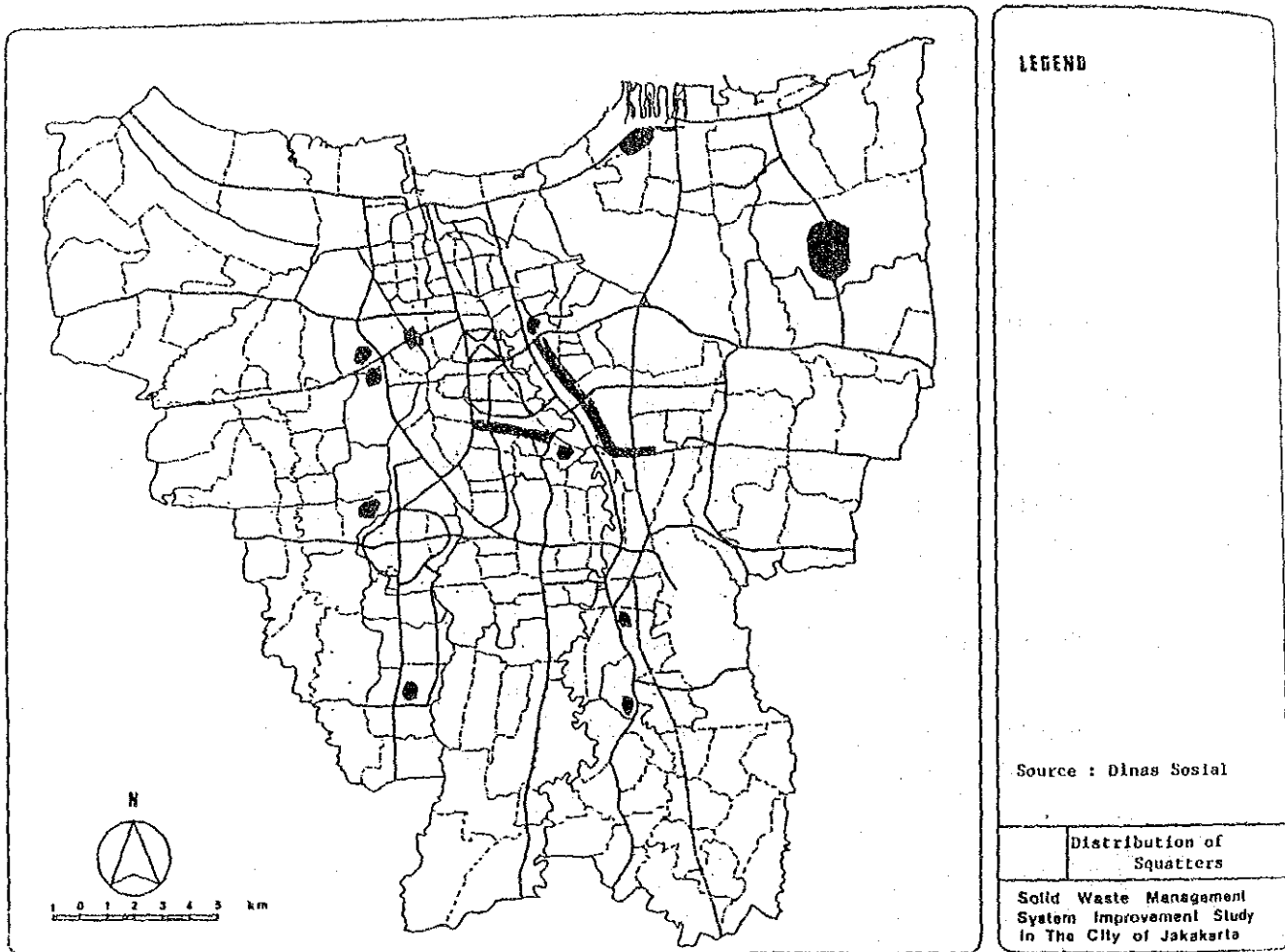


Fig. 4.2-3 Distribution of Squatters

#### 4.2.6 Tribes

Jakarta is a melting pot of people. People come to Jakarta from various parts of Indonesia. More than 350 tribes and about 250 dialects are said to be in Indonesia.

In Jakarta, the majority of people are Javanese and Sudanese, but there are also people from Ache in north Sumatera, Batak, near Lake Toba in north Sumatera, Minankabau in west Sumatera, Malay from east Sumatera, Banjar and Dayak from Kalimantan, Bugis and Makasar from south Sulawesi, Manado from north Sulawesi, Madura from Madura, Balinese from Bali Ambonese from Maluku islands, Irianese from Irian Jaya. And also there are Chinese Indonesians immigrated since the Dutch period.

People of different tribes have different manners and customs. For instances, Javanese are attached to traditional and feudalistic cooperation, while Minankabau, because of the tradition of a maternal society, are independent and leave their native village for the outside world. Javanese have withdrawn nature, e.g. to avoid explicit conflict by managing problems personally or within a community, while Bugis and Makasar and people in Sumatera are open and of outgoing nature. Culture and customs of tribes also vary owing to natural conditions and historical situations in their regions.

People living in Jakarta inherit the customs and manners of their tribes. These have mixed and influenced each other and yet people keep their own traditional sense of values. Jakarta is a heterogeneous city. It is not accurate to talk about Jakarta on a similar level with the homogeneous provincial cities.

Table 4.2-5 Number of Immigration by Activity Status and Region, 1983

No.	Status Pekerjaan	Jakarta Selatan	Jakarta Timur	Jakarta Pusat	Jakarta Barat	Jakarta Utara	Total
1.	Armed Forces	574	925	141	67	121	1,855
2.	Civil Servant	1,185	1,175	348	236	163	3,107
3.	Private Employee	7,521	6,134	1,879	1,735	1,480	18,749
4.	Student	447	1,233	416	219	114	2,429
5.	Servant	432	1,525	161	124	53	2,295
6.	With Husband	5,365	3,126	1,029	888	816	9,227
7.	With Wife	159	759	67	46	11	1,042
8.	With Parent	3,186	3,418	1,231	1,139	1,027	10,001
9.	With Children	141	141	31	21	20	354
10.	Other	215	8	-	-	215	438
Total		17,225	18,475	5,303	4,475	4,020	49,497

Sumber: Dinas Pendaftaran Kependudukan DKI Jakarta

Source: Office For Population Affairs Jakarta

**LEGEND**

Coming in  
 more than 500 persons  
 200 - 500 persons  
 Moving out  
 more than 500 persons  
 200 - 500 persons

--- Boundary of DKI Jakarta  
 - - - Boundary of Wilayah  
 - - - Boundary of Kecamatan  
 - - - Boundary of Kelurahan

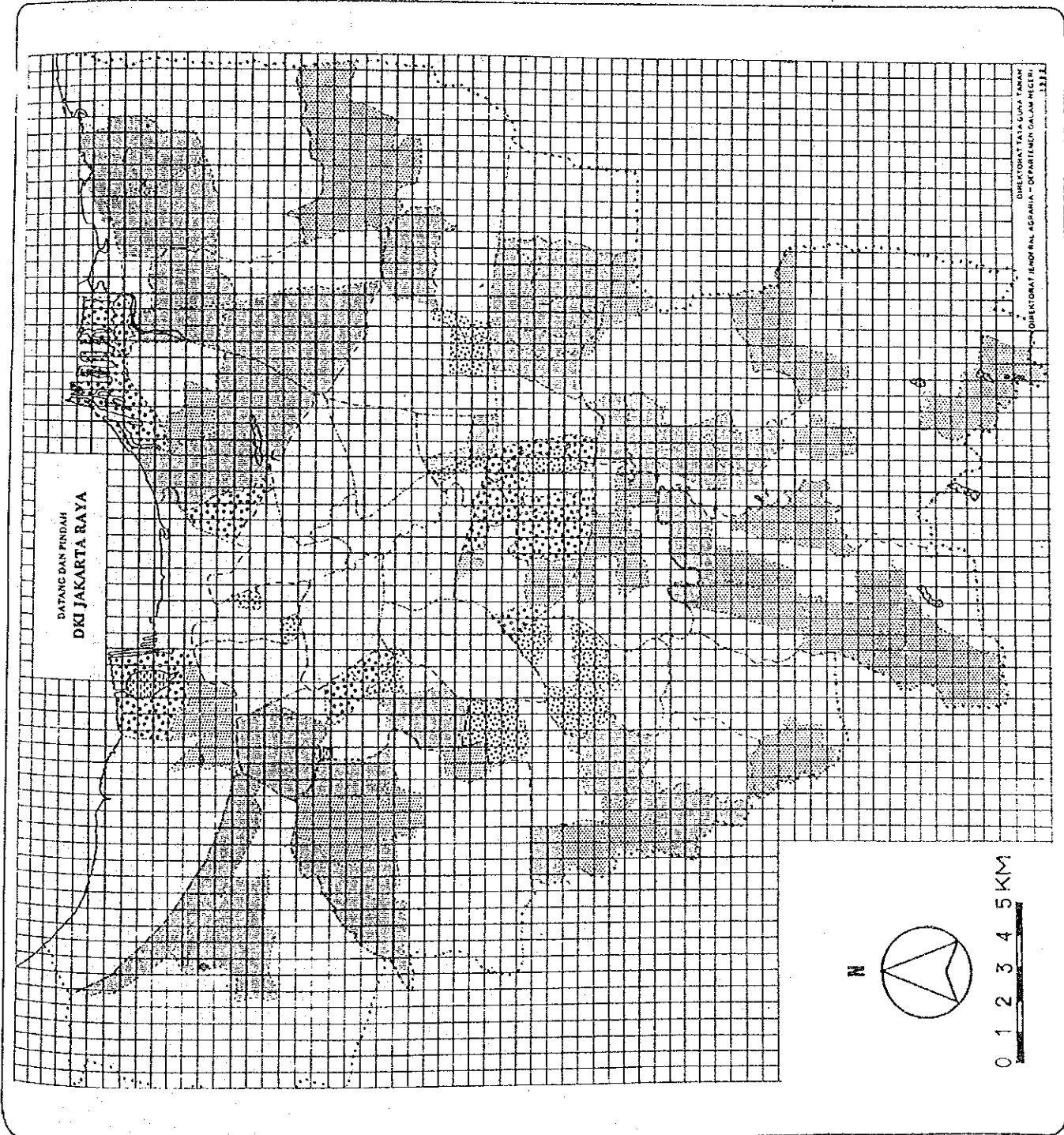
Source :

Dir. Jen. Agraria - Dep. Dalam Negri  
 Atlas DKI Jakarta Raya

Fig. 4.2-4

Immigration and Emigration

Solid Waste Management  
 System Improvement Study  
 in The City of Jakarta



#### 4.2.7 Publicity

##### 1) School Education

- . 33.4% of the economically active population does not graduate from primary school in DKI Jakarta, although attending primary school is compulsory at present.
- . 5.5% of the economically active population have graduated from a college or University.
- . The rate of illiteracy in DKI Jakarta based on the 1980 Population Census is 11.7%

##### 2) Mass Media

- . Based on the 1980 Population Census, 45.9% of the population had own televisions and 66.0% own radios.
- . The percentage of population that watched TV in a given week was 87.5% in 1981.
- . The percentage of population that listened to the radio in a given week was 76.3% in 1981.
- . The percentage of population that read a newspaper in a given week was 48.9% in 1981.

#### 4.2.8 Public Health

For the purpose of looking at the sanitary conditions of Jakarta incidence of major contagious diseases is shown in Table 4.2-6. In general, the number is decreasing, except Leprosy and DHF.

Table 4.2-6 Incidence and Number of Death for Selected Diseases  
Jakarta, 1981 - 1985

	1981 Case (Death)	1982 Case (Death)	1983 Case (Death)	1984 Case (Death)	1985 Case (Death)
Malaria	521	130	71	71	62
Gastro enteritis	8,562 (68)	10,319 (103)	9,681 (121)	8,318 (76)	2,210 (50)
Kusta	2,120	2,312 (1)	2,294	2,211 (1)	2,523 (1)
TBC Tuberculosis	1,548	1,631 (1)	1,784 (1)	1,747	2,232 (3)
DHF	1,434 (21)	1,615 (39)	3,100 (70)	2,029 (23)	1,828 (27)
Typhoid fever	1,084 (48)	1,297 (47)	1,519 (67)	2,188 (59)	2,092 (76)
Diphtheria	398 (9)	334 (18)	372 (14)	255 (8)	394 (13)
Measles	112 (5)	273 (5)	150 (12)	394 (13)	128 (4)
Rabies	-	1 (1)	-	1 (1)	-

Note : Total of Gastro enteritis, 40% are suffers from cholera.

Source: P3M Dinas Kesehatan DKI Jakarta.

According to a publication of the Jakarta statistical office, "Jakarta in Figures", the number of hospitals and beds in Jakarta in 1983 was 45 and 10,836 respectively. There were 370 public health centres, besides 30 district health centres (Puskesmas Kelurahan). The number of general physicians, specialist physicians and pharmacists was 2,760, 718 and 776 respectively in Jakarta in 1983.

Table 4.2.7 Number of Hospitals and Beds, and Dispensaries by Administrative Region, DKI Jakarta 1983

Wilayah	Hospitals	Beds	Dispensaries
Jakarta Pusat	15	4,713	105
Jakarta Utara	7	2,065	29
Jakarta Barat	5	1,534	64
Jakarta Selatan	7	1,012	66
Jakarta Timur	12	1,512	51
DKI Jakarta	45	10,836	313

Source: Public Health Service Jakarta



### 4.3 Population Move from and in Jakarta

#### 4.3.1 Commuters Data

According to Table 4.3-1, among those the commuters with destination to Central Jakarta the largest are from Bogor and Depok (43 percent), followed by commuter from Bekasi, Kerawang and Purawakarta (32 percent) and 24 percent from Tangerang and Serpong. The commuters to North Jakarta has slightly different pattern, almost 49 percent come from Bekasi, Kerawang and Purawakarta; followed by commuters from Bogor, Depok (33 percent) and from Tangerang and Serpong (18 percent). West Jakarta commuter is dominated by those from Bogor and Depok (49 percent). Only 19 percent from Tangerang and Serpong. South Jakarta also shows a different pattern. Commuters to this area is mainly consist of Bogor and Depok's origin (61 percent), this amount comprise almost three times commuters origin from Bekasi and vicinity (22 percent). The last area of commuter destination is East Jakarta Bogor, Depoks origin and Bekasi-Kerawang-Purwakarta's origin shows almost the same share (44%) while the rest come from Tangerang and Serpong. Table 4.3-2 shows that majority of the commuters originally from Bogor and Depok; followed by Bekasi-Kerawang-Purwakarta; and Tangerang-Serpong (46 percent; 36 percent; and 19 percent respectively). While in overall, the ranking of commuters destination are to Central Jakarta (31 percent); East Jakarta (20 percent); South Jakarta (18 percent) and only 14 percent going to West Jakarta.

#### 4.3.2 Seasonal Migrants

The highest seasonal migrants is in South Jakarta (39 percent), while the lowest one is in Central Jakarta (4 percent). This could be related to the fact that South and East Jakarta are predominantly a residential area, as a result they tend to be dominated by seasonal migrants as becaks drivers etc. East Jakarta shows the second highest (28 percent) followed by West Jakarta (17 percent) and North Jakarta (11 percent). This situation is in contrast to the commuters data where most of them destine to Central Jakarta (48 percent). This amount comprise of almost twice commuters to East Jakarta; four times West Jakarta; three times South Jakarta and Twelve times North Jakarta. Again, this situation is

closely related to the situation where most of the office areas in Central Jakarta (government buildings etc.).

In overall, it is obvious that in Jakarta there are about four times as much as amount of seasonal migrants (905,231 people) compare to commuters (249,603 people). From the table about 15 percent of the total population in Jakarta are either commuters or seasonal migrants.

There are several reasons why there are many people who want to migrate to Jakarta.

a. Push Factors: as the reason why people leave their place:

- . Lack of job opportunity
- . The income is too low, so the people from rural areas (villages) want to increase their income by going to the cities.
- . Social factor, the seasonal migrants sends to have a low social status. As a result they want to move to the higher social status by education, experience as well as accumulation of wealth.
- . Environmental factor.
- . When there's some natural disaster and calamities such as earthquake, flood, drought, people try to survive by going to the city to start a new life.

b. Pull factors:

Jakarta as metropolitan city has a very strong magnet to the migrants.

- . There are more job opportunities and relatively easier to do anything in Jakarta.
- . The differences in income earned in Jakarta and the village for the same type of jobs, Jakarta always offers higher rewards.
- . The attractiveness and the brightness of the city life.

Some demographic characteristics of the seasonal migrants:

- They come sometimes to Jakarta from outer Jakarta areas just temporarily and they will go back to their original places.

- The length of stay of this type of migrants is 9.5 months in a year and the visit to their village between 2-6 times a year.
- They tend to be self-employed or as free labors at informal sector.
- They live in Jakarta in groups with friends of same business and regions.
- These migrants are usually in productive groups (10-54 years) with low educational back ground.

Table 4.3-1 Computer Destination in Jakarta by Region of Destination

No.	Central			Destination in Jakarta					
	%	North	%	West	South	East			
1. Bogor, Depok	43	16,703	33	21,259	49	33,407	61	27,334	44
2. Tangerang, Serpong	24	9,051	18	8,098	19	9,527	18	6,669	11
3. Bekasi, Kerawang	32	24,332	49	14,378	33	12,166	22	27,650	45
* And Purwakarta	-	-	-	-	-	-	-	-	-
* Total	100%	50,086	100%	43,735	100%	55,100	100%	61,653	100%

Source: Monitoring Team Population Division DKI Jakarta.

Table 4.3-2 Total Commuters in Jakarta by Origin

No.	Origin	Destination in Jakarta				Total Commuters	%	
		Central	North	West	South			East
1.	Bogor, Depok	43,145	16,703	21,259	33,407	27,334	141,848	46
2.	Tangerang, Serpong	24,292	9,051	8,098	9,527	6,669	57,637	19
3.	Bekasi, Kerawang And Purwakarta	32,074	24,332	14,378	12,166	27,650	110,600	36
	Total	95,511	50,086	43,735	55,100	61,653	310,085	100%

Source: Monitoring Team Population Division DKI Jakarta.

Table 4.3-3 Seasonal Migrants

No.	City Area	W.N.I.	%	Seasonal	%	Computers	%	Total	%
1.	Central Jakarta	1,155,632	18	39,925	4	120,080	48	1,315,607	18
2.	North Jakarta	924,183	15	103,766	11	10,045	4	1,037,994	14
3.	West Jakarta	1,223,381	19	151,922	17	30,125	12	1,405,428	19
4.	South Jakarta	1,550,059	24	352,620	39	40,133	16	1,942,812	26
5.	East Jakarta	1,477,173	23	257	28	49,250	20	1,783,421	24
	Total	6,330,428	100%	905,231	100%	249,603	100%	7,485,262	100%

Source: District's Registration

#### 4.4 Survey on Scavengers in Jakarta

##### 4.4.1 Introduction

Activity to collect and reuse of reusable materials is one of the economic activity in urban areas. This activity is still exists because of the demand for reusable materials either for immediate consumption or for input for further processing. In addition this activity offers one of several alternatives of employment opportunities which are becoming scarece in urban areas, but for the type of work and income received, the activity of the scavengers can be considered marginal. It is not only because of the small income received but also unpleasant image of society to the scavengers. Many people think that scavengers are part of the sources of criminality in urban areas. The income received is very low and fluctuates, and the "basic needs" (demand for food, clothing and shelter) of these people is not sufficient.

As one of the activity in informal sectors in urban areas, the activity to scavengers has linkage to various stages with manufacturing sectors. In fact their activity is part of the business system in reusable materials business. Because of the nature of activities, it is a source of employment creation. According to the 1980 Population Census, it is estimated around 19,925 persons living as scavengers in Jakarta.

The distribution of the scavengers is as follow:

Jakarta Pusat	8,149 persons or (41%)
Jakarta Utara	2,575 persons or (13%)
Jakarta Barat	3,736 persons or (19%)
Jakarta Selatan	2,147 persons or (11%)
Jakarta Timur	3,318 persons or (17%)

While according to the sexes it can be seen: Man 12,844 or 64% of total and woman 7,077 (36%). (1)

#### 4.4.2 Survey on Scavengers

Based on the above information a survey on scavengers in Jakarta was conducted in December 1986. The survey covers 5 regions of Jakarta with 16 household as seen in Table 4.4-1 below.

Table 4.4-1 Location and Sample Size

Region	Village	Sample Size	Percentage of Sample
Jakarta Pusat	- Karang Anyar	1	6.25
	- Pintu Air	2	12.50
	- Ir. H. Juanda	2	12.50
Jakarta Selatan	- Srengseng	2	12.50
	- Menteng Atas	1	12.50
	- Guntur	1	6.25
Jakarta Barat	- Tambora	1	6.25
	- Mangga Besar	1	6.25
Jakarta Timur	- Cipinang	1	6.25
Jakarta Utara	- Muara Karang	3	18.75
	- Pluit	1	6.25
Total		16	100.00

(1) Dinas Sosial DKI Jakarta, Masalah Pengemis Gelandangan di DKI Jakarta (Scavengers Problem in Jakarta), unpublished report, Jakarta, January 1982.

In this survey the respondents live in the area for their work. The respondents of the survey limited to the head of household.



The survey revealed that most of the household had to earn living for about 1-3 persons in their household (38%). In addition some of respondents had responsibility to take care of 4-6 persons in their household. Only 19 percent were bachelors and 13% had to carry burden of more than 7 persons in their household as seen in Table 4.4-2.

Table 4.4-2 Dependency Burden (Wife + Children) for Each Household

Dependency burden for one household	Number of Household	Percentage
none	3	18.75
1 - 3 persons	6	37.50
4 - 6 persons	5	31.25
7 persons	2	12.50

#### Age and education level

Most of the scavengers were at the age of 20 - 39 years. These age bracket consist of 75% of the total, while the rest, 25%, is of the 40 to 59 years old groups. The distribution of scavengers by age group is shown in Table 4.4-3.

Table 4.4-3 Age of Scavengers

Age	Number of Household	Percentage
20 - 29	5	31.25
31 - 39	7	43.75
40 - 49	2	12.50
50 - 59	2	12.50

Looking at the member of the household, the age structure is shown in Table 4.4-4 below.

Table 4.4-4 Average Age of the Member of Household (Wife + Children)

Member of Household with Age under 15 year	Number of Household	Percentage	Member of Household with Age 15 years and over	Number of Household	Percentage
none	3	18.75			
1 - 2 person	8	50.00	1 - 2 persons	14	87.50
3 - 5 persons	4	25.00	3 - 5 persons	1	6.25
6 persons	1	6.25	6 persons	1	6.25

From the table above most of the household either has members with age below 15 years (50%) or has member with age 15 and over (88%). These figure fall in the classification of household with 1-2 person as member of the household. It means that either they still have young child to be taken care of or the member of household is old enough to join the work as scavengers.

From the educational level, the distribution of scavenger is summarized in Table 4.4-5.

Table 4.4-5 Level of Education of the Head of Household

Level of Education	Number of Household	Percentage
No Schooling	1	6.25
Elementary School	9	56.25
Junior High School	3	18.75
Senior High School	3	18.75
Total	16	100.00

The survey revealed that most of the respondents only finished elementary school (56%). This finding is similar to the situation as described by Dinas Sosial DKI Jakarta in their survey which give indication that 45% of scavengers living in Jakarta only finish elementary school of their educational level. On contrary, a survey of 150 scavengers in Jakarta done by BPP Teknologi (2) revealed that 42% of the respondents never

finish elementary school and only 19% of respondents had finished their elementary education.

The educational level for member of the household is shown in Table 4.4-6.

- (2) BPP Teknologi, Studi Aktivitas Pemungutan dan Pemanfaatan Barang Bekas (Survey of Activities of Scavengers) unpublished report, Jakarta, July 1983.

Table 12.4-6 Educational Level of the Number of Household (Wife + Children)

Member of Household	Not yet/no Schooling		Elementary School (SD)		Junior High School (SMP)		Secondary High School (SMA/SMEA)		Academic	
	Number of Household	Percent- age	Number of Household	Percent- age	Number of Household	Percent- age	Number of Household	Percent- age	Number of Household	Percent- age
None	10	65.50	3	18.75	12	75.50	12	75.00	15	93.75
1 - 2 persons	6	37.50	8	50.00	4	25.00	3	18.75	1	6.25
3 - 5 persons	-	-	4	25.00	-	-	1	6.25	-	-
6 persons	-	-	1	6.25	-	-	-	-	-	-

#### 4.4.2 Mobility of Scavengers

Mobility among works and places is one of the usual characteristic for the worker in the informal sectors. Due to the places of work, which depends on the amount of reusable materials, the scavengers also lives in the place near to their jobs. If they move, they also find the place near the bulk of reusable materials. According to the place of origin, Table 4.4-7 shows the origin of scavengers in Jakarta.

Table 4.4-7 Place of Origin of the Head of Household

Place of Origin	Number of Household	Percentage
DKI Jakarta	1	6.25
West Jawa (a)	4	25.00
Central Jawa (b)	8	50.00
East Jawa (c)	3	18.75
Total	16	100.00

- Notes: (a) Mostly from Sukabumi  
(b) Mostly from Manyumas, Brebes, Solo and Yogya  
(c) Mostly from Madiun and Bojonegoro

From Table 4.4-7, it can be seen that most of scavengers come from Central Jawa (50%). Only few indogenous Betawi, the title given to person born and lives in Jakarta, become scavengers (6%). This survey is in accordance with data from Dinas Sosial DKI which revealed that 39% of total scavenger in Jakarta are from West Jawa, 32% from Central Jawa and 19% from East Jawa.

Looking at the mobility rate before residing at the present place, most of the scavengers move around 1-2 times during the lifetime. Only 25% of total respondents has moved around 3-5 times and 25% of total respondents had never moved as shown in Table 4.4-8.

Table 4.4-8 Movement of the Respondents

Number of Movements	Number of Household	Percentage
None/never	4	25.00
1 - 2 times	8	50.00
3 - 5 times	4	25.00
Total	16	100.00

#### 4.5 Plans and Projects Relating to Jakarta

##### 4.5.1 JABOTABEK Metropolitan Development Plan (JMDP)

- . The JABOTABEK Metropolitan Development Plan (JMDP) was begun in 1980.
- . The Development Strategy of JMDP includes the following elements:
  - Efficient exploitation of natural resources within BOTABEK.
  - Reduction of the differences between household incomes.
  - Deconcentration of leading economic sectors away from DKI Jakarta.
  - Maximum involvement of local communities and individual households in socio economic development.
  - Efficient spatial arrangement of land use and transportation.
- . The key spatial elements of the development plan are related to solid waste as follows:
  - An immediate programme of collection and disposal of solid wastes currently dumped in canals.
  - Immediate provision of rubbish containers at regular intervals along canals and drains.
  - Regulation of existing official and unofficial collection depots (lepaks) near canals and water ways.
  - Regulation of illegal waste dumping in canals and drain once collection and disposal is made effective.
  - Purchase of suitable land fill sites.
  - Analysis and management surveys of Dinas Kebersihan and the refuse disposal section P.D. Pasar Jaya should be made.
  - Maintenance Systems for truck fleets and mechanical plan should be planned and implemented.

##### 4.5.2 Jakarta Master Plan

- . The Jakarta Master Plan 1985 - 2005 is the continuation of the Jakarta Master Plan 1965 - 1985 and is in accordance with the guiding principles formulated in the regulation by the Minister of Home Affairs No. 4/1980 concerning guidance for city planning.

. The main policies which should be determined so as to achieve the objectives of the Master Plan are:

- a) To implement several policies to limit the growth of the population of Jakarta so as not to be exceeded 12 million in the year 2005.
- b) To implement procedures of municipal and development so as to meet the demand of the growth of the city which is increasing at an average of 260,000 persons per annum.
- c) To promote the opportunity for growth of the economy and social welfare especially among social groups with low income.
- d) To minimize transportation costs and to prepare infrastructure and land for the new growth of the city, so that there is more opportunity for the groups with low income to obtain housing.
- e) To minimize the bad condition of the environment and of the densely populated areas of the city, so as to create a sound and balanced environment.
- f) To make efforts to minimize the use of ground water in the northern parts of Jakarta and to maintain the water source in the southern parts.
- f) To limit new growth in the north east and north west and to prevent growth southwards.
- h) To synchronize the development and management of the region with that of the surrounding area (BOTABEK).

#### 4.5.3 Kampung Improvement Project (KIP)

KIP is a nation wide project to improve poor residential areas. KIP was started in 1969, the beginning of the Indonesia Five Year Development Plan.



. In Jakarta, according to KIP, 89 Kampung were improved during 1969 to 1974, 245 Kampung during 1974 to 1979 and 238 Kampung during 1979 to 1984.




As a result most of the Kampung, badly needed improvement, were included in KIP by 1984. Fig. 4.5-1 shows the areas improved in each phase.

. KIP intends to improve basic urban infrastructure, such as paving roads and foot paths as well as constructing concrete drainage, providing public bathing, washing and toilet facilities and providing hydrants.

. KIP was implemented by the integrated authority of the KIP office in DKI Jakarta, which has its own budget and the power to implement the project.

. As a result of KIP, Kampung in Jakarta are in a much better condition now. Actually KIP may be one of the most successful programmes ever implemented to improve poor urban areas. Even though paths between houses are narrow and winding, they are unexpectedly clean and provide comfortable space for life in the Kampung.

LEGEND

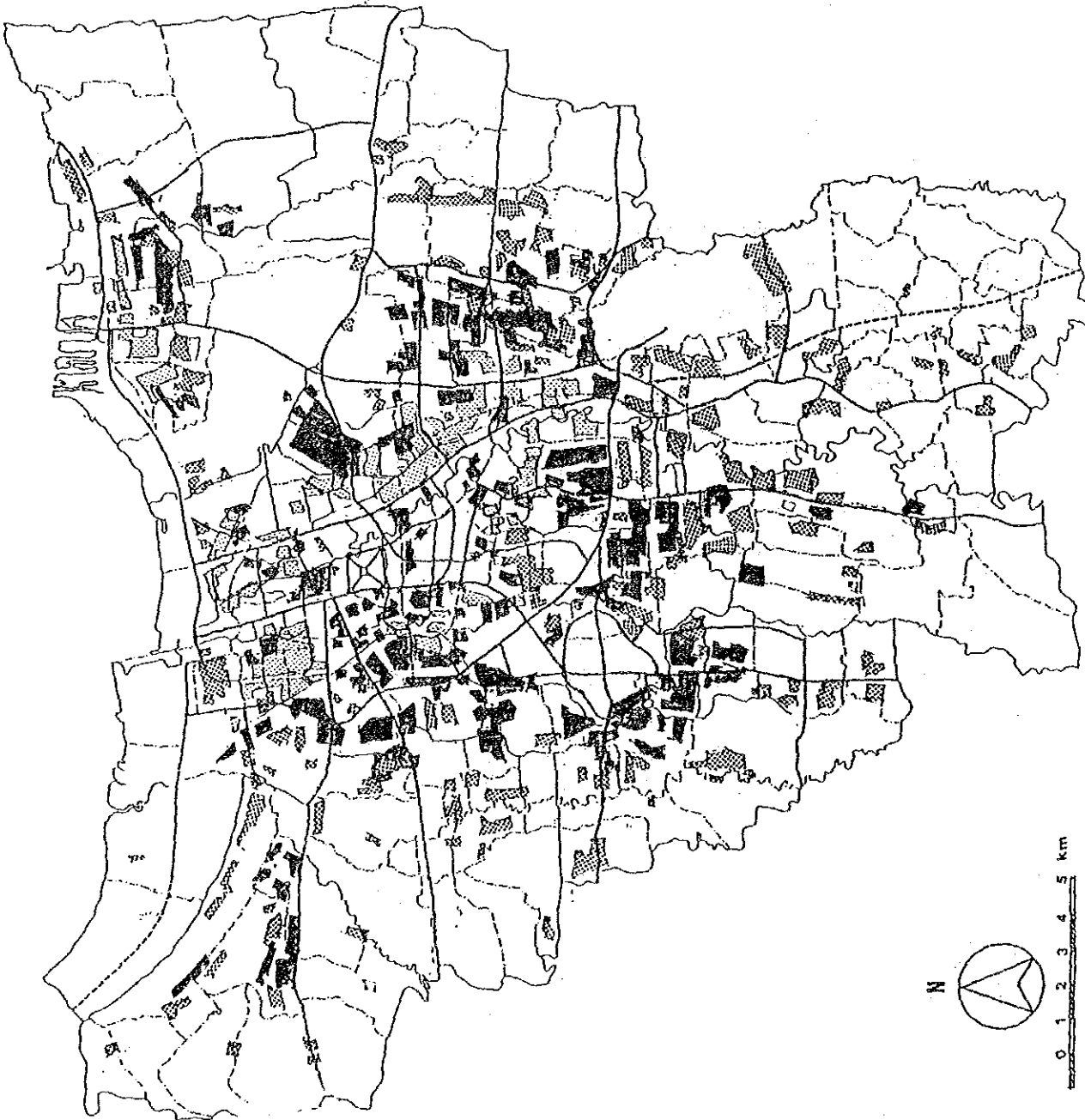
-  Phase I (1969 - 1974)
-  Phase II (1974 - 1979)
-  Phase III (1979 - 1984)

Source : BAPEM KIP

Fig. 4.5-1

Area of Kampung Improvement

Solid Waste Management System  
Improvement Study  
in The City Of Jakarta



#### 4.5.4 Urban Betterment Program (UBP)

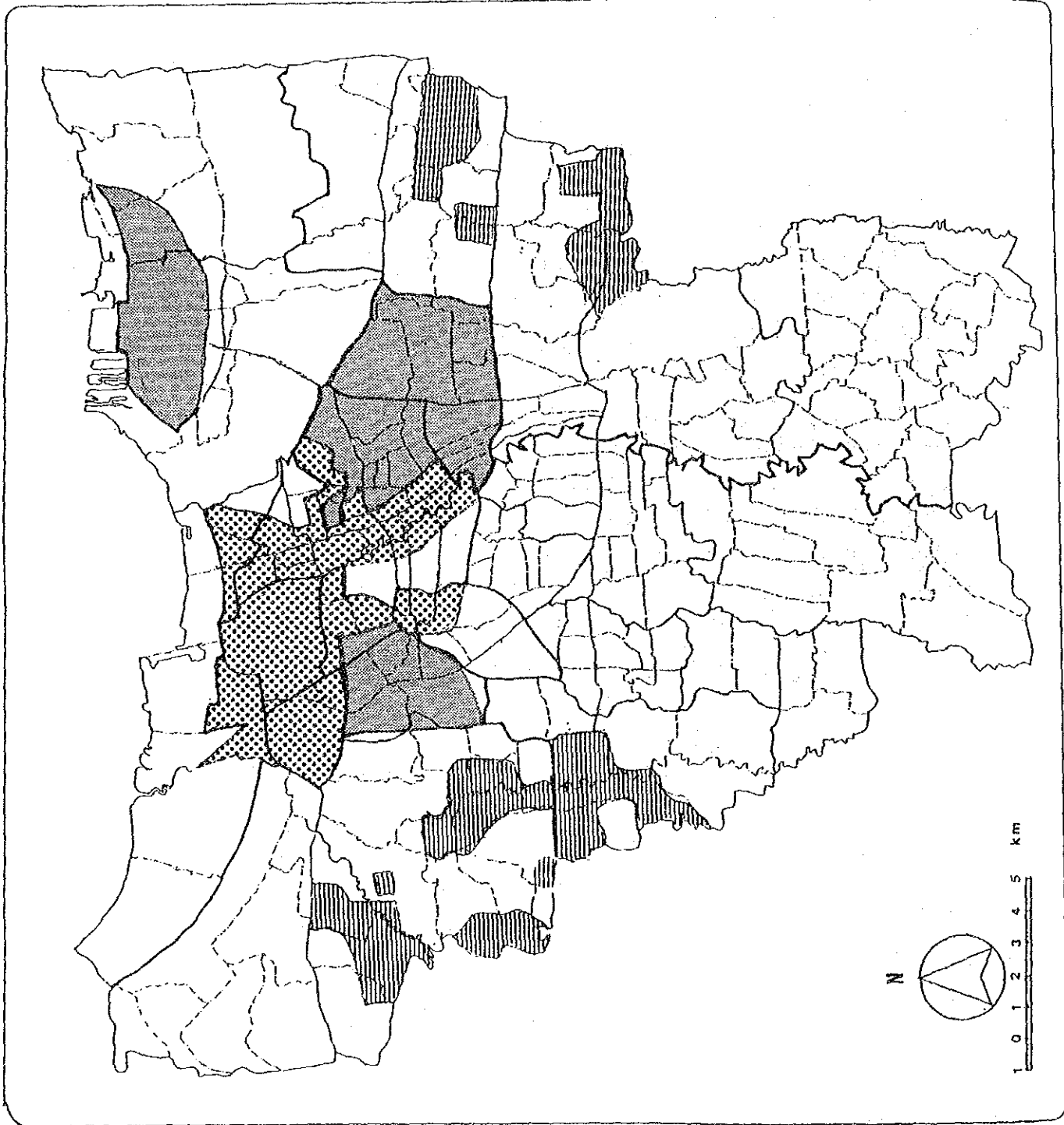
The urban Betterment Program was started in 1985 and was introduced in Pelita IV, the Fourth Five Year National Plan of Indonesia. The objectives of the Urban Betterment Program are to continue the improvement process which was begun by MHT Kampung Improvement Program. The Urban Betterment Program is the step between first stage infrastructure improvement (KIP) and higher standards of urban infrastructure and social services at a later stage.

The aim of UBP is to improve inter-Kampung infrastructure and social services beyond the Kampung boundaries.

MHT II, UBP for North Jakarta/Tanjung Priok, involves the improvement of health care, water supply sanitation, solid waste disposal and flood protection as well as road and drainage improvement.

Actual works are executed by each agency concerned, e.g. DPU, PAM, Dinas of Landscape and Gardening. Regarding solid waste disposal, the cleansing Department of DKI Jakarta is responsible for depots or "Dipos" and transfer stations in the project area.

While UBP is financed by the Indonesian Government, KIP is financed by the World Bank. UBP is implemented through the coordination of separate agencies. This may imply that the implementation of UBP is slower and more difficult than the implementation of KIP. MHT II is divided into 6 phases which are scheduled to be completed by 1990. The UBP areas are shown in Fig. 4.5-2.



LEGEND

GLDP

Urban betterment

PHASE-1

PHASE-2

Source : JMDP  
BAPEM KIP

Fig. 4.5-2

Site of Related Plan & Project

Solid Waste Management  
System Improvement Study  
in The City of Jakarta

#### 4.5.5 Guided Land Development Program (GLDP)

- . The guided land Development Programme is a part of the Action Programmes in East and West Jakarta stated in the Master Plan 2005 of DKI Jakarta. It aims to provided housing and land for all income groups by paying special attention to the preferred Indonesian life style and social system.
- . GLDP intends to plan areas prior to their urbanization by controlling the direction of their development, while KIP and UBP are projects to improve the existing poor conditions of urban infrastructures and social services.
- . GLDP intends to develop East and West Jakarta with the population density of 300 persons per hectre, and at the same time keep land prices lower by means of restricting vehicle access to inside GLDP lots by grids of approx. 250 m x 250 m (Fig. 4.5-3). In a sense GLDP intends to create well - planned Kampung.
- . Project areas of GLDP are shown in Fig. 4.5-4.  
Beppeda DKI is presently making a pilot plan for Kebun Jeruk, West Jakarta, and Pulo Gadung, East Jakarta.

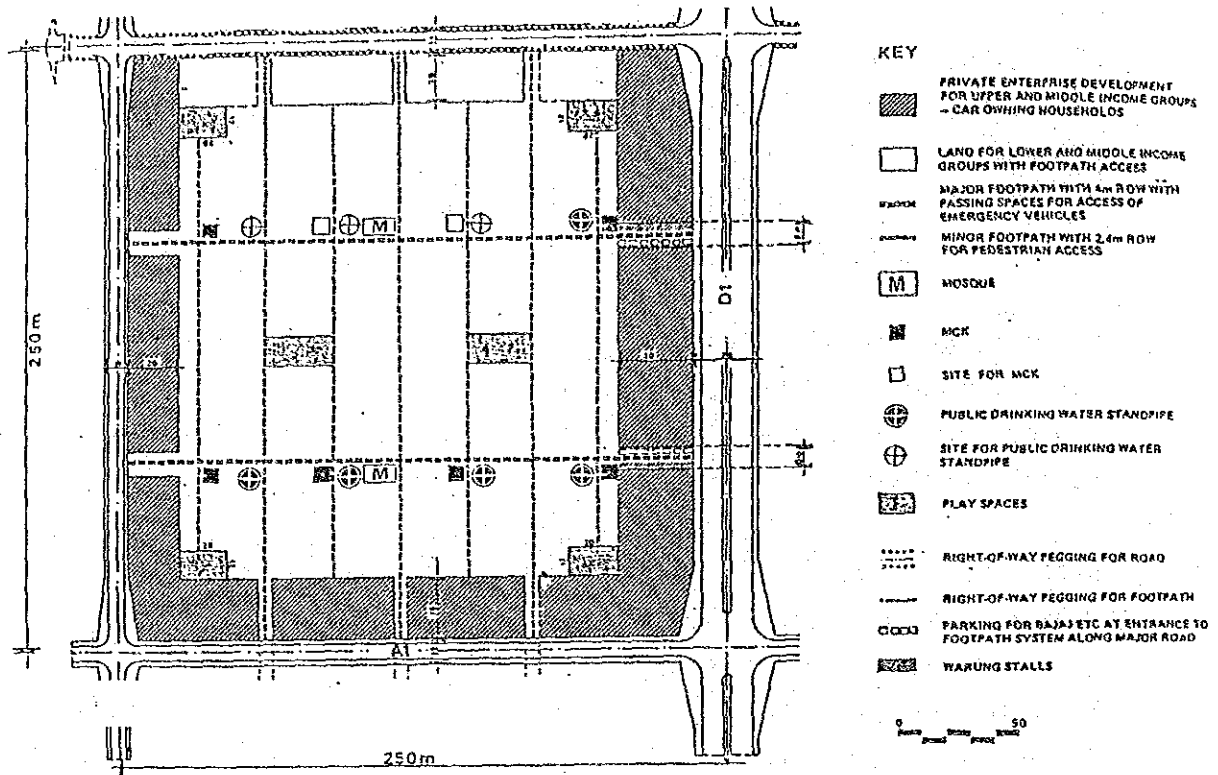


Fig. 4.5-3 Typical Grid of GLD

#### 4.6 Building Use in Pusat

##### Gambir:

In Table 4.6-1, in Gambir district, the dwelling unit use are mostly for housing (83 percent) follows by for shops/commerce industries and hotels/restaurants. According to the subdistrict, most housing are in Duri Pulo, South Petojo, Cideng (29 percent; 18 percent and 18 percent respectively). While only 6 percent of total housing in Gambir located in Gambir subdistrict. Shop/commerce establishment are mostly in Kebon Kelapa, South Petojo and Duri Pulo (23 percent, 22 percent and 20 percent respectively). Only 9 percent of these shops/commerce located in Gambir subdistrict. For Industries, Kebon Kelapa has the largest share (28 percent) in contrast to South Petojo (5 percent). The rest of the subdistrict has industries between 8 and 19 percent. Hotels and restaurants can mostly be found in Gambir (36 percent) and Kebon Kelapa (26 percent), while the rest are ranging between 8 and 13 percents. Other dwelling units use mostly in Gambir (37 percent), the rest are mostly less than half of this amount.

Regular household can mostly be found in three areas; Duri Pulo; Cideng and South Petojo. The least percentage are in Gambir (5 percent). About seventy percent of special household are in north Petojo while other subdistrict are ranging from 6 to 11 percent with none available in Cideng.

##### Sawah Besar:

In this district, housing majority exists in Kartini and South Mangga Dua subdistrict (almost 30 percent), the least are in North Gunung Sahari (13 percent). Shops and commercial establishments are mostly in Pasar Baru (45 percent) compare to North Gunung Sahari (6 percent) or Kartini (10 percent). South Mangga Dua and Karang Anyar has half as much as store in Pasar Baru. Mangga Dua and Kartini are also subdistricts with the highest concentration of industries (38 percent and 27 percent respectively). For other subdistricts the average are about one fourth of South Mangga Dua Industries. Hotels and restaurants are common in South Mangga Dua and Pasar Baru. Karang Anyar has less than 5 percent of

Industries. For other uses of the dwelling unit Pasar Baru is the highest (36 percent) follows by South Mangga Dua (22 percent) and North Gunung Sahari (23 percent) and only 4 percent in Karang Anyar. The type of household in this district according to their classification are as follows: Regular household more than half can be found in South Mangga Dua and Kartini. While the rest shared is ranging from 15 percent to 17 percent. None of special household are available in Pasar Baru, but 92 percent scattered evenly in South Mangga Dua, Karang Anyar and North Gunung Sahari.

**Kemayoran:**

Dwelling unit that can be used as housing are mainly in Harapan Mulia and Serdang. Less than 10 percent in Kemayoran. The situation for shop/commercial establishment are mostly located in Harapan Mulia (37 percent), Serdang and Kebon Kosong. For industrial purposes, 42 percent can be found in Harapan Mulia. The rest are mostly less than 21 percent. Restaurants/Hotels are mainly located in three main areas. Kebon Kosong, Harapan Mulia and South Gunung Sahari (35 percent; 29 percent and 24 percent respectively).

For household purposes, regular ones are mostly concentrated in Harapan Mulia (35 percent), Serdang (26 percent) and Kebon Kosong (19 percent). Special households are located in Kebon Kosong and South Gunung Sahari (comprise more than 60 percent) Kemayoran and Serdang has the smallest share (about 15 percent from total household).

**Cempaka Putih:**

More than 40 percent of the housing are located in two main areas: Tanah Tinggi and Johar Baru. The rest share are ranging from 9 to 12 percent). For commercial/shops purposes are mainly located in West Cempaka Putih (23 percent) as opposite to East Cempaka Putih (5 percent). Most of this type of dwelling unit are ranging from 10 to 12 percent of the total industries in the area. Hotel/restaurant in Cempaka Putih district are heavily concentrated in Rawasari and Tanah Tinggi (about 51 percent); 35 percent can be found both in East and West Cempaka



Putih. Galur and Johar Baru has the smallest share (6 percent and 7 percent respectively). None of the hotels/restaurants can be located in Kampung Rawa. While for other purposes about half of the dwelling unit (50 percent) are located in Tanah Tinggi and Johar Baru. The rests share are mostly ranging from 4 to 16 percent). About 55 percent regular household are found in Tanah Tinggi, Johar Baru and West Cempaka Putih the rest's share are less than 11 percent. Special household is dominated by Rawasari (47 percent) which is almost as much twice as East Cempaka Putih; as much 90 times as Galur. Unfortunately none of this special type of household in Johar Baru.

Senen:

The use of dwelling unit in this district are as follows. For housing, Paseban, Kramat and Bungur have the largest share (25 percent; 23 percent and 19 percent respectively), while Senen has the smallest share. In contrast to this type of dwelling unit, shopping/commercial area are dominated by Senen (61 percent) and the other subdistrict's share ranging from 4 percent to 10 percent. The category from Industrial purpose has the following pattern: Kramat and Bungur have almost more than half of the share while the rest ranging from 4 percent in Senen to 19 percent in Kwitang. Hotel/restaurants are mostly located in Kramat Kwitang and Paseban (40 percent; 15 percent; 15 percent respectively). The rest subdistrict only shows the share that less than 10 percent altogether. Other categories are mostly dominated by Kramat and Paseban areas (more than half). The remaining subdistrict's share are ranging from 10 to 16 percent).

Regular household in Senen district has the following order:

Paseban (24 percent), Kramat (23 percent), Bungur (19 percent), Kwitang (14 percent), Kenari (10 percent) and Senen (9 percent). While special household are mostly dominated by Senen (64 percent) or almost two-third of their type of category. Paseban has 20 percent special household and the rest are mostly negligible (less than 15 percent altogether).

#### Menteng:

Menteng area is well known as one of the best residential area in the city. More than two-third of housing are located in Menteng and Pegangsaan subdistricts. Cikini has 13 percent share of the housing and the rest (Kebon Sirih and Gondangdia) has share less than 10 percent each. To accommodate this housing need; shops/commercial establishment are also found mostly in Pegangsaan, Kebon Sirih and Menteng (33 percent, 31 percent and 29 percent respectively). For Industries this area are mainly dominated by Menteng subdistrict (44 percent) compare to Kebon Sirih, Cikini & Pegangsaan with share less than 45 percent altogether with the least at Gondangdia (5 percent). Hotels and restaurants in this area are mostly showed almost similar share (between 15 and 17 percent for 3 areas) with the exception of Kebon Sirih and Menteng (28 percent and 22 percent respectively). For other purposes, Cikini has the largest share (30 percent) with the other's share ranging from 13 to 21 percent). Regular household as we expected can be located in 3 main subdistricts: Menteng, Pegangsaan and Kebon Sirih (32 percent, 27 percent and 22 percent respectively.).

The smallest share come from Gondangdia and Cikini. For special category of the household Cikini has the largest share (38 percent) followed by Menteng (27,43 percent) and Pegangsaan (18 percent). Kebon Sirih and Gondangdia's share are less than 17 percent altogether.

#### Tanah Abang:

Table 4.6-7, shows that housing are mostly located in Kebon Melati (23 percent) and Karet Tengsin (23 percent). Petamburan, Bendungan Hilir, Kebon Kacang and Kampung Bali each has share less than 15 percent. Only Gelora has 5 percent of housing. Shopping/commercial establishment are slightly different, Kebon Kacang and Kampung Bali has the largest share (23 percent and 21 percent respectively), followed by Kebon Melati (16 percent) and Karet Tengsin (14 percent). Only 5 percent of shops/commercial establishment can be found in Gelora. For industrial purpose, Karet Tengsin has the most share (almost 30 percent) compare to the rest that mostly consist of one third to one half of the industry.

The amount of Hotel/restaurant in Bendungan Hilir is the largest (49 percent and the least is Petamburan. The use of this dwelling units for other purpose can be found mainly in Kebon Melati (20 percent) follow by Bendungan Hilir and Karet Tengsing (17 percent and 17 percent respectively).

Regular household are mostly located in Kebon Melati (24 percent), Karet Tengsin (22 percent). The rest share in average less than 13 percent each, with the exception Gelora (only 5 percent). While special households composition are as follows almost 6 & 5 percent are located in Kebon Melati and Kebon Kacang. Bendungan Hilir's share is about 23 percent, the rest are less than 4 percent.

## 4.7 Interview Survey in Pusat

### 4.7.1 Household

In order to have a clear picture on solid waste collection activities, a survey was done in 3 areas in Kecamatan Cempaka Putih with a sample of 30 households in each area. Sample areas are divided into 3 categories according to the level of income. One area which considered as high income area is in Kelurahan Cempaka Putih Timur, especially Rw 07. While the choice for middle income area is in the Kelurahan Cempaka Putih concentrated in Rw 03. Kelurahan Cempaka Putih Barat also considered as low income area, especially Rw 01. Several findings related to income and expenditure are discussed in the following tables.

In the high income area, most of the people earn between Rp. 301,000 to Rp. 6,000,000 monthly. The percentage of this categories is 47% out of total number of household surveyed. It is surprising that only one respondent has monthly income above Rp. 1,200,000. But since the survey was done for one Rw and also a very small sample this fact may occur. Nevertheless if one would to look at similar situation in some parts of south Jakarta, for example, it is almost prominent that number of household who has monthly income above Rp. 1,000,000 will not less than ten percent.

However, careful investigation on the expenditure side, reveals that actually they earn much more than reported. The bulk of respondent for expenditure side fall on the expenditure brackets of Rp. 301,000 - Rp. 6,000,0000 monthly. It consists 63% out of total household surveyed. Only 9 households or 30% has the expenditure less than Rp. 300,000 a month. It is the reason why researchers approaching expenditure rather than income for determining household with respect to financial status. Many people in Jakarta have more than one sources for their monthly income. Because of that, they can afford to have high expenditure allowances.

For this high income level, proportion of expenditure goes for foods only about 31-40%. It is consistent with the usual observation which stated, the more wealthy a person is the big portion of their expenditure goes on-non food consumption. But it is also surprising that 13 households spent more than 51% of their expenditure on food. However, these findings are consistent with the survey of household expenditure done by Jakarta Province Statistical Office, which found out that the percentage of spending on food is the highest proportion of expenditure spent by Jakarta population.

Regarding monthly payment to RT for securities and facilities which they get, each household has to pay around Rp. 5,100 to Rp. 15,000 (63%). In fact, in some places, in addition to money terms, they have collection in nature, such as rice, cloth, etc. In addition to monthly collection households have to pay a certain amount for sold waste collection. The payment for this kind of services also varies among households most of households in survey area pay less than Rp. 3,000 (63%) monthly for solid waste collection service.

The condition of middle income area is somewhat different. The average monthly income of this group is ranging from Rp. 151,000 - Rp. 450,000 (63%). But again, if we look at the expenditure of this group, we'll see that about 83% of total sample population spent less than Rp. 300,000 a month. The larger portion of the expenditure of this group goes for foods (30%). Even though this group is classified as middle income group, but they have also pay a collection of between Rp. 5,100 - Rp. 15,000 monthly to Rt (57%). In addition to that payment, they still have to pay between Rp. 1,500 to Rp. 2,500 monthly for solid waste collection (87%). This implies that even though the collection paid by household for RT is similar, there is a big difference in monthly payment for solid waste collection.

Low income area with an average monthly income of Rp. 250,000 and below (67%) spent their income mostly Rp. 125,000 and below (66%). Therefore 50% of their income goes for expenditure purposes. And 51 - 75% of this expenditure is spent for food consumption. It is likely

following the theory which said that low income earners mostly spent the great amount of their income on food. As to payment to RT, this categories of household mostly pay more than Rp. 5,000 a month (40%). This is not surprising since the payment to RT sometimes is not depending on the average income but rather on the fixed rates determined by RT or the results of meeting residents in specific area. The similar situation is found for collection of solid waste. Majority of the households (87%) pays around Rp. 1,000 a month for the solid waste collection. Therefore, the decision taken on how much each household has to pay does not depend on their income, but rather on the decision taken during the RT meeting.

It is very likely that this kind of collection system and amount of payment will last for a long time in the future. Since the amount of payment is determined by meeting, then it will stay as it is as long as the resident still pay respects to such a meeting. In addition, most of households feel that RT is somewhat helpful for them, especially concerning information on solid waste collection, thus, there is no reason for them to change the system.

The role of RT and RW is solely as coordinator for solid waste collection system. Possibility to formalize their role as payment collection for solid waste disposal depends on the function given to RW and RT in the future. As long as their role mainly as social leader, this possibility is unseen. But, if one try to change their role to become a formal leader who has authority, even in economic matters, then it is very wise to ask RW and RT as collector for solid waste monthly expenses. Thus, before determining RW/RT role, one should investigate their function in the future regional administration system of this country. And it is not easy taken which can be fulfilled just in 3 to 4 months study investigation.

Table 4.7-1 High Income Area

Income (Rp)	Number of Household	Percentage (%)
300,000	2	6.7
301,000 - 600,000	14	46.7
601,000 - 900,000	8	26.7
901,000 - 1,200,000	5	16.6
1,200,000	1	3.3
	30	100.0

Number of Household Members under 15 years old	Number of Household	Percentage (%)
≤2	20	66.7
3 - 5	8	26.7
≥5	2	6.6
	30	100.0

Number of Household Members over 15 years old	Number of Household	Percentage (%)
≤2	9	30.0
3 - 5	13	43.3
≥5	8	26.7
	30	100.0

Person Who Gets Money	Number of Household	Percentage (%)
1	20	66.8
2	5	16.7
3	2	6.6
>3	3	10.0
	30	100.0

Household Expenditure (Rp)	Number of Household	Percentage (%)
≤300,000	9	30.0
301,000 - 600,000	19	63.3
>600,000	2	6.7
	30	100.0

Portion for Food Expenditure	Number of Household	Percentage (%)
20% - 30%	3	10.0
31% - 40%	9	30.0
41% - 50%	5	16.7
51% - 60%	7	23.3
≥61%	6	10.0
	30	100.0



Occupation	Number of Household	Percentage (%)
Government employee	6	20.0
Private Co. employee	11	36.7
Entrepreneur	3	10.0
Merchant	3	10.0
Retailer	2	6.7
Pension	5	16.6
	30	100.0

Hometown	Number of Household	Percentage (%)
Inside Jakarta	27	90.0
Outside Jakarta	3	10.0
	30	100.0

Duration Stay (years)	Number of Household	Percentage (%)
≤3	4	13.3
4 - 7	9	30.0
8 - 11	13	43.4
>11	4	13.3
	30	100.0

Monthly Payment to RT (Rp)	Number of Household	Percentage (%)
≤5,000	7	23.3
5,100 - 15,000	19	63.4
>15,000	4	13.3
	30	100.0

Monthly Payment for Solid Waste (Rp)	Number of Household	Percentage (%)
≤3,000	19	63.3
3,100 - 6,000	9	30.0
>6,000	2	6.7
	30	100.0

Table 4.7-2 Middle Income Area

Income (Rp)	Number of Household	Percentage (%)
≤150,000	4	13.3
151,000 - 300,000	13	43.3
301,000 - 450,000	6	20.0
>450,000	7	23.4
	30	100.0

Number of Household Members under 15 years old	Number of Household	Percentage (%)
≤2	20	66.7
3 - 5	8	26.7
>5	2	6.6
	30	100.0

Number of Household Members over 15 years old	Number of Household	Percentage (%)
≤2	10	33.4
3 - 5	13	43.3
>5	7	23.3
	30	100.0

Persons Who Gets Money	Number of Household	Percentage (%)
1	20	66.7
2	7	23.3
3	-	-
>3	3	10.0
	30	100.0

Household Expenditure (Rp)	Number of Household	Percentage (%)
<150,000	15	50.0
151,000 - 300,000	10	33.3
301,000 - 450,000	3	10.0
>450,000	2	6.7
	30	100.0

Portion for Foods	Number of Household	Percentage (%)
20% - 30%	2	6.7
31% - 40%	4	12.3
41% - 50%	3	10.0
>50%	21	30.0
	30	100.0

Occupation	Number of Household	Percentage (%)
Government employee	13	43.3
Private Co. employee	9	30.0
Retailer	5	16.7
Pension	3	10.0
	30	100.0

Hometown	Number of Household	Percentage (%)
Inside Jakarta	24	80.0
Outside Jakarta	6	20.0
	30	100.0

Duration Stay (years)	Number of Household	Percentage (%)
≤8	5	17.6
9 - 17	9	10.0
>17	16	53.4
	30	100.0

Monthly Payment to RT (Rp)	Number of Household	Percentage (%)
≤5,000	8	26.6
5,100 - 15,000	17	26.7
>15,100	5	16.7
	30	100.0

Monthly Payment for Solid Waste (Rp)	Number of Household	Percentage (%)
≤1,500	18	60.0
1,501 - 2,500	8	26.6
2,501 - 3,500	2	6.7
>3,500	2	6.7
	30	100.0

Table 4.7-3 Low Income Area

Income (Rp)	Number of Household	Percentage (%)
≤125,000	11	36.6
126,000 - 250,000	10	33.4
>250,000	9	30.0
	30	100.0

Number of Household Members under 15 years old	Number of Household	Percentage (%)
≤2	17	56.7
3 - 5	13	43.3
	30	100.0

Number of Household Members over 15 years old	Number of Household	Percentage (%)
≤2	13	43.3
3 - 5	13	43.3
>5	8	23.3
	30	100.0

Persons Who Gets Money	Number of Household	Percentage (%)
1	20	66.7
2	5	16.7
3	5	16.7
	30	100.0

Household Expenditure (Rp)	Number of Household	Percentage (%)
<125,000	20	66.7
125,000 - 250,000	9	30.9
>250,000	1	3.3
	30	100.0

Portion for Foods	Number of Household	Percentage (%)
≤50%	-	-
51% - 75%	20	66.7
>75%	10	33.3
	30	100.0



Occupation	Number of Household	Percentage (%)
Government employee	5	16.7
Private Co. employee	7	23.3
Retailer	5	16.7
Entrepreneur	4	13.3
Coolie	6	20.0
Pension	3	10.0
	30	100.0

Hometown	Number of Household	Percentage (%)
Inside Jakarta	25	83.3
Outside Jakarta	5	16.7
	30	100.0

Duration Stay (years)	Number of Household	Percentage (%)
≤5	8	26.7
6 - 10	1	3.3
>10	21	70.0
	30	100.0

Monthly Payment to RT (Rp)	Number of Household	Percentage (%)
<3,000	8	26.6
3,100 - 5,000	10	33.4
>5,000	12	40.4
	30	100.0

Monthly Payment for Solid Waste (Rp)	Number of Household	Percentage (%)
<1,000	26	86.7
1,100 - 2,000	4	13.3
	30	100.0

#### 4.7.2 RW and RT

Out of 25 sample RW/RT about 20 of them have solid waste collection service, the remaining still burned their waste by themselves. The amount of fees that has to be paid by each household is shown as follows.

Table 4.7-4 Amount of Monthly Payment

Number of RT. (%)	Monthly Payment (Rp.)
4 (20)	<250
5 (25)	251 - 500
8 (40)	501 - 1000
3 (15)	1000<

In overall, the majority of the households has to pay the fees between Rp. 501,- - Rp. 1000,- (40 percent), follows by the collection fee between Rp. 251,- - Rp. 500,- (25 percent). Only 20 percent of these household pays less than Rp. 250,- and 15 percent pays more than Rp. 1000,-. If it is necessary 50 percent of RT/RW that held solid waste collection service are willing to increase the fee.

Table 4.7-5 The Amount of Fee Increase

Number of RT. (%)	Amount of Fee Increase (%)
4 (40)	10
4 (40)	20
2 (20)	25

Forty percent of the RT say they are willing to increase the fee by 10 percent; while another 40 percent say twenty percent increase is in accordance with their objective and the rest (20 percent) say 25 percent increase will be feasible if it is necessary. In term of their collection all the RT with solid waste collection system do not have any problem in collecting the monthly payment. Eighty five percent of these RT usually finish collecting the payment before the 15th of the month; the rest are between the 15th and 20th day of the month. This service is solely organized by RT and all the RT/RW agree to work together with Dinas Kebersihan in the future. 1)

1) Including RT/RW with no collection service.

#### 4.8 Handcart Collector

The information on the handcart collectors condition is very important in relation to the future possibility and RW/RT characteristics. In this survey, sample of 25 RT has been drawn in to know the composition of handcart collectors in each RT. The result shows the following pattern.

Table 4.8-1 Number of Handcart Collector in Each RT

Number of handcart collectors	Number of RT (%)
1	3 (15)
2 - 3	8 (40)
3 - 5	5 (25)
5	4 (20)

In overall, the majority of the RT (about 40 percent) has 2 to 3 handcart collectors; 25 percent RT has handcart collectors between 3 to 5; only 15 percent RT has only one collector each and 20 percent has hand collector more than 5.

Not much can be exposed in relation to handcart collection survey. Only data on age was obtain revealed that average age for handcart collector is between 35 to 45 years old. Therefore they are considered as a productive age of labor force. Most of them came from central Jawa. The situation in Central Jawa which is dominated by the class of laborer, gives a clear relation as to why these migrants want to do such kind of job. This fact is also related to the fact that most of the migrants come from Central Jawa as can be seen in section 4.1. In general these handcart collectors only enjoy elementary school education. It is also similar to the general situation of the labor force where almost 80% only graduated from elementary school, or even are drop-outs person. Education level for labor force in Indonesia is somewhat low.

The average income of handcart collector is ranging from Rp. 20,000 to Rp. 50,000. It means that most of them do not receive all the money households spent for solid waste collection service. If one assumes that handcart collector may collect solid waste from 20 households, then he will get at least Rp. 60,000 monthly income from this job. The fact that he only receives Rp. 50,000 or less, meaning that some of the money collected from the household for solid waste payment, goes somewhere else. It is also reasonable to say that in the future the service of handcart collectors is needed. It is not only because the number of handcart collectors is rising, but also because someone may get benefits from this system.

The supply of handcart collectors seems still continue to grow. The main reason, as stated by Man Power Minister Soedomo after cabinet session at Bina Graha September 3, 1986 is because about 9,3 million job opportunities should be provided in this current fourth five year development plan, while absorptive capacity of the economy only 6,1 million jobs. Therefore about 3,2 million people should look for opportunities in the informal sector, such as handcart collector.

With present instruksi presiden (presidential instruction), Minister Soedomo said, the live of informal sector is protected. At present the Inpres will lift up the street vendor business live. But very soon it will touch another informal sector activities such as handcart collector.

#### Informal Sector:

The high population growth rate and labor force are the main problem in providing employment. With its surplus of labor, for the time being and many years ahead employment creation will be the main problem for Indonesia. The development process which emphasize on formal sector job opportunities in reality can not be relied on providing job for the new labor force entrants. The remaining of the labor force that can not be absorbed by this sector will have to depend on the informal sector. In Indonesian context this informal sector will still be the main solution to employment problem. This could be true if those people who has a low educational background is still predominantly existence in Indonesian

labor force. It is expected that informal sector will be the katup pengaman (safety lead) in Indonesian economy. When we look at the people who was in the labor force in 1982, most of them were engaged in informal sector, with the exception of DKI Jakarta (look at Table 4.7-2 and 4.7-3). This lower figure for Jakarta reflects the job opportunities in formal sector that mostly available in Jakarta as the capital city and as a governmental center activities.

From, those two tables in 1982 there were 2,024,243 people who worked in Jakarta where (478,009 people or 73% worked in formal sector, while the rest or 546,234 people or 27% worked in informal sector as pedagang kaki lima (stall vendors), retailer, scavengers, becak's driver, newspaper sellers etc.

In Table 4.7-4 it is estimated that the total population of Jakarta grew 3% annually; total manpower grew 3% annually; and the labor force grew 4% annually. The formal sector is still unable to provide the job for the whole available labor force (with the assumption: economic growth will marginally exceeds the population growth, low productivity and still that exists is still a handicapped for someone who want to work at formal sector). It is reasonable, then, to predict that the informal sector in Jakarta will be able to absorb this labor force (with expectation that formal and informal sector will be complement to each other). The role of informal sector is not limited to providing the job as a supplement to formal sector problem but mainly as a continuation of the lowest chain merchandise trader (retailer). In the future this role has to be considered again especially since we know that informal sector is not considered as a productive employment opportunities (in term of productivity).

## 4.9 Social Education Survey

### 4.9.1 Public Communication Programs by Dinas Kebersihan

Solid waste management needs the understanding and cooperation of the public. As such, people must be informed of the way in which to cooperate in the solid waste management effort. Dinas Kebersihan of DKI Jakarta has in its organization a Department of Information and Community Participation. The features of this Department are summarized as follows:

#### 1) Program Activities

##### (1) Cleansing Days (Kerja Bakti)

- On the 17th of every month (except for August).
- Dinas Kebersihan sends a campaign car to the Kelurahan which has been selected as a special campaign area, Dinas only gives guidance. This activity is determined by the Governor.
- People in the Kelurahan clean the area (Kerja Bakti).

##### (2) Cleansing Contest

- This is an "annual clean area" contest among all Kelurahans in DKI Jakarta.
- The top three Kelurahans are first selected from each Kecamatan. Then they compete for each Wilayah and finally for DKI.
- The winner of the contest is celebrated on August 17.
- The cleanliness of the area is evaluated by an evaluation checklist. A special committee is formed for the evaluation.
- There are also cleansing contest between elementary schools.

##### (3) Exhibitions

- There are four annual exhibitions in which Dinas Kebersihan participates.



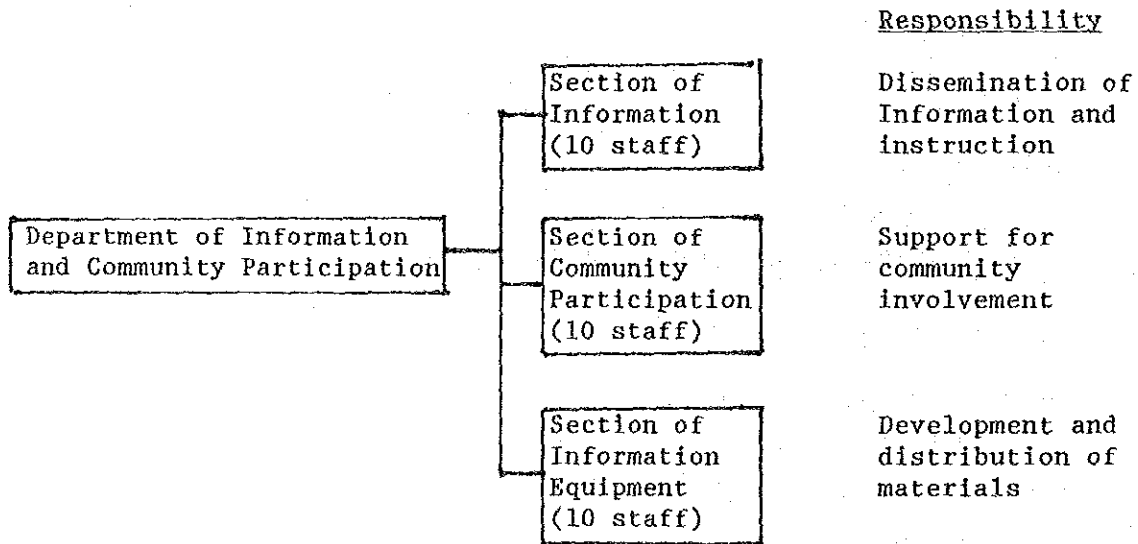
- 1) End of June-end of July      Jakarta Fair (MONAS)
  - 2) August 14 - 18                  Jakarta Development (MONAS)
  - 3) August 23 - 30                  Flower Exhibition (Banteng)
  - 4) End of October                  Pancasila (every Kecamatan)
- In these exhibitions, panels, leaflets, booklets etc. are shown and distributed.
- (4) Slides
- Shown in movie theaters and on TV.
  - In theaters, slides are shown on the screen before showing films.
  - On TV, slides are shown twice a week for a few minutes.
- (5) Drama
- Twice a year, a drama is produced on TV for 30 minutes.
- (6) Radio Broadcasting
- (7) Printing of Booklets, Leaflets, etc.
- About 10,000 booklets are printed each year.
- (8) Annual Report
- Dinas Kebersihan's activities are reported to the Governor annually. The annual report is distributed to the Government offices involved in solid waste management.
- (9) Lectures to RW/RT
- Lectures concerning refuse cleansing are given to RW/RT whose community areas are in bad condition.
  - The lectures are given three times a month by Dinas Kebersihan personnel in their office.

(10) Music Band Mission

- A band is sent to areas with bad cleansing conditions, and music is played there three times a month.

(11) Billboard Signs for Canal Waste, and signs on the side of Collection Trucks.

2) Organization and Responsibility



3) Finance

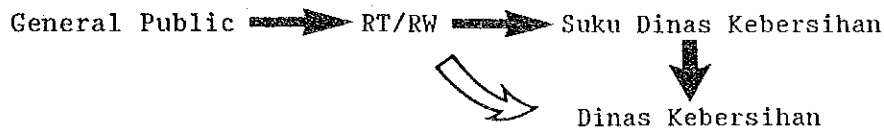
The budget for the activities is requested in the proposal to the Governor. The Financial Department of DKI Jakarta will then allocate the budget according to the proposal. The budget for the fiscal year 1986/87 is as follows:

- Rp. 13,800,000 for routine operation
- Rp. 80,000,000 for equipment development (including plastic bags)
- Rp. 93,800,000

This figure excludes personnel costs.

#### 4) Communication Channel

When the public have complaints and suggestions about solid waste, they usually talk with RT/RW. RT/RW in turn transfers the information to Suku Dinas Kebersihan, or occasionally to Dinas Kebersihan. A crew will then be sent to the area to alleviate the problem.



#### 4.9.2 Coordination with Other Organizations

Dinas Kebersihan's effort alone can not effectively change the minds and habits of people, coordination with other organizations must be sought to educate people from different standpoints. The following are possible organizations whose activities can be integrated into the joint effort.

##### 1) Dinas P dan K (Education Service)

- Education on social systems, such as solid waste management, should be started as early in life as possible. Elementary schools may be good starting points in this respect and in fact, solid waste management is taught at the third or fourth grade of elementary schools in Japan.
- The present curriculum of elementary schools in Indonesia does not include lessons on solid waste management. It is recommended that such a program be included in the elementary school curriculum, especially in the subject "Sports and Health".
- The lessons can be supplemented by using a special booklet on solid waste and visiting Dinas Kebersihan's facilities.

- In the Phase 2 Study, a booklet on solid waste used in Japan was translated into Indonesian and submitted to Dinas P dan K. This may be used as a reference for developing similar material in Jakarta.

## 2) Dinas Kesehatan (Health Service)

- Dinas Kebersihan and Dinas Kesehatan have a common interest in protecting public health, and on many occasions they have promoted joint campaign programs.
- The joint programs can be further strengthened if community education on health and solid waste is carried out in public health centers (Puskesmas).
- A public health center is located in each Kelurahan and provides health education service.  
This health education service can be utilized.
- School sanitation is the responsibility of Dinas Kesehatan.  
Therefore, the elementary school education mentioned in 1 above should also be jointly or technically supported by Dinas Kesehatan.

## 3) Dinas Pekerjaan Umum (Public Works Service)

- A major solid waste problem in Jakarta is waste in canals. The collection and haulage of canal waste is the responsibility of Dinas P.U. However, the key to the problem is uncontrolled dumping of solid waste into canals, which is the responsibility of Dinas Kebersihan. The solution can be found only when the efforts of both Dinases are coordinated.
- In the Phase 2 Study, discussion between Dinas P.U. and Dinas Kebersihan on canal waste was initiated on suggestions from the JICA Study team. Although campaigning alone cannot solve the problem, it can play an important role in changing people's habits and therefore it must be included in the solution strategy.

#### 4) PKK (Women's Organizations)

- The members of PKK are women over 16 years of age, and its leaders are the wives of chiefs of administrative units (e.f. the leader of a Kecamatan PKK is the Camat's wife). PKK, however, is not a governmental organization.
- PKK carries out 10 programs in and around households. One of the 10 programs is concerned with cleansing practice. Therefore, solid waste management campaigns in residential communities may be effectively done through PKK.

#### 4.9.3 Summary and Recommendations

Currently, various activities in public communication are conducted by Dinas Kebersihan. Although these programs are effectively carried out, some improvements can be suggested in the following areas:

- 1) Strengthening of coordination between other organizations such as PKK, Dinas Kesehatan and Dinas P dan K is recommended to enhance the effectiveness of current programs.
- 2) Lessons on solid waste management to school children in elementary schools are recommended. Curriculum and material development should consultation with Dinas P dan K.
- 3) Better communication channels should be set up to receive public complaints and suggestions about solid waste management. These should be used to improve the solid waste situation in Jakarta.

Present Programs  
of Dinas Kebersihan

- Cleansing days
- Cleansing contests
- Exhibitions
- Slides
- Drama
- Radio broadcasting
- Printing of booklets, etc.
- Annual report
- Lectures to RW/RT
- Music band mission
- Billboard signs, etc.



Recommendations  
for Future Programs

Each program should be strengthened through coordination with other organizations such as PKK and Dinas Kesehatan

Shortcomings

- Target population is mainly the adult population
- The information flows to the public mostly from Dinas Kebersihan



Solid waste management education should be carried out at elementary schools.

Communication channels should be set up to receive public opinion (telephone service, interview survey ,etc.)

## **5. Comparison of Various Collection Methods**





## 5. Comparison of Various Collection Methods

### 5.1 Configuration of Present Collection Systems

The configuration of present collection system and types of applied vehicles are as indicated below:

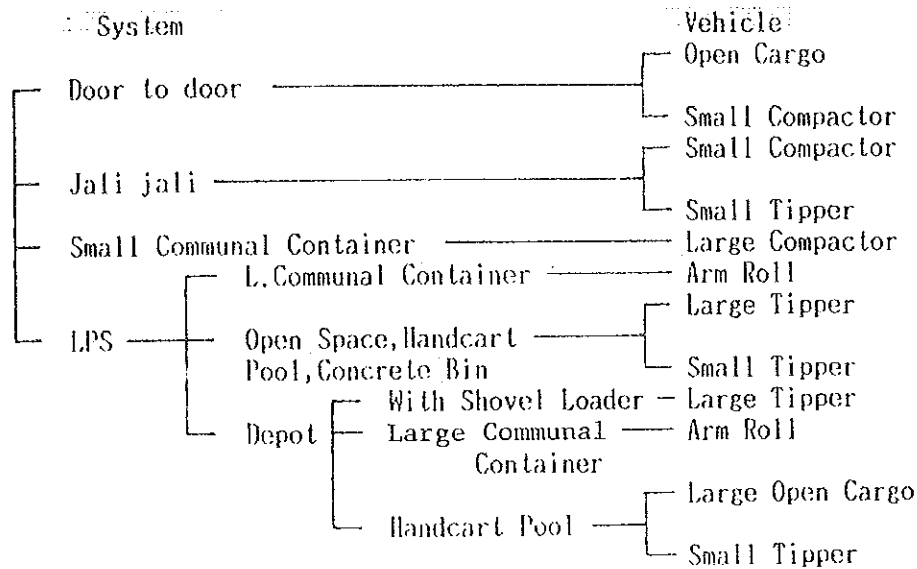


Fig. 5.1-1 Present Collection System and Vehicles

### 5.2 Cost of Present Collection System

#### (1) Method of calculating the present collection cost

The cost per vehicle under the present collection systems can be expressed as follows:

$$\text{Collection cost per vehicle} = \text{Depreciation cost of vehicle} + \text{Repair cost} + \text{Fuel cost} + \text{Personnel cost}$$

The cost per ton is obtained from the following formula:

$$\text{Cost per ton} = \frac{[\text{Collection cost per vehicle}]}{[\text{Payload capacity} \times \text{No. of trips} \times \text{No. of operating days}]}$$

The cost calculation conditions are as explained below:

1) Price of Collection Equipment

The results of investigating the price of collection equipment are shown in the table below. Among the collecting equipment, the engine, hydraulic units, arm roll equipment, electrical equipment, control devices, etc. will be imported. Meanwhile, the price indicated herein is a market price and higher than the standard price compiled by the Jakarta city.

Table 5.2-1 Price of Collection Vehicle/Equipment

				10 <sup>3</sup> Rp
OPEN CARGO	S	6m <sup>3</sup>	19,000	
	L	10m <sup>3</sup>	38,000	
TIPPER	S		23,000	
	L		43,000	
COMPACTOR	S	4m <sup>3</sup>	43,000	
	L	10m <sup>3</sup>	70,000	
ARM ROLL	S			32,000
	L			50,000
CONTAINER	S	6m <sup>3</sup>		2,400
	L	10m <sup>3</sup>		2,500
HANDCART				370
SHOVEL LODER				83,250

2) Depreciation cost

The depreciation cost of collecting equipment is generally calculated according to the following formula:

$$\text{Depreciation cost} = \frac{\text{Purchase price} \times (1 - \text{Ratio of residual value})}{\text{Durable years}}$$

The depreciation cost of individual equipment is as assumed in the following.

Table 5.2-2 Service Life and Residual Value

	Present durable years	Expected durable years	Ratio of residual value
Vehicle	5 - 6	7	10%
Container	4	4	10%
Handcart	4	4	0%
Shovel car	4 - 5	7	10%

It is highly important to clarify how the service life (durable years) of equipment is. As far as estimated based on available data, the present service life seems to be 5 - 6 years in the case of vehicle, and 4 - 5 years in the case of shovel car. The major reason that the service life is so short is that replenishment of imported spare parts and preventive maintenance are not sufficient in addition to rough operation of drivers.

The effect of extension of service life upon the cost is presented later in this report.

### 3) Repair cost

Since any general formula for obtaining the repair cost of vehicle is not available, the repair cost is usually calculated according to an empirically obtained formula. Although sufficient records of data pertaining to repair should preferably be available, such data are unfortunately insufficient.

Therefore, the assumed repair cost data are used hereunder.

In Japan, it has been known that an amount of repair cost which is roughly equal to the purchase price is required during service life of equipment. Since ideal maintenance and repair is practiced and the manpower cost for repair is high in Japan, it is not appropriate to apply the repair cost in Japan as it is

for calculating the cost in Indonesia. In Japan, the depreciation cost of equipment for maintenance and cost of spare parts are clarified to amount to roughly 40% of the total repair cost. Considering that the cost of spare parts in Indonesia would not vary from that in Japan, the value corresponding to 40% of the total repair cost is adopted herein.

Meanwhile, the container and handcart are not assumed to require any particular repair cost.

Therefore, the repair cost of vehicle and bulldozer will be:

$$\text{Repair cost} = \frac{\text{Purchase cost} \times 0.4}{\text{Durable years}}$$

#### 4) Fuel cost

Generally, the fuel cost is calculated according to the following formula:

$$\text{Fuel cost} = \text{Consumption/day} \times \text{Fuel price} \times \\ \text{No. of operating days}$$

The fuel consumption of vehicle per day in Jakarta is estimated at about 40 liter according to records. This value is too large judging from common sense. The fuel consumption of compactor vehicle ranges from 20 to 30 liter when operated 5 - 6 hours per day. In this report 30 liter of fuel including oil replacement is assumed to be consumed. Meanwhile, although the fuel consumption naturally varies depending upon the type of vehicle, it also varies depending upon the actual trip distance and operating hours. However, the difference due to the type of vehicle is disregarded herein.

Light oil consumed per vehicle is assumed to be 30 liter and the fuel cost per liter is assumed at Rp. 200.

5) Personnel cost

The personnel cost of collector and driver is set as follows:

Collector : Rp. 8,000/month

Driver : Rp. 14,000/month

Although this amount is higher than the official one, it is assumed taking into account the actual amount including tip, incentive, etc.

(2) Payload capacity, number of trip and crew

The actual payload capacity of the present collection systems, numbers of trip and crew are summarized as follows:

Table 5.2-3 Actual Payload and Numbers of Trip and Crew

S Y S T E M		V E H I C L E	CREW	PAY LOAD	No. OF TRIP	
Door to door system		L. open truck	5	2.3 ton	1.3	
		Small Compactor	5	2.6	1.6	
Jali jali system		Small Compactor	3	2.6	1.6	
		S. Tipper	3	2.0	1.6	
Small Communal Container system		Large Compactor	4	5.1	1.5	
LPS	Large Communal Container	Arm Roll	1	2.8	2.6	
	Open Space, Handcart Pool Concrete Bin	L. Open cargo	3	2.3	1.8	
		S. Tipper	3	2.7	1.9	
	Depot	With Shovel Loader C. Container Handcart Pool	L. Tipper	3	4.9	2.5
			Arm Roll	1	2.8	2.6
			S. Tipper	3	2.7	1.9
			L. Open cargo	3	2.3	1.8

The present number of trips was estimated from operation data in Pusat and the results of investigation in Dinas Kebersihan.

The number of crew was obtained based on the results of investigation in Dinas Kebersihan and the results of interview (hearing from) with Suku Dinas.

The payload is based on actual measurement data obtained by weighing using truck scale by the JICA Study Team.

Since either of these data is based on the measurements at the time of the first trip, the data is considered to be larger than the daily average payload. Here this value is adopted as a payload capacity.

(3) Collection cost

The collection cost according to each collection system is obtained hereunder. Prior to this cost calculation, the costs of shovel loader, handcart, small container and large container are obtained in advance.

1) Shovel loader cost

Daily handling capacity of shovel loader = 4.9 ton x 2.5 trips x  
2 loaders = 24.5 ton

Fuel consumption : 15 l/day

No. of operating days: 300 days/year

Table 5.2-4 Cost of Shovel Loader

Purchaser cost: Rp. 83,250,000/one loader			
Annual cost per loader	Depreciation cost	Rp. 10,704,000 (7 years)	Rp. 14,985,000 (5 years)
	Repair cost	4,757,000	3,398,000
	Fuel cost	900,000	900,000
	Labor cost	1,680,000	1,680,000
	Total	Rp. 18,041,000	Rp. 20,963,000
	Cost/ton (Rp. ton)	2,455	2,852

2) Handcart

One handcart is to be capable of carrying 1.6 tons of payload per day and operated 300 days per year.

Meanwhile, the labor cost of collector of RT/RW will be about Rp. 60,000 per month.

Table 5.2-5 Cost of Handcart

Purchase cost of handcart (Rp.)	370,000/one handcart
Annual depreciation cost per one handcart (Rp.)	92,500
Cost per ton (Rp./ton)	514
Cost per ton including labor cost (Rp./ton)	914

3) Large Communal container

Table 5.2-6 Cost of Large Communal Container

Cost per container (10 m <sup>3</sup> ) (Rp.)	2,200,000
Depreciation cost per container(Rp.)	495,000
Cost per ton (Rp./ton)	570

(300 days/year)

4) Small Communal container

One small communal container is to have a capacity of 0.3 ton and used three times per week or 150 days per year for collection.

Table 5.2-7 Cost of Small Communal Container

Cost per container (1 m <sup>3</sup> )(Rp.)	300,000
Depreciation cost per container(Rp.)	68,000
Cost per ton (Rp./ton)	1,511

5) Cost according to each of the present collection systems

The cost of the present respective collection systems is obtained as shown in Table 5.2-8. Among the present systems, the handcart pool/open space using small tipper is lowest in cost followed successively by the depot using shovel loader, depot with communal container (10 m<sup>3</sup>) and Jali-jali using small tipper.

As far as the cost is compared in terms of the present service conditions of collecting vehicles, the cost can be said to be relatively low in the case of using small tippers on the basis of the Jali-jali system and handcart pool/open space system and further in the case of using shovel loader and large communal container at depot.



Table 5.2-8 Cost of Present Collection System

	DOOR TO L-OPEN	DOOR TO S-COMP	JALI-2 S-TIPP	JALI-2 S-COMP	S-CONTAI L-COMP	L-CONTAI ARM ROLL	H-POOL L-OPEN	H-POOL S-TIPP	DEPO-SHC L-TIPP
TRIP	1.3	1.6	1.6	1.6	1.5	2.6	1.8	1.9	2.2
NO. CREW	5	5	3	3	4	1	3	3	3
PAY LOAD	2.3	2.6	2.7	2.6	5.1	2.9	2.3	2.7	4.9
PURCHASE	38000	43000	23000	43000	70000	50000	38000	23000	43000
LAIF AGE	6	6	6	6	6	6	6	6	6
DEPRECIATI	5700	6450	3450	6450	10500	7500	5700	3450	6450
REPAIR	1861	2106	1127	2106	3429	2449	1861	1127	2106
FUEL	1800	1800	1800	1800	1800	1800	1800	1800	1800
COLLECTOR	3840	3840	1920	1920	2880	0	1920	1920	0
DRIVER	1680	1680	1680	1680	1680	1680	1680	1680	1680
TOTAL	14881	15876	9977	13956	20289	13429	12961	9977	12036
WASTE-Q	2.99	4.16	4.32	4.16	7.65	7.28	4.14	5.13	10.78
COST (Rp/t)	16589	12721	7697	11182	8840	6148	10435	6482	3721
SHOVEL	0	0	0	0	0	0	0	0	2852
HANDCART	0	0	0	0	0	514	514	514	514
CONTAINER	0	0	0	0	1511	570	0	0	0
T-COST	16589	12721	7697	11182	10351	7232	10949	6996	7087

### 5.3 Relationship between the collection cost and affecting factors

#### (1) Number of trip and collection cost

The number of daily trips of collection vehicle causes the most extensive effect upon the collection cost as shown below:

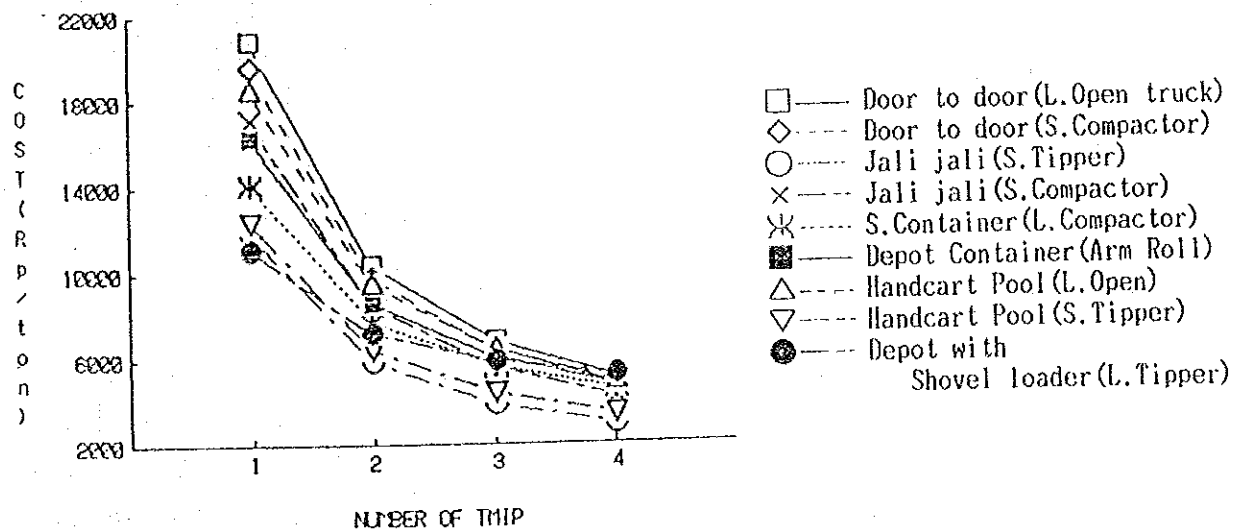


Fig. 5.3-1 Collection Cost and No. of Trips

As the above diagram indicates, the collection cost is substantially reduced by increasing the number of daily trips.

(2) Collection system and cost

The cost of various collection systems in case the number of trip is two is compared as shown in Table 5.3-1.

	DOOR TO L-OPEN	DOOR TO S-COMP	JALI-2 S-TIPP	JALI-2 S-COMP	S-CONTAI L-COMP	L-CONTAI ARM ROLL	H-POOL L-OPEN	H-POOL S-TIPP	DEPO-SHO L-TIPP
Ton/trip	2	2	2	2	2	2	2	2	2
NO. CREW	5	5	3	3	4	1	3	3	3
PAY LOAD	2.3	2.6	2.7	2.6	5.1	2.8	2.3	2.7	4.9
10 <sup>3</sup> Rp PURCHASE	38000	43000	23000	43000	70000	50000	38000	23000	43000
LIFE AGE	7	7	7	7	7	7	7	7	7
10 <sup>3</sup> Rp DEPRECIATI	4886	5529	2957	5529	9000	6429	4886	2957	5529
REPAIR	2171	2457	1314	2457	4000	2857	2171	1314	2457
FUEL	1800	1800	1800	1800	1800	1800	1800	1800	1800
COLLECTOR	3840	3840	1920	1920	2880	0	1920	1920	1800
DRIVER	1680	1680	1680	1680	1680	1680	1680	1680	1680
TOTAL	14377	15306	9671	13386	19360	12766	12457	9671	11466
(t/day) WASTE-Q	4.6	5.2	5.4	5.2	10.2	5.6	4.6	5.4	9.6
(Rp/ton) COST(Rp/t)	10418	9811	5970	8580	6326	7598	9026	5970	3899
SHOVEL	0	0	0	0	0	0	0	0	2852
HANDCART	0	0	0	0	0	514	514	514	514
CONTAINER	0	0	0	0	1511	570	0	0	0
T-COST	10418	9811	5970	8580	7837	8682	9540	6484	7265

As the results of comparison show, the higher the price of collection equipment and the smaller the payload capacity per one trip, then the higher the collection cost. Therefore, the collection cost is low in the case of using low price small tippers with large payload capacity. Thus, it is sufficiently reasonable to use tipper vehicles under the same trip conditions when any labor safety and sanitation are not taken into consideration.

(3) Feasible conditions of trip and collection cost

In case high price collection equipment is used, the collection cost will unavoidably become high unless such equipment is used highly efficiently. Since high price collection equipment generally permits speedy collection work and therefore offers the possibility to increase the number of trips. In contrast, the manual handling of wastes is not efficiently practiced. The use of the collection system and equipment which require much time for the collection work makes it very difficult to increase the number of trips. According to the present situations in Jakarta where the door-to-door system using tipper, open space/handcart pool system using tipper or open

cargo, etc., roughly two hours is required to load wastes and it is very difficult to increase the number of trips. In the case of the small container system, depot large communal container system, etc., it is sufficiently possible to increase the number of trips. The present situations where the number of trip has not been increased in spite of this possibility should sufficiently be taken into consideration.

This point will apply elsewhere in the world. In case various collection systems are available, the productivity (efficiency) of work tends to be adopted to the lowest level. In case there is any inefficient system (which does not allow increase of the number of trips) and if collection can be finished by one trip with the system, collection tends to be finished by one trip even though there are other efficient systems which enable to increase the number of trips. Such a pattern is actually practiced in Jakarta. In order to raise the efficiency, the following requirements shall be met:

- 1) In case especially inefficient collection system is left over when it is required to apply various collection systems, the overall efficiency will be deteriorated. Therefore, particularly inefficient collection system shall be abolished.
- 2) The collection systems of a similar efficiency level shall be selected, and weight control using truck scale, control of the time of departure, arrival at collection area and the transfer station shall be carried out sufficiently.

When the number of trips has been increased by using high price collection equipment, it is apparent that the cost of the depot large communal container system, small container system, etc. can be lowered as shown in the following table. On the other hand, the door-to-door system will become high in cost because of its high service level. The Jali-jali system is also a system which does not permit enhancement of the efficiency.

In conclusion, the more systematic the handling system is as in the case of the depot-large communal container and small container systems, it is possible to make the cost the lower.

#### 5.4 Selection of Collection System

In principle, the collection system and equipment shall be so selected as to minimize the collection cost. For the purpose of practically attaining the assumed cost, however, it is essential to take into account the social, cultural and economic conditions ensuring sufficient functions of the collection system as well as the working environment and sanitation problem for workers.

In the case of Jakarta city, the following points shall particularly be taken into consideration:

- 1) Financial conditions of the city
- 2) Conditions of streets
- 3) Income level of citizens
- 4) Concept of citizens on sanitation
- 5) Disciplines of workers
- 6) Targets of sanitation conditions and working environment
- 7) Maintenance

When compared with other industrialized countries, the following can be pointed out: Namely, the financial standing of the city is very weak and it is economically impossible for citizens to regularly use containers for discharge of wastes. And sufficient consideration has not been given for the working environment. Moreover, the workers lack in disciplines and collection work is not performed punctually.

In light of the fact that the financial conditions of the city will not be improved so drastically in the future, the system to be selected should be as low in cost as possible.

The disciplines of workers and working environment conditions should immediately be improved, and any collection system should not be selected unless such conditions have been improved. In order to heighten the disciplines of workers and realize punctual collection work, the collection equipment shall be mechanized as much as practicable.

The obstacle against mechanization is the maintenance and management of equipment. In some developing countries, excellent equipment cannot be effectively used because spare parts are not readily available. In this regard, there is no problem in Indonesia. The domestic parts and other industries are undergoing steady growth. For the growth of domestic industries in the future, mechanization of collecting equipment should also be taken into consideration.

On the basis of the results of study made so far, the collection systems applicable to the realistic conditions in Jakarta will be as follows:

- 1) Reconditioning of depot and formation of collection systems wherein large communal containers ( $10 \text{ m}^3$ ) can be arranged.
- 2) Widespread use of small communal container ( $1 \text{ m}^3$ ) system using large scale compactor vehicles.

In the areas where these two systems can not be applicable, the Jali-jali system should preferably be adopted, while the door-to-door system be adopted in the areas where additional service is desired particularly in view of the collection charge policy.

Meanwhile, it is required to take into consideration that the systems recommended herein are expected to be selected solely in the future. The system using containers cannot necessarily be said to be the best system. Along with improvement of the people's income level and need for higher service level, the system using container will become in view of external appearance. In addition, it will become increasingly difficult to find container installation site. When looking back the history of waste collection system in the world, the waste collection methods have roughly undergone the following course of development as shown in Table 5.4-1.

Although any city of any country would not undergo the same process of development, the above steps have been experienced in many cases. The level of collecting system has been raised in parallel with the maturity of citizens (cooperation for discharge of waste and payment of charge, and request for improvement of service level), increase of labor cost and number of technical staff for waste collection. The level to be attained in Jakarta in the near future will be that in Stage 4 in Table 5.4-1. If the citizens of Jakarta have come to desire a collection system of a higher level, although the efficiency might be somewhat low, as a result of enhancement of the sanitation level and rise of labor cost by the year 2005, then it would be necessary to study on the transfer to the subsequent step.

Table 5.4-1 Historical Stages of Solid Waste Collection

No.	Features	Collection methods	Remarks
1	A village becomes too large to dispose of wastes around their own homes.	Workers are employed to collect wastes on handcarts and dispose them at waste disposal yard on the outskirts of the village.	
2	The village has further developed and it has become difficult to dispose of waste any more within the village.	Collection of waste is started by public organization from the previous waste disposal yards, etc. Open cargo, etc. are used as collecting equipment.	<ul style="list-style-type: none"> <li>o In any case, priority is given for collection of waste. Because of low labor cost, a lot of workers are employed to collect wastes.</li> <li>o In case of Jakarta, teh waste collecting/transferring positions (LPS) were started mainly from the center of each town.</li> </ul>
3	As a result of further development of town, the public disposal yard becomes more and more distant, thereby requiring cost for disposal.	Efforts are directed successively for improving the efficiency for waste collection. One of compactor car as collecting vehicle is started.	<ul style="list-style-type: none"> <li>o In Japan, mechanization of collecting vehicles was started in about 1960.</li> <li>o At present, Jakarta is at the stages 2 and 3 and undergoing transfer to the stage 4.</li> </ul>
4	The income level of the citizens is not high and their manner of waste discharge is not adequate so that high price collecting equipment does not sufficiently function.	Since the manner of waste disposal by citizens is not sufficient although improvement of the waste collecting efficiency is requested, use of containers is generally promoted.	<ul style="list-style-type: none"> <li>o Although containers were popularly used also in Japan in the past, they are no longer favoured.</li> </ul>

- continued

No.	Features	Collection methods	Remarks						
5	<p>The income level of the citizens becomes so high as to improve the citizen's manner of waste discharge. Although the labour cost becomes increasingly high, it becomes also possible for citizens to pay the service charge.</p>	<p>Plastics bags and containers are used for discharge of wastes, and waste station is built to collect waste. Use of station collection and compactor vehicles.</p>	<p>o Punctual waste collection is attained in Japan.</p>						
6	<p>The income level of the citizens becomes extremely high.</p>	<p>Use of collecting equipment requiring less labour cost, recycle of resources, etc. are promoted.</p>	<p>o Revival of containers, etc. in large facilities and buildings. o Ratio of the price of vehicle to the labour cost per worker:</p> <table data-bbox="1029 145 1165 672"> <tr> <td colspan="2" style="text-align: right;"><u>Vehicle : Labor cost</u></td> </tr> <tr> <td style="text-align: right;">Japan</td> <td style="text-align: right;">1 : 1.500</td> </tr> <tr> <td style="text-align: right;">Indonesia</td> <td style="text-align: right;">1 : 0.025</td> </tr> </table>	<u>Vehicle : Labor cost</u>		Japan	1 : 1.500	Indonesia	1 : 0.025
<u>Vehicle : Labor cost</u>									
Japan	1 : 1.500								
Indonesia	1 : 0.025								
7	<p>The labor cost becomes extremely high.</p>	<p>A vacuum waste collection system is introduced.</p>	<p>o This system is adopted in the new city areas in Sweden, Japan and the United States.</p>						



## **6. Present Conditions of Economic/Financial Factors and Fee Collection System**



## 6. Present Conditions of Economic/Financial Factors and Fee Collection Systems

### 6.1 Economic Factors

#### 6.1.1 The Economy of Jakarta

##### 1) Trends of the Jakarta Economy

The growth rate of the Jakarta economy is higher than that of the national economy (Fig. 6.1-1).

In the past 3 years, the average growth rate of the Jakarta economy has been 10% per year based on 1980 prices.

Economic activities in Jakarta are predominantly in the trade and service sectors including banking and other financial intermediaries. The composition of the GDP indicates that banking and other financial intermediaries, services and electricity, gas and water supply are centralized in Jakarta. (Table 6.1-1).

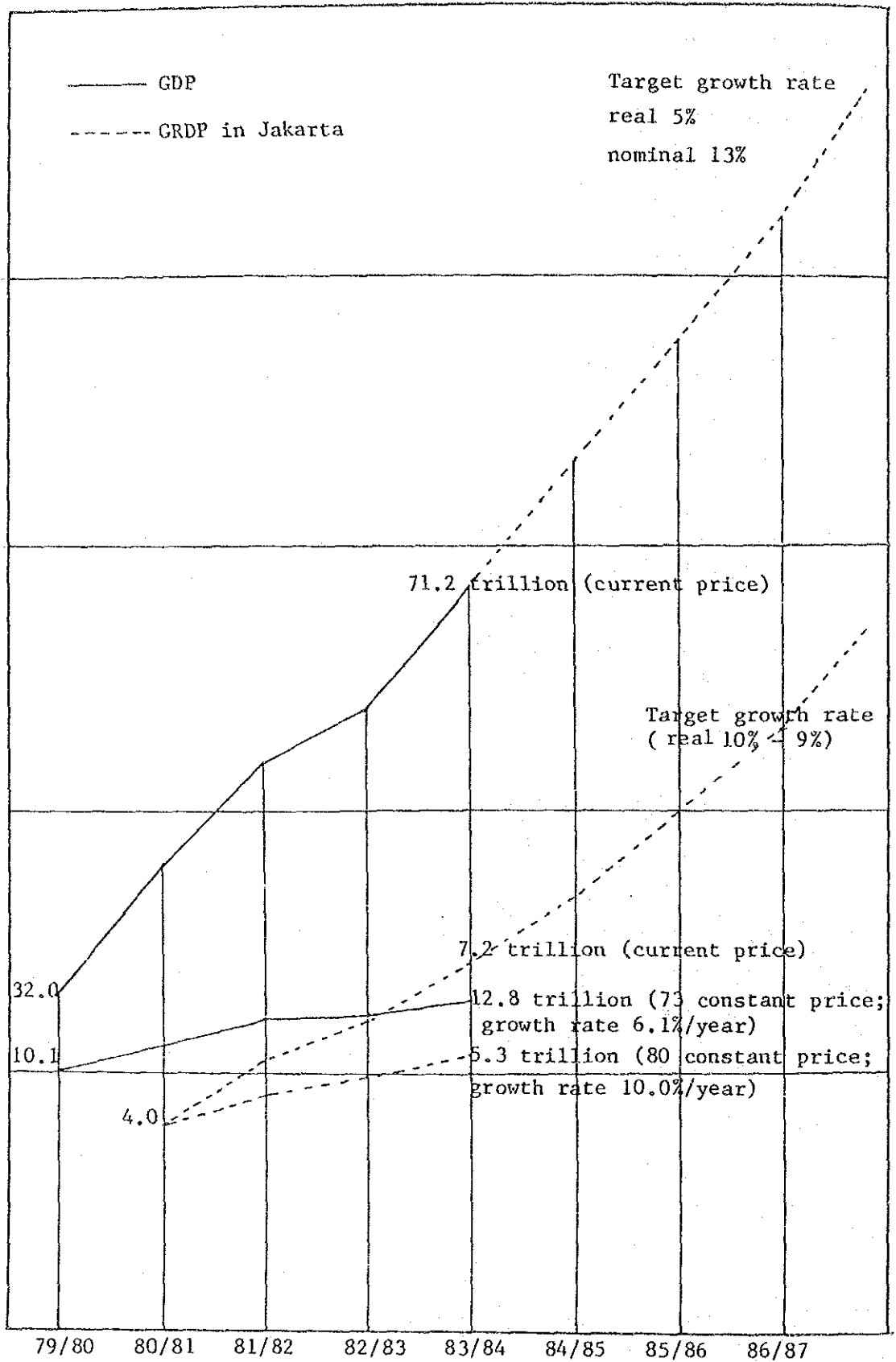


Fig. 6.1-1 GDP and GRDP in Jakarta

Source: Statistic Indonesia 1984,  
 Jakarta 5 year Plan

Table 6.1-1 Composition of Industry in Jakarta

	Current Price 1983			Growth Rate (1983/80)	
	GRDP	GDP		GRDP	GDP
1. Agriculture	121.1	18,771.5	0.6	11.5	3.9
2. Mining & Quarrying	-	13,823.6	-	-	-2.6
3. Manufacturing Industries	1,336.1	8,918.0	15.0	7.1	4.5
4. Electricity, Gas & Water Supply	174.4	503.2	34.7	15.1	13.2
5. Construction	277.0	4,433.7	6.2	11.5	8.0
6. Wholesale and retail trade	1,825.5	10,846.6	16.8	4.9	6.6
7. Transport & Communication	876.5	3,325.0	26.4	12.1	7.3
8. Banking & Other Financial Intermediaries	1,117.4	1,840.9	60.7	23.1	10.0
9. Ownership of dwelling	294.4	1,961.8	15.0	3.4	6.1
10. Public Administration & defense	522.1	5,224.7	10.0	11.8	6.6
11. Services	648.0	1,537.7	42.1	8.3	2.4
<b>Total</b>	<b>7,129.7</b>	<b>71,214.7</b>	<b>10.1</b>	<b>10.0</b>	<b>6.0</b>

Source: Statistic Indonesia 1984, Jabotabek Metropolitan Development Plan, Information from Dinas Pendapatan Daerah.

## 2) Future Perspectives

Future perspectives of GRDP in Jakarta, which was examined by JICA Team for Jabotabek transportation and also by Financial Group in DKI for Repelita IV, is shown in Table 6.1-2.

Table 6.1-2 Future Perspectives of GRDP in Jakarta (%)

	1990 - 1985	1985 - 1995	1995 - 2005
Master Plan 2005	9.5	8.0	7.0
JICA Team Case (I)	8.0	5.0	5.0
JICA Team Case (II)	8.0	8.5	7.0
		- 88/89	
Financial Group of DKI (medium)	10.0	9.0	
UI (low)	8.0	7.06	

Source: Master Plan DKI 2005, Financial Dept. of DKI Jakarta JICA Study

Considering that the 5% target growth rate for the national economy will be difficult to reach due to the downward trend in oil prices, in addition to the continued low growth of the world economy, the continuation of a real growth of GRDP over 5% per year for the next 20 years will be difficult.

In this report, growth rate estimated as Case (I) by the JICA Team for Jabotabek transportation is adopted.

According to the growth rate, GRDP in 2005 will reach Rp. 23,100 billion which is about triple that of 1985.

On this point, the economists in BAPPEDA made comments as follows;

The real annual growth-rate of Jakarta's economy is more than or equal 5% because:

- Master Plan 2005 future perspectives of GRDP (Gross Regional Domestic Product) is average 7%, and population growth-rate of Jakarta's is less than 4%.

- If there is no new government policy, with use data GRDP in 1980, 1981, 1982, 1983, and Linear Regression Model for forecasting, then annual growth-rate of Jakarta's is less than 5%, but more than population growth-rate in 2005 (note, KB (family planning) program must be successful).

### 6.1.2 Income

Based on the 1980 census in DKI Jakarta, the income distribution 1980 and the forecast in 2005 are shown according to the ratio of each income group. The income groups are divided as follows:

Group I	Rp.	0 - 25.000/month/employee
Group II	Rp.	25.000 - 50.000/month/employee
Group III	Rp.	50.000 - 75.000/month/employee
Group IV	Rp.	75.000 - 100.000/month/employee
Group V	Rp.	100.000 - /month/employee

From this ratio average income is calculated as follows.

Table 6.1-3 Prediction of Income

	1980	2005	Growth Rate (%/year)
Average income of employee (Rp/month)	42,600	80,200	2.6
Average income of household (Rp/month)	767,000	1,444,000	

Source: Prepared by Study Team based on master Plan DKI 2005.

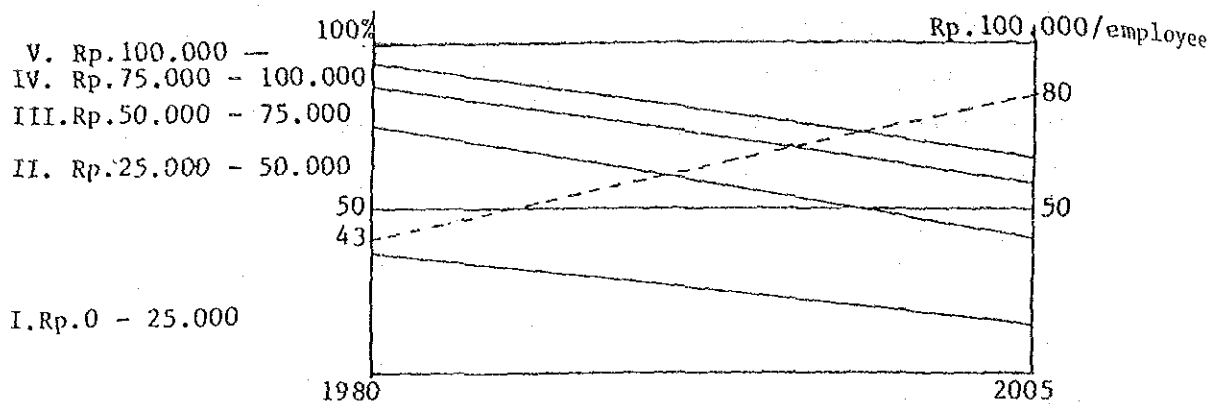


Fig. 6.1-2 Change of Income Group

The growth of real income will increase the amount of waste per capita, and change the composition of solid waste in the future.

On the other hand, it will relatively increase the personnel cost in Solid Waste Management through it will make it easier to collect the fee for solid waste from residence than it is at present.

The forecast also indicates that the low income class will remain in 2005, which will serve as a work force for solid waste.

These perspectives indicate that collection by handcarts will be less common in 2005 than now. Also, the youth will tend to seek white collar jobs, therefore the collection by handcarts will be done by older people and other workers at the bottom of the employment ladders. This suggests that transferring waste by handcart which is a hard work at present will become easier.

Based on the Master Plan DKI, the income distribution according to the ratio of each income group 1984 and 2005 is shown in Table 6.1-4.



Table 6.1-4 Monthly Income Level by Household

Income Level	1984	1995	2005
High Income			
RP 200,000 -	126,000	354,000	781,000
Average: RP 391,000	(8.9%)	(17.0%)	(27,5%)
Medium Income			
RP 55,000 - 200,000	639,000	1,050,000	1,363,000
Average: RP 109,000	(45.0%)	(50.5%)	(48.0%)
Low Income			
RP - 55,000	655,000	676,000	696,000
Average: RP 33,000	(46.1%)	(32.5%)	(24.5%)

Source: 1984 income is the estimated figure based on the 1980 and 2005 figures in the Master Plan DKI.

: 1995 and 2005 income is from the Master Plan DKI.

Note : 1980 price

### 6.1.3 Expenditures

Expenditure on food as a proportion of total expenditure tends to decrease as income increases. This is shown in Fig. 6.1-3. Proportional expenditures on housing, fuel, light and water increase slightly.

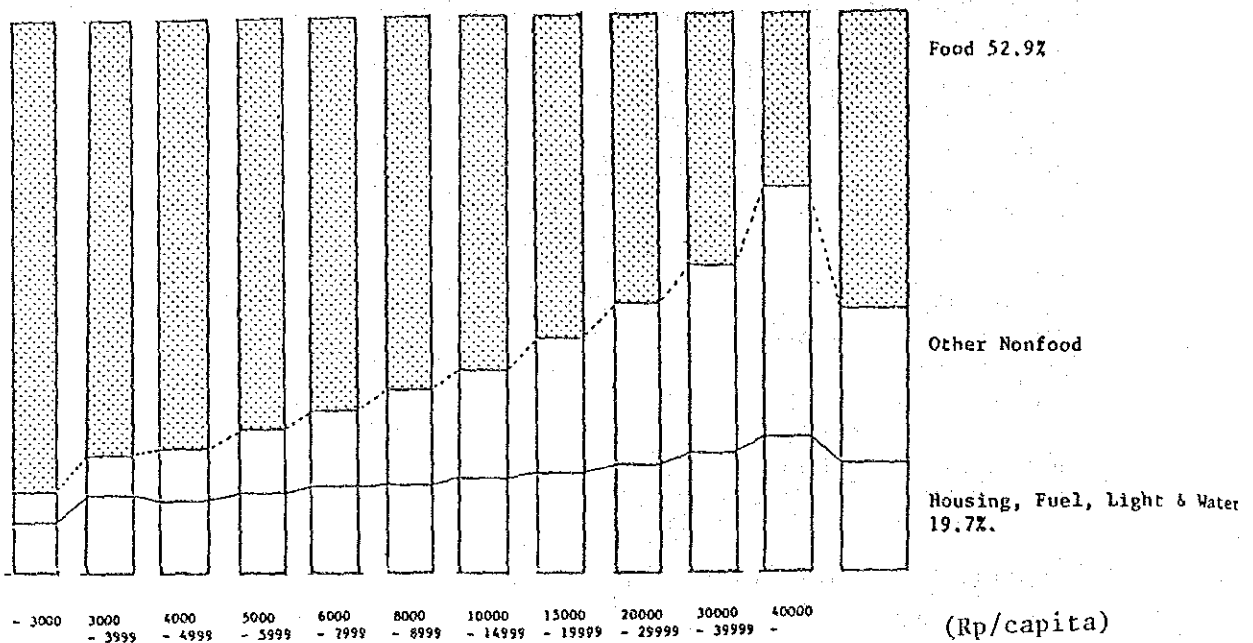


Fig. 6.1-3 Average per-Capita Monthly Expenditure in Urban Areas

Source: Statistic Indonesia 1984

On the other hand, the percentage of households having television, radio and a bicycle in 1980 is shown in Table 6.1-5.

These factors will affect the nature of solid waste in the future.

- . Decrease of the proportion of garbage
- . Increase of the large size wastes

Table 6.1-5 Percentage of Household Having Television, Radio and Bicycle in 1980 (household %)

Area	Television	Radio	Bicycle
All Indonesia	9.8	40.8	33.7
Urban	33.5	57.9	35.9
Rural	3.8	36.4	33.2
Jakarta	47.4	66.4	20.7

Source: Indonesia Hand Book 1985

#### 6.1.4 Wages

The trends for minimum wages in certain industries are shown in Table 6.1-6.

In the past 5 years, the increase rate of the minimum wages for most sectors is over 10% per year, in contrast to the increase rate in consumer's price of 8%.

The wage in Public administration is relatively low level, and has increased less than those of the other sectors and consumer's prices.

The spread between minimum wage and maximum wage tends to increase in most sectors.

Table 6.1-6 Differences of Wage

Sectors	Minimum Wage (Rp/month)			Difference (Maximum/Minimum)	
	1980	1985	Increase rate (%/y)	1975	1984
Agriculture	17,606	35,171	14.8	14.0	9.2
Mining	60,069	91,763	8.8	14.9	9.7
Manufacturing	42,137	82,945	14.5	10.0	11.6
Construction	29,105	50,209	11.5	6.6	12.7
Energy	21,050	55,365	21.3	6.3	9.9
Trade, banking & other financial	42,112	45,508	15.2	9.1	11.1
Transport	41,972	87,885	15.9	7.6	9.6
Services	33,270	71,461	16.5	4.5	7.1
Public administration	26,500	38,880	8.0	6.3	9.6
Consumer's price index	167.55	250.38	8.4		

Source: Indonesia Hand Book 1985, Data from Jetro

## 6.2 Financial Factors

### 6.2.1 Finance in Jakarta

#### 1) The Trend of Finance

The trend of finance is shown in Table 6.2-1 and Fig. 6.2-1.

Table 6.2-1 Trend of Finance of Jakarta

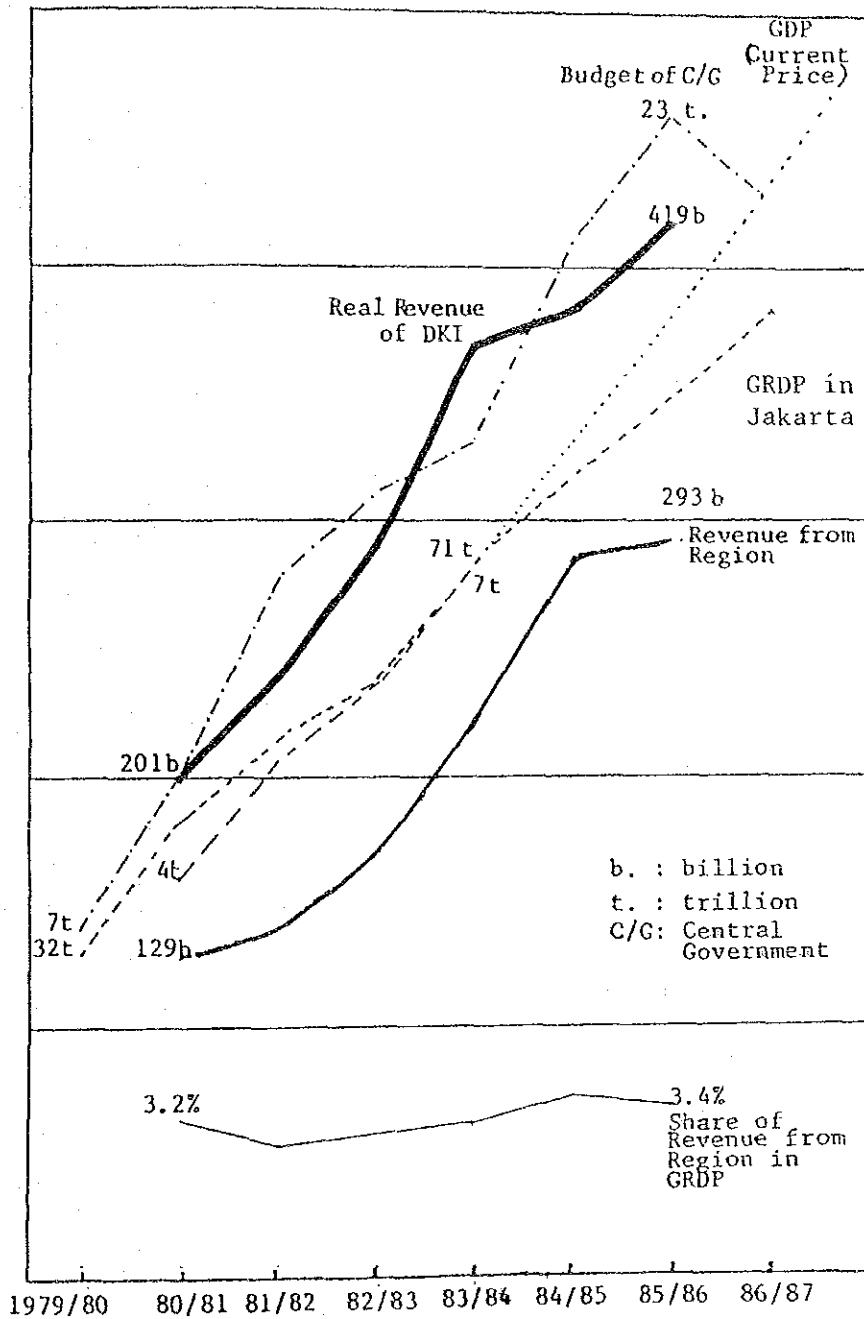
(Billion Rp.)

	80/81	81/82	82/83	83/84	84/85	85/86	86/87
<b>Revenue</b>							
from Central Government	54.2	76.9	87.0	90.0	97.0	126.7	159.0
from Region (Jakarta)	128.5	140.0	170.5	221.7	286.7	292.6	237.6
U.K.P**	18.7	23.7	33.1	58.6	-	-	-
Sub Total	201.5	241.2	290.6	370.3	383.2	419.3	396.5
<b>Expenditure</b>							
Routine	78.6	91.6	105.6	123.7	143.3	186.0	194.3
Development	78.2	88.2	92.1	100.8	156.3	232.8	220.3
U.K.P	17.8	23.3	26.6	37.2	37.9	53.7	-
Sub Total	174.6	203.7	224.3	261.7	337.5	427.5	396.5
Balance	26.9	37.5	66.3	108.6	45.7	-8.2	
Budget of Central Government (C/G)	10,560	13,900	15,600	16,560	20,560	23,050	21,420
Share of Revenue from C/G in Budget of DKI	0.51	0.55	0.55	0.54	0.47	0.55	
Share of Revenue from Region in GRDP	3.2	2.7	2.9	3.1	3.6	3.4	

\* Means budget after reassessment.

\*\* Calculation and Finance Matters.

Source: Financial Dept. of DKI Jakarta,  
Dinas Pendapatan Daerah



Source: Financial Dept. of DKI Jakarta,  
 Dinas Pendapatan Daerah

Fig. 6.2-1 Trends in GRDP and Finance of DKI Jakarta

From the above data, characteristics of finance are summarized as follows:

1. Revenue and expenditure were balanced before 1984/85, though the increase rate of expenditure exceeds that of Revenue.
2. Revenue of the region, including regional taxes, is almost 60% of total revenue.
3. Routine expenditure is almost 50% of the total expenditure.
4. The budget of the central government has declined from 1985/86 to 1986/87 because of a fall in oil prices.

## 2) Future Perspective

The finance group in DKI has forecasted its own revenues, which were about 75% of the revenue from the region, in proportion to GRDP of Jakarta.

Considering the continued low growth of the world economy and the fall of the budget of the central government from 1985/86 to 1986/87, the revenue from the central government will remain on the same level as in 1985/86.

In this report, future perspective of finance is estimated based on GRDP, which means that 3% of GRDP is equal to the revenue of the region.

Table 6.2-2 Estimated Finance in 2005 (constant price in 1985)

Case	Finance Scale	Comments
Revenue from Central Government	126.7	
Revenue from Region	693.0	
Total	819.7	Double of 1985

Source: Calculated by Study Team

On this point, the economists in BAPPEDA made comments as follows:

The financial scale of Jakarta in 205 approx. is more than 1,000 billion rupiah by current price.

- Data of Jakarta City Government Budget Income from 1979/1980 to 1984/1985, and use Linear Regression Model for forecasting, then budget income in 2005 is more than 1,000 billion rupiah by current price.

### 3) Debt Service Ratio (DSR)

In Indonesia, the consideration on Debt Service Ratio is necessary when projects are proposed.

In Jakarta, DSR should be less than 15% of Development Budget. The change of the Development Budget and the limitation of loan are shown in Table 6.2-3.

Table 6.2-3 Development Budget and Limitation of Loan

	TAHUN 1984/1985	TAHUN 1985/1986	%	TAHUN 1986/1987	TAHUN 1987/1988	TAHUN 1988/1989	TAHUN 1989/1990	TAHUN 1990/1991	TAHUN 1991/1992	TAHUN 1992/1993	TAHUN 1993/1994
Pendapatan Pem. Pusat	96.97	117.80	21.48	158.96 *)	1) 174.86 2) 170.88 3) 166.91	192.35 183.70 175.26	211.59 197.48 184.02	232.75 212.29 193.22	256.03 228.21 202.88	281.63 245.33 213.02	309.79 263.73 223.67
Pendapatan Pem. Daerah	277.24	280.29	1.10	237.55 *)	1) 261.31 2) 255.37 3) 249.43	287.44 274.52 261.90	316.18 295.11 275.00	347.80 317.24 288.75	382.58 341.03 303.19	420.84 366.61 318.35	462.92 394.11 334.27
Total Pendapatan	374.21	398.09	6.36	396.51	1) 43.17 2) 426.25 3) 416.34	479.79 458.22 437.16	527.77 492.59 459.02	580.55 529.53 481.97	638.61 569.24 506.07	702.47 611.93 531.37	772.71 657.82 557.94
Balanza Putri	143.31	177.83	24.09	194.34	1) 213.78 2) 208.92 3) 204.06	235.16 224.59 214.26	258.68 241.43 224.97	284.55 259.54 236.22	313.01 279.01 248.03	344.31 299.94 260.43	378.74 322.44 273.45
Sisa Pendapatan	230.90	220.26	(4.61)	202.17	1) 22.39 2) 217.33 3) 212.28	244.63 233.63 222.90	269.09 251.16 234.05	296.00 269.99 245.75	325.61 290.23 258.04	358.16 311.99 270.94	393.97 335.38 284.49
PSP - 15% dari sisa Pendapatan	34.64	33.04	(4.62)	30.33	1) 33.36 2) 32.60 3) 31.84	36.69 35.04 33.44	40.36 37.67 35.11	44.40 40.50 36.86	48.84 43.53 38.71	53.72 46.80 40.64	59.10 50.31 42.67
Angsuran Pinjaman yang harus dibayar	6.45	7.64	18.45	6.42	6.00	6.84	7.66	7.27	6.93	6.75	6.56
Batas Kemungkinan Jumlah Angsuran Pinjaman	28.19	25.40	(9.90)	23.92	1) 27.36 2) 26.60 3) 25.84	29.85 28.29 26.60	32.70 30.01 27.45	37.13 33.23 29.59	41.91 36.60 31.78	46.97 40.05 33.89	52.54 43.75 36.11

Catatan:

- 1) Asumsi kenaikan pendapatan : 10%
  - 2) Asumsi kenaikan pendapatan : 7.5%
  - 3) Asumsi kenaikan pendapatan : 5%
- \*) Pendapatan dari Pemerintah Pusat : 158.96
- 1. Ganjaran dari Pegawai : 3.63
  - 2. Subsidi/Perimbangan Keuangan : 96.97
  - 3. Bantuan Dati I : 10.00
  - 4. PRB : 44.82
  - 5. Konpensasi Bahan Bakar : 1.36
  - 6. Pantuan Pemerintah : -
  - 7. Konpensasi Jembatan Timbang : -
  - 8. SP2 Sekeloh Pasak : 1.79
  - 9. Turan Hasil Butan (IPH) : 0.39
- \*) Pendapatan Pemerintah Daerah : 237.55
- 1. Pajak pajak Daerah : 161.87
  - 2. Retribusi Daerah : 27.60
  - 3. Setoran Perusahaan Daerah : 7.72
  - 4. Penerimaan Dinas Daerah : 29.06
  - 5. Penerimaan Lain lain : 11.30
- Source BAPPEDA



## 6.3 Financial Resources and Expenditure

### 6.3.1 Money Flow and Revenue Structure

#### 1) Money Flow in Solid Waste Management

The money flow in solid waste management is shown in Fig. 6.3-1. The description of the money flow can be summarized as follows:

- a. The money flow is very complex, because solid waste management is carried out by several organization and authorities.

In particular, the market wastes are collected by PD Pasar Jaya, Wilayahs and Private companies.

- b. The fee for collection of solid waste is separate from the revenue of Dinas Kebersihan.
- c. Although revenue of Dinas Kebersihan depends on the budget of DKI Jakarta, it is actually controlled by various sections of Dinas Kebersihan.
- d. Residents pay the fees to the RW/RT, although there is no direct charge by Dinas Kebersihan except in the door to door service area.

Money flows related to the cleansing companies and RW/RTs are not clear. From the socio-economic survey, both of them pay the fee to Dinas Kebersihan or Suku Dinas Kebersihan informally.

The cleansing companies	Rp. 1.500.000 - 2.000.000/month
RWs	Rp. 50.000 - 300.000/month

But those revenue was not counted in the Revenue of Dinas Kebersihan or Suku Dinas Kebersihan.

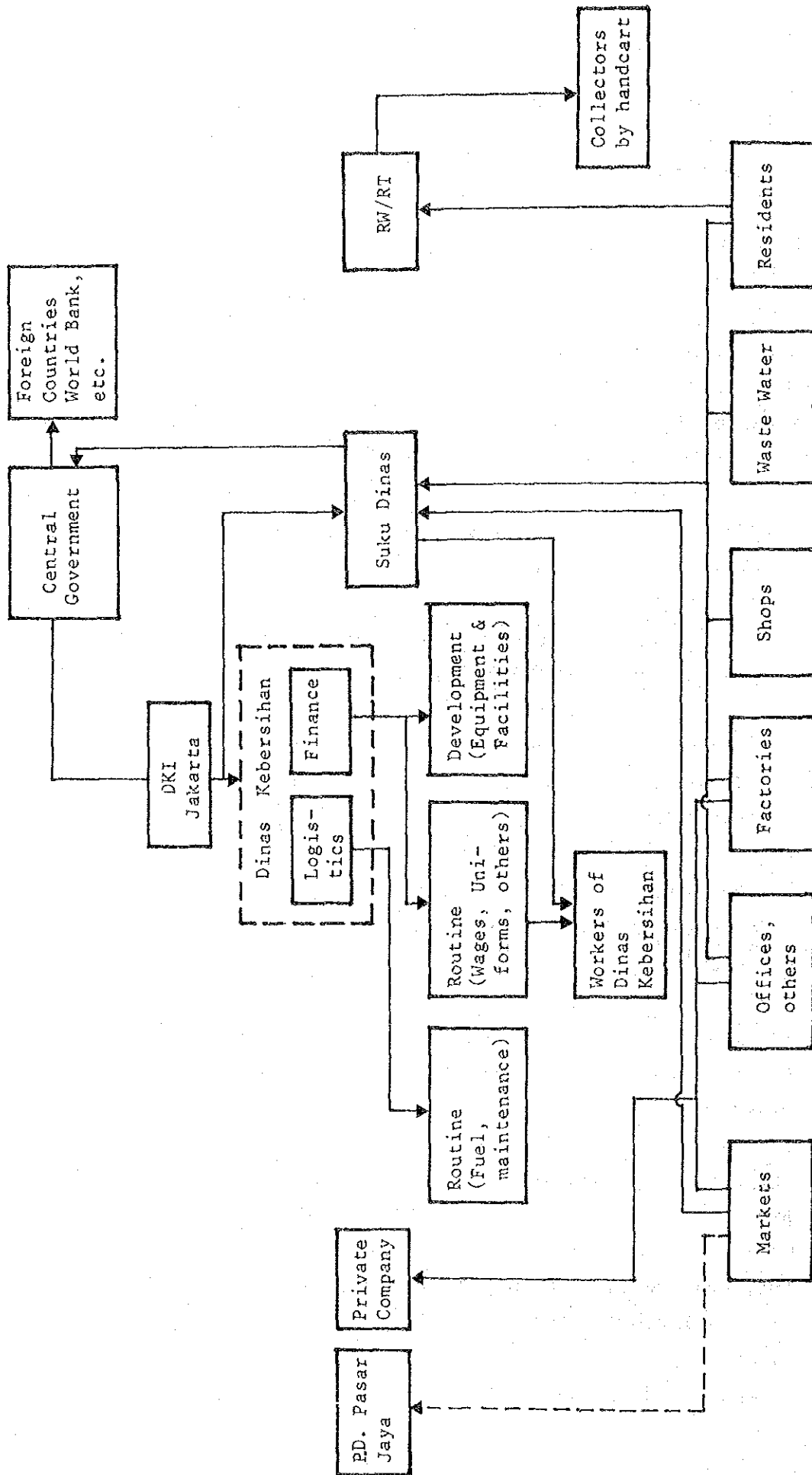


Fig. 6.3-1 Money Flow in Solid Waste Management

2) Trends in Revenue of Dinas Kebersihan

Trends in the revenue of Dinas Kebersihan are shown in Table 6.3-1.

Since 1984/85, money from revenue that is allotted for fuel, oil and maintenance are separated from the Budget of the Dinas Kebersihan, and controlled by the logistics sections.

Based on the table, the following points can be made.

- a. Revenue from residents and business establishments has increased, but it is separated from the revenue of Dinas Kebersihan.
- b. The budget of Dinas Kebersihan has decreased over the last 3 years.

The Reasons explained by Dinas Kebersihan are:

- The budget for Development/Investment has decreased considerably after 1984/85.
  - The number of workers has decreased slightly.
- c. About 40% of the revenue depends on foreign loans received before 1983/84.

Table 6.3-1 Trends in Revenue for Solid Waste Management  
(Rp. 1,000.-)

	1982/83	1983/84	1984/85	1985/86	1986/87
Fee for S.W.M.*					
From Residents by door to door services	12,134	83,122	103,249	185,774	
From Industries	10,023	11,917	33,444	50,882	60,753
From Shops	53,720	56,081	36,438	47,648	
Dumping & Licence Fees	-	-	-	-	607
<b>TOTAL</b>	<b>75,877</b>	<b>151,120</b>	<b>173,137</b>	<b>284,304</b>	<b>61,360***</b>
Budget for S.W.M.					
Budget from DKI Jakarta	4,968,850	9,754,690	9,323,860	7,425,120	14,343,183
Subsidy from Central Government	-	-	-	-	-
Foreign Grants	-	-	-	-	-
Foreign Loans	4,425,000	5,984,000	-	-	-
<b>Sub Total **</b>	<b>9,393,850</b>	<b>15,738,690</b>	<b>9,323,860</b>	<b>7,425,120</b>	
Budget controlled by Logistic Section	-	-	3,575,137	4,955,734	
<b>TOTAL</b>	<b>9,393,850</b>	<b>15,738,690</b>	<b>12,898,997</b>	<b>12,380,854</b>	<b>14,343,183</b>

\* Revenue for the Central Government

\*\* Excluding fee for S.W.M.

\*\*\* From April to June, 1986

Source: Data from Dinas Kebersihan

### 6.3.2 Expenditure Structure

#### 1) Trends in Expenditures of Dinas Kebersihan

Trends in expenditures are shown in Table 6.3-2 and Fig. 6.3-2. The data on the operation costs for Suku Dinas were not received in the first survey. In the table, the estimated costs are listed.

Based on Table 6.3-2 and Fig. 6.3-2, the following characteristics are indicated:

- a. Budget for Routine Work has increased, however that for developments/investments has fallen.
- b. Development/investment costs have changed to the degree that the cost is less than half of the maximum cost.
- c. Personnel expenditure, including estimated cost for Suku Dinas, is about 40% of total expenditure.
- d. Fuel, oil and maintenance costs, which reach 30% of the total expenditure in 1985/86, has increased rapidly since 1983/84.

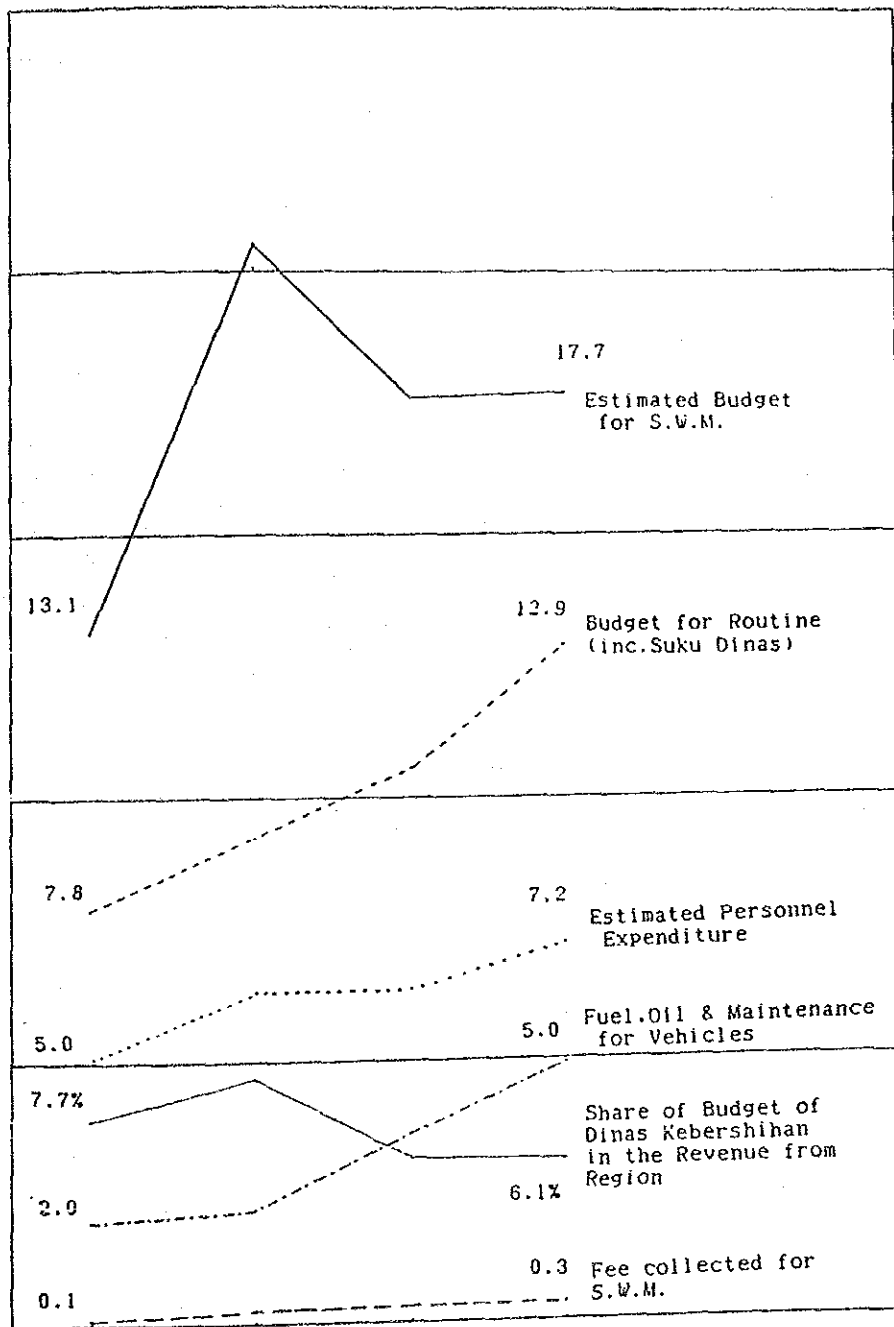
Table 6.3-2 Trends in Expenditure for Solid Waste Management  
(Rp. 1,000.-)

	1982/83	1983/84	1984/85	1985/86	1986/87
Budget of Dinas Kebersihan					
- Development/Investments					
Transfer Vehicles	998,110	836,800	528,000	126,500	
Haulage Vehicles*	2,142,500	6,140,500	3,260,000	2,490,000	
Landfill Vehicles	816,640	684,700	432,000	103,500	
Facilities	730,000	1,951,750	1,902,300	1,490,000	
Sub Total	5,234,000	11,276,250	7,122,300	4,822,000	5,983,809
- Routine Work					
Personnel Expenditure	1,344,620	1,515,370	1,574,790	1,869,500	2,263,520
Maintenance Costs	59,000	72,200	78,800	88,420	104,600
Fuel and Oil	1,965,880	2,194,540	3,575,137	4,955,734	5,023,434**
Others	799,750	680,330	547,970	645,200	967,820
Sub Total	4,159,850	4,462,440	5,776,697	7,558,854	8,359,374
Budget of Wilayahs (Operation Costs for Suku Dinas)					
	3,210,895	3,997,696	4,411,937	5,153,71	
Total	12,604,745	19,736,659	17,310,934	17,534,566	

\* Including Collection Vehicles

\*\* Estimated by subtracting other items from Total Routine Budget

Source: Dinas Kebersihan



Source: Dinas Kebersihan

Fig. 6.3-2 Trends in Finance for Solid Waste Management

2) Cost of Each Service Item

Solid Waste Management generally consists of the following 6 aspects:

- a. Collection
- b. Transfer
- c. Haulage
- d. Intermediate Treatment
- e. Final Disposal
- f. Staffing

In Jakarta, the distribution of the budget to each service is not clear. Therefore, the distribution will be estimated according to the number of workers and that of vehicles as shown in Table 6.3-3. The results of a rough estimation indicate that a large part of solid waste management expenditure is in haulage and that the waste treatment cost per ton is Rp. 14,234-.



Table 6.3.-3 Expenditure of Solid Waste Management

	Collection	Transfer	Haulage	Intermediate Treatment	Final Disposal	Other*	Total
<b>Personnel Expenditure</b>							
Basic Wage	2,586.7	49.3	1,538.2	-	41.1	1,231.8	5,447.1
Incentives	323.4	6.2	192.3	-	5.1	-	527.0
<b>Depreciation</b>							
Facilities	-	-	-	-	-	759.3	579.3
Vehicles	482.8	560.2	2,413.7	-	590.2	-	3,965.9
<b>Maintenance Costs</b>							
Spare Parts	48.2	39.0	371.5	-	31.9	-	490.6
Maintenance Services	17.9	14.6	140.2	-	12.1	18.3	203.1
<b>Fuel &amp; Oil</b>							
Fuel	332.8	269.0	2,567.8	-	220.1	-	3,389.7
Oil	-	-	-	-	-	535.2	535.2
<b>Other Utilities</b>							
Electricity	-	-	-	-	-	5.4	5.4
Water	-	-	-	-	-	55.8	55.8
Others	-	-	-	-	-	44.6	44.6
<b>TOTAL</b>	<b>3,791.8</b>	<b>938.3</b>	<b>7,223.7</b>	<b>-</b>	<b>819.5</b>	<b>2,650.4</b>	<b>15,423.7</b>
<b>Share %</b>	<b>24.6</b>	<b>6.1</b>	<b>46.8</b>		<b>5.3</b>	<b>17.2</b>	<b>100.0</b>
<b>Cost per Solid Waste (Rp)**</b>							<b>14,324</b>

\* Excluding the work for waste water.

\*\* The amount of solid waste treated is estimated as 1,076,750 ton/year.

Source: Prepared by the Study Team

### 6.3.3 Financial Conditions of Suku Dinas

#### 1) Financial scale of Suku Dinas

As can be seen from Table 6.3-4, the financial scale of Suku Dinas as a whole is Rp. 5.7 billion, of which 40% is accounted for by Jakarta Pusat. This is because the core facilities of the Indonesian Government are located in Jakarta Pusat and the need to place emphasis on solid waste management there is strong.

The funds available for Suku Dinas come from two sources; namely each respective Wilayah and Dinas Kebersihan.

Vehicles, oil, etc. are supplied in kind, separate from the above, by the Logistics Section of Dinas Kebersihan.

In general, no development budget is appropriated for the Wilayah now. It is necessary to reexamine the institutional system in this respect prior to delegating authority to Suku Dinas in the future.

Table 6.3-4 Financial Scale of Suku Dinas

	1981/82	1982/83	1983/84	1984/85	1985/86
Pusat	1,496,140	1,498,145	1,837,059	1,954,077	2,226,834
Utara	292,757	294,672	361,148	403,418	511,326
Barat	626,220	638,785	796,808	859,136	993,275
Selatan	544,590	575,893	735,533	821,943	958,678
Timur	523,603	545,824	(672,779)	799,734	993,369
Total	3,483,310	3,553,319	(4,403,327)	4,838,308	5,683,482
Wilayah	3,144,300	3,210,895	(3,997,969)	4,411,937	5,153,712
Dinas Keb.	339,010	342,424	(405,358)	426,371	529,770

( ) indicates the estimated data

Source: Suku Dinas

The financial scales of each Wilayah is as follows.

unit: Rp. 1,000.-

Pusat	16,195,210
Utara	2,088,810
Barat	2,310,400
Selatan	2,751,410
Timur	2,789,950
Total	26,135,780

Source: BAPPEDA

2) Financial condition of Suku Dinas Pusat

At Suku Dinas, income of each account title is expended in the same amount under the same account title. Account titles and composition of total 1986/86 amount for Suku Dinas Pusat are as follows.

	Unit: Rp. 1,000.-	%
Wilayah		
Salary	1,888,181	(84.6)
Insentive	169,725	(7.6)
Transport	3,780	(0.2)
Overtime	14,904	(0.7)
Contingency	8,950	(0.4)
Others	3,868	(0.2)
Dinas Kebersihan		
Hardwork Payment	119,355	(5.3)
Supporting Dinas Activity	22,762	(1.0)
Total	2,231,525	100.00

Source: Sub Division of Personnel/Finance

#### 6.3.4 Total Financial Scale of Solid Waste Management in Jakarta

Solid waste management in Jakarta city is performed by RTs, PD Pasar Jaya and cleansing companies besides Dinas Kebersihan/Suku Dinas Kebersihan.

The financial condition of each respective group is not necessarily clear, but the facts which have been uncovered in the process of survey will be exemplified to estimate the approximate financial scales of the other groups involved in order to assess the weight occupied by Dinas Kebersihan in solid waste management in Jakarta City.

##### 1) Financial condition of RT/RW

###### a. In the case of RW in Tanah Abang

Collects wastes from 12 RTs 560 k/k

Has two handcarts (15% of the inhabitants receive this service under the jali-jali system)

Income: Rp. 400,000/month

Outgo : Rp. 110,000/month for handcart workers

Rp. 20,000/month for crew/driver of collection vehicle

Rp. 270,000/month for other activities

###### b. In the case of RW in Menteng

733 k/k

Has three small handcarts and 4 ordinary handcarts

Income: Rp. 348,000/month

Outgo : Rp. 10,000 - 15,000/month/worker for handcart collection

Rp. 54,000 for workers of collection vehicle

On the other hand, according to the interview survey conducted in Chempaka Putih, the high income household is said to be paying Rp. 6,000/month to RW, the middle income household, Rp. 1,500/month and the low income household, Rp. 300/month. Since about 33 to 40% of these payments are considered to be allocated to solid waste management, the cost of solid waste management by RTs throughout Jakarta City is estimated to be round Rp. 8.4 billion.

	Number of K/K	Free from K/K	Financial Scale of RW/RT
High Income	126,000	Rp. 6,000/month	Rp. 9.1 billion/year
Middle Income	639,000	Rp. 1,500/month	Rp. 11.2 billion/year
Low Income	655,000	Rp. 300/month	Rp. 2.4 billion/year
Total	1,420,000		Rp. 22.7 billion/year

This scale is about half that of Dinas/Suku Dinas Kebersihan. Interview surveys with other RWs have revealed that there are cases where an RW collects Rp. 10,000 - 16,000/month from each RT and pays Rp. 50,000 - 300,000/month to drivers and other workers of collection vehicles. When the above amount is simply multiplied by the number of RWs, it means that informal money of Rp. 1.7 billion flows into Dinas/Suku Dinas Kebersihan.

## 2) Financial condition of P.D. Pasar Jaya

P.D. Pasar Jaya is reportedly not collecting any solid waste management fees in particular, but on the question of expenditures, it gave the following answer.

### Proses Penyapuan & Pengumpulan Sampah

a. Gaji, Uang Makan, Transport, Insentif	= Rp. 1,106,701,200.-
b. Alat-Alat Kebersihan	= Rp. 68,910,540.-
c. Perangsang Angkutan Sampa	= Rp. 45,031,290.-
d. Kerja Bhakti	= <u>Rp. 35,082,410.-</u>
Jumlah per Tahun	= <u>Rp. 1,255,725,440.-</u>

Proses Pengangkutan Sampah

Biaya Operasional

a. Honor, Uang Makan, Transport dan Insentif Pegawai	= Rp.	342,628,145.-
b. Biaya Kantor	= Rp.	23,029,385.-
c. Biaya Umum	= Rp.	47,143,020.-
d. Biaya Perawatan	= Rp.	<u>362,187,157.50</u>
Sub Total	= Rp.	774,986,797.50
Biaya Penyusutan Kendaraan (Depreciation)	= Rp.	<u>60,296,310.46</u>
Jumlah 1984/1985		

---

Jumlah Biaya per Tahun 1984/1985 = Rp. 2,091,009,448.96

This scale is more than 10% that of Dinas/Suku Dinas Kebersihan. As a result, it became clear that it incurred a cost of Rp. 16,926/ton for solid waste management in 1984/85.

3) Financial condition of cleansing companies

Here the results of interview survey were converted into financial figures on a trial basis. A relatively large company was hypothesized.

Revenues : Rp. 2,812,500/month from companies (3,750 x 750)  
Rp. 450,000/month from household customers  
(1,500 x 300)

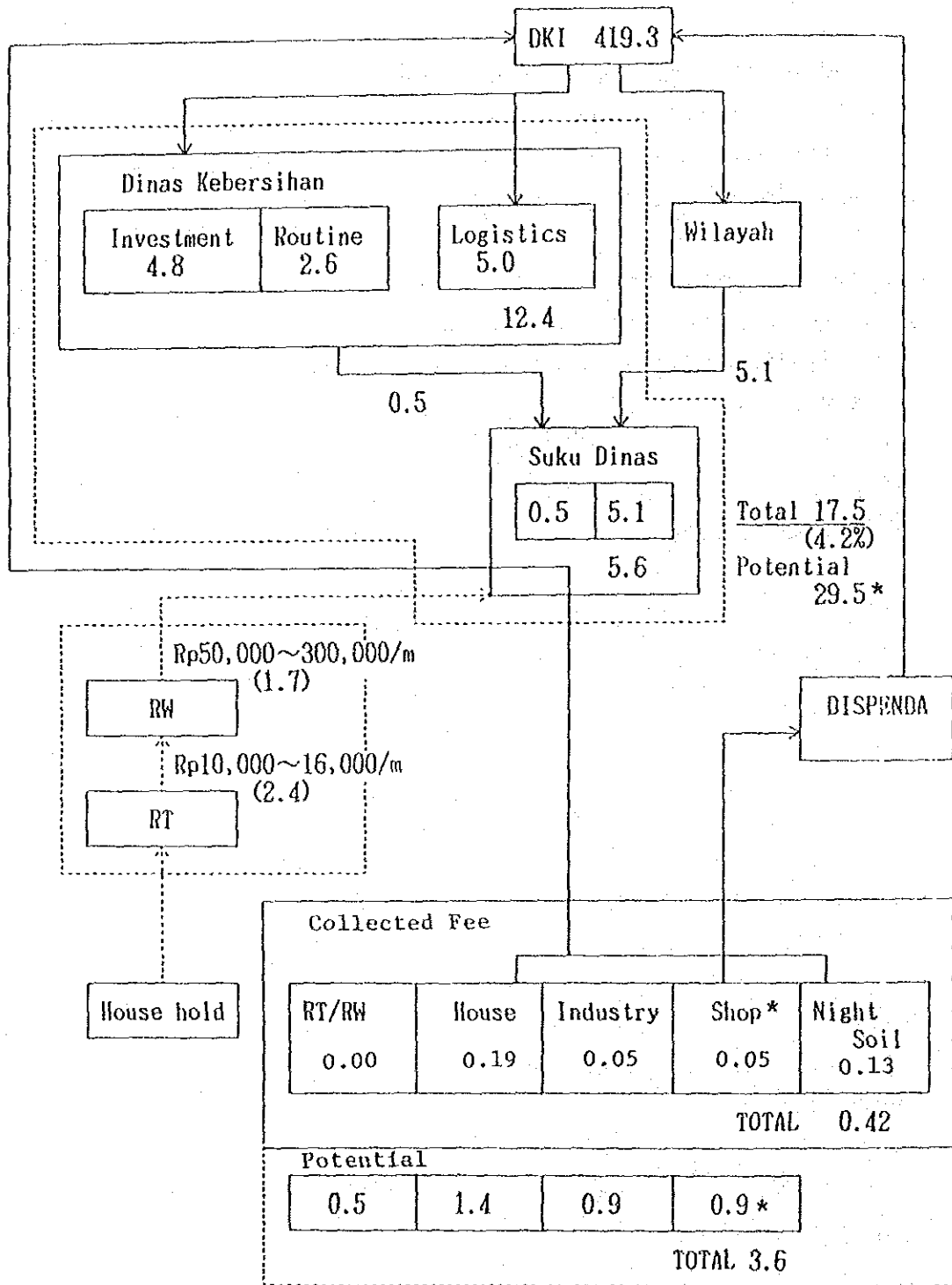
Expenditures: Rp. 1,000,000/month for workers (50,000 x 20)  
Rp. 1,750,000/month for Dinas/Suku-Dinas Kebersihan

Even if there should be a few tens of companies of this size, their total financial scale would only be Rp. 150 - 200 million. Since neither the total number of cleansing companies has been grasped nor the difference in scale among companies been elucidated, the financial conditions of the cleansing companies are not reflected in the total financial scale of solid waste management.

4) Financial scale of solid waste management as whole

Based on the results of the foregoing trial estimation the financial scale of solid waste management as a whole is more than Rp. 30 billion even now, and Dinas /Suku-Dinas are assumed to account for about 60% of the total.

Also, on a generation base including commercial wastes, the cost burden is estimated to be Rp. 17,500/ton and Rp. 22,180/year - Rp. 1,850/month/per household on average.



(Unit: Billion Rp.)

→ Formal Money Flow

⋯ Informal Money Flow

\* Excluding PD Pasar Jaya

Fig. 1-1-7 Outline of Financial Flow and Solid Waste Management Budget (1985/1986)



## 6.4 Fee Collection Systems

### 6.4.1 Present Retribution System in Jakarta

In regional regulation No. 8 /1977, the fees for waste water and solid waste collection were set.

A new regulation, which is called "The retribution regulation in the field of people's welfare in DKI" (No. 10/1985), was legalized by the Minister of Home Affairs on June 2, 1986. However, it has not yet been totally realized yet.

The main changes can be stated as follows;

- to increase the total amount of fees from shops or other business establishments.
- to have separate fees in economical areas according to urban services.
- to clarify that outside protocol and economical areas, fees should be collected by the RT's.
- to introduce a licence fee and a dump site fee.

The tariff is shown in Table 6.4-1.

From the tariff, the imbalance of burden is clear.

Burden Rp/ton		Preconditions of calculation
Shops	3,300	Extra charge Rp. 200/each 0.2 m <sup>3</sup> /day, 1 ton = 3 m <sup>3</sup>
Industries	6,700	Tariff Rp. 2,000/m <sup>3</sup> , 1 ton = 3 m <sup>3</sup>
Household		
Protocol Area	25,000	Rp. 3,000/month, 0.6 kg/capita (day)

Table 6.4-1 Change in Tariff from the Old System and Comparison between Jakarta and Bandung

Sources of Waste	Jakarta		Bandung
	Tariff under old regulation	Tariff under new regulation	
1 Restaurants & Dispensaries	Large Rp 400/day Middle Rp 300/day Small Rp 200/day	Rp 500/day - Rp 15,000/month Rp 400/day - Rp 12,000/month Rp 300/day - Rp 9,000/month	1st class Rp 20,000/month 2nd class Rp 15,000/month 3rd class Rp 5,000/month 4th class Rp 3,000/month
2 Shops glass, iron, drink & foods, kitchen-utensils electrical, radio/TV, vehicle parts	Large Rp 250/day Middle Rp 200/day Small Rp 150/day	Rp 300/day - Rp 9,000/month Rp 250/day - Rp 7,500/month Rp 200/day - Rp 6,000/month	1st class Rp 7,000/month 2nd class Rp 5,000/month 3rd class Rp 2,500/month
3 Shops furniture, drug, photo studio, tailor, others	Large Rp 200/day Middle Rp 150/day Small Rp 100/day  * For items 1, 2 and 3 extra charge if over 0.5m <sup>3</sup> /day Rp 100/each 0.2 m <sup>3</sup> /day	Rp 250/day - Rp 7,500/month Rp 200/day - Rp 6,000/month Rp 150/day - Rp 4,500/month  * For items 1, 2 and 3 extra charge if over 0.5m <sup>3</sup> /day Rp 200/each 0.2m <sup>3</sup> /day	
4 Industries	Rp 5,000/minimum 2.5m <sup>3</sup> /trip  1 extra charge if over 2.5m <sup>3</sup> /day Rp 1,500/each 1 m <sup>3</sup>	Rp 2,000/m <sup>3</sup>	Factories, Technical enterprises, Workshops 1st class Rp 17,500/month 2nd class Rp 15,000/month 3rd class Rp 10,000/month  Home industries 1st class Rp 10,000/month 2nd class Rp 5,000/month 3rd class Rp 2,500/month
5 Office centers		Rp 20,000/m <sup>3</sup>	1st class Rp 2,000/month 2nd class Rp 1,000/month 3rd class Rp 750/month
6 Shopping centers, Plazaes, Supermarkets		Rp 2,000/m <sup>3</sup>	1st class Rp 3,000/month 2nd class Rp 2,000/month 3rd class Rp 1,000/month
7 Motels, Hotels, Mansion and others			1st class Rp 25,000/month 2nd class Rp 15,000/month 3rd class Rp 10,000/month 4th class Rp 7,500/month 5th class Rp 5,000/month Hoatal Rp 2,500/month
8 Entertainment, Recreational areas			-none-
9 Hospitals, Clinics, Laboratories			1st class Rp 15,000/month 2nd class Rp 10,000/month 3rd class Rp 7,000/month

Table 6.4-1 (con't)

Sources of Waste	Jakarta		Bandung
	Tariff under old regulation	Tariff under new regulation	
10 Household	Economy & Protocol area Rp 3,000/month	Protocol areas Rp 3,000/month 1st economic class Rp 2,000/month 2nd economic class Rp 1,000/month 3rd economic class Rp 500/month 4th economic class Rp 250/month	1st class Rp 3,500/month 2nd class Rp 2,500/month 3rd class Rp 1,000/month 4th class (Kampung) Rp 250/month
	Kampung Rp 1,000/RT/month (not yet) Rp 3,000/RT/month	Rp 1,500/RT/month	
11 Theaters	Large Rp 250/day Middle Rp 200/day Small Rp 150/day	Rp 500/day - Rp 15,000/month Rp 400/day - Rp 12,000/month Rp 300/day - Rp 9,000/month (involved in item 1)	1st class Rp 20,000/month 2nd class Rp 15,000/month 3rd class Rp 10,000/month
12 Public transportation Warehouses, Storehouses	-none-	-none-	1st class Rp 7,000/month 2nd class Rp 5,000/month 3rd class Rp 2,000/month
13 Waste/Industrial water that bears poison & has been neutralized	have to pay extra charge settled by Governor	Rp 7,500/m <sup>3</sup>	-none-
14 Waste water (Septic tank)	minimum 2 m <sup>3</sup> /trip Rp 2,000/m <sup>3</sup>	minimum 2 m <sup>3</sup> /trip Rp 4,000/m <sup>3</sup>	Rp 4,500/month
15 Dumping Site	-none-	Site provided by Regional Governor Rp 800/m <sup>3</sup> Outside of the facility Rp 500/day Dirt/faeces dumping location Rp 2,000/m <sup>3</sup>	-none-
16 Permission for carrying out business in the field of sanitation.	-none-	Rp 15,000/year	-none-

made by JICA study team

Although some improvements have been made, the situation of two equally ranking sections (Dispenda and Dinas Kebersihan) collecting fees has not changed. This causes some confusion in its implementation.

The organization relating to the retribution of S.W.M is shown in Fig. 6.4-1.

The figure illustrates another confusion between the sections of Dinas Kebersihan. The fee from enterprises are collected by Dinas Kebersihan, Suku Dinas Kebersihan and Seksi Kebersihan.

The regulation on job determination is summarized in Table 6.4-2.

The responsibility of collecting fees is decentralized to the Suku Dinas Kebersihan level, and not to the Seksi Kebersihan level, which is more familiar with the existing situation of the area.

On the other hand, Suku Dinas Pendapatan Daerah collects fees from shops/restaurants by applying two methods:

- Good payers are provided with a Retribution Fee Card and pay their fee directly to Kas Daerah (Local Treasurer).
- Bad payers are visited by fee collectors of the Seksi Pendapatan Daerah and submit a stamp-system bill. The fee collectors take the money to Suku Dinas Pendapatan Daerah.

Ref.

#### Average rate of markets and business establishments

The previous studies showed the average rate of markets and business establishment in Table 6.4-3.

The markets where solid waste is collected by P.D. Pasar Jaya generally do not pay fees for solid waste.

The business establishments where solid waste is collected by the private companies generally pay more fees than fees in case solid waste is collected by Wilayahs or Suku Dinas.

— Money flow  
 - - - Information flow

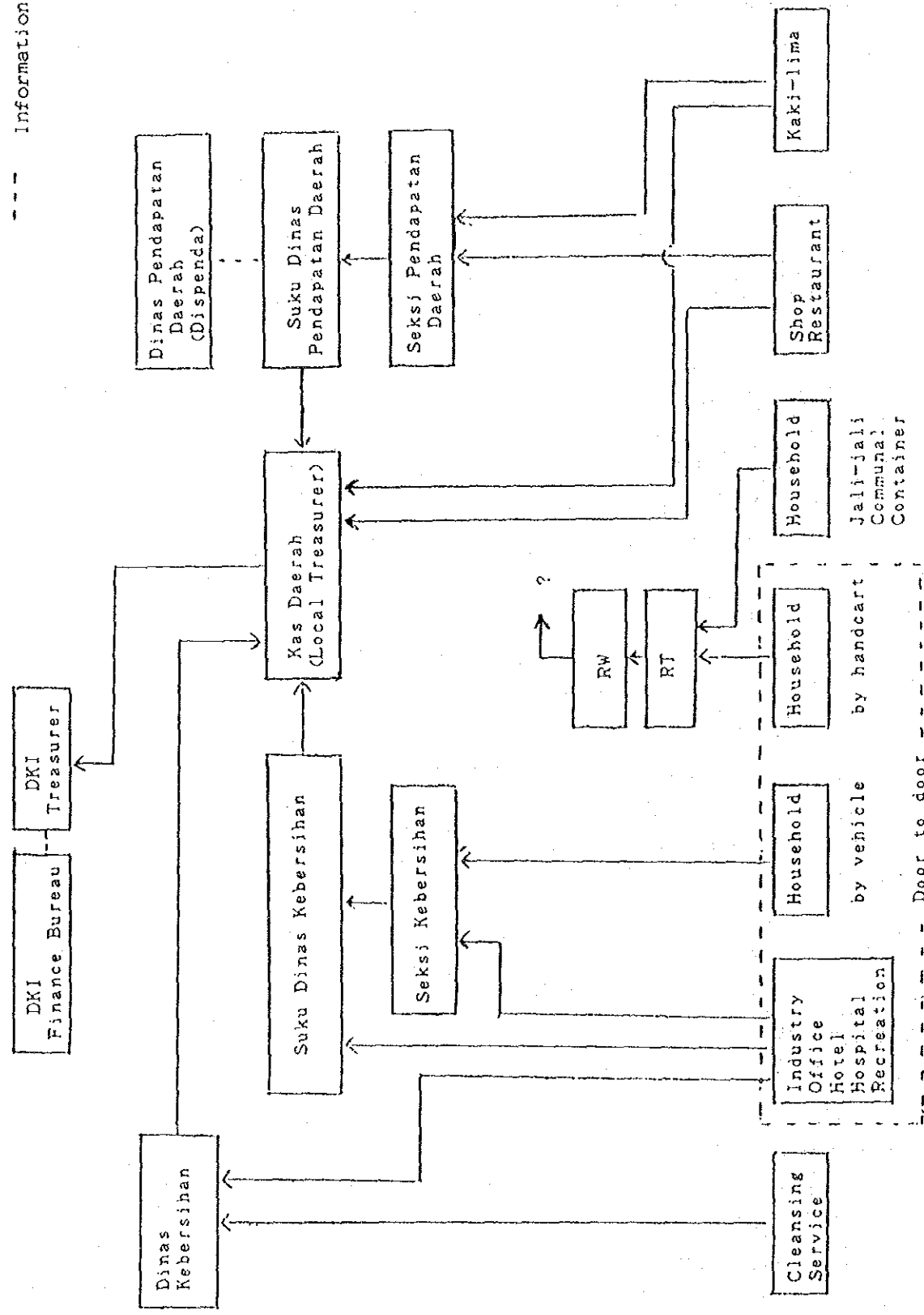


Fig. 6.4-1 The Organization Relating to the Retribution of S.W.M.

Table 6.4-2 Current Organization of Retribution for S.W.M.

Dinas Kebersihan	Suki Dinas Keb.	Seksi Keb.	Pengawasan Kurulahan
Section for Fee Collection	- Retribution	- Assistance of retribution	- Assistance to make the
- Retribution	- Listing of fees		list of
Restaurants, Offices	- Public relations		unsettled
Households	- Summation of retribution results		bills
Solid waste amount base	- Keeping receipts in good order		
Industry	- Reporting		
Hotels	- Checking the fee collection by other departments		
Hospitals	- Assistance of retribution		
- Fee collection at disposal sites	- Measures to increase income		
- Checking the fee collection by other departments, etc.	- Evaluation		
- Reporting of the result of retribution	- Surveillance and reporting of unjust or illegal fee collection		
Section for controlling retribution	- Periodical reporting of the results of retribution		
- General management of retribution	- Listing of unsettled payers		
- Measures to increase income	- Educational activities		
- Checking and surveillance of retribution			
- Reporting of unjust or illegal fee collection			

Table 5.4-3 Average Rate of Markets and Business Establishment

	Central		North		South		East (%)		West (%)	
	No. of Markets	%	No. of Markets	%	No. of Markets	%	Wilayah Private	Wilayah Private	Wilayah Private	Private
Paid	27	79.4	11	57.9	19	76	80	44	(100)	
Rp/month										
5,000-10,000	-		-		-	(42.8)	(54.5)	(18.2)		
10,000-10,000	2	(7.4)	5	(45.4)	7	(36.9)	(7.2)	(18.2)	(40)	
15,000-20,000	6	(22.2)	-		8	(42.1)	-	(54.5)	(40)	
20,000-25,000	-		-		-	(50)	(9.1)	(9.1)		
25,000-	16	(59.3)	2	(18.2)	-	(36.4)		(20)		
Rp/truck										
2,000-5,000	3	(11.1)	4	(36.4)	2	(10.5)				
5,000-10,000	-		-		2	(10.5)				
Not paid	7	20.6	8	42.1	6	24	19.1	56	(0)	
Total	34	100	19	100	25	100				

	Central		North	
	Factories	Shops	Factories	Shops
Business establishment	No.	%	No.	%
Rp/month				
2,500-5000	19	20.9	31	15.3
5,000-7,500	51	56.0	82	40.4
7,500-10,000	5	5.5	54	26.6
10,000-	16	17.6	36	17.7
Total	91		203	



#### 6.4.2 Changes of Fee Collected

##### 1) Change of amount of fee collected in Jakarta

The target to be collected and the actual amount collected is shown in Table 6.4-4.

Based on the table, the following points can be mentioned.

- a. Amount of fee collected from household has increased rapidly (about 15 times in four years) while the amount of fee from shops and restaurants has decreased.
- b. The fees from RW/RT have not been collected though the regulation sets the rule to collect the fees. This fact is not compatible with the interview of RW.
- c. Total amount collected has increased on account of the rapid increase of the amount from household.
- d. The amount collected from household shows that only 5,000 households pay the fee constantly.

The fees are collected from residents only for the door-to-door service, but are not collected in the Jali-Jali system.

The difference in the collecting rate was occurred by the reason that in Jakarta, the two same rank sections have collected the fees for solid waste.

Further more, Suku Dinas cannot control Kelurahan, which closely contacts with RW/RT.

Table 6.4-4 Change of Amount of Fee Collected

(Rp. 1,000)

Subject	1982/83	1983/84	1984/85	1985/86	Increase rate (%)
Solid Waste					
Shops & Restaurants					
Target (A)	250,000	200,000	200,000	200,000	
Amount collected (B)	53,721	56,082	36,438	47,648	-3.9
(B/A %)	(21.5)	(28.0)	(18.2)	(23.8)	
Industries					
Target (A)	40,000	50,000	50,000	50,000	
Amount collected (B)	19,108	11,913	33,444	50,882	38.6
(B/A %)	(47.8)	(23.8)	(66.9)	(101.8)	
Household					
Target (A)	275,000	100,000	100,000	100,000	
Amount collected (B)	12,132	83,122	103,250	185,774	148.3
(B/A %)	(4.4)	(83.1)	(103.2)	(185.8)	
RT/RW					
Target (A)	75,000	50,000	50,000	50,000	
Amount collected (B)	-	-	-	-	-
(B/A %)	(-)	(-)	(-)	(-)	
Total					
Target (A)	640,000	400,000	400,000	400,000	
Amount collected	84,925	151,117	173,132	284,304	49.6
(B/A %)	(13.3)	(37.8)	(43.3)	(71.1)	
Cf.					
Waste Water					
Target (A)	80,000	80,000	90,000	90,000	
Amount collected (B)	83,991	83,738	94,684	132,371	34.8
(B/A %)	(67.5)	(104.7)	(105.2)	(147.1)	

Source: Data from Dinas Kebersihan

Table 6.4-5 Actual Amount of Fee collected in 1986/87

Kind of Retribution	Target (A)	Amount (B)* Collected	Collection Rate (B/A %)
Solid Waste			
Waste collection & disposal		60,753	
Dumping fee for solid solid waste/waster water	400,000	552	
Business licence for establishing cleansing services		55	
Sub Total	400,000	61,360	15.3
Waster Water	200,000	27,771	13.9
Total	600,000	89,131	14.9

Source: Data from Dinas Kebersihan

\* from April to June, 1986

What is referred to as the "target" here is the amount set by the local parliament. From the new regulation and the statistical data, a total revenue of Rp. 7 billion can be expected. (Table 6.4-6). However the fees actually collected were only 4% of this potential.

The main reason why the total fees actually collected are so low is that there is no control system to meet the target. The present system relies for its results on the spontaneous efforts of the fee collectors.

Therefore, the current situation of fee collection in each Suku Dinas varies, as shown in Table 6.4-7.

The largest amount was collected in Jakarta Utara, followed by Jakarta Pusat. The other three Suku Dinas together collectively collected amount in excess of Jakarta Pusat.

The reason why the largest amount was collected in Jakarta Utara is that Suku Dinas hires its own fee collectors and systematically collects fees from households.

According to the performance in 1985/86, 40% of the total fees were collected from households in Jakarta Utara. It is considered possible to raise the level of fee collection a little further even by direct collection if its method of collection is improved (Refer to Table 6.4-7).

Table 6.4-6 Estimation of Retribution Income for Households, Shops & Industry in DKI Jakarta according to Statistic Data, Operational Data and Realization 1985/86

No.	Statistic Data		Operational Data		Realization 1985/1986 (Rp)	
	Total	Estimation of Income (Rp)	Total	Estimation of Income (Rp)		
1.	Dwelling House in the Area of Protocol/Economy/Roads	1,073,283	3,219,849,000	1,073,283	3,219,849,000	185,744,250
2.	Household in Residential Area	2,866	51,588,000			
3.	Shops/Restaurant	20,207	1,490,904,000	6,940	499,680,000	47,647,600
4.	a. Office	4,396	316,512,000			
	b. Warehouse & Other Buildings	3,721	267,912,000			
5.	a. Industry	4,307	1,550,520,000			
	b. Shopping Center	120	43,200,000			
	c. Supermarket	78	28,080,000			
	d. Clinic	406	146,160,000			
	e. Hospital	60	21,600,000			
	f. Health Center	281	101,160,000			
	g. Amusement Park	25	9,000,000			
	h. Bank	252	90,720,000			
	TOTAL	-	7,337,205,000	-	3,719,529,000	233,421,850

- Protocol/Economy Roads Houses Average Rp. 250.-
- Household in Residential Area Rp. 1,500/month
- Shops Average Rp. 6,000/month
- Industry, Average Rp. 30,000/month (15 m<sup>3</sup>/month)
- Statistic Office DKI Jakarta 1984

Table 6.4-7 Real Retribution for Each Suku Dinas on April until January 1987.

(Unit: Thousand Rp)

No.	Month/year	Collected Unit/District					Total	
		Central	North	West	South	East		Dinas
1.	April/1986	6,998	8,107	1,978	2,080	2,126	904	22,192
2.	May/1986	4,034	9,106	2,305	2,705	1,271	285	19,705
3.	June/1986	3,622	7,071	2,595	3,085	1,748	622	19,464
4.	July/1986	5,197	7,905	2,948	2,829	2,461	408	21,747
5.	August/1986	5,557	8,382	2,897	3,463	2,664	1,117	24,078
6.	September/1986	5,990	7,993	2,570	4,175	1,512	1,003	23,243
7.	October/1986	8,932	8,765	2,534	3,499	2,626	358	26,713
8.	November/1986	10,010	8,644	2,762	2,831	1,463	1,345	27,054
9.	December/1986	7,520	8,811	5,013	2,911	2,880	1,176	28,310
10.	January/1987	4,412	10,398	2,427	2,183	604	1,316	21,340
TOTAL		62,272	85,182	28,029	29,761	19,355	8,534	233,846

- Realization on April until December 1986, data sources from District finance of DKI Jakarta

- Realization for January, data sources from report to each unit collection/district

Table 6.4-8 Real Retribution of Each Wilayah (1985/86)

Unit: Rp. 1,000

Items	Pusat	Utara	Barat	Selatan	Timur	Total
Shops	11,648	2,922	8,100	10,339	14,639	47,648
Industries	20,701	4,363	10,070	6,551	9,197	50,882
Household	43,587	101,532	5,213	19,032	16,410	185,774
Total	75,936	108,817	23,383	35,922	40,246	284,304
cf. Night Soil	19,245	8,736	16,931	22,313	65,146	132,371

Source: Dinas Retribusi

2) Change of amount of fee collected in Jakarta Pusat

The trends of fee collection in Suku Dinas Kebersihan Jakarta Pusat are shown as Fig. 2.5-2. The figures show a gradually rising trend in fee collection.

Concerning the differences according to area, Menteng has the highest retribution rate, and Kemayoran the lowest (Table 6.4-11)

From an interview survey of responsible persons in charge of retribution in Suku Dinas Kebersihan or in Seksi Kebersihan, the weak points of the present retribution system are clear. (Table 6.4-12)

The present situation is summarized as follows;

- There is no detailed target for each Suku Dinas and/or Seksi Kebersihan.
- There are very few fee collectors, and almost all of them have other jobs in parallel with fee collection.
- There is no incentive system for the fee collectors in cases when they exceed the target successfully or rapidly.

- There is no motorbike or vehicle to make fee collection more efficient.

The most critical point for successful fee collection is to maintain punctual collection of solid waste. This will be proposed in the collection improvement project.



million Rp

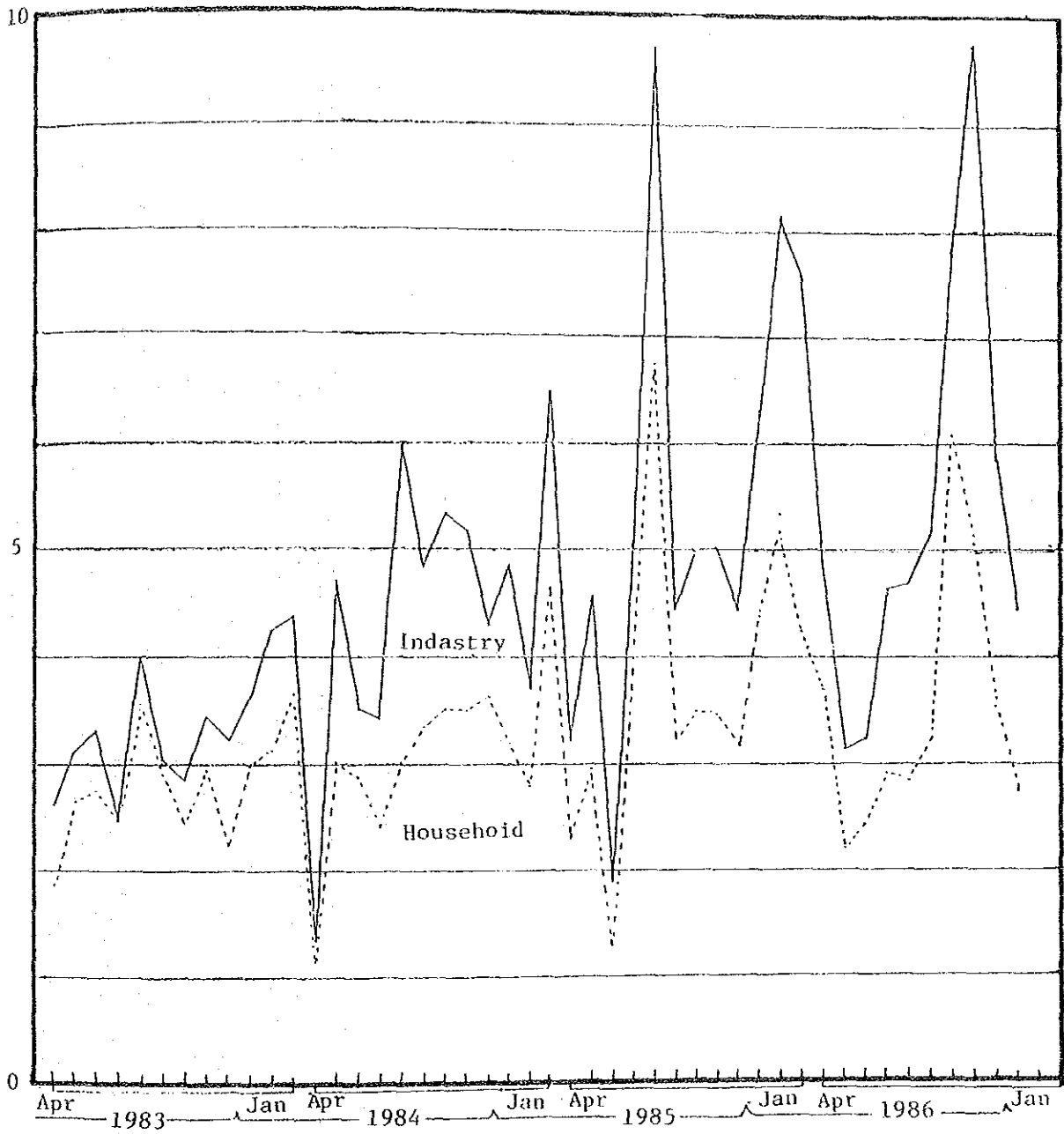


Fig. 6.4-2 Changes of Retribution in Jakarta Pusat

Table 6.4-9 Real Retribution in Jakarta Pusat from Household

Month	Gambir	Menteng	Sawah Besar	Tanah Abang	Senen	Kemayoran	Cem. Putih	Total
Recovery of 85/86	Rp. -	Rp. 117,000	Rp. 360,000	Rp. -	Rp. 150,000	Rp. -	Rp. -	Rp. 627,000
April '86	492,000	2,078,000	360,000	-	-	57,000	726,000	3,714,000
May '86	492,000	930,000	360,000	-	-	60,000	360,000	2,202,000
June '86	492,000	1,197,000	300,000	-	-	-	426,000	2,415,000
July '86	492,000	1,401,000	360,000	-	294,000	72,000	300,000	2,919,000
August '86	492,000	783,000	420,000	-	-	-	1,140,000	2,835,000
September '86	492,000	1,278,000	-	-	300,000	105,000	1,047,000	3,222,000
October '86	492,000	1,401,000	660,000	2,565,000	428,000	106,000	423,000	6,087,000
November '86	492,000	1,503,000	360,000	-	1,230,000	75,000	1,407,000	5,067,000
December '86	498,000	1,791,000	420,000	405,000	342,000	75,000	-	3,531,000
January '87	498,000	1,146,000	360,000	-	465,000	72,000	189,000	2,730,000
<b>Total</b>	<b>Rp. 4,932,000.-</b>	<b>Rp. 13,626,000.-</b>	<b>Rp. 3,960,000.-</b>	<b>Rp. 2,970,000.-</b>	<b>Rp. 3,279,000.-</b>	<b>Rp. 624,000.-</b>	<b>Rp. 6,018,000.-</b>	<b>Rp. 35,349,000.-</b>

Table 6.4-10 Real Retribution in Jakarta Pusat from Industries

Month	Gambir	Menteng	Sawah Besar	Tanah Abang	Senen	Kemayoran	Cam. Putih	Suku Dinas Keb. Pusat	Total
	Rp.	Rp.	Rp.	Rp.	Rp.	Rp.	Rp.	Rp.	Rp.
Recovery of 85/86									
April '86	188,000	42,000	150,000	-	-	277,500	110,000	469,750	1,180,250
May '86	202,000	92,000	150,000	-	-	157,500	60,000	284,760	946,250
June '86	204,500	92,000	150,000	-	-	-	20,000	337,000	803,500
July '86	224,500	92,000	150,000	-	-	157,500	-	1,048,750	1,692,750
August '86	224,500	92,000	150,000	-	171,500	157,500	220,000	826,250	1,840,750
September '86	224,500	92,000	150,000	-	-	157,500	570,000	802,500	1,936,500
October '86	224,500	92,000	150,000	-	155,000	315,000	150,000	607,500	1,704,000
November '86	157,000	92,000	150,000	307,500	8,000	127,500	350,000	1,100,250	2,286,250
January '87	329,500	92,000	150,000	-	-	187,500	160,000	763,000	1,682,000
Total	Rp. 2,292,500.-	Rp. 920,000.-	Rp. 1,500,000.-	Rp. 2,942,500.-	Rp. 457,500.-	Rp. 1,695,000.-	Rp. 1,920,000.-	Rp. 7,563,750.0 Rp. 19,292,250.-	

Table 6.4-11 Retribution Income by Seksi Kebersihan  
(from April 1986 to January 1987)  
(Unit: set)

Month	Gambir	Menteng	Sawah Besar	Tanah Abang	Senen	Kemayoran	Cem. Putih	Total
April	164	693	120	-	-	19	242	1,238
May	164	310	120	-	-	20	120	734
June	164	399	100	-	-	-	142	805
July	164	467	120	-	98	24	100	973
August	164	269	140	-	-	-	380	945
September	164	426	-	-	100	35	349	1,074
October	164	467	220	855	146	36	141	2,029
November	164	501	120	-	410	25	469	1,689
December	166	597	140	135	114	25	-	1,177
January	166	382	120	-	155	24	63	910
Total	1,644	4,503	1,200	990	1,023	208	2,006	11,547

Table 6.4-12 Retribution of Each Seksi Kebersihan in Jakarta Pusat

Seksi Kebersihan	No. of Payers Listed		Characteristic of Area
	Household	Enterprise	
Gambir	166	30+a	- 166 household on 4 Kurulahan are served by door to door system. - Executed by one or two fee collectors for each Kurulahan.
Menteng	492	13	- 2,394 households are served by door to door system. - 30% of them will not pay the fee. - Executed by one controller and 7 fee collectors.
Sawah Besar	120	19+a	
Tanah Abang	120	25	- Dispenda, RT/RW, Wilayah and Suku Dinas Kebersihan collect the fee from the same area.

(Continued)

Seksi Kebersihan	No. of Payers Listed		Characteristic of Area
	Household	Enterprise	
Tanah Abang			<ul style="list-style-type: none"> <li>- 120 households are fee collected by Seksi Kebersihan.</li> <li>- 6 enterprises are served and fees are collected by Seksi Kebersihan.</li> <li>- The fee collection from RT/RW will be started on April, 1987.</li> </ul>
Senen	125	15	
Kemayoran	20	10	<ul style="list-style-type: none"> <li>- No fee collection is done because of the Pilot Study.</li> <li>- About 200 shops are listed up.</li> <li>- Data are arranged on maps.</li> </ul>
Gem. Putih	247	4	<ul style="list-style-type: none"> <li>- The fee from RW are collected by Rp. 3,000/month by Pengawans.</li> <li>- 174 households are collected every month by one fee collectors.</li> </ul>

Table 6.4-13 Retribution Income for S.W.M. by Suku Dinas Pendapatan Daerah (Jakarta Pusat)  
(Unit: Thousand Rp.)

Month	To Local Treasurer	Stamps System	Total	Ref.* Household
April 1986	1,238	2,698	3,936	3,714
May 1986	2,124	532	2,656	2,202
June 1986	886	-	886	2,415
July 1986	3,320	-	3,320	2,919
August 1986	368	483	851	2,835
September 1986	450	546	996	3,220
October 1986	641	640	1,280	6,087
November 1986	417	388	805	5,067
December 1986	475	904	1,378	3,531
January 1986	718	293	1,011	2,730

Households are collected by Dinas Kebersihan.

### 6.4.3 Conditions of Others Fee Collection Systems

In Jakarta electricity and water supply are managed by public corporations, that is, PLN (National Electricity Authority) and PADM (Jakarta Water Supply Authority).

For a purpose of exploring a possibility of establishing a public corporation for managing solid waste in Jakarta, a brief survey was made on the subjects of amount of supply, and collection of charge from customers.

Comparism of electricity and water charge is shown in Table 6.4-12 and 6.4-13.

#### 1) Amount of supply and charge collected

Both in electricity and water, number one customer is household.

For electricity 39.7% of total amount supplied to household, which is larger than the supply to industry. As for water 46.6% of total amount is supplied to household while only 15.8% is supplied to commercial and industry. As for amount of charge collected from customers the largest amount of electricity charge is collected from household and for water charge the largest amount is from public use including hospitals and schools.

#### 2) System to collect charge and its difficulty

Rate of collecting charge by due date is 80% for water. In case charge is not paid by customer within a grace period, electricity or water supply is terminated by cutting a power supply or stopping waster flow as a penalty. However, in case of water supply it can not be cut out effectively.

- 3) Diffusion rate and problems in collecting fees together with other utility charges

The diffusion rates of public utilities in the City of Jakarta as a whole is said to be more than 80% in the case of electricity and 60% in the case of water. As seen from Fig. 6.4-3, however, the areas where the water supply pervasion rate is less than 30% account for an overwhelming majority. What is more, water service pipes are connected to only 130,000 households as seen from Table 6.4-11. Most of the households are supplied with water from common taps, and there are said to be many Kampunges where tap water in bottles or PVC bags are sold. Water theft is also said to be frequent.

Collection of water rates by PDAM, under such a situation, is not necessarily going well. If waste management fees are to be collected as an addition to water rates, it would be necessary to improve PDAM's system of water charge collection, too.

Electricity, by contrast, is already supplied to 80% of the entire household and it planned to be supplied to all households by 2005.

Table 6.4-14 Comparison of Public Utility Charges

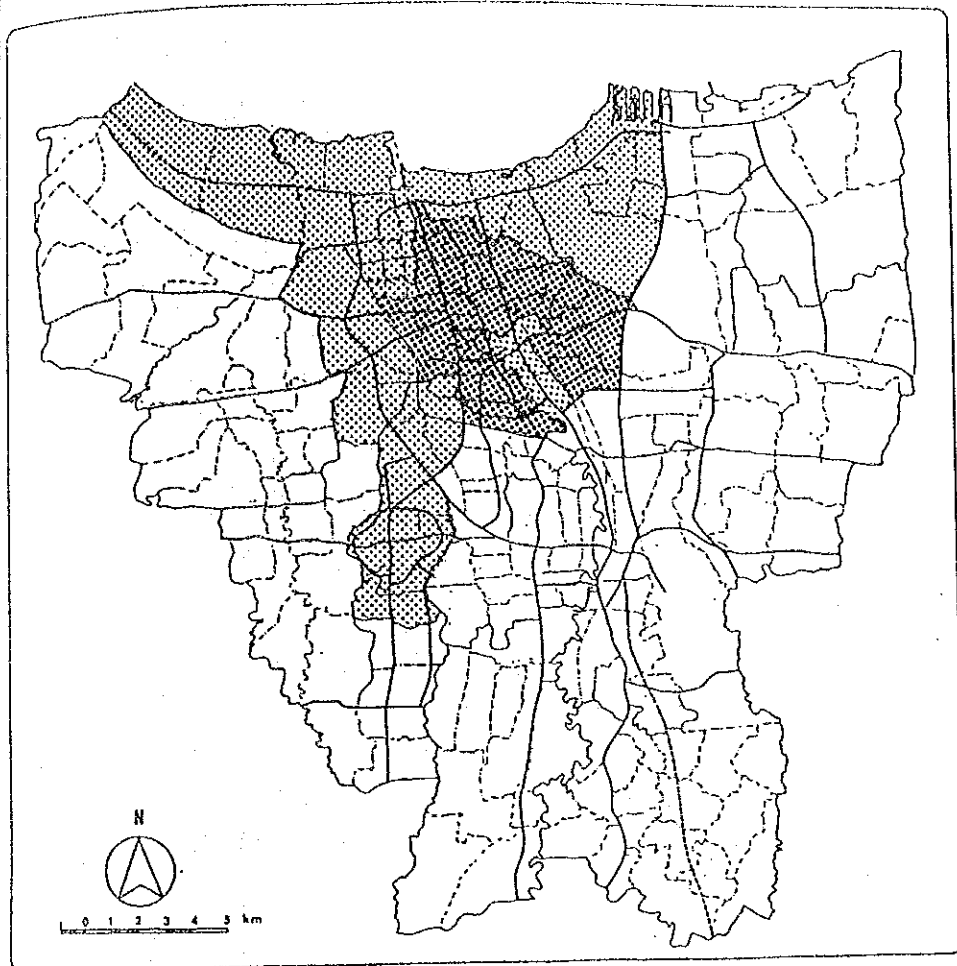
Revenue from the charge		
	Share of Supply	
	Electricity	City Water
Household	1,000 x 10 <sup>6</sup> Kwh (39.7)	41 x 10 <sup>6</sup> M <sup>3</sup> (46.6)
Commercial	229 x 10 <sup>6</sup> Kwh ( 9.1)	
Industry	970 x 10 <sup>6</sup> Kwh (38.6)	14 x 10 <sup>6</sup> M <sup>3</sup> (15.8)
Public	317 x 10 <sup>6</sup> Kwh (12.6)	33 x 10 <sup>6</sup> M <sup>3</sup> (37.6)
<b>Total</b>	<b>2,516 x 10<sup>6</sup> Kwh (100.0)</b>	<b>88 x 10<sup>6</sup> M<sup>3</sup> (100.0)</b>

Amount/(Share) of Charge Collected			
		Electricity Billion/Year	City Water Billion/Year
Household	0.103	103 (42.2)	7 (31.8)
Commercial	0.170	39 (16.0)	
Industry	0.076	74 (30.0)	7 (31.8)
Public	0.088	28 (11.5)	8 (36.4)
<b>Total</b>	<b>0.097</b>	<b>244 (100.0)</b>	<b>22 (100.0)</b>

Table 6.4-15 Method and Rate of Collecting Charge

	Electricity (PLN)	City Water (PADM)
Method of Collecting charge	through payment points, 350 points in DKI Jakarta. Actual work is done by bank people.	visiting each household by PADM staff
Rate of collecting charge	by due date: 80% later : up to 95%	by due date: 70% later : Up to 90%
Any difficulty in collecting charge	not much difficulty as penalty is imposed effectively.	difficult to enforce as water supply is difficult to stop effectively.





LEGEND




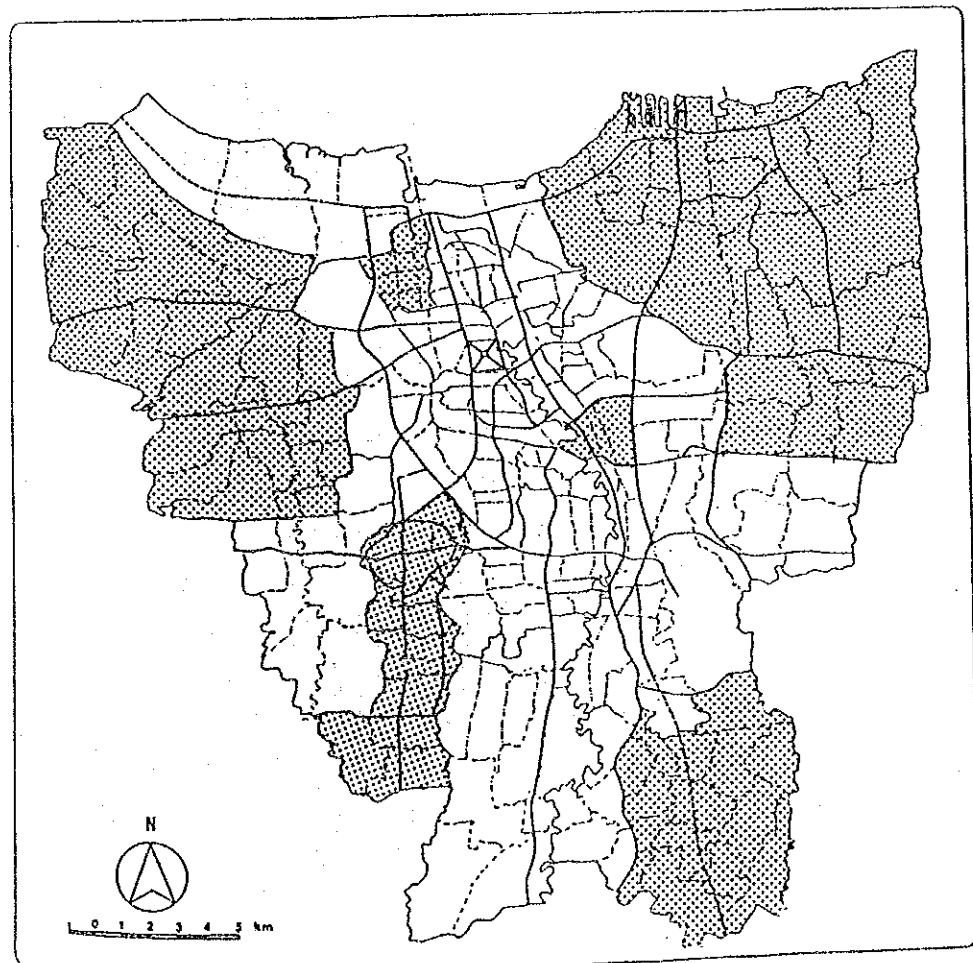
-  50 - 71 %
-  30 - 50 %
-  less than 30 %

Fig. 6.4-3

Percentage of house hold with water supply

Solid Waste Management System Improvement Study In The City Of Jakarta



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
-  more than 80%
-  50 - 80 %

Fig. 6.4-4

Percentage of house hold with electricity service

Solid Waste Management System Improvement Study In The City Of Jakarta

Table 6.4-16 C. DINTAR POGISI PELANGKAN PERUSAHAAN AIR MINUM OKI JAKARTA PERTAKTI

BULAN : 1 1 1 1 1 9 8 4

KODE TARIK	JAKARTA PRISAT	JAKARTA UTARA	JAKARTA BARAT	JAKARTA SELATAN	JAKARTA TIMUR	LOAR BOGOR	UNIT H. BE-SAR	UNIT HY-DRAINT	KINCIR ANGIN	RAYON P. ANCOL	RAYON TANAH ABANG	RAYON KUNINGAN	RAYON CEMPUT	RAYON P. PAS	RAYON KLEBER	JUMLAH
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
A.	37.071	14.623	31.091	12.273	4.367	1.000	119	3	275	6.275	1.170	1.000	4.297	1.170	1.000	190.772
B.	490	36	40	54	4	17	111	-	1	1	1	1	31	1	1	1.117
C.	190	20	65	40	45	4	70	-	-	15	17	61	17	3	3	589
D.	32	6	14	23	17	-	34	-	-	7	7	2	4	-	-	103
E.	171	82	107	55	75	37	54	-	-	5	17	15	5	1	1	370
F.	13	12	6	7	7	4	19	-	-	4	4	1	1	1	1	66
G.	40	13	35	-	23	8	12	-	-	41	-	-	3	7	1	270
H.	54	13	78	-	68	28	7	-	-	6	5	-	4	40	312	
I.	4.778	294	4.953	546	947	54	20	-	-	465	194	54	69	244	-	12.376
J.	2	3	1	-	-	-	2	-	-	1	1	-	2	1	-	11
K.	2.011	578	2.358	280	372	101	2	36	-	405	152	46	189	52	5	6.405
L.	40	4	4	4	24	1	27	-	-	15	10	1	1	1	-	110
M.	69	7	41	22	24	1	1	-	-	-	2	1	5	3	-	738
N.	31	3	21	3	7	1	1	-	-	-	4	-	2	-	-	61
O.	10	1	10	5	4	2	1	-	-	-	6	-	2	-	-	36
P.	62	12	65	13	12	5	7	-	-	7	7	-	3	5	-	184
Q.	189	18	155	56	64	5	-	-	-	72	31	8	13	12	-	553
R.	47	4	4	3	4	-	-	-	-	-	4	-	-	-	-	68
S.	55	8	72	4	13	-	18	-	-	-	14	-	-	-	-	184
T.	79	11	22	5	8	5	5	-	-	4	2	-	5	1	-	134
U.	31	1	9	6	6	3	7	-	-	7	1	-	3	3	-	105
V.	-	-	-	-	-	-	-	1.206	-	-	-	-	-	-	-	1.207
W.	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
X.	5	-	2	1	2	1	1	-	76	-	4	-	1	-	-	42
Y.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
Z.	7	-	7	-	25	-	34	-	-	-	-	-	-	-	-	451
1.	7	-	4	1	1	6	13	-	-	-	1	-	2	1	-	21
2.	7	-	3	-	-	-	-	-	-	-	-	-	-	-	-	21
3.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Jumlah	55.379	17.756	39.353	13.271	10.318	2.068	1.142	1.253	202	7.231	9.841	2.027	4.672	3.500	3.264	156.778

#### 6.4.4 Fee Collection Systems in Other Cities

##### 1) Bandung

In the case of Bandung, direct collection is enforced only in some areas although still in the experimental stage. It adopts the idea of cross-subsidy of collecting fees from commercial and high income residential areas and of offering solid waste management service to both these areas a matter of course, and also to the low income residential areas.

However, whenever it tries to raise the collection rate, it is demanded to offer better service so that it has been unable to expand the areas from where fees can be collected as initially planned. In view of the situation, the city is considering raising the fees of business establishments and the possibility of collecting the fees by adding them to the electric charges.

##### 2) Bogor

In Bogor, the solid waste management fees are collected as an addition to the water bill. Specifically, it enters the charges for solid waste management on the bill for water rates, and asks to have the total amount paid through banks. So far, no incidence of refusal to pay has been reported.

In the case of the ordinary households, the waste management fee is determined by the street on which the household faces and by the looks of the house. The amount of wastes discharged by large dischargers such as business enterprises is confirmed by the discharger and the driver at the time of collection, and the discharger is billed an amount commensurate to the waste amount discharged. If any changes are to be made in the amount chargeable, the list of changes is forwarded to PDAM by the 20th of each month, and PDAM issues the bills accordingly

In the case of households which do not use the waterworks, solid waste management fees are collected directly from them, but the amount of such fees collected is very small.

The amount of fees actually collected has increased by three to six times ever since the system of charging the fees as an addition to the water bills was induced. As a consequence, the self-financing rate of Bogor's solid waste management system is now well above 50% as seen from Table 6.4-17.

Table 6.4-17 Change of Fee Collection in Bogor

Year	Target	Realization	Remarks
1979/1980	Rp. 25,000,000	Rp. 18,000,000	Direct
1980/1981	Rp. 25,000,000	Rp. 20,000,000	Direct
1981/1982	Rp. 45,000,000	Rp. 25,500,000	Direct
1982/1983	Rp. 41,000,000	Rp. 35,000,000	Direct
1983/1984	Rp. 37,500,000	Rp. 104,500,000	PADM
1984/1985	Rp. 200,000,000	Rp. 205,000,000	PADM
1985/1986	Rp. 225,000,000	Rp. 229,000,000	PADM
1986/1987	Rp. 263,000,000	-	PADM

Source: Dinas Kebersihan Katamadya Bogor

Table 6.4-18 Retribution Fee Comparative Data

Items	Bogor	DKI - Jakarta
Total Population	260,000	7,300,000
High Class (income)	10%	9%
Middle Class	60%	45%
Low Class	30%	46%
Rate of Population Served	75%	75% by Dinas
Waste Amount Collected	100 - 150 ton/day	2,960 ton/day
Tariff:		
High	Rp. 2,000	Rp. 3,000
Middle	Rp. 500	Rp. -
Low	Rp. 200	Rp. -
Standard	Rp. 2,500	Rp. 7,500
Industry	Rp. 7,500	Rp. 2.00/m <sup>3</sup>
Method of Fee Collection	Surcharge on the city water Payment at the bank	Direct collection
Total Cost of Treatment	Rp. 0.45 billion	Rp. 17.5 billion (including night soil)
Revenue/Expenditure	51%	2.5%
Special Incentive for Cleansing Workers	15% of base wage	( )% of base wage

