

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT

MINISTRY OF PUBLIC WORKS

THE REPUBLIC OF INDONESIA

THE STUDY  
ON  
COMPREHENSIVE RIVER WATER  
MANAGEMENT PLAN  
IN  
JABOTABEK

FINAL REPORT  
VOLUME IV  
ANNEXES I

MARCH 1997

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COMPREHENSIVE RIVER WATER MANAGEMENT PLAN  
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**FINAL REPORT**

The Final Report consists of the following:

**VOLUME I : EXECUTIVE SUMMARY**

**VOLUME II : MAIN REPORT (MASTER PLAN)**

**VOLUME III : MAIN REPORT (FEASIBILITY STUDY)**

**VOLUME IV : ANNEXES I**

ANNEX 1	Socio-economy and Economic Evaluation
ANNEX 2	Geology
ANNEX 3	River Survey
ANNEX 4	Topographic Mapping
ANNEX 5	Hydrology
ANNEX 6	Flood Control

**VOLUME V : ANNEXES II**

ANNEX 7	Urban Flooding and Drainage
ANNEX 8	Design and Cost Estimate
ANNEX 9	Water Resources and River Water Quality
ANNEX 10	Environment
ANNEX 11	Comprehensive River Water Management Plan
ANNEX 12	Institutions

**VOLUME VI : SUPPORTING PAPERS**

**VOLUME VII : DATA BOOK I**

(River Survey and Topographic Mapping for Master Plan)

**VOLUME VIII : DATA BOOK II**

(River Survey and Topographic Mapping for Feasibility Study)

The costs are estimated based on October 1995 price level and the average exchange rate in October 1995. The average exchange rate in October 1995 is as follows:

US\$ 1.00 = Rp.2,281  
Y 1.00 = Rp.22.70



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## ABBREVIATIONS

### *(1) Organization*

DPU (Departemen Pekerjaan Umum)	: Ministry of Public Work
DPUP (Dinas Pekerjaan Umum Propinsi)	: Provincial Department Office of Public Works
P3SA ( Proyek Perancang Pengembangan Sumber-sumber Air )	: Water Resources Development Planing Project Division
Cipta Karya	: Directorate General of Housing, Building Planing and Urban Development
DGWRD	: Directorate General of Water Resources Development
POJ (Perusahaan Umum Otorita Jatiluhur)	: Jatiluhur Authority Public Corporation
DPMA (Direktorat Penyelidikan Masalah Air)	: Directorate of Hydraulic Engineering
DEG	: Directorate of Environmental Geology
DKI Jakarta ( Daerah Khusus Ibukota Jakarta)	: Jakarta Municipal City of Capital = Jakarta Jakarta Municipality
PDAM (Perusahaan Umum Daerah Air Minum)	: Regional Water Supply Public Corporation
JATS	: JABOTABEK Advisory Team Services
JICA	: Japan International Corporation Agency
JMDP	: JABOTABEK Metropolitan Development Plan
JMDPR	: JABOTABEK Metropolitan Development Plan Review
JWRMS	: JABOTABEK Water Resources Management Study
BAPPENAS ( Badan Perencanaan Pembangunan Nasional )	: National Development Planning Agency
BAPPEDA	: Regional Development Planning Agency
BPS (Biro Pusat Statistik)	: Central Bureau of Statistics
DBPP ( Direktorat Bina Program Perencanaan)	: Directorate of Planning and Programming
PMG (Pusat Metereologi dan Geofisika)	: Metereological and Geographical Center
PT, or P.T (Perusahaan Terbatas)	: Co. Limited (private firms)
PPWSCC (Proyek Pengembangan Wilayah Sungai Ciliwung-Cisadane)	: Ciliwung-Cisadane River Basin Development Project Office

### *(2) Regional Administration*

Propinsi	: Province
Kab. (Kabupaten)	: Regency
Kec. (Kecamatan)	: Subdistrict
Kota	: City
Kotip (Kota Administratif)	: Administrative city (Semi municipal city)

Kodya (Kotamadya)

Desa

Kp. (Kampung)

Kelurahan

Rw. (Rukun Warga)

Rt. (Rukun Tetangga)

: Municipal city

: Village

: Village (sometimes, smaller administrative community under "Desa" in West Java province)

: Village, but belongs to "Kota"

: Small community belongs to "Kampung"

: Smallest community belongs to "Rukun Warga"

*(3) Place Name or Geographical Name*

G. or Gn. (Gunung)

Pr. (Perkebunan Rakyat)

PTP (Perusahaan Terbatas Perkebunan)

Ci- (originated from "Cai = water")

KCC

TJC

WBC

EBC

CBL Floodway

WTC

: Mountain (or Mount.)

: Private Plantation (small scale holder plantation)

: State owned plantation

: River

: Kopo-Cikande-Carenang Irrigation System

: Tarum Jaya Canal

: Western Banjir Canal

: Eastern Banjir Canal

: Cikarang-Bekasi-Laut Floodway

: West Tarum Canal

## ABBREVIATIONS OF MEASUREMENT

### Length

mm	=	millimeter
cm	=	centimeter
m	=	meter
km	=	kilometer
ft	=	foot
yd	=	yard

### Area

cm <sup>2</sup>	=	square centimeter
m <sup>2</sup>	=	square meter
ha	=	hectare
km <sup>2</sup>	=	square kilometer

### Volume

10 <sup>6</sup>	=	million
cm <sup>3</sup>	=	cubic centimeter
l	=	litre
kl	=	kilolitre
m <sup>3</sup>	=	cubic meter
gal	=	gallon

### Weight

Gwh	=	Gigawatthour
mg	=	milligram
g	=	gram
kg	=	kilogram
ton	=	metric ton
lb.	=	pound

### Time

s	=	second
min	=	minute
h	=	hour
d	=	day
y	=	year

### Electrical Measurement

V	=	Volt
A	=	Ampere
hz	=	Hertz (cycle)
Ghz	=	Gigahertz
W	=	Watt
kW	=	kilowatt
MW	=	Megawatt
GW	=	Gigawatt
pr	=	pair

### Other Measures

%	=	percent
PS	=	horsepower
o	=	degree
'	=	minute
"	=	second
10 <sup>3</sup>	=	thousand
10 <sup>9</sup>	=	billion

### Derived Measures

m <sup>3</sup> /s	=	cubic meter per second
cusec	=	cubic feet per second
mgd	=	million gallon per day
kWh	=	Kilowatthour
Mwh	=	Megawatthour
Wh/y	=	Kilowatthour per year
kVA	=	kilovolt ampere
BTU	=	British Thermal Unit
psi	=	pound per square inch
lcd	=	litre per capita per day
Kb/s	=	Kilobot/second
Mb/s	=	Megabit/second

### Currency

US\$	=	US Dollar
Rp	=	Indonesia Rupia

## ***ANNEX 1***

# ***SOCIO-ECONOMY AND ECONOMIC EVALUATION***



**THE STUDY  
ON  
COMPREHENSIVE RIVER WATER MANAGEMENT PLAN  
IN  
JABOTABEK**

***Annex I : Socio-economy and Economic Evaluation***

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## 1. SOCIO-ECONOMY

### 1.1 Planning for Development

The Government of Indonesia has two kinds of national development plans. One is Twenty-Five Year Long Term Plan (PJP) and another is Five-Year Development Plan (Repelita). During one PJP, five Repelitas are drawn up. The first PJP started from April 1969 and completed in March 1994 and during the same period Reperitas I to V had been completed.

Since April 1994 the Second Twenty-Five Year Long Term Plan (PJP II) and the Sixth Five-Year Development Plan (Repelita VI) have been started simultaneously. The outlines of the plans are described in the following sub-sections.

#### 1.1.1 The Second Twenty-Five Year Long-Term Development Plan (PJP II)

In the Second Twenty-Five Year Long-Term Development Plan (PJP II, April 1994 - March 2019), Indonesia aims to enter "the take-off stage" in the effort to become a developed, just, prosperous and self-reliant nation. The plan includes the following challenges:

- 1) Sustaining high economic growth,
- 2) Increasing equitable development,
- 3) Resolving the unemployment and underemployment problems,
- 4) Improving the quality of human resources,
- 5) Developing science and technology,
- 6) Conservation of natural resources and the environment, and
- 7) Development of law, social institutions and national culture.

The comparison between the results of PJP I and the targets of PJP II is summarized below.

Item	PJP I (Apr. 1969 - Mar. 1994) Results	PJP II (Apr. 1994 - Mar. 2018) Targets
1. Average annual economic growth rate	6.8 %	7 %
2. Population growth rate	in the 1970s: 2.3 % in the 1990s: 1.6 %	by the end of PJP II: 0.88 %
3. Per capita income	beginning: US\$ 70 final : US\$ 650 (nominal)	by the end of PJP II: US\$ 2,600
4. Average life expectancy	beginning: 45.7 years final : 62.7 years	by the end of PJP II: 70 years and up
5. Infant mortality rate (per 1000 births)	in 1967 : 145 persons in 1993 : 58 persons	by the end of PJP II: 26 persons
6. Elementary school attendance rate	in 1968 : 41 % in 1993 : 100 %	
7. Junior high school attendance rate	in 1968 : 17 % in 1993 : 53 %	to make compulsory education within 10 years, at latest 15 years

### 1.1.2 The Sixth Five-Year Development Plan (Repelita VI)

The general objective of the Sixth Five-Year Development Plan (Repelita VI, April 1994 - March 1999) is described in it as the growth of self-reliance, through increased participation, efficiency, and productivity of the people, in the context of increasing their standard of living, intelligence and overall well-being.

The comparison between the estimated results of Repelita V and the targets of Repelita VI is shown below.

Item	Repelita V (Apr. 1989 - Mar. 1994) Estimate, end of Repelita V	Repelita VI (Apr. 1994 - Mar. 1999) Targets
1. Average annual economic growth rate	6.6%	6.2 % (increase from 6.0 % to 6.6 %)
Agriculture	2.4 %	3.4 %
Manufacturing industry	10.0 %	9.4 %
(Non-oil/gas manufacturing)	11.0 %	10.3 %
Other	7.2 %	6.0 %
2. Population growth rate	1.66 %	lower from 1.66 % to 1.51 %
3. Per capita income (Nominal)	1993: US\$ 638	by the end of Repelita VI: US\$ 1,000
-ditto - (Real terms)		by the end of Repelita VI: US\$ 775
4. Tax share in revenue	64.1 %	increase from 64 % to 77 %
5. Total investment	Rp.93.4 trillion	1998/99: Rp.660 trillion
6. Inflation rate	7.3 %	control at about 5 %
7. Ratio of outstanding debt to GDP	57 %	lower from 57 % to 46 %
8. DSR	31 %	lower from 31 % to 21 %
9. Ratio of foreign aid	39 %	lower from 38 % to 32 %
10. Increase Employment		11.9 million persons
11. Unemployment	1993: 2.8 %	1998/99: 0.8 %
12. Poverty population		1998/99: less than 12 million persons

## 1.2 Study Area

The Study Area covers whole area of Jabotabek which consists of DKI Jakarta, Kabupaten Bogor, Kotamadya Bogor, Kabupaten Tangerang, Kotamadya Tangerang and Kabupaten Bekasi. Left bank of the Cidurian river, that belongs to Kabupaten Serang, is also taken into account for the study on the socio-economy. Administrative boundary of the Study Area is shown in Figure 1.

### DKI Jakarta

DKI Jakarta is bounded by Kabupaten and Kotamadya Tangerang on the west, Kabupaten Bogor on the south, Kabupaten Bekasi on the east and the Java sea on the north. It is the capital city of Indonesia and prospering as a center of politics and economy in Indonesia. The head of DKI Jakarta is a governor (Gubernur). DKI Jakarta has five municipalities (Kotamadya), i.e. Central Jakarta, North Jakarta, West Jakarta, South Jakarta, and East Jakarta. The head of the each municipality is a Walikota. These municipalities are divided into 43

districts (Kecamatan) of which the heads are called Camats. The smallest administrative unit is Kelurahan. Administrative boundaries of DKI Jakarta to Kecamatan level is shown in Figure 2.

### **Kabupaten Bogor**

Kabupaten Bogor is bounded by Kabupaten Lebak on the west, Kabupatens Sukabumi and Cianjur on the south, Kabupaten Purwakarta on the east and Kabupaten Tangerang, DKI Jakarta and Kabupaten Bekasi on the north. Agriculture, manufacturing industry and trade are the major economic activities there. A Bupati is the head of Kabupaten Bogor. It is divided into 33 districts (Kecamatan) and the smallest administrative unit is Desa.

### **Kotamadya Bogor**

Kotamadya Bogor is located almost at the center of Kabupaten Bogor. Trade, transportation, communication and public services are the major economic activities there. The head of Kotamadya Bogor is a Walikota. Kotamadya Bogor is divided into six districts (Kecamatan) and the smallest administrative unit is Kelurahan.

### **Kabupaten Tangerang**

Kabupaten Tangerang is bounded by Kabupaten Serang on the west, Kabupaten Lebak and Bogor on the south, Kotamadya Tangerang and DKI Jakarta on the east, and the Java sea on the north. Manufacturing industry, trade, transportation, communication and agriculture are the major economic activities there. A Bupati is the head of Kabupaten Tangerang. Kabupaten Tangerang is divided into 19 districts (Kecamatan) and the smallest administrative unit is Desa.

### **Kotamadya Tangerang**

Kotamadya Tangerang is a new municipality divided from Kabupaten Tangerang on February 27, 1993. It is bounded by Kabupaten Tangerang on the north, west and south, and DKI Jakarta on the east. Trade and manufacturing industry is the major economic activities there. A Walikota is the head of Kotamadya Tangerang. Kotamadya Tangerang is divided into six districts (Kecamatan) and the smallest administrative unit is Kelurahan.

### **Kabupaten Bekasi**

Kabupaten Bekasi is bounded by DKI Jakarta on the west, Kabupaten Bogor on the south, Kabupaten Karawang on the east and the Java sea on the north. Manufacturing industry, trade and agriculture is the major economic activities of the area. The head of Kabupaten Bekasi is a Bupati. Kabupaten Bekasi is divided into 22 districts (Kecamatan) and the smallest administrative unit is Desa.

### **Kabupaten Serang**

In addition to the above, eastern part of Kabupaten Serang is a part of the Cidurian river basin. Kabupaten Serang is bounded by the Sunda strait on the west, Kabupaten Pandeglang and Lebak on the south, Kabupaten Tangerang on the east and the Java sea on the North. Major economic activities of the Kabupaten Serang is manufacturing industry, agriculture and trade. A Bupati is the head of Kabupaten Serang. It is divided into 15 districts (Kecamatan) and the smallest administrative unit is Desa.

### **1.3 Population and Labor Force**

#### **1.3.1 Population**

In Indonesia, population censuses were conducted in 1961, 1971, 1980 and 1990 by Biro Pusat Statistik (BPS). The results of the censuses 1971, 1980 and 1990 have been utilized for the study.

According to the population census 1990 by BPS, Indonesia had a population of 179 million. This population increased by 32 million as compared with the census 1980 as shown in Table 1. During 9 years from 1971 to 1980, the average annual growth rate of the population was 2.39 %. During 10 years from 1980 to 1990, the growth rate slowed down to 1.98 %. This rate, however, indicates that the population may double in about 35 years (by 2025).

Average annual growth rate of population in the Study Area indicates higher increasing trend than that in whole Indonesia. The population in the Study Area increased from 12.9 million in 1980 to 18.5 million in 1990 with an average growth rate of 3.67 %. Figure 3 shows population in the Study Area by the censuses 1971, 1980 and 1990.

During 10 years from 1980 to 1990, population in DKI Jakarta increased from 6.4 million to 8.2 million with an average annual growth rate of 2.47 %. Especially in East, North and West Jakarta, population increased with a high rate of 3.55 %, 3.78 % and 3.99 % respectively.

In the Study Area, populations in Kabupatens Bogor, Tangerang and Bekasi indicate very high increasing trend. Average annual growth rates from 1980 to 1990 are 4.10 %, 6.15 % and 6.47 % respectively.

Table 2 shows area, population and number of household by Kecamatan in the Study Area based on the result of the population census 1990. After the census 1990, several Kecamatan have been divided into two new Kecamatan each. Furthermore, six Kecamatan in Kabupaten Tangerang grew into Kotamadya Tangerang. Therefore populations in the new Kecamatan and Kecamatan in Kotamadya Tangerang is still included in the original Kecamatan at the time of the census 1990 in the table. Restructuring of Kecamatan between 1990 and 1995 is summarized in Table 3.

#### **1.3.2 Labor Force**

The economically active population is defined as persons aged 10 years and up, and who are working or looking for a job in Indonesia. The economically active population is increasing



both in DKI Jakarta and West Java province with average annual growth rate of 3.5 % and 3.9 % respectively during 9 years from 1985 to 1994 as shown in Table 4. These rates are higher than those of population growth of persons aged 10 years and up during the same period.

On the other hand, unemployment ratio of DKI Jakarta is decreasing gradually till 5.6 % in 1993. However it went up again to 9.2 % in 1994. In West Java province, the unemployment ratio had been relatively stable at about 4 % until 1993, but it rose to 6 % in 1994.

#### **1.4 Economic Situation**

##### **1.4.1 Regional Gross Domestic Product (RGDP)**

The Government of Indonesia set a target of an annual economic growth rate of 3.4 % for the agricultural sector, 9.4 % for the industrial sector, 6.0% for other sectors and 6.2 % in total in its sixth National Development Plan (1994-1998). The plan also aims to increase per capita annual income to more than US\$ 1,000.

Gross domestic product (GDP) in 1993 was Rp. 302,018 billion (approximately US\$ 144 billion) and GDP per capita in 1993 was Rp. 1,609,997 (approximately US\$ 770) as shown in Table 5. Annual growth rates of GDP since 1989 were high from 6.5 % to 7.2 % on 1983 constant price basis. GDP per capita is also increasing with annual growth rate from 4.7 % to 5.2 % in the same period. Figure 4 shows GDP and its growth rate on 1983 constant price basis.

Table 6 shows RGDP in the Study Area by industrial origin in current price. High percentage of banking and financing is characteristic of DKI Jakarta as the capital city. Manufacturing industry and trade, restaurant and hotel shared relatively high percentage in Botabek area. Table 7 shows RGDP in the Study Area on 1983 constant price basis. The table shows that the economic growth rates in the Study Area were higher than that in whole Indonesia reflecting industrialization in the area. Especially in Kabupaten Tangerang, Kotamadya Tangerang and Kabupaten Bekasi, average annual growth rate came up to more than 10 % in recent years.

##### **1.4.2 Government Finance**

In 1994/1995 fiscal year, the Government finance of Indonesia amounted to Rp. 72.3 trillion (approximately US\$ 33 billion) as shown in Table 8. Average annual growth rate during last seven years is 15.1 %. The receipt from oil and gas in 1994/1995 fiscal year is Rp. 13.4 trillion (approximately US\$ 6.1 billion), it accounted for 18.5% of whole receipt. However, its average annual growth rate during the same period was relatively low at 4.2 %. On the other hand, average annual growth rates of receipts from income tax and value added tax are very high at 31.8 % and 22.6 % respectively reflecting prosperity. Project aid amounted to Rp. 11 trillion (approximately US\$ 5 billion) and it accounted for 15.1 % of whole receipt.

Provincial Government finance of DKI Jakarta and West Java is shown in Table 8. Receipts of DKI Jakarta and West Java Province are Rp. 1.67 trillion (approximately US\$ 762 million) and Rp. 1.11 trillion (approximately US\$ 508 million) respectively in 1993/1994 fiscal year. Average annual growth rates of the receipts are high at 24.2 % in DKI Jakarta and 16.5 % in West Java during six years since 1987/1988 fiscal year. However the development expenditure of West Java Province is still low at Rp. 153.2 billion (approximately US\$ 70 million) in 1993/1994 fiscal year.

#### **1.4.3 Prices**

Movement of the consumer price in DKI Jakarta continued with its upward trend as shown in Table 9. Average inflation rate during five years from 1990 to 1995 is 9.24 %. This rate is slightly higher than that during 10 years from 1985 to 1995. Especially the price index of housing cost shows higher upward trend than other categories in the latest five years.

Wholesale price index for construction materials shows the same upward trend as that of the consumer price index. However, its average annual increasing ratio in the latest five years is relatively lower than that of the consumer price index.

#### **1.4.4 Foreign Trade and International Balance of Payment**

The Government of Indonesia set a target of an annual increase ratio of total exports from 13.3 % to 14.7 % in Repelita VI. Out of the total export, the plan aims to increase the share of non-oil and non-gas exports from 78.1 % to 86.7 % per annum during the same period.

Table 10 shows the international balance of payment from 1988/89 fiscal year until 1994/95 fiscal year. In 1994/95 fiscal year, the balance of foreign trade was accounted at US\$ 8,039 million in amount. However, in the total current account, the credit exceeds the debit by the amount of US\$ 3,488 million in the same fiscal year. Total amounts of exports and imports of non-oil and non-gas items were US\$ 42,161 million and US\$ 31,716 million, respectively in the same fiscal year. The share of exports of non-oil and non-gas items achieved 75.2 % of the total exports.

On the other hand, the capital account has been kept plus side. However, the debt repayment of the official capital is increasing gradually and its amount reached US\$ 5,546 million in 1994/95 fiscal year. The amount is almost 98 % of the inflows of the official capital. The total of international balance of payment amounted to US\$ 1,262 million as the excess of cash balance as of 1994/95 fiscal year.

Table 11 shows main import and export commodities of Indonesia. In 1995, machinery and vehicles were the major commodities of import, accounting to 40.1 %. On the other hand, exports of garments and other textile have been increasing remarkably, oil, gas and related products still shared largest percentage of total exports, though.

In the Study Area, Tanjung Priok port has been playing an important role for foreign trade of Indonesia. Tanjung Priok port took charge of 59 % of imports and 29 % of exports of

Indonesia in 1994 as shown in Table 12.

#### **1.4.5 Foreign Currency Exchange Rate**

Table 13 shows foreign currency exchange rate between US dollar, Japanese Yen and Indonesian Rupiah currencies since January 1989. The exchange rate of Rp.1,735.38 to US\$1.00 in January 1989 was gradually depreciated to Rp.2,346.05 to US\$1.00 in October 1996.

### **1.5 Importance of Flood Control Project**

#### **1.5.1 Flood Damage in January 1996**

In January 1996, DKI Jakarta and its surrounding area suffered from serious flood damage. The flood was caused by heavy rainfall in the mountainous area, the upstream basin of the Ciliwung river.

According to survey of the Municipal Government of DKI Jakarta, the major direct flood damage was summarized as follows:

- 10 killed,
- 60,110 houses inundated,
- 2.5 km long embankment damaged,
- one footpath bridge damaged,
- 529 houses washed away,
- 398 houses heavily damaged.

Furthermore, according to report of the Public Works Department of West Java Province, serious flood disaster was occurred at several locations in Kotamadya and Kabupaten Bogor along the Ciliwung river as summarized below.

- One killed,
- One Islamic school totally damaged,
- More than 80 houses and shops damaged or washed away,
- River facilities such as weirs, embankments, water supply facilities, and telecommunication equipment are damaged.

#### **1.5.2 Flood Damage in February 1996**

In February 1996, heavy local rainfall and the subsequent flood attacked Jakarta again. Many of the international and domestic flights departing from and coming to Soekarno - Hatta Airport were canceled since the access highway to the airport was badly inundated. A lot of office buildings as well as residences suffered from flood damage. According to survey of the Municipal Government of DKI Jakarta, the major direct flood damage was summarized as follows:

- 20 killed
- 92,220 houses inundated

### 1.5.3 Various Influence of Flood

During 2nd year study in Indonesia, interview survey had been made about floods occurred in January and February 1996 mostly in Jakarta. As a result of the interview survey, various kinds of influence of floods on peoples' livelihood and economic activities have been found other than damage to properties. The following are the major influence heard during the interview survey and details shown in Table 14. However these are only fragments of the flood influence and there must be a lot of other influence which is not covered here nor in Table 14.

	Influence of Flood (other than damage to properties)
Health	<ul style="list-style-type: none"> <li>- skin disease</li> <li>- sore throat</li> <li>- stomachache</li> <li>- tiredness by flood fighting</li> <li>- infectious disease</li> <li>- more than 30 people were killed by flood in Jan. and Feb. 1996</li> </ul>
Public services	<ul style="list-style-type: none"> <li>- interruption of the power supply</li> <li>- interruption of public transportation and commute</li> <li>- interruption of school</li> </ul>
Commercial sector	<ul style="list-style-type: none"> <li>- cost for measures may be needed after flood.</li> <li>- cancellation of hotel reservation</li> <li>- interruption of business activity</li> </ul>
Manufacturing industry	<ul style="list-style-type: none"> <li>- cost for measures may be needed after flood.</li> <li>- loss due to long time interruption of factory may be bigger than direct damage to the properties.</li> </ul>
Traffic	<ul style="list-style-type: none"> <li>- heavy traffic jam due to road inundation</li> <li>- cancellation of international and domestic flights due to inundation of access highway to the airport</li> <li>- trains and train stations were inundated.</li> </ul>
Other	<ul style="list-style-type: none"> <li>- scarcity of food</li> <li>- assistance by army, central and rural Government, and neighborhood (flood fighting, food, etc.)</li> <li>- damage to personal memorabilia such as postcards, letters, and pictures.</li> </ul>

Both the floods happened to occur on weekends. If they occurred on weekdays, the confusion by the floods must have been more serious. Furthermore, collapse of levees did not occur even though they were damaged at several locations. If the floods caused the collapse of the levees, the flood damage must have been more immense.

As discussed above, since the economic and social damage due to floods in January and

February 1996 was enormous, implementation of the flood control project is very important.

## **1.6 Various Measures Being Taken by Central and Local Governments**

### **1.6.1 Regulation on Land Use**

The Government of Indonesia has land use regulations concerning the area earmarked for conservation purposes and catchment as shown below.

- 1) Regulation of President Decision No. 48 in 1983: Restriction of development in Jakarta, Bogor, Puncak and Cianjur outside the city areas  
(Kepres No. 48 in 1983)
- 2) Regulation of President Decision No. 79 in 1985: General plan for land regulation around Puncak area  
(Kepres No. 79 in 1985)
- 3) Regulation of President Decision No. 32 in 1990: Management of reservation area  
(Kepres No. 32 in 1990)

The regulations says that the conservation areas are needed especially for water management, flood prevention, land erosion prevention and land fertility. It is prohibited to give damage to soil, land, water, air, flora and fauna in the reservation area by these regulations.

In accordance with the regulations mentioned above, a number of illegal villas in the catchment area are being demolished by a local regency. The regency is planning to tear down around 500 illegal buildings including luxury villas in the reservation area in Puncak where the Ciliwung river rises in.

### **1.6.2 Apartment for Inhabitants Relocated from River Area**

The river normalization program is underway in the middle reaches of the Ciliwung river basin where serious flood disaster occurred in January 1996. For the purpose of the program, land acquisition and resettlement of inhabitants who live in river area have been made by the central and local Governments.

The local government built apartments specially for the people who had lived in the river area of the Ciliwung middle reaches and who had to move for the program. The apartments are sold for the people with low price since half of the cost is born by subsidy of the Government. The people also can buy the apartment by credit of 5, 10, 15, and 20 years.

Approximately 800 households have already started to live in the apartments. The local Government has plan to built more apartments for the people who will move from the river area.

The Government is trying to acquire the land of 8 km long beside the Ciliwung river. However only the land of 800 m long has been already acquired by September 1996 because of limited budget.

### **1.6.3 Flood Warning System for the Ciliwung River**

It will take a long time to acquire the land along the Ciliwung river as discussed above. The Ciliwung-Cisadane River Basin Development Project Office (PPWSCC) has a plan to install a flood warning system for inhabitants who live along the flood prone area of the Ciliwung river.

PPWSCC consider that an enormous sum of loss due to January and February floods in 1996 was occurred because the information on flood was very late. When water came, people did not have enough time to secure their household equipment.

According to PPWSCC, the warning system will be able to detect a flood at Katulampa station 10 hours before flood water comes to Manggarai Barrage. Information on hazardous water level will be transmitted to PPWSCC and Central Public Works Department, and then it will be informed to the local Government. Flood warning will be given to the inhabitants by the local Government with a kind of a siren.

## **2. PROJECT EVALUATION FOR FLOOD CONTROL MASTER PLAN**

### **2.1 Methodology**

Evaluation of project is made at the price level of October 1995 and applied foreign exchange rate is US\$ 1 equivalent to Rp.2,281 and One Japanese Yen equivalent to Rp.22.70.

Flood damage is estimated as the direct damage, indirect damage, and other damage.

Direct flood damage is estimated based on the damage to properties in the flood prone area on the following items:

- 1) General assets
  - a) Residence and other buildings for office, factory, commercial sector, warehouse and public services
  - b) Household effects and indoor moveable of buildings specified above
- 2) Agricultural properties: Various kind of crops on farm land
- 3) Infrastructure such as roads, channel, canal and public utilities related to water and electricity supply

Indirect damage is estimated as the damage to economic activities due to its activities stagnation.

Other damage is estimated as the following:

- Cost of emergency measures made by central and/or rural government
- Termination of public services such as transportation, communication, electricity, water and gas supply.
- Loss due to interruption of traffic
- Social, economical and political loss due to paralysis of their function
- Inconvenience of citizens' life
- Insanitary and danger of infectious diseases
- Injury to human lives

Distribution of the properties in the Study Area is based on the statistic data on general assets and study result of land use in this study. The Study Area is divided into blocks about one sq. km wide for flood simulation analysis as shown in Figures 5. The same block division is used for damage assessment.

Flood damage is estimated, in principle, from properties in flooding area multiplying damage rates depending on the flood conditions.

### **2.2 Damageable Properties**

#### **2.2.1 General Assets**

## (1) Residence

### 1) House

Generally types of residence are classified into three classes such as permanent type, semi-permanent type and non-permanent type according to statistic data. Definition of the types of residence is as follows;

- Permanent type : house with full outside walls made of block masonry,
- Semi-permanent type : house with combination outside walls of block masonry (lower part) and wood material (upper part),
- Non-permanent type : house with full wood or bamboo made outside walls.

Unit value of residence is estimated as follows:

Type of residence	Average floor area (a)	Unit construction cost (b)	Depreciation rate of house (c)	Unit value of residence (a) x (b) x (c)
Permanent	88 m <sup>2</sup>	Rp.390,000/m <sup>2</sup>	0.5	Rp.17,160,000
Semi-permanent	64 m <sup>2</sup>	Rp.250,000/m <sup>2</sup>	0.5	Rp.8,000,000
Non-permanent	49 m <sup>2</sup>	Rp.150,000/m <sup>2</sup>	0.5	Rp.3,675,000

Average floor area is estimated based on interview survey in the Study Area. Unit construction cost is estimated based on information obtained from several real estate development companies and the interview survey. Depreciation rate of residence is assumed to be 0.5 considering the average life time of residence and period of use.

According to the Agricultural Census 1993 (Sensus Pertanian 1993 - Potensi Desa/Kelurahan), the number of houses by type in the flood prone area is as shown in Table 15.

Population projection for Jabotabek area was made based on the population censuses 1980 and 1990 by Jabotabek Water Resources Management Study (JWRMS). Basically the population projection by JWRMS has been applied for estimation of population in 1995 and 2025. In JWRMS, population projection was made by Kecamatan for Botabek area but for DKI Jakarta it was made only dividing into two parts, i.e. northern half of Jakarta and southern half of Jakarta. The projected population in DKI Jakarta has been divided into five Kotamadya referring trend of population growth obtained from Proyeksi Penduduk DKI Jakarta 1990 - 2010, Kantor Statistik Propinsi DKI Jakarta as shown in Figure 6. The projected population as of 1995 and 2025 in the flood prone area is shown in Table 16.

After the population census 1990, several Kecamatan have been divided into two new Kecamatan as discussed in the foregoing sub-section 1.3.1. The population projection by JWRMS was made based on Kecamatan at the time of the population census 1990. In this study, the projected population in a old Kecamatan is divided into two new Kecamatan according to composition of population in the latest statistic data. It is assumed that the



population growth of these two new Kecamatans is the same.

Based on the population projection, the number of houses in the Study Area has been projected on the assumption that family size and composition of type of house until 2025 continue to be the same as that in 1993. The projected number of house by type in the flood prone area is shown in Table 17.

## 2) Household Effects

Value of household effects has been assumed as mentioned below based on the information during site reconnaissance. The household effects were estimated from the market price depreciating by the assumed average lifetime and period of use.

Type of residence	Unit value of household effects
Permanent (DKI Jakarta)	Rp. 19,000,000
Permanent (outside)	Rp. 13,000,000
Semi-permanent	Rp. 4,000,000
Non-permanent	Rp. 900,000

## (2) Commercial Sector

### 1) Building for Commercial Sector

Unit value of buildings in commercial sector such as shops, restaurants, supermarkets, department stores, hotels and banks is estimated classifying into two classes, i.e. large scale shop and medium/small scale shop. Markets (pasar) consist of a number of small shops are also included in the large scale shop. The unit value of buildings in commercial sector is estimated as shown below.

Type of building for commercial sector	Average floor area (a)	Unit construction cost (b)	Depreciation rate of building (c)	Unit value of building (a) x (b) x (c)
Large scale shop	1,300 m <sup>2</sup>	Rp.800,000/m <sup>2</sup>	0.5	Rp.520,000,000
Medium/small scale shop	40 m <sup>2</sup>	Rp.300,000/m <sup>2</sup>	0.5	Rp.6,000,000

Table 18 shows numbers of buildings in commercial sector in the flood prone area.

### 2) Facilities in Building for Commercial Sector

Buildings in commercial sector generally have such facilities as show cases, display racks, refrigerators, tables, chairs and cooking facilities inside. Value of such facilities are assumed as shown below.

Type of building in commercial sector	Unit value of facilities for commercial sector
Large scale shop	Rp.162,000,000
Medium/small scale	Rp.1,200,000

The value of facilities for a large scale shop is estimated using sample of several supermarkets and that of a medium/small scale shop is also estimated using sample of several common size general store in the Study Area.

### 3) Merchandise

Value of merchandise in a building for commercial sector is estimated as follows:

Type of building in commercial sector	Unit value of merchandise
Large scale shop	Rp.390,000,000
Medium/small scale shop	Rp.4,500,000

For estimation of stocked merchandise in commercial sector, it is assumed that unit value of merchandise per sq.m in a large scale shop is Rp 300,000 and that in medium/small scale shop is Rp. 112,500 based on site reconnaissance. Then, total value of merchandise is obtained from unit value multiplying by average floor area.

### (3) Office

#### 1) Building for Office

Average size of building for office is estimated from average number of employees (assumed to be 20 people) and necessary area for them. Type of building is assumed to be the same as that of the permanent residence.

Type of building	Average floor area (a)	Unit construction cost (b)	Depreciation rate of building (c)	Unit value of building (a) x (b) x (c)
Office	120 m <sup>2</sup>	Rp.390,000/m <sup>2</sup>	0.5	Rp.23,400,000

Buildings for office are considered only for DKI Jakarta since data on the number of office buildings are not available for the area outside DKI Jakarta. The number of the office buildings in the flood prone area is shown in Table 18.

#### 2) Facilities in Building for Office

Buildings for office generally have such facilities as desk, chair, bookshelf, stationary, typewriter, telephone, drinking water server and some large offices have personal computers, a photocopy machine and facsimile machine. Value of such facilities are assumed as shown

below.

Type of building	Unit value of facilities for office
Office	Rp. 17,000,000

The facilities for office were estimated based on site reconnaissance from the market price depreciating by the assumed average lifetime and period of use.

#### (4) Factory

##### 1) Building for Factory

Factories in Indonesia are generally classified into three categories, i.e. 1) large scale factory with more than 100 employees, 2) medium scale factory with 20 to 99 employees and 3) small scale factory with 5 to 19 employees. Average floor area of factory building is assumed based on average number of employees and necessary area for them based on field reconnaissance. Unit value of buildings for factory is estimated as follows.

Type of building for factory	Average floor area (a)	Unit construction cost (b)	Depreciation rate of building (c)	Unit value of building (a) x (b) x (c)
Large scale	2,520 m <sup>2</sup>	Rp. 600,000/m <sup>2</sup>	0.5	Rp. 756,000,000
Medium scale	360 m <sup>2</sup>	Rp. 400,000/m <sup>2</sup>	0.5	Rp. 72,000,000
Small scale	40 m <sup>2</sup>	Rp. 250,000/m <sup>2</sup>	0.5	Rp. 5,000,000

Table 18 shows number of factory buildings in the flood prone area by type.

##### 2) Property in Factory Building

Property in factory building consists of stock of products, stock of raw materials and machines and equipment. Value of properties in factory buildings are estimated as follows:

Type of factory	Unit value of properties in factory building
Large scale	Rp. 4,356,990,000
Medium scale	Rp. 605,784,000
Small scale	Rp. 15,532,000

The stock value of products and raw materials are estimated to be equivalent to half of monthly gross output and 82 % of monthly input cost, respectively. The detailed process of this estimation is presented in Table 19.

#### (5) Warehouse

### 1) Building for Warehouse

Number of warehouse in the Study Area is available in statistic data or data collected from Kabupaten offices but classification of warehouse is not available in the data collected. Therefore average size of warehouse is assumed on the basis of site reconnaissance. Unit construction cost of warehouse is estimated. Unit value of warehouse is as shown below.

Type of warehouse	Average floor area (a)	Unit construction cost (b)	Depreciation rate of building (c)	Unit value of building (a) x (b) x (c)
Large scale (DKI Jakarta)	1,440 m <sup>2</sup>	Rp.540,000/m <sup>2</sup>	0.5	Rp.388,800,000
Small scale (DKI Jakarta)	72 m <sup>2</sup>	Rp.390,000/m <sup>2</sup>	0.5	Rp.14,040,000
Small scale (outside Jakarta)	94 m <sup>2</sup>	Rp.250,000/m <sup>2</sup>	0.5	Rp.11,750,000

Table 18 shows number of warehouses in the flood prone area.

### 2) Stock in Warehouse

Value of stocks in warehouse is estimated based on the following consideration:

- warehouses located at Kecamatans Tanjung Priok, Cilincing, Pulo Gadung and Cakung in DKI Jakarta are classified into large scale warehouses and assumed to stock export and import goods. Sugar imported from Brazil and sport shoes to be exported are considered for estimation of stock value.
- other warehouses in DKI Jakarta are classified into small scale warehouses and assumed to stock merchandise. Stocks of textile seen at warehouses in Tanah Abang area is considered for estimation of stock value.
- warehouses located outside DKI Jakarta are classified into small scale warehouses and assumed to stock agricultural products, fertilizer and chemicals. Warehouses of village cooperatives (gudang KUD) used for stock of rice are considered for estimation of stock value.

Type of warehouse	Unit value of stock in warehouse
Large scale (DKI Jakarta)	Rp.1,889,000,000
Small scale (DKI Jakarta)	Rp.309,600,000
Small scale (outside Jakarta)	Rp.10,210,000

### (6) Public Building

#### 1) Public Building

Public buildings include such buildings as schools, mosques, churches, medical facilities and government offices. The number of such buildings in the Study Area are estimated based on statistic data and data collected from Kabupaten offices. Unit value of public building is as shown below.

Type of building	Average floor area	Unit construction cost	Depreciation rate of building	Unit value of building
	(a)	(b)	(c)	(a) x (b) x (c)
School, mosque, church	550 m <sup>2</sup>	Rp.400,000/m <sup>2</sup>	0.5	Rp.110,000,000
Medical facility	600 m <sup>2</sup>	Rp.400,000/m <sup>2</sup>	0.5	Rp.120,000,000
Other public building	280 m <sup>2</sup>	Rp.400,000/m <sup>2</sup>	0.5	Rp.56,000,000

Table 18 shows numbers of public buildings in the Study Area.

## 2) Properties in Public Building

Public buildings also have various kind of properties inside. Medical facilities have various kind of medical instruments and government offices also have desks, chairs and typewriters and various kinds of document. Value of such facilities are estimated from the market price depreciating by assumed lifetime and period of use as shown below.

Type of building	Unit value of property in public building
School, mosque, church	negligible small
Medical facility	Rp.18,000,000
Other public building	Rp.10,000,000

## (7) Future Value of General Assets

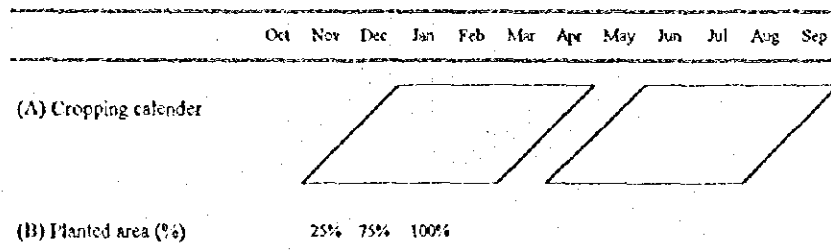
After estimation of assets in Kecamatan in the flood prone area, correlation between assets in Kecamatan and number of population has been examined. Its result is shown in Figure 7. It is able to say that assets in Kecamatan increase in proportion to population growth. Therefore future value of general assets in flood prone area is assumed to increase in proportion to population growth for flood damage assessment.

### 2.2.2 Agricultural Crops

According to Agricultural Census 1993 (Potensi Desa/Kelurahan) conducted by BPS, major agricultural activity in the flood prone area is production of paddy. Several kinds of upland crops are also cultivated in the area but their cultivation area is far smaller than paddy cultivation area. They are generally situated on hilly areas and those areas are free from flood. Thus only damage to paddy cultivation is taken into account. Table 20 shows the land use in the flood prone area based on the Agricultural Census 1993.

Damage to paddy cultivation is decrease in yield due to submergence. According to past record, flood occurs in January most frequently and lasts three to four days.

On the other hand, cropping pattern of paddy in Jabotabek is generally as shown below according to information obtained from Dinas Pertanian Tanaman Pangan in Tangerang and interview to farmers.



The figure indicates that rice planting is completed in almost all paddy field in January when flood occurs most frequently.

The economic farm gate price of paddy is calculated as shown in Table 21.

### 2.2.3 Indirect Damage

Indirect Damage is assumed at 6 % of flood damage to the general assets which discussed above. The indirect flood damage is the net economic loss of goods and services to the nation due to interruption of economic activities in the Study Area.

### 2.2.4 Infrastructure

Damage to infrastructure such as roads, railway, channel, and irrigation facilities is assumed at 30 % of damage to the general assets and agricultural crops based on information obtained from the Public Works Department of DKI Jakarta on restoration cost of roads and channel damaged by flood.

### 2.2.5 Other Damage

Twenty (20) percent of total damage to general assets, agricultural crops, indirect damage and infrastructure is assumed as other damage which may include the followings:

- Cost of emergency measures made by central and/or rural government
- Termination of public services such as transportation, communication, electricity, water and gas supply.
- Loss due to interruption of traffic
- Social, economical and political loss due to paralysis of their function
- Inconvenience of citizens' life
- Insanitary and danger of infectious diseases
- Injury to human lives

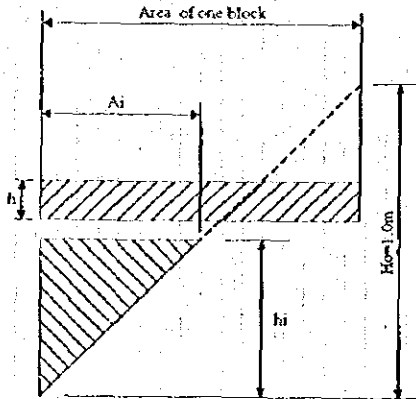
## 2.3 Damage Rate

### (1) Flood Condition

As a result of flood simulation analysis, average inundation depth has been obtained. The depth, however, is an average over the unit block of about one (1) km<sup>2</sup>, actual inundated area

and depth are supposed to be different from the calculated average depth depending on the topography of the block.

With the following equations, the inundated depth and area are estimated from the calculated average inundation depth for each block by the following relations:



when  $h_i \leq H_o$  or  $h \leq H_o / 2$

$$h_i = (2h \times H_o)^{0.5}$$

$$A_i = (2h / H_o)^{0.5}$$

when  $h_i > H_o$  or  $h > H_o / 2$

$$h_i = h - H_o / 2 + H_o$$

$$A_i = h + H_o / 2$$

where,  $h_i$  : maximum inundation depth in a block

$A_i$  : percentage of area inundated in a block

$h$  : calculated average inundation depth of a block

$H_o$  : maximum height of land undulation (1.0 m)

The above relations are derived based on the assumption of inclined flat block area with the maximum height of one (1) meter. The height was assumed based on point elevation shown on a topographic map of 1/25,000.

As to the duration of inundation, flooding is assumed to occur in January and lasts three to four days based on past record of flood occurrence in the Study Area.

## (2) Damage Rate

With respect to house/building, household effects, indoor movable and agricultural crops, basically standard rate developed by Ministry of Construction, Japan is applied since no such data is available in Indonesia. Damage rate by inundation depth is estimated based on inundation area and depth calculated from the average inundation depth considering the land undulation as discussed in the above. Table 22 shows estimated flood damage rate.

## 2.4 Flood Damage

Probable flood damage is estimated from the damageable property in inundated area multiplied by the flood damage rate corresponding to inundation condition under various magnitude of

flood events.

Annual mean flood damage is estimated as accumulation of flood damage segments derived from various magnitude of probable flood damage multiplied by the corresponding probability of occurrence, from non-damageable flood up to design probable flood.

## 2.5 Flood Reduction Benefit

Difference of the annual mean flood damage between those with and without project is counted as annual flood reduction benefit.

Probable flood damage for each river system by different magnitude of flood is summarized in Table 23. Based on the probable flood damage by different magnitude of flood, the annual mean flood damage is calculated as shown in Table 24 and this is indeed the flood reduction benefit.

Alternative	Design Scale	(Unit: Million Rp)
		Annual Flood Reduction Benefit
Cidurian River system (CDR)	1/25	7,295
Cimanecuri River system (CMC)	1/25	931
Cirarab River system (CRB)	1/25	2,098
Cisadane River system (CSD)	1/50	8,419
Cengkareng Floodway system (CKR)	1/100	87,792
Western Banjir Canal system (WBC)	1/100	77,396
Eastern Banjir Canal system (EBC)	1/100	228,798
CBL Floodway system (CBL)	1/50	9,988

## 2.6 Economic Project Cost

### (1) Project Cost

The economic cost of the project are the figures that reflect the true economic value of goods and services involved. These costs are used for the economic evaluation of the project. Transfer items such as taxes and duties imposed on construction materials and equipment, including government subsidy, are excluded from the elements of financial cost. It is assumed that 3 % of foreign currency portion and 8 % of local currency portion of direct construction cost are deemed as the transfer items.

Regarding the land acquisition and house compensation costs, since land price in Jabotabek is speculatively high and it does not reflect true economic value of land, the following are considered as economic cost of land acquisition and house compensation.

- (a) Farm land : productivity of the land during the project life (50 years).
- (b) Residential area : productivity of the land during the project life (50 years) + building cost of new house.



The financial and economic project costs of each alternative are shown in Table 25.

Annual disbursement schedule for economic project cost of each alternative is presented in Table 26. In this table, in order to compare the economic viability, it is assumed that all the alternative projects start simultaneously.

## (2) Annual Operation and Maintenance Cost

Annual operation and maintenance costs for flood control facilities are assumed to be 0.5 % of the direct construction cost.

## (3) Replacement Cost

Average lifetime of the metal and mechanical works related to the project is assumed to be 25 years after installation. The replacement cost covers cost for replacement of such metal and mechanical facilities after the lifetime during project life. The financial and economic replacement cost is shown in Table 27.

## 2.7 Economic Evaluation

Economic viability of each alternative for the flood mitigation is assessed using three indicators: economic internal rate of return (EIRR), cost-benefit ratio (B/C), and net present value (NPV). Calculation is made in consideration of the annual cash flow prepared from the economic project cost and annual mean benefit discussed in previous section. The economic viability of each alternative is summarized below and its annual cash flow is shown in Table 28.

River system	Alternative	EIRR	B/C	NPV (Million Rp)
Cidurian River system	CDR-1	3.8 %	0.38	-62,510
Cimanceuri River system	CMC-1	-	0.14	-34,437
Cirarab River system	CRB-1	12.1 %	1.01	65
Cisadane River system	CSD-1	3.3 %	0.36	-68,891
Cengkareng Floodway system	CKR-1	42.9 %	4.59	324,161
	CKR-2	12.6 %	1.05	14,137
	CKR-3	14.6 %	1.23	54,793
	CKR-4	7.8 %	0.66	-148,512
Western Banjir Canal system + Cisadane River system	WBC-1	22.5 %	2.12	165,664
	+CSD-1			
	WBC-3 +CSD-1'	16.1 %	1.37	77,384
Eastern Banjir Canal system	EBC-1-1	8.4 %	0.71	-314,124
	EBC-1-2	20.6 %	1.83	343,838
	EBC-1-3	30.5 %	3.15	518,958
CBL Floodway system	CBL-1	6.2 %	0.53	-41,081

Note: Discount rate of 12 % is assumed for calculation of B/C and NPV.

## 2.8 Overall Evaluation

The following aspects are taken into account for selecting the flood control Master Plan out of the alternatives prepared for river systems of Cengkareng Floodway, Western Banjir Canal, and Eastern Banjir. Evaluation criteria and result of evaluation are presented in Table 29.

- 1) financial project cost
- 2) financial land acquisition and house compensation cost
- 3) economic internal rate of return (EIRR)
- 4) technical evaluation
- 5) environmental impact

After the selection of the flood control Master Plan, a priority project was selected with criteria shown in Table 30. As a result of the overall evaluation, the flood control of the Western Banjir Canal system + Cisadane river system has been selected as priority projects among the other projects of the flood control Master Plan in Jabotabek. The result of evaluation is presented in Table 30 and summarized below.

Check Item	Unit	River System						
		Cidrian	Cimanceuri	Cirarab	Cengkareng Floodway	WBC + Cisadane	EBC	CBH Floodway
1 Beneficial Population	1000 persons	495	605	144	2,505	1,865	4,119	1,607
2 Beneficial Area	km <sup>2</sup>	180	240	70	120	230	210	570
3 Financial Project Cost	Rp. billion	227	108	27	858	767	1,931	221
4 Financial Land House Cost	Rp. billion	87	59	12	295	305	943	88
5 EIRR	%	3.8	-	12.1	14.6	16.1	20.6	6.2
6 Technical feasibility		ordinary	ordinary	ordinary	complicated	complicated	ordinary	ordinary
7 Social Benefit		small	small	small	big	very big	big	middle
8 Environmental Impact		not affect	may affect	not affect	not affect	not affect	not affect	may affect
Overall Point	point	20	20	26	34	40	31	28
Evaluation						Priority		

### 3 PROJECT EVALUATION FOR OPTIMUM SCALE OF URGENT FLOOD CONTROL PROJECTS

#### 3.1 Introduction

The flood control of the Western Banjir Canal system + Cisadane river system has been selected as priority projects among the other projects of the flood control Master Plan in Jabotabek. However it needs an enormous sum to implement the priority projects on the Master Plan level at once. Stepwise implementation of the projects would lighten the burden of huge cost for the government.

On the other hand, in January and February 1996, DKI Jakarta was hit by the worst floods of the Ciliwung river and the Western Banjir Canal (WBC) after World War II. Therefore implementation of flood control in DKI Jakarta is urgently required. The damage by flood in January and February 1996 is discussed in Section 1.5.

In consideration of these above, an urgent flood control project out of the priority projects should be formulated as the first stage project.

#### 3.2 Alternative Schemes

The following four alternative schemes have been examined for optimum scale of the First Stage Project. The alternative schemes are illustrated in Figure 8.

Alternatives	WBC	Ciliwung Floodway	Cisadane
Alt. 1	M/P scale (1/100)	2 tunnels (300 m <sup>3</sup> /s x 2 units), discharge volume: 600 m <sup>3</sup> /s	1/50 (1,900 m <sup>3</sup> /s)
Alt. 2	M/P scale (1/100)	1 tunnel (300 m <sup>3</sup> /s x 1 unit), discharge volume: 300 m <sup>3</sup> /s	1/25 (1,500 m <sup>3</sup> /s)
Alt. 2'	M/P scale (1/100)	2 tunnels (300 m <sup>3</sup> /s x 2 units), discharge volume: 300 m <sup>3</sup> /s	1/25 (1,500 m <sup>3</sup> /s)
Alt. 3	1/50	1 tunnel (300 m <sup>3</sup> /s x 1 unit), discharge volume: 300 m <sup>3</sup> /s	1/10 (1,200 m <sup>3</sup> /s)

#### 3.3 Economic Evaluation

As a result of flood simulation analysis, in case of heavy rainfall of 50-years or 100-years, flood inundation will be occurred under the condition of Alt. 2, Alt. 2', and Alt. 3. Therefore, the flood damage under the condition of Alt. 2, Alt. 2', and Alt. 3 were estimated first, and then the amount of flood damage was deducted from the flood reduction benefit of Master Plan scale. The following is the flood reduction benefit of the each alternative.

(Unit: Million Rp.)

Alternatives	Flood reduction Benefit
Alt. 1 (same as Master Plan)	85,815
Alt. 2	79,196
Alt. 2'	79,196
Alt. 3	68,800

Economic and financial project cost of each alternative is shown in Table 31. The result of the benefit/cost analysis is shown in Table 32 and summarized below.

Check Item	Unit	Alternatives			
		Alt. 1	Alt. 2	Alt. 2'	Alt. 3
1 Financial Project Cost	Rp. billion	767	672	714	595
2 Financial Land/House Cost	Rp. billion	305	304	304	273
3 EIRR	%	16.1	18.0	16.4	17.8
4 B/C (at discount rate: 12 %)		1.37	1.57	1.41	1.54
5 NPV (at discount rate: 12 %)	Rp. billion	77	100	76	88

### 3.4 Overall Evaluation

The Alt.2 has the highest EIRR, B/C, and NPV. However, considering the quality of rocks around the tunnel sites and existing houses above the tunnel site, difficulties could be foreseen in constructing a new tunnel of 300 m<sup>3</sup>/s in the Second (Master Plan) Stage Project just beside the tunnel to be constructed in the First Stage Project. Besides, single tunnel might be uncertain in an emergency.

Judging from technical viewpoint on construction of the tunnel, the Alt.2' has higher advantage than the Alt.2. The Alt.2' still has higher EIRR and B/C than that of the Alt.1, the Master Plan scale, and has same design discharge distribution with Alt.2.

In consideration of these, the Alt.2' with two tunnels (300 m<sup>3</sup>/s x 2 units) has been selected as the optimum plan of the First Stage Project of the priority projects.

## 4 ECONOMIC EVALUATION OF THE PRIORITY PROJECTS

### 4.1 The Priority Projects

The priority projects consist of the following sub-projects.

Stage	Phase	WBC	Ciliwung Floodway	Cisadane
Urgent Flood Control Project (1st Stage)	- Phase 1		2 tunnels (300 m <sup>3</sup> /s x 2 units), discharge volume: 300 m <sup>3</sup> /s	improve to convey 1/25 flood (1,500 m <sup>3</sup> /s)
	- Phase 2	improve to meet M/P scale (1/100 flood)		
2nd Stage			increase discharge volume to 600 m <sup>3</sup> /s	improve to convey 1/50 flood (1,900 m <sup>3</sup> /s)

### 4.2 Methodology

#### (1) Damageable Property

The methodology applied for the economic evaluation of the priority projects is same as that applied for economic evaluation of the flood control Master Plan. The same general assets and agricultural assets are used for estimation of flood damage.

#### (2) Review of Indirect Damage

According to information obtained through the interview survey, one of the largest car manufacturing companies had to stop operation of the factory for two weeks during and after the flood in February 1996. They estimate that the loss due to the shutdown of the factory is far bigger than the direct damage to their properties. On the other hand, according to a division manager of an international hotel in Jakarta, the economy of Jakarta was completely standstill during floods, and no hotel guest could go out for business. In view of these kinds of information, the indirect flood damage has been reviewed by the following manner.

The number of population in the beneficial area of the Western Banjir Canal system is 960,000 in the area of 60 km<sup>2</sup> in 1995. Judging from the number of shops, offices, factories, warehouses, and public offices in the area, approximately 500,000 persons are assumed to be working there.

Average annual growth rate of per capita regional income in DKI Jakarta is assumed to be 5.4 % from the past growth rate of RGDP per capita. By using the growth rate, per capita regional income is estimated at Rp.12.3 million in 2008 when the First Stage Project is almost completed. Assuming that 2/3 of whole population in DKI Jakarta is the population of working people, per capita regional income in 2008 for working people is estimated at Rp. 18.4 million.

Assuming that working population in beneficial area of the Western Banjir Canal (WBC) is

500,000, the reduction of regional income due to suspension of working for two weeks for these people is estimated at Rp. 352 billion. This amount is more than 60 % of the direct flood damage under the condition of 50-year flood. Therefore 60 % of the direct flood damage is assumed to be the indirect flood damage in the Western Banjir Canal system.

As for the Cisadane river system, 6 % will be applied according to the standard developed by Ministry of Construction, Japan, since the most of the area along the downstream reaches of the Cisadane river will assumed to remain as agricultural land.

### 4.3 Flood Reduction Benefit

Probable flood damage of the Western Banjir Canal system and Cisadane river system by different magnitude of flood is estimated as shown in Table 33. Based on the probable flood damage by different magnitude of flood, the annual mean flood damage is calculated as presented in Table 34 and this is indeed the flood reduction benefit. The beneficial area of the priority projects is shown in Figure 9.

(Unit: Million Rp)			
Priority Projects	Alternative	Scale	Flood reduction benefit
Whole	Cisadane River system (CSD)	50-year	8,419
	Western Banjir Canal system (WBC)	100-year	108,126
	Total		116,545
Urgent Flood Control Project (1st Stage)	Cisadane River system (CSD)	25-year	6,420
	Western Banjir Canal system (WBC)	100-year	101,672
	Total		108,092

### 4.4 Economic Project Cost

#### (1) Project Cost

The financial project cost of the priority projects has been converted into the economic cost with the same manner as that used for the flood control Master Plan.

The reviewed financial and economic project costs of the priority projects are summarized below and shown in Table 35.

Priority Projects	(Million Rp.)			
	Whole		Urgent Flood Control Project (1st Stage)	
	Financial cost	Economic cost	Financial cost	Economic cost
1. Direct construction cost	532,159	507,664	499,844	476,872
2. Land acquisition/house compensation	85,494	26,879	81,702	25,064
3. Administration	30,882	26,727	29,077	25,097
4. Engineering services	79,824	79,824	74,977	74,977
5. Sub-total (1+2+3+4)	728,360	641,094	685,601	602,010
6. Physical contingency	72,836	64,109	68,560	60,201
7. Sub-total (5+6)	801,196	705,203	754,161	662,211
8. Price Contingency	367,930	0	340,983	0
9. Total cost (7+8)	1,169,126	705,203	1,095,144	662,211

Annual disbursement of economic project cost is presented in Table 36.

## (2) Annual Operation and Maintenance Cost

Annual operation and maintenance costs for flood control facilities are assumed to be 0.5 % of the direct construction cost.

## (3) Replacement Cost

Average lifetime of the metal and mechanical works related to the project is assumed to be 25 years after installation. The replacement cost covers cost for replacement of such metal and mechanical facilities after the lifetime during project life. The financial and economic replacement cost is shown in Table 37.

## 4.5 Economic Evaluation

Economic viability of the priority projects for the flood mitigation is assessed using three indicators: economic internal rate of return (EIRR), cost-benefit ratio (B/C), and net present value (NPV). The economic viability of the priority projects is summarized below and its annual cash flow is shown in Table 38.

Priority Projects	Alternative	EIRR	B/C	NPV (Million Rp.)
Whole	Cisadane River system (50-year) + Western Banjir Canal system (100-year)	13.2%	1.11	39,166
Urgent Flood Control Project (1st Stage)	Cisadane River system (25-year) + Western Banjir Canal system (100-year)	13.1%	1.10	35,281

Note: Discount rate of 12 % is assumed for calculation of B/C and NPV.

## 4.6 Sensitivity Analysis

Sensitivity of EIRR of the priority projects has been examined adopting increase in cost and decrease in benefit. The result of the analysis is shown below.

Case	EIRR	
	Whole	Urgent Flood Control Project (1st Stage)
(a) Base Estimate	13.2%	13.1%
(b) Construction cost increase of 15 %	11.6%	11.5%
(c) Benefit decrease of 15 %	11.4%	11.3%
(d) Combination of (b) and (c) above	10.0%	9.9%

## 4.7 Result of Economic Evaluation

As a result of the economic evaluation including sensitivity analysis, the projects of both the whole priority projects and urgent flood control project (1st Stage project), respectively, have sufficient EIRRs (13.2 % and 13.1 %), and the benefit-cost ratios (B/C) and net present values (NPV) are also high. The projects can be judged economically feasible from the result.





Table 1 POPULATION IN INDONESIA, WEST JAVA AND THE STUDY AREA

Region	Area in 1990 (km <sup>2</sup> )	Population			Average Annual Growth Rate		
		1971	1980	1990	'71-'80	'80-'90	'71-'90
INDONESIA	1,919,317	119,208 (x 1000)	147,490 (x 1000)	179,381 (x 1000)	2.39%	1.98%	2.17%
West Java Province	46,300	21,624 (x 1000)	27,454 (x 1000)	35,384 (x 1000)	2.69%	2.57%	2.63%
Study Area							
DKI Jakarta	7,936	8,550,498	12,913,900	18,578,173	4.69%	3.70%	4.17%
Jakarta Selatan	661	3,927,055	6,444,654	8,227,746	5.66%	2.47%	3.97%
Jakarta Timur	145	1,054,655	1,579,795	1,905,283	4.59%	1.89%	3.16%
Jakarta Pusat	188	805,722	1,456,750	2,064,499	6.80%	3.55%	5.08%
Jakarta Barat	48	624,859	1,236,876	1,074,997	7.88%	-1.39%	2.90%
Jakarta Utara	126	824,190	1,231,188	1,820,019	4.56%	3.99%	4.26%
Kab. Bogor	154	617,649	940,045	1,362,948	4.78%	3.78%	4.25%
Kab. Bogor	2,770	1,668,778	2,501,141	3,738,868	4.60%	4.10%	4.34%
Kab. Tangerang	22	195,882	247,104	271,341	2.61%	0.94%	1.73%
Kab. Tangerang	1,301	1,066,695	1,487,898	2,764,988	3.77%	6.39%	5.14%
Kab. Bekasi	1,401	832,721	1,123,976	2,104,392	3.39%	6.47%	5.00%
Kab. Serang	1,781	859,367	1,109,127	1,470,838	2.88%	2.86%	2.87%

Source: 1. Statistik Indonesia 1994, Biro Pusat Statistik

2. Penduduk DKI Jakarta, Hasil Sensus Penduduk 1990, Kantor Statistik Propinsi DKI Jakarta

3. Jakarta Dalam Angka 1991, Kantor Statistik Propinsi DKI Jakarta

4. Sensus Penduduk Kabupaten Tangerang 1990, Kantor Statistik Kabupaten Tangerang

5. Kabupaten Bekasi Dalam Angka 1990, Kantor Statistik Kabupaten Bekasi

6. Study on Cijujung - Cidurian Integrated Water Resources in Indonesia, JICA

Table 2 AREA AND POPULATION BY ADMINISTRATIVE UNIT IN STUDY AREA (1/3)  
(by Population Census 1990)

Administrative Units	Area (km <sup>2</sup> )	Population (persons)	No. of households	No. of persons per household	Population density (persons/ km <sup>2</sup> )
<b>DKI Jakarta</b>	661.26	8,227,746	1,740,214	4.73	12,443
<b>Jakarta Selatan</b>	145.37	1,905,283	392,474	4.85	13,106
Kebayoran Lama	19.31	299,721	61,833	4.85	15,522
Pesanggrahan	13.47	153,715	31,263	4.92	11,412
Pasar Minggu	21.91	231,848	47,082	4.92	10,582
Jagakarsa	25.02	143,072	29,931	4.78	5,718
Mampang Prapatan	7.74	148,665	31,799	4.68	19,207
Pancoran	8.23	141,373	30,121	4.69	17,178
Kebayoran Baru	12.91	186,865	38,896	4.80	14,474
Setia Budi	9.05	179,495	37,122	4.84	19,834
Tebet	9.53	248,493	48,670	5.11	26,075
Cilandak	18.20	172,036	35,757	4.81	9,453
<b>Jakarta Timur</b>	181.73	2,064,499	444,975	4.64	10,997
Pasar Rebo	12.94	119,517	25,245	4.73	9,236
Cipayung	27.35	100,860	21,004	4.80	3,688
Ciracas	16.08	157,704	34,533	4.57	9,807
Kramat Jati	13.34	211,757	44,679	4.74	15,874
Makasar	21.64	146,532	30,650	4.78	6,771
Jatinegara	10.64	277,582	57,749	4.81	26,089
Duren Sawit	22.81	290,246	62,965	4.61	12,725
Matraman	4.85	165,372	34,304	4.82	34,097
Pulo Gadung	15.61	279,103	58,625	4.76	17,880
Cakung	42.47	315,826	75,221	4.20	7,436
<b>Jakarta Pusat</b>	47.90	1,074,997	224,592	4.79	22,443
Tanah Abang	9.30	192,152	39,016	4.92	20,662
Menteng	6.53	90,774	17,830	5.09	13,901
Senen	4.23	112,792	25,797	4.37	26,665
Cempaka Putih	4.69	92,539	19,635	4.71	19,731
Johor Baru	2.38	122,866	25,927	4.74	51,624
Sawah Besar	5.92	124,482	25,809	4.82	21,027
Gambir	7.60	112,864	22,039	5.12	14,851
Kemayoran	7.25	226,528	48,539	4.67	31,245
<b>Jakarta Barat</b>	126.15	1,820,019	383,880	4.74	14,427
Kebon Jeruk	17.51	261,630	54,159	4.83	14,942
Kembangan	24.64	157,239	33,908	4.64	6,381
Cengkareng	27.93	372,332	85,555	4.35	13,331
Kali Deres	27.40	175,496	39,452	4.45	6,405
Grogol Petamburan	11.29	241,887	48,600	4.98	21,425
Palmerah	7.54	217,502	44,030	4.94	28,846
Tambora	5.48	263,607	53,296	4.95	48,103
Taman Sari	4.36	130,326	24,880	5.24	29,891
<b>Jakarta Utara</b>	154.11	1,362,948	294,293	4.63	8,844
Penjaringan	35.48	262,065	60,944	4.30	7,386
Pademangan	11.91	144,743	30,424	4.76	12,153
Tanjung Priok	24.90	328,272	65,903	4.98	13,184
Koja	11.34	288,271	63,468	4.54	25,421
Kelapa Gading	16.12	103,223	23,645	4.37	6,403
Kepulauan Seribu	11.80	14,826	2,717	5.46	1,256
Cilincing	42.56	221,548	47,192	4.69	5,206

**Table 2 AREA AND POPULATION BY ADMINISTRATIVE UNIT IN STUDY AREA (2/3)**  
(by Population Census 1990)

Administrative Units	Area (km <sup>2</sup> )	Population (persons)	No. of households	No. of persons per household	Population density (persons/ km <sup>2</sup> )
<b>Kab. Bogor</b>	<b>2,769.66</b>	<b>3,738,868</b>	<b>779,770</b>	<b>4.79</b>	<b>1,350</b>
Nanggung	197.19	52,444	11,470	4.57	266
Leuwiliang	101.69	123,084	25,096	4.90	1,210
Cibungbulang	97.26	173,149	34,592	5.01	1,780
Ciampea	55.97	130,518	26,212	4.98	2,332
Ciomas	85.03	295,104	59,851	4.93	3,471
Cijeruk	58.03	123,388	25,947	4.76	2,126
Caringin	57.67	72,204	15,174	4.76	1,252
Ciawi	40.02	120,217	24,799	4.85	3,004
Cisarua	186.62	136,479	27,792	4.91	731
Cariu	156.74	73,825	19,859	3.72	471
Janggol	224.48	128,638	31,606	4.07	573
Citeureup	137.10	165,074	35,607	4.64	1,204
Cileungsi	161.36	137,108	31,421	4.36	850
Gunung Putri	56.26	88,323	19,380	4.56	1,570
Cimanggis	50.28	220,308	47,379	4.65	4,382
Cibinong	42.71	125,104	27,123	4.61	2,929
Kedung Halang	57.45	185,464	38,382	4.83	3,228
Semplak	62.59	160,127	31,706	5.05	2,558
Bojong Gede	66.99	138,898	26,860	5.17	2,076
Sawangan	73.40	165,835	33,244	4.99	2,259
Parung	71.20	130,488	25,590	5.10	1,833
Gunung Sindur	50.55	49,589	9,573	5.18	981
Rumpin	123.05	81,486	17,585	4.63	662
Cigudeg	229.20	109,283	22,408	4.88	477
Jasinga	143.69	79,994	16,301	4.91	557
Parung Panjang	117.45	91,797	18,984	4.84	782
Pancoran Mas	19.72	111,380	21,460	5.19	5,648
Beji	14.81	71,034	15,018	4.73	4,796
Sukmajaya	31.24	198,526	39,351	5.05	6,355
<b>Kotamadya Bogor</b>	<b>21.56</b>	<b>271,341</b>	<b>54,249</b>	<b>5.00</b>	<b>12,585</b>
Kota Bogor Selatan	2.74	51,991	10,607	4.90	18,975
Kota Bogor Timur	4.47	62,253	12,003	5.19	13,927
Kota Bogor Utara	7.62	80,896	16,473	4.91	10,616
Kota Bogor Tengah	3.17	35,393	6,844	5.17	11,165
Kota Bogor Barat	3.56	40,808	8,322	4.90	11,463
<b>Kab. Tangerang</b>	<b>1,301.07</b>	<b>2,764,988</b>	<b>421,144</b>	<b>6.57</b>	<b>2,125</b>
Cisoka	76.57	86,918	15,332	5.67	1,135
Tigaraksa	77.93	72,741	14,430	5.04	933
Cikupa	78.70	118,480	15,711	7.54	1,505
Legok	95.29	108,356	19,768	5.48	1,137
Serpong	91.24	131,479	21,566	6.10	1,431
Ciputat	64.53	318,763	38,889	8.20	4,940
Pondok Aren	29.64	113,029	20,124	5.62	3,813
Curug	39.06	96,951	11,778	8.23	2,482
Pasar Kemis	61.58	91,378	12,903	7.08	1,481
Balareja	73.11	100,005	17,428	5.74	1,368
Kresek	56.59	71,214	14,470	4.92	1,258
Kronjo	67.93	64,929	12,828	5.06	956
Mauk	115.05	117,005	21,259	5.50	1,017
Rajeg	52.16	62,356	9,688	6.44	1,195
Sepatan	91.18	154,860	24,254	6.38	1,698
Teluknaga	72.38	134,676	23,287	5.78	1,861
Ciledug	25.17	191,112	21,933	8.71	7,593
Cipondoh	39.17	140,767	24,951	5.64	3,594
Tangerang	24.35	223,355	30,292	7.37	9,173
Jatiuwung	35.99	203,627	21,966	9.27	5,658
Batucaep	33.45	162,987	28,287	5.76	4,873

**Table 2 AREA AND POPULATION BY ADMINISTRATIVE UNIT IN STUDY AREA (3/3)**  
(by Population Census 1990)

Administrative Units	Area (km <sup>2</sup> )	Population (persons)	No. of households	No. of persons per household	Population density (persons/ km <sup>2</sup> )
<b>Kab. Bekasi</b>	<b>1,400.53</b>	<b>2,104,392</b>	<b>456,745</b>	<b>4.61</b>	<b>1,503</b>
Pondok Gede	74.53	282,126	57,806	4.88	3,785
Bantargebang	53.31	58,200	12,874	4.52	1,092
Setu	67.09	60,889	13,733	4.43	908
Cibarusah	79.24	54,884	12,790	4.29	693
Serang	87.14	65,898	16,318	4.04	756
Lemahabang	102.77	116,290	27,187	4.28	1,132
Cikarang	83.70	137,874	29,633	4.65	1,647
Cibitung	87.87	132,469	29,378	4.51	1,508
Tanibun	81.61	159,690	34,407	4.64	1,957
Tarumajaya	50.69	37,560	7,814	4.81	741
Dabelan	55.25	71,032	14,695	4.83	1,286
Tambelang	95.60	56,450	12,951	4.36	590
Sukatani	81.22	77,482	16,601	4.67	954
Pebayuran	83.39	68,814	15,782	4.36	825
Cabangbungin	120.13	39,910	8,575	4.65	332
Muaragembong	104.75	21,500	4,618	4.66	205
Bekasi Timur	29.19	218,677	46,752	4.68	7,492
Bekasi Selatan	25.75	177,115	36,276	4.88	6,878
Bekasi Barat	21.84	164,449	36,342	4.53	7,530
Bekasi Utara	15.46	103,083	22,213	4.64	6,668
<b>Jabotabek area</b>	<b>6,154.08</b>	<b>17,107,335</b>	<b>3,452,122</b>	<b>4.96</b>	<b>2,780</b>
<b>Kab. Serang</b>	<b>1,781.32</b>	<b>1,470,838</b>	<b>301,689</b>	<b>4.88</b>	<b>826</b>
Cinangka	123.02	45,034	10,164	4.43	366
Padarincang	74.40	49,252	10,359	4.75	662
Ciomas	57.12	28,005	5,738	4.88	490
Pabuaran	76.96	39,115	8,568	4.57	508
Baros	33.94	34,856	7,969	4.37	1,027
Petir	92.00	63,641	12,661	5.03	692
Cikeusal	96.13	77,045	15,749	4.89	801
Pamarayan	71.67	52,455	11,498	4.56	732
Kopo	87.30	60,763	12,145	5.00	696
Cikande	82.70	70,451	14,807	4.76	852
Kragilan	40.33	45,310	8,670	5.23	1,123
Walantaka	45.83	43,982	7,885	5.58	960
Serang	59.92	155,296	29,045	5.35	2,592
Taktakan	62.00	40,400	7,936	5.09	652
Wr. Kurung	43.90	27,334	5,544	4.93	623
Mancak	91.03	31,703	6,887	4.60	348
Anyar	58.85	33,519	7,435	4.51	570
Bojonegara	66.58	50,415	10,272	4.91	757
Kramat Watu	51.58	46,720	9,627	4.85	906
Kasemen	60.55	55,645	11,709	4.75	919
Ciruas	36.19	43,099	7,892	5.46	1,191
Pontang	75.65	42,814	8,925	4.80	566
Carenang	63.46	49,250	11,226	4.39	776
Tirtayasa	90.69	58,651	12,433	4.72	647
Ciwandan	43.47	63,552	12,441	5.11	1,462
Cilegon	39.70	77,601	15,793	4.91	1,955
Pulomerak	56.35	84,930	18,311	4.64	1,507
<b>Total of Study Area</b>	<b>7,935.40</b>	<b>18,578,173</b>	<b>3,753,811</b>	<b>4.95</b>	<b>2,341</b>

Source: Penduduk DKI Jakarta, Hasil Sensus Penduduk 1990, Kantor Statistik Propinsi DKI Jakarta

Jakarta Dalam Angka 1991, Kantor Statistik Propinsi DKI Jakarta

Sensus Penduduk Kabupaten Tangerang 1990, Kantor Statistik Kabupaten Tangerang

Kabupaten Bekasi Dalam Angka 1990, Kantor Statistik Kabupaten Bekasi

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**Table 3 RESTRUCTURING OF KECAMATANS BETWEEN 1990 AND 1995**

1990		1995	
Kodya/Kab.	Kecamatan	Kodya/Kab.	Kecamatan
Kab. Bogor	Ciomas	Kab. Bogor	Ciomas + Darmaga
	Cisarua		Cisarua + Megamendung
	Sawangan		Sawangan + Limo
	Parung Panjang		Parung Panjang + Tenjo
Kodya Bogor	Bogor Utara	Kodya Bogor	Bogor Utara + Tanah Sareal
Kab. Tangerang	Ciputat	Kab. Tangerang	Ciputat + Pamulang
	Sepatan		Sepatan + Pakuhaji
	Teluknaga		Teluknaga + Kosambi
	Ciledug	Kodya Tangerang	Ciledug
	Cipondoh		Cipondoh
	Tangerang		Tangerang
	Jatiuwung		Jatiuwung
	Batuceper		Batuceper + Benda
Kab. Bekasi	Pondok Gede	Kab. Bekasi	Pondok Gede + Jatiasih
	Cikarang		Cikarang + Kedungwaringin
Kab. Serang	Cikeusal	Kab. Serang	Cikeusal + Curug
	Serang		Serang + Cipocok Jaya
	Cilegon		Cilegon + Cibeber

Table 4 POPULATION OF 10 YEARS AND UP, ECONOMICALLY ACTIVE POPULATION  
IN DKI JAKARTA AND WEST JAVA

	DKI Jakarta				West Java			
	Population of 10 years and up	Economically Active Population	Working Population	Ratio of Economic Active Popu.	Unemployment Ratio	Population of 10 years and up	Economically Active Population	Working Population
1985	5,965,228	2,538,847	2,395,437	42.6%	5.6%	22,356,898	10,777,379	10,455,491
1986	6,157,382	2,567,793	2,302,527	41.7%	10.3%	22,809,449	11,853,387	11,372,718
1987	6,449,467	2,741,735	2,477,648	42.5%	9.6%	23,513,215	12,176,912	11,723,788
1988	6,883,543	2,916,913	2,673,922	42.4%	8.3%	24,525,174	13,034,940	12,528,099
1989	6,785,594	2,731,864	2,478,983	40.3%	9.3%	24,567,538	12,628,900	11,948,050
1990	7,146,929	3,169,207	2,938,549	44.3%	7.3%	25,479,144	13,152,203	12,718,594
1991	6,620,077	3,006,686	2,815,748	45.4%	6.4%	26,940,957	13,790,183	13,242,168
1992	6,823,452	3,034,276	2,841,159	44.5%	6.4%	27,796,080	14,427,818	13,892,887
1993	7,007,751	3,121,183	2,947,175	44.5%	5.6%	28,457,849	14,438,033	13,876,469
1994	7,180,149	3,451,570	3,135,439	48.1%	9.2%	29,378,937	15,239,049	14,327,990
Average annual growth rate	2.1%	3.5%	3.0%			3.1%	3.9%	3.6%

Source: Statistik Indonesia 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, and 1994.

Table 5 GROSS DOMESTIC PRODUCT

Year	At Current Price			At 1983 Constant Price		
	GDP		GDP Per Capita	GDP		GDP Per Capita
	Amount (Rp. Billion)	Growth Rate	Amount (Rp.)	Amount (Rp. Billion)	Growth Rate	Amount (Rp.)
1984	89,885	-	-	83,037	-	-
1985	96,997	7.9%	581,469	85,082	2.5%	491,836
1986	102,683	5.9%	576,005	90,081	5.9%	500,837
1987	124,817	21.6%	734,866	94,518	4.9%	556,478
1988	142,020	13.8%	818,962	99,936	5.7%	576,282
1989	167,185	17.7%	956,817	107,437	7.5%	614,872
1990	195,597	17.0%	1,097,812	115,217	7.2%	646,671
1991	227,450	16.3%	1,253,971	123,225	7.0%	679,361
1992	259,885	14.3%	1,408,657	131,185	6.5%	711,063
1993	302,018	16.2%	1,609,997	139,707	6.5%	744,751

Source: Pendapatan Nasional Indonesia 1988 - 1993, Biro Pusat Statistik

Statistik Indonesia 1988, 1990 and 1991

Note: Figures in 1992 and 1993 are preliminary.

Table 6 REGIONAL GROSS DOMESTIC PRODUCT IN CURRENT PRICE IN JABOTABEK

Industry Origin	Indonesia		West Java		DKI Jakarta		Kab Bogor		Kodya Bogor		Kab Tangerang		Kodya Tangerang		Kab Bekasi		Kab Serang	
	Year	1993*	Amount	(%)	Year	1993*	Amount	(%)	Year	1993	Amount	(%)	Year	1993	Amount	(%)	Year	1993
<i>Regional Gross Domestic Products</i>																		
1) Agriculture		55,746	18.5%		9,494	20.5%	152	0.3%		602	12.5%	2	0.4%		408	20.6%	44	1.9%
2) Mining & quarrying		30,750	10.2%		3,165	6.8%	0	0.0%		409	8.5%	0	0.0%		8	0.4%	0	0.0%
3) Manufacturing industries		67,441	22.3%		10,740	23.2%	10,961	21.5%		1,861	38.7%	96	17.6%		604	30.5%	962	42.6%
4) Electricity, gas & water supply		2,714	0.9%		1,044	2.3%	859	1.7%		64	1.3%	40	7.4%		56	2.8%	71	3.1%
5) Construction		18,140	6.0%		3,096	6.7%	6,651	13.0%		392	8.1%	72	13.2%		120	6.1%	137	6.1%
6) Trade, restaurant and hotel		49,789	16.5%		9,793	21.2%	11,317	22.2%		768	16.0%	96	17.6%		372	18.8%	364	16.1%
7) Transportation & communication		20,728	6.9%		2,391	5.2%	4,536	8.9%		202	4.2%	86	15.8%		141	7.1%	518	22.9%
8) Banking and Financing		15,257	5.1%		1,162	2.5%	11,415	22.4%		2	0.0%	57	10.5%		9	0.5%	18	0.8%
9) Ownership of dwelling		7,611	2.5%		685	1.5%		0.0%		164	3.4%	44	8.1%		91	4.6%	27	1.2%
10) Public services and defence		22,458	7.4%		3,075	6.6%	2,168	4.3%		184	3.8%	26	4.8%		77	3.9%	39	1.7%
11) Services		11,384	3.8%		1,654	3.6%	2,940	5.8%		166	3.4%	25	4.6%		94	4.7%	78	3.5%
Total:		302,018	100.0%		46,299	100.0%	50,999	100.0%		4,814	100.0%	544	100.0%		1,980	100.0%	2,258	100.0%

Note \*: Preliminary figure

Source : 1. Pendataan Nasional Indonesia 1988 - 1993, Biro Pusat Statistik

2. Produk Domestik Regional Bruto Propinsi - Propinsi di Indonesia Menurut Lapangan Usaha 1988 - 1993, Biro Pusat Statistik

3. Jakarta Dalam Angka 1995, Kantor Statistik Propinsi DKI Jakarta

4. Produk Domestik Regional Bruto Kabupaten/Kotamadya di Jawa Barat 1993 - 1994, Kantor Statistik Propinsi Jawa Barat



Table 7 REGIONAL GROSS DOMESTIC PRODUCT IN 1983 CONSTANT PRICE LEVEL IN STUDY AREA

Industry Origin	Indonesia		West Java		DKI Jakarta		Kab Bogor		Kab Bogor		Kab. Tangerang		Kab. Bekasi		Kab. Serang	
	1993	1994	1993	1994	1993	1994	1993	1994	1993	1994	1993	1994	1993	1994	1993	1994
	(Rp. Billion)	(Rp. Billion)	(Rp. Billion)	(Rp. Billion)	(Rp. Billion)	(Rp. Billion)	(Rp. Billion)	(Rp. Billion)	(Rp. Billion)	(Rp. Billion)	(Rp. Billion)	(Rp. Billion)	(Rp. Billion)	(Rp. Billion)	(Rp. Billion)	(Rp. Billion)
<b>Regional Gross Domestic Products</b>																
1) Agriculture	24,569	17.6%	3,870,047	17.6%	84,497	0.4%	2,499	1.3%	169,038	12.0%	19,122	2.3%	145,718	13.8%	126,777	11.0%
2) Mining & quarrying	19,370	13.9%	2,512,203	11.4%	0	0.0%	0	0.0%	507	0.0%	0	0.0%	3,527	0.3%	5,964	0.5%
3) Manufacturing industries	29,484	21.1%	5,008,020	22.8%	4,986,474	26.5%	14,585	7.6%	402,670	28.6%	274,123	33.3%	456,578	43.3%	696,231	60.3%
4) Electricity, gas & water supply	1,022	0.7%	471,850	2.1%	828,245	4.4%	9,692	5.1%	33,180	2.4%	16,053	1.9%	23,178	2.2%	5,781	0.5%
5) Construction	9,223	6.6%	1,453,758	6.6%	1,950,023	10.4%	29,426	15.4%	105,917	7.5%	64,523	7.8%	96,126	9.1%	84,675	7.3%
6) Trade, restaurant and hotel	22,850	16.4%	4,582,276	20.9%	3,763,679	20.0%	41,249	21.6%	290,749	20.6%	160,055	19.4%	177,312	16.8%	127,416	11.0%
7) Transportation & communication	8,302	5.9%	1,241,942	5.7%	2,124,181	11.3%	89,225	5.6%	288,946	20.5%	248,160	30.1%	58,588	5.6%	33,495	2.9%
8) Banking and financing	7,070	5.1%	525,667	2.4%	3,195,861	17.0%	2,485	0.2%	9,235	0.7%	3,012	0.4%	2,305	0.2%	7,068	0.6%
9) Ownership of dwelling	3,411	2.4%	318,952	1.5%	598,631	3.2%	1,875	1.0%	14,261	1.0%	4,731	0.6%	10,885	1.0%	8,461	0.7%
10) Public services and defence	9,509	6.8%	1,224,079	5.6%	1,238,918	6.7%	31,579	16.5%	61,213	4.3%	22,087	2.7%	41,961	4.0%	39,145	3.4%
11) Services	4,897	3.5%	746,774	3.4%	82,482	5.1%	8,061	4.2%	34,032	2.4%	12,478	1.5%	37,781	3.6%	19,780	1.7%
<b>Total :</b>	139,707	100.0%	21,955,568	100.0%	18,790,509	100.0%	191,039	100.0%	1,409,748	100.0%	824,344	100.0%	1,053,959	100.0%	1,154,793	100.0%

Year	1993		1994		1995		1996		1997		1998		1999		2000	
	Growth Rate	Rate	Growth Rate	Rate	Growth Rate	Rate	Growth Rate	Rate	Growth Rate	Rate	Growth Rate	Rate	Growth Rate	Rate	Growth Rate	Rate
1993	139,707	6.5%	21,955,568	6.9%	17,350,315	8.4%	-	-	-	-	-	-	-	-	-	-
1992	131,185	6.5%	20,540,754	7.0%	16,001,557	8.6%	1,604,089	10.9%	1,409,748	10.9%	748,589	8.1%	1,053,959	15.8%	-	-
1991	123,225	7.0%	19,195,892	6.9%	14,730,349	7.8%	1,485,688	9.1%	1,270,671	7.7%	692,571	-	909,889	12.5%	1,154,793	8.7%
1990	115,217	7.2%	17,959,098	9.4%	13,664,719	8.6%	1,361,966	9.2%	1,179,445	8.1%	-	-	808,810	13.4%	1,062,366	-
1989	107,437	7.5%	16,409,083	8.2%	12,586,088	9.7%	1,247,098	7.4%	1,091,071	7.4%	-	-	713,047	8.3%	-	-
1988	99,981	5.8%	15,167,864	8.3%	11,469,201	6.6%	1,161,429	9.1%	1,016,116	9.1%	-	-	658,099	12.1%	923,631	6.9%
1987	94,518	4.9%	14,007,974	3.7%	10,757,764	5.8%	1,044,163	19.9%	931,525	7.6%	-	-	587,162	4.0%	864,301	4.6%
1986	90,081	5.9%	13,504,535	6.6%	10,163,638	5.0%	870,977	8.6%	865,648	8.1%	-	-	564,490	5.2%	826,148	22.8%
1985	85,082	2.5%	12,671,165	6.1%	9,678,677	5.1%	802,242	5.7%	800,459	26.9%	-	-	536,750	8.7%	673,020	21.3%
1984	83,037	-	11,940,200	-	9,204,771	-	758,896	-	630,948	-	-	-	493,755	-	554,855	-

Sources : 1. Pendataan Nasional Indonesia 1988 - 1993, Biro Pusat Statistik

2. Pendataan Regional Bruto Propinsi-Propinsi di Indonesia Menurut Lapangan Usaha 1988 - 1993, Biro Pusat Statistik

3. Jakarta Dalam Angka 1994, 1995, Kab. Bogor Dalam Angka 1992, Kab. Tangerang Dalam Angka 1993, Kab. Bekasi Dalam Angka 1993

4. Produk Domestik Regional Bruto Kabupaten/Kotamadya di Jawa Barat 1986 - 1990, Kantor Statistik Propinsi Jawa Barat

5. Study on Cuijiang - Ciduan Integrated Water Resources in Indonesia, JICA

**Table 8 GOVERNMENT FINANCE (1/3)**  
(Central Government)

Kind of Receipts / Expenditures	(Rp. billion)								Average Annual growth rate (%)
	1987/ 1988	1988/ 1989	1989/ 1990	1990/ 1991	1991/ 1992	1992/ 1993	1993/ 1994	1994/ 1995	
<b>RECEIPT</b>	<b>26,961</b>	<b>32,995</b>	<b>38,169</b>	<b>49,451</b>	<b>51,994</b>	<b>58,168</b>	<b>62,652</b>	<b>72,353</b>	<b>15.1%</b>
<i>I. Routine Receipts</i>	<i>20,803</i>	<i>23,004</i>	<i>28,740</i>	<i>39,546</i>	<i>41,585</i>	<i>47,452</i>	<i>52,280</i>	<i>61,370</i>	<i>16.7%</i>
A. Oil & gas	10,047	9,527	11,252	17,712	15,039	15,330	12,508	13,399	4.2%
B. Non oil & gas	10,756	13,477	17,488	21,834	26,546	32,122	39,772	47,971	23.8%
Income tax	2,663	3,949	5,488	6,755	9,580	11,913	15,273	18,350	
Value added tax	3,390	4,505	5,837	7,463	8,926	10,714	12,282	14,087	
Import duties	938	1,192	1,587	2,486	2,133	2,652	2,888	3,218	
Excises duties	1,106	1,390	1,477	1,917	2,223	2,381	2,560	3,001	
Export tax	184	156	171	44	19	8	14	120	
Other taxes	223	292	276	243	303	360	285	303	
Tax on land and buildings	275	424	590	811	875	1,101	1,534	1,632	
Non tax receipts	1,977	1,569	2,062	2,115	2,487	2,993	3,895	5,997	
Other oil receipts	0	0	0	0	0	0	1,041	1,263	
<i>II. Development Receipts</i>	<i>6,158</i>	<i>9,991</i>	<i>9,429</i>	<i>9,905</i>	<i>10,409</i>	<i>10,716</i>	<i>10,372</i>	<i>10,983</i>	<i>8.6%</i>
Program aid	728	2,041	1,007	1,397	1,563	512	441	0	
Project aid	5,430	7,950	8,422	8,508	8,846	10,204	9,931	10,983	
<b>EXPENDITURE</b>	<b>26,958</b>	<b>32,990</b>	<b>38,165</b>	<b>49,450</b>	<b>51,992</b>	<b>58,166</b>	<b>64,460</b>	<b>72,342</b>	<b>15.1%</b>
<i>I. Routine Expenditure</i>	<i>17,481</i>	<i>20,739</i>	<i>24,331</i>	<i>29,998</i>	<i>30,228</i>	<i>34,031</i>	<i>38,799</i>	<i>43,179</i>	<i>13.8%</i>
A. Personnel Expenditure	4,618	4,998	6,201	7,054	8,103	9,466	11,214	13,069	16.0%
Rice allowance	451	518	588	640	922	888	905	1038	
Wages and salaries	3,561	3,833	4,826	5,570	6,299	7,533	9,167	10,490	
Flood allowance	299	327	373	382	393	473	498	801	
Other internal personnel expenditure	177	185	243	264	280	313	342	396	
External personnel expenditure	130	135	171	198	209	259	302	344	
B. Material Expenditure	1,329	1,492	1,702	1,830	2,373	2,870	3,042	4,296	18.2%
Domestic material expenditure	1,239	1,378	1,569	1,670	2,218	2,681	2,848	4,071	
External material expenditure	90	114	133	160	155	189	194	225	
C. Subsidies to Regions	2,815	3,037	3,566	4,236	4,834	5,283	6,796	7,188	14.3%
For Irian Jaya	223	259	228	275	314	377	378	432	
For other local government	2,592	2,778	3,338	3,961	4,520	4,906	6,418	6,756	
D. Debt Repayment	8,204	10,941	11,939	13,395	13,434	15,217	17,288	18,422	12.3%
Internal debt	39	78	149	250	251	275	121	204	
External debt	8,165	10,863	11,790	13,145	13,183	14,942	17,167	18,218	
E. Other Expenditures	515	271	923	3,483	1,484	1,195	459	204	-12.4%
<i>II. Development Expenditure</i>	<i>9,477</i>	<i>12,251</i>	<i>13,834</i>	<i>19,452</i>	<i>21,764</i>	<i>24,135</i>	<i>25,661</i>	<i>29,163</i>	<i>17.4%</i>
Department / Institution	1,385	1,855	2,509	4,854	5,971	7,858	8,560	9,478	
Development subsidy to villages	102	112	112	181	250	327	390	432	
Development subsidy to Kabupaten	263	267	270	392	583	825	1,025	2,554	
Development subsidy to Provinces	291	334	324	486	573	701	783	1318	
Development of primary schools	193	130	100	374	521	655	698	538	
Facilities / public health centers	74	99	122	193	269	320	377	412	
Road infrastructure developments	164	180	294	679	972	1,225	1,352	0	
Subsidies to reconstruction and development of markets	3	3	3	3	2	1	4	0	
Subsidies for regreening & reforestation	16	16	16	33	75	95	104	0	
Development subsidies to East Timor	5	6	0	0	0	0	0	0	
Tax subsidies on land and buildings	223	344	478	657	708	891	1,243	1,485	
Fertilizer subsidy	756	200	278	265	302	175	265	457	
Government capital participation	57	125	141	323	470	150	126	205	
Others	515	630	765	504	722	708	803	904	
Project aid	5,430	7,950	8,422	8,508	8,846	10,204	9,931	10,983	
Development reserves	0	0	0	2,000	1,500	0	0	0	
Subsidies for undeveloped villages	0	0	0	0	0	0	0	397	
<b>SURPLUS/DEFICIT</b>	<b>3</b>	<b>5</b>	<b>4</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>-1,808</b>	<b>11</b>	

Source: Indikator Ekonomi, September 1996, Biro Pusat Statistik

**Table 8 GOVERNMENT FINANCE (2/3)**  
(DKI Jakarta)

Kind of Receipts / Expenditures	(Rp. billion)							Average Annual growth rate (%)
	1987 / 1988	1988 / 1989	1989 / 1990	1990 / 1991	1991 / 1992	1992 / 1993	1993 / 1994	
<b>RECEIPT</b>	<b>454.4</b>	<b>542.5</b>	<b>650.2</b>	<b>987.1</b>	<b>1,241.6</b>	<b>1,381.0</b>	<b>1,670.8</b>	<b>24.2%</b>
1. <i>Previous year surplus</i>	30.1	35.2	36.6	96.2	192.5	180.3	149.1	30.6%
2. <i>Local Government original receipt</i>	245.7	317.8	331.6	618.6	700.6	775.0	993.7	26.2%
Local taxes receipt	179.1	257.3	263.1	470.7	520.8	578.9	768.5	
Retributions receipt	29.4	15.1	51.0	105.4	122.2	115.2	141.5	
Local Government corporate profit	6.8	7.5	7.7	7.2	15.9	21.4	13.6	
Official service receipt	23.3	31.2	4.3	4.7	4.6	3.9	0.9	
Other receipt	7.1	6.7	5.5	30.6	37.1	55.6	69.2	
3. <i>Tax and non tax share</i>	51.4	37.1	98.3	57.8	86.7	103.0	165.2	21.5%
Tax share	51.0	32.0	94.8	51.6	76.6	90.8	143.8	
Non tax share	0.4	5.1	3.5	6.2	10.1	12.2	21.4	
4. <i>Subsidies and contributions</i>	127.2	149.5	165.6	192.3	227.4	280.3	324.7	16.9%
Subsidies	117.2	118.6	130.9	138.8	156.8	193.3	235.4	
Contributions	10.0	30.9	34.7	53.5	70.6	87.0	89.3	
5. <i>Development receipt</i>	0.0	2.9	18.1	22.2	34.4	42.4	38.1	20.5%
Local Government loan	-	2.4	18.1	22.2	34.4	42.4	38.1	
Loan for local corporate	-	0.5	-	-	-	-	-	
<b>EXPENDITURE</b>	<b>454.5</b>	<b>467.3</b>	<b>650.6</b>	<b>962.6</b>	<b>1,051.6</b>	<b>1,232.1</b>	<b>1,403.2</b>	<b>20.7%</b>
1. <i>Current Expenditure</i>	217.4	264.0	335.8	444.3	593.4	715.9	818.1	24.9%
Personnel expenditure	120.6	131.6	140.9	149.7	177.0	200.3	286.2	
Material expenditure	40.8	42.7	55.8	63.8	123.6	159.7	162.7	
Repair & maintenance expenditure	20.1	43.3	67.5	99.4	147.5	178.7	188.2	
Official travel expenditure	2.9	2.6	3.3	4.8	13.6	5.1	5.4	
Other procurement	25.5	23.7	54.3	97.8	92.8	131.2	116.6	
Debt & interest repayment	-	5.5	6.2	6.4	6.7	7.1	9.7	
Funds/Subsidies	-	-	-	-	-	-	-	
Pension and aid expense	7.5	8.0	-	-	-	-	-	
Other current expenditure	-	6.5	7.6	22.2	32.2	33.7	49.1	
Unpredicted current expenditure	-	0.1	0.2	0.2	-	0.1	0.2	
2. <i>Development Expenditure</i>	237.1	203.3	314.8	518.3	458.2	516.2	585.1	16.8%
Agriculture and irrigation	9.1	4.6	17.4	17.4	20.5	28.7	30.9	
Industry	1.0	0.8	0.7	1.1	1.2	1.1	1.5	
Mining and energy	4.4	3.9	5.1	12.3	7.0	7.8	8.4	
Transportation and tourism	35.5	22.9	104.0	175.2	133.2	125.2	130.4	
Trade and cooperatives	0.6	1.8	0.2	0.6	1.1	1.0	2.5	
Manpower and transmigration	2.1	2.3	2.0	3.9	4.9	4.8	5.8	
Rural development	44.7	51.8	21.9	39.1	48.6	59.6	70.0	
Religion	7.9	3.8	6.4	9.0	6.7	6.8	10.1	
Youth education, culture and belief	50.6	33.9	43.7	76.2	48.9	59.9	63.6	
Health & welfare	20.5	13.1	17.2	25.2	21.7	28.8	47.1	
House & transmigration	14.0	13.1	18.7	19.0	17.1	15.8	18.4	
Law	-	0.3	0.6	0.9	1.5	1.5	1.8	
Security & national defense	8.4	4.7	10.1	11.3	15.1	17.5	21.5	
Information, pers & communication	1.0	0.9	1.2	4.5	1.9	2.2	2.7	
Science, technology & research	1.0	1.4	2.5	3.5	5.1	4.3	8.3	
State apparatus	26.5	23.7	38.8	96.2	81.3	89.2	77.8	
Business enterprises	3.1	5.7	9.2	2.4	15.9	36.9	44.8	
Resources & environment	-	14.6	14.6	18.9	24.9	25.1	39.5	
Subsidies	-	-	0.5	1.6	1.6	-	-	
Debt payback payment	6.7	-	-	-	-	-	-	
<b>SURPLUS/DEFICIT</b>	<b>(0.1)</b>	<b>75.2</b>	<b>(0.4)</b>	<b>24.5</b>	<b>190.0</b>	<b>148.9</b>	<b>267.6</b>	

Source: Statistik Keuangan Pemerintah Daerah Tingkat I 1986/1987 - 1989/1990  
and 1990/1991 - 1993/1994, Biro Pusat Statistik

**Table 8      GOVERNMENT FINANCE (3/3)**  
**(West Java Province)**

Kind of Receipts / Expenditures	(Rp. billion)							Average Annual growth rate (%)
	1987/ 1988	1988/ 1989	1989/ 1990	1990/ 1991	1991/ 1992	1992/ 1993	1993/ 1994	
<b>RECEIPT</b>	<b>445.3</b>	<b>488.4</b>	<b>576.0</b>	<b>690.3</b>	<b>802.8</b>	<b>918.9</b>	<b>1,112.5</b>	<b>16.5%</b>
1. <i>Previous year surplus</i>	13.9	23.5	22.0	46.6	76.1	55.8	24.2	9.7%
2. <i>Local Government original receipt</i>	66.1	76.4	103.7	149.1	165.4	181.2	237.9	23.8%
Local taxes receipt	57.1	66.0	87.6	128.3	138.1	149.8	200.6	
Retributions receipt	6.7	7.5	12.7	15.8	19.1	23.6	29.7	
Local Government corporate profit	0.7	0.7	1.0	1.2	3.1	3.4	2.5	
Official service receipt	0.1	0.1	0.2	0.2	0.2	0.2	0.3	
Other receipt	1.5	2.1	2.2	3.6	4.9	4.2	4.8	
3. <i>Tax and non tax share</i>	8.0	8.8	13.0	15.1	17.5	20.0	28.0	23.2%
Tax share	6.8	7.3	11.9	13.9	16.3	18.3	25.4	
Non tax share	1.2	1.5	1.1	1.2	1.2	1.7	2.6	
4. <i>Subsidies and contributions</i>	354.5	378.4	436.0	479.5	543.8	661.9	822.4	15.1%
Subsidies	342.5	366.1	416.4	450.3	506.5	620.0	777.4	
Contributions	12.0	12.3	19.6	29.2	37.3	41.9	45.0	
5. <i>Development receipt</i>	2.8	1.3	1.3	0.0	0.0	0.0	0.0	-
Local Government loan	2.8	0.6	1.0	-	-	-	-	
Loan for local corporate	-	0.7	0.3	-	-	-	-	
<b>EXPENDITURE</b>	<b>422.0</b>	<b>466.4</b>	<b>529.4</b>	<b>614.1</b>	<b>747.0</b>	<b>894.7</b>	<b>1,035.3</b>	<b>16.1%</b>
1. <i>Current Expenditure</i>	374.2	401.5	459.9	510.6	580.0	713.5	882.1	17.7%
Personnel expenditure	312.9	333.9	395.7	431.2	488.2	605.6	764.9	
Material expenditure	26.2	27.7	30.2	33.9	37.3	42.1	47.1	
Repair & maintenance expenditure	3.6	3.7	5.0	5.4	6.7	8.4	10.2	
Official travel expenditure	2.8	3.0	3.5	4.2	5.0	6.3	7.7	
Other procurement	14.4	12.2	14.0	18.6	22.2	22.3	22.5	
Debt & interest repayment	-	0.8	0.8	1.0	1.3	0.5	0.5	
Funds/Subsidies	2.9	5.0	5.6	5.8	8.4	12.0	12.2	
Pension and aid expense	11.4	12.1	-	-	-	-	-	
Other current expenditure	-	3.1	5.1	10.5	10.9	16.0	17.0	
Unpredicted current expenditure	-	-	-	-	0.0	0.3	0.0	
2. <i>Development Expenditure</i>	47.8	64.9	69.5	103.5	167.0	181.2	153.2	21.8%
Agriculture and irrigation	9.0	9.5	8.8	10.6	14.3	13.6	14.6	
Industry	0.4	0.1	0.2	0.3	0.4	0.6	0.7	
Mining and energy	0.3	0.3	0.6	0.2	0.3	0.8	0.5	
Transportation and tourism	7.0	12.7	17.0	23.1	35.8	30.0	27.2	
Trade and cooperatives	0.1	0.2	0.5	0.5	1.0	1.7	1.2	
Manpower and transmigration	0.1	0.3	0.4	0.5	0.7	1.0	0.9	
Rural development	-	12.8	2.9	2.5	1.8	1.7	3.4	
Religion	1.3	1.7	2.9	2.8	9.2	7.5	4.6	
Youth education, culture and belief	2.7	4.2	4.3	5.4	10.8	15.7	11.5	
Health & welfare	1.9	2.2	3.3	3.5	4.4	8.1	8.6	
House & transmigration	0.5	0.5	0.8	1.5	2.8	4.8	2.3	
Law	-	0.2	0.3	0.4	0.6	0.5	0.5	
Security & national defense	0.5	0.9	0.9	1.4	3.7	1.7	1.7	
Information, pers & communication	0.2	0.6	0.6	0.6	1.8	1.1	1.1	
Science, technology & research	0.4	0.5	0.8	0.7	0.9	2.3	1.4	
State apparatus	16.9	9.9	9.4	12.0	12.6	18.4	10.0	
Business enterprises	-	2.9	1.9	3.2	6.1	3.5	3.9	
Resources & environment	0.1	0.4	0.6	0.7	1.3	1.4	1.9	
Subsidies	6.2	5.0	13.3	33.6	58.5	66.8	57.2	
Debt payback payment	0.2	-	-	-	-	-	-	
<b>SURPLUS/DEFICIT</b>	<b>23.3</b>	<b>22.0</b>	<b>46.6</b>	<b>76.2</b>	<b>55.8</b>	<b>24.2</b>	<b>77.2</b>	

Source: Statistik Keuangan Pemerintah Daerah Tingkat I 1986/1987 - 1989/1990  
and 1990/1991 - 1993/1994, Biro Pusat Statistik

Table 9 PRICE INDEX AND INFLATION RATE

Year	Consumer Price Index (DKI Jakarta)				Wholesale Price Index		Inflation Rate (DKI Jakarta)	
	General	Foodstuffs	Housing	Clothing	Miscellaneous	Construction Materials	Calendar	Fiscal
						General	Year	Year
<b>Price Index</b>								
1985	232.28	207.77	272.79	194.85	242.28	113.00	3.94%	5.44% (85/86)
1986	239.92	222.20	275.97	195.91	246.28	119.00	8.18%	6.24% (86/87)
1987	263.50	242.51	292.61	225.29	281.28	132.00	9.02%	8.08% (87/88)
1988	263.70	283.10	309.80	230.10	289.80	145.00	4.44%	5.99% (88/89)
1989	301.02	300.94	324.20	239.91	299.63	160.00	5.56%	4.97% (89/90)
1990	(100)	(100)	(100)	(100)	(100)			
1991	112.31	109.18	115.06	113.96	111.90	174.00	11.26%	10.29% (90/91)
1992	123.79	118.63	127.87	119.98	126.49	190.00	10.38%	10.75% (91/92)
1993	134.30	129.45	137.65	130.32	137.55	200.00	5.46%	11.50% (92/93)
1994	148.29	139.60	156.67	147.10	149.03	213.00	10.28%	7.29% (93/94)
1995	162.35	156.67	175.66	159.38	155.11	224.00	10.56%	9.47% (94/95)
	179.03	178.29	195.32	169.85	165.69	246.00	9.54%	10.30% (95/96)
<b>Average annual increasing ratio</b>								
1985 - 1995 (10 years)	8.8%	10.0%	8.8%	7.7%	7.4%	8.1%	8.5%	8.5%
1990 - 1995 (latest 5 years)	9.8%	10.5%	11.2%	8.3%	8.2%	7.2%	9.2%	9.9%

Sources :

Statistik Indonesia 1988, 1991, 1994, Biro Pusat Statistik  
 Indikator Ekonomi, January 1993, January 1994, January to December 1995  
 Indikator Ekonomi DKI Jakarta 1995, BPS DKI Jakarta

Note :

1. Consumer price index before 1990: April 1977 - March 1978 = 100
2. Consumer price index since 1990: April 1988 - March 1989 = 100
3. Wholesale price index: 1983 = 100

Table 10 INTERNATIONAL BALANCE OF PAYMENT

(Unit : US\$ million)

Items	Fiscal Year						
	1988/ 1989	1989/ 1990	1990/ 1991	1991/ 1992	1992/ 1993	1993/ 1994	1994/ 1995
A) Current Account	-1,859	-1,599	-3,741	-4,352	-2,561	-2,940	-3,488
1) Merchandise	5,513	6,456	5,115	4,911	7,986	7,377	8,039
a) Export (F.O.B)	19,824	23,830	28,143	29,714	35,303	36,504	42,161
Non-oil and non-gas	12,184	14,493	15,380	19,008	24,823	27,170	31,716
Oil and gas	7,640	9,337	12,763	10,706	10,480	9,334	10,445
- Oil	5,007	6,288	8,053	6,869	6,363	5,512	6,312
- LNG	2,508	2,801	4,304	3,510	3,764	3,507	3,746
- LPG	125	248	406	327	353	315	387
b) Import (F.O.B)	-14,311	-17,374	-23,028	-24,803	-27,317	-29,127	-34,122
Non-oil and non-gas	-12,239	-14,845	-19,448	-21,660	-23,751	-25,311	-30,476
Oil and gas	-2,072	-2,529	-3,580	-3,143	-3,566	-3,816	-3,646
- Oil	-1,912	-2,342	-3,388	-2,915	-3,314	-3,555	-3,383
- LNG	-160	-187	-192	-228	-252	-261	-263
2) Services (net)	-7,372	-8,055	-8,856	-9,263	-10,547	-10,317	-11,527
a) Non-oil and non-gas	-4,864	-5,158	-5,683	-6,262	-7,148	-7,333	-8,515
b) Oil and gas	-2,508	-2,897	-3,173	-3,001	-3,399	-2,984	-3,012
- Oil	-1,560	-1,635	-1,783	-1,796	-1,722	-1,638	-1,557
- LNG	-948	-1,262	-1,390	-1,205	-1,677	-1,346	-1,455
B) Capital Account	2,614	2,405	6,780	5,551	5,199	5,711	4,750
1) Official capital (net)	2,825	1,830	924	1,418	915	1,063	105
a) inflows	6,588	5,516	5,006	5,600	5,755	6,195	5,651
IGGI	5,468	4,668	4,897	5,250	5,527	5,778	5,510
non-IGGI	1,120	848	109	350	228	417	141
b) Debt repayment	-3,763	-3,686	-4,082	-4,182	-4,840	-5,132	-5,546
2) Private capital	-211	575	5,856	4,133	4,284	4,648	4,645
a) Direct investment	585	722	1,424	1,531	1,705	1,971	2,566
b) Others	-796	-147	4,432	2,602	2,579	2,677	2,079
C) Total (A through B)	755	806	3,039	1,199	2,638	2,771	1,262
D) Errors and Omissions (net)	-1,432	-558	263	-218	-1,199	-2,044	646
E) Reserves	677	-248	-3,302	-981	-1,439	-727	-616
1) Foreign assets	677	-248	-3,302	-981	-1,439	-727	-616
2) Foreign liabilities	0	0	0	0	0	0	0

Sources : Indikator Ekonomi January 1993 and September 1996, Biro Pusat Statistik.

Table 11 MAIN IMPORT AND EXPORT COMMODITIES OF INDONESIA

Commodity Group	1981		1985		1990		1995	
	Value (US\$ million)	Rate(*)	Value (US\$ million)	Rate(*)	Value (US\$ million)	Rate(*)	Value (US\$ million)	Rate(*)
<b>(A) Import</b>								
a) Foodstuff and livestock	1,356	10.2%	556	5.4%	852	3.9%	3,023	7.4%
b) Beverages and tobacco	45	0.3%	21	0.2%	54	0.2%	178	0.4%
c) Raw materials (inedible)	565	4.3%	729	7.1%	1,885	8.6%	3,643	9.0%
d) Fuel, lubricants and related materials	1,727	13.0%	1,288	12.6%	1,937	8.9%	3,007	7.4%
e) Animal & vegetable oils & fats	29	0.2%	36	0.4%	25	0.1%	105	0.3%
f) Chemical materials	1,754	13.2%	1,917	18.7%	3,394	15.5%	6,251	15.4%
g) Manufactured goods classified chiefly by materials	2,518	19.0%	1,718	16.7%	3,553	16.3%	6,669	16.4%
h) Machinery and vehicles	4,619	34.8%	3,618	35.3%	9,328	42.7%	16,290	40.1%
i) Miscellaneous manufactured articles	325	2.4%	331	3.2%	797	3.6%	1,426	3.5%
j) Commodities & transactions not classified above	334	2.5%	46	0.4%	12	0.1%	37	0.1%
Total	13,272	100.0%	10,260	100.0%	21,837	100.0%	40,629	100.0%
<b>(B) Export</b>								
(1) Petroleum & Gas	20,663	82.1%	12,718	68.4%	11,071	43.1%	10,465	23.0%
a) Crude petroleum	16,954	67.4%	8,251	44.4%	6,220	24.2%	5,146	11.3%
b) Petroleum and related products	1,211	4.8%	832	4.5%	1,184	4.6%	1,297	2.9%
c) Gas	2,499	9.9%	3,635	19.6%	3,667	14.3%	4,022	8.9%
(2) Agricultural Products	1,570	6.2%	1,388	7.5%	2,083	8.1%	2,889	6.4%
a) Rubber	42	0.2%	35	0.2%	40	0.2%	42	0.1%
b) Coffee	346	1.4%	556	3.0%	369	1.4%	596	1.3%
c) Logs	662	2.6%	9	0.0%	-	0.0%	-	0.0%
d) Shrimps	163	0.6%	202	1.1%	671	2.6%	1,032	2.3%
e) Tea	101	0.4%	149	0.8%	181	0.7%	85	0.2%
f) Spices	73	0.3%	126	0.7%	152	0.6%	214	0.5%
g) Tobacco	51	0.2%	43	0.2%	59	0.2%	49	0.1%
h) Cocoa beans	15	0.1%	59	0.3%	99	0.4%	225	0.5%
i) Cassava	33	0.1%	46	0.2%	71	0.3%	-	0.0%
j) Fish	37	0.1%	22	0.1%	205	0.8%	372	0.8%
k) Vegetables	5	0.0%	7	0.0%	22	0.1%	43	0.1%
l) Fruits	4	0.0%	16	0.1%	21	0.1%	30	0.1%
m) Other agricultural products	39	0.2%	118	0.6%	192	0.7%	201	0.4%
(3) Industrial Products	2,667	10.6%	4,246	22.8%	11,879	46.3%	29,328	64.6%
a) Plywood	161	0.6%	825	4.4%	2,726	10.6%	3,462	7.6%
b) Sawn wood	220	0.9%	307	1.7%	110	0.4%	454	1.0%
c) Other processed wood	36	0.1%	53	0.3%	491	1.9%	1,075	2.4%
d) Tin	452	1.8%	241	1.3%	173	0.7%	239	0.5%
e) Aluminium	1	0.0%	246	1.3%	262	1.0%	475	1.0%
f) Nickel	151	0.6%	117	0.6%	188	0.7%	284	0.6%
g) Garments	95	0.4%	340	1.8%	1,670	6.5%	3,388	7.5%
h) Other textile	31	0.1%	220	1.2%	1,260	4.9%	2,816	6.2%
i) Processed rubber	812	3.2%	683	3.7%	851	3.3%	2,191	4.8%
j) Cattle fodder	88	0.4%	68	0.4%	163	0.6%	142	0.3%
k) Palm oil	107	0.4%	166	0.9%	204	0.8%	747	1.6%
l) Fatty acids	11	0.0%	59	0.3%	80	0.3%	327	0.7%
m) Electrical apparatus	86	0.3%	144	0.8%	286	1.1%	922	2.0%
n) Processed food	64	0.3%	57	0.3%	293	1.1%	819	1.8%
o) Cement	19	0.1%	22	0.1%	97	0.4%	8	0.0%
p) Chemicals	30	0.1%	57	0.3%	113	0.4%	519	1.1%
q) Fertilizer	4	0.0%	80	0.4%	194	0.8%	277	0.6%
r) Paper & paper goods	1	0.0%	21	0.1%	156	0.6%	1,011	2.2%
s) Other industrial products	296	1.2%	542	2.9%	2,561	10.0%	10,172	22.4%
(4) Mining Products	203	0.8%	196	1.1%	636	2.5%	2,691	5.9%
a) Copper ore	128	0.5%	115	0.6%	375	1.5%	1,537	3.4%
b) Coal	5	0.0%	35	0.2%	168	0.7%	1,033	2.3%
c) Other mining products	69	0.3%	47	0.3%	94	0.4%	121	0.3%
(5) Other Products	62	0.2%	39	0.2%	6	0.0%	46	0.1%
Total	25,165	100.0%	18,587	100.0%	25,675	100.0%	45,418	100.0%

Source : Indikator Ekonomi, September 1996, Biro Pusat Statistik

Note : Symbol of (\*) indicates percentage distribution in value within major import and export commodities.

Table 12 TRADING SITUATION OF TANJUNG PRIOK PORT IN JAKARTA

Port of Import and/or Export	1987		1988		1989		1990		1991		1992		1993		1994	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value
<b>(A) Import</b>																
<i>Tanjung Priok</i>	6,199	5,895	6,197	6,527	7,238	8,395	9,245	12,008	10,054	14,248	11,218	14,116	12,578	15,340	14,907	18,340
Contribution (%)		47.7%		49.3%		51.3%		55.0%		55.1%		51.7%		54.2%		59.2%
<i>Indonesia</i>	23,081	12,370	21,518	13,249	26,082	16,380	30,280	21,837	34,215	25,869	36,016	27,280	37,961	28,328	41,960	30,954
Contribution (%)		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%
<b>(B) Export</b>																
<i>Tanjung Priok</i>	7,547	2,013	8,144	2,795	9,759	3,891	8,176	5,123	8,671	6,885	11,950	9,751	10,463	10,903	10,689	11,411
Contribution (%)		11.7%		14.5%		17.6%		20.0%		23.6%		28.6%		29.6%		28.7%
<i>Indonesia</i>	134,249	17,136	115,381	19,219	102,263	22,159	107,566	25,675	115,461	29,142	151,535	33,967	177,471	56,823	214,714	39,708
Contribution (%)		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%		100.0%

Sources: Statistik Indonesia 1991 and 1994 Biro Pusat Statistik

Note:

1. Unit: Volume in 1,000 ton

Value in US\$ million

2. Figures in 1994 are estimated figures by Biro Pusat Statistik



Table 13 FOREIGN CURRENCY EXCHANGE RATE  
(Middle Rate)

Month	1989		1990		1991		1992		1993		1994		1995		1996	
	US\$	JP¥	US\$	JP¥	US\$	JP¥	US\$	JP¥	US\$	JP¥	US\$	JP¥	US\$	JP¥	US\$	JP¥
January	1,735.38	13.56	1,803.75	12.35	1,907.40	14.13	1,997.60	15.79	2,064.78	16.55	2,126.25	18.99	2,217.25	22.14	2,303.25	22.65
February	1,741.50	13.50	1,810.95	12.33	1,915.00	14.56	2,006.75	15.60	2,066.63	17.12	2,133.75	20.06	2,232.00	22.69	2,315.40	21.66
March	1,750.80	13.33	1,819.00	11.85	1,928.25	13.97	2,014.80	15.07	2,069.13	17.70	2,161.60	20.53	2,236.80	24.48	2,341.75	22.13
April	1,755.00	13.19	1,825.75	11.41	1,935.20	13.95	2,028.80	14.98	2,070.76	18.45	2,170.25	20.93	2,244.00	26.70	2,346.20	21.91
May	1,765.00	12.66	1,830.80	11.78	1,943.00	13.93	2,024.50	15.36	2,076.67	18.88	2,173.25	20.67	2,245.00	26.52	2,344.80	22.12
June	1,770.90	12.21	1,840.00	11.92	1,951.50	13.80	2,030.60	15.89	2,083.83	19.48	2,169.25	21.35	2,242.50	26.54	2,346.00	21.64
July	1,772.50	12.47	1,845.80	12.28	1,957.00	14.03	2,033.60	16.06	2,093.00	19.47	2,163.00	21.89	2,239.25	25.86	2,348.40	21.53
August	1,779.30	12.51	1,853.55	12.48	1,961.10	14.19	2,034.50	15.97	2,097.38	20.25	2,177.25	21.84	2,258.60	24.17	2,356.00	21.90
September	1,786.25	12.21	1,859.57	13.28	1,966.00	14.49	2,037.70	16.51	2,115.00	20.01	2,186.40	22.07	2,284.00	22.73	2,345.71	21.41
October	1,787.03	12.48	1,865.00	14.29	1,973.80	14.97	2,043.80	16.80	2,135.50	19.46	2,186.00	22.19	2,281.00	22.68	2,346.05	20.94
November	1,793.15	12.38	1,874.60	14.44	1,980.75	15.16	2,053.00	16.49	2,115.00	19.38	2,185.60	22.32	2,291.20	22.50		
December	1,794.19	12.39	1,888.91	13.93	1,988.38	15.34	2,057.90	16.47	2,118.00	18.96	2,195.80	22.02	2,302.50	22.65		
Average	1,769.25	12.74	1,843.14	12.70	1,950.62	14.38	2,030.30	15.92	2,091.97	18.81	2,169.03	21.24	2,256.18	24.14	2,339.36	21.79

Source : Study on Cijulang - Cidurian Integrated Water Resources in Indonesia, JICA.

Indikator Ekonomi January 1992, January 1993, January 1994, May 1994, January 1995, May 1995, August 1995, October 1995, January 1996, April 1996 and August 1996, Biro Pusat Statistik.

Written information from Bank Indonesia for September and October 1996.

**Table 14 INFLUENCE OF FLOODS IN JANUARY AND FEBRUARY 1996 (1/4)**  
(Based on Interview Survey)

No.	Respondent	Location	Information obtained
1.	Shopkeeper (female) Kiosk	on the left embankment of WBC near estuary (illegal)	<ul style="list-style-type: none"> <li>- Both January and February floods last one week.</li> <li>- Children could not go to school for one week.</li> <li>- Itchy skin after floods</li> </ul>
2.	Shopkeeper (male) Small grocery	in a housing complex on the left side of lower WBC	<ul style="list-style-type: none"> <li>- 40 cm inundation in January and 1 m in February.</li> <li>- Merchandise are carried upstairs during floods.</li> <li>- They opened the shop upstairs during floods for the convenience of neighbors.</li> <li>- Street in front of shop can not be used for 10 to 14 days.</li> <li>- They had to use boat to go to main street.</li> <li>- Children could not go to school for one week.</li> </ul>
3.	Shopkeeper (female) Book store	in a housing complex on the left side of lower WBC	<ul style="list-style-type: none"> <li>- 30 cm inundation in January and 80 cm in February.</li> <li>- Furniture such as spring bed, wardrobe, books and stationery are damaged.</li> <li>- Itchy skin and sore throat after flood.</li> <li>- They moved to relative's place since they have a baby for one month.</li> </ul>
4.	Shopkeeper (male) Small grocery	on the left side of lower WBC near Jembatan Besi	<ul style="list-style-type: none"> <li>- 50 cm inundation in January and 1 m in February</li> <li>- Street in front of shop can not be used for 4 days.</li> <li>- Assistance of food was available from the Village.</li> <li>- Children could not go to school for one week.</li> </ul>
5.	Shopkeeper (male) Architectural materials dealer	on the left side of lower WBC near Jembatan Besi	<ul style="list-style-type: none"> <li>- 60 cm inundation in January and 1 m in February.</li> <li>- Building, household equipment and cloths are damaged.</li> <li>- Merchandise such as cement, tiles, sand, blocks are damaged.</li> <li>- Some food was provided from the village.</li> <li>- Stomachache and itchy skin due to dirty water of flood.</li> </ul>
6.	Shopkeeper (male) Architectural material dealer	on the left side of lower WBC near Jembatan Besi	<ul style="list-style-type: none"> <li>- 40 cm inundation into the house in February.</li> <li>- The street in front of the shop can not be used for 4 days.</li> <li>- Household equipment like refrigerator was damages.</li> <li>- Merchandise such as plywood, cement, tin plate were damaged (approximately Rp.10 million).</li> <li>- Skin disease and itchy skin after flood.</li> </ul>
7.	Housewife	on the right side of WBC near railway in Kel. Cideng.	<ul style="list-style-type: none"> <li>- Location is just beside the embankment which was almost collapsed by the flood in February.</li> <li>- 70 cm inundation into the house in February.</li> <li>- House was damaged by stones of railway carried by the flood water.</li> <li>- Children could not go to school for 3 days.</li> <li>- Assistance from army worked for flood fighting.</li> <li>- Assistance of food from the Government.</li> <li>- Assistance of neighbors and relatives</li> <li>- Some caught cold due to tiredness by flood fighting.</li> </ul>

**Table 14 INFLUENCE OF FLOODS IN JANUARY AND FEBRUARY 1996 (2/4)**  
(Based on Interview Survey)

No.	Respondent	Location	Information obtained
8.	The master of a house	on the right side of WBC near railway in Kel. Cideng	<ul style="list-style-type: none"> <li>- Location is just beside the embankment which was almost collapsed by the flood in February.</li> <li>- 80 cm inundation into the house in February.</li> <li>- House was almost collapsed by stones of railway carried by the flood water.</li> <li>- He could not go to work for 3 days.</li> <li>- They took shelter at a shopping center during floods.</li> <li>- Assistance of food from the Government was available.</li> <li>- Assistance of neighbors and relatives was available.</li> </ul>
9.	The master of a house	on the left side of WBC near Rawa Kepa pumping st. in Kel. Tomang	<ul style="list-style-type: none"> <li>- 90 cm inundation in January and 1 m in February.</li> <li>- House, bed, wardrobe and cloths are damaged.</li> <li>- He could not go to work for a week.</li> <li>- They took shelter at a school during floods.</li> <li>- Assistance of food from the Government was available.</li> <li>- Failure of power supply and trouble of water pump occurred due to flood.</li> <li>- Warning of the flood by the village was available in February. No warning in January.</li> </ul>
10.	Shopkeeper (male)	on the left side of WBC near Rawa Kepa pumping st. in Kel. Tomang	<ul style="list-style-type: none"> <li>- 10 cm inundation in January, 40 cm in February.</li> <li>- house, household equipment and cloths are damaged.</li> <li>- He could not go to work for 3 days in February.</li> <li>- Food assistance (rice/noodles) was available.</li> <li>- He had to have inoculation at a health center after flood.</li> </ul>
11.	The master of a house	on the left side of WBC near Karet barrage in Kel. Petamburan	<ul style="list-style-type: none"> <li>- 110 cm inundation in January, 120 cm in February.</li> <li>- Both January and February floods last 3 days.</li> <li>- They carried all furniture upstairs during flood</li> <li>- Skin disease and itchy skin after flood.</li> <li>- Food assistance (rice/noodles) was available.</li> </ul>
12.	Housewife	on the left side of WBC near Karet barrage in Kel. Petamburan	<ul style="list-style-type: none"> <li>- 150 cm inundation in January, 160 cm in February</li> <li>- Both January and February floods last 3 to 4 days.</li> <li>- They carried all furniture upstairs during flood.</li> <li>- Stomachache and itchy skin after flood.</li> <li>- Children could not go to school for 3 to 4 days.</li> </ul>
13.	Shopkeeper (female) Wholesaler of sugar, rice and flour	on the right side of Ciliwung river near Jatinegara in Kel. Balimester	<ul style="list-style-type: none"> <li>- 160 cm inundation in January, 30 cm in February</li> <li>- They had to close the shop for almost 1 month.</li> <li>- Beds, TV and refrigerator are damaged.</li> <li>- Most of merchandise (sugar, rice, flour) are damaged.</li> <li>- They had to damped a lot of rice, sugar, flour.</li> <li>- They estimate their damage at Rp. 10 to 20 million.</li> </ul>

**Table 14 INFLUENCE OF FLOODS IN JANUARY AND FEBRUARY 1996 (3/4)**  
(Based on Interview Survey)

No.	Respondent	Location	Information obtained
14.	Clerk (male) Bank	on the right side of Ciliwung river near Jatinegara in Kel. Balimester	<ul style="list-style-type: none"> <li>- 150 cm inundation in January.</li> <li>- Special equipment such as computers, telephone and cash counting machines are damaged. Backup copy of computer data was safe.</li> <li>- Bank documents were damaged.</li> <li>- They operated the bank even during the flood at a temporary office for the convenience of customers without power supply.</li> <li>- They estimate the damage may be Rp.50 to 100 million.</li> </ul>
15.	Shopkeeper (male) Tailor	on the right side of Ciliwung river near Jatinegara in Kel. Balimester	<ul style="list-style-type: none"> <li>- 90 cm inundation in January.</li> <li>- The flood was biggest in these 30 years</li> <li>- Merchandise (cloth, label and paper) were damaged.</li> <li>- He regret that he lost letters and pictures due to flood.</li> </ul>
16.	Shopkeeper (male) Kerosene, gas dealer	on the left side of Ciliwung river in Kampung Melayu area	<ul style="list-style-type: none"> <li>- 80 cm inundation in January and 30 cm in February.</li> <li>- Both January and February floods last 2 days.</li> <li>- Street in front of shop can not be used for 3 days.</li> <li>- They carried all household equipment upstairs during floods.</li> <li>- Itchy skin after floods.</li> </ul>
17.	Housemaid (female)	on the left side of Ciliwung river in Kampung Melayu area	<ul style="list-style-type: none"> <li>- 150 cm inundation in January and 30 cm in February.</li> <li>- Both January and February floods last 3 days.</li> <li>- Street in front of shop can not be used for 3 days.</li> <li>- A lot of earth and sand discharged into the house.</li> <li>- The family could not go to work or school for a week.</li> </ul>
18.	Act. Room Division Manager (male) One of large international hotel in Indonesia	Jl. M.H. Thamrin	<ul style="list-style-type: none"> <li>- No flood water come into the hotel.</li> <li>- Power supply from PLN stopped for 24 to 36 hours. They used their own generator sets for lighting, but they have to give us air conditioner because of the capacity of the generator.</li> <li>- They had many cancellation but had many guests from other hotels which had been inundated.</li> <li>- Since the highway to the airport was inundated, guests had to use alternative road and it took 3 to 6 hours to the airport.</li> <li>- Many employee of the hotel could not come to the hotel since the public transportation was not available during flood.</li> <li>- Guests already stayed in the hotel could not go out for business.</li> <li>- He said that the activity of Jakarta was at a complete standstill during and after the flood.</li> </ul>

**Table 14 INFLUENCE OF FLOODS IN JANUARY AND FEBRUARY 1996 (4/4)**  
(Based on Interview Survey)

No.	Respondent	Location	Information obtained
19.	Guest relation officer (female) One of middle class hotel	Jl. K.H. Wahid Hasyim	<ul style="list-style-type: none"> <li>- Underground space used for parking lot and electric facilities was submerged.</li> <li>- Some cars parked underground were damaged.</li> <li>- Electric facilities including electricity panel and generator sets were submerged. Electricity supply was not available for 2 days. Therefore they had to transfer their guests to other hotels.</li> <li>- They already installed a new generator sets on a higher base.</li> </ul>
20.	Manager (male) General affairs division, One of the largest car manufacturer in Indonesia	North Jakarta	<p>[Damage]</p> <ul style="list-style-type: none"> <li>- 60 cm inundation in February.</li> <li>- They had to stop operation of the factory for 2 weeks which normally manufactures one car every 2.4 minutes.</li> <li>- 110 to 120 new cars were submerged and all the cars are used by them and their groups (not for sale).</li> <li>- Warehouse with 21,000 m<sup>2</sup> and 45,000 tons of spare parts was inundated with 30 cm depth. A lot of spare parts were submerged and all the submerged parts are sold as scrap iron with 10 % of regular price.</li> <li>- 4,000 employee could not come to work for at least a week.</li> </ul> <p>[Measure]</p> <ul style="list-style-type: none"> <li>- They had have a lot of drainage pumps in the factory. However the pumps did not work during flood in February because the water level out side the factory was already high and also power supply was stopped. They have generator sets also, but they did not works either due to submergence.</li> <li>- They organized a study team and established a program to prevent flood damages against the same scale flood as one in February. The program was already implemented during dry season from April to September 1996. The program includes the following works. <ul style="list-style-type: none"> <li>a. Level up gates</li> <li>b. High concrete block fence</li> <li>c. Strengthen drainage pumps</li> <li>d. Level up electricity panel to higher position</li> <li>e. Level up generator sets to higher position</li> <li>f. Strengthen generator sets</li> </ul> </li> <li>- Budget for the program was more than Rp.1.5 billion. But they said that direct damage and cost they spent for the program is small when compared with the loss due to 2 weeks suspension of the factory.</li> </ul>

**Table 15 NUMBER OF HOUSE BY ADMINISTRATIVE UNIT IN FLOOD PRONE AREA (1/2)**  
(As of 1993)

Administrative Units	Area (km2)	Population in 1993 (persons)	Type of House						Total Nos	Average family size
			Permanent		Semi-permanent		Non-permanent			
			Nos	Comp.	Nos	Comp.	Nos	Comp.		
<b>DKI Jakarta</b>	466.30	5,624,267	480,052	53%	307,880	34%	123,914	14%	911,846	6.2
<b>Jakarta Selatan</b>	18.58	449,588	28,364	48%	23,594	40%	6,914	12%	58,872	7.6
Setia Budi	9.05	169,764	10,581	38%	12,472	45%	4,500	16%	27,553	6.2
Tebet	9.53	279,824	17,783	57%	11,122	36%	2,414	8%	31,319	8.9
<b>Jakarta Timur</b>	131.36	1,526,642	154,467	60%	79,774	31%	23,247	9%	257,488	5.9
Kramat Jati	13.34	187,361	29,529	86%	4,639	14%	25	0%	34,193	5.5
Makasar	21.64	145,894	16,063	78%	3,472	17%	1,181	6%	20,716	7.0
Jatinegara	10.64	274,181	13,245	34%	22,517	57%	3,770	10%	39,532	6.9
Duren Sawit	22.81	266,799	39,737	80%	7,557	15%	2,610	5%	49,904	5.3
Matraman	4.85	186,471	10,325	38%	13,660	51%	2,915	11%	26,900	6.9
Pulo Gadung	15.61	260,588	25,946	71%	8,849	24%	1,551	4%	36,346	7.2
Cakung	42.47	205,348	19,622	39%	19,080	38%	11,195	22%	49,897	4.1
<b>Jakarta Pusat</b>	47.90	1,130,265	77,210	49%	58,560	37%	21,194	14%	156,964	7.2
Tanah Abang	9.30	196,113	10,530	38%	10,919	39%	6,470	23%	27,919	7.0
Menteng	6.53	115,576	8,559	59%	4,906	34%	1,024	7%	14,489	8.0
Senen	4.23	127,101	7,156	48%	5,938	39%	1,963	13%	15,057	8.4
Cempaka Putih	4.69	88,548	6,367	69%	1,825	20%	1,009	11%	9,201	9.6
Johor Baru	2.38	109,262	11,752	68%	5,210	30%	342	2%	17,304	6.3
Sawah Besar	5.92	141,488	10,699	50%	8,693	41%	1,801	8%	21,193	6.7
Gambir	7.60	121,376	10,792	53%	8,138	40%	1,244	6%	20,174	6.0
Kemayoran	7.25	230,801	11,355	36%	12,931	41%	7,341	23%	31,627	7.3
<b>Jakarta Barat</b>	126.15	1,441,942	128,076	50%	91,475	36%	37,096	14%	256,647	5.6
Kebon Jeruk	17.51	179,862	21,059	57%	13,182	36%	2,642	7%	36,883	4.9
Kembangan	24.64	111,242	13,975	63%	7,390	33%	814	4%	22,179	5.0
Cengkareng	27.93	198,378	16,873	36%	16,485	35%	13,288	28%	46,646	4.3
Kali Deres	27.40	121,054	12,201	34%	11,717	33%	11,547	33%	35,465	3.4
Grogol Petamburan	11.29	219,876	18,631	59%	10,909	34%	2,181	7%	31,721	6.9
Palmerah	7.54	190,602	11,793	38%	16,992	54%	2,459	8%	31,244	6.1
Tambora	5.48	270,229	21,256	64%	9,366	28%	2,487	8%	33,109	8.2
Taman Sari	4.36	150,699	12,288	63%	5,434	28%	1,678	9%	19,400	7.8
<b>Jakarta Utara</b>	142.31	1,075,830	91,935	51%	54,477	30%	35,463	19%	181,875	5.9
Penjaringan	35.48	164,568	21,143	63%	7,111	21%	5,105	15%	33,359	4.9
Pademangan	11.91	120,643	6,846	43%	4,688	29%	4,520	28%	16,054	7.5
Tanjung Priok	24.90	285,027	22,118	42%	18,316	35%	12,147	23%	52,581	5.4
Koja	11.34	233,210	17,451	51%	10,971	32%	5,951	17%	34,373	6.8
Kelapa Gading	16.12	83,841	9,739	66%	4,182	28%	785	5%	14,706	5.7
Cilincing	42.56	188,541	14,638	48%	9,209	30%	6,955	23%	30,802	6.1

**Table 15 NUMBER OF HOUSE BY ADMINISTRATIVE UNIT IN FLOOD PRONE AREA (2/2)**  
(As of 1993)

Administrative Units	Area (km2)	Population in 1993 (persons)	Type of House						Total Nos	Average family size
			Permanent		Semi-permanent		Non-permanent			
			Nos	Comp.	Nos	Comp.	Nos	Comp.		
<b>Kab. Tangerang</b>	840.83	1,068,723	68,429	36%	61,329	32%	60,767	32%	190,525	5.6
Cisoka	72.26	99,700	10,077	55%	7,336	40%	1,002	5%	18,415	5.4
Cikupa	79.98	126,839	10,156	49%	6,001	29%	4,656	22%	20,813	6.1
Pasar Kemis	91.41	95,015	9,020	50%	6,822	38%	2,266	13%	18,108	5.2
Balaraja	64.73	108,534	11,830	61%	4,614	24%	2,810	15%	19,254	5.6
Kresck	58.55	77,770	3,729	27%	3,886	29%	6,000	44%	13,615	5.7
Kronjo	67.19	72,133	2,582	20%	3,508	27%	6,928	53%	13,018	5.5
Mauk	137.60	120,571	4,892	24%	6,064	30%	9,551	47%	20,507	5.9
Rajeg	56.45	56,675	3,070	25%	3,678	30%	5,373	44%	12,121	4.7
Sepatan	60.69	97,257	2,981	18%	5,764	34%	8,274	49%	17,019	5.7
Pakuhaji	81.65	71,456	2,600	20%	4,315	33%	6,243	47%	13,158	5.4
Teluknaga	39.51	83,391	3,531	27%	5,183	40%	4,397	34%	13,111	6.4
Kosambi	30.81	59,382	3,961	35%	4,158	37%	3,267	29%	11,386	5.2
<b>Kotamadya Tangerang</b>	92.88	620,950	70,219	58%	30,950	25%	20,895	17%	122,064	5.1
Ciledug	23.46	251,726	39,374	80%	8,044	16%	2,074	4%	49,492	5.1
Cipondoh	39.17	180,045	17,719	54%	9,787	30%	5,413	16%	32,919	5.5
Batucapeer	20.26	145,082	10,133	33%	10,964	36%	9,456	31%	30,553	4.7
Benda	9.99	44,097	2,993	33%	2,155	24%	3,952	43%	9,100	4.8
<b>Kab. Bekasi</b>	629.60	1,271,356	151,596	50%	92,851	31%	55,776	19%	300,223	4.2
Pondok Gede	46.85	169,418	21,009	52%	13,195	33%	6,001	15%	40,205	4.2
Jatiasih	24.49	78,815	10,718	53%	5,348	27%	4,037	20%	20,103	3.9
Bantargebang	41.78	61,281	4,661	36%	4,329	33%	4,008	31%	12,998	4.7
Tambun	78.78	167,297	17,076	47%	11,467	31%	7,902	22%	36,445	4.6
Tarumajaya	54.63	38,395	1,433	17%	2,222	27%	4,709	56%	8,364	4.6
Babelan	63.61	67,646	4,715	30%	5,782	37%	4,996	32%	15,493	4.4
Tambelang	99.19	59,235	1,389	12%	3,377	29%	7,065	60%	11,831	5.0
Muaragembong	122.90	21,093	1,000	18%	1,973	36%	2,506	46%	5,479	3.8
Bekasi Timur	29.16	216,175	28,846	62%	17,570	38%	0	0%	46,416	4.7
Bekasi Selatan	23.67	141,933	21,763	68%	6,998	22%	3,076	10%	31,837	4.5
Bekasi Barat	26.66	142,561	31,739	67%	10,735	23%	5,175	11%	47,649	3.0
Bekasi Utara	17.88	107,507	7,247	31%	9,855	42%	6,301	27%	23,403	4.6
<b>A part of Kab. Serang</b>	241.00	181,585	12,513	35%	9,163	26%	13,682	39%	35,358	5.1
Cikande	91.42	71,266	4,002	31%	6,037	47%	2,887	22%	12,926	5.5
Carenang	63.50	50,823	3,042	29%	2,679	25%	4,889	46%	10,610	4.8
Tirtayasa	86.08	59,496	5,469	46%	447	4%	5,906	50%	11,822	5.0
<b>Total of Kecamatan in Flood Prone Area</b>	2,270.61	8,766,881.00	782,809.00	50%	502,173.00	32%	275,034.00	18%	1,560,016.00	5.6

Source: Sensus Pertanian 1993 - Potensi Desa/Kelurahan, Biro Pusat Statistik

Note: Permanent house: house with full outside walls made of block masonry.

Semi-permanent: house with combination outside walls of block masonry (lower part) and wood material (upper part).

Non-permanent: house with full wood or bamboo made outside walls.

**Table 16 POPULATION PROJECTION BY ADMINISTRATIVE UNIT IN FLOOD PRONE AREA (1/2)**

Administrative Units	Area (km <sup>2</sup> )	Population Census 1990 (1,000 persons)	Population Projection			
			in 1995		in 2025	
			Population (1,000 persons)	Average annual growth rate	Population (1,000 persons)	Average annual growth rate
<b>DKI Jakarta</b>	466.3	6,357.5	6,990.9	1.9%	11,153.5	1.6%
<b>Jakarta Selatan</b>	18.58	428	443.5	0.7%	460.5	0.2%
Setia Budi	9.05	179.5	186.0	0.7%	193.1	0.2%
Tebet	9.53	248.5	257.5	0.7%	267.4	0.2%
<b>Jakarta Timur</b>	131.36	1,686.4	1,899.8	2.4%	3,258.4	1.9%
Kramat Jati	13.34	211.8	238.6	2.4%	409.2	1.9%
Makasar	21.64	146.5	165.1	2.4%	283.1	1.9%
Jatinegara	10.64	277.6	312.7	2.4%	536.4	1.9%
Duren Sawit	22.81	290.2	326.9	2.4%	560.7	1.9%
Matraman	4.85	165.4	186.3	2.4%	319.5	1.9%
Pulo Gadung	15.61	279.1	314.4	2.4%	539.3	1.9%
Cakung	42.47	315.8	355.8	2.4%	610.2	1.9%
<b>Jakarta Pusat</b>	47.90	1,075.1	1,028.4	-0.9%	660.8	-1.4%
Tanah Abang	9.3	192.2	183.8	-0.9%	118.1	-1.4%
Menteng	6.53	90.8	86.8	-0.9%	55.8	-1.4%
Senen	4.23	112.8	107.9	-0.9%	69.4	-1.4%
Cempaka Putih	4.69	92.5	88.5	-0.9%	56.8	-1.4%
Johor Baru	2.38	122.9	117.6	-0.9%	75.6	-1.4%
Sawah Besar	5.92	124.5	119.1	-0.9%	76.5	-1.4%
Gambir	7.6	112.9	108.0	-0.9%	69.4	-1.4%
Kemayoran	7.25	226.5	216.7	-0.9%	139.2	-1.4%
<b>Jakarta Barat</b>	126.15	1,819.9	2,100.6	2.9%	4,169.1	2.4%
Kebon Jeruk	17.51	261.6	302.0	2.9%	599.4	2.4%
Kembangan	24.64	157.2	181.4	2.9%	360.1	2.4%
Cengkareng	27.93	372.3	429.7	2.9%	852.9	2.4%
Kali Deres	27.4	175.5	202.6	2.9%	402.0	2.4%
Grogol Petamburan	11.29	241.9	279.2	2.9%	554.2	2.4%
Palmerah	7.54	217.5	251.0	2.9%	498.2	2.4%
Tambora	5.48	263.6	304.3	2.9%	603.8	2.4%
Taman Sari	4.36	130.3	150.4	2.9%	298.5	2.4%
<b>Jakarta Utara</b>	142.31	1,348.1	1,518.6	2.4%	2,604.7	1.9%
Penjaringan	35.48	262.1	295.2	2.4%	506.4	1.9%
Pademangan	11.91	144.7	163.0	2.4%	279.6	1.9%
Tanjung Priok	24.9	328.3	369.8	2.4%	634.3	1.9%
Koja	11.34	288.3	324.8	2.4%	557.0	1.9%
Kelapa Gading	16.12	103.2	116.3	2.4%	199.4	1.9%
Cilincing	42.56	221.5	249.5	2.4%	428.0	1.9%



Table 16 POPULATION PROJECTION BY ADMINISTRATIVE UNIT IN FLOOD PRONE AREA (2/2)

Administrative Units	Area (km <sup>2</sup> )	Population Census 1990 (1,000 persons)	Population Projection			
			in 1995		in 2025	
			Population (1,000 persons)	Average annual growth rate	Population (1,000 persons)	Average annual growth rate
<b>Kab. Tangerang</b>	840.83	1,001.9	1,204.9	3.8%	3,089.1	3.3%
Cisoka	72.26	86.9	111.5	5.1%	356.8	4.1%
Cikupa	79.98	118.5	162.7	6.5%	618.7	4.8%
Pasar Kemis	91.41	91.4	109.5	3.7%	308.9	3.5%
Balaraja	64.73	100.0	131.0	5.5%	447.2	4.4%
Kresek	58.55	71.2	82.4	3.0%	176.9	2.6%
Kronjo	67.19	64.9	73.6	2.5%	141.0	2.2%
Mauk	137.6	117.0	129.0	2.0%	218.7	1.8%
Rajeg	56.45	62.4	71.9	2.9%	150.8	2.6%
Sepatan	60.69	154.9	101.6	2.5%	199.8	2.3%
Pakuhaji	81.65		73.7	2.5%	144.9	2.3%
Teluknaga	39.51	134.7	91.2	3.2%	187.9	2.6%
Kosambi	30.81		66.8	3.2%	137.5	2.6%
<b>Kotamadya Tangerang</b>	92.88	494.9	675.0	6.4%	1,475.5	3.2%
Ciledug	23.46	191.1	237.4	4.4%	446.9	2.5%
Cipondoh	39.17	140.8	210.1	8.3%	541.4	3.9%
Batucaeper	20.26	163.0	174.4	6.9%	373.5	3.2%
Benda	9.99		53.1	6.9%	113.7	3.2%
<b>Kab. Bekasi</b>	629.60	1,349.9	1,738.2	5.2%	3,952.2	3.1%
Pondok Gede	46.85	282.1	266.9	5.3%	618.5	3.2%
Jatiasih	24.49		97.7	5.3%	226.4	3.2%
Bantargebang	41.78	58.2	76.2	5.5%	343.8	5.2%
Tambun	78.78	159.7	223.6	7.0%	629.8	4.0%
Tarumajaya	54.63	37.6	42.6	2.5%	87.1	2.4%
Babelan	63.61	71.0	84.1	3.4%	188.6	2.8%
Tambelang	99.19	56.5	63.9	2.5%	116.4	2.1%
Muaragembong	122.9	21.5	24.2	2.4%	42.7	2.0%
Bekasi Timur	29.16	218.7	277.6	4.9%	552.2	2.7%
Bekasi Selatan	23.67	177.1	236.0	5.9%	471.3	2.8%
Bekasi Barat	26.66	164.4	210.3	5.0%	407.0	2.6%
Bekasi Utara	17.88	103.1	135.1	5.6%	268.4	2.8%
<b>Apart of Kab. Serang</b>	241	178.5	221.2	4.4%	668.8	3.8%
Cikande	91.42	70.5	87.4	4.4%	264.2	3.8%
Carenang	63.5	49.3	61.1	4.4%	184.7	3.8%
Tirtayasa	86.08	58.7	72.7	4.4%	219.9	3.8%
<b>Total of Kecamatan</b>						
<b>In Flood Prone Area</b>	2,270.61	9,382.7	10,830.2	2.9%	20,339.1	2.2%

Source: Sensus Pertanian 1993 - Potensi Desa/Kelurahan, Biro Pusat Statistik

Proyeksi Penduduk DKI Jakarta 1990 - 2010, Kantor Statistik Propinsi DKI Jakarta

Jabotabek Water Resources Management Study, Ministry of Public Works

**Table 17 PROJECTED NUMBER OF HOUSE BY ADMINISTRATIVE UNIT IN FLOOD PRONE AREA (1/2)**  
(Present and Future Condition)

Administrative Units	Present (1995)				Future (2025)			
	House (1000 nos.)				House (1000 nos.)			
	Permanent	Semi-perm.	Non-perm.	Total	Permanent	Semi-perm.	Non-perm.	Total
<b>DKI Jakarta</b>	617.3	397.1	173.6	1,188.0	1,015.5	645.9	289.5	1,950.9
Jakarta Selatan	28.0	23.9	7.1	59.0	29.0	24.8	7.4	61.2
Setia Budi	11.6	13.7	4.9	30.2	12.0	14.2	5.1	31.3
Tebet	16.4	10.2	2.2	28.8	17.0	10.6	2.3	29.9
<b>Jakarta Timur</b>	195.1	102.3	33.0	330.4	334.8	175.1	56.8	566.7
Kramat Jati	37.6	5.9	0.0	43.5	64.5	10.1	0.1	74.7
Makasar	18.1	3.9	1.4	23.4	31.2	6.7	2.3	40.2
Jatinegara	15.1	25.7	4.3	45.1	25.9	44.0	7.4	77.3
Duren Sawit	48.7	9.3	3.1	61.1	83.5	15.9	5.5	104.9
Matraman	10.3	13.7	2.9	26.9	17.7	23.4	5.0	46.1
Pulo Gadung	31.3	10.7	1.9	43.9	53.7	18.3	3.2	75.2
Cakung	34.0	33.1	19.4	86.5	58.3	56.7	33.3	148.3
<b>Jakarta Pusat</b>	70.7	53.0	19.5	143.2	45.4	34.1	12.5	92.0
Tanah Abang	9.9	10.2	6.1	26.2	6.3	6.6	3.9	16.8
Menteng	6.4	3.7	0.8	10.9	4.1	2.4	0.5	7.0
Senen	6.1	5.0	1.7	12.8	3.9	3.2	1.1	8.2
Cempaka Putih	6.4	1.8	1.0	9.2	4.1	1.2	0.6	5.9
Johor Baru	12.6	5.6	0.4	18.6	8.1	3.6	0.3	12.0
Sawah Besar	9.0	7.3	1.5	17.8	5.8	4.7	1.0	11.5
Gambir	9.6	7.3	1.1	18.0	6.2	4.6	0.7	11.5
Kemayoran	10.7	12.1	6.9	29.7	6.9	7.8	4.4	19.1
<b>Jakarta Barat</b>	190.4	141.8	64.4	396.6	378.0	281.2	127.9	787.1
Kebon Jeruk	35.3	22.1	4.5	61.9	70.2	43.9	8.8	122.9
Kembangan	22.8	12.1	1.3	36.2	45.2	23.9	2.7	71.8
Cengkareng	36.5	35.7	28.8	101.0	72.5	70.9	57.1	200.5
Kali Deres	20.4	19.6	19.4	59.4	40.5	38.9	38.4	117.8
Grogol Petamburan	23.7	13.9	2.7	40.3	47.0	27.5	5.5	80.0
Palmerah	15.5	22.4	3.2	41.1	30.8	44.4	6.5	81.7
Tambora	23.9	10.6	2.8	37.3	47.5	20.9	5.6	74.0
Taman Sari	12.3	5.4	1.7	19.4	24.3	10.8	3.3	38.4
<b>Jakarta Utara</b>	133.1	76.1	49.6	258.8	228.3	130.7	84.9	443.9
Penjaringan	37.9	12.7	9.2	59.8	65.1	21.9	15.7	102.7
Pademangan	9.3	6.3	6.1	21.7	15.9	10.9	10.4	37.2
Tanjung Priok	28.7	23.8	15.7	68.2	49.2	40.8	27.0	117.0
Koja	24.3	15.3	8.3	47.9	41.7	26.2	14.2	82.1
Kelapa Gading	13.5	5.8	1.1	20.4	23.2	10.0	1.8	35.0
Cilincing	19.4	12.2	9.2	40.8	33.2	20.9	15.8	69.9

**Table 17 PROJECTED NUMBER OF HOUSE BY ADMINISTRATIVE UNIT IN FLOOD PRONE AREA (2/2)**  
(Present and Future Condition)

Administrative Units	Present (1995)				Future (2025)			
	House (1000 nos.)				House (1000 nos.)			
	Permanent	Semi-perm.	Non-perm.	Total	Permanent	Semi-perm.	Non-perm.	Total
<b>Kab. Tangerang</b>	78.8	69.2	66.9	214.9	222.7	175.2	151.2	549.1
Cisoka	11.3	8.2	1.1	20.6	36.1	26.3	3.5	65.9
Cikupa	13.0	7.7	6.0	26.7	49.5	29.3	22.7	101.5
Pasar Kemis	10.4	7.9	2.6	20.9	29.3	22.2	7.4	58.9
Balaraja	14.3	5.6	3.3	23.2	48.7	19.0	11.6	79.3
Kresiek	3.9	4.1	6.4	14.4	8.5	8.8	13.7	31.0
Kronjo	2.6	3.6	7.1	13.3	5.0	6.8	13.6	25.4
Mauk	5.2	6.5	10.2	21.9	8.9	11.0	17.3	37.2
Rajeg	3.9	4.7	6.8	15.4	8.2	9.8	14.3	32.3
Sepatan	3.1	6.0	8.7	17.8	6.1	11.9	17.0	35.0
Pakuhaji	2.7	4.5	6.4	13.6	5.3	8.8	12.6	26.7
Teluknaga	3.9	5.7	4.7	14.3	7.9	11.7	9.9	29.5
Kosambi	4.5	4.7	3.6	12.8	9.2	9.6	7.6	26.4
<b>Kotamadya Tangerang</b>	73.7	34.8	24.3	132.8	157.0	77.5	54.6	289.1
Ciledug	37.2	7.6	1.9	46.7	69.9	14.3	3.7	87.9
Cipondoh	20.7	11.4	6.3	38.4	53.3	29.4	16.3	99.0
Batucapeper	12.2	13.2	11.3	36.7	26.1	28.2	24.4	78.7
Benda	3.6	2.6	4.8	11.0	7.7	5.6	10.2	23.5
<b>Kab. Bekasi</b>	214.2	126.2	72.6	413.0	473.7	286.1	170.1	929.9
Pondok Gede	33.1	20.8	9.4	63.3	76.7	48.2	21.9	146.8
Jatiasih	13.3	6.6	5.0	24.9	30.8	15.4	11.6	57.8
Bantargebang	5.8	5.4	5.0	16.2	26.1	24.3	22.5	72.9
Tambun	22.8	15.3	10.6	48.7	64.3	43.2	29.7	137.2
Tarumajaya	1.6	2.5	5.2	9.3	3.3	5.0	10.7	19.0
Babelan	5.9	7.2	6.2	19.3	13.1	16.1	14.0	43.2
Tambelang	1.5	3.7	7.6	12.8	2.7	6.6	13.9	23.2
Muaragembong	1.1	2.3	2.9	6.3	2.0	4.0	5.1	11.1
Bekasi Timur	37.0	22.6	0.0	59.6	73.7	44.9	0.0	118.6
Bekasi Selatan	36.2	11.6	5.1	52.9	72.3	23.2	10.2	105.7
Bekasi Barat	46.8	15.8	7.7	70.3	90.6	30.6	14.8	136.0
Bekasi Utara	9.1	12.4	7.9	29.4	18.1	24.6	15.7	58.4
<b>A part of Kab. Serang</b>	15.3	11.1	16.7	43.1	46.1	33.8	50.3	130.2
Cikande	4.9	7.4	3.6	15.9	14.8	22.4	10.7	47.9
Carenang	3.7	3.2	5.9	12.8	11.1	9.7	17.8	38.6
Tirtayasa	6.7	0.5	7.2	14.4	20.2	1.7	21.8	43.7
<b>Total of Kecamatan in Flood Prone Area</b>	999.3	638.4	354.1	1,991.8	1,915.0	1,218.5	715.7	3,849.2

Note: Permanent house: house with full outside walls made of block masonry,

Semi-permanent: house with combination outside walls of block masonry (lower part) and wood material (upper part),

Non-permanent: house with full wood or bamboo made outside walls.

**Table 18 NUMBER OF BUILDINGS BY ADMINISTRATIVE UNIT IN FLOOD PRONE AREA (1/2)**  
(As of 1995)

Administrative Units	Area (km <sup>2</sup> )	Type of Building (Nos.)										
		Commercial Sector		Office	Factory			Warehouse		Public Office		
		Large	Med/Small		Large	Medium	Small	Large	Small	School/ Mosque	Medical	Other
<b>DKI Jakarta</b>	466.30	334	32,316	6,178	718	1,804	5,149	285	1,050	8,635	1,211	1,284
Jakarta Selatan	18.58	16	959	240	23	50	353	0	69	578	94	83
Setia Budi	9.05	7	357	150	7	21	304	0	54	246	45	48
Tebet	9.53	9	602	90	16	29	49	0	15	332	49	35
Jakarta Timur	131.36	67	4,760	651	204	603	712	31	40	2,391	337	273
Kramat Jati	13.34	8	179	89	5	7	87	0	26	293	61	37
Makasar	21.64	1	204	32	3	5	19	0	12	224	33	49
Jatinegara	10.64	14	1,509	47	2	2	34	0	0	365	57	37
Duren Sawit	22.81	19	899	16	4	73	84	0	1	418	58	32
Matraman	4.85	4	157	64	0	7	49	0	1	259	31	35
Pulo Gadung	15.61	18	1,070	399	8	172	100	17	0	440	55	57
Cakung	42.47	3	742	4	182	337	339	14	0	362	42	26
Jakarta Pusat	47.90	119	13,654	2,502	22	118	964	0	476	1,859	228	493
Tanah Abang	9.30	18	6,965	330	3	12	261	0	277	321	19	90
Menteng	6.53	26	725	347	0	3	36	0	2	177	40	61
Senen	4.23	17	1,563	171	1	18	226	0	0	214	19	63
Cempaka Putih	4.69	11	187	21	4	7	24	0	70	140	18	21
Johor Baru	2.38	2	223	12	2	6	62	0	3	184	32	27
Sawah Besar	5.92	18	3,002	898	6	48	134	0	16	205	22	26
Gambir	7.60	17	464	570	4	8	72	0	16	247	25	125
Kemayoran	7.25	10	525	153	2	16	149	0	92	371	53	80
Jakarta Barat	126.15	79	7,649	1,451	134	426	1,598	0	340	2,159	316	226
Kebon Jeruk	17.51	13	1,279	15	8	22	384	0	6	266	38	21
Kembangan	24.64	2	360	191	9	33	207	0	94	201	23	16
Cengkareng	27.93	10	548	16	55	99	81	0	84	329	43	23
Kali Deres	27.40	2	156	0	45	117	200	0	37	249	36	21
Grogol Petamburan	11.29	15	760	128	10	53	76	0	4	357	47	44
Palmerah	7.54	5	351	151	0	28	197	0	59	276	50	33
Tambora	5.48	8	816	64	7	115	351	0	47	281	51	24
Taman Sari	4.36	24	3,379	886	0	29	102	0	9	240	28	41
Jakarta Utara	142.31	53	5,294	1,334	335	537	1,522	254	125	1,608	236	209
Penjaringan	35.48	8	2,078	400	120	270	964	0	16	257	39	33
Pademangan	11.91	10	1,351	42	23	53	96	0	60	182	28	20
Tanjung Priok	24.90	14	1,197	700	52	65	245	239	0	416	76	72
Koja	11.34	12	481	129	4	65	94	0	37	309	64	44
Kelapa Gading	16.12	3	173	20	21	36	81	0	12	121	5	11
Cilincing	42.56	6	14	43	115	48	42	15	0	293	24	29

Table 18 NUMBER OF BUILDINGS BY ADMINISTRATIVE UNIT IN FLOOD PRONE AREA (2/2)  
(As of 1995)

Administrative Units	Area	Type of Building (Nos.)										
		Commercial Sector		Office	Factory			Warehouse		Public Office		
		Large	Med/Small		Large	Medium	Small	Large	Small	School	Mosque	Medical
<b>Kab. Tangerang</b>	<b>840.83</b>	<b>13</b>	<b>1,829</b>	<b>0</b>	<b>198</b>	<b>87</b>	<b>265</b>	<b>0</b>	<b>17</b>	<b>1,403</b>	<b>109</b>	<b>214</b>
Cisoka	72.26	1	203	0	0	0	0	0	1	145	33	22
Cikupa	79.98	0	131	0	154	0	129	0	1	140	10	22
Pasar Kemis	91.41	1	197	0	0	46	6	0	0	122	6	12
Balaraja	64.73	1	153	0	35	41	2	0	1	162	10	21
Kresek	58.55	1	101	0	0	0	0	0	2	132	6	19
Kronjo	67.19	1	158	0	0	0	4	0	2	127	6	19
Mauk	137.60	5	169	0	0	0	90	0	0	144	9	27
Rajeg	56.45	0	139	0	0	0	0	0	7	91	4	15
Sepatan	60.69	1	289	0	9	0	10	0	0	90	8	17
Pakuhaji	81.65	1	148	0	0	0	0	0	0	79	2	15
Teluknaga	39.51	1	141	0	0	0	24	0	2	107	7	14
Kosambi	30.81	0	0	0	0	0	0	0	1	64	8	11
<b>Kotamadya Tangerang</b>	<b>92.88</b>	<b>10</b>	<b>2,477</b>	<b>0</b>	<b>77</b>	<b>95</b>	<b>42</b>	<b>0</b>	<b>2</b>	<b>593</b>	<b>50</b>	<b>38</b>
Ciledug	23.46	5	1,174	0	0	4	0	0	0	221	20	14
Cipondoh	39.17	3	807	0	11	20	10	0	2	172	13	9
Batucaeper	20.26	2	473	0	59	66	10	0	0	119	13	9
Benda	9.99	0	23	0	7	5	22	0	0	81	4	6
<b>Kab. Bekasi</b>	<b>629.60</b>	<b>42</b>	<b>1,057</b>	<b>0</b>	<b>80</b>	<b>368</b>	<b>843</b>	<b>0</b>	<b>57</b>	<b>1,614</b>	<b>35</b>	<b>114</b>
Pondok Gede	46.85	5	218	0	0	0	163	0	4	248	5	11
Jatiasih	24.49	2	49	0	0	2	36	0	0	109	2	7
Bantargebang	41.78	1	14	0	0	87	23	0	0	71	1	9
Tambun	78.78	8	94	0	78	78	65	0	39	165	4	18
Tarumajaya	54.63	2	13	0	0	0	0	0	1	46	1	9
Babelan	63.61	2	9	0	2	0	74	0	5	76	2	10
Tambelang	99.19	1	8	0	0	0	0	0	3	77	1	15
Muaragembong	122.90	1	9	0	0	0	0	0	2	48	1	6
Bekasi Timur	29.16	5	310	0	0	41	57	0	0	267	5	7
Bekasi Selatan	23.67	3	114	0	0	79	360	0	0	233	5	9
Bekasi Barat	26.66	9	116	0	0	46	38	0	2	160	5	7
Bekasi Utara	17.88	3	103	0	0	35	27	0	1	114	3	6
<b>A part of Kab. Serang</b>	<b>241.00</b>	<b>4</b>	<b>392</b>	<b>0</b>	<b>19</b>	<b>19</b>	<b>47</b>	<b>0</b>	<b>12</b>	<b>353</b>	<b>16</b>	<b>63</b>
Cikande	91.42	1	252	0	19	19	10	0	1	131	7	22
Carenang	63.50	1	18	0	0	0	0	0	6	119	4	18
Tirtayasa	86.08	2	122	0	0	0	37	0	5	103	5	23
<b>Total of Kecamatan in Flood Prone Area</b>	<b>2,270.61</b>	<b>403</b>	<b>38,071</b>	<b>6,178</b>	<b>1,092</b>	<b>2,373</b>	<b>6,316</b>	<b>285</b>	<b>1,138</b>	<b>12,598</b>	<b>1,421</b>	<b>1,713</b>

Source: Statistik Wilayah DKI 1994, Kantor Statistik Propinsi DKI Jakarta

Kabupaten Tangerang Dalam Angka Tahun 1993, Kantor Statistik Kabupaten Tangerang

Kotamadya Tangerang Dalam Angka 1993, Kantor Statistik Kotamadya Tangerang

Kabupaten Bekasi Dalam Angka 1993, Kantor Statistik Kabupaten Bekasi

Kabupaten Serang Dalam Angka 1993, Kantor Statistik Kabupaten Serang

Sensus Pertanian 1993 Potensi Desa Kelurahan

Laporan Data Monografi Kecamatan for some Kecamatan also referred.

**Table 19**      **PROCESS FOR ESTIMATION OF VALUE OF  
PROPERTY OF MANUFACTURING INDUSTRY**  
(As of 1995 in DKI Jakarta)

Equation:  $V_i = V_{sp} + V_{sm} + V_{eq}$

Where,       $V_i$       : value of property in manufacturing firm,  
                  $V_{sp}$       : stock value of products,  
                  $V_{sm}$       : stock value of raw materials, and  
                  $V_{eq}$       : value of machines and equipment.

**1. Number of Manufacturing Establishment**

	Numbers in 1994	Average annual growth rate	Numbers in 1995
1. Large scale manufacturer	797	7.6 %	858
2. Medium scale manufacturer	1,912	7.6 %	2,057
3. Small scale manufacturer	6,212	7.6 %	6,684

Note: Average annual growth rate from 1984 to 1994 in total number of manufacturing establishments.

**2. Stock Value of Products ( $V_{sp}$ )**

**(1) Gross Output of Manufacturing Industry**

	Amount in 1992	Average annual growth rate	Unit: Rp.1000 Amount in 1995
Gross output of manufacturing Industry	17,625,964,688	16.3%	27,725,685,890

Note: Average annual growth rate from 1987 to 1992

consisting of,

	Unit: Rp. 1000 Gross Output in Total	Gross Output of One Workshop
1. Large scale manufacturer	20,293,491,380	23,652,087
2. Medium scale manufacturer	6,764,497,130	3,288,525
3. Small scale manufacturer	667,697,380	6,684

Note: Dividing proportionally based on floor area.

**(2) Gross Output of One Factory**

	Amount in 1992	Average annual growth rate	Unit: Rp.1000 Amount in 1995
Gross output of manufacturing Industry	17,625,964,688	16.3%	27,725,685,890

Note: Average annual growth rate from 1987 to 1992

consisting of,

	Gross Output	nos. of factory	Gross output of one factory
1. Large scale manufacturer	20,293,491,380	858	23,652,087
2. Medium scale manufacturer	6,764,497,130	2,057	3,288,525
3. Small scale manufacturer	667,697,380	6,684	99,895

Unit: Rp. 1000

Note: Dividing proportionally based on floor space.

### (3) Stock Value of Products (Vsp)

	Gross output of one factory	Stock period of products	Stock value of products
1. Large scale manufacturer	23,652,087	0.5 month = 1/24 year	985,504
2. Medium scale manufacturer	3,288,525	0.5 month = 1/24 year	137,022
3. Small scale manufacturer	99,895	0.5 month = 1/24 year	4,162

Unit: Rp. 1000

### 3. Stock Value of Raw Material (Vsm)

	Amount in 1992	Average annual growth rate	Amount in 1995
Gross input of manufacturing Industry	11,065,505,362	21.5 %	19,847,238,410

Unit: Rp. 1000

Note: Average annual growth rate from 1987 to 1992

consisting of,

	Gross input	nos. of factory	Gross input of one factory
1. Large scale manufacturer	14,885,428,810	858	17,348,984
2. Medium scale manufacturer	4,961,809,603	2,057	2,412,158
3. Small scale manufacturer	391,091,573	6,684	58,512

Unit: Rp. 1000

### Stock Value of Raw Material (Vsm)

	Gross input of one factory	Stock period of raw materials	Stock value of raw material
1. Large scale manufacturer	17,348,984	82 % x 1/12 year	1,185,514
2. Medium scale manufacturer	2,412,158	82 % x 1/12 year	164,831
3. Small scale manufacturer	58,512	82 % x 1/12 year	3,998

Unit: Rp. 1000

### 4. Value of Machines and Equipment (Veq)

	Gross input of one factory	Rate of input for machines and equipment to gross input	Value of machines and equipment
1. Large scale manufacturer	17,348,984	12.6 %	2,185,972
2. Medium scale manufacturer	2,412,158	12.6 %	303,931
3. Small scale manufacturer	58,512	12.6 %	7,372

Unit: Rp. 1000

### 5. Summary of Estimation of Value of Property of Manufacturing Industry

	Unit	Large scale	Medium scale	Small scale
1. Number of manufacturing establishment	nos.	858	2,057	6,684
2. Stock value of products				
(1) Gross output of manufacturing industry	Rp.10 <sup>6</sup>	20,293,491	6,764,497	667,697
(2) Gross output of one manufacturer	Rp.10 <sup>6</sup>	23,652	3,289	100
(3) Stock value of products (Vsp)	Rp.10 <sup>3</sup>	985,504	137,022	4,162
3. Stock value of raw materials				
(1) Gross input of manufacturing industry	Rp.10 <sup>6</sup>	14,885,429	4,961,810	391,092
(2) Gross input of one manufacturer	Rp.10 <sup>6</sup>	17,349	2,412	59
(3) Stock value of raw materials (Vsm)	Rp.10 <sup>3</sup>	1,185,514	164,831	3,998
4. Value of machines and equipment				
Gross input for machines and equipment of one manufacturer = Value of machines and equipment (Veq)	Rp.10 <sup>3</sup>	2,185,972	303,931	7,372
5. Value of Property of Manufacturing (Vi = Vsp + Vsm + Veq)	Rp.10 <sup>3</sup>	4,356,990	605,784	15,532

Source:

1. Statistik Industri Besar-Sedang DKI Jakarta, 1994
2. Statistik Industri Kecil Propinsi DKI Jakarta, 1994
3. Statistik Industri 1990 Indonesia Bagian I, BPS
4. East Jakarta Flood Control Project Review Report Vol. X Economic Evaluation, August 1988



Table 20 LAND USE IN FLOOD PRONE AREA (1/2)  
(by Agriculture Census 1993)

Administrative Units	Total Area	Paddy field						Dry land						Total
		Irrigated Cultivation		Rain fed (ha)	Swamp used for paddy (ha)	Present-ly not in use (ha)	Total (ha)	Agriculture			Housing area (ha)	Other (ha)		
		x2 (ha)	x1 (ha)					Planta-tion (ha)	Fish pond (ha)	Other (ha)				
DKI Jakarta	466.30	401	809	672	381	146	2,409	828	121	222	35,037	7,847	44,055	
Jakarta Selatan	18.58	0	0	0	0	0	0	0	16	0	1,702	140	1,858	
Setia Budi	9.05	0	0	0	0	0	0	0	16	0	813	76	905	
Tebet	9.53	0	0	0	0	0	0	0	0	0	889	61	953	
Jakarta Timur	131.36	114	625	109	0	35	883	244	14	114	9,559	2,322	12,253	
Kramat Jati	13.34	0	0	0	0	0	0	91	0	0	992	246	1,329	
Makasar	21.64	0	0	45	0	30	75	53	1	80	1,163	791	2,088	
Jatinegara	10.64	0	0	0	0	0	0	0	1	3	830	231	1,065	
Duren Sawit	22.81	0	0	44	0	0	44	12	7	27	1,453	739	2,238	
Matraman	4.85	0	0	0	0	0	0	4	0	4	450	27	485	
Pulo Gadung	15.61	0	0	0	0	0	0	1	0	0	1,463	99	1,563	
Cakung	42.47	114	625	20	0	5	764	83	5	0	3,208	189	3,485	
Jakarta Pusat	47.90	0	0	0	0	0	0	0	0	0	4,295	529	4,824	
Tanah Abang	9.30	0	0	0	0	0	0	0	0	0	798	133	931	
Menteng	6.53	0	0	0	0	0	0	0	0	0	627	27	654	
Senen	4.23	0	0	0	0	0	0	0	0	0	413	10	423	
Cempaka Putih	4.69	0	0	0	0	0	0	0	0	0	432	37	469	
Johor Baru	2.38	0	0	0	0	0	0	0	0	0	236	2	238	
Sawah Besar	5.92	0	0	0	0	0	0	0	0	0	386	238	624	
Gambir	7.60	0	0	0	0	0	0	0	0	0	731	28	759	
Kemayoran	7.25	0	0	0	0	0	0	0	0	0	672	54	726	
Jakarta Barat	126.15	287	11	311	21	110	740	584	0	101	9,130	2,072	11,887	
Kebon Jeruk	17.51	0	0	0	0	0	0	36	0	34	1,234	448	1,752	
Kembangan	24.64	0	0	0	0	0	0	353	0	0	1,969	141	2,463	
Cengkareng	27.93	22	11	149	21	82	285	0	0	67	1,643	798	2,508	
Kali Deres	27.40	265	0	162	0	28	455	194	0	0	1,653	439	2,286	
Grogol Petamburan	11.29	0	0	0	0	0	0	0	0	0	1,139	0	1,139	
Palmerah	7.54	0	0	0	0	0	0	1	0	0	618	136	755	
Tambora	5.48	0	0	0	0	0	0	0	0	0	498	50	548	
Taman Sari	4.36	0	0	0	0	0	0	0	0	0	376	60	436	
Jakarta Utara	142.31	0	173	252	360	1	786	0	91	7	10,351	2,784	13,233	
Penjaringan	35.48	0	0	0	360	0	360	0	0	0	2,085	1,103	3,188	
Pademangan	11.91	0	0	0	0	0	0	0	0	0	980	11	991	
Tanjung Priok	24.90	0	0	0	0	0	0	0	0	0	2,352	128	2,480	
Koja	11.34	0	0	0	0	0	0	0	0	0	1,091	41	1,132	
Kelapa Gading	16.12	0	119	0	0	1	120	0	91	0	1,190	210	1,491	
Cilincing	42.56	0	54	252	0	0	306	0	0	7	2,653	1,291	3,951	

Table 20 LAND USE IN FLOOD PRONE AREA (2/2)  
(by Agriculture Census 1993)

Administrative Units	Total Area	Paddy field					Total	Dry land					Total
		Irrigated Cultivation		Rain fed (ha)	Swamp used for paddy (ha)	Present- ly not in use (ha)		Agriculture			Housing area (ha)	Other (ha)	
		x2	x1					Planta- tion (ha)	Fish pond (ha)	Other (ha)			
		(km2)	(ha)										
<b>Kab. Tangerang</b>	840.83	29,491	1,033	8,660	374	1,100	40,658	8,762	3,315	206	17,783	3,397	33,463
Cisoka	72.26	631	165	2,631	0	24	3,451	2,042	13	142	1,771	191	4,159
Cikupa	79.98	45	0	1,799	0	379	2,223	1,629	3	0	3,395	759	5,786
Pasar Kemis	91.41	1,618	708	184	15	0	2,525	1,291	1	48	1,652	281	3,273
Balaraja	64.73	2,363	82	846	78	377	3,746	760	5	0	2,261	539	3,565
Kresek	58.55	3,367	28	762	5	20	4,182	390	0	11	1,047	162	1,610
Kronjo	67.19	3,665	0	950	69	21	4,705	506	758	0	542	239	2,045
Mauk	137.60	7,362	0	535	50	103	8,050	688	964	0	1,274	309	3,235
Rajeg	56.45	2,124	0	583	157	96	2,960	849	9	0	1,312	91	2,261
Sepatan	60.69	2,095	0	60	0	0	2,155	185	0	0	1,217	153	1,555
Pakuhaji	81.65	3,030	0	159	0	0	3,189	284	377	0	1,236	321	2,218
Teluknaga	39.51	1,975	50	0	0	3	2,028	115	505	0	1,220	188	2,028
Kosambi	30.81	1,216	0	151	0	77	1,444	23	680	5	856	164	1,728
<b>Kodya. Tangerang</b>	92.88	559	338	571	0	403	1,871	628	64	113	5,540	1,239	7,584
Ciledug	23.46	0	0	94	0	240	334	100	4	37	1,735	341	2,217
Cipondoh	39.17	55	338	477	0	128	998	487	28	0	1,958	448	2,921
Batuaceper	20.26	345	0	0	0	0	345	24	17	44	1,344	207	1,636
Benda	9.99	159	0	0	0	35	194	17	15	32	503	243	810
<b>Kab. Bekasi</b>	629.60	16,053	3,222	4,056	179	151	23,661	7,040	7,824	317	16,915	2,823	34,919
Pondok Gede	46.85	274	15	100	0	29	418	1,456	14	102	2,479	145	4,196
Jatiasih	24.49	49	0	122	0	14	185	1,191	3	14	766	300	2,274
Bantargebang	41.78	194	0	1,028	0	51	1,273	1,568	3	21	1,646	340	3,578
Tambun	78.78	2,555	175	53	0	15	2,798	698	32	25	2,181	549	3,485
Tarumajaya	54.63	2,574	1,056	350	0	0	3,980	79	224	59	426	167	955
Babelan	63.61	3,821	0	335	54	0	4,210	951	385	0	660	288	2,284
Tambelang	99.19	5,816	1,615	716	0	0	8,147	4	33	91	896	263	1,287
Muaragembong	122.90	0	346	1,278	125	0	1,749	724	7,110	0	967	251	9,052
Bekasi Timur	29.16	0	0	61	0	15	76	178	4	0	1,924	321	2,427
Bekasi Selatan	23.67	334	0	13	0	0	347	2	16	5	2,099	120	2,242
Bekasi Barat	26.66	134	15	0	0	27	176	42	0	0	1,682	36	1,760
Bekasi Utara	17.88	302	0	0	0	0	302	147	0	0	1,189	43	1,379
<b>Kab. Serang</b>	241.00	3,574	2,097	8,257	612	237	14,777	2,072	2,654	506	2,596	1,547	9,375
Cikande	91.42	456	530	3,859	0	0	4,845	1,881	0	92	1,848	499	4,320
Carenang	63.50	1,208	25	2,967	597	0	4,797	93	0	83	448	931	1,555
Tirtayasa	86.08	1,910	1,542	1,431	15	237	5,135	98	2,654	331	300	117	3,500
<b>Total of Kecamatan in Flood Prone Area</b>	2,270.61	50,078	7,499	22,216	1,546	2,037	83,376	19,330	13,978	1,364	77,871	16,853	129,396

Source: Sensus Pertanian 1993 - Potensi Desa/Kelurahan, Biro Pusat Statistik

Jakarta Dalam Angka 1995, Kantor Statistik Propinsi DKI Jakarta

Kabupaten Tangerang Dalam Angka 1993, Kantor Statistik Kabupaten Tangerang

Kotamadya Tangerang Dalam Angka 1993, Kantor Statistik Kotamadya Tangerang

Kabupaten Bekasi Dalam Angka 1993, Kantor Statistik Kabupaten Bekasi

Kabupaten Serang Dalam Angka 1993, Kantor Statistik Kabupaten Serang

**Table 21 ECONOMIC PRICE OF PADDY**

Item	1995	
	US\$/ton	Rp./ton
FOB price of rice in Bangkok (white, milled, 5 % broken)	278	
Quality adjustment (10 % discount)	250	
Freight and insurance from Bangkok to Jakarta	66	
Value of rice CIF Jakarta (US\$1 = Rp.2,281)	316	720,796
Handling, storage and transportation cost to mill		100,000
Value of rice at ex-mill gate		820,796
Conversion of milled rice to dry paddy (68 %)		558,141
Storage loss (5 % of harvested weight)		27,907
Milling cost of paddy		24,532
Transport cost from mills to farm (20 km)		50,000
Farm gate price of paddy		455,702
Round off to:		455,000

Source: Price Prospects for Major Primary Commodities, 1990-2005 including Quarterly Review of Commodity Markets, Third Quarter 1993, the World Bank

**Table 22 ESTIMATION OF FLOOD DAMAGE RATE**

**1. Base Condition**

Range of Maximum Depth (m)		0 - 0.49	0.50 - 0.99	1.00 - 1.99	2.00 - 2.99	3.00 - 4.00
Range of Mean Depth (m)	h	0 - 0.124	0.125 - 0.499	0.50 - 1.49	1.50 - 2.49	2.50 - 3.50
Average Depth (m)		0.062	0.312	0.995	1.995	3.000
Maximum Depth (m)	hi	0.35	0.79	1.50	2.50	3.50
Inundation Area	Ai	35%	79%	100%	100%	100%

**2. Estimation of Damage Rate**

Inundation Depth	Damage Rate by MOC Japan a	Area to be inundated b	Applied Damage Rate c=a x b	Area to be inundated d	Applied Damage Rate e=a x d	Area to be inundated h	Applied Damage Rate i=a x h	Area to be inundated j	Applied Damage Rate k=a x j	Area to be inundated l	Applied Damage Rate m=a x l
<b>(1) House/Building</b>											
0 cm	0	65%	-	21%	-	-	-	-	-	-	-
0 - 49 cm	0.053	35%	0.019	50%	0.027	-	-	-	-	-	-
50 - 99 cm	0.072	-	-	29%	0.021	50%	0.036	-	-	-	-
100 - 199 cm	0.109	-	-	-	-	50%	0.055	50%	0.055	-	-
200 - 299 cm	0.152	-	-	-	-	-	-	50%	0.076	50%	0.076
300 - cm	0.22	-	-	-	-	-	-	-	-	50%	0.110
<b>Accumulation</b>			0.019		0.047		0.091		0.131		0.186
<b>(2) Household Effects</b>											
0 cm	0	65%	-	21%	-	-	-	-	-	-	-
0 - 49 cm	0.086	35%	0.030	50%	0.043	-	-	-	-	-	-
50 - 99 cm	0.191	-	-	29%	0.055	50%	0.096	-	-	-	-
100 - 199 cm	0.331	-	-	-	-	50%	0.166	50%	0.166	-	-
200 - 299 cm	0.499	-	-	-	-	-	-	50%	0.250	50%	0.250
300 - cm	0.69	-	-	-	-	-	-	-	-	50%	0.345
<b>Accumulation</b>			0.030		0.098		0.261		0.415		0.595
<b>(3) Facilities/Machinery</b>											
0 cm	0	65%	-	21%	-	-	-	-	-	-	-
0 - 49 cm	0.18	35%	0.063	50%	0.090	-	-	-	-	-	-
50 - 99 cm	0.314	-	-	29%	0.091	50%	0.157	-	-	-	-
100 - 199 cm	0.419	-	-	-	-	50%	0.210	50%	0.210	-	-
200 - 299 cm	0.539	-	-	-	-	-	-	50%	0.270	50%	0.270
300 - cm	0.632	-	-	-	-	-	-	-	-	50%	0.316
<b>Accumulation</b>			0.063		0.181		0.367		0.479		0.586
<b>(4) Merchandise/Stock</b>											
0 cm	0	65%	-	21%	-	-	-	-	-	-	-
0 - 49 cm	0.127	35%	0.045	50%	0.064	-	-	-	-	-	-
50 - 99 cm	0.276	-	-	29%	0.080	50%	0.138	-	-	-	-
100 - 199 cm	0.379	-	-	-	-	50%	0.190	50%	0.190	-	-
200 - 299 cm	0.479	-	-	-	-	-	-	50%	0.240	50%	0.240
300 - cm	0.562	-	-	-	-	-	-	-	-	50%	0.281
<b>Accumulation</b>			0.045		0.144		0.328		0.429		0.524
<b>(5) Paddy</b>											
0 cm	0	65%	-	21%	-	-	-	-	-	-	-
0 - 49 cm	0.3	35%	0.106	50%	0.150	-	-	-	-	-	-
50 - 99 cm	0.44	-	-	29%	0.128	50%	0.220	-	-	-	-
100 - cm	0.54	-	-	-	-	50%	0.270	100%	0.540	100%	0.540
<b>Accumulation</b>			0.106		0.278		0.490		0.540		0.540

Note: when  $hi \leq Ho$  or  $h \leq Ho/2$

$$hi = (2h \times Ho)^{0.5}$$

$$Ai = (2h / Ho)^{0.5}$$

when  $hi > Ho$  or  $h > Ho/2$

$$hi = h - Ho/2 + Ho$$

$$Ai = h + Ho/2$$

where,

hi : maximum inundation depth in a block

Ai : percentage of area inundated in a block

h : calculated average inundation depth of a block

Ho : maximum height of land undulation (1.0 m)

Table 23 PROBABLE FLOOD DAMAGE (1/2)

Alternatives	Return Period (Year)	Unit: Million Rp																
		General Asset										Crops (Paddy)	Total of Direct Damage	Indirect Damage	Infra-structure	Other Damage	Total of Probable Damage	
		Housing Asset		Commercial Sector	Office	Factory	Warehouse	Public Office										
		House	Household Effects															
Ciduhan River System																		
	2	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	
	5	2,310	3,808	67	0	3,040	1	222	166	9,615	567	2,884	2,613	15,679				
	10	5,186	8,444	189	0	3,040	3	608	525	17,995	1,048	5,399	4,888	29,330				
	25	11,842	18,835	476	0	3,041	8	1,512	1,382	37,096	2,143	11,129	10,074	60,442				
Cimanoeuri River System																		
	2	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	
	5	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	
	10	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	
	25	4,172	5,791	81	0	8,579	1	279	109	19,013	1,134	5,704	5,170	31,021				
Cirarab River System																		
	2	70	59	4	0	62	0	6	5	206	12	62	56	336				
	5	929	1,031	65	0	985	0	85	65	3,160	186	948	859	5,153				
	10	1,457	1,805	110	0	1,324	0	138	141	4,975	290	1,492	1,351	8,109				
	25	1,696	2,322	133	0	1,332	0	163	175	5,821	339	1,746	1,581	9,488				
Cisadane River System																		
	2	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	
	5	1,369	1,679	60	0	14	1	145	85	3,353	196	1,006	911	5,466				
	10	7,724	11,340	239	0	473	4	735	394	20,910	1,231	6,273	5,683	34,096				
	25	18,324	30,328	529	0	1,363	10	1,702	857	53,114	3,135	15,934	14,437	86,620				
	50	23,692	40,586	600	0	1,380	13	2,136	1,048	69,454	4,104	20,836	18,879	113,274				
Cengkarang Floodway System																		
	2	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	
	5	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	
	10	58,324	142,550	3,512	1,149	118,752	3,441	2,674	0	330,382	19,823	99,115	89,864	539,184				
	25	72,870	189,767	4,698	1,610	160,110	4,137	3,555	0	436,547	26,193	130,964	118,741	712,444				
	50	80,803	215,836	5,100	1,691	172,822	4,743	3,712	0	484,707	29,082	145,412	131,840	791,042				
	100	88,660	237,417	5,444	1,770	183,635	5,165	4,061	0	526,151	31,569	157,845	143,113	858,678				

Table 23 PROBABLE FLOOD DAMAGE (2/2)

Unit: Million Rp

Alternatives	Return Period (Year)	General Asset										Crops (Paddy)	Total of Direct Damage	Indirect Damage	Infra-structure	Other Damage	Total of Probable Damage
		Housing Asset		Commercial Sector	Office	Warehouse	Factory	Public Office									
		House	Household Effects														
Western Banjir Canal System																	
	2	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0
	5	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0
	10	48,800	102,999	21,696	9,675	20,695	10,556	7,396	7,396	10,556	10,556	221,817	13,309	66,545	60,334	362,005	
	25	97,756	206,074	31,992	13,807	69,129	15,522	12,443	12,443	15,522	15,522	446,723	26,803	134,017	121,509	729,053	
	50	121,081	273,973	37,621	15,764	98,511	18,849	14,853	14,853	18,849	18,849	580,652	34,839	174,196	157,937	947,624	
	100	127,377	293,907	40,575	17,096	106,016	19,424	15,550	15,550	19,424	19,424	619,946	37,197	185,984	168,625	1,011,752	
Proposed Eastern Banjir Canal System																	
	2	29,253	52,819	1,866	94	14,844	359	1,986	1,986	359	359	101,230	6,073	30,369	27,535	165,207	
	5	60,441	129,091	4,174	205	34,566	831	4,164	4,164	831	831	233,507	14,010	70,052	63,514	381,083	
	10	76,832	170,895	5,454	246	60,331	1,420	5,314	5,314	1,420	1,420	320,508	19,230	96,152	87,178	523,068	
	25	95,898	214,810	6,968	451	99,631	2,744	6,788	6,788	2,744	2,744	427,305	25,637	128,191	116,227	697,361	
	50	109,066	245,639	7,816	616	123,391	3,811	7,683	7,683	3,811	3,811	498,037	29,881	149,411	135,466	812,795	
	100	119,293	263,892	8,180	625	154,815	4,577	8,271	8,271	4,577	4,577	559,668	33,579	167,901	152,230	913,378	
CBL Floodway System																	
	2	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0
	5	4,621	7,475	136	0	900	6	239	239	6	6	13,754	803	4,126	3,737	22,420	
	10	7,433	12,117	262	0	1,343	9	408	408	9	9	22,298	1,294	6,689	6,056	36,337	
	25	9,793	17,169	343	0	1,808	12	533	533	12	12	30,555	1,780	9,166	8,300	49,801	
	50	11,779	21,224	403	0	2,077	14	644	644	14	14	37,109	2,168	11,133	10,082	60,492	

Table 24

## ANNUAL MEAN FLOOD DAMAGE

Alternatives	Return Period	Exceedance	Difference of Exceedance	Damage (Million Rp)		Annual Damage (Million Rp)	
				Amount	Mean	Segment	Cumulative
Cidurian River System	-	1.00	-	-	-	-	-
	2	0.50	0.50	-	-	-	-
	5	0.20	0.30	15,679	7,840	2,352	2,352
	10	0.10	0.10	29,330	22,505	2,250	4,602
	25	0.04	0.06	60,442	44,886	2,693	7,295
Cimanceuri River System	-	1.00	-	-	-	-	-
	2	0.50	0.50	-	-	-	-
	5	0.20	0.30	-	-	-	-
	10	0.10	0.10	-	-	-	-
	25	0.04	0.06	31,021	15,510	931	931
Cirarab River System	-	1.00	-	-	-	-	-
	2	0.50	0.50	336	168	84	84
	5	0.20	0.30	5,153	2,745	823	907
	10	0.10	0.10	8,109	6,631	663	1,570
	25	0.04	0.06	9,488	8,798	528	2,098
Cisadane River System	-	1.00	-	-	-	-	-
	2	0.50	0.50	-	-	-	-
	5	0.20	0.30	5,466	2,733	820	820
	10	0.10	0.10	34,096	19,781	1,978	2,798
	25	0.04	0.06	86,620	60,358	3,621	6,420
	50	0.02	0.02	113,274	99,947	1,999	8,419
Cengkareng Floodway System	-	1.00	-	-	-	-	-
	2	0.50	0.50	-	-	-	-
	5	0.20	0.30	-	-	-	-
	10	0.10	0.10	539,184	269,592	26,959	26,959
	25	0.04	0.06	712,444	625,814	37,549	64,508
	50	0.02	0.02	791,042	751,743	15,035	79,543
	100	0.01	0.01	858,678	824,860	8,249	87,792
Western Banjir Canal System	-	1.00	-	-	-	-	-
	2	0.50	0.50	-	-	-	-
	5	0.20	0.30	-	-	-	-
	10	0.10	0.10	362,005	181,003	18,100	18,100
	25	0.04	0.06	729,053	545,529	32,732	50,832
	50	0.02	0.02	947,624	838,338	16,767	67,599
	100	0.01	0.01	1,011,752	979,688	9,797	77,396
Proposed Eastern Banjir Canal System	-	1.00	-	-	-	-	-
	2	0.50	0.50	165,207	82,604	41,302	41,302
	5	0.20	0.30	381,083	273,145	81,944	123,245
	10	0.10	0.10	523,068	452,076	45,208	168,453
	25	0.04	0.06	697,361	610,214	36,613	205,066
	50	0.02	0.02	812,795	755,078	15,102	220,167
	100	0.01	0.01	913,378	863,086	8,631	228,798
CBL Floodway System	-	1.00	-	-	-	-	-
	2	0.50	0.50	-	-	-	-
	5	0.20	0.30	22,420	11,210	3,363	3,363
	10	0.10	0.10	36,337	29,379	2,938	6,301
	25	0.04	0.06	49,801	43,069	2,584	8,885
	50	0.02	0.02	60,492	55,147	1,103	9,988

**Table 25 FINANCIAL AND ECONOMIC PROJECT COST (1/2)**

Cost Item	F.C. (Million Yen)		L.C. (Million Rp)		Total financial	Total economic
	Financial cost	Economic cost	Financial cost	Economic cost	cost (Million Rp)	cost (Million Rp)
<b>CDR-1</b>						
Direct construction	2,789	2,705	30,677	28,223	93,987	89,627
Land acquisition/house	0	0	87,109	20,580	87,109	20,580
Administration	0	0	9,055	5,510	9,055	5,510
Engineering services	474	474	5,215	5,215	15,975	15,975
Sub-total	3,263	3,179	132,056	59,528	206,126	131,692
Physical contingency	326	318	13,206	5,953	20,613	13,169
Total cost	3,589	3,497	145,262	65,481	226,739	144,861
<b>CMC-1</b>						
Direct construction	706	685	13,664	12,571	29,690	28,121
Land acquisition/house	0	0	58,706	13,862	58,706	13,862
Administration	0	0	4,420	2,099	4,420	2,099
Engineering services	120	120	2,323	2,323	5,047	5,047
Sub-total	826	805	79,113	30,855	97,863	49,129
Physical contingency	83	81	7,911	3,086	9,786	4,913
Total cost	909	886	87,024	33,941	107,649	54,042
<b>CRB-1</b>						
Direct construction	195	189	5,441	5,006	9,868	9,296
Land acquisition/house	0	0	11,684	2,765	11,684	2,765
Administration	0	0	1,078	603	1,078	603
Engineering services	33	33	925	925	1,674	1,674
Sub-total	228	222	19,128	9,299	24,304	14,338
Physical contingency	23	22	1,913	930	2,430	1,434
Total cost	251	244	21,041	10,229	26,734	15,772
<b>CSD-1</b>						
Direct construction	3,416	3,314	34,712	31,935	112,255	107,163
Land acquisition/house	0	0	112,984	27,082	112,984	27,082
Administration	0	0	11,262	6,712	11,262	6,712
Engineering services	581	581	5,901	5,901	19,090	19,090
Sub-total	3,997	3,895	164,859	71,630	255,591	160,047
Physical contingency	400	390	16,486	7,163	25,559	16,005
Total cost	4,397	4,285	181,345	78,793	281,150	176,052
<b>CKR-1</b>						
Direct construction	1,970	1,911	41,587	38,260	86,306	81,640
Land acquisition/house	0	0	406,275	27,015	406,275	27,015
Administration	0	0	24,629	5,433	24,629	5,433
Engineering services	335	335	7,070	7,070	14,675	14,675
Sub-total	2,305	2,246	479,561	77,778	531,885	128,763
Physical contingency	231	225	47,956	7,778	53,189	12,876
Total cost	2,536	2,471	527,517	85,556	585,074	141,639
<b>CKR-2</b>						
Direct construction	12,958	12,569	152,376	140,186	446,523	425,502
Land acquisition/house	0	0	621,300	30,331	621,300	30,331
Administration	0	0	53,391	22,792	53,391	22,792
Engineering services	2,203	2,203	25,904	25,904	75,912	75,912
Sub-total	15,161	14,772	852,971	219,213	1,197,126	554,537
Physical contingency	1,516	1,477	85,297	21,921	119,713	55,454
Total cost	16,677	16,249	938,268	241,134	1,316,839	609,991
<b>CKR-3</b>						
Direct construction	11,306	10,967	129,013	118,692	385,659	367,643
Land acquisition/house	0	0	294,750	20,470	294,750	20,470
Administration	0	0	34,020	19,406	34,020	19,406
Engineering services	1,922	1,922	21,932	21,932	65,561	65,561
Sub-total	13,228	12,889	479,715	180,500	779,990	473,080
Physical contingency	1,323	1,289	47,972	18,050	77,999	47,308
Total cost	14,551	14,178	527,687	198,550	857,989	520,388



Table 25 FINANCIAL AND ECONOMIC PROJECT COST (2/2)

Cost Item	F.C. (Million Yen)		L.C. (Million Rp)		Total financial cost (Million Rp)	Total economic cost (Million Rp)
	Financial cost	Economic cost	Financial cost	Economic cost		
<b>CKR-4</b>						
Direct construction	22,284	21,615	230,177	211,763	736,024	702,424
Land acquisition/house	0	0	570,725	28,610	570,725	28,610
Administration	0	0	65,337	36,552	65,337	36,552
Engineering services	3,788	3,788	39,130	39,130	125,118	125,118
Sub-total	26,072	25,403	905,369	316,055	1,497,204	892,704
Physical contingency	2,607	2,540	90,537	31,606	149,720	89,270
Total cost	28,679	27,943	995,906	347,661	1,646,924	981,974
<b>WBC-1 + CSD-1</b>						
Direct construction	4,870	4,724	52,021	47,859	162,570	155,094
Land acquisition/house	0	0	466,144	65,341	466,144	65,341
Administration	0	0	31,436	11,022	31,436	11,022
Engineering services	828	828	8,844	8,844	27,640	27,640
Sub-total	5,698	5,552	558,445	133,066	687,790	259,097
Physical contingency	570	555	55,845	13,307	68,779	25,910
Total cost	6,268	6,107	614,290	146,373	756,569	285,007
<b>WBC-3 + CSD-1'</b>						
Direct construction	9,762	9,469	87,084	80,117	308,681	295,063
Land acquisition/house	0	0	305,364	50,043	305,364	50,043
Administration	0	0	30,702	17,255	30,702	17,255
Engineering services	1,660	1,660	14,804	14,804	52,486	52,486
Sub-total	11,422	11,129	437,954	162,219	697,233	414,847
Physical contingency	1,142	1,113	43,795	16,222	69,723	41,485
Total cost	12,564	12,242	481,749	178,441	766,956	456,332
<b>EBC-1-1</b>						
Direct construction	50,185	48,679	650,901	598,829	1,790,101	1,703,842
Land acquisition/house	0	0	877,997	97,751	877,997	97,751
Administration	0	0	133,405	90,080	133,405	90,080
Engineering services	8,531	8,531	110,653	110,653	304,307	304,307
Sub-total	58,716	57,210	1,772,956	897,313	3,105,810	2,195,980
Physical contingency	5,872	5,721	177,296	89,731	310,581	219,598
Total cost	64,588	62,931	1,950,252	987,044	3,416,391	2,415,578
<b>EBC-1-2</b>						
Direct construction	16,351	15,860	256,571	236,045	627,739	596,067
Land acquisition/house	0	0	942,901	96,012	942,901	96,012
Administration	0	0	78,532	34,604	78,532	34,604
Engineering services	2,780	2,780	43,617	43,617	106,723	106,723
Sub-total	19,131	18,640	1,321,621	410,278	1,755,895	833,406
Physical contingency	1,913	1,864	132,162	41,028	175,590	83,341
Total cost	21,044	20,504	1,453,783	451,306	1,931,485	916,747
<b>EBC-1-3</b>						
Direct construction	6,125	5,941	165,554	152,310	304,592	287,171
Land acquisition/house	0	0	1,088,187	108,187	1,088,187	108,187
Administration	0	0	69,639	19,768	69,639	19,768
Engineering services	1,041	1,041	28,144	28,144	51,775	51,775
Sub-total	7,166	6,982	1,351,524	308,409	1,514,193	466,901
Physical contingency	717	698	135,152	30,841	151,419	46,690
Total cost	7,883	7,680	1,486,676	339,250	1,665,612	513,591
<b>CBL-1</b>						
Direct construction	2,586	2,508	30,115	27,706	88,817	84,638
Land acquisition/house	0	0	87,706	20,627	87,706	20,627
Administration	0	0	8,826	5,263	8,826	5,263
Engineering services	440	440	5,120	5,120	15,108	15,108
Sub-total	3,026	2,948	131,767	58,716	200,457	125,636
Physical contingency	303	295	13,177	5,872	20,046	12,564
Total cost	3,329	3,243	144,944	64,588	220,503	138,200

Note: 1. CSD-1' includes the river improvement of the Cisadane River system so as to convey the design discharge of the Cisadane river and Ciliwung Floodway safely.

2. Currency conversion rate: ¥1 = Rp. 22.7

3. Administration cost: 5 % of direct construction cost and land acquisition/house compensation cost

4. Engineering service cost: DD = 7 % of direct construction cost, CS = 10 % of direct construction cost

5. Physical contingency: 10 % of total cost