

To promote the construction of septic tank with up-flow filter system by households, it will be advisable for the Government to provide subsidy in some form or another.

## 2.3 Required Government Investment

### 2.3.1 Dimension of Development Funds

The development expenditure of DKI Jakarta fluctuated between Rp. 150 billion and Rp. 400 billion during the nine year period from 1980/81 to 1988/89, the annual average working out at Rp. 259,453 million. Out of it, Rp. 84,322 million or 32.5% was on average earmarked for urban development. Sub-sectors of the urban development sector consist of urban drainage/flood, KIP/MIP, water supply/wastewater and solid wastes.

Out of the urban development sector expenditure, 52.9% has been allocated on average for urban road. This sub-sector's overwhelmingly strong position is steady and even rising during the last nine years. The second place is occupied by KIP/MIP with the average share of 17.2%. However, its share is gradually declining. Other three sub-sectors have similar average shares, that is, 10.4% for both drainage/flood and solid wastes, and 9.1% for water supply/wastewater (Refer to Table J.34).

The above expenditure is mostly financed by the central government out of its own coffer.

Another source of development funds for DKI Jakarta is foreign loans. They are provided to DKI Jakarta by way of the central government. The average annual amount of foreign loans for the last seven years excluding 1983/84 and 1984/1985 because of irregularly large amount for the two years works out at Rp. 413,464 million. It is by 59.4% bigger than the average annual amount of the development expenditure of DKI Jakarta.

The combined amount of development expenditure and foreign investment comes to Rp. 672,917 million on average per annum. It corresponds to 4.8% of the gross domestic product (GDP) of DKI Jakarta.

### 2.3.2 Projection of Urban Development Funds

Regression analysis was performed to determine the quantitative relationship between GDP and total development funds (= combined amount of development expenditure and foreign investment).

The results is presented in Table J.36. Using this relationship and GDP forecast, total development funds were projected over the period 1990 to 2010 as shown in the same table. It is to be noted that the ratio of total development funds to GDP is projected to take a slightly upward course.

Urban development funds were projected on the assumptions that the allocations for the urban development sector will be 32.5%. This figure is based on the past share of the same sector in the development expenditure. As Table J.36 shows, yearly urban development funds roughly fall between Rp. 300,000 million and Rp. 1,000,000 million.

The implementation period of the wastewater disposal project is assumed to be 18 years from 1993 to 2010. Cumulative amount of urban development funds over the same period is calculated at Rp. 12,280,910 million. Whereas, the initial cost of the wastewater disposal project requiring public funds is estimated at Rp. 1,903,314 million. Thus the share of the allocations for wastewater in the urban development funds during the above period works out at 15.5%.

Table J.1      Estimated Average Annual Flood Damages  
(Direct Damages to Property) per ha  
by Inundation Area in 1988 - 'Without' Case

(Unit : Rp.)

Inundation No.	Area	Flood Damages	Inundation No.	Area	Flood Damages
1		4,091,352	49		72,132
2		5,776,445	50		4,280,691
3		2,225,148	51		3,580,972
4		1,037,859	52		13,360,580
5		5,029,563	53		3,043,223
6		2,879,442	54		0
7		1,442,748	55		8,193,991
8		3,832,603	56		11,718,240
9		2,368,116	57		3,077,214
10		0	58		2,467,366
11		3,648,013	59		1,914,271
12		0	60		0
13		0	61		0
14		0	62		6,064,450
15		5,196,081	63		27,810,040
16		5,227,847	64		25,510,050
17		0	65		31,265,660
18		0	66		3,621,011
19		0	67		255,762
20		853,412	68		0
21		0	69		4,847,723
22		6,443,180	70		1,305,906
23		342,637	71		0
24		0	72		21,207,880
25		1,493,652	73		5,151,307
26		354,974	74		1,124,252
27		14,705,930	75		2,715,978
28		4,774,203	76		0
29		7,760,458	77		0
30		0	78		0
31		6,730,764	79		689,417
32		4,375,037	80		13,318,250
33		0	81		2,950,765
34		18,226,910	82		0
35		16,421,070	83		0
36		7,513,131	84		9,285,216
37		17,101,550	85		14,639,640
38		853,668	86		26,296,600
39		1,226,147	87		1,080,698
40		2,281,195	88		3,662,771
41		0	89		0
42		0	90		16,334,060
43		1,206,871	91		358,789
44		513,521	92		491,071
45		0	93		3,015,270
46		1,871,291	94		1,395,082
47		831,219	95		1,018,191
48		2,379,517	96		0

Note : Property = Houses, Shops and Factories

Source : JICA

Table J.2 Estimated Average Annual Flood Damages  
(Direct Damages to Property) per ha  
by Inundation Area in 2010 - 'Without' Case

(Unit : Rp.)

Inundation No.	Area	Flood Damages	Inundation No.	Area	Flood Damages
1		11,011,830	49		213,585
2		15,298,830	50		11,479,510
3		5,802,951	51		11,296,330
4		2,930,207	52		37,742,250
5		14,234,740	53		8,597,296
6		8,523,793	54		0
7		15,393,910	55		22,208,150
8		12,628,540	56		31,754,570
9		6,419,451	57		18,742,210
10		0	58		11,607,020
11		10,188,240	59		15,803,660
12		0	60		0
13		0	61		0
14		0	62		27,863,200
15		13,893,790	63		82,097,320
16		14,861,490	64		73,247,830
17		0	65		96,384,990
18		0	66		11,919,770
19		0	67		903,644
20		2,420,947	68		0
21		0	69		15,237,920
22		19,259,720	70		4,040,380
23		1,032,358	71		0
24		0	72		65,074,910
25		8,178,667	73		15,675,230
26		1,283,742	74		3,849,011
27		48,925,560	75		12,806,580
28		14,515,400	76		0
29		23,828,920	77		0
30		0	78		0
31		18,788,230	79		3,121,193
32		15,130,220	80		41,826,030
33		0	81		17,310,380
34		57,662,220	82		0
35		51,945,780	83		0
36		27,994,800	84		34,284,290
37		54,095,580	85		54,818,870
38		4,775,201	86		88,712,350
39		4,869,073	87		3,339,459
40		8,376,738	88		11,702,010
41		0	89		0
42		0	90		62,032,050
43		3,813,139	91		1,767,807
44		2,529,277	92		1,903,343
45		0	93		16,967,098
46		7,077,866	94		6,134,524
47		3,957,991	95		3,983,142
48		8,591,124	96		0

Note : Property = Houses, Shops and Factories

Source : JICA

Table J.3 Economic Project Cost of Urban Drainage Development

(Unit : Rp. million)			
Item	On-Going Project	New Project	Total
A. Initial Cost			
I. Direct Construction Cost	338,126	69,739	407,865
II. Land Aguisition and Compensation			
1 Land Acquisition	(0)	(0)	(0)
2 Compensation	(40,731)	(15,991)	(56,722)
Sub-Total	40,731	15,991	56,722
III. Engineering Service	25,973	5,398	31,371
IV. Government Administration	7,093	1,781	8,874
V. Physical Contingency	37,104	7,712	44,816
Total	449,026	100,621	549,647
B. O/M Cost	1,876	387	2,263

Source : JICA

Table J.4 Cost Benefit Streams

IC = Initial Costs; OM = O/M Costs; CS = Costs; BF = Benefits  
 SCF = Cash Flow (=BF - CS)

(Unit : Rp. Million)

NO	YEAR	IC	OM	CS	BF	CF
1	1992	73,692	0	73,692	7,791	-65,901
2	1993	73,692	306	73,998	17,022	-56,976
3	1994	84,072	613	84,685	28,546	-56,139
4	1995	84,072	950	85,022	41,619	-43,403
5	1996	67,079	1,287	68,366	53,794	-14,572
6	1997	31,173	1,556	32,729	62,213	29,484
7	1998	31,173	1,690	32,863	71,213	38,350
8	1999	31,173	1,824	32,997	80,847	47,850
9	2000	26,927	1,958	28,885	90,242	61,357
10	2001	190	2,073	2,263	95,028	92,765
11	2002	190	2,073	2,263	101,679	99,416
12	2003	9,548	2,074	11,622	108,519	96,897
13	2004	9,548	2,112	11,660	115,542	103,882
14	2005	9,548	2,150	11,698	122,748	111,050
15	2006	9,548	2,189	11,737	127,853	116,116
16	2007	2,675	2,227	4,902	133,659	128,757
17	2008	2,675	2,239	4,914	139,523	134,609
18	2009	2,675	2,251	4,926	145,442	140,516
19	2010	0	2,263	2,263	150,624	148,361
20	2011	0	2,263	2,263	155,802	153,539
21	2012	0	2,263	2,263	160,980	158,717
22	2013	0	2,263	2,263	160,980	158,717
23	2014	0	2,263	2,263	160,980	158,717
24	2015	0	2,263	2,263	160,980	158,717
25	2016	0	2,263	2,263	160,980	158,717
26	2017	0	2,263	2,263	160,980	158,717
27	2018	0	2,263	2,263	160,980	158,717
28	2019	0	2,263	2,263	160,980	158,717
29	2020	0	2,263	2,263	160,980	158,717
30	2021	0	2,263	2,263	160,980	158,717
31	2022	0	2,263	2,263	160,980	158,717
32	2023	0	2,263	2,263	160,980	158,717
33	2024	0	2,263	2,263	160,980	158,717
34	2025	0	2,263	2,263	160,980	158,717
35	2026	0	2,263	2,263	160,980	158,717
36	2027	0	2,263	2,263	160,980	158,717
37	2028	0	2,263	2,263	160,980	158,717
38	2029	0	2,263	2,263	160,980	158,717
39	2030	0	2,263	2,263	160,980	158,717
40	2031	0	2,263	2,263	160,980	158,717
41	2032	0	2,263	2,263	160,980	158,717
42	2033	0	2,263	2,263	160,980	158,717
43	2034	0	2,263	2,263	160,980	158,717
44	2035	0	2,263	2,263	160,980	158,717
45	2036	0	2,263	2,263	160,980	158,717
46	2037	0	2,263	2,263	160,980	158,717
47	2038	0	2,263	2,263	160,980	158,717
48	2039	0	2,263	2,263	160,980	158,717
49	2040	0	2,263	2,263	160,980	158,717
50	2041	0	2,263	2,263	160,980	158,717

Table J.5 Cumulative Cost Benefit Stream

BNFT=Benefits; COST=Costs; CSFL=Cash Flow (=BNFT-COST)

CM BNFT=Cumulative Benefits; CM COST=Cumulative Costs; CM CSFL=Cumulative Cash Flow

(Unit: Rp. Million)

NO.	YEAR	COST	BNFT	CSFL	CM COST	CM BNFT	CM CSFL
1	1992	73,692	7,791	-65,901	73,692	7,791	-65,901
2	1993	73,998	17,022	-56,976	147,690	24,813	-122,877
3	1994	84,685	28,546	-56,139	232,375	53,359	-179,016
4	1995	85,022	41,619	-43,403	317,397	94,978	-222,419
5	1996	68,366	53,794	-14,572	385,763	148,772	-236,991
6	1997	32,729	62,213	29,484	418,492	210,985	-207,507
7	1998	32,863	71,213	38,350	451,355	282,198	-169,157
8	1999	32,997	80,847	47,850	484,352	363,045	-121,307
9	2000	28,885	90,242	61,357	513,237	453,287	-59,950
10	2001	2,263	95,028	92,765	515,500	548,315	32,815
11	2002	2,263	101,679	99,416	517,763	649,994	132,231
12	2003	11,622	108,519	96,897	529,385	758,513	229,128
13	2004	11,660	115,542	103,882	541,045	874,055	333,010
14	2005	11,698	122,748	111,050	552,743	996,803	444,060
15	2006	11,737	127,853	116,116	564,480	1,124,656	560,176
16	2007	4,902	133,659	128,757	569,382	1,258,315	688,933
17	2008	4,914	139,523	134,609	574,296	1,397,838	823,542
18	2009	4,926	145,442	140,516	579,222	1,543,280	964,058
19	2010	2,263	150,624	148,361	581,485	1,693,904	1,112,419
20	2011	2,263	155,802	153,539	583,748	1,849,706	1,265,958
21	2012	2,263	160,980	158,717	586,011	2,010,686	1,424,675
22	2013	2,263	160,980	158,717	588,274	2,171,666	1,583,392
23	2014	2,263	160,980	158,717	590,537	2,332,646	1,742,109
24	2015	2,263	160,980	158,717	592,800	2,493,626	1,900,826
25	2016	2,263	160,980	158,717	595,063	2,654,606	2,059,543
26	2017	2,263	160,980	158,717	597,326	2,815,586	2,218,260
27	2018	2,263	160,980	158,717	599,589	2,976,566	2,376,977
28	2019	2,263	160,980	158,717	601,852	3,137,546	2,535,694
29	2020	2,263	160,980	158,717	604,115	3,298,526	2,694,411
30	2021	2,263	160,980	158,717	606,378	3,459,506	2,853,128
31	2022	2,263	160,980	158,717	608,641	3,620,486	3,011,845
32	2023	2,263	160,980	158,717	610,904	3,781,466	3,170,562
33	2024	2,263	160,980	158,717	613,167	3,942,446	3,329,279
34	2025	2,263	160,980	158,717	615,430	4,103,426	3,487,996
35	2026	2,263	160,980	158,717	617,693	4,264,406	3,646,713
36	2027	2,263	160,980	158,717	619,956	4,425,386	3,805,430
37	2028	2,263	160,980	158,717	622,219	4,586,366	3,964,147
38	2029	2,263	160,980	158,717	624,482	4,747,346	4,122,864
39	2030	2,263	160,980	158,717	626,745	4,908,326	4,281,581
40	2031	2,263	160,980	158,717	629,008	5,069,306	4,440,298
41	2032	2,263	160,980	158,717	631,271	5,230,286	4,599,015
42	2033	2,263	160,980	158,717	633,534	5,391,266	4,757,732
43	2034	2,263	160,980	158,717	635,797	5,552,246	4,916,449
44	2035	2,263	160,980	158,717	638,060	5,713,226	5,075,166
45	2036	2,263	160,980	158,717	640,323	5,874,206	5,233,883
46	2037	2,263	160,980	158,717	642,586	6,035,186	5,392,600
47	2038	2,263	160,980	158,717	644,849	6,196,166	5,551,317
48	2039	2,263	160,980	158,717	647,112	6,357,146	5,710,034
49	2040	2,263	160,980	158,717	649,375	6,518,126	5,868,751
50	2041	2,263	160,980	158,717	651,638	6,679,106	6,027,468

Table J.6 Cumulative Cost Benefit Stream at Discount Rate of 10 %

BNFT=Benefits; COST=Costs; CSFL=Cash Flow (=BNFT-COST)

CM BNFT=Cumulative Benefits; CM COST=Cumulative Costs; CM CSFL=Cumulative

Cash Flow

(Unit: Rp. Million)

NO.	YEAR	COST	BNFT	CSFL	CM COST	CM BNFT	CM CSFL
1	1992	66,993	7,083	-59,910	66,993	7,083	-59,910
2	1993	61,155	14,068	-47,088	128,148	21,150	-106,998
3	1994	63,625	21,447	-42,178	191,773	42,598	-149,176
4	1995	58,071	28,426	-29,645	249,844	71,024	-178,820
5	1996	42,450	33,402	-9,048	292,294	104,426	-187,869
6	1997	18,475	35,118	16,643	310,769	139,543	-171,226
7	1998	16,864	36,544	19,680	327,633	176,087	-151,546
8	1999	15,393	37,716	22,322	343,026	213,803	-129,224
9	2000	12,250	38,271	26,021	355,276	252,074	-103,202
10	2001	872	36,637	35,765	356,149	288,711	-67,437
11	2002	793	35,638	34,845	356,942	324,349	-32,593
12	2003	3,703	34,577	30,874	360,645	358,927	-1,718
13	2004	3,377	33,468	30,091	364,023	392,395	28,373
14	2005	3,080	32,323	29,243	367,103	424,719	57,616
15	2006	2,810	30,607	27,797	369,913	455,326	85,413
16	2007	1,067	29,088	28,021	370,980	484,414	113,434
17	2008	972	27,604	26,632	371,952	512,018	140,066
18	2009	886	26,159	25,273	372,838	538,177	165,339
19	2010	370	24,628	24,258	373,208	562,805	189,597
20	2011	336	23,159	22,823	373,544	585,964	212,420
21	2012	306	21,753	21,448	373,850	607,717	233,867
22	2013	278	19,776	19,498	374,128	627,493	253,365
23	2014	253	17,978	17,725	374,381	645,471	271,090
24	2015	230	16,344	16,114	374,610	661,814	287,204
25	2016	209	14,858	14,649	374,819	676,672	301,853
26	2017	190	13,507	13,317	375,009	690,179	315,170
27	2018	173	12,279	12,107	375,182	702,458	327,277
28	2019	157	11,163	11,006	375,339	713,621	338,283
29	2020	143	10,148	10,005	375,481	723,769	348,288
30	2021	130	9,226	9,096	375,611	732,995	357,384
31	2022	118	8,387	8,269	375,729	741,382	365,653
32	2023	107	7,624	7,517	375,836	749,006	373,170
33	2024	97	6,931	6,834	375,934	755,937	380,004
34	2025	89	6,301	6,213	376,022	762,239	386,217
35	2026	81	5,728	5,648	376,103	767,967	391,864
36	2027	73	5,208	5,134	376,176	773,175	396,999
37	2028	67	4,734	4,668	376,242	777,909	401,666
38	2029	61	4,304	4,243	376,303	782,212	405,910
39	2030	55	3,913	3,858	376,358	786,125	409,767
40	2031	50	3,557	3,507	376,408	789,682	413,274
41	2032	45	3,233	3,188	376,453	792,915	416,462
42	2033	41	2,940	2,898	376,495	795,855	419,360
43	2034	38	2,672	2,635	376,532	798,527	421,995
44	2035	34	2,429	2,395	376,566	800,957	424,390
45	2036	31	2,209	2,177	376,597	803,165	426,568
46	2037	28	2,008	1,980	376,626	805,173	428,547
47	2038	26	1,825	1,800	376,651	806,998	430,347
48	2039	23	1,659	1,636	376,675	808,657	431,983
49	2040	21	1,508	1,487	376,696	810,166	433,470
50	2041	19	1,371	1,352	376,715	811,537	434,822



Table J.7 Computation of NPV and B/C

(Unit of NPV : Rp. Million)		
ITEM	NPV	B/C
VALUE	434,822	2.15

Table J.8 Computation of EIRR

DF: Discount Factor; CM BNFT=Cumulative Benefit;  
 CM COST=Cumulative Cost; NPV=Net Present Value  
 B/C=Benefit Cost Ratio

(Unit : Rp. Million)				
DF	CM COST	CM BNFT	NPV	B/C
0	651,638	6,679,106	6,027,468	10.25
1	601,778	5,027,963	4,426,185	8.36
2	560,799	3,855,863	3,295,064	6.88
3	526,326	3,010,576	2,484,250	5.72
4	496,742	2,391,266	1,894,524	4.81
5	470,918	1,930,357	1,459,439	4.10
6	448,059	1,582,018	1,133,959	3.53
7	427,585	1,314,792	887,207	3.07
8	409,071	1,106,818	697,747	2.71
9	392,197	942,717	550,520	2.40
10	376,715	811,537	434,822	2.15
11	362,433	705,381	342,948	1.95
12	349,196	618,484	269,288	1.77
13	336,879	546,590	209,711	1.62
14	325,379	486,517	161,138	1.50
15	314,611	435,859	121,248	1.39
16	304,501	392,778	88,277	1.29
17	294,987	355,853	60,866	1.21
18	286,015	323,977	37,962	1.13
19	277,539	296,274	18,735	1.07
20	269,518	272,051	2,533	1.01
21	261,915	250,750	-11,165	0.96

EIRR= 20.17

Table J.9 Water Colors of Near-by Rivers/Canals by Kecamatan in 1988

(Unit : %)

CODE NUMBER	NAME OF KECAMATAN	Black	Gray	Dark Brown	Light Brown	Green	Total
1100	GAMBIR	47.1	0.0	35.2	5.9	11.8	100.0
1200	SAWAH BESAR	84.6	15.4	0.0	0.0	0.0	100.0
1300	KEMAYORAN	85.2	7.4	7.4	0.0	0.0	100.0
1400	SEKEN	54.5	15.2	6.1	24.2	0.0	100.0
1500	CEMPAKA PUTIH	100.0	0.0	0.0	0.0	0.0	100.0
1600	MENTENG	57.1	28.6	9.5	4.8	0.0	100.0
1700	TANAH ABANG	21.2	6.1	63.6	6.1	3.0	100.0
1000	JAKARTA PUSAT	60.2	10.4	20.2	7.4	1.8	100.0
2200	PENJARINGAN	58.9	20.5	7.7	2.6	10.3	100.0
2300	TANJUNG PRIOK	82.1	0.0	5.1	0.0	12.8	100.0
2400	KOJA	53.4	10.0	13.3	3.3	20.0	100.0
2500	CILINCING	91.9	0.0	2.7	2.7	2.7	100.0
3000	JAKARTA UTARA	72.4	7.6	6.9	2.1	11.0	100.0
3100	CENGKARENG	51.4	17.9	12.8	17.9	0.0	100.0
3200	GROGOL PETAMBURA	96.2	0.0	3.8	0.0	0.0	100.0
3300	TAMAN SARI	77.8	0.0	8.3	13.9	0.0	100.0
3400	TAMBORA	74.0	8.0	12.0	2.0	4.0	100.0
3500	KEBON JERUK	22.2	11.1	44.5	22.2	0.0	100.0
3000	JAKARTA BARAT	69.9	7.5	11.9	9.4	1.3	100.0
4100	TEBET	34.3	2.9	22.9	34.2	5.7	100.0
4200	SETIA BUDI	21.4	35.7	42.9	0.0	0.0	100.0
4300	MAMPANG PRAPATA	10.3	17.2	41.5	10.3	20.7	100.0
4400	PASAR MINGGU	3.4	6.9	51.8	37.9	0.0	100.0
4500	KEBAYORAN BARU	32.4	14.7	47.0	5.9	0.0	100.0
4600	KEBAYORAN LAMA	9.1	9.1	63.6	18.2	0.0	100.0
4700	CILANDAK	0.0	16.7	50.0	33.3	0.0	100.0
4000	JAKARTA SELATAN	19.6	12.7	42.3	20.3	5.1	100.0
5100	MATRAMAN	48.0	8.0	36.0	4.0	4.0	100.0
5200	PULO GADUNG	42.4	54.6	0.0	3.0	0.0	100.0
5300	JATINEGARA	57.6	10.2	22.0	5.1	5.1	100.0
5400	KRAMAT JATI	71.4	14.3	14.3	0.0	0.0	100.0
5500	PASAR REBO	27.3	9.1	27.3	36.3	0.0	100.0
5600	CAKUNG	45.9	0.0	20.8	33.3	0.0	100.0
5000	JAKARTA TIMUR	51.5	17.3	19.1	9.8	2.3	100.0
10000	JAKARTA	51.3	11.8	22.1	11.0	3.8	100.0

Note : A percentage means the ratio of respondents who answered in the affirmative regarding a particular water color of near-by rivers/canals.

Source : JICA

Table J.10 Water Smell of Near-by Rivers/Canals by Kecamatan in 1988

						(Unit : %)
CODE NUMBER	NAME OF KECAMATAN	No Smell	Slight Smell	Strong Smell	Total	
1100	GAMBIR	12.5	68.7	18.8	100.0	
1200	SAWAH BESAR	7.7	69.2	23.1	100.0	
1300	KEMAYORAN	7.4	63.0	29.6	100.0	
1400	SENEN	9.1	78.8	12.1	100.0	
1500	CEMPAKA PUTIH	5.3	47.4	47.3	100.0	
1600	MENTENG	4.8	85.7	9.5	100.0	
1700	TANAH ABANG	6.1	66.6	27.3	100.0	
1000	JAKARTA PUSAT	7.4	69.1	23.5	100.0	
2200	PENJARINGAN	10.3	38.5	51.2	100.0	
2300	TANJUNG PRIOK	15.4	56.4	28.2	100.0	
2400	KOJA	10.0	76.7	13.3	100.0	
2500	CILINCING	10.8	83.8	5.4	100.0	
3000	JAKARTA UTARA	11.7	62.8	25.5	100.0	
3100	CENGKARENG	12.8	43.6	43.6	100.0	
3200	GROGOL PETAMBURAN	11.5	38.5	50.0	100.0	
3300	TAMAN SARI	0.0	80.6	19.4	100.0	
3400	TAMBORA	6.0	36.0	58.0	100.0	
3500	KEBON JERUK	44.5	44.4	11.1	100.0	
3000	JAKARTA BARAT	9.4	48.7	41.9	100.0	
4100	TEBET	31.4	62.9	5.7	100.0	
4200	SETIA BUDI	33.3	53.4	13.3	100.0	
4300	MAMPANG PRAPATAN	33.3	37.1	29.6	100.0	
4400	PASAR MINGGU	65.5	34.5	0.0	100.0	
4500	KEBAYORAN BARU	25.0	59.4	15.6	100.0	
4600	KEBAYORAN LAMA	9.1	81.8	9.1	100.0	
4700	CILANDAK	33.3	66.7	0.0	100.0	
4000	JAKARTA SELATAN	35.5	52.9	11.6	100.0	
5100	MATRAMAN	20.0	72.0	8.0	100.0	
5200	PULO GADUNG	27.3	36.4	36.3	100.0	
5300	JATINEGARA	27.6	60.3	12.1	100.0	
5400	KRAMAT JATI	19.0	47.7	33.3	100.0	
5500	PASAR REBO	36.4	45.4	18.2	100.0	
5600	CAKUNG	37.5	54.2	8.3	100.0	
5000	JAKARTA TIMUR	27.3	54.1	18.6	100.0	
10000	JAKARTA	20.4	56.3	23.3	100.0	

Note : A percentage means the ratio of respondents who answered in the affirmative regarding a particular water smell of near-by rivers/canals.

Source : JICA

Table J.11 Practice of Industrial Wastes Dumping  
in Near-by Rivers/Canals by Kecamatan in 1989

(Unit : %)				
CODE NUMBER	NAME OF KECAMATAN	Yes	No	Total
1100	GAMBIR	85.7	14.3	100.0
1200	SAWAH BESAR	100.0	0.0	100.0
1300	KEMAYORAN	76.5	23.5	100.0
1400	SENEN	96.2	3.8	100.0
1500	CEMPAKA PUTIH	77.8	22.2	100.0
1600	MENTENG	46.7	53.3	100.0
1700	TANAH ABANG	92.3	7.7	100.0
1000	JAKARTA PUSAT	83.3	16.7	100.0
2200	PENJARINGAN	60.0	40.0	100.0
2300	TANJUNG PRIOK	73.7	26.3	100.0
2400	KOJA	81.0	19.0	100.0
2500	CILINCING	71.4	28.6	100.0
3000	JAKARTA UTARA	71.0	29.0	100.0
3100	CENGKARENG	67.6	32.4	100.0
3200	GROGOL PETAMBURAN	79.2	20.8	100.0
3300	TAMAN SARI	71.9	28.1	100.0
3400	TAMBORA	89.4	10.6	100.0
3500	KEBON JERUK	55.6	44.4	100.0
3000	JAKARTA BARAT	76.5	23.5	100.0
4100	TEBET	68.7	31.3	100.0
4200	SETIA BUDI	62.5	37.5	100.0
4300	MAMPANG PRAPATAN	73.3	26.7	100.0
4400	PASAR MINGGU	57.6	42.4	100.0
4500	KEBAYORAN BARU	96.9	3.1	100.0
4600	KEBAYORAN LAMA	58.3	41.7	100.0
4700	CILANDAK	100.0	0.0	100.0
4000	JAKARTA SELATAN	72.5	27.5	100.0
5100	MATRAMAN	100.0	0.0	100.0
5200	PULO GADUNG	89.7	10.3	100.0
5300	JATINEGARA	78.4	21.6	100.0
5400	KRAMAT JATI	89.5	10.5	100.0
5500	PASAR REBO	54.5	45.5	100.0
5600	CAKUNG	54.5	45.5	100.0
5000	JAKARTA TIMUR	79.6	20.4	100.0
10000	JAKARTA	76.8	23.2	100.0

Note : A percentage means the ratio of respondents who answered in the affirmative or negative regarding the practice of industrial wastes dumping in near-by rivers/canals.

Source : JICA

Table J.12 Service Ratio by Kecamatan

(Unit : %)					
CODE NUMBER	NAME OF KECAMATAN	HIGH INCOME CALSS	MIDDLE INCOME CLASS	LOW INCOME CLASS	AVERAGE
1100	GAMBIR	66.6	77.5	44.4	62.1
1200	SAWAH BESAR	80.0	85.0	75.0	79.9
1300	KEMAYORAN	100.0	82.2	87.5	85.3
1400	SENEN	66.6	56.6	37.5	46.0
1500	CEMPAKA PUTIH	50.0	28.5	25.0	27.4
1600	MENTENG	70.0	55.0	15.0	43.8
1700	TANAH ABANG	50.0	37.1	21.4	30.9
1000	JAKARTA PUSAT	67.4	59.6	44.6	52.7
2200	PENJARINGAN	100.0	94.3	88.7	91.5
2300	TANJUNG PRIOK	100.0	71.0	82.1	78.0
2400	KOJA	100.0	92.2	74.0	82.0
2500	CILINCING	100.0	92.3	94.0	93.4
3000	JAKARTA UTARA	100.0	88.0	84.1	86.0
3100	CENGKARENG	30.5	33.6	31.0	31.9
3200	GROGOL PETAMBURAN	65.0	39.6	24.0	34.4
3300	TAMAN SARI	100.0	68.5	51.0	62.0
3400	TAMBORA	36.3	58.0	51.5	54.4
3500	KEBON JERUK	13.6	2.2	0.0	2.2
3000	JAKARTA BARAT	45.0	38.8	30.4	34.9
4100	TEBET	19.0	26.6	11.9	19.5
4200	SETIA BUDI	21.4	6.2	0.0	3.6
4300	MAMPANG PRAPATAN	12.1	1.8	9.8	5.7
4400	PASAR MINGGU	3.0	5.5	0.0	2.7
4500	KEBAYORAN BARU	48.3	21.5	0.0	15.0
4600	KEBAYORAN LAMA	16.6	6.0	0.0	3.5
4700	CILANDAK	0.0	10.0	0.0	5.8
4000	JAKARTA SELATAN	18.0	10.2	2.9	7.3
5100	MATRAMAN	33.3	20.8	12.5	17.5
5200	PULO GADUNG	50.0	13.5	6.4	13.2
5300	JATINEGARA	38.0	16.6	6.6	14.4
5400	KRAMAT JATI	21.2	11.3	2.0	8.3
5500	PASAR REBO	0.0	0.9	0.0	0.4
5600	CAKUNG	0.0	18.3	19.6	19.0
5000	JAKARTA TIMUR	22.3	11.5	5.8	9.4
10000	JAKARTA	41.6	34.3	26.2	30.8

Note : Service Ratio = Ratio of households served with water supply

Source : JICA

Table J.13      Correlation between Population Density and Water Color/Smell of Rivers

1. Data

- x : Average population density (population/ha)
- y<sub>1</sub> : Average percentage of respondents who replied that water color of near-by rivers/canals was black (%).
- y<sub>2</sub> : Average percentage of respondents who replied that water smell of near-by rivers/canals was strong (%).

2. No. of Samples

25 samples by Kecamatan excluding 4 irregular ones

3. Results of Correlation Analysis

1) Correlation between x and y<sub>1</sub>

correlation coefficient : 0.4117

T - value : 2.1187

regression equation :  $y_1 = 35.1602 + 0.068527x$

2) Correlation between x and y<sub>2</sub>

correlation coefficient : 0.3722

T - value : 1.9234

regression equation :  $y_2 = 12.8419 + 0.035523x$

Source : JICA

Table J.14      Regression Analysis of Relationships between Water Color /  
Smell of Rivers and Diseases Contraction Ratio

1. Data

- $x_1$  : Average percentage of respondents who replied that water color of near-by rivers/canals was black (%)
- $x_2$  : Average percentage of respondents who replied that water smell of near-by rivers/canals was strong (%)
- $y$  : No. of those who contracted major water-borne diseases in the last three years (cases/1,000 population).

2. No. of Samples

27 samples by Kecamatan excluding 2 irregular ones

3. Results of Regression Analysis

1) Regression analysis between  $x_1$  and  $y$

regression equation :  $y = 35.9953 + 0.41388x_1$   
correlation coefficient : 0.3595  
T - value : 1.9262

2) Regression analysis between  $x_2$  and  $y$

regression equation :  $y = 36.0219 + 0.99162x_2$   
correlation coefficient : 0.4843  
T - Value : 2.7674

3) Multiple regression analysis between  $x_1/x_2$  and  $y$

regression equation :  $y = 29.8976 + 0.19074x_1 + 0.82926x_2$   
correlation coefficient : 0.5056  
T - Value : 2.9303

Source : JICA

Table J.15 Correlation between Water Color and Smell of Rivers

1. Data

- x : Average percentage of respondents who replied that water color of near-by rivers/canals was black (%)
- y : Average percentage of respondents who replied that water smell of near-by rivers/canals was strong (%)

2. No. of Samples

27 samples by Kecamatan excluding 2 irregular ones

3. Results of Correlation Analysis

- correlation coefficient : 0.6459
- T - value : 4.2308
- regression equation :  $y = 3.1385 + 0.38094x$

Source : JICA

Table J.16 Regression Analysis of Relationships between Service Ratio and Infantile Mortality Rate

1. Data

- x : Percentage of households served with water supply (service ratio) (%)
- y : No. of infantile mortality cases in the last three years (No./1,000 infants).

2. No. of Samples

25 samples by Kecamatan excluding 2 irregular ones

3. Regression Analysis

- regression equation :  $y = 20.8725 - 0.23824x$
- correlation coefficient : -0.4974
- T - value : -2.8670

Source : JICA



Table J.17 (1) Effects of Sewerage Development on Rivers

CODE NUMBER	NAME OF KECAMATAN	Revival of Uses						Removal of Disappearance			
		Transport	Washing	Bathing	Drinking	Irrigation	Industry	Recreation	Fishing Ground	Obnoxious Odor	of Black Colored Water
1100	GAMBIR	1.7	8.3	1.7	1.7	20.0	8.3	3.3	1.7	81.7	61.7
1200	SAWAH BESAR	2.1	6.3	0.0	0.0	6.3	4.2	2.1	2.1	87.5	66.7
1300	KEMAYORAN	0.0	5.1	1.3	0.0	7.7	0.0	1.3	2.6	93.6	75.6
1400	SENEN	0.0	6.6	6.6	3.3	0.0	3.3	9.8	1.6	90.2	70.5
1500	CEMPAKA PUTIH	0.0	4.3	2.9	1.4	4.3	15.9	10.1	5.8	56.5	42.0
1600	MENTENG	0.0	6.0	8.0	0.0	22.0	2.0	12.0	6.0	96.0	84.0
1700	TANAH ABANG	4.3	5.7	8.6	1.4	24.3	0.0	7.1	4.3	95.7	70.0
1000	JAKARTA PUSAT	1.1	6.0	4.1	1.1	11.9	4.8	6.4	3.4	85.6	66.7
2200	PENJARINGAN	1.2	7.3	11.0	0.0	2.4	1.2	1.2	9.8	95.1	59.8
2300	TANJUNG PRIOK	0.0	6.0	0.0	0.0	3.0	1.5	3.0	6.0	76.1	61.2
2400	KOJA	1.2	0.0	0.0	0.0	1.2	14.0	0.0	4.7	75.6	72.1
2500	CILINCING	0.0	14.5	0.0	0.0	4.3	0.0	0.0	1.4	97.1	95.7
2000	JAKARTA UTARA	0.7	6.6	3.0	0.0	2.6	4.6	1.0	5.6	85.9	71.7
3100	CENGKARENG	0.0	9.3	8.3	0.9	3.7	6.5	4.6	2.8	88.0	78.7
3200	GROGOL PETAMBURAN	0.0	8.2	1.8	1.8	4.5	0.0	1.8	0.9	89.1	63.6
3300	TAMAN SARI	0.0	2.5	0.0	0.0	2.5	3.8	3.8	0.0	91.3	36.3
3400	TAMBORA	6.5	6.5	4.7	0.9	1.9	5.6	1.9	2.8	83.2	63.6
3500	KEBON JERUK	0.0	4.6	3.4	5.7	13.8	8.0	3.4	4.6	66.7	50.6
3000	JAKARTA BARAT	1.4	6.5	3.9	1.8	5.1	4.7	3.0	2.2	83.9	60.2
4100	TEBET	1.4	1.4	1.4	0.0	5.6	0.0	4.2	2.8	93.1	45.8
4200	SETIA BUDI	0.0	5.1	6.3	2.5	10.1	1.3	5.1	5.1	79.7	62.0
4300	MAMPANG PRAPATAN	2.8	2.8	1.9	0.9	9.3	5.6	2.8	0.9	82.2	70.1
4400	PASAR MINGGU	0.0	9.8	11.4	3.3	31.7	1.6	4.9	7.3	61.8	58.5
4500	KEBAYORAN BARU	0.0	2.2	1.1	4.4	27.5	8.8	4.4	1.1	84.6	52.7
4600	KEBAYORAN LAMA	0.0	3.6	0.9	1.8	17.3	2.7	1.8	0.9	78.2	62.7
4700	CILANDAK	0.0	6.8	11.4	2.3	11.4	0.0	4.5	0.0	86.4	68.2
4000	JAKARTA SELATAN	0.6	4.6	4.6	2.2	17.6	3.2	3.8	2.9	79.1	60.1

Table J.17 (2) Effects of Sewerage Development on Rivers

CODE NUMBER	NAME OF KECAMATAN	Revival of Uses							Removal of Disappearance of Black Colored Water	
		Transport	Washing	Bathing	Drinking	Irrigation	Industry	Recreation	Fishing Ground	Odor
5100	MATRAMAN	11.7	3.3	0.0	0.0	13.3	15.0	5.0	16.7	66.7
5200	PULO GADUNG	0.0	1.5	0.0	0.0	1.5	3.1	1.5	1.5	98.5
5300	JATINEGARA	0.7	10.1	2.2	1.4	3.6	3.6	0.0	0.0	89.9
5400	KRAMAT JATI	2.0	3.0	1.0	0.0	23.0	3.0	3.0	6.0	85.0
5500	PASAR REBO	4.7	10.0	0.6	0.0	17.1	1.2	0.6	2.9	84.7
5600	CAKUNG	0.0	7.0	1.4	0.0	2.8	0.0	0.0	0.0	90.1
5000	JAKARTA TIMUR	3.0	7.0	1.0	0.3	11.3	3.5	1.3	3.6	86.3
10000	JAKARTA	1.5	6.1	3.3	1.2	10.7	4.0	3.1	3.3	83.8
										65.5

Note : A percentage means the ratio of respondents who replied in the affirmative regarding a particular effect of sewerage development.

Source : JICA

Table J.18 (1) Disease Reduction Effects of Water Purification

(Unit : %)

CODE NUMBER	NAME OF KECAMATAN	Malaria	Gastro- enteritis	Cholera	Tubercu- losis	DHF	Typhoid	Dysen- tery	Diph- theria	Measles	Hepatitis A	Hepatitis B	Skin Diseases	Total
1100	GAMBIR	46.7	71.7	21.7	0.9	1.7	60.0	3.3	33.3	1.7	0.0	0.0	1.7	23.3
1200	SAWAH BESAR	22.4	79.6	14.3	6.1	0.0	51.0	8.2	26.5	0.0	0.0	0.0	0.0	28.6
1300	KEMAYORAN	44.3	79.7	12.7	1.3	7.6	68.4	2.5	11.4	0.0	0.0	0.0	0.0	27.8
1400	SENEN	32.8	85.2	8.2	3.3	4.9	50.8	3.3	13.1	3.3	1.6	1.6	3.2	32.8
1500	CEMPAKA PUTIH	22.9	60.0	18.6	0.0	1.4	50.0	5.7	15.7	1.4	0.0	0.0	0.0	24.3
1600	MENTENG	50.0	80.0	26.0	4.0	10.0	40.0	10.0	24.0	2.0	0.0	0.0	0.0	46.0
1700	TANAH ABANG	52.9	72.9	12.9	0.0	2.9	67.1	7.1	31.4	2.9	0.0	0.0	0.0	27.1
1000	JAKARTA PUSAT	39.2	75.2	15.9	1.8	4.1	56.5	5.5	21.6	1.6	0.2	0.2	0.7	29.4
2200	PENJARINGAN	35.4	61.0	4.9	1.2	6.1	75.6	4.9	12.2	3.7	0.0	0.0	2.4	14.6
2300	TANJUNG PRIOK	24.3	68.6	5.7	2.9	1.4	21.4	1.4	12.9	0.0	0.0	0.0	1.4	32.9
2400	KOJA	54.0	66.7	3.4	1.1	0.0	66.7	3.4	10.3	0.0	0.0	1.1	1.1	32.2
2500	CILINCING	84.1	79.7	24.6	0.0	30.4	79.7	8.7	29.0	1.4	0.0	0.0	2.9	34.8
2000	JAKARTA UTARA	49.0	68.5	9.1	1.3	8.8	61.7	4.5	15.6	1.3	0.0	0.3	1.9	28.2
3100	CENGKARENG	50.9	72.2	19.4	2.8	8.3	71.3	5.6	39.8	2.8	0.0	1.9	4.6	24.1
3200	GROGOL PETAMBURAN	27.0	43.2	4.5	0.9	0.9	63.1	1.8	16.2	1.8	0.0	0.0	0.9	30.6
3300	TAMAN SARI	19.0	62.0	13.9	0.0	1.3	50.6	6.3	20.3	0.0	0.0	0.0	0.0	32.9
3400	TAMBORA	46.8	77.1	13.8	0.9	4.6	63.3	5.5	32.1	2.8	0.0	1.8	2.8	27.5
3500	KEBON JERUK	46.9	61.2	8.2	1.0	4.1	57.1	5.1	24.5	1.0	0.0	0.0	0.0	13.3
3000	JAKARTA BARAT	39.0	63.2	11.9	1.2	4.0	61.8	4.8	26.9	1.8	0.0	0.8	1.8	25.5
4100	TEBET	36.1	72.2	9.7	0.0	2.8	52.8	6.9	23.6	1.4	0.0	2.8	1.4	4.2
4200	SETIA BUDI	23.8	60.0	8.8	0.0	3.8	58.8	10.0	17.5	1.3	0.0	1.3	0.0	8.8
4300	MAMPANG PRAPATAN	46.8	68.8	21.1	1.8	10.1	51.4	4.6	48.6	0.0	0.0	0.0	0.0	9.2
4400	PASAR MINGGU	18.2	66.9	9.1	0.8	1.7	47.9	9.1	23.1	0.0	0.0	1.7	0.8	9.9
4500	KEBAYORAN BARU	37.9	68.4	15.8	2.1	8.4	55.8	5.3	37.9	0.0	0.0	0.0	0.0	5.3
4600	KEBAYORAN LAMA	42.7	70.0	11.8	0.0	3.6	49.1	0.9	20.0	0.0	0.0	0.0	0.9	5.5
4700	CILANDAK	21.3	63.8	12.8	0.0	4.3	51.1	2.1	38.3	2.1	0.0	4.3	2.1	10.6
4000	JAKARTA SELATAN	33.3	67.5	12.9	0.8	5.0	52.1	5.7	29.7	0.5	0.0	1.1	0.6	7.6

Table J.18 (2) Disease Reduction Effects of Water Purification

(Unit : %)

CODE NUMBER	NAME OF KECAMATAN	Malaria	Gastro- enteritis	Cholera	Tubercu- losis	DHF	Typhoid	Dysen- tery	Diph- theria	Measles	Hepatitis A	Hepatitis B	Skin Diseases	Total
5100	MATRAMAN	51.7	70.0	1.7	0.0	3.3	48.3	15.0	15.0	1.7	0.0	0.0	1.7	18.3
5200	PULO GADUNG	29.6	76.1	14.1	1.4	1.4	46.5	5.6	19.7	1.4	1.4	1.4	2.8	31.0
5300	JATINEGARA	40.9	71.8	20.1	4.7	14.8	61.7	22.1	23.5	1.3	0.0	0.7	5.3	38.3
5400	KRAMAT JATI	32.8	79.8	9.2	0.8	0.8	52.9	14.3	34.5	0.8	0.0	0.0	2.5	32.8
5500	PASAR REBO	40.8	79.9	14.0	2.8	16.8	48.6	12.3	26.8	1.1	0.0	0.0	0.0	34.6
5600	CAKUNG	4.2	80.6	12.5	0.0	0.0	36.1	4.2	18.1	0.0	2.8	2.8	4.2	52.8
5000	JAKARTA TIMUR	35.1	76.8	13.2	2.2	8.6	50.8	13.5	24.6	1.1	0.5	0.6	2.6	35.2
10000	JAKARTA	37.8	70.4	12.8	1.5	6.0	55.7	7.3	24.7	1.2	0.2	0.7	1.6	24.5

Note : DHF = Dengue haemohagic fever; Skin diseases = Kadas, panu, bisul, etc.

A percentage means the ratio of respondents who replied concerning a particular

disease that people's contraction of the disease will be reduced when water of near-by rivers/canals is purified

Source JICA

Table J.19 Methodology for Estimation of Benefits of Medical Cost Reduction

1. No. of Patients

$$\begin{aligned} 1) \quad PTNT(1,i) &= POP(i) * CR(1) \\ PTNT(2,i) &= POP(i) * CR(2) \end{aligned}$$

where

$PTNT(1,i)$  : No. of patients in the year  $i$  in the "without" case  
 $PTNT(2,i)$  : No. of patients in the year  $i$  in the "with" case  
 $POP(i)$  : Population in the year  $i$   
 $CR(1)$  : Disease contraction rate in the "without" case  
 $CR(2)$  : Disease contraction rate in the "with" case

$$2) \quad CR(1) = 56.5/1000/3$$

$$CR(2) = (27.3933 + 0.19074 * CLR(i) + 0.82926 * SML(i)) / 1000/3$$

where

$CLR(i)$  : Water color of rivers/canals in the year  $i$   
 $SML(i)$  : Water smell of rivers/canals in the year  $i$

2. Unit Medical Cost

$$UMC = \frac{\sum_j (CR(j) * (UMC(j) + UBD(j) * LP * WD + MR(j) * LC))}{\sum_j CR(j)}$$

where

$UMC$  : Average medical cost per patient  
 $CR(j)$  : Contraction rate for disease  $j$   
 $UMC(j)$  : Medical cost per patient for disease  $j$   
 $UBD(j)$  : No. of days in bed per patient for disease  $j$   
 $LP$  : Labor force participation rate  
 $WD$  : Wages/salaries per worker per day  
 $MR(j)$  : Mortality rate for disease  $j$   
 $LC$  : Labor cost per worker

3. Benefits

$$BNFT = \sum_i BNFT(i) = \sum_i (PTNT(1,i) - PTNT(2,i)) * UMC$$

where

$BNFT$  : Benefits of medical cost reduction  
 $BNFT(i)$  : BNFT in the year  $i$

Source : JICA

Table J.20 Medical Cost per Patient

(Unit : Rp.)

Name of Diseases	Outside Hospital			In Hospital			Total Cost per Patient
	Medication Period (days)	Unit Cost (Rp./day)	Cost	Medication Period (days)	Unit Cost (Rp./day)	Cost	
1 Malaria	0	2,000	0	12	20,000	240,000	240,000
2 Gastro-Enteritis	3	2,000	6,000	4	20,000	80,000	86,000
3 Cholera	0	2,000	0	3	20,000	60,000	60,000
4 Tuberculosis	0	2,000	0	23	20,000	460,000	460,000
5 DHF	0	2,000	0	6	20,000	120,000	120,000
6 Typhoid	0	2,000	0	12	20,000	240,000	240,000
7 Dysentery	5	2,000	10,000	10	20,000	200,000	210,000
8 Diphtheria	0	2,000	0	14	20,000	280,000	280,000
9 Measles	14	2,000	28,000	8	20,000	160,000	188,000
10 Hepatitis A	0	2,000	0	12	20,000	240,000	240,000
11 Hepatitis B	30	2,000	60,000	11	20,000	220,000	280,000
12 Skin Diseases	12	2,000	24,000	16	20,000	320,000	344,000

Source : BPPT &amp; JICA

Table J.21 Total Medical Cost in " Without" and "With" Cases

Year	(Unit : Rp. million)		
	"Without"	"With"	Benefits
	Case	Case	
	(1)	(2)	(3) = (1) - (2)
1990	125,242	125,242	0
1991	127,739	127,739	0
1992	130,236	130,236	0
1993	132,733	132,733	0
1994	135,230	135,230	0
1995	137,727	137,727	0
1996	140,224	140,224	0
1997	142,722	133,785	8,937
1998	145,219	128,105	17,114
1999	147,716	123,010	24,706
2000	150,213	118,376	31,837
2001	152,710	114,113	38,597
2002	155,207	110,153	45,054
2003	157,704	106,445	51,259
2004	160,201	102,948	57,253
2005	162,698	99,629	63,069
2006	165,195	96,462	68,733
2007	167,693	93,425	74,268
2008	170,190	90,501	79,689
2009	172,687	87,676	85,011
2010	175,184	84,936	90,248

Source : JICA

Table J.22 Willingness to Pay per Household per Month by Sanitation Facilities

(Unit : Rp.)

Sanitation Facility	Wilayah	High Income Class	Middle Income Class	Low Income Class	Average
MCK	Pusat	-	372	706	530
	Utara	-	-	682	404
	Barat	-	962	340	638
	Selatan	-	1,250	438	898
	Timur	-	300	300	300
	Jakarta	-	836	498	574
Individual Toilet with Treatment	Pusat	2,554	1,418	803	1,175
	Utara	1,284	1,586	754	1,094
	Barat	2,653	2,065	798	1,469
	Selatan	3,694	2,739	876	1,938
	Timur	1,411	922	795	883
	Jakarta	2,568	1,775	810	1,316
Toilet with Sewerage	Pusat	5,510	2,143	907	1,703
	Utara	5,398	2,568	848	1,626
	Barat	5,220	2,516	890	1,829
	Selatan	5,807	3,755	1,068	2,635
	Timur	3,385	1,521	792	1,263
	Jakarta	4,962	2,513	907	1,846

Source : JICA



Table J.23 Income Class-Wise Willingness to Pay (/Household/Month) for Sewerage Facilities by Kecamatan in 1989

CODE NUMBER	NAME OF KECAMATAN	(Unit : Rp.)			AVERAGE
		HIGH INCOME CLASS	MIDDLE INCOME CLASS	LOW INCOME CLASS	
1100	GAMBIR	2,931	1,455	694	1,190
1200	SAWAH BESAR	2,792	1,117	394	792
1300	KEMAYORAN	2,558	1,145	1,480	1,343
1400	SEKEN	4,205	1,337	705	1,075
1500	CEMPAKA PUTIH	5,018	813	893	1,022
1600	MENTENG	6,913	1,898	974	2,286
1700	TANAH ABANG	12,140	6,564	942	4,414
1000	JAKARTA PUSAT	5,510	2,143	907	1,703
2200	PENJARINGAN	16,970	5,528	984	3,549
2300	TANJUNG PRIOK	1,361	1,459	454	862
2400	KOJA	1,337	1,263	796	998
2500	CILINCING	1,919	1,972	1,159	1,455
2000	JAKARTA UTARA	5,398	2,568	848	1,626
3100	CENGKARENG	3,954	2,533	1,228	1,699
3200	GROGOL PETAMBURAN	6,393	4,139	820	2,813
3300	TAMAN SARI	2,642	761	492	698
3400	TAMBORA	2,471	1,902	995	1,452
3500	KBBON JERUK	10,228	2,771	782	2,533
3000	JAKARTA BARAT	5,220	2,516	890	1,829
4100	TEBET	4,261	1,148	1,141	1,288
4200	SETIA BUDI	3,678	4,125	991	2,530
4300	MAMPANG PRAPATAN	4,334	4,460	848	2,868
4400	PASAR MINGGU	10,905	6,170	1,549	4,079
4500	KEBAYORAN BARU	7,108	2,827	1,134	2,544
4600	KEBAYORAN LAMA	3,046	2,631	848	1,780
4700	CILANDAK	5,824	3,825	701	2,977
4000	JAKARTA SELATAN	5,807	3,755	1,068	2,635
5100	MATRAMAN	3,141	2,034	851	1,560
5200	PULO GADUNG	7,852	2,115	1,022	2,083
5300	JATINEGARA	3,374	1,769	796	1,528
5400	KRAMAT JATI	3,046	1,057	635	970
5500	PASAR REBO	1,808	1,361	754	1,057
5600	CAKUNG	1,092	1,159	827	953
5000	JAKARTA TIMUR	3,385	1,521	792	1,263
10000	JAKARTA	4,962	2,513	907	1,846

Source : JICA

Table J.24 Relationships between Household Income and Willingness to Pay for Sewerage Facilities

1. Results of Regression Analysis

$$F(x) = 963 + 0.003380x$$

where

$x$  : Monthly Household Income (Rp.)

$F(x)$  : Willingness to Pay for Sewerage Facilities per Month per Household (Rp.)

Correlation Coefficient = 0.3348

T - Value = 4.5366

$x_a$  (Average  $x$ ) = 261,167

$F(x_a)$  = 1,846

2. Elasticity of Willingness to Pay to Income

$$E(x) = \frac{\frac{dF(x)}{F(x)}}{\frac{dx}{x}} = \frac{dF(x)}{dx} * \frac{x}{F(x)} = (0.003380x) / (963 + 0.003380x)$$

$$E(615) = 0.476767$$

Table J.25 Relationships between Floor Area and Willingness to Pay for Sewerage Facility

Item	Regression Equation	$X_a$	$F(X_a)$	$F(100)$	Correlation Coefficient	T-Value
1. Household	$F(x) = 1,029 + 8.79x$	93	1,846	1,908	0.2618	5.4342

where

$X$  = Floor Area per Household ( $m^2$ )

$F(X)$  = Willingness to Pay per Household per Month (Rp.)

$X_a$  = Average  $x$

2. Establishment/ Facilities	$F(X) = 4,988 + 2.43x$	427	6,026	5,231	0.6500	5.1323
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where

$X$  = Floor Area per Establishment/Facility ( $m^2$ )

$F(X)$  = Willingness to Pay per Establishment/Facility per Month (Rp.)

$X_a$  = Average  $x$

1) Shop	167	5,394
2) Factory	437	6,050
3) Hotel	2,199	10,332
4) Restaurant	140	5,328
5) Hospital	1,259	8,047
6) Office	692	6,670
7) School	1,150	7,783
8) Religious Facilities	513	6,235

Note : School = Primary, Junior General High & High ; Religious Facilities = Mosque, Church & Temple

Table J.26      Methodology for Estimation of Major Variables Related to Estimation of Total Willingness to Pay for Sewerage Facilities by Kelurahan in 2010

1. No. of Households in 2010

$$NOH_2 = NOP_2 \text{ (No. of Population by Kelurahan in 2010)} \\ / 5.6 \text{ (Average No. of Household Members)}$$

2. Average Per Capita Per Month Income by Kelurahan in 2010

$$ICM_2 = ICM_1 \text{ (Average Per Capita Per Month Income by Kelurahan in 1988)} \\ \times 2.485102 \text{ (Estimated Growth Rate of Per Capita GDP 1988 to 2010)}$$

3. Average Monthly Willingness to Pay for Sewerage Facilities per Household by Kelurahan in 2010

$$WLH_2 = 963 + 0.003380 \times ICM_2 \times 5.6$$

4. No. of Shops/Factories by Kelurahan in 2010

$$NOS_2 = NOS_1 \text{ (No. of Shops by Kelurahan in 1988)} \\ \times 1.456861 \text{ (Estimated Growth Rate of Population 1988 to 2010)}$$

$$NOF_2 = NOF_1 \text{ (No. of Factories by Kelurahan in 1988)} \\ \times 1.583517 \text{ ((Estimated Industrial Growth Rate 1988 to 2010)} \\ / \text{ (Estimated Growth Rate of Per Capita GDP 1988 to 2010))}$$

5. Average Monthly Willingness to Pay for Sewerage Facilities per Shop/Factory in 2010

$$WLE_2 = WLE_1 \text{ (Average Monthly Willingness to Pay for Sewerage Facilities} \\ \text{per Shop/Factory in 1988)} \times (1 + 1.485102 \text{ (Estimated Net Growth Rate} \\ \text{of Per Capita GDP 1988 to 2010)} \times 0.476767 \text{ (Elasticity of Willingness to} \\ \text{Pay to Income)})$$

Table J.27 (1) Total Willingness to Pay of Households, Shops and Factories for Sewerage Facilities by Kelurahan in 1988

(Unit : Rp.)

CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY	CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY
1101	CIDENG	118,182,600	2201	KAMAL MUARA	21,627,930
1102	DURI PULO	210,195,700	2202	KAPUK MUARA	34,867,860
1103	PETOJO UTARA	133,176,700	2203	PEJAGALAN	340,780,600
1104	PETOJO SELATAN	134,355,500	2204	PENJARINGAN	378,750,300
1105	KEBON KILAPA	103,443,200	2205	PLUIT (MANGGA DUA UTARA)	177,188,000
1106	GAMBIR	23,523,350	2206	PADEMANGAN BARAT	309,412,900
1100	GAMBIR	722,877,000	2207	PADEMANGAN TIMUR	217,761,100
1201	MANGGA DUA SELATAN	274,543,800	2208	ANCOL	148,833,800
1202	KARANG ANYAR	186,410,700	2200	PENJARINGAN	1,629,222,000
1203	KAR TINI	162,766,200	2301	SUNTER AGUNG	191,457,100
1204	PASAR BARU	173,215,300	2302	PAPANGGO	121,704,500
1205	GUNUNG SAHARI UTARA	134,679,100	2303	SUNGAI BAMBU	151,390,000
1200	SAWAH BESAR	931,615,000	2304	KEBON BAWANG	248,883,000
1301	GUNUNG SAHARI SELATAN	142,299,300	2305	TANJUNG PRIOK	154,672,900
1302	KEMAYORAN	120,295,800	2306	SUNTER JAYA	201,368,500
1303	KEBON KOSONG	137,810,100	2307	WARAKAS	214,400,000
1304	SERDANG	139,717,400	2300	TANJUNG PRIOK	1,283,876,000
1305	HARAPAN MULIA	134,403,200	2401	KOJA UTARA	174,943,000
1306	UTANPANJANG	163,583,200	2402	LOGOA	269,744,200
1307	CEMPAKA BARU	194,842,600	2403	KOJA SELATAN	136,570,800
1308	SUMURBATU	99,113,290	2404	TUGU SELATAN	46,006,420
1300	KEMAYORAN	1,132,065,000	2405	TUGU UTARA	239,520,200
1401	SEKEN	59,734,580	2406	RAWA BADAQ	274,154,100
1402	KWITANG	96,171,920	2407	KELAPA GADING BARAT	83,667,310
1403	KENARI	79,155,030	2408	KELAPA GADING TIMUR	165,424,900
1404	KRAMAT	169,487,600	2409	PEGANGSAAN DUA	83,874,110
1405	PASEBAN	159,303,600	2400	KOJA	1,473,905,000
1406	BUNGUR	158,223,800	2501	KALI BARU	207,896,300
1400	SEKEN	722,076,600	2502	CILINCING	81,731,430
1501	TANAH TINGGI	166,093,900	2503	SEMPER BARAT	224,960,100
1502	JOHAR BARU	156,443,200	2504	SEMPER TIMUR	106,220,900
1503	GALUR	85,512,480	2505	MARUNDA	25,194,850
1504	KAMPUNG RAWA	79,984,060	2506	SUKAPURA	67,015,210
1505	RAWA SARI	141,622,000	2507	ROROTAN	18,162,910
1506	CEMPAKA PUTIH BARAT	189,600,500	2500	CILINCING	761,181,700
1507	CEMPAKA PUTIH TIMUR	136,216,200	2000	JAKARTA UTARA	5,148,185,000
1500	CEMPAKA PUTIH	955,472,200	3101	SEMANAN	111,203,600
1601	KEBON SIRIH	140,471,600	3102	KAMAL	42,658,360
1602	GONDANGDIA	56,344,470	3103	TEGAL ALUR	152,440,300
1603	CIKINI	74,395,630	3104	PEGADUNGAN	57,601,730
1604	MENTENG	238,102,000	3105	KALI DERES	116,520,100
1605	PEGANGSAAN	145,779,600	3106	CENGKARENG TIMUR	144,458,000
1600	MENTENG	655,093,200	3107	KAPUK	229,927,800
1701	KAMPUNG BALI	125,475,200	3108	KEDAUNG KALI ANGKE	89,353,660
1702	KEBON KACANG	168,047,100	3109	DURI KOSAMBI	73,150,030
1703	KEBON MELATI	273,175,500	3110	RAWA BUAYA	101,361,500
1704	PETAMBURAN	181,411,400	3111	CENGKARENG BARAT	200,375,800
1705	KARET TENGSI	250,263,900	3100	CENGKARENG	1,319,051,000
1706	BENDUNGAN HILIR	195,204,600			
1707	GELORA	47,432,730			
1700	TANAH ABANG	1,241,010,000			
1000	JAKARTA PUSAT	6,360,210,000			

Source : JICA

Table J.27 (2) Total Willingness to Pay of Households, Shops and Factories for Sewerage Facilities by Kelurahan in 1988

(Unit : Rp.)

CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY	CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY
3201	GROGOL	165,274,400	4201	SETIA BUDI	50,685,970
3202	JELAMBAR	228,665,000	4202	GUNTUR	161,940,100
3203	TANJUNG DUREN	312,626,300	4203	KARET	195,755,400
3204	TOMANG	268,524,500	4204	KARET SEMANGGI	78,859,400
3205	JATI PULO	172,823,000	4205	KARET KUNINGAN	232,373,900
3206	KOTA BAMBU	281,285,600	4206	KUNINGAN TIMUR	58,937,970
3207	SLIPI	114,393,200	4207	PASAR MANGGIS	287,566,000
3208	PAL MERAH	287,459,100	4208	MENTENG ATAS	252,444,500
3209	KEMANGGISAN	196,415,400	4200	SETIA BUDI	1,318,563,000
3210	JELAMBAR BARU	253,105,900	4301	KUNINGAN BARAT	100,294,700
3211	WIJAYA KUSUMA	115,630,000	4302	MAMPANG PRAPATAN	106,233,700
3200	GROGOL PETAMBURAN	2,396,202,000	4303	PELA MAMPANG	215,801,400
3301	PINANGSIA	123,664,000	4304	TEGAL PARANG	94,795,120
3302	MANGGA BESAR	77,836,180	4305	BANGKA	99,008,630
3303	TANGKI	120,473,600	4306	PANCORAN	98,112,580
3304	GLODOK	157,776,600	4307	DUREN TIGA	128,170,800
3305	KEAGUNGAN	142,574,600	4308	KALI BATA	180,701,900
3306	KRUKUT	138,078,600	4309	CIKOKO	58,357,940
3307	TAMAN SARI	118,424,900	4310	PENGADEGAN	91,450,520
3308	MAHPAR	141,828,400	4311	RAWAJATI	53,414,510
3300	TAMAN SARI	1,020,657,000	4300	MAMPANG PRAPATAN	1,226,342,000
3401	PEKOJAN	146,942,700	4401	PEJATEN BARAT	147,659,400
3402	ROA MALAKA	119,920,300	4402	PASAR MINGGU	162,407,700
3403	TAMBORA	73,612,110	4403	TANJUNG BARAT	89,646,910
3404	JEMBATAN LIMA	125,052,300	4404	JATI PADANG	114,468,800
3405	ANGKE	170,119,300	4405	RAGUNAN	130,153,300
3406	JEMBATAN BESI	160,422,300	4406	CILANDAK TIMUR	97,657,650
3407	KRENDANG	120,777,200	4407	JAGAKARSA	93,755,020
3408	TANAH SEREAL	173,297,200	4408	LENTENG AGUNG	161,081,700
3409	DURI UTARA	116,146,900	4409	SRENGSENG SAWAH	113,242,200
3410	KALI BARU	129,088,300	4410	CIGANJUR	93,882,420
3411	DURI SELATAN	95,674,750	4411	KEBAGUSAN	88,547,830
3400	TAMBORA	1,431,054,000	4412	PEJATEN TIMUR	216,681,000
3501	KEMBANGAN	126,365,800	4400	PASAR MINGGU	1,509,184,000
3502	KEDOYA	236,458,300	4501	SENAYAN	152,064,200
3503	DURI KEPA	167,194,900	4502	RAWA BARAT	48,588,810
3504	MARUYA ILIR	118,583,000	4503	SELONG	32,025,890
3505	MARUYA UDIK	73,497,400	4504	GUNUNG	89,917,260
3506	JOGL0	86,425,260	4505	KRAMAT PEL4	92,676,110
3507	SRENGSENG	75,052,030	4506	MELAWAI	49,238,000
3508	KEBON JERUK	190,032,700	4507	PETOGOGAN	91,984,390
3509	SUKABUMI ILIR	118,625,500	4508	PULO	59,522,480
3510	KELAPA DUA	72,672,570	4509	GANDARIA UTARA	225,021,400
3511	SUKABUMI UDIK	89,281,420	4510	CIPETE UTARA	160,824,100
3500	KEBON JERUK	1,354,189,000	4500	KABAYORAN BARU	1,001,863,000
3600	JAKARTA BARAT	7,521,152,000	4601	GROGOL UTARA	221,798,800
4101	MENTENG DALAM	287,335,500	4602	GROGOL SELATAN	217,757,300
4102	TEBET BARAT	174,859,100	4603	CIPULIR	175,058,000
4103	TEBET TIMUR	139,912,500	4604	KEBAYORAN LAMA UTARA	275,965,000
4104	KEBON BARU	205,599,900	4605	PONDOK PINANG	229,826,400
4105	BUKIT DURI	197,564,800	4606	PETUKANGAN UTARA	118,187,800
4106	MANGGARAI SELATAN	144,892,300	4607	PETUKANAGN SELATAN	85,170,480
4107	MANGGARAI	167,042,200	4608	ULUJAMI	105,012,300
4100	TEBET	1,317,206,000	4609	PESANGGARAHAN	112,585,200
			4610	BINTARO	143,562,000
			4611	KEBAYORAN LAMA SELATAN	201,191,700
			4600	KEBAYORAN LAMA	1,886,114,000

Source : JICA

Table J.27 (3) Total Willingness to Pay of Households, Shops and Factories for Sewerage Facilities by Kelurahan in 1988

(Unit : Rp.)

CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY	CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY
4701	GANDARIA SELATAN	109,044,100	5501	LUBANG BUAYA	96,432,110
4702	CIPETE SELATAN	127,977,500	5502	GEDONG	111,042,700
4703	CILANDAK BARAT	300,969,800	5503	RAMBUTAN	88,661,880
4704	LEBAK BULUS	108,445,500	5504	CEGER	26,936,080
4705	PONDOK LABU	152,335,900	5505	BAMBU APUS	33,743,880
4700	CILANDAK	798,772,700	5506	SETU	26,463,240
4000	JAKARTA SELATAN	9,058,044,000	5507	CIPAYUNG	32,506,590
5101	KEBON MANGGIS	118,559,600	5508	SUSUKAN	139,593,800
5102	PAL MERIAM	115,167,000	5509	CIRACAS	156,090,200
5103	KAYUMANIS	167,179,900	5510	CUANTUNG	103,326,100
5104	UTAN KAYU UTARA	194,243,100	5511	BARU	72,688,710
5105	PISANGAN BARU	212,516,600	5512	KALI SARI	66,007,700
5106	UTAN KAYU SELATAN	190,383,600	5513	PEKAYON	132,883,100
5100	MATRAMAN	998,049,800	5514	KELAPA DUA WETAN	70,346,210
5201	KAYU PUTIH	267,490,400	5515	MUNJUL	37,726,990
5202	JATI	189,107,500	5516	CILANGKAP	31,413,530
5203	PISANGAN TIMUR	255,862,500	5517	CIBUBUR	137,293,400
5204	CIPINANG	234,107,800	5518	PONDOK RANGON	27,606,420
5205	PULO GADUNG	131,408,400	5500	PASAR REBO	1,390,763,000
5206	JATINEGARA KAUM	126,035,400	5601	RAWA TERATE	71,074,160
5207	RAWAMANGUN	286,685,100	5602	JATI NEGARA	192,251,900
5200	PULO GADUNG	1,490,697,000	5603	PENGGILINGAN	182,580,900
5301	KAMPUNG MELAYU	144,678,800	5604	CAKUNG BARAT	116,449,000
5302	BALI MESTER	85,994,010	5605	UJUNG MENTENG	51,004,950
5303	BIDARA CINA	246,626,800	5606	PULO GEBANG	157,837,400
5304	CIPINANG CEMPEDAK	227,215,800	5607	CAKUNG TIMUR	105,272,000
5305	RAWA BUNGA	172,635,100	5600	CAKUNG	876,470,200
5306	CIPINANG MUARA	260,309,000	5000	JAKARTA TIMUR	9,071,508,000
5307	CIPINANG BESAR UTARA	185,825,000	10000	JAKARTA	37,159,100,000
5308	PONDOK BAMBU	226,129,500			
5309	KLENDER	246,434,800			
5310	DUREN SAWIT	163,809,900			
5311	MALAKA SARI	166,817,300			
5312	PONDOK KELAPA	139,078,100			
5313	CIPINANG BESAR SELATAN	113,519,800			
5314	MALAKA JAYA	219,001,400			
5315	PONDOK KOPI	140,399,800			
5300	JATINEGARA	2,738,475,000			
5401	CAWANG	206,368,800			
5402	CIPINANG MELAYU	148,045,000			
5403	CILILITAN	184,470,500			
5404	KRAMAT JATI	161,540,900			
5405	KEBON PALA	149,927,400			
5406	HALIM PERDANA KUSUMA	193,488,300			
5407	BATU AMPAR	123,183,300			
5408	BALE KAMBANG	61,495,490			
5409	MAKASSAR	133,703,600			
5410	KAMPUNG TENGAH	115,620,300			
5411	DUKUH	54,827,010			
5412	PINANG RANTE	44,382,250			
5400	KRAMAT JATI	1,577,053,000			

Source : JICA

Table J.28 (1) Total Willingness to Pay of Households, Shops and Factories for Sewerage Facilities by Kelurahan in 2010

(Unit : Rp.)

CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY	CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY
1101	CIDENG	234,123,500	2201	KAMAL MUARA	183,821,200
1102	DURI PULO	393,013,300	2202	KAPUK MUARA	348,017,300
1103	PETOJO UTARA	266,890,800	2203	PEJAGALAN	747,068,300
1104	PETOJO SELATAN	292,806,000	2204	PENJARINGAN	794,299,300
1105	KEBON KELAPA	209,126,600	2205	PLUIT (MANGGA DUA UTARA)	529,181,500
1106	GAMBIR	171,308,200	2206	PADEMANGAN BARAT	570,278,000
1100	GAMBIR	1,567,268,400	2207	PADEMANGAN TIMUR	637,553,900
1201	MANGGA DUA SELATAN	528,847,500	2208	ANCOL	389,727,700
1202	KARANG ANYAR	344,096,100	2200	PENJARINGAN	4,199,948,000
1203	KAR TINI	302,585,400	2301	SUNTER AGUNG	513,427,900
1204	PASAR BARU	397,663,200	2302	PAPANGGO	333,413,500
1205	GUNUNG SAHARI UTARA	239,350,900	2303	SUNGAI BAMBU	380,066,900
1200	SAWAH BESAR	1,812,543,000	2304	KEBON BAWANG	512,689,000
1301	GUNUNG SAHARI SELATAN	377,990,600	2305	TANJUNG PRIOK	519,442,100
1302	KEMAYORAN	204,819,200	2306	SUNTER JAYA	469,260,600
1303	KEBON KOSONG	233,153,000	2307	WARAKAS	411,720,500
1304	SERDANG	237,074,900	2300	TANJUNG PRIOK	3,140,020,000
1305	HARAPAN MULIA	237,841,000	2401	KOJA UTARA	358,253,500
1306	UTANPANJANG	275,809,700	2402	LOGOA	536,512,100
1307	CEMPAKA BARU	336,449,900	2403	KOJA SELATAN	308,694,900
1308	SUMURBATU	166,847,900	2404	TUGU SELATAN	190,353,200
1300	KEMAYORAN	2,069,986,000	2405	TUGU UTARA	582,310,400
1401	SEKEN	112,991,200	2406	RAWA BADAK	581,726,100
1402	KWITANG	177,848,100	2407	KELAPA GADING BARAT	333,105,300
1403	KENARI	158,571,600	2408	KELAPA GADING TIMUR	465,275,700
1404	KRAMAT	314,931,000	2409	PEGANGSAAN DUA	303,528,700
1405	PASEBAN	289,102,900	2400	KOJA	3,659,760,000
1406	BUNGUR	276,153,600	2501	KALI BARU	449,227,600
1400	SEKEN	1,329,599,000	2502	CILINCING	317,425,500
1501	TANAH TINGGI	275,588,600	2503	SEMPER BARAT	433,578,400
1502	JOHAR BARU	270,269,200	2504	SEMPER TIMUR	295,744,900
1503	GALUR	144,521,300	2505	MARUNDA	129,522,800
1504	KAMPUNG RAWA	132,511,400	2506	SUKAPURA	242,126,200
1505	RAWA SARI	280,900,000	2507	ROROTAN	241,583,300
1506	CEMPAKA PUTIH BARAT	354,512,200	2500	CILINCING	2,109,209,000
1507	CEMPAKA PUTIH TIMUR	282,874,100	2000	JAKARTA UTARA	13,108,940,000
1500	CEMPAKA PUTIH	1,741,177,000	3101	SEMANAN	348,591,200
1601	KEBON SIRIH	275,644,500	3102	KAMAL	96,842,860
1602	GONDANGDIA	205,031,100	3103	TEGAL ALUR	398,325,700
1603	CIKINI	165,423,700	3104	PEGADUNGAN	238,002,500
1604	MENTENG	555,552,000	3105	KALI DERES	331,453,100
1605	PEGANGSAAN	289,687,500	3106	CENGKARENG TIMUR	400,768,600
1600	MENTENG	1,491,339,000	3107	KAPUK	564,663,200
1701	KAMPUNG BALI	251,144,800	3108	KEDAUNG KALI ANGKE	213,807,500
1702	KEBON KACANG	334,931,400	3109	DURI KOSAMBI	268,436,100
1703	KEBON MELATI	527,288,300	3110	RAWA BUAYA	289,930,200
1704	PETAMBURAN	370,297,900	3111	CENGKARENG BARAT	465,013,000
1705	KARET TENGSI	523,784,100	3100	CENGKARENG	3,615,834,000
1706	BENDUNGAN HILIR	418,951,400			
1707	GELORA	141,559,100			
1700	TANAH ABANG	2,567,957,000			
1000	JAKARTA PUSAT	12,579,870,000			

Source : JICA



Table J.28 (2) Total Willingness to Pay of Households, Shops and Factories for Sewerage Facilities by Kelurahan in 2010

(Unit : Rp.)

CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY	CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY
3201	GROGOL	332,328,900	4201	SETIA BUDI	125,475,400
3202	JELAMBAR	444,253,600	4202	GUNTUR	329,845,100
3203	TANJUNG DUREN	643,525,800	4203	KARET	396,388,700
3204	TOMANG	546,225,300	4204	KARET SEMANGGI	198,684,700
3205	JATI PULO	319,387,200	4205	KARET KUNINGAN	512,467,500
3206	KOTA BAMBUI	515,940,400	4206	KUNINGAN TIMUR	206,743,100
3207	SLIPI	218,638,500	4207	PASAR MANGGIS	686,829,600
3208	PAL MERAH	570,099,300	4208	MENTENG ATAS	509,342,100
3209	KEMANGGISAN	385,509,700	4200	SETIA BUDI	2,965,776,000
3210	JELAMBAR BARU	488,520,100	4301	KUNINGAN BARAT	219,618,200
3211	WIJAYA KUSUMA	275,711,800	4302	MAMPANG PRAPATAN	225,796,000
3200	GROGOL PETAMBURAN	4,740,141,000	4303	PELA MAMPANG	462,221,400
3301	PINANGSIA	254,307,700	4304	TEGAL PARANG	224,219,300
3302	MANGGA BESAR	149,804,100	4305	BANGKA	349,937,900
3303	TANGKI	227,262,400	4306	PANCORAN	235,852,400
3304	GLODOK	352,789,500	4307	DUREN TIGA	375,253,400
3305	KEAGUNGAN	261,132,200	4308	KALI BATA	423,696,600
3306	KRUKUT	265,003,600	4309	CIKOKO	141,169,200
3307	TAMAN SARI	226,226,100	4310	PENGADegan	209,702,500
3308	MAHPAR	277,835,800	4311	RAWAJATI	126,983,700
3300	TAMAN SARI	2,014,361,000	4300	MAMPANG PRAPATAN	2,994,451,000
3401	PEKOJAN	258,104,100	4401	PEJATEN BARAT	410,047,800
3402	ROA MALAKA	288,084,000	4402	PASAR MINGGU	387,576,400
3403	TAMBORA	135,766,300	4403	TANJUNG BARAT	284,142,900
3404	JEMBATAN LIMA	216,723,400	4404	JATI PADANG	232,351,500
3405	ANGKE	309,424,800	4405	RAGUNAN	361,345,100
3406	JEMBATAN BESI	289,046,400	4406	CILANDAK TIMUR	253,830,300
3407	KRENDANG	206,016,000	4407	JAGAKARSA	263,596,000
3408	TANAH SEREAL	297,460,700	4408	LENTENG AGUNG	335,522,500
3409	DURI UTARA	203,673,700	4409	SRENGSENG SAWAH	335,341,700
3410	KALI BARU	211,478,500	4410	CIGANJUR	306,753,500
3411	DURI SELATAN	166,787,800	4411	KEBAGUSAN	211,957,900
3400	TAMBORA	2,582,566,000	4412	PEJATEN TIMUR	503,676,100
3501	KEMBANGAN	784,519,500	4400	PASAR MINGGU	3,886,142,000
3502	KEDOYA	1,006,199,000	4501	SENAYAN	310,396,400
3503	DURI KEPA	653,653,200	4502	RAWA BARAT	125,118,500
3504	MARUYA ILIR	664,735,100	4503	SELONG	139,163,700
3505	MARUYA UDIK	368,525,300	4504	GUNUNG	243,794,000
3506	JOGLU	581,164,300	4505	KRAMAT PELAI	234,258,900
3507	SRENGSENG	560,898,100	4506	MELAWAI	171,895,800
3508	KEBON JERUK	665,300,700	4507	PETOGOGAN	214,157,400
3509	SUKABUMI ILIR	351,662,400	4508	PULO	177,791,100
3510	KELAPA DUA	260,771,300	4509	GANDARIA UTARA	453,019,300
3511	SUKABUMI UDIK	305,114,400	4510	CI PETE UTARA	369,532,300
3500	KEBON JERUK	6,202,543,000	4500	KABAYORAN BARU	2,439,127,000
3000	JAKARTA BARAT	19,155,440,000	4601	GROGOL UTARA	707,222,100
4101	MENTENG DALAM	649,475,500	4602	GROGOL SELATAN	653,938,700
4102	TEBET BARAT	405,231,600	4603	CIPULIR	505,142,600
4103	TEBET TIMUR	324,251,900	4604	KEBAYORAN LAMA UTARA	682,956,000
4104	KEBON BARU	437,100,700	4605	PONDOK PINANG	1,113,939,000
4105	BUKIT DURI	371,066,700	4606	PETUKANGAN UTARA	489,863,400
4106	MANGGARAI SELATAN	259,635,700	4607	PETUKANAGN SELATAN	349,514,200
4107	MANGGARAI	315,243,300	4608	ULUJAMI	348,641,000
4100	TEBET	2,762,005,000	4609	PESANGGARAHAN	394,057,100
			4610	BINTARO	715,429,900
			4611	KEBAYORAN LAMA SELATAN	595,445,000
			4600	KEBAYORAN LAMA	6,556,149,000

Source : JICA

Table J.28 (3) Total Willingness to Pay of Households, Shops and Factories for Sewerage Facilities by Kelurahan in 2010

(Unit : Rp.)

CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY	CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY
4701	GANDARIA SELATAN	296,954,100	5501	LUBANG BUAYA	216,427,100
4702	CIPETE SELATAN	384,381,700	5502	GEDONG	262,123,400
4703	CILANDAK BARAT	728,006,800	5503	RAMBUTAN	188,367,300
4704	LEBAK BULUS	327,249,600	5504	CIGER	117,426,100
4705	PONDOK LABU	373,865,800	5505	BAMBU APUS	107,583,600
4700	CILANDAK	2,110,458,000	5506	SETU	85,817,980
4000	JAKARTA SELATAN	23,714,110,000	5507	CIPAYUNG	106,304,700
5101	KEBON MANGGIS	273,732,900	5508	SUSUKAN	289,406,300
5102	PAL MERIAM	257,014,800	5509	CIRACAS	373,300,000
5103	KAYUMANIS	338,823,800	5510	CIJANTUNG	229,385,100
5104	UTAN KAYU UTARA	424,880,100	5511	BARU	173,600,200
5105	PISANGAN BARU	427,021,100	5512	KALI SARI	160,300,000
5106	UTAN KAYU SELATAN	415,800,800	5513	PEKAYON	297,818,900
5100	MATRAMAN	2,137,274,000	5514	KELAPA DUA WETAN	171,516,100
5201	KAYU PUTIH	609,577,500	5515	MUNJUL	99,037,170
5202	JATI	512,884,700	5516	CILANGKAP	135,782,000
5203	PISANGAN TIMUR	607,453,800	5517	CIBUBUR	324,622,500
5204	CIPINANG	549,678,900	5518	PONDOK RANGON	120,316,800
5205	PULO GADUNG	410,499,500	5500	PASAR REBO	3,459,136,000
5206	JATINEGARA KAUM	332,150,700	5601	RAWA TERATE	231,728,500
5207	RAWAMANGUN	745,250,300	5602	JATI NEGARA	764,153,300
5200	PULO GADUNG	3,767,495,000	5603	PENGGILINGAN	614,099,700
5301	KAMPUNG MELAYU	294,421,200	5604	CAKUNG BARAT	359,223,600
5302	BALI MESTER	207,772,200	5605	UJUNG MENTENG	202,599,200
5303	BIDARA CINA	531,015,700	5606	PULO GEBANG	648,535,800
5304	CIPINANG CEMPEDAK	520,499,800	5607	CAKUNG TIMUR	480,110,400
5305	RAWA BUNGA	370,466,900	5600	CAKUNG	3,300,450,000
5306	CIPINANG MUARA	639,075,400	5000	JAKARTA TIMUR	23,959,850,000
5307	CIPINANG BESAR UTARA	393,731,900	10000	JAKARTA	92,518,210,000
5308	PONDOK BAMBU	813,623,900			
5309	KLENDER	685,105,600			
5310	DUREN SAWIT	638,454,300			
5311	MALAKA SARI	404,516,400			
5312	PONDOK KELAPA	710,230,900			
5313	CIPINANG BESAR SELATAN	298,210,800			
5314	MALAKA JAYA	472,350,700			
5315	PONDOK KOPI	356,545,800			
5300	JATINEGARA	7,336,021,000			
5401	CAWANG	479,496,800			
5402	CIPINANG MELAYU	436,160,300			
5403	CILILITAN	403,297,000			
5404	KRAMAT JATI	394,201,800			
5405	KEBON PALA	381,344,900			
5406	HALIM PERDANA KUSUMA	591,549,900			
5407	BATU AMPAR	270,092,700			
5408	BALE KAMBANG	143,309,200			
5409	MAKASSAR	339,145,100			
5410	KAMPUNG TENGAH	251,030,500			
5411	DUKUH	144,994,200			
5412	PINANG RANTE	124,850,900			
5400	KRAMAT JATI	3,959,473,000			

Source : JICA

Table J.29 Total Willingness to Pay of Households and Establishments/Facilities for Sewerage Facilities in 1988 and 2010

Item	1988				2010			
	Average Willingness to Pay (Unit/Month)	Total No. of Units	Total Willingness to Pay per Year		Average Willingness to Pay (Unit/Month)	Total No. of Units	Total Willingness to Pay per Year	
	A1	B1	C1=A1xB1x12		A2	B2	C2=A2xB2x12	
1. Household	1,846	1,568,931	34,754,959,000		3,153	2,285,714	86,482,275,000	
2. Establishments/Facilities								
1) Shop	5,394	27,908	1,806,429,000		9,213	40,658	4,494,986,000	
2) Factory	6,050	5,820	422,532,000		10,334	9,216	1,142,858,000	
3) Hotel	10,332	180	22,317,000		17,648	262	55,485,000	
4) Restaurant	5,328	1,256	80,304,000		9,100	1,830	199,836,000	
5) Hospital	8,047	1,533	148,033,000		13,745	2,233	368,311,000	
6) Office	6,670	5,178	414,447,000		11,393	7,544	1,031,386,000	
7) School	7,783	5,355	500,136,000		13,294	7,801	1,244,478,000	
8) Religious Facilities	6,235	8,244	616,816,000		10,650	12,010	1,534,878,000	
9) Others			401,101,000				1,007,222,000	
Sub-Total			4,412,115,000				11,079,440,000	
Total			39,167,074,000				97,561,715,000	

Note : A2 = A1 x (1 + 1.485102 (Estimated Net Growth Rate of Per Capita GDP 1988 to 2010))

x 0.476767 (Elasticity of Willingness to Pay to Income))

B2 = B1 x 1.456861 (Estimated Growth Rate of Population 1988 to 2010) ..... Excepting Factory

B2 = B1 x 1.583517 ((Estimated Industrial Growth Rate 1988 to 2010)

/ (Estimated Growth Rate of Per Capita GDP 1988 to 2010)) ..... Factory

Source : JICA

Table J.30 (1) Willingness to Pay of Households, Shops and Factories for Sewerage Facilities per ha by Kelurahan in 1988

(Unit : Rp.)					
CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY	CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY
1101	CIDENG	937,957	2201	KAMAL MUARA	20,539
1102	DURI PULO	2,919,384	2202	KAPUK MUARA	34,660
1103	PETOJO UTARA	1,189,078	2203	PEJAGALAN	1,055,048
1104	PETOJO SELATAN	1,002,653	2204	PENJARINGAN	958,861
1105	KEBON KELAPA	1,326,195	2205	PLUIT (MANGGA DUA UTARA)	229,816
1106	GAMBIR	91,176	2206	PADEMANGAN BARAT	2,022,307
1100	GAMBIR	926,765	2207	PADEMANGAN TIMUR	834,334
1201	MANGGA DUA SELATAN	2,128,246	2208	ANCOL	257,944
1202	KARANG ANYAR	3,655,113	2200	PENJARINGAN	358,939
1203	KAR TINI	2,959,385	2301	SUNTER AGUNG	272,731
1204	PASAR BARU	916,483	2302	PAPANGGO	434,659
1205	GUNUNG SAHARI UTARA	680,197	2303	SUNGAI BAMBU	641,483
1200	SAWAH BESAR	1,497,773	2304	KEBON BAWANG	1,438,630
1301	GUNUNG SAHARI SELATAN	906,365	2305	TANJUNG PRIOK	279,193
1302	KEMAYORAN	2,187,197	2306	SUNTER JAYA	439,669
1303	KEBON KOSONG	1,219,559	2307	WARAKAS	1,966,973
1304	SERDANG	1,330,642	2300	TANJUNG PRIOK	511,097
1305	HAJARAN MULIA	1,476,958	2401	KOJA UTARA	1,206,503
1306	UTANPANJANG	1,557,935	2402	LOGOA	1,707,242
1307	CEMPAKA BARU	2,117,854	2403	KOJA SELATAN	746,288
1308	SUMURBATU	962,265	2404	TUGU SELATAN	171,666
1300	KEMAYORAN	1,378,885	2405	TUGU UTARA	721,446
1401	SEKEN	737,464	2406	RAWA BADAQ	1,218,462
1402	KWITANG	2,137,154	2407	KELAPA GADING BARAT	157,863
1403	KENARI	869,836	2408	KELAPA GADING TIMUR	365,176
1404	KRAMAT	2,387,149	2409	PEGANGSAAN DUA	133,558
1405	PASEBAN	2,243,713	2400	KOJA	504,416
1406	BUNGUR	2,511,489	2501	KALI BARU	841,686
1400	SEKEN	1,711,082	2502	CILINCING	98,353
1501	TANAH TINGGI	2,678,934	2503	SEMPER BARAT	1,414,843
1502	JOHAR BARU	1,314,649	2504	SEMPER TIMUR	336,142
1503	GALUR	3,167,129	2505	MARUNDA	31,812
1504	KAMPUNG RAWA	2,666,135	2506	SUKAPURA	119,457
1505	RAWA SARI	1,132,976	2507	ROROTAN	45,266
1506	CEMPAKA PUTIH BARAT	1,554,102	2500	CILINCING	191,733
1507	CEMPAKA PUTIH TIMUR	613,587	2000	JAKARTA UTARA	369,231
1500	CEMPAKA PUTIH	1,351,446	3101	SEMANAN	185,959
1601	KEBON SIRIH	1,692,428	3102	KAMAL	154,559
1602	GONDANGDIA	385,921	3103	TEGAL ALUR	195,939
1603	CIKINI	907,264	3104	PEGADUNGAN	96,973
1604	MENTENG	975,828	3105	KALI DERES	236,349
1605	PEGANGSAAN	1,487,547	3106	CENGKARENG TIMUR	265,061
1600	MENTENG	1,003,206	3107	KAPUK	318,019
1701	KAMPUNG BALI	1,718,838	3108	KEDAUNG KALI ANGKE	342,351
1702	KEBON KACANG	2,366,860	3109	DURI KOSAMBI	145,427
1703	KEBON MELATI	2,168,059	3110	RAWA BUAYA	217,048
1704	PETAMBURAN	2,015,682	3111	CENGKARENG BARAT	392,125
1705	KARET TENGGIN	1,635,712	3100	CENGKARENG	229,440
1706	BENDUNGAN HILIR	1,235,473			
1707	GELORA	183,138			
1700	TANAH ABANG	1,334,420			
1000	JAKARTA PUSAT	1,288,796			

Source : JICA

Table J.30 (2)

Willingness to Pay of Households, Shops and Factories for  
Sewerage Facilities per ha by Kelurahan in 1988

(Unit : Rp.)

CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY	CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY
3201	GROGOL	1,354,708	4201	SETIA BUDI	684,946
3202	JELAMBAR	1,587,951	4202	GUNTUR	2,491,387
3203	TANJUNG DUREN	1,157,875	4203	KARET	2,082,505
3204	TOMANG	1,428,322	4204	KARET SEMANGGI	876,216
3205	JATI PULO	1,986,471	4205	KARET KUNINGAN	1,298,178
3206	KOTA BAMBU	2,232,425	4206	KUNINGAN TIMUR	274,130
3207	SLIPI	1,179,311	4207	PASAR MANGGIS	3,686,744
3208	PAL MERAH	1,233,730	4208	MENTENG ATAS	2,804,939
3209	KEMANGGHISAN	930,879	4200	SETIA BUDI	1,489,902
3210	JELAMBAR BARU	1,757,680	4301	KUNINGAN BARAT	1,023,415
3211	WIJAYA KUSUMA	443,027	4302	MAMPANG PRAPATAN	1,361,970
3200	GROGOL PETAMBURAN	1,272,545	4303	PELA MAMPANG	1,332,108
3301	PINANGSIA	1,288,167	4304	TEGAL PARANG	894,294
3302	MANGGA BESAR	1,526,200	4305	BANGKA	300,026
3303	TANGKI	3,256,043	4306	PANCORAN	791,230
3304	GLODOK	4,152,014	4307	DUREN TIGA	494,868
3305	KEAGUNGAN	4,455,457	4308	KALI BATA	872,956
3306	KRUKUT	2,510,520	4309	CIKOKO	821,943
3307	TAMAN SARI	1,741,542	4310	PENGADENGAN	962,637
3308	MAHPAR	2,403,871	4311	RAWAJATI	989,158
3300	TAMAN SARI	2,340,956	4300	MAMPANG PRAPATAN	774,206
3401	PEKOJAN	1,883,881	4401	PEJATEN BARAT	509,170
3402	ROA MALAKA	2,262,647	4402	PASAR MINGGU	484,799
3403	TAMBORA	2,629,004	4403	TANJUNG BARAT	170,756
3404	JEMBATAN LIMA	2,718,529	4404	JATI PADANG	748,162
3405	ANGKE	2,126,491	4405	RAGUNAN	224,790
3406	JEMBATAN BESI	2,916,769	4406	CILANDAK TIMUR	276,651
3407	KRENDANG	3,774,289	4407	JAGAKARSA	193,309
3408	TANAH SEREAL	2,795,117	4408	LENTENG AGUNG	605,570
3409	DURI UTARA	1,659,242	4409	SRENGSENG SAWAH	187,177
3410	KALI BARU	4,034,008	4410	CIGANJUR	140,332
3411	DURI SELATAN	2,813,963	4411	KEBAGUSAN	323,167
3400	TAMBORA	2,510,620	4412	PEJATEN TIMUR	752,364
3501	KEMBANGAN	185,559	4400	PASAR MINGGU	312,979
3502	KEDOYA	381,384	4501	SENAYAN	993,884
3503	DURI KEPA	433,147	4502	RAWA BARAT	704,186
3504	MARUYA ILIR	228,044	4503	SELONG	228,756
3505	MARUYA UDIK	257,886	4504	GUNUNG	681,191
3506	JOGLO	177,830	4505	KRAMAT PELTA	753,464
3507	SRENGSENG	152,545	4506	MELAWAI	390,778
3508	KEBON JERUK	605,200	4507	PETOGOGAN	1,057,292
3509	SUKABUMI ILIR	741,409	4508	PULO	468,681
3510	KELAPA DUA	501,190	4509	GANDARIA UTARA	1,654,569
3511	SUKABUMI UDIK	551,120	4510	CIPETE UTARA	878,820
3500	KEBON JERUK	318,558	4500	KABAYORAN BARU	785,159
3000	JAKARTA BARAT	583,533	4601	GROGOL UTARA	668,069
4101	MENTENG DALAM	1,113,704	4602	GROGOL SELATAN	764,061
4102	TEBET BARAT	1,016,623	4603	CIPULIR	902,361
4103	TEBET TIMUR	1,006,565	4604	KEBAYORAN LAMA UTARA	1,541,704
4104	KEBON BARU	1,581,538	4605	PONDOK PINANG	336,003
4105	BUKIT DURI	1,829,304	4606	PETUKANGAN UTARA	395,277
4106	MANGGARAI SELATAN	2,841,026	4607	PETUKANAGN SELATAN	403,652
4107	MANGGARAI	1,758,339	4608	ULUJAMI	614,107
4100	TEBET	1,382,168	4609	PESANGGARAHAN	536,120
			4610	BINTARO	314,829
			4611	KEBAYORAN LAMA SELATAN	782,847
			4600	KEBAYORAN LAMA	575,386

Source : JICA

Table J.30 (3) Willingness to Pay of Households, Shops and Factories for Sewerage Facilities per ha by Kelurahan in 1988

(Unit : Rp.)

CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY	CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY
4701	GANDARIA SELATAN	623,109	5501	LUBANG BUAYA	259,226
4702	CIPETE SELATAN	539,989	5502	GEDONG	422,215
4703	CHLANDAK BARAT	498,294	5503	RAMBUTAN	424,220
4704	LEBAK BULUS	245,908	5504	CEGER	74,204
4705	PONDOK LABU	421,983	5505	BAMBU APUS	106,448
4700	CHLANDAK	439,369	5506	SEITU	81,425
4000	JAKARTA SELATAN	619,735	5507	CIPAYUNG	110,567
5101	KEBON MANGGIS	1,500,755	5508	SUSUKAN	730,858
5102	PAL MERIAM	1,771,799	5509	CIRACAS	369,882
5103	KAYUMANIS	2,932,981	5510	CIJANTUNG	432,327
5104	UTAN KAYU UTARA	1,849,934	5511	BARU	384,596
5105	PISANGAN BARU	3,125,244	5512	KALI SARI	230,796
5106	UTAN KAYU SELATAN	1,699,853	5513	PEKAYON	417,871
5100	MATRAMAN	2,053,600	5514	KELAPA DUA WETAN	208,742
5201	KAYU PUTIH	612,106	5515	MUNJUL	173,857
5202	JATI	896,244	5516	CILANGKAP	76,062
5203	PISANGAN TIMUR	1,421,458	5517	CIBUBUR	305,097
5204	CIPINANG	1,520,180	5518	PONDOK RANGON	65,730
5205	PULO GADUNG	684,419	5500	PASAR REBO	247,247
5206	JATINEGARA KAUM	1,024,678	5601	RAWA TERATE	173,352
5207	RAWAMANGUN	1,046,296	5602	JATI NEGARA	291,291
5200	PULO GADUNG	948,884	5603	PENGGILINGAN	406,639
5301	KAMPUNG MELAYU	3,014,142	5604	CAKUNG BARAT	188,124
5302	BALI MESTER	1,283,493	5605	UJUNG MENTENG	115,135
5303	BIDARA CINA	1,957,355	5606	PULO GEBANG	230,084
5304	CIPINANG CEMPEDAK	1,360,573	5607	CAKUNG TIMUR	107,311
5305	RAWA BUNGA	1,961,763	5600	CAKUNG	206,325
5306	CIPINANG MUARA	897,617	5000	JAKARTA TIMUR	483,324
5307	CIPINANG BESAR UTARA	1,615,869	10000	JAKARTA	570,345
5308	PONDOK BAMBU	452,259			
5309	KLENDER	797,524			
5310	DUREN SAWIT	360,815			
5311	MALAKA SARI	1,208,821			
5312	PONDOK KELAPA	243,144			
5313	CIPINANG BESAR SELATAN	696,441			
5314	MALAKA JAYA	2,234,708			
5315	PONDOK KOPI	681,553			
5300	JATINEGARA	819,657			
5401	CAWANG	1,152,899			
5402	CIPINANG MELAYU	585,158			
5403	CILILITAN	1,024,836			
5404	KRAMAT JATI	1,062,769			
5405	KEBON PALA	651,858			
5406	HALIM PERDANA KUSUMA	148,040			
5407	BATU AMPAR	483,072			
5408	BALE KAMBANG	368,236			
5409	MAKASSAR	722,722			
5410	KAMPUNG TENGAH	569,558			
5411	DUKUH	276,904			
5412	PINANG RANTE	234,827			
5400	KRAMAT JATI	450,844			

Source : JICA

Table J.31 (1) Willingness to Pay of Households, Shops and Factories for Sewerage Facilities per ha by Kelurahan in 2010

(Unit : Rp.)

CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY	CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY
1101	CIDENG	1,858,123	2201	KAMAL MUARA	174,569
1102	DURI PULO	5,458,518	2202	KAPUK MUARA	345,942
1103	PETOJO UTARA	2,382,953	2203	PEJAGALAN	2,312,905
1104	PETOJO SELATAN	2,185,119	2204	PENJARINGAN	2,010,884
1105	KEBON KILAPA	2,681,110	2205	PLUIT (MANGGA DUA UTARA)	686,357
1106	GAMBIR	663,985	2206	PADEMANGAN BARAT	3,727,308
1100	GAMBIR	2,009,318	2207	PADEMANGAN TIMUR	2,442,735
1201	MANGGA DUA SELATAN	4,099,593	2208	ANCOL	675,438
1202	KARANG ANYAR	6,746,982	2200	PENJARINGAN	925,302
1203	KAR TINI	5,501,553	2301	SUNTER AGUNG	731,379
1204	PASAR BARU	2,104,038	2302	PAPANGGO	1,190,763
1205	GUNUNG SAHARI UTARA	1,208,843	2303	SUNGAI BAMBU	1,610,453
1200	SAWAH BESAR	2,914,057	2304	KEBON BAWANG	2,963,520
1301	GUNUNG SAHARI SELATAN	2,407,584	2305	TANJUNG PRIOK	937,621
1302	KEMAYORAN	3,723,985	2306	SUNTER JAYA	1,024,586
1303	KEBON KOSONG	2,063,301	2307	WARAKAS	3,777,252
1304	SERDANG	2,257,856	2300	TANJUNG PRIOK	1,250,008
1305	HAAPAN MULIA	2,613,637	2401	KOJA UTARA	2,470,714
1306	UTANPANJANG	2,626,759	2402	LOGOA	3,395,646
1307	CEMPAKA BARU	3,657,064	2403	KOJA SELATAN	1,686,857
1308	SUMURBATU	1,619,883	2404	TUGU SELATAN	710,273
1300	KEMAYORAN	2,521,299	2405	TUGU UTARA	1,753,947
1401	SEKEN	1,394,953	2406	RAWA BADAK	2,585,449
1402	KWITANG	3,952,181	2407	KELAPA GADING BARAT	628,501
1403	KENARI	1,742,545	2408	KELAPA GADING TIMUR	1,027,099
1404	KRAMAT	4,435,648	2409	PEGANGSAAN DUA	483,326
1405	PASEBAN	4,071,872	2400	KOJA	1,252,485
1406	BUNGUR	4,383,391	2501	KALI BARU	1,818,735
1400	SEKEN	3,150,707	2502	CILINCING	381,980
1501	TANAH TINGGI	4,444,978	2503	SEMPER BARAT	2,726,908
1502	JOHAR BARU	2,271,169	2504	SEMPER TIMUR	935,901
1503	GALUR	5,352,640	2505	MARUNDA	163,539
1504	KAMPUNG RAWA	4,417,046	2506	SUKAPURA	431,598
1505	RAWA SARI	2,247,200	2507	ROROTAN	227,052
1506	CEMPAKA PUTIH BARAT	2,905,838	2500	CILINCING	531,287
1507	CEMPAKA PUTIH TIMUR	1,274,208	2000	JAKARTA UTARA	940,180
1500	CEMPAKA PUTIH	2,462,768	3101	SEMANAN	582,929
1601	KEBON SIRIH	3,321,018	3102	KAMAL	350,880
1602	GONDANGDIA	1,404,323	3103	TEGAL ALUR	511,987
1603	CIKINI	2,017,362	3104	PEGADUNGAN	400,678
1604	MENTENG	2,276,852	3105	KALI DERES	672,319
1605	PEGANGSAAN	2,955,995	3106	CENGKARENG TIMUR	735,355
1600	MENTENG	2,283,827	3107	KAPUK	781,000
1701	KAMPUNG BALI	3,440,339	3108	KEDAUNG KALI ANGKE	819,186
1702	KEBON KACANG	4,717,343	3109	DURI KOSAMBI	533,670
1703	KEBON MELATI	4,184,828	3110	RAWA BUAYA	620,836
1704	PETAMBURAN	4,114,421	3111	CENGKARENG BARAT	910,006
1705	KARET TENGSIN	3,423,425	3100	CENGKARENG	628,950
1706	BENDUNGAN HILIR	2,651,591			
1707	GELORA	546,560			
1700	TANAH ABANG	2,761,244			
1000	JAKARTA PUSAT	2,549,112			

Source : JICA

Table J.31 (2) Willingness to Pay of Households, Shops and Factories for Sewerage Facilities per ha by Kelurahan in 2010

(Unit : Rp.)					
CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY	CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY
3201	GROGOL	2,724,007	4201	SETIA BUDI	1,695,613
3202	JELAMBAR	3,085,094	4202	GUNTUR	5,074,540
3203	TANJUNG DUREN	2,383,429	4203	KARET	4,216,902
3204	TOMANG	2,905,454	4204	KARET SEMANGGI	2,207,608
3205	JATI PULO	3,671,117	4205	KARET KUNINGAN	2,862,947
3206	KOTA BAMBU	4,094,765	4206	KUNINGAN TIMUR	961,596
3207	SLIPI	2,254,006	4207	PASAR MANGGIS	8,805,508
3208	PAL MERAH	2,446,778	4208	MENTENG ATAS	5,659,356
3209	KEMANGGISAN	1,827,060	4200	SETIA BUDI	3,351,160
3210	JELAMBAR BARU	3,392,501	4301	KUNINGAN BARAT	2,241,002
3211	WIJAYA KUSUMA	1,056,367	4302	MAMPANG PRAPATAN	2,894,821
3200	GROGOL PETAMBURAN	2,517,334	4303	PELA MAMPANG	2,853,219
3301	PINANGSIA	2,649,038	4304	TEGAL PARANG	2,115,277
3302	MANGGA BESAR	2,937,335	4305	BANGKA	1,060,418
3303	TANGKI	6,142,228	4306	PANCORAN	1,902,035
3304	GLODOK	9,283,935	4307	DUREN TIGA	1,448,855
3305	KEAGUNGAN	8,160,382	4308	KALI BATA	2,046,843
3306	KRUKUT	4,818,248	4309	CIKOKO	1,988,298
3307	TAMAN SARI	3,326,854	4310	PENGADegan	2,207,394
3308	MAHPAR	4,709,082	4311	RAWAJATI	2,351,550
3300	TAMAN SARI	4,620,095	4300	MAMPANG PRAPATAN	1,890,436
3401	PEKOJAN	3,309,026	4401	PEJATEN BARAT	1,413,958
3402	ROA MALAKA	5,435,547	4402	PASAR MINGGU	1,156,945
3403	TAMBORA	4,848,797	4403	TANJUNG BARAT	541,225
3404	JEMBATAN LIMA	4,711,378	4404	JATI PADANG	1,518,637
3405	ANGKE	3,867,810	4405	RAGUNAN	624,085
3406	JEMBATAN BESI	5,255,389	4406	CILANDAK TIMUR	719,066
3407	KRENDANG	6,438,001	4407	JAGAKARSA	543,497
3408	TANAH SEREAL	4,797,753	4408	LENTENG AGUNG	1,261,363
3409	DURI UTARA	2,909,625	4409	SRENGSENG SAWAH	554,284
3410	KALI BARU	6,608,702	4410	CIGANJUR	458,525
3411	DURI SELATAN	4,905,523	4411	KEBAGUSAN	773,569
3400	TAMBORA	4,530,817	4412	PEJATEN TIMUR	1,748,875
3501	KEMBANGAN	1,152,011	4400	PASAR MINGGU	805,919
3502	KEDOYA	1,622,902	4501	SENAYAN	2,028,734
3503	DURI KEPA	1,693,402	4502	RAWA BARAT	1,813,311
3504	MARUYA ILIR	1,278,337	4503	SELONG	994,026
3505	MARUYA UDIK	1,293,071	4504	GUNUNG	1,846,924
3506	JOGLO	1,195,811	4505	KRAMAT PELTA	1,904,544
3507	SRENGSENG	1,140,037	4506	MELAWAI	1,364,253
3508	KEBON JERUK	2,118,792	4507	PETOGOGAN	2,461,579
3509	SUKABUMI ILIR	2,197,890	4508	PULO	1,399,930
3510	KELAPA DUA	1,798,423	4509	GANDARIA UTARA	3,331,024
3511	SUKABUMI UDIK	1,883,422	4510	CIPETE UTARA	2,019,302
3500	KEBON JERUK	1,459,079	4500	KABAYORAN BARU	1,911,542
3000	JAKARTA BARAT	1,486,185	4601	GROGOL UTARA	2,130,187
4101	MENTENG DALAM	2,517,347	4602	GROGOL SELATAN	2,294,522
4102	TEBET BARAT	2,355,998	4603	CIPULIR	2,603,828
4103	TEBET TIMUR	2,332,747	4604	KEBAYORAN LAMA UTARA	3,815,397
4104	KEBON BARU	3,362,313	4605	PONDOK PINANG	1,628,566
4105	BUKIT DURI	3,435,803	4606	PETUKANGAN UTARA	1,638,339
4106	MANGGARAI SELATAN	5,090,895	4607	PETUKANAGN SELATAN	1,656,465
4107	MANGGARAI	3,318,350	4608	ULUJAMI	2,038,836
4100	TEBET	2,898,222	4609	PESANGGARAHAN	1,876,462
			4610	BINTARO	1,568,925
			4611	KEBAYORAN LAMA SELATAN	2,316,907
			4600	KEBAYORAN LAMA	2,000,045

Source : JICA



Table J.31 (3) Willingness to Pay of Households, Shops and Factories for Sewerage Facilities per ha by Kelurahan in 2010

			(Unit : Rp.)		
CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY	CODE NUMBER	NAME OF KELURAHAN & KECAMATAN	WILLINGNESS TO PAY
4701	GANDARIA SELATAN	1,696,880	5501	LUBANG BUAYA	581,793
4702	CIPETE SELATAN	1,621,864	5502	GEDONG	996,667
4703	CILANDAK BARAT	1,205,309	5503	RAMBUTAN	901,279
4704	LEBAK BULUS	742,063	5504	CIGER	323,488
4705	PONDOK LABU	1,035,639	5505	BAMBU APUS	339,380
4700	CILANDAK	1,160,868	5506	SETU	264,055
4000	JAKARTA SELATAN	1,622,476	5507	CIPAYUNG	361,581
5101	KEBON MANGGIS	3,464,974	5508	SUSUKAN	1,515,216
5102	PAL MERIAM	3,954,074	5509	CIRACAS	884,597
5103	KAYUMANIS	5,944,277	5510	CIANTUNG	959,770
5104	UTAN KAYU UTARA	4,046,477	5511	BARU	918,520
5105	PISANGAN BARU	6,279,722	5512	KALI SARI	560,489
5106	UTAN KAYU SELATAN	3,712,508	5513	PEKAYON	936,538
5100	MATRAMAN	4,397,683	5514	KELAPA DUA WETAN	508,950
5201	KAYU PUTIH	1,394,914	5515	MUNJUL	456,392
5202	JATI	2,430,733	5516	CILANGKAP	328,770
5203	PISANGAN TIMUR	3,374,744	5517	CIBUBUR	721,383
5204	CIPINANG	3,569,343	5518	PONDOK RANGON	286,469
5205	PULO GADUNG	2,138,018	5500	PASAR REBO	614,957
5206	JATINEGARA KAUM	2,700,412	5601	RAWA TERATE	565,191
5207	RAWAMANGUN	2,719,892	5602	JATI NEGARA	1,157,808
5200	PULO GADUNG	2,398,151	5603	PENGGIILINGAN	1,367,705
5301	KAMPUNG MELAYU	6,133,775	5604	CAKUNG BARAT	580,329
5302	BALI MESTER	3,101,078	5605	UJUNG MENTENG	457,335
5303	BIDARA CINA	4,214,410	5606	PULO GEBANG	945,387
5304	CIPINANG CEMPEDAK	3,116,765	5607	CAKUNG TIMUR	489,409
5305	RAWA BUNGA	4,209,851	5600	CAKUNG	776,942
5306	CIPINANG MUARA	2,203,708	5000	JAKARTA TIMUR	1,276,565
5307	CIPINANG BESAR UTARA	3,423,756	10000	JAKARTA	1,420,036
5308	PONDOK BAMBU	1,627,248			
5309	KLENDER	2,217,170			
5310	DUREN SAWIT	1,406,287			
5311	MALAKA SARI	2,931,279			
5312	PONDOK KELAPA	1,241,662			
5313	CIPINANG BESAR SELATAN	1,829,514			
5314	MALAKA JAYA	4,819,905			
5315	PONDOK KOPI	1,730,805			
5300	JATINEGARA	2,195,756			
5401	CAWANG	2,678,753			
5402	CIPINANG MELAYU	1,723,954			
5403	CILILITAN	2,240,539			
5404	KRAMAT JATI	2,593,433			
5405	KEBON PALA	1,658,021			
5406	HALIM PERDANA KUSUMA	452,601			
5407	BATU AMPAR	1,059,187			
5408	BALE KAMBANG	858,139			
5409	MAKASSAR	1,833,217			
5410	KAMPUNG TENGAH	1,236,604			
5411	DUKUH	732,294			
5412	PINANG RANTE	660,587			
5400	KRAMAT JATI	1,131,925			

Source : JICA

Table J.32

## Beneficiaries' Payment - Sewerage Services Charge

(Unit : Rp. million)

Property	No. of Connection	Average Floor Area per Customer* (m2)	Sewerage Service Charge per m2 per Month** (Rp.)	Total Sewerage Service Charge per Year
House	322,300	133	28	14,403
Shop	16,275	167	40	1,305
Factory	3,213	437	100	1,685
Hotel	36	728	100	31
Restaurant	854	140	60	86
Hospital	763	1,259	100	1,153
Office	813	692	40	270
School	2,758	1,150	40	1,522
Religious Institutions	3,895	513	40	959
Others	3,179	636	40	970
High Rise Building	444	14,138	140	10,546
Total	354,530			32,930

Note : \* Based on the questionnaire survey

\*\* Based on the tariff of sewerage services legalized by the Minister of Public Works on July 11, 1989

Source : JICA

Table J.33 Beneficiaries' Payment - Environmental Charge

(Unit : Rp. million)			
Property	No. of Properties	Environmental charge per Month per Property * (Rp.)	Total Environmental Charge per Year
House	462,226	1,000	5,547
Shop	10,936	2,500	328
Factory	2,116	2,500	63
Hotel	54	2,500	2
Restaurant	564	2,500	17
Hospital	503	2,500	15
Office	535	2,500	16
School	1,822	2,500	55
Religious Institutions	2,567	2,500	77
Others	1,910	2,500	57
High Rise Building	0	50,000	0
Total			6,177

Note : \* Based on the environmental charges now in force in Bandung.

Source : JICA

Table J.34 Development Expenditure of D.K.I Jakarta

Year	Urban		Development					Sub- Total	Total
	Urban Road	Drainage/ Flood	KIP/ MIP	Water Supply/ Wastewater		Solid Wastes			
1980/81	37,788 (48.4%)	5,929 (7.9%)	25,447 (32.6%)	5,365 (6.9%)	3,513 (4.5%)	78,041 (45.3%)	172,342 (100.0%)		
1981/82	36,800 (46.5%)	5,676 (7.2%)	27,178 (34.3%)	4,890 (6.2%)	4,678 (5.9%)	79,222 (46.6%)	169,882 (100.0%)		
1982/83	27,591 (49.6%)	4,040 (7.3%)	11,174 (20.1%)	841 (1.5%)	11,961 (21.5%)	55,607 (24.0%)	232,009 (100.0%)		
1983/84	35,932 (47.2%)	3,905 (5.1%)	9,427 (12.4%)	14,384 (18.9%)	12,468 (16.4%)	76,116 (31.8%)	239,595 (100.0%)		
1984/85	34,742 (44.2%)	6,034 (7.7%)	9,217 (11.7%)	15,394 (19.6%)	13,128 (16.7%)	78,515 (35.4%)	221,649 (100.0%)		
1985/86	29,350 (58.1%)	5,954 (11.8%)	7,210 (14.3%)	4,916 (9.7%)	3,072 (6.1%)	50,503 (18.8%)	268,551 (100.0%)		
1986/87	41,337 (58.5%)	9,090 (12.9%)	6,578 (9.3%)	7,204 (10.2%)	6,443 (9.1%)	70,652 (18.1%)	390,829 (100.0%)		
1987/88	55,505 (62.2%)	13,046 (14.6%)	10,796 (12.1%)	4,005 (4.5%)	5,842 (6.5%)	89,195 (24.1%)	370,542 (100.0%)		
1988/89	79,516 (61.5%)	24,653 (19.1%)	10,778 (8.3%)	5,871 (4.5%)	8,566 (6.6%)	129,384 (48.0%)	269,678 (100.0%)		

Sources : DPU, DKI Jakarta &amp; JICA

Table J.35 Development Expenditure and Foreign Investment for D.K.I Jakarta

Year	(Unit : Rp. million at 1990 prices)				Ratio to GDP
	Development Expenditure (1)	Foreign Investment (2)	Total (3) = (1) + (2)	GDP (4)	
1980/81	172,342	201,906	374,248	9,213,520	4.1 %
1981/82	169,882	428,502	598,384	10,890,440	5.5 %
1982/83	232,009	1,655,085	1,887,094	11,511,600	16.4 %
1983/84	239,595	1,185,511	1,425,106	12,812,220	11.1 %
1984/85	221,649	433,070	654,719	14,765,800	4.4 %
1985/86	268,551	330,785	599,336	14,170,080	4.2 %
1986/87	390,829	390,206	781,035	15,473,880	5.0 %
1987/88	370,542	597,038	967,580	16,479,820	5.9 %
1988/89	269,678	512,738	782,416	17,712,600	4.4 %

Sources : Statistik Indonesia, Jakarta in Figures & JICA

Table J.36 Projection of Urban Development Funds for D.K.I Jakarta

Year	GDP	Total Development Funds	Ratio to GDP	Urban Development Funds	Ratio to Total Development Funds
	(1)	(2)	(3)=(2)/(1)x100	(4)	(5)=(4)/(2)x100
1989	18,863,919	932,077	4.9	302,925	32.5
1990	19,995,754	992,055	5.0	322,418	32.5
1991	21,195,499	1,055,632	5.0	343,080	32.5
1992	22,467,229	1,123,024	5.0	364,983	32.5
1993	23,815,263	1,194,459	5.0	388,199	32.5
1994	25,244,179	1,270,180	5.0	412,809	32.5
1995	26,758,830	1,350,444	5.0	438,894	32.5
1996	28,364,359	1,435,524	5.1	466,545	32.5
1997	30,066,221	1,525,709	5.1	495,855	32.5
1998	31,870,194	1,621,305	5.1	526,924	32.5
1999	33,782,406	1,722,637	5.1	559,857	32.5
2000	35,809,350	1,830,049	5.1	594,766	32.5
2001	37,957,911	1,943,906	5.1	631,769	32.5
2002	40,235,386	2,064,593	5.1	670,993	32.5
2003	42,649,509	2,192,523	5.1	712,570	32.5
2004	45,208,480	2,328,127	5.1	756,641	32.5
2005	47,920,988	2,471,869	5.2	803,357	32.5
2006	50,796,248	2,624,234	5.2	852,876	32.5
2007	53,844,023	2,785,742	5.2	905,366	32.5
2008	57,074,664	2,956,940	5.2	961,006	32.5
2009	60,499,144	3,138,410	5.2	1,019,983	32.5
2010	64,129,092	3,330,768	5.2	1,082,500	32.5

Relationships between GDP and Total Development Funds

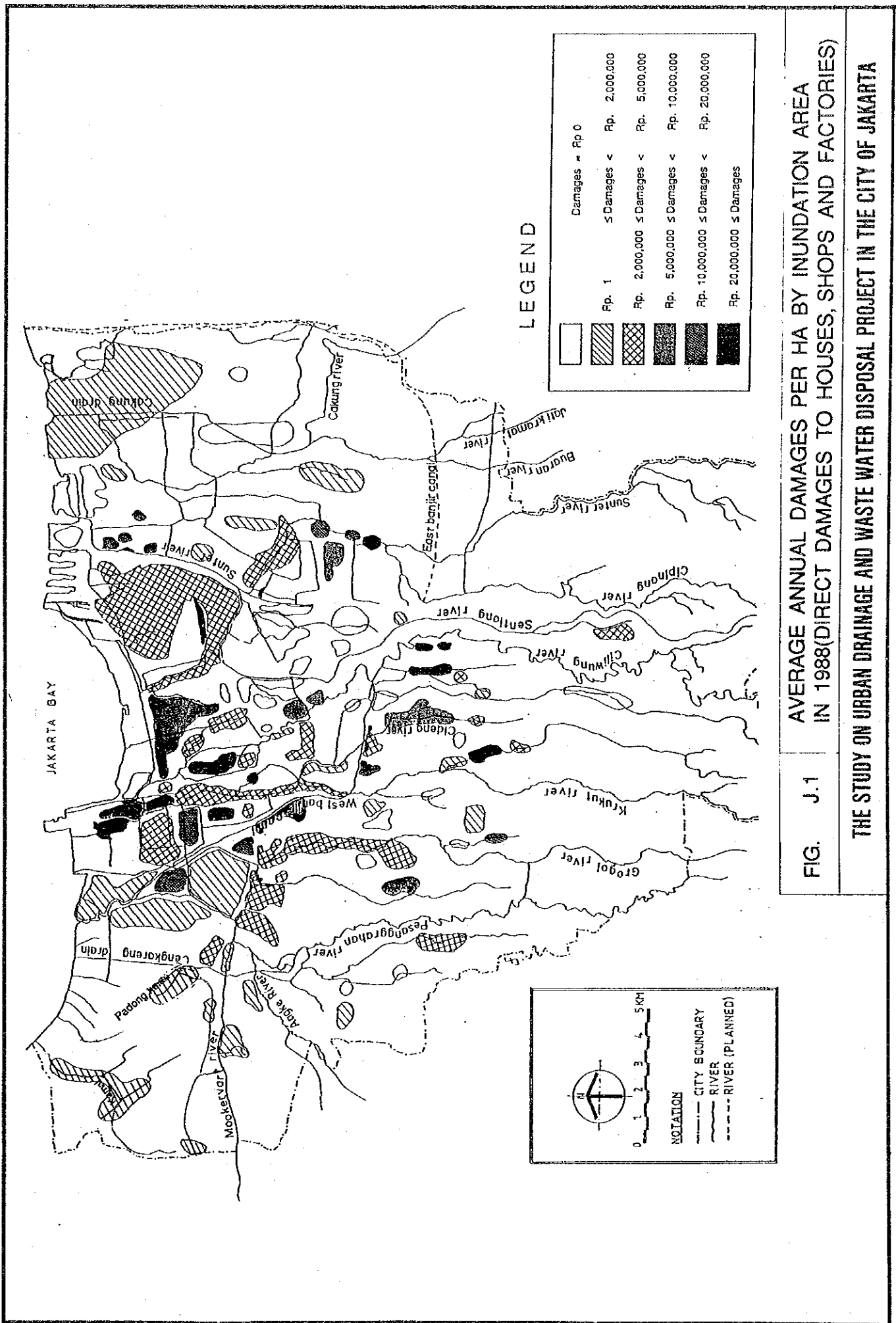
REGRESSION EQUATION :  $Y = -67558.94 + 5.299197E-02 * X$ 

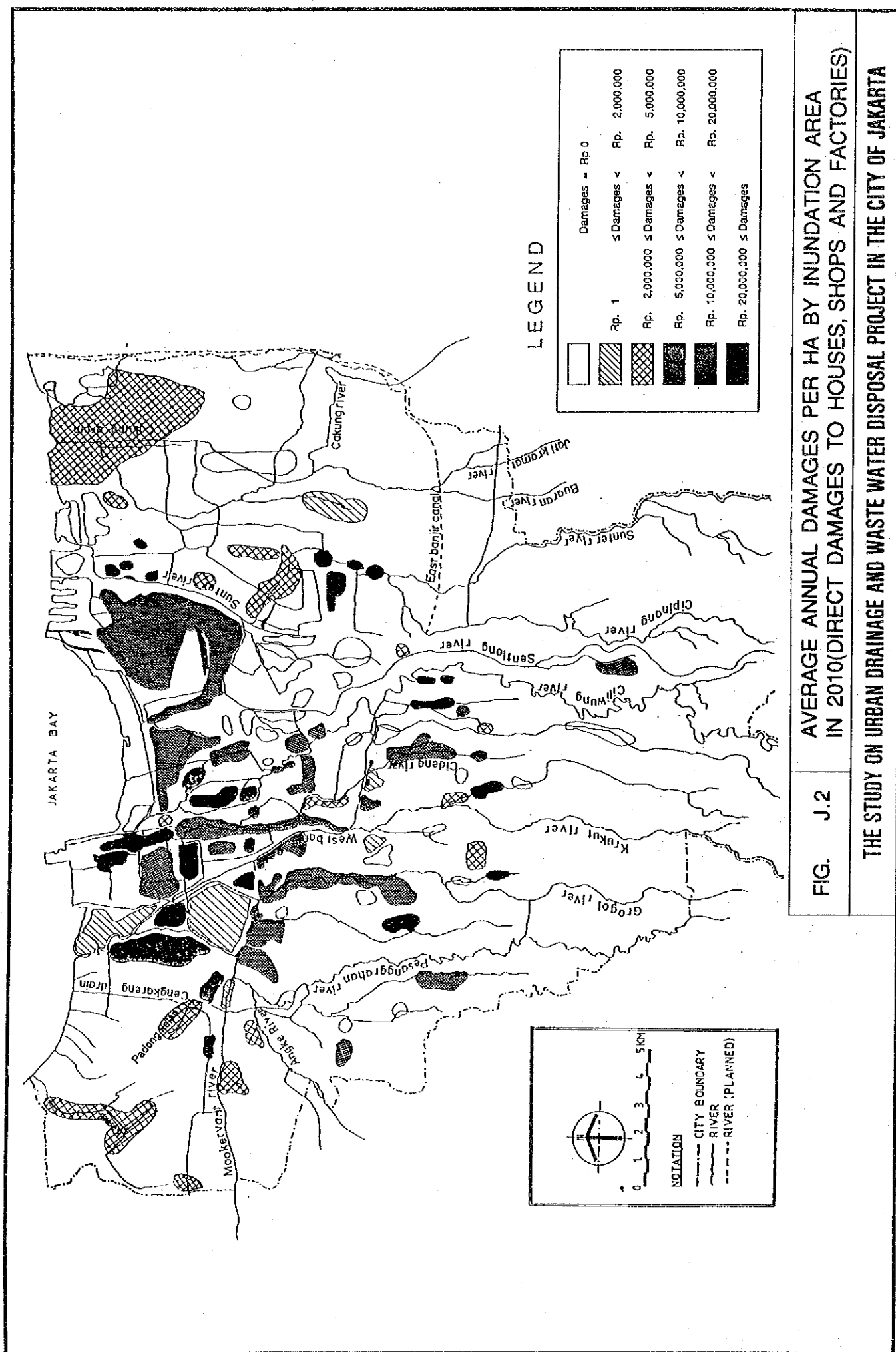
where x : GDP for D.K.I Jakarta (Rp. million)

y : Total development fund for D.K.I Jakarta (Rp. million)

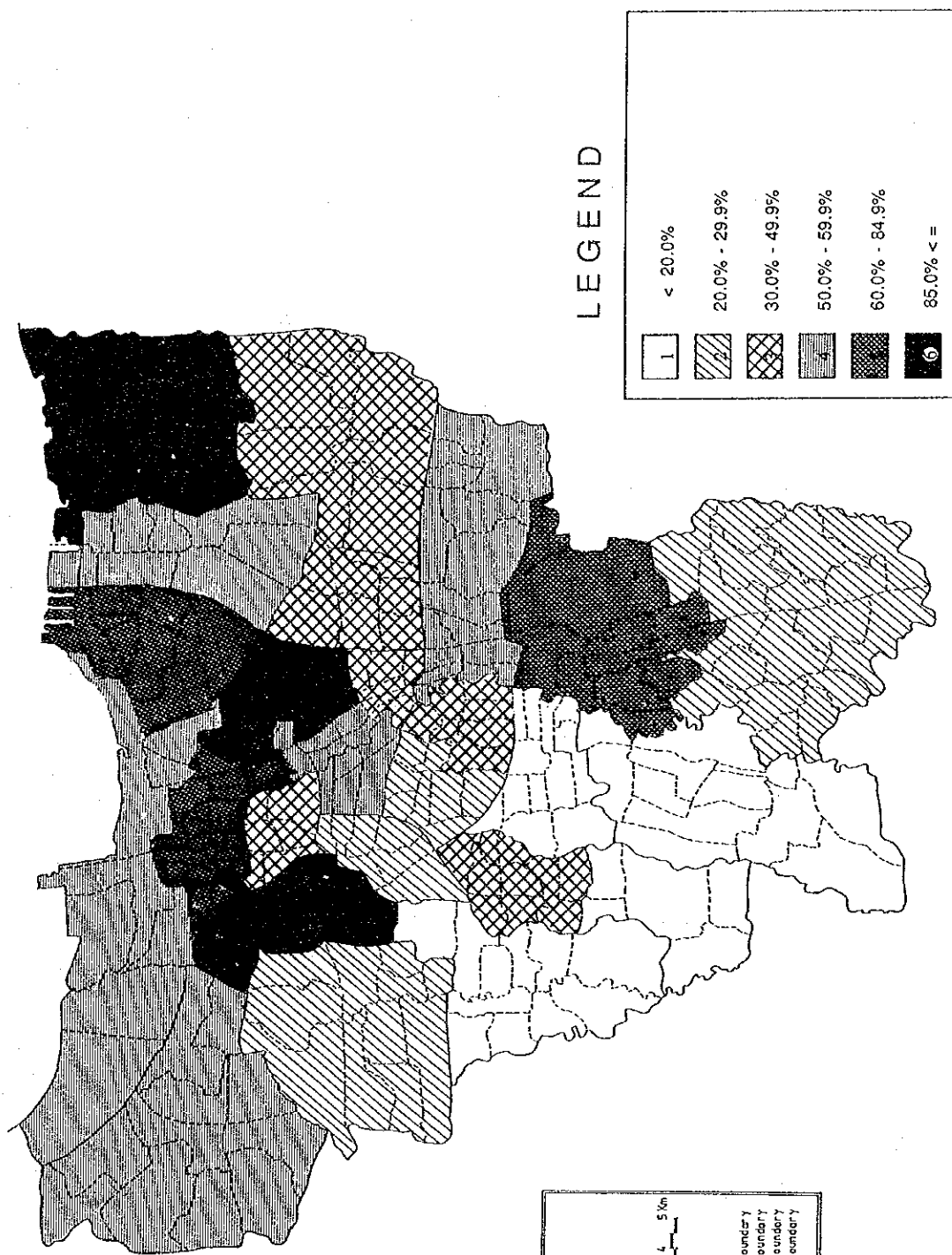
CORRELATION COEFFICIENT = .8579725 T VALUE = 3.734673

Source : DPU, DKI Jakarta &amp; JICA









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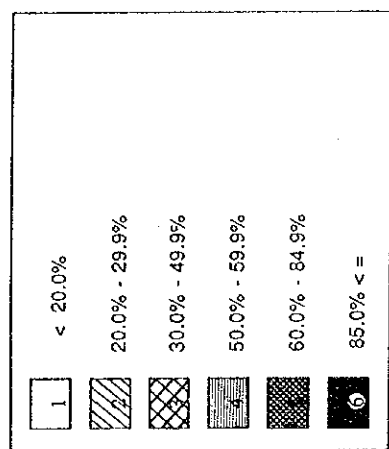
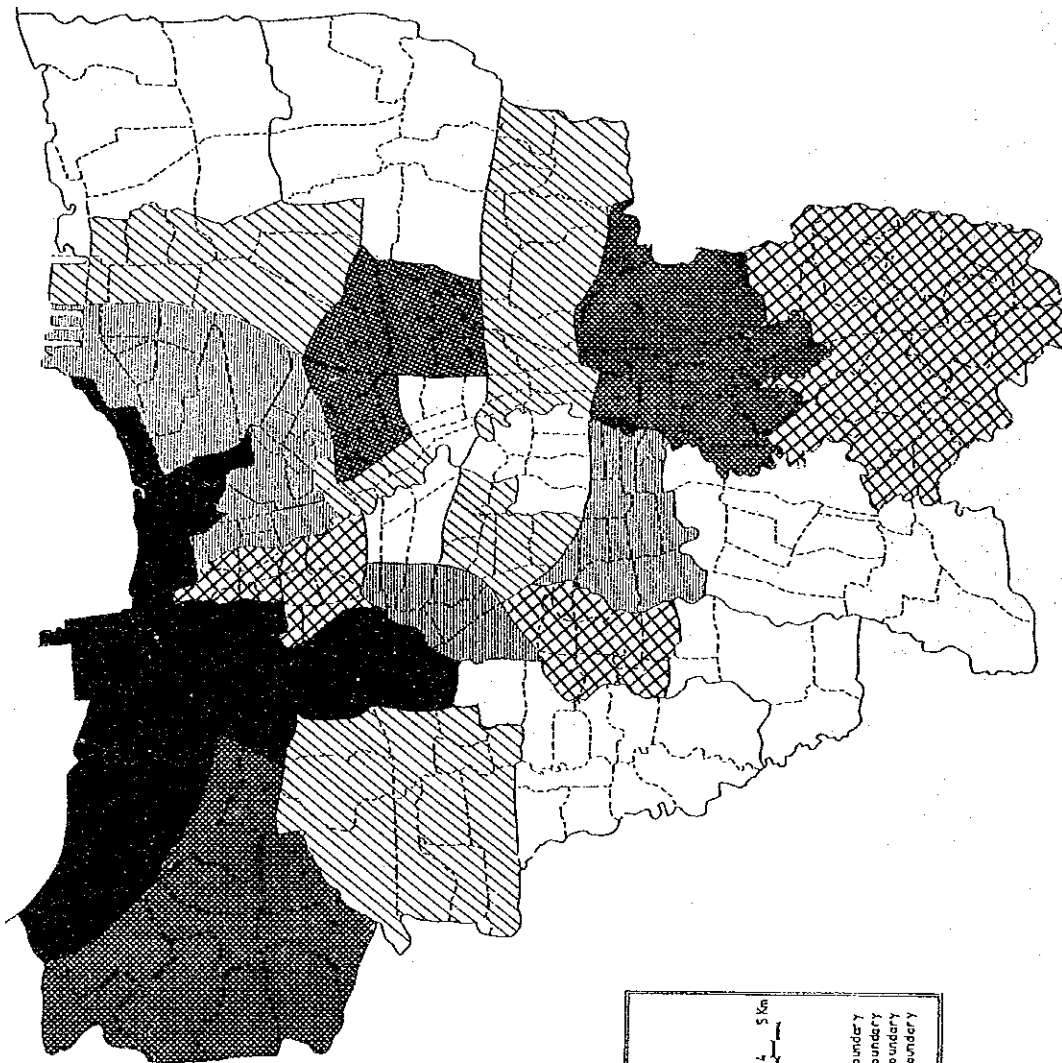


FIG. J.3 PERCENTAGE OF RESPONDENTS WHO REPLIED THAT THE WATER COLOR OF NEAR-BY RIVERS/CANALS WAS BLACK IN 1989

THE STUDY ON URBAN DRAINAGE AND WASTE WATER DISPOSAL PROJECT IN THE CITY OF JAKARTA



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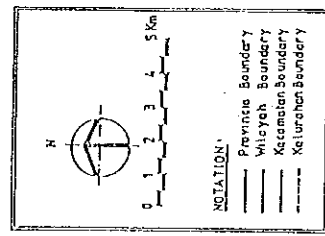
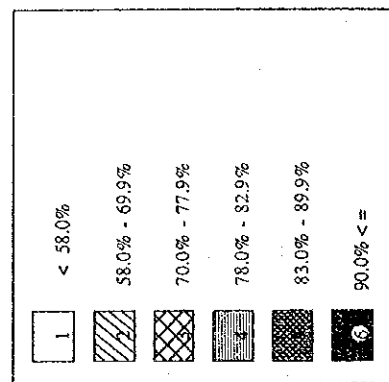
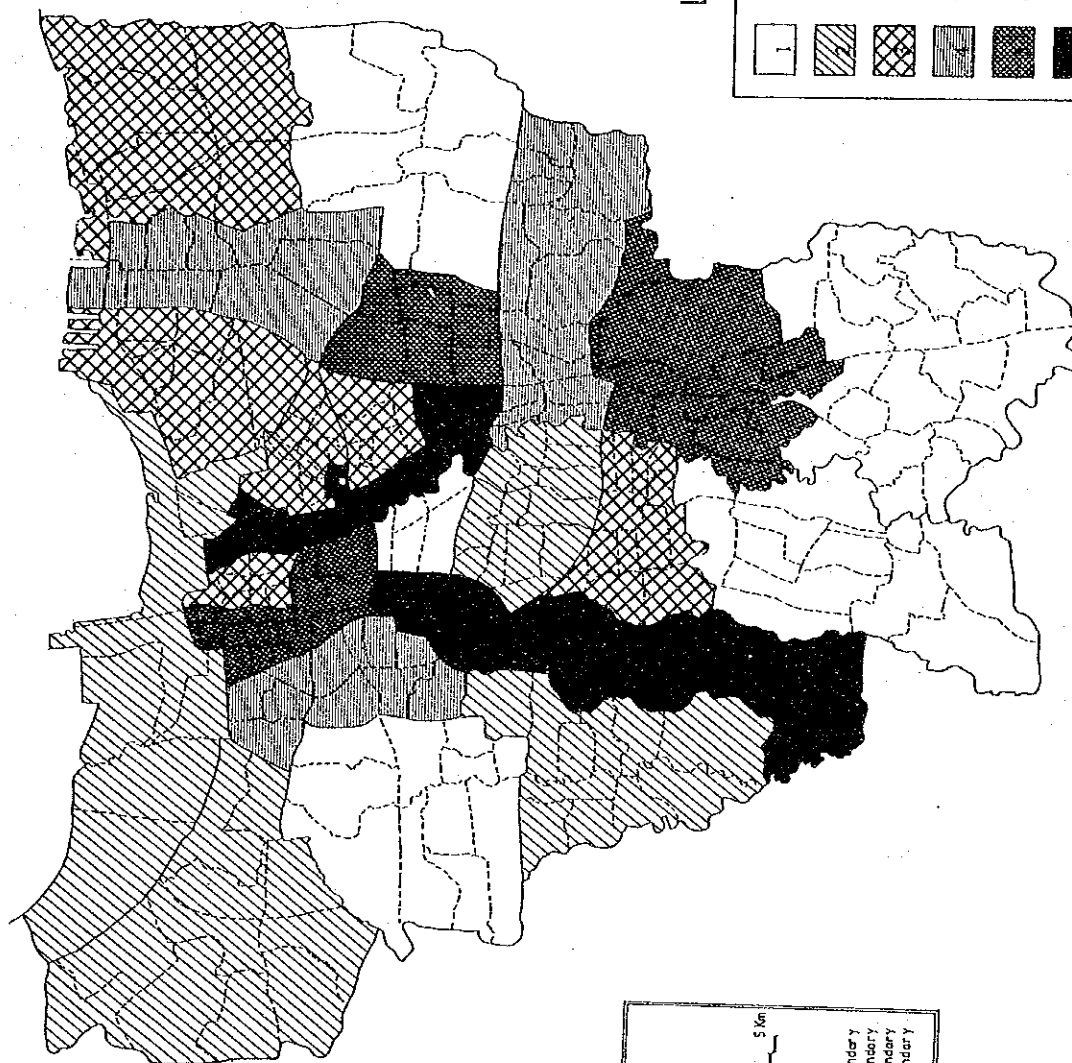


FIG. J.4 PERCENTAGE OF RESPONDENTS WHO REPLIED THAT THE WATER SMELL OF NEAR-BY RIVERS/CANALS WAS STRONG IN 1989

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# LEGEND

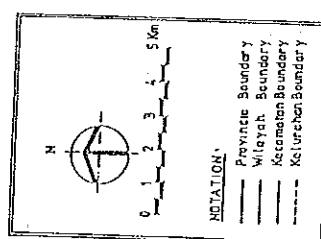
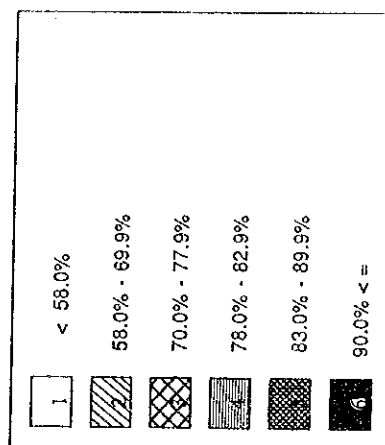
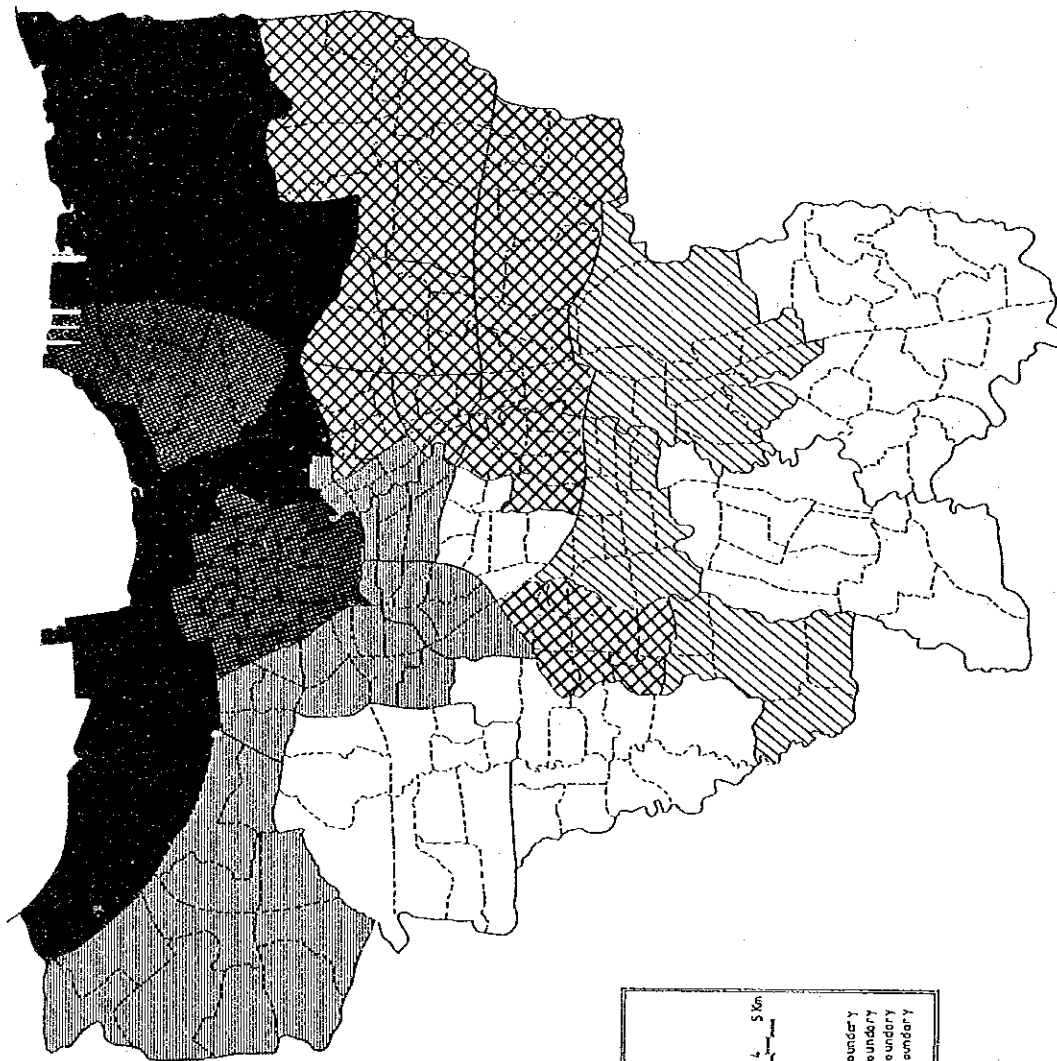


FIG. J.5

PERCENTAGE OF RESPONDENTS WHO REPLIED THAT INDUSTRIAL WASTES WERE DUMPED IN NEAR-BY RIVERS/CANALS IN 1989

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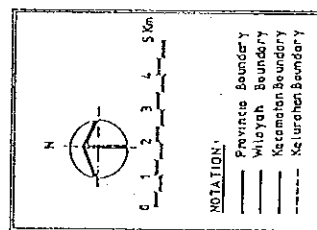
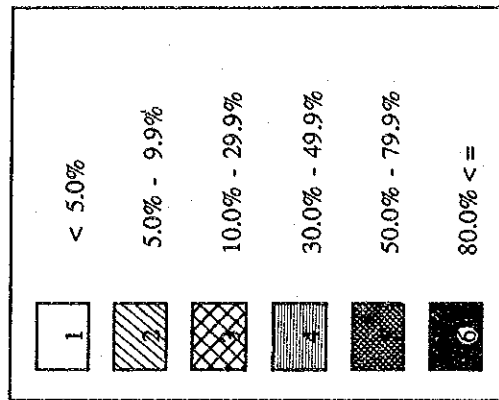


FIG. J.6 PERCENTAGE OF HOUSEHOLDS SERVED WITH WATER SUPPLY (SERVICE RATIO) IN 1989

THE STUDY ON URBAN DRAINAGE AND WASTE WATER DISPOSAL PROJECT IN THE CITY OF JAKARTA

y : No. of those who contracted major water-borne diseases in the last three years (cases/1,000 population).

1700

regression equation :  
 $y = 35.9953 + 0.41388x_1$   
 correlation coefficient : 0.3595  
 T - value : 1.9262

2200

5200

4300

2400

3300

1200

2500

1500

1100

5300

4400

3100

1300

5400 . 3400

5600

5100

1400

1600

4100

4500

4200

4600

3500

5500

4700

3200

x<sub>1</sub> : Average percentage of respondents who replied that water color of near-by rivers/canals was black (%)

10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Notes : 1. Number = Code No. of Kecamatan  
 2. Encircled points (Kecamatans) excluded

FIG. J.7 CORRELATION BETWEEN WATER COLOR OF RIVERS AND DISEASES CONTRACTION RATIO

THE STUDY ON URBAN DRAINAGE AND WASTE WATER DISPOSAL PROJECT IN THE CITY OF JAKARTA

y : No. of those who contracted major water-borne diseases in the last three years (cases/1,000 population).

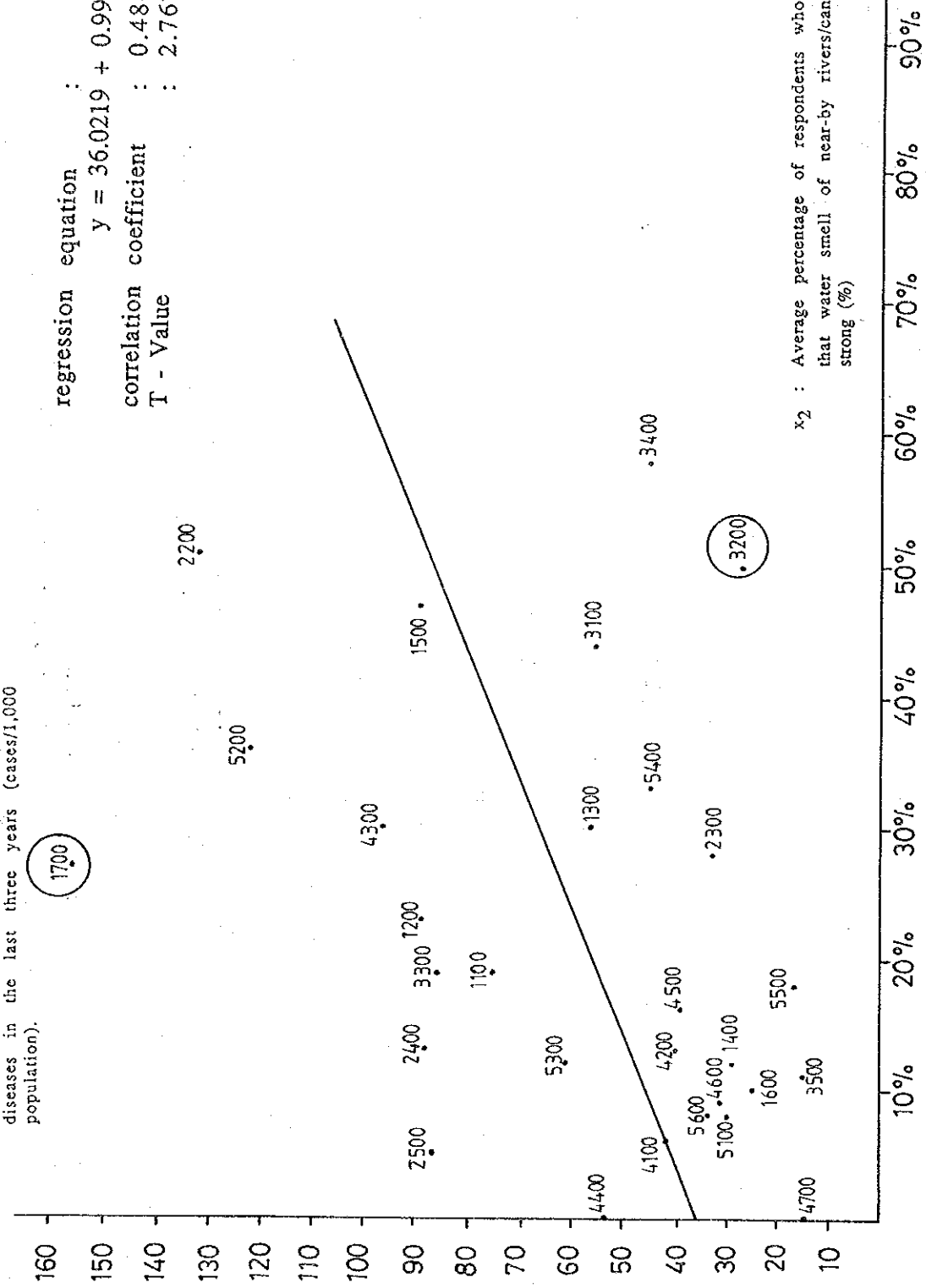
1700

regression equation :

$$y = 36.0219 + 0.99162x_2$$

correlation coefficient : 0.4843

T - Value : 2.7674



x<sub>2</sub> : Average percentage of respondents who replied that water smell of near-by rivers/canals was strong (%)

Notes : 1. Number = Code No. of Kecamatan  
2. Encircled points (Kecamatans) excluded

FIG. J.8 CORRELATION BETWEEN WATER SMELL OF RIVERS AND DISEASES CONTRACTION RATIO

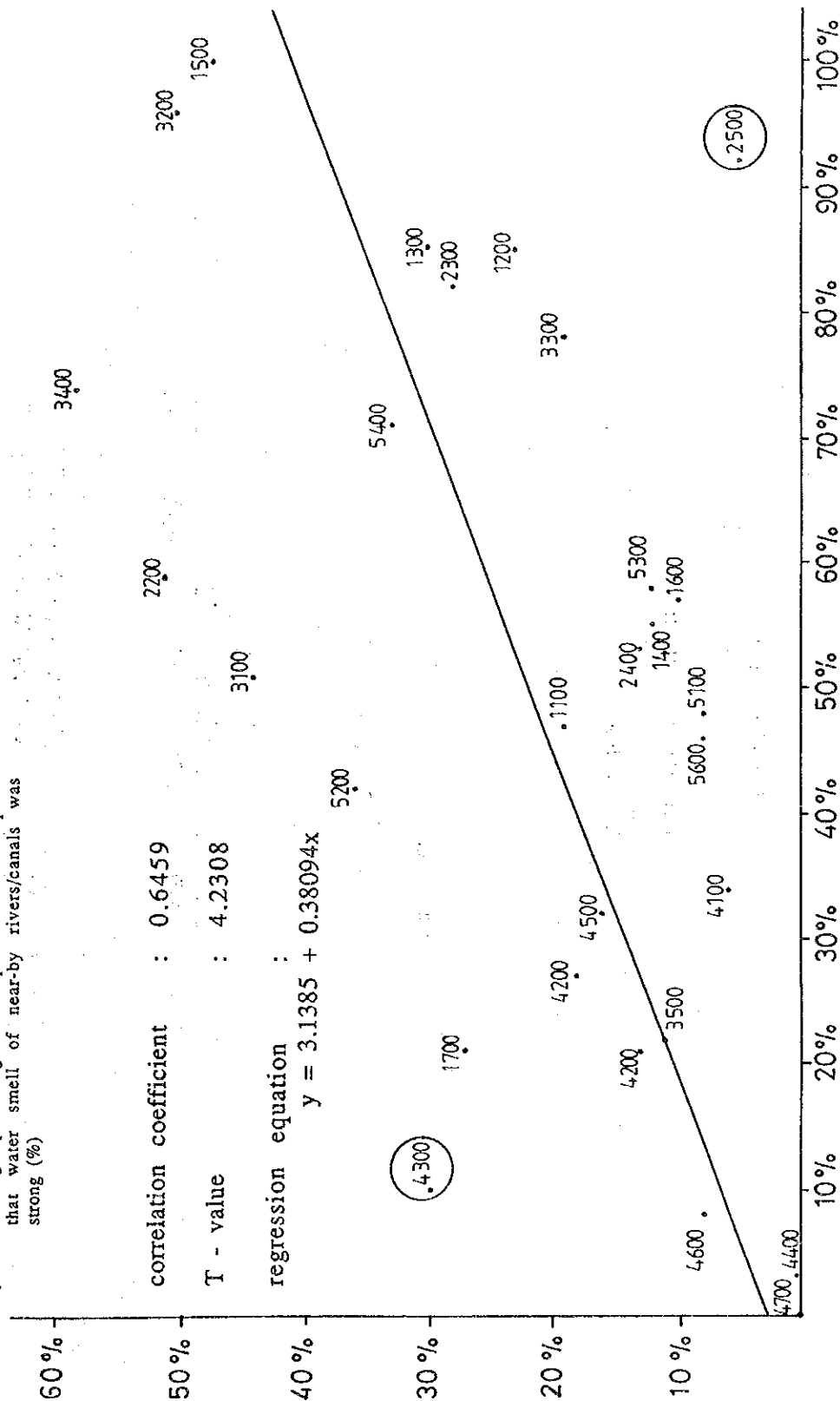
THE STUDY ON URBAN DRAINAGE AND WASTE WATER DISPOSAL PROJECT IN THE CITY OF JAKARTA

y : Average percentage of respondents who replied that water smell of near-by rivers/canals was strong (%)

correlation coefficient : 0.6459

T - value : 4.2308

regression equation :  
 $y = 3.1385 + 0.38094x$



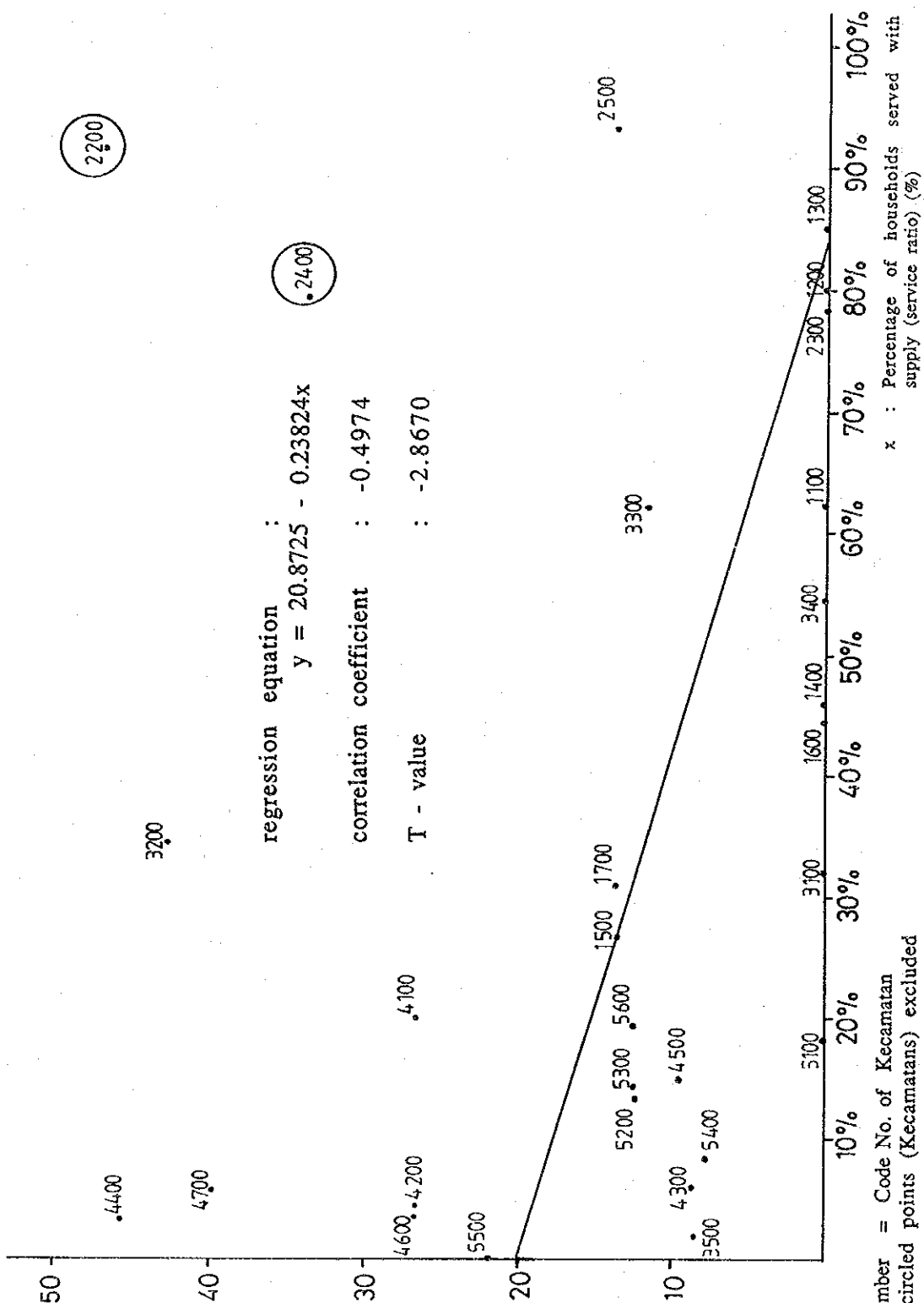
Notes : 1. Number = Code No. of Kecamatan  
 2. Encircled points (Kecamatans) excluded

x : Average percentage of respondents who replied that water color of near-by rivers/canals was black (%)

FIG. J.9 CORRELATION BETWEEN WATER COLOR AND SMELL OF RIVERS

THE STUDY ON URBAN DRAINAGE AND WASTE WATER DISPOSAL PROJECT IN THE CITY OF JAKARTA

y : No. of infantile mortality cases in the last three years (No./1,000 infants).



Notes : 1. Number = Code No. of Kecamatan  
2. Encircled points (Kecamatans) excluded

FIG. J.10 CORRELATION BETWEEN SERVICE RATIO AND INFANTILE MORTALITY RATE

THE STUDY ON URBAN DRAINAGE AND WASTE WATER DISPOSAL PROJECT IN THE CITY OF JAKARTA



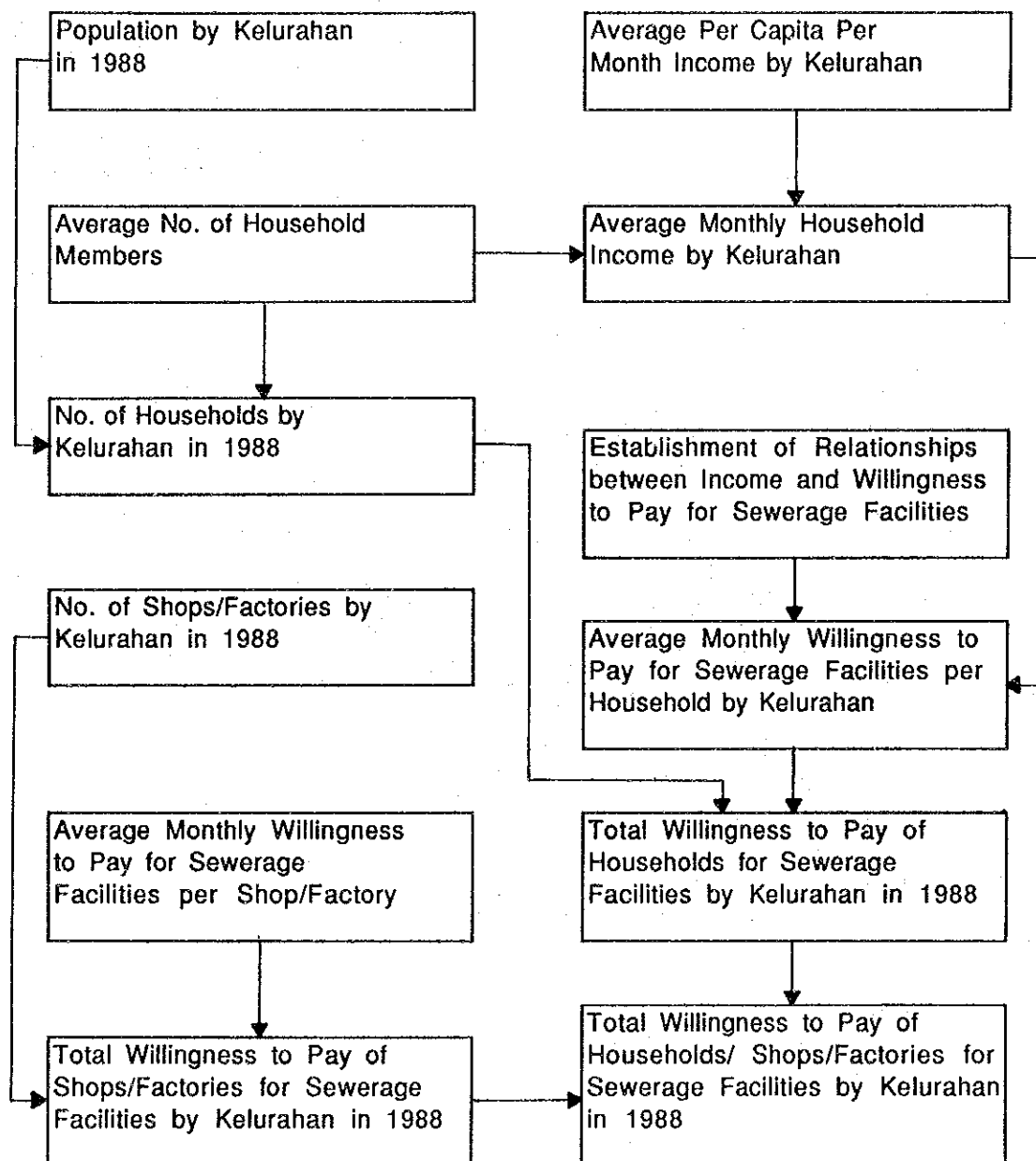
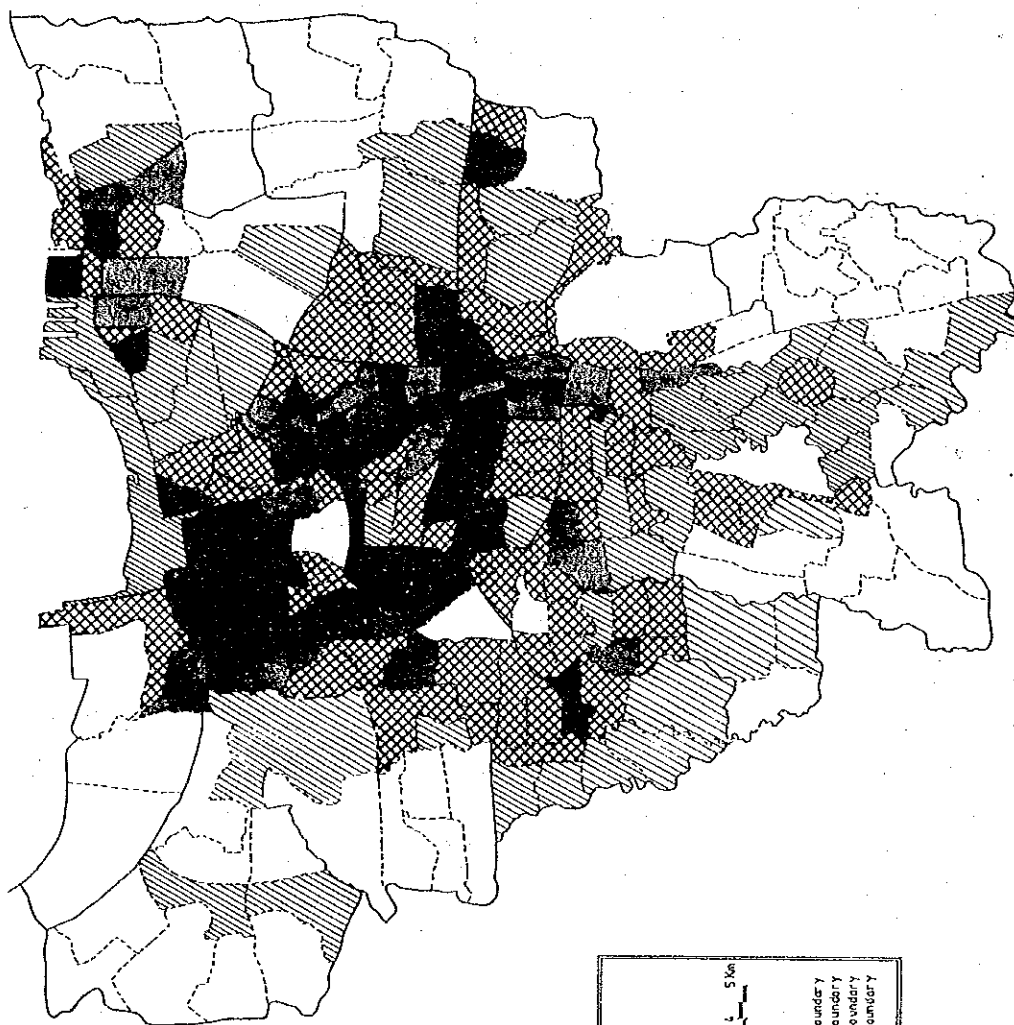


FIG. J.11

FLOW CHART FOR ESTIMATION OF TOTAL WILLINGNESS TO PAY FOR SEWERAGE FACILITIES BY KELURAHAN IN 1988

THE STUDY ON URBAN DRAINAGE AND WASTE WATER DISPOSAL PROJECT IN THE CITY OF JAKARTA

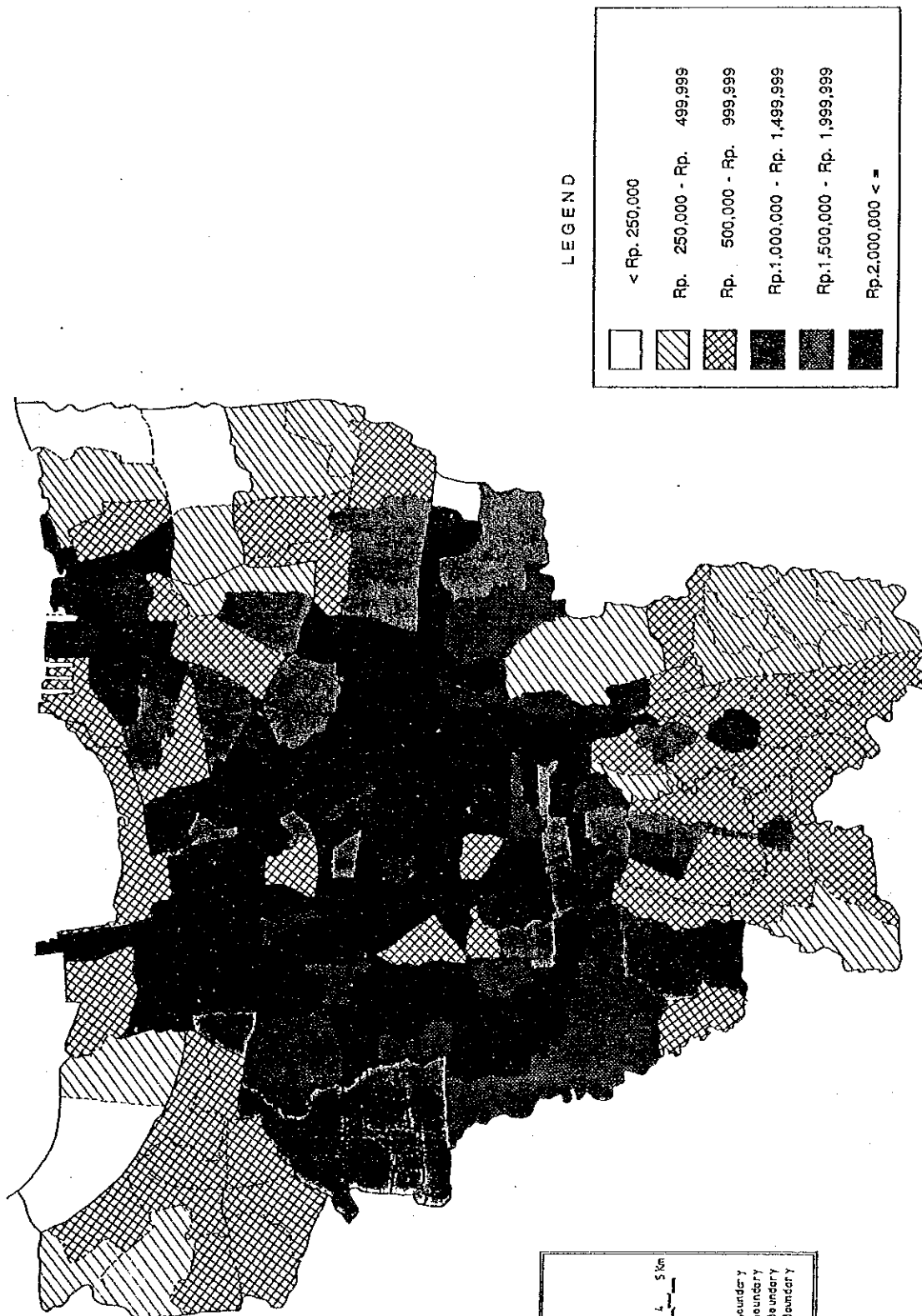


# LEGEND

	< Rp. 250,000
	Rp. 250,000 - Rp. 499,999
	Rp. 500,000 - Rp. 199,999
	Rp. 1,000,000 - Rp. 1,499,999
	Rp. 1,500,000 - Rp. 1,999,999
	Rp. 2,000,000 < =

FIG. J.12 WILLINGNESS TO PAY OF HOUSEHOLD, SHOPS & FACTORIES  
FOR SEWERAGE FACILITIES PER HA BY KELURAHAN IN 1988

THE STUDY ON URBAN DRAINAGE AND WASTE WATER DISPOSAL PROJECT IN THE CITY OF JAKARTA



**FIG. J.13** WILLINGNESS TO PAY OF HOUSEHOLD, SHOPS & FACTORIES FOR SEWERAGE FACILITIES PER HA BY KELURAHAN IN 2010

THE STUDY ON URBAN DRAINAGE AND WASTE WATER DISPOSAL PROJECT IN THE CITY OF JAKARTA



*APPENDIX K*

*SUPPLEMENTARY  
STUDY*



## APPENDIX K SUPPLEMENTARY STUDY

### 1 Sewerage Development for Pluit Housing Estate

#### 1.1 Design Condition

##### 1.1.1 Pluit Housing Estate Development Plan

The target year of Pluit housing estate development plan is 2005. The whole development area covers 278 ha consisting of Pluit Baru area of 164 ha and Pantai Mutiara area of 114 ha. The population covered in the year 2005 is estimated to be 43,200 with a distribution of 27,200 for Pluit Baru area and 16,000 for Pantai Mutiara. The future population is compared to the existing one as follows :

	Existing	Future (2005)
Pluit Baru	23,200	27,200
Pantai Mutiara	3,200	16,000
Total	26,400	43,200

##### 1.1.2 Sewerage Development Area

The whole housing development area will be served by sewerage system. The sewerage development area is shown Fig. K.1.

##### 1.1.3 Design Wastewater Discharge

The design wastewater discharge in the year 2005 is determined to be 12,000 m<sup>3</sup>/d based on the assumptions that :

- Unit wastewater generation in the year 2005 is 250 l/c/d
- Whole population in 2005 is served by conventional sewage collection system
- Groundwater infiltration equivalent to wastewater discharge is added.

## 1.2 Proposed Collection System

The proposed collection system of conventional separate sewerage covers the whole housing development area of 278 ha. The expected number of house connection in the year 2005 is 3,400 for Pluit Baru area and 2,000 for Pantai Mutiara.

The required sewer length is as follows.

Tertiary and Secondary Sewer ( $\phi$ 150 mm ~ $\phi$ 300 mm)	42,120 m
Main Sewer ( $\phi$ 350 mm ~ $\phi$ 800 mm)	6,255 m
Total	48,375 m

Layout of the proposed sewer networks is shown in Fig. K.2. Detailed sewer design is shown in Table K.1.

One (1) lift pump station will be installed at Pluit Baru. The salient features of the pump station are as follows.

Design Discharge	:	14.7 m <sup>3</sup> /min
Inflow pipe diameter	:	700 mm
Inflow pipe elevation	:	P.P - 10.8 m
Lift pump capacity	:	5 m <sup>3</sup> /min with head of 8 m 4 units, with one (1) units as stand-by

## 1.3 Wastewater Treatment

The wastewater of the Pluit housing estate area will be treated by the Pluit Pond aerated lagoon treatment plant proposed in the Master Plan. The treatment plant with a design capacity 529,000 m<sup>3</sup>/s is considered to be capable to treat this additional wastewater quantity of 12,000 m<sup>3</sup>/d without being overloaded.



## 2 Sewerage Development for West Jakarta Area

### 2.1 Design Condition

#### 2.1.1 Sewerage Development Area

The proposed sewerage development area covers 3,298 ha including seven (7) Kelurahan. The covered area by Kelurahan is shown in Table K.2.

#### 2.1.2 Design Population

The existing total population and population density of the sewerage development area is estimated to be 232,349 and 70.5 person/ha respectively. Those in 2010 are also estimated at 684,800 and 207.6 person/ha respectively. Their break-down by Kelurahan is shown in Table K.2.

The estimated population density of this area in 2010 is still less than 300 person/ha. It means that sewerage development of large scale is not required for this area until 2010. The proposed sewerage development targets the year when the population density would reach 300 person/ha. Hence, the design total population of the area is determined to be 989,400 with a population density of 300 person/ha. The design population by Kelurahan is also shown in Table K.1.

#### 2.1.3 Design Wastewater Discharge

The design wastewater discharge of the area is determined to be 218,000 m<sup>3</sup>/d based on the following assumptions.

- Design unit wastewater generation is 200 l/c/d.
- Whole population is served by conventional sewage collection system.
- Groundwater infiltration equivalent to 10 % of wastewater discharge is considered.

## 2.2 Proposed Collection System

The whole area will be covered by conventional collection system. Thier required sewer length are as follows.

Tertiary and secondary sewer (ø150 mm ~ ø300 mm)	334,400 m
Main sewer (ø350 mm ~ ø800 mm)	51,500 m
Trunk sewer (ø900 mm ~ ø2300 mm)	19,800 m
<hr/>	
Total	405,700 m

The proposed sewer networks is shown in Fig.K.5.

## 2.3 Proposed Treatment Plant

Possible treatment plant site for this sewerage development is identified only in the green area located at the confluence of the Angke River and the Pesanggrahan River. However, part of the green area is already allocated for the treatment plant of the North West Sewerage zone proposed in the Master Plan, by aerated lagoon system.

The green area of 24 ha is insufficient to treat the whole wastewater of 342,000 m<sup>3</sup>/d from both sewerage development areas using aerated lagoon system. Therefore, after the sewerage development of West Jakarta area, the wastewater from both areas will be treated by conventional activated sludge system in order to cope with the limited available area for treatment plant.

## 3. Sewerage Development for East Jakarta Area

### 3.1 Design Condition

#### 3.1.1 Sewerage Development Area

The proposed sewerage development area cover eleven (11) Kelurahan with a total area of 4,194.2 ha, which include 560.0 ha of industrial development area. However, in principle industrial wastewater will be treated by the industries themselves. Hence, large industrial development areas are excluded from the proposed sewerage area, and the proposed area becomes 3,635 ha. The covered area by Kelurahan is shown in Table K.3.

### 3.1.2 Design Population

The existing total population and population density of the sewerage development area in the year 1988 is estimated to be 441,374 and 121.4 person/ha respectively, those in 2010 are estimated at 847,900 and 233.2 person/ha. Their break-down by Kelurahan is shown in Table K.3.

The estimated population density of each Kelurahan in 2010 is less than 300 person/ha, except for the four (4) Kelurahans, Kel. Jatinegara Kaum (320.8 person/ha), Malakasari (378.4 person/ha), Malakajaya (9608.2 person/ha) and Jatinegara (490.1 persons/ha). Hence, a population density of 300 person/ha is assumed for all those remaining Kelurahans.

Consequently, the design total population of the area is determined to be 1,177,800 with average population density of 324 person/ha. The design population and population density by Kelurahan is also shown in Table K.3.

### 3.1.3 Design Wastewater Discharge

The design wastewater discharge of the area is determined to be 236,000 m<sup>3</sup>/d based on the following assumptions.

- Design unit wastewater generation is 200 l/c/d.
- Whole population is served by conventional sewage collection system
- Groundwater infiltration equivalent to 10% of wastewater discharge is considered.