

Table 26 HISTORICAL PER CAPITA DAILY USE IN THE  
CITIES OF THE WORLD IN 1974 AND 1975

City	Population Size (10 <sup>3</sup> persons)	Per Capita Daily Use Including UA <sup>/1</sup> (lpcd)	Per Capita Daily Use Excluding UA (lpcd)	Per Capita GDP	
				(US\$)	Year
Madrid	3,520	330	264	2,276	1974
Rome	2,884	616	493	2,758	1975
Ottawa	2,798	362	290	7,340	1974
Paris	2,290	320	256	4,510	1974
West Berlin	1,951	244	195	6,007	1975
Hamburg	1,699	204	163	5,470	1974
Vienna	1,593	317	254	3,892	1974
Brussels	1,042	141	113	5,028	1974
Lisbon	832	200	160	1,442	1974
Amsterdam	745	215	172	5,442	1975
Copenhagen	699	271	217	5,357	1974
Capetown	691	270	216	1,147	1974
Stockholm	661	452	362	7,526	1975
Montreal	626	647	518	7,340	1974

Remarks; /1: UA ratio was assumed at 20%.

Source; Ref. 19

Table 27 HISTORICAL PER CAPITA DAILY USE  
IN JAPAN IN 1976

City	Population Size (10 <sup>3</sup> persons)	Per Capita Daily Use Including UA <sup>/1</sup> (lpcd)	Per Capita Daily Use Excluding UA <sup>/1</sup> (lpcd)
Tokyo	11,496	444	360
Osaka	3,007	600	486
Yokohama	2,868	417	338
Nagoya	2,270	454	368
Kyoto	1,571	431	349
Kobe	1,287	399	328
Sapporo	1,211	295	239
Kitakyushu	1,144	385	312
Kawasaki	1,125	465	377
Fukuoka	1,032	405	328
Hiroshima	783	428	347
Sakai	718	368	298
Sendai	649	334	271
Amagasaki	596	412	334
Okayama	562	431	349
Higashiosaka	559	358	290
Other Cities	500 - 250	386	316
	250 - 100	357	289
	100 - 50	352	285
	50 - 30	330	267
	30 - 20	307	249
	20 - 10	295	239
	10 - 5	277	224

Remarks; (1): Per capita GDP of Japan was US\$4,500 in 1976.  
<sup>/1</sup> : UA ratio was about 19%.

Source ; Ref. 19

Table 28 PROJECTED PER CAPITA DAILY USE

Unit: 1 pcđ

Population Size (10 <sup>3</sup> )	Estimated				Lower Economic Growth		
	1982	1985	1990	2000	1985	1990	2000
<u>City/Town</u>							
More than 1,000	215.0	225.0	240.0	270.0	220.0	230.0	245.0
1,000 - 500	195.0	205.0	220.0	250.0	200.0	210.0	225.0
500 - 100	175.0	185.0	200.0	230.0	180.0	190.0	205.0
100 - 10	165.0	175.0	190.0	220.0	170.0	180.0	195.0
<u>Rural</u>							
PWD	85.0	100.0	125.0	175.0	90.0	105.0	135.0
MOH	40.0	45.0	55.0	70.0	45.0	50.0	60.0
<u>Private</u>	40.0	40.0	40.0	40.0	40.0	40.0	40.0

Table 29 PROJECTED POPULATION SERVED BY PUBLIC  
WATER SUPPLY SYSTEMS BY WATER SUPPLY  
REGION IN THE STUDY AREA (1/2)

State	Water Supply Region	City/Rural	Unit: 10 <sup>3</sup> Persons			
			Estimated 1982	Projected		
			1985	1990	2000	
Perlis	1. Kangar	1 Kangar	12	15	19	29
		Rural	112	126	144	171
		Total	124	141	163	200
	2. Cuping	Rural	11	13	15	17
		Total	11	13	15	17
	Perlis Total		135	154	178	217
Kedah	3. Changlun	Rural	16	21	23	25
		Total	16	21	23	25
	4. Alor Setar	2 Alor Setar	62	66	74	96
		101 Jitra	14	17	23	38
		Rural	221	303	358	383
		Total	297	386	455	517
	5. Kuala Nerang	Rural	31	44	53	59
		Total	31	44	53	59
	6. Pendang	102 Guan Chempedak	7	9	10	14
		103 Yan	5	6	8	12
		Rural	52	70	80	85
		Total	64	85	98	111
	7. Jeneri	Rural	22	30	35	38
		Total	22	30	35	38
	8. Jeniang	Rural	33	46	53	57
		Total	33	46	53	57
	9. Sik	Rural	18	24	28	30
		Total	18	24	28	30
	10. Sg. Petani	3 Sg. Petani	41	46	55	75
		104 Tikan Batu	4	5	8	13
		Rural	88	121	140	150
		Total	133	172	203	238

Table 30 PROJECTED POPULATION SERVED BY PUBLIC  
WATER SUPPLY SYSTEMS BY WATER SUPPLY  
REGION IN THE STUDY AREA (2/2)

				Unit: 10 <sup>3</sup> Persons			
State	Water Supply Region	City/Rural	Estimated	Projected			
			1982	1985	1990	2000	
Kedah	11. Kuala Ketil	203 Kuala Ketil	4	5	6	10	
		Rural	41	54	62	65	
		Total	45	59	68	75	
	12. Baling	Rural	45	60	68	71	
		Total	45	60	68	71	
	13. Kulim	4 Kulim	25	28	35	50	
		Rural	34	45	50	52	
		Total	59	73	85	102	
	14. Karangan	Rural	9	12	13	14	
		Total	9	12	13	14	
	Kedah Total			772	1,012	1,182	1,337
	P. Pinang	15. Perai	5 Butterworth	66	70	74	82
			6 Bt. Mertajam	24	26	27	30
			109 Kg. Pmtg Kuching	9	9	10	11
110 Perai			8	9	9	10	
201 Bandar Seberang							
Jaya			10	29	58	250	
Rural			266	277	298	324	
Total			383	420	476	707	
16. P. Pinang		8 Georgetown	278	295	296	296	
		105 Air Itam	31	33	35	39	
		106 Tg. Tokong	12	13	14	15	
		107 Gelugor	11	12	13	14	
		108 Tg. Bunga	10	10	11	12	
		202 Bandar Bayan Baru	18	45	80	250	
		Rural	121	126	135	147	
		Total	481	534	584	773	
P. Pinang Total			864	954	1,060	1,480	
P.K.P. Total			1,771	2,120	2,420	3,034	

Table 31 PROJECTED POPULATION SERVED BY PUBLIC  
WATER SUPPLY SYSTEMS BY WATER SUPPLY  
REGION IN THE STUDY AREA UNDER THE  
CONDITION OF LOWER ECONOMIC GROWTH (1/2)

			Unit: 10 <sup>3</sup> Persons			
State	Water Supply Region	City/Rural	Estimated	Projected		
			1982	1985	1990	2000
Perlis	1. Kangar	1 Kangar	12	14	16	20
		Rural	112	126	141	172
		Total	124	140	157	192
	2. Cuping	Rural	11	13	14	17
		Total	11	13	14	17
	Perlis Total		135	153	171	209
Kedah	3. Changlun	Rural	16	21	23	25
		Total	16	21	23	25
	4. Alor Setar	2 Alor Setar	62	61	64	67
		101 Jitra	14	15	20	26
		Rural	221	309	365	415
		Total	297	385	449	508
	5. Kuala Nerang	Rural	31	44	54	65
		Total	31	44	54	65
	6. Pendang	102 Guan Chempedak	7	8	9	10
		103 Yan	5	6	7	8
		Rural	52	70	80	87
		Total	64	84	96	105
	7. Jeneri	Rural	22	30	36	41
		Total	22	30	36	41
	8. Jeniang	Rural	33	45	53	59
		Total	33	45	53	59
	9. Sik	Rural	18	24	28	31
		Total	18	24	28	31
	10. Sg. Petani	3 Sg. Petani	41	42	48	51
		104 Tikan Batu	4	5	7	9
		Rural	88	120	140	156
		Total	133	167	195	216

Table 32 PROJECTED POPULATION SERVED BY PUBLIC  
WATER SUPPLY SYSTEMS BY WATER SUPPLY  
REGION IN THE STUDY AREA UNDER THE  
CONDITION OF LOWER ECONOMIC GROWTH (2/2)

				Unit: 10 <sup>3</sup> Persons			
State	Water Supply Region	City/Rural	Estimated	Projected			
			1982	1985	1990	2000	
	11. Kuala Ketil	203 Kuala Ketil	4	5	6	8	
		Rural	41	54	61	65	
		Total	45	59	67	73	
	12. Baling	Rural	45	59	66	69	
		Total	45	59	66	69	
	13. Kulim	4 Kulim	25	26	31	34	
		Rural	34	44	49	51	
		Total	59	70	80	85	
	14. Karangan	Rural	9	12	13	14	
		Total	9	12	13	14	
Kedah Total			772	1,000	1,160	1,291	
P. Pinang	15. Perai	5 Butterworth	66	64	64	57	
		6 Bt. Mertajam	24	23	23	21	
		109 Kg. PMTG Kuching	9	9	9	7	
		110 Perai	8	8	8	7	
		201 Bandar Seberang					
		Jaya	10	26	49	192	
		Rural	266	275	306	438	
		Total	383	405	459	722	
	16. P. Pinang	8 Georgetown	278	287	271	227	
		105 Air Itam	31	30	31	27	
		106 Tg. Tokong	12	12	12	10	
		107 Gelugor	11	11	11	10	
		108 Tg. Bunga	10	10	9	8	
		202 Bandar Bayan Baru	18	42	69	192	
		Rural	121	139	161	236	
		Total	481	531	564	710	
P. Pinang Total			864	936	1,023	1,432	
P.K.P. Total			1,771	2,089	2,354	2,932	

Table 33

ESTIMATED DOMESTIC AND INDUSTRIAL WATER DEMAND  
IN THE STUDY AREA BY WATER SUPPLY REGION AND  
BY PURPOSE BY TYPE OF SUPPLY FOR 1982 (1/2)

Unit: 10<sup>6</sup> m<sup>3</sup>/y

State	Water Supply Region	City/Rural	Domestic					Industrial			Total D&I	
			Public		Un-Treated	Total	Pri-vate	Total	Public	Pri-vate		Total
			Treated									
Perlis	1. Kangar	City										
		1 Kangar	1.2	-	1.2	0.1	1.3	1.2	1.2	2.4	3.7	
		Rural										
	1 Perlis	4.5	0.7	5.2	0.3	5.5	0.0	0.0	0.0	5.5		
	Total	5.7	0.7	6.4	0.4	6.8	1.2	1.2	2.4	9.2		
2. Cuping	Rural											
	1 Perlis	0.4	0.1	0.5	0.0	0.5	0.0	0.0	0.0	0.5		
Perlis Total			6.1	0.8	6.9	0.4	7.3	1.2	1.2	2.4	9.7	
Kedah	3. Changlun	Rural										
		3 Kubang Pasu	0.3	0.2	0.5	0.1	0.6	0.0	0.0	0.0	0.6	
	4. Alor Setar	City										
		2 Alor Setar	5.2	-	5.2	0.3	5.5	3.2	3.2	6.4	11.9	
		101 Jitra	1.1	-	1.1	0.1	1.2	0.4	0.3	0.7	1.9	
		City Total	6.3	-	6.3	0.4	6.7	3.6	3.5	7.1	13.8	
		Rural										
		3 Kubang Pasu	1.3	0.8	2.1	0.6	2.7	0.0	0.0	0.0	2.7	
		5 Kota Setar	2.9	1.8	4.7	1.3	6.0	0.0	0.0	0.0	6.0	
	6 Pendang	0.2	0.1	0.3	0.1	0.4	0.0	0.0	0.0	0.4		
	Rural Total	4.4	2.7	7.1	2.0	9.1	0.0	0.0	0.0	9.1		
	Total	10.7	2.7	13.4	2.4	15.8	3.6	3.5	7.1	22.9		
	5. Kuala Nerang	Rural										
		4 Padang Terap	0.6	0.3	0.9	0.2	1.1	0.0	0.0	0.0	1.1	
	6. Pendang	City										
		102 Guan Chempedak	0.3	-	0.3	0.0	0.3	0.3	0.3	0.6	0.9	
		103 Yan	0.2	-	0.2	0.0	0.2	0.2	0.1	0.3	0.5	
		City Total	0.5	-	0.5	0.0	0.5	0.5	0.4	0.9	1.4	
		Rural										
		6 Pendang	0.7	0.5	1.2	0.3	1.5	0.0	0.0	0.0	1.5	
		7 Yan	0.3	0.2	0.5	0.2	0.7	0.0	0.0	0.0	0.7	
		Rural Total	1.0	0.7	1.7	0.5	2.2	0.0	0.0	0.0	2.2	
Total	1.5	0.7	2.2	0.5	2.7	0.5	0.4	0.9	3.6			
7. Jeneri	Rural											
	5 Kota Setar	0.2	0.1	0.3	0.1	0.4	0.0	0.0	0.0	0.4		
	6 Pendang	0.2	0.1	0.3	0.1	0.4	0.0	0.0	0.0	0.4		
Rural Total		0.4	0.2	0.6	0.2	0.8	0.0	0.0	0.0	0.8		
8. Jeniang	Rural											
	8 Sik	0.2	0.1	0.3	0.1	0.4	0.0	0.0	0.0	0.4		
	9 Kuala Muda	0.3	0.2	0.5	0.2	0.7	0.0	0.0	0.0	0.7		
Rural Total		0.5	0.3	0.8	0.3	1.1	0.0	0.0	0.0	1.1		
9. Sik	Rural											
	8 Sik	0.3	0.2	0.5	0.1	0.6	0.0	0.0	0.0	0.6		
10. Sg. Petani	City											
	3 Sg. Petani	3.4	-	3.4	0.2	3.6	2.0	2.0	4.0	7.6		
	104 Tikan Batu	0.2	-	0.2	0.0	0.2	2.6	2.6	5.2	5.4		
	City Total	3.6	-	3.6	0.2	3.8	4.6	4.6	9.2	13.0		
	Rural											
	7 Yan	0.2	0.1	0.3	0.1	0.4	0.0	0.0	0.0	0.4		
	9 Kuala Muda	1.5	0.9	2.4	0.7	3.1	0.0	0.0	0.0	3.1		
	Rural Total	1.7	1.0	2.7	0.8	3.5	0.0	0.0	0.0	3.5		
Total	5.3	1.0	6.3	1.0	7.3	4.6	4.6	9.2	16.5			



Table 34

ESTIMATED DOMESTIC AND INDUSTRIAL WATER DEMAND  
IN THE STUDY AREA BY WATER SUPPLY REGION AND  
BY PURPOSE BY TYPE OF SUPPLY FOR 1982 (2/2)

Unit: 10<sup>6</sup> m<sup>3</sup>/y

State	Water Supply Region	City/Rural	Domestic					Industrial			Total D&I
			Treated	Public		Pri-vate	Total	Public	Pri-vate		
				Un-Treated	Total				Total	Total	
Kedah	11. Kuala Ketil	City									
		203 Kuala Ketil	0.2	-	0.2	0.0	0.2	0.1	0.1	0.2	0.4
		Rural									
		9 Kuala Muda	0.2	0.1	0.3	0.1	0.4	0.0	0.0	0.0	0.4
		10 Baling	0.6	0.3	0.9	0.2	1.1	0.0	0.0	0.0	1.1
		11 Kulim	0.1	0.1	0.2	0.0	0.2	0.0	0.0	0.0	0.2
		Rural Total	0.9	0.5	1.4	0.3	1.7	0.0	0.0	0.0	1.7
		Total	1.1	0.5	1.6	0.3	1.9	0.1	0.1	0.2	2.1
	12. Baling	Rural									
		10 Baling	0.9	0.6	1.5	0.5	2.0	0.0	0.0	0.0	2.0
	13. Kulim	City									
		4 Kulim	2.1	-	2.1	0.1	2.2	0.3	0.2	0.5	2.7
		Rural									
		11 Kulim	0.7	0.5	1.2	0.3	1.5	0.0	0.0	0.0	1.5
	Total	2.8	0.5	3.3	0.4	3.7	0.3	0.2	0.5	4.2	
	14. Karangan	Rural									
		11 Kulim	0.2	0.1	0.3	0.1	0.4	0.0	0.0	0.0	0.4
Kedah Total			24.6	7.3	31.9	6.1	38.0	9.1	8.8	17.9	55.9
P. Pinang	15. Perai	City									
		5 Butterworth	4.9	-	4.9	0.3	5.2	14.9	1.6	16.5	21.7
		6 St. Mertajam	1.8	-	1.8	0.1	1.9	5.7	0.6	6.3	8.2
		109 Kg. Pmtg									
		Kuching	0.7	-	0.7	0.0	0.7	1.2	0.1	1.3	2.0
		110 Perai	0.6	-	0.6	0.0	0.6	12.1	1.3	13.4	14.0
		201 Bandar Seberang									
		Jaya	0.8	-	0.8	0.0	0.8	1.4	0.1	1.5	2.3
		City Total	8.8	-	8.8	0.4	9.2	35.3	3.7	39.0	48.2
		Rural									
		13 Utara	3.3	0.3	3.6	0.3	3.9	0.0	0.0	0.0	3.9
		14 Tengah	3.4	0.4	3.8	0.3	4.1	0.0	0.0	0.0	4.1
		15 Selatan	2.1	0.2	2.3	0.2	2.5	0.0	0.0	0.0	2.5
		Rural Total	8.8	0.9	9.7	0.8	10.5	0.0	0.0	0.0	10.5
		Total	17.6	0.9	18.5	1.2	19.7	35.3	3.7	39.0	58.7
	16. P. Pinang	City									
		8 Georgetown	22.0	-	22.0	0.0	22.0	8.5	0.9	9.4	31.4
		105 Air Itam	2.3	-	2.3	0.1	2.4	4.0	0.4	4.4	6.8
		106 Tg. Tokong	0.9	-	0.9	0.1	1.0	1.5	0.2	1.7	2.7
		107 Gelugor	0.8	-	0.8	0.1	0.9	0.7	0.1	0.8	1.7
		108 Tg. Bunga	0.7	-	0.7	0.0	0.7	1.2	0.1	1.3	2.0
		202 Bandar Bayan									
		Baru	1.3	-	1.3	0.1	1.4	1.5	0.2	1.7	3.1
		City Total	28.0	-	28.0	0.4	28.4	17.4	1.9	19.3	47.7
		Rural									
		16 Timur Laut	2.1	0.2	2.3	0.2	2.5	0.0	0.0	0.0	2.5
		17 Barat Daya	1.9	0.2	2.1	0.2	2.3	0.0	0.0	0.0	2.3
		Rural Total	4.0	0.4	4.4	0.4	4.8	0.0	0.0	0.0	4.8
		Total	32.0	0.4	32.4	0.8	33.2	17.4	1.9	19.3	52.5
P. Pinang Total			49.6	1.3	50.9	2.0	52.9	52.7	5.6	58.3	111.2
P.K.P. Total			80.3	9.4	89.7	8.5	98.2	63.0	15.6	78.6	176.8

Table 35

PROJECTED DOMESTIC AND INDUSTRIAL WATER DEMAND  
IN THE STUDY AREA BY WATER SUPPLY REGION AND  
BY PURPOSE BY TYPE OF SUPPLY FOR 1985 (1/2)

Unit: 10<sup>6</sup> m<sup>3</sup>/y

State	Water Supply Region	City/Rural	Domestic					Industrial			Total D&I	
			Public		Total	Pri- vate	Total	Public	Pri- vate	Total		
			Treated	Un- Treated								
Perlis	1. Kangar	City										
		1 Kangar	1.3	-	1.3	0.0	1.3	1.8	1.7	3.5	4.8	
		Rural										
		1 Perlis	5.1	0.7	5.8	0.3	6.1	0.2	0.1	0.3	6.4	
		Total	6.4	0.7	7.1	0.3	7.4	2.0	1.8	3.8	11.2	
	2. Cuping	Rural										
		1 Perlis	0.6	0.1	0.7	0.0	0.7	0.0	0.0	0.0	0.7	
Perlis Total			7.0	0.8	7.8	0.3	8.1	2.0	1.8	3.8	11.9	
Kedah	3. Changlun	Rural										
		3 Kubang Pasu	0.5	0.2	0.7	0.1	0.8	0.1	0.0	0.1	0.9	
	4. Alor Setar	City										
		2 Alor Setar	5.2	-	5.2	0.2	5.4	4.9	4.8	9.7	15.1	
		101 Jitra	1.3	-	1.3	0.1	1.4	0.2	0.1	0.3	1.7	
			City Total	6.5	-	6.5	0.3	6.8	5.1	4.9	10.0	16.8
		Rural										
		3 Kubang Pasu	2.3	0.8	3.1	0.3	3.4	0.2	0.2	0.4	3.8	
		5 Kota Setar	5.2	1.9	7.1	0.6	7.7	0.2	0.1	0.3	8.0	
		6 Pendang	0.3	0.1	0.4	0.0	0.4	0.1	0.0	0.1	0.5	
		Rural Total	7.8	2.8	10.6	0.9	11.5	0.5	0.3	0.8	12.3	
		Total	14.3	2.8	17.1	1.2	18.3	5.6	5.2	10.8	29.1	
	5. Kuala Nerang	Rural										
		4 Padang Terap	1.1	0.4	1.5	0.1	1.6	0.3	0.3	0.6	2.2	
	6. Pendang	City										
		102 Guan Chempedak	0.7	-	0.7	0.0	0.7	0.5	0.5	1.0	1.7	
		103 Yan	0.3	-	0.3	0.0	0.3	0.5	0.4	0.9	1.2	
			City Total	1.0	-	1.0	0.0	1.0	1.0	0.9	1.9	2.9
		Rural										
		6 Pendang	1.1	0.4	1.5	0.1	1.6	0.1	0.1	0.2	1.8	
		7 Yan	0.7	0.2	0.9	0.1	1.0	0.1	0.0	0.1	1.1	
		Rural Total	1.8	0.6	2.4	0.2	2.6	0.2	0.1	0.3	2.9	
		Total	2.8	0.6	3.4	0.2	3.6	1.2	1.0	2.2	5.8	
7. Jeneri	Rural											
	5 Kota Setar	0.3	0.1	0.4	0.0	0.4	0.0	0.0	0.0	0.4		
	6 Pendang	0.4	0.2	0.6	0.1	0.7	0.1	0.0	0.1	0.8		
	Rural Total	0.7	0.3	1.0	0.1	1.1	0.1	0.0	0.1	1.2		
8. Jeniang	Rural											
	8 Sik	0.5	0.2	0.7	0.1	0.8	0.2	0.1	0.3	1.1		
	9 Kuala Muda	0.7	0.3	1.0	0.1	1.1	0.1	0.0	0.1	1.2		
	Rural Total	1.2	0.5	1.7	0.2	1.9	0.3	0.1	0.4	2.3		
9. Sik	Rural											
	8 Sik	0.6	0.2	0.8	0.1	0.9	0.3	0.2	0.5	1.4		
10. Sg. Petani	City											
	3 Sg. Petani	3.6	-	3.6	0.1	3.7	3.1	3.0	6.1	9.8		
	104 Tikan Batu	0.2	-	0.2	0.0	0.2	0.4	0.3	0.7	0.9		
		City Total	3.8	-	3.8	0.1	3.9	3.5	3.3	6.8	10.7	
	Rural											
	7 Yan	0.4	0.2	0.6	0.1	0.7	0.0	0.0	0.0	0.7		
	9 Kuala Muda	2.7	1.0	3.7	0.3	4.0	0.2	0.1	0.3	4.3		
	Rural Total	3.1	1.2	4.3	0.4	4.7	0.2	0.1	0.3	5.0		
	Total	6.9	1.2	8.1	0.5	8.6	3.7	3.4	7.1	15.7		

Table 36

PROJECTED DOMESTIC AND INDUSTRIAL WATER DEMAND  
IN THE STUDY AREA BY WATER SUPPLY REGION AND  
BY PURPOSE BY TYPE OF SUPPLY FOR 1985 (2/2)

Unit: 10<sup>6</sup> m<sup>3</sup>/y

State	Water Supply Region	City/Rural	Domestic						Industrial			Total D&I
			Treated	Public		Pri-vate	Total	Public	Pri-vate			
				Un-	Total				Total	Total		
	11. Kuala Ketil	City										
	203 Kuala Ketil	0.2	-	0.2	0.0	0.2	0.0	0.0	0.0	0.2		
	Rural											
	9 Kuala Muda	0.3	0.1	0.4	0.0	0.4	0.0	0.0	0.0	0.4		
	10 Baling	0.9	0.3	1.2	0.1	1.3	0.2	0.1	0.3	1.6		
	11 Kulim	0.2	0.1	0.3	0.0	0.3	0.0	0.0	0.0	0.3		
	Rural Total	1.4	0.5	1.9	0.1	2.0	0.2	0.1	0.3	2.3		
	Total	1.6	0.5	2.1	0.1	2.2	0.2	0.1	0.3	2.5		
	12. Baling	Rural										
	10 Baling	1.5	0.6	2.1	0.2	2.3	0.3	0.2	0.5	2.8		
13. Kulim	City											
	4 Kulim	2.5	-	2.5	0.1	2.6	0.4	0.4	0.8	3.4		
	Rural											
	11 Kulim	1.1	0.4	1.5	0.1	1.6	0.2	0.1	0.3	1.9		
	Total	3.6	0.4	4.0	0.2	4.2	0.6	0.5	1.1	5.3		
14. Karangan	Rural											
	11 Kulim	0.3	0.1	0.4	0.0	0.4	0.1	0.0	0.1	0.5		
Kedah Total			35.1	7.8	42.9	3.0	45.9	12.8	11.0	23.8	69.7	
P. Pinang	15. Perai	City										
	5 Butterworth	5.5	-	5.5	0.2	5.7	17.7	2.0	19.7	25.4		
	6 Bt. Mertajam	2.0	-	2.0	0.1	2.1	6.8	0.7	7.5	9.6		
	109 Kg. Pmtg											
	Kuching	0.7	-	0.7	0.0	0.7	1.4	0.1	1.5	2.2		
	110 Perai	0.7	-	0.7	0.0	0.7	14.5	1.6	16.1	16.8		
	201 Bandar Seberang											
	Jaya	2.3	-	2.3	0.1	2.4	4.1	0.4	4.5	6.9		
	City Total	11.2	-	11.2	0.4	11.6	44.5	4.8	49.3	60.9		
	Rural											
	13 Utara	4.1	0.3	4.4	0.3	4.7	4.8	0.5	5.3	10.0		
	14 Tengah	4.3	0.4	4.7	0.3	5.0	4.2	0.5	4.7	9.7		
	15 Selatan	2.7	0.2	2.9	0.2	3.1	4.4	0.5	4.9	8.0		
	Rural Total	11.1	0.9	12.0	0.8	12.8	13.4	1.5	14.9	27.7		
	Total	22.3	0.9	23.2	1.2	24.4	57.9	6.3	64.2	88.6		
	16. P. Pinang	City										
		8 Georgetown	24.7	-	24.7	0.0	24.7	10.1	1.1	11.2	35.9	
		105 Air Itam	2.6	-	2.6	0.1	2.7	4.5	0.5	5.0	7.7	
		106 Tg. Tokong	1.0	-	1.0	0.0	1.0	1.7	0.2	1.9	2.9	
		107 Gelugor	0.9	-	0.9	0.0	0.9	1.6	0.2	1.8	2.7	
		108 Tg. Bunga	0.8	-	0.8	0.0	0.8	1.4	0.2	1.6	2.4	
		202 Bandar Bayan										
		Baru	3.6	-	3.6	0.1	3.7	6.2	0.7	6.9	10.6	
		City Total	33.6	-	33.6	0.2	33.8	25.5	2.9	28.4	62.2	
		Rural										
		16 Timur Laut	2.6	0.2	2.8	0.2	3.0	2.2	0.2	2.4	5.4	
		17 Barat Daya	2.4	0.2	2.6	0.2	2.8	3.1	0.3	3.4	6.2	
		Rural Total	5.0	0.4	5.4	0.4	5.8	5.3	0.5	5.8	11.6	
		Total	38.6	0.4	39.0	0.6	39.6	30.8	3.4	34.2	73.8	
P. Pinang Total			60.9	1.3	62.2	1.8	64.0	88.7	9.7	98.4	162.4	
P.K.P. Total			103.0	9.9	112.9	5.1	118.0	103.5	22.5	126.0	244.0	

Table 37 PROJECTED DOMESTIC AND INDUSTRIAL WATER DEMAND  
IN THE STUDY AREA BY WATER SUPPLY REGION AND  
BY PURPOSE BY TYPE OF SUPPLY FOR 1990 (1/2)

Unit: 10<sup>6</sup> m<sup>3</sup>/y

State	Water Supply Region	City/Rural	Domestic					Industrial			Total DSI
			Treated	Public		Pri- vate	Total	Public	Pri- vate	Total	
				Treated	Total						
Perlis	1. Kangar	City 1 Kangar	1.6	-	1.6	0.0	1.6	2.9	2.9	5.8	7.4
		Rural 1 Perlis	6.5	0.9	7.4	0.2	7.6	0.2	0.1	0.3	7.9
		Total	8.1	0.9	9.0	0.2	9.2	3.1	3.0	6.1	15.3
	2. Cuping	Rural 1 Perlis	0.7	0.1	0.8	0.0	0.8	0.0	0.0	0.0	0.8
		Perlis Total	8.8	1.0	9.8	0.2	10.0	3.1	3.0	6.1	16.1
	Kedah	3. Changlun	Rural 3 Kubang Pasu	0.9	0.2	1.1	0.0	1.1	0.1	0.0	0.1
4. Alor Setar			City 2 Alor Setar	6.3	-	6.3	0.1	6.4	9.3	9.2	18.5
		101 Jitra	3.8	-	3.8	0.0	3.8	0.3	0.3	0.6	4.4
City Total		10.1	-	10.1	0.1	10.2	9.6	9.5	19.1	29.3	
Rural		3 Kubang Pasu	3.7	1.0	4.7	0.1	4.8	0.2	0.1	0.3	5.1
		5 Kota Setar	8.8	2.4	11.2	0.2	11.4	0.2	0.1	0.3	11.7
6 Pendang		0.5	0.1	0.6	0.0	0.6	0.0	0.0	0.0	0.6	
Rural Total		13.0	3.5	16.5	0.3	16.8	0.4	0.2	0.6	17.4	
Total		23.1	3.5	26.6	0.4	27.0	10.0	9.7	19.7	46.7	
5. Kuala Nerang		Rural 4 Padang Terap	1.9	0.5	2.4	0.1	2.5	0.3	0.3	0.6	3.1
		6. Pendang	City 102 Guan								
Chempedak			0.9	-	0.9	0.0	0.9	0.9	0.9	1.8	2.7
103 Yan		0.5	-	0.5	0.0	0.5	0.9	0.8	1.7	2.2	
City Total		1.4	-	1.4	0.0	1.4	1.8	1.7	3.5	4.9	
Rural		6 Pendang	1.9	0.5	2.4	0.0	2.4	0.1	0.1	0.2	2.6
		7 Yan	1.0	0.3	1.3	0.0	1.3	0.1	0.0	0.1	1.4
Rural Total		2.9	0.8	3.7	0.0	3.7	0.2	0.1	0.3	4.0	
Total		4.3	0.8	5.1	0.0	5.1	2.0	1.8	3.8	8.9	
7. Jeneri		Rural 5 Kota Setar	0.6	0.2	0.8	0.0	0.8	0.0	0.0	0.0	0.8
		6 Pendang	0.7	0.2	0.9	0.0	0.9	0.1	0.0	0.1	1.0
Rural Total		1.3	0.4	1.7	0.0	1.7	0.1	0.0	0.1	1.8	
8. Jeniang		Rural 8 Sik	0.8	0.2	1.0	0.0	1.0	0.2	0.1	0.3	1.3
		9 Kuala Muda	1.2	0.3	1.5	0.0	1.5	0.1	0.0	0.1	1.6
Rural Total		2.0	0.5	2.5	0.0	2.5	0.3	0.1	0.4	2.9	
9. Sik		Rural 8 Sik	1.0	0.3	1.3	0.0	1.3	0.2	0.2	0.4	1.7
	10. Sg. Petani	City 3 Sg. Petani	4.7	-	4.7	0.1	4.8	5.8	5.8	11.6	16.4
104 Tikan Batu		0.5	-	0.5	0.0	0.5	0.8	0.7	1.5	2.0	
City Total	5.2	-	5.2	0.1	5.3	6.6	6.5	13.1	18.4		
Rural	7 Yan	0.7	0.2	0.9	0.0	0.9	0.0	0.0	0.0	0.9	
	9 Kuala Muda	4.4	1.2	5.6	0.1	5.7	0.2	0.1	0.3	6.0	
Rural Total	5.1	1.4	6.5	0.1	6.6	0.2	0.1	0.3	6.9		
Total	10.3	1.4	11.7	0.2	11.9	6.8	6.6	13.4	25.3		

Table 38

PROJECTED DOMESTIC AND INDUSTRIAL WATER DEMAND  
IN THE STUDY AREA BY WATER SUPPLY REGION AND  
BY PURPOSE BY TYPE OF SUPPLY FOR 1990 (2/2)

Unit: 10<sup>6</sup> m<sup>3</sup>/y

State	Water Supply Region	City/Rural	Domestic				Industrial			Total D&I		
			Treated	Public		Pri-vate	Total	Public	Pri-vate			
				Un-Treated	Total				Total		Total	
	11. Kuala Ketil	City										
		203 Kuala Ketil	0.4	-	0.4	0.0	0.4	0.0	0.0	0.0	0.4	
		Rural										
		9 Kuala Muda	0.6	0.1	0.7	0.0	0.7	0.0	0.0	0.0	0.7	
		10 Baling	1.4	0.4	1.8	0.0	1.8	0.2	0.1	0.3	2.1	
		11 Kulim	0.3	0.1	0.4	0.0	0.4	0.0	0.0	0.0	0.4	
		Rural Total	2.3	0.6	2.9	0.0	2.9	0.2	0.1	0.3	3.2	
		Total	2.7	0.6	3.3	0.0	3.3	0.2	0.1	0.3	3.6	
	12. Baling	Rural										
		10 Baling	2.5	0.7	3.2	0.1	3.3	0.2	0.2	0.4	3.7	
13. Kulim	City											
		4 Kulim	3.0	-	3.0	0.1	3.1	0.8	0.7	1.5	4.6	
	Rural											
		11 Kulim	1.8	0.5	2.3	0.0	2.3	0.1	0.1	0.2	2.5	
	Total	4.8	0.5	5.3	0.1	5.4	0.9	0.8	1.7	7.1		
14. Karangan	Rural											
		11 Kulim	0.5	0.1	0.6	0.0	0.6	0.1	0.0	0.1	0.7	
Kedah Total			55.3	9.5	64.8	0.9	65.7	21.2	19.8	41.0	106.7	
P. Pinang	15. Perai	City										
		5 Butterworth	6.3	-	6.3	0.1	6.4	27.1	3.0	30.1	36.5	
		6 Bt. Mertajam	2.3	-	2.3	0.1	2.4	10.4	1.1	11.5	13.9	
		109 Kg. Pmtg										
		Kuching	0.9	-	0.9	0.0	0.9	1.9	0.2	2.1	3.0	
		110 Perai	0.8	-	0.8	0.0	0.8	22.1	2.4	24.5	25.3	
		201 Bandar Seberang										
		Jaya	4.9	-	4.9	0.1	5.0	11.4	1.3	12.7	17.7	
		City Total	15.2	-	15.2	0.3	15.5	72.9	8.0	80.9	96.4	
		Rural										
		13 Utara	5.9	0.3	6.2	0.2	6.4	4.8	0.5	5.3	11.7	
		14 Tengah	6.2	0.3	6.5	0.2	6.7	4.1	0.5	4.6	11.3	
		15 Selatan	3.9	0.2	4.1	0.1	4.2	4.4	0.5	4.9	9.1	
		Rural Total	16.0	0.8	16.8	0.5	17.3	13.3	1.5	14.8	32.1	
		Total	31.2	0.8	32.0	0.8	32.8	86.2	9.5	95.7	128.5	
	16. P. Pinang	City										
			8 Georgetown	26.8	-	26.8	0.0	26.8	15.4	1.7	17.1	43.9
			105 Air Itam	3.0	-	3.0	0.1	3.1	7.1	6.8	7.9	11.0
			106 Tg. Tokong	1.2	-	1.2	0.0	1.2	2.7	0.3	3.0	4.2
			107 Gelugor	1.1	-	1.1	0.0	1.1	2.4	0.3	2.7	3.8
		108 Tg. Bunga	0.9	-	0.9	0.0	0.9	2.2	0.2	2.4	3.3	
		202 Bandar Bayan										
		Baru	6.9	-	6.9	0.2	7.1	16.1	1.8	17.9	25.0	
		City Total	39.9	-	39.9	0.3	40.2	45.9	5.1	51.0	91.2	
		Rural										
		16 Timur Laut	3.8	0.2	4.0	0.1	4.1	2.2	0.2	2.4	6.5	
		17 Barat Daya	3.5	0.2	3.7	0.1	3.8	3.1	0.3	3.4	7.2	
	Rural Total	7.3	0.4	7.7	0.2	7.9	5.3	0.5	5.8	13.7		
	Total	47.2	0.4	47.6	0.5	48.1	51.2	5.6	56.8	104.9		
P. Pinang Total			78.4	1.2	79.6	1.3	80.9	137.4	15.1	152.5	233.4	
P.K.P. Total			142.5	11.7	154.2	2.4	156.6	161.7	37.9	199.6	356.2	

Table 39

PROJECTED DOMESTIC AND INDUSTRIAL WATER DEMAND  
IN THE STUDY AREA BY WATER SUPPLY REGION AND  
BY PURPOSE BY TYPE OF SUPPLY FOR 2000 (1/2)

Unit: 10<sup>6</sup> m<sup>3</sup>/y

State	Water Supply Region	City/Rural	Domestic				Industrial			Total D&I	
			Treated	Public		Pri-vate	Total	Public	Pri-vate		
				Un-Treated	Total				Total		Total
Perlis	1. Kangar	City									
		1 Kangar	2.9	-	2.9	0.0	2.9	11.4	11.4	22.8	25.7
		Rural									
		1 Perlis	10.8	1.4	12.2	0.0	12.2	0.2	0.1	0.3	12.5
		Total	13.7	1.4	15.1	0.0	15.1	11.6	11.5	23.1	38.2
		Rural									
	2. Cuping	1 Perlis	1.1	0.1	1.2	0.0	1.2	0.0	0.0	0.0	1.2
		Perlis Total	14.8	1.5	16.3	0.0	16.3	11.6	11.5	23.1	39.4
	Kedah	3. Changlun	Rural								
3 Kubang Pasu			1.3	0.3	1.6	0.0	1.6	0.1	0.0	0.1	1.7
4. Alor Setar			City								
		2 Alor Setar	9.5	-	9.5	0.0	9.5	36.0	35.9	71.9	81.4
		101 Jitra	3.8	-	3.8	0.0	3.8	1.1	1.1	2.2	6.0
		City Total	13.3	-	13.3	0.0	13.3	37.1	37.0	74.1	87.4
		Rural									
		3 Kubang Pasu	5.7	1.2	6.9	0.0	6.9	0.2	0.1	0.3	7.2
		5 Kota Setar	14.2	3.0	17.2	0.0	17.2	0.2	0.1	0.3	17.5
6 Pendang		0.8	0.2	1.0	0.0	1.0	0.0	0.0	0.0	1.0	
Rural Total		20.7	4.4	25.1	0.0	25.1	0.4	0.2	0.6	25.7	
Total		34.0	4.4	38.4	0.0	38.4	37.5	37.2	74.7	113.1	
5. Kuala Nerang		Rural									
		4 Padang Terap	3.2	0.7	3.9	0.0	3.9	0.3	0.3	0.6	4.5
		6. Pendang	City								
102 Guan Chempedak			1.4	-	1.4	0.0	1.4	3.7	3.7	7.4	8.8
103 Yan			1.3	-	1.3	0.0	1.3	3.3	3.3	6.6	7.9
City Total			2.7	-	2.7	0.0	2.7	7.0	7.0	14.0	16.7
Rural											
6 Pendang			3.0	0.6	3.6	0.0	3.6	0.1	0.1	0.2	3.8
7 Yan			1.6	0.3	1.9	0.0	1.9	0.1	0.0	0.1	2.0
Rural Total			4.6	0.9	5.5	0.0	5.5	0.2	0.1	0.3	5.8
Total	7.3		0.9	8.2	0.0	8.2	7.2	7.1	14.3	22.5	
7. Jeneri	Rural										
	5 Kota Setar	0.9	0.2	1.1	0.0	1.1	0.0	0.0	0.0	1.1	
	6 Pendang	1.1	0.2	1.3	0.0	1.3	0.1	0.0	0.1	1.4	
Rural Total	2.0	0.4	2.4	0.0	2.4	0.1	0.0	0.1	2.5		
8. Jeniang	Rural										
	8 Sik	1.2	0.3	1.5	0.0	1.5	0.2	0.1	0.3	1.8	
	9 Kuala Muda	1.9	0.4	2.3	0.0	2.3	0.1	0.0	0.1	2.4	
Rural Total	3.1	0.7	3.8	0.0	3.8	0.3	0.1	0.4	4.2		
9. Sik	Rural										
	8 Sik	1.6	0.3	1.9	0.0	1.9	0.2	0.2	0.4	2.3	
10. Sg. Petani	City	3 Sg. Petani	7.5	-	7.5	0.0	7.5	22.6	22.6	45.2	52.7
		104 Tikan Batu	1.3	-	1.3	0.0	1.3	3.5	3.4	6.9	8.2
		City Total	8.8	-	8.8	0.0	8.8	26.1	26.0	52.1	60.9
	Rural										
	7 Yan	1.1	0.2	1.3	0.0	1.3	0.0	0.0	0.0	1.3	
	9 Kuala Muda	7.1	1.5	8.6	0.0	8.6	0.2	0.1	0.3	8.9	
	Rural Total	8.2	1.7	9.9	0.0	9.9	0.2	0.1	0.3	10.2	
Total	17.0	1.7	18.7	0.0	18.7	26.3	26.1	52.4	71.1		

Table 40 PROJECTED DOMESTIC AND INDUSTRIAL WATER DEMAND  
IN THE STUDY AREA BY WATER SUPPLY REGION AND  
BY PURPOSE BY TYPE OF SUPPLY FOR 2000 (2/2)

Unit: 10<sup>6</sup> m<sup>3</sup>/y

State	Water Supply Region	City/Rural	Domestic					Industrial			Total D&I		
			Treated	Public		Pri-vate	Total	Public	Pri-vate				
				Un-Treated	Total				Total	Total			
	11. Kuala Ketil	City											
		203 Kuala Ketil	1.0	-	1.0	0.0	1.0	0.0	0.0	0.0	1.0		
		Rural											
		9 Kuala Muda	0.9	0.2	1.1	0.0	1.1	0.0	0.0	0.0	1.1		
		10 Baling	2.3	0.5	2.8	0.0	2.8	0.2	0.1	0.3	3.1		
		11 Kulim	0.4	0.1	0.5	0.0	0.5	0.0	0.0	0.0	0.5		
		Rural Total	3.6	0.8	4.4	0.0	4.4	0.2	0.1	0.3	4.7		
		Total	4.6	0.8	5.4	0.0	5.4	0.2	0.1	0.3	5.7		
	12. Baling	Rural											
		10 Baling	3.9	0.8	4.7	0.0	4.7	0.2	0.2	0.4	5.1		
13. Kulim	City												
		4 Kulim	5.0	-	5.0	0.0	5.0	2.9	2.8	5.7	10.7		
	Rural												
		11 Kulim	2.8	0.6	3.4	0.0	3.4	0.1	0.1	0.2	3.6		
	Total	7.8	0.6	8.4	0.0	8.4	3.0	2.9	5.9	14.3			
14. Karangan	Rural												
		11 Kulim	0.8	0.2	1.0	0.0	1.0	0.1	0.0	0.1	1.1		
Kedah Total			86.6	11.8	98.4	0.0	98.4	75.5	74.2	149.7	248.1		
P. Pinang	15. Perai	City											
			5 Butterworth	8.2	-	8.2	0.0	8.2	34.7	3.9	38.6	46.8	
			6 Bt. Mertajam	3.0	-	3.0	0.0	3.0	13.2	1.5	14.7	17.7	
			109 Kg. Pmtg										
			Kuching	1.1	-	1.1	0.0	1.1	2.5	0.3	2.8	3.9	
			110 Perai	1.0	-	1.0	0.0	1.0	28.5	3.2	31.7	32.7	
			201 Bandar Seberang Jaya	26.0	-	26.0	0.0	26.0	57.8	6.4	64.2	90.2	
			City Total	39.3	-	39.3	0.0	39.3	136.7	15.3	152.0	191.3	
			Rural										
			13 Utara	9.6	0.2	9.8	0.0	9.8	4.7	0.5	5.2	15.0	
			14 Tengah	10.1	0.2	10.3	0.0	10.3	4.1	0.5	4.6	14.9	
			15 Selatan	6.2	0.1	6.3	0.0	6.3	4.3	0.5	4.8	11.1	
			Rural Total	25.9	0.5	26.4	0.0	26.4	13.1	1.5	14.6	41.0	
			Total	65.2	0.5	65.7	0.0	65.7	149.8	16.8	166.6	232.3	
		16. P. Pinang	City										
				8 Georgetown	30.8	-	30.8	0.0	30.8	19.7	2.2	21.9	52.7
				105 Air Itam	3.9	-	3.9	0.0	3.9	9.0	1.0	10.0	13.9
				106 Tg. Tokong	1.5	-	1.5	0.0	1.5	3.5	0.4	3.9	5.4
				107 Gelugor	1.4	-	1.4	0.0	1.4	3.2	0.4	3.6	5.0
	108 Tg. Bunga		1.2	-	1.2	0.0	1.2	2.8	0.3	3.1	4.3		
	202 Bandar Bayan Baru		26.0	-	26.0	0.0	26.0	57.8	6.4	64.2	90.2		
	City Total		64.8	-	64.8	0.0	64.8	96.0	10.7	106.7	171.5		
	Rural												
	16 Timur Laut		6.1	0.1	6.2	0.0	6.2	2.2	0.2	2.4	8.6		
	17 Barat Daya	5.7	0.1	5.8	0.0	5.8	3.1	0.3	3.4	9.2			
	Rural Total	11.8	0.2	12.0	0.0	12.0	5.3	0.5	5.8	17.8			
	Total	76.6	0.2	76.8	0.0	76.8	101.3	11.2	112.5	189.3			
P. Pinang Total			141.8	0.7	142.5	0.0	142.5	251.1	28.0	279.1	421.6		
P.K.P. Total			243.2	14.0	257.2	0.0	257.2	338.2	113.7	451.9	709.1		

Table 41 PROJECTED DOMESTIC AND INDUSTRIAL WATER DEMAND  
IN THE STUDY AREA BY WATER SUPPLY REGION AND  
BY PURPOSE BY TYPE OF SUPPLY FOR 1985 UNDER  
THE CONDITION OF LOWER ECONOMIC GROWTH (1/2)

Unit: 10<sup>6</sup> m<sup>3</sup>/y

State	Water Supply Region	City/Rural	Domestic					Industrial			Total D&I
			Treated	Public		Pri- vate	Total	Public	Pri- vate	Total	
				Un- Treated	Total						
Perlis	1. Kangar	City									
		1 Kangar	1.1	-	1.1	0.1	1.2	1.6	1.5	3.1	4.3
		Rural									
	2. Cuping	1 Perlis	4.7	0.7	5.4	0.3	5.7	0.2	0.1	0.3	6.0
		Total	5.8	0.7	6.5	0.4	6.9	1.8	1.6	3.4	10.3
		Rural									
Perlis Total	1 Perlis	0.5	0.1	0.6	0.0	0.6	0.0	0.0	0.0	0.6	
		6.3	0.8	7.1	0.4	7.5	1.8	1.6	3.4	10.9	
Kedah	3. Changlun	Rural									
		3 Kubang Pasu	0.5	0.2	0.7	0.1	0.8	0.1	0.0	0.1	0.9
	4. Alor Setar	City									
		2 Alor Setar	4.7	-	4.7	0.3	5.0	4.2	4.2	8.4	13.4
		101 Jitra	1.2	-	1.2	0.1	1.3	0.2	0.1	0.3	1.6
		City Total	5.9	-	5.9	0.4	6.3	4.4	4.3	8.7	15.0
		Rural									
		3 Kubang Pasu	2.0	0.8	2.8	0.3	3.1	0.2	0.1	0.3	3.4
		5 Kota Setar	4.7	1.9	6.6	0.6	7.2	0.2	0.1	0.3	7.5
		6 Pendang	0.3	0.1	0.4	0.0	0.4	0.0	0.0	0.0	0.4
		Rural Total	7.0	2.8	9.8	0.9	10.7	0.4	0.2	0.6	11.3
		Total	12.9	2.8	15.7	1.3	17.0	4.8	4.5	9.3	26.3
	5. Kuala Nerang	Rural									
		4 Padang Terap	1.0	0.4	1.4	0.1	1.5	0.3	0.3	0.6	2.1
	6. Pendang	City									
		102 Guan Chempedak	0.6	-	0.6	0.0	0.6	0.5	0.4	0.9	1.5
		103 Yan	0.2	-	0.2	0.0	0.2	0.4	0.4	0.8	1.0
		City Total	0.8	-	0.8	0.0	0.8	0.9	0.8	1.7	2.5
		Rural									
		6 Pendang	1.0	0.4	1.4	0.1	1.5	0.1	0.1	0.2	1.7
		7 Yan	0.6	0.2	0.8	0.1	0.9	0.1	0.0	0.1	1.0
		Rural Total	1.6	0.6	2.2	0.2	2.4	0.2	0.1	0.3	2.7
		Total	2.4	0.6	3.0	0.2	3.2	1.1	0.9	2.0	5.2
		7. Jeneri	Rural								
	5 Kota Setar		0.3	0.1	0.4	0.0	0.4	0.0	0.0	0.0	0.4
	6 Pendang		0.4	0.2	0.6	0.1	0.7	0.1	0.0	0.1	0.8
8. Jeniang	Rural Total	0.7	0.3	1.0	0.1	1.1	0.1	0.0	0.1	1.2	
	Rural										
9. Sik	8 Sik	0.4	0.2	0.6	0.1	0.7	0.2	0.1	0.3	1.0	
	9 Kuala Muda	0.6	0.3	0.9	0.1	1.0	0.1	0.0	0.1	1.1	
	Rural Total	1.0	0.5	1.5	0.2	1.7	0.3	0.1	0.4	2.1	
10. Sg. Petani	Rural										
	8 Sik	0.6	0.2	0.8	0.1	0.9	0.2	0.2	0.4	1.3	
Sg. Petani	City										
	3 Sg. Petani	3.3	-	3.3	0.2	3.5	2.6	2.6	5.2	8.7	
	104 Tikan Batu	0.2	-	0.2	0.0	0.2	0.3	0.2	0.5	0.7	
	City Total	3.5	-	3.5	0.2	3.7	2.9	2.8	5.7	9.4	
	Rural										
	7 Yan	0.4	0.2	0.6	0.1	0.7	0.0	0.0	0.0	0.7	
	9 Kuala Muda	2.4	1.0	3.4	0.3	3.7	0.2	0.1	0.3	4.0	
	Rural Total	2.8	1.2	4.0	0.4	4.4	0.2	0.1	0.3	4.7	
	Total	6.3	1.2	7.5	0.6	8.1	3.1	2.9	6.0	14.1	



Table 42 PROJECTED DOMESTIC AND INDUSTRIAL WATER DEMAND  
IN THE STUDY AREA BY WATER SUPPLY REGION AND  
BY PURPOSE BY TYPE OF SUPPLY FOR 1985 UNDER  
THE CONDITION OF LOWER ECONOMIC GROWTH (2/2)

Unit: 106 m<sup>3</sup>/y

State	Water Supply Region	City/Rural	Domestic					Industrial			Total D&I
			Treated	Public		Pri- vate	Total	Public	Pri- vate		
				Un- Treated	Total				Total	Total	
Kedah	11. Kuala Ketil	City									
		203 Kuala Ketil	0.2	-	0.2	0.0	0.2	0.0	0.0	0.0	0.2
		Rural									
		9 Kuala Muda	0.3	0.1	0.4	0.0	0.4	0.0	0.0	0.0	0.4
		10 Baling	0.8	0.3	1.1	0.1	1.2	0.1	0.1	0.2	1.4
		11 Kulim	0.1	0.1	0.2	0.0	0.2	0.0	0.0	0.0	0.2
		Rural Total	1.2	0.5	1.7	0.1	1.8	0.1	0.1	0.2	2.0
		Total	1.4	0.5	1.9	0.1	2.0	0.1	0.1	0.2	2.2
	12. Baling	Rural									
		10 Baling	1.4	0.6	2.0	0.2	2.2	0.2	0.2	0.4	2.6
	13. Kulim	City									
		4 Kulim	2.0	-	2.0	0.1	2.1	0.4	0.3	0.7	2.8
		Rural									
		11 Kulim	1.0	0.4	1.4	0.1	1.5	0.1	0.1	0.2	1.7
	Total	3.0	0.4	3.4	0.2	3.6	0.5	0.4	0.9	4.5	
	14. Karangan	Rural									
		11 Kulim	0.3	0.1	0.4	0.0	0.4	0.1	0.0	0.1	0.5
Kedah Total			31.5	7.8	39.3	3.2	42.5	10.9	9.6	20.5	63.0
P. Pinang	15. Perai	City									
		5 Butterworth	4.9	-	4.9	0.3	5.2	15.2	1.7	16.9	22.1
		6 Bt. Mertajam	1.8	-	1.8	0.1	1.9	5.8	0.6	6.4	8.3
		109 Kg. Pmtg									
		Kuching	0.7	-	0.7	0.0	0.7	1.2	0.1	1.3	2.0
		110 Perai	0.6	-	0.6	0.0	0.6	12.4	1.4	13.8	14.4
		201 Bandar Seberang									
		Jaya	2.0	-	2.0	0.1	2.1	3.4	0.4	3.8	5.9
		City Total	10.0	-	10.0	0.5	10.5	38.0	4.2	42.2	52.7
		Rural									
		13 Utara	3.4	0.3	3.7	0.3	4.0	4.6	0.5	5.1	9.1
		14 Tengah	4.3	0.4	4.7	0.3	5.0	4.1	0.5	4.6	9.6
		15 Selatan	2.2	0.2	2.4	0.2	2.6	4.3	0.5	4.8	7.4
		Rural Total	9.9	0.9	10.8	0.8	11.6	13.0	1.5	14.5	26.1
		Total	19.9	0.9	20.8	1.3	22.1	51.0	5.7	56.7	78.8
	16. P. Pinang	City									
		8 Georgetown	23.4	-	23.4	0.0	23.4	8.6	0.9	9.5	32.9
		105 Air Itam	2.3	-	2.3	0.1	2.4	4.0	0.4	4.4	6.8
		106 Tg. Tokong	0.9	-	0.9	0.1	1.0	1.5	0.2	1.7	2.7
		107 Gelugor	0.9	-	0.9	0.1	1.0	1.4	0.2	1.6	2.6
		108 Tg. Bunga	0.7	-	0.7	0.0	0.7	1.3	0.1	1.4	2.1
		202 Bandar Bayan									
		Baru	3.2	-	3.2	0.2	3.4	5.3	0.6	5.9	9.3
		City Total	31.4	-	31.4	0.5	31.9	22.1	2.4	24.5	56.4
		Rural									
		16 Timur Laut	2.6	0.2	2.8	0.2	3.0	2.1	0.2	2.3	5.3
		17 Barat Daya	2.5	0.2	2.7	0.2	2.9	3.1	0.3	3.4	6.3
		Rural Total	5.1	0.4	5.5	0.4	5.9	5.2	0.5	5.7	11.6
		Total	36.5	0.4	36.9	0.9	37.8	27.3	2.9	30.2	68.0
P. Pinang Total			56.4	1.3	57.7	2.2	59.9	78.3	8.6	86.9	146.8
P.K.P. Total			94.2	9.9	104.1	5.8	109.9	91.0	19.8	110.8	220.7

Table 43

PROJECTED DOMESTIC AND INDUSTRIAL WATER DEMAND  
IN THE STUDY AREA BY WATER SUPPLY REGION AND  
BY PURPOSE BY TYPE OF SUPPLY FOR 1990 UNDER  
THE CONDITION OF LOWER ECONOMIC GROWTH (1/2)

Unit: 10<sup>6</sup> m<sup>3</sup>/y

State	Water Supply Region	City/Rural	Domestic					Industrial			Total D&I
			Public			Pri- vate	Total	Public	Pri- vate	Total	
			Treated	Un- Treated	Total						
Perlis	1. Kangar	City 1 Kangar	1.3	-	1.3	0.1	1.4	1.8	1.8	3.6	5.0
		Rural 1 Perlis	5.2	0.9	6.1	0.3	6.4	0.1	0.1	0.2	6.6
		Total	6.5	0.9	7.4	0.4	7.8	1.9	1.9	3.8	11.6
	2. Cuping	Rural 1 Perlis	0.5	0.1	0.6	0.0	0.6	0.0	0.0	0.0	0.6
		Perlis Total	7.0	1.0	8.0	0.4	8.4	1.9	1.9	3.8	12.2
	Kedah	3. Changlun	Rural 3 Kubang Pasu	0.7	0.2	0.9	0.0	0.9	0.1	0.0	0.1
4. Alor Setar			City 2 Alor Setar	5.2	-	5.2	0.2	5.4	5.8	5.7	11.5
		101 Jitra	1.7	-	1.7	0.1	1.8	0.2	0.2	0.4	2.2
		City Total	6.9	-	6.9	0.3	7.2	6.0	5.9	11.9	19.1
		Rural 3 Kubang Pasu	3.0	0.9	3.9	0.1	4.0	0.2	0.1	0.3	4.3
5 Kota Setar		7.3	2.2	9.5	0.3	9.8	0.1	0.1	0.2	10.0	
6 Pendang		0.4	0.1	0.5	0.0	0.5	0.0	0.0	0.0	0.5	
Rural Total		10.7	3.2	13.9	0.4	14.3	0.3	0.2	0.5	14.8	
Total		17.6	3.2	20.8	0.7	21.5	6.3	6.1	12.4	33.9	
5. Kuala Nerang		Rural 4 Padang Terap	1.6	0.5	2.1	0.1	2.2	0.2	0.2	0.4	2.6
		6. Pendang	City 102 Guan Chempedak	0.7	-	0.7	0.0	0.7	0.6	0.6	1.2
103 Yan			0.3	-	0.3	0.0	0.3	0.5	0.5	1.0	1.3
City Total			1.0	-	1.0	0.0	1.0	1.1	1.1	2.2	3.2
Rural 6 Pendang			1.6	0.5	2.1	0.1	2.2	0.1	0.0	0.1	2.3
7 Yan		0.8	0.3	1.1	0.0	1.1	0.0	0.0	0.0	1.1	
Rural Total		2.4	0.8	3.2	0.1	3.3	0.1	0.0	0.1	3.4	
Total		3.4	0.8	4.2	0.1	4.3	1.2	1.1	2.3	6.6	
7. Jeneri		Rural 5 Kota Setar	0.5	0.1	0.6	0.0	0.6	0.0	0.0	0.0	0.6
		6 Pendang	0.6	0.2	0.8	0.0	0.8	0.0	0.0	0.0	0.8
Rural Total		1.1	0.3	1.4	0.0	1.4	0.0	0.0	0.0	1.4	
8. Jeniang		Rural 8 Sik	0.6	0.2	0.8	0.0	0.8	0.1	0.1	0.2	1.0
		9 Kuala Muda	1.0	0.3	1.3	0.0	1.3	0.1	0.0	0.1	1.4
		Rural Total	1.6	0.5	2.1	0.0	2.1	0.2	0.1	0.3	2.4
9. Sik	Rural 8 Sik	0.8	0.3	1.1	0.0	1.1	0.2	0.1	0.3	1.4	
	10. Sg. Petani	City 3 Sg. Petani	3.9	-	3.9	0.2	4.1	3.6	3.6	7.2	11.3
104 Tikan Batu		0.3	-	0.3	0.0	0.3	0.5	0.4	0.9	1.2	
City Total		4.2	-	4.2	0.2	4.4	4.1	4.0	8.1	12.5	
Rural 7 Yan		0.6	0.2	0.8	0.0	0.8	0.0	0.0	0.0	0.8	
9 Kuala Muda	3.7	1.1	4.8	0.2	5.0	0.1	0.1	0.2	5.2		
Rural Total	4.3	1.3	5.6	0.2	5.8	0.1	0.1	0.2	6.0		
Total	8.5	1.3	9.8	0.4	10.2	4.2	4.1	8.3	18.5		

Table 44

PROJECTED DOMESTIC AND INDUSTRIAL WATER DEMAND  
IN THE STUDY AREA BY WATER SUPPLY REGION AND  
BY PURPOSE BY TYPE OF SUPPLY FOR 1990 UNDER  
THE CONDITION OF LOWER ECONOMIC GROWTH (2/2)

Unit: 10<sup>6</sup> m<sup>3</sup>/y

State	Water Supply Region	City/Rural	Domestic					Industrial			Total D&I
			Treated	Public		Pri-vate	Total	Public	Pri-vate		
				Un-	Total				Total	Total	
Kedah	11. Kuala Ketil	City									
		203 Kuala Ketil	0.3	-	0.3	0.0	0.3	0.0	0.0	0.0	0.3
		Rural									
		9 Kuala Muda	0.5	0.1	0.6	0.0	0.6	0.0	0.0	0.0	0.6
		10 Baling	1.2	0.4	1.6	0.0	1.6	0.1	0.1	0.2	1.8
		11 Kulim	0.2	0.1	0.3	0.0	0.3	0.0	0.0	0.0	0.3
		Rural Total	1.9	0.6	2.5	0.0	2.5	0.1	0.1	0.2	2.7
	Total		2.2	0.6	2.8	0.0	2.8	0.1	0.1	0.2	3.0
		12. Baling	Rural								
	10 Baling	2.0	0.6	2.6	0.1	2.7	0.2	0.1	0.3	3.0	
		13. Kulim	City								
	4 Kulim	2.5	-	2.5	0.1	2.6	0.5	0.4	0.9	3.5	
		Rural									
	11 Kulim	1.5	0.4	1.9	0.1	2.0	0.1	0.1	0.2	2.2	
Total		4.0	0.4	4.4	0.2	4.6	0.6	0.5	1.1	5.7	
14. Karangan	Rural										
	11 Kulim	0.4	0.1	0.5	0.0	0.5	0.0	0.0	0.0	0.5	
Kedah Total			43.9	8.8	52.7	1.6	54.3	13.3	12.4	25.7	80.0
P. Pinang	15. Perai	City									
		5 Butterworth	5.2	-	5.2	0.2	5.4	19.5	2.2	21.7	27.1
		6 Bt. Mertajam	1.9	-	1.9	0.1	2.0	7.4	0.8	8.2	10.2
		109 Kg. Pmtg									
		Kuching	0.7	-	0.7	0.0	0.7	1.4	0.2	1.6	2.3
		110 Perai	0.4	-	0.4	0.0	0.4	15.9	1.8	17.7	18.1
		201 Bandar Seberang Jaya	4.0	-	4.0	0.2	4.2	8.3	0.9	9.2	13.4
		City Total	12.2	-	12.2	0.5	12.7	52.5	5.9	58.4	71.1
		Rural									
		13 Utara	4.4	0.3	4.7	0.2	4.9	4.8	0.5	5.3	10.2
		14 Tengah	6.1	0.4	6.5	0.3	6.8	4.2	0.5	4.7	11.5
		15 Selatan	2.8	0.2	3.0	0.2	3.2	4.4	0.5	4.9	8.1
		Rural Total	13.3	0.9	14.2	0.7	14.9	13.4	1.5	14.9	29.8
		Total	25.5	0.9	26.4	1.2	27.6	65.9	7.4	73.3	100.9
	16. P. Pinang	City									
		8 Georgetown	23.3	-	23.3	0.0	23.3	11.0	1.2	12.2	35.5
		105 Air Itam	2.5	-	2.5	0.1	2.6	5.0	0.6	5.6	8.2
		106 Tg. Tokong	1.0	-	1.0	0.0	1.0	2.0	0.2	2.2	3.2
		107 Gelugor	0.9	-	0.9	0.0	0.9	1.9	0.2	2.1	3.0
		108 Tg. Bunga	0.8	-	0.8	0.0	0.8	1.5	0.2	1.7	2.5
202 Bandar Bayan Baru		5.6	-	5.6	0.2	5.8	10.2	2.5	12.7	18.5	
City Total		34.1	-	34.1	0.3	34.4	31.6	4.9	36.5	70.9	
Rural											
16 Timur Laut		3.7	0.3	4.0	0.2	4.2	2.2	0.2	2.4	6.6	
17 Barat Daya	3.3	0.2	3.5	0.2	3.7	3.1	0.3	3.4	7.1		
Rural Total	7.0	0.5	7.5	0.4	7.9	5.3	0.5	5.8	13.7		
Total	41.1	0.5	41.6	0.7	42.3	36.9	5.4	42.3	84.6		
P. Pinang Total			66.6	1.4	68.0	1.9	69.9	102.8	12.8	115.6	185.5
P.K.P. Total			117.5	11.2	128.7	3.9	132.6	118.0	27.1	145.1	277.7

Table 45

PROJECTED DOMESTIC AND INDUSTRIAL WATER DEMAND  
IN THE STUDY AREA BY WATER SUPPLY REGION AND  
BY PURPOSE BY TYPE OF SUPPLY FOR 2000 UNDER  
THE CONDITION OF LOWER ECONOMIC GROWTH (1/2)

Unit: 10<sup>6</sup> m<sup>3</sup>/y

State	Water Supply Region	City/Rural	Domestic					Industrial			Total D&I	
			Treated	Public		Pri-vate	Total	Public	Pri-vate	Total		
				Un-Treated	Total							
Perlis	1. Kangar	City										
		1 Kangar	1.7	-	1.7	0.0	1.7	3.0	3.0	6.0	7.7	
		Rural										
	2. Cuping	1 Perlis	8.1	1.3	9.4	0.1	9.5	0.1	0.0	0.1	9.6	
		Total	9.8	1.3	11.1	0.1	11.2	3.1	3.0	6.1	17.3	
		Rural										
Perlis Total												
			10.6	1.4	12.0	0.1	12.1	3.1	3.0	6.1	18.2	
Kedah	3. Changlun	Rural										
		3 Kubang Pasu	1.0	0.2	1.2	0.0	1.2	0.0	0.0	0.0	1.2	
	4. Alor Setar	City										
		2 Alor Setar	5.9	-	5.9	0.1	6.0	9.4	9.4	18.8	24.8	
		101 Jitra	2.3	-	2.3	0.1	2.4	0.3	0.3	0.6	3.0	
		City Total	8.2	-	8.2	0.2	8.4	9.7	9.7	19.4	27.8	
		Rural										
		3 Kubang Pasu	4.3	1.1	5.4	0.0	5.4	0.1	0.0	0.1	5.5	
	5. Kuala Nerang	5 Kota Setar	11.5	2.8	14.3	0.1	14.4	0.1	0.0	0.1	14.5	
		6 Pendang	0.7	0.2	0.9	0.0	0.9	0.0	0.0	0.0	0.9	
		Rural Total	16.5	4.1	20.6	0.1	20.7	0.2	0.0	0.2	20.9	
		Total	24.7	4.1	28.8	0.3	29.1	9.9	9.7	19.6	48.7	
		6. Pendang	Rural									
			4 Padang Terap	2.6	0.7	3.3	0.0	3.3	0.1	0.1	0.2	3.5
	City											
	102 Guan Chempedak		0.9	-	0.9	0.0	0.9	1.0	0.9	1.9	2.8	
	103 Yan		0.5	-	0.5	0.0	0.5	0.9	0.8	1.7	2.2	
	City Total		1.4	-	1.4	0.0	1.4	1.9	1.7	3.6	5.0	
	7. Jeneri	Rural										
		6 Pendang	2.3	0.6	2.9	0.0	2.9	0.1	0.0	0.1	3.0	
		7 Yan	1.2	0.3	1.5	0.0	1.5	0.0	0.0	0.0	1.5	
		Rural Total	3.5	0.9	4.4	0.0	4.4	0.1	0.0	0.1	4.5	
Total		4.9	0.9	5.8	0.0	5.8	2.0	1.7	3.7	9.5		
8. Jeniang		Rural										
	5 Kota Setar	0.7	0.2	0.9	0.0	0.9	0.0	0.0	0.0	0.9		
	6 Pendang	0.9	0.2	1.1	0.0	1.1	0.0	0.0	0.0	1.1		
	Rural Total	1.6	0.4	2.0	0.0	2.0	0.0	0.0	0.0	2.0		
	9. Sik	Rural										
		8 Sik	0.9	0.2	1.1	0.0	1.1	0.1	0.0	0.1	1.2	
9 Kuala Muda		1.5	0.4	1.9	0.0	1.9	0.0	0.0	0.0	1.9		
Rural Total		2.4	0.6	3.0	0.0	3.0	0.1	0.0	0.1	3.1		
10. Sg. Petani		Rural										
		8 Sik	1.3	0.3	1.6	0.0	1.6	0.1	0.1	0.2	1.8	
	City											
	3 Sg. Petani	4.5	-	4.5	0.1	4.6	5.9	5.9	11.8	16.4		
	104 Tikan Batu	0.8	-	0.8	0.0	0.8	0.9	0.8	1.7	2.5		
	City Total	5.3	-	5.3	0.1	5.4	6.8	6.7	13.5	18.9		
Total	Rural											
	7 Yan	0.8	0.2	1.0	0.0	1.0	0.0	0.0	0.0	1.0		
	9 Kuala Muda	5.6	1.4	7.0	0.1	7.1	0.1	0.0	0.1	7.2		
	Rural Total	6.4	1.6	8.0	0.1	8.1	0.1	0.0	0.1	8.2		
	Total	11.7	1.6	13.3	0.2	13.5	6.9	6.7	13.6	27.1		

Table 46

PROJECTED DOMESTIC AND INDUSTRIAL WATER DEMAND  
IN THE STUDY AREA BY WATER SUPPLY REGION AND  
BY PURPOSE BY TYPE OF SUPPLY FOR 2000 UNDER  
THE CONDITION OF LOWER ECONOMIC GROWTH (2/2)

Unit: 10<sup>6</sup> m<sup>3</sup>/y

State	Water Supply Region	City/Rural	Domestic					Industrial			Total D&I
			Treated	Public		Pri-vate	Total	Public	Pri-vate		
				Un-Treated	Total				Total	Total	
	11. Kuala Ketil	City									
		203 Kuala Ketil	0.5	-	0.5	0.0	0.5	0.0	0.0	0.0	0.5
		Rural									
		9 Kuala Muda	0.7	0.2	0.9	0.0	0.9	0.0	0.0	0.0	0.9
		10 Baling	1.7	0.4	2.1	0.0	2.1	0.1	0.0	0.1	2.2
		11 Kulim	0.3	0.1	0.4	0.0	0.4	0.0	0.0	0.0	0.4
		Rural Total	2.7	0.7	3.4	0.0	3.4	0.1	0.0	0.1	3.5
		Total	3.2	0.7	3.9	0.0	3.9	0.1	0.0	0.1	4.0
	12. Baling	Rural									
		10 Baling	2.8	0.7	3.5	0.0	3.5	0.1	0.1	0.2	3.7
	13. Kulim	City									
		4 Kulim	3.0	-	3.0	0.1	3.1	0.8	0.7	1.5	4.6
		Rural									
		11 Kulim	2.1	0.5	2.6	0.0	2.6	0.1	0.0	0.1	2.7
		Total	5.1	0.5	5.6	0.1	5.7	0.9	0.7	1.6	7.3
	14. Karangan	Rural									
		11 Kulim	0.6	0.1	0.7	0.0	0.7	0.0	0.0	0.0	0.7
Kedah Total			61.9	10.8	72.7	0.6	73.3	20.2	19.1	39.3	112.6
P. Pinang	15. Perai	City									
		5 Butterworth	5.0	-	5.0	0.1	5.1	22.0	2.4	24.4	29.5
		6 Bt. Mertajam	1.8	-	1.8	0.0	1.8	8.5	0.9	9.4	11.2
		109 Kg. Pmtg									
		Kuching	0.4	-	0.4	0.0	0.4	1.4	0.2	1.6	2.0
		110 Perai	0.4	-	0.4	0.0	0.4	17.9	2.0	19.9	20.3
		201 Bandar Seberang									
		Jaya	17.8	-	17.8	0.0	17.8	36.3	4.0	40.3	58.1
		City Total	25.4	-	25.4	0.1	25.5	86.1	9.5	95.6	121.1
		Rural									
		13 Utara	8.4	0.4	8.8	0.1	8.9	4.4	0.5	4.9	13.8
		14 Tengah	12.1	0.5	12.6	0.2	12.8	3.9	0.4	4.3	17.1
		15 Selatan	5.3	0.2	5.5	0.1	5.6	4.1	0.4	4.5	10.1
		Rural Total	25.8	1.1	26.9	0.4	27.3	12.4	1.3	13.7	41.0
		Total	51.2	1.1	52.3	0.5	52.8	98.5	10.8	109.3	162.1
	16. P. Pinang	City									
		8 Georgetown	21.0	-	21.0	0.0	21.0	12.5	1.4	13.9	34.9
		105 Air Itam	2.4	-	2.4	0.1	2.5	5.7	0.6	6.3	8.8
		106 Tg. Tokong	0.9	-	0.9	0.0	0.9	2.2	0.2	2.4	3.3
		107 Gelugor	0.9	-	0.9	0.0	0.9	2.2	0.2	2.4	3.3
		108 Tg. Bunga	0.5	-	0.5	0.0	0.5	1.8	0.2	2.0	2.5
		202 Bandar Bayan									
		Baru	17.8	-	17.8	0.2	18.0	36.3	4.0	40.3	58.3
		City Total	43.5	-	43.5	0.3	43.8	60.7	6.6	67.3	111.1
		Rural									
		16 Timur Laut	7.5	0.3	7.8	0.1	7.9	2.0	0.2	2.2	10.1
		17 Barat Daya	6.4	0.3	6.7	0.1	6.8	2.9	0.3	3.2	10.0
	Rural Total	13.9	0.6	14.5	0.2	14.7	4.9	0.5	5.4	20.1	
	Total	57.4	0.6	58.0	0.5	58.5	65.6	7.1	72.7	131.2	
P. Pinang Total			108.6	1.7	110.3	1.0	111.3	164.1	17.9	182.0	293.3
P.K.P. Total			181.1	13.9	195.0	1.7	196.7	187.4	40.0	227.4	424.1

Table 47 GROSS OUTPUT VALUE RATIOS OF CITIES/TOWNS  
AND RURAL AREA TO STATE

		Unit: %			
State	City/Rural	1982	1985	1990	2000
Kedah/Perlis					
	1. Kangar	10.2	11.5	12.4	13.2
	2. Alor Setar	32.0	36.2	39.3	41.7
	3. Sg. Petani	20.1	22.6	24.6	26.2
	4. Kulim	2.5	2.9	3.1	3.3
	101. Jitra	1.0	1.2	1.3	1.3
	102. Guan Chempedak	3.2	3.6	3.8	4.3
	103. Yan	2.7	3.1	3.4	3.6
	104. Tikan Batu	1.8	2.6	3.2	4.0
	203. Kuala Ketil	0.0	0.0	0.0	0.0
	City Total	26.5	83.5	91.1	97.6
	Rural	73.5	6.5	8.9	2.4
Total		100.0	100.0	100.0	100.0
Pulau Pinang					
	5. Butterworth	21.0	20.3	19.9	13.9
	6. Bukit Mertajam	8.0	7.7	7.6	5.3
	8. Georgetown	11.9	11.5	11.3	7.9
	105. Air Itam	5.6	5.2	5.2	3.6
	106. Tg. Tokong	2.2	2.0	2.0	1.4
	107. Takek Gelugor	1.0	1.9	1.8	1.3
	108. Tg. Bunga	1.6	1.6	1.6	1.1
	109. Kg. Pmtg Kuching	1.7	1.5	1.4	1.0
	110. Perai	17.1	16.6	16.2	11.4
	201. Bandar Seberang Jaya	1.9	4.6	8.4	23.1
	202. Bandar Bayan Baru	2.2	7.1	11.8	23.1
	City Total	74.2	80.0	87.2	93.1
	Rural	25.8	20.0	12.8	6.9
Total		100.0	100.0	100.0	100.0

Table 48 GROSS OUTPUT VALUE RATIOS OF CITIES/TOWNS  
AND RURAL AREA TO STATE UNDER THE CONDITION  
OF LOWER ECONOMIC GROWTH

		Unit: %			
State	City/Rural	1982	1985	1990	2000
Kedah/Perlis					
	1. Kangar	10.2	11.4	12.3	13.1
	2. Alor Setar	32.0	36.2	38.7	41.4
	3. Sg. Petani	20.1	22.4	24.3	26.0
	4. Kulim	2.5	2.9	3.1	3.3
	101. Jitra	1.0	1.2	1.2	1.3
	102. Guan Chempedak	3.2	3.7	4.0	4.1
	103. Yan	2.7	3.1	3.3	3.5
	104. Tikan Batu	1.8	2.2	2.9	3.8
	203. Kuala Ketil	0.0	0.0	0.0	0.0
	City Total	73.5	83.1	89.8	96.5
	Rural	26.5	16.9	10.2	3.5
Total		100.0	100.0	100.0	100.0
Pulau Pinang					
	5. Butterworth	21.0	19.7	19.0	13.5
	6. Bukit Mertajam	8.0	7.5	7.2	5.2
	8. Georgetown	11.9	11.1	10.7	7.7
	105. Air Itam	5.6	5.1	4.9	3.5
	106. Tg. Tokong	2.2	2.0	1.9	1.3
	107. Takek Gelugor	1.0	1.9	1.8	1.3
	108. Tg. Bunga	1.6	1.6	1.5	1.1
	109. Kg. Pmtg Kuching	1.7	1.5	1.4	0.9
	110. Perai	17.1	16.1	15.5	11.0
	201. Bandar Seberang Jaya	1.9	4.4	8.0	22.3
	202. Bandar Bayan Baru	2.2	6.9	11.1	22.3
	City Total	74.2	77.8	83.0	90.1
	Rural	25.8	22.2	17.0	9.9
Total		100.0	100.0	100.0	100.0

Table 49      PROJECTED NET UNIT INDUSTRIAL WATER USE PER  
GROSS VALUE OF MANUFACTURING OUTPUT BY  
COMMODITY GROUP

Unit: m<sup>3</sup>/d/M\$10<sup>6</sup>/y

Commodity Group	Estimated 1982	Projected		Malaysian Data	
		1985	1990 & 2000	Sampling Survey/ <u>1</u>	Kedah/Perlis Report/ <u>2</u>
1. Food	74.0	73.0	71.0	-	97
2. Textile	76.0	75.0	73.0	27	-
3. Wood Product	12.7	12.7	13.0	-	24
4. Paper Product	552.5	540.3	520.0	-	-
5. Publishing	10.0	10.0	10.0	-	-
6. Chemicals	135.3	133.3	130.0	392	65
7. Rubber Manufacturing	97.5	85.3	65.0	-	28
8. Non-metal	79.7	69.3	68.0	108	-
9. Basic Metal	51.1	50.3	49.0	0	-
10. Machinery	18.7	18.7	20.0	22	96
11. Miscellaneous	48.7	48.7	49.0	12	-

Remarks; (1): The values indicated are net manufacturing fresh water use excluding sea water and water used cyclically per M\$10<sup>6</sup> of the gross value of manufacturing output at 1970 price.

/1: Sampling survey carries out by the Study Team in 1980

/2: Ref. 12



Table 50 PROJECTED WATER DEMAND FOR PALM OIL MILLS  
AND RUBBER FACTORIES BY STATE

Unit:  $10^3 \text{ m}^3/\text{y}$

State	1982		1985		1990		2000	
	Palm	Rubber	Palm	Rubber	Palm	Rubber	Palm	Rubber
Perlis	-	-	-	-	-	-	-	-
Kedah	29	3,974	48	4,174	48	4,477	60	6,284
P. Pinang	9	1,806	59	1,978	61	2,197	160	4,285
P.K.P. Total	38	5,780	107	6,152	109	6,674	220	10,569

Table 51 DISTRIBUTION OF WATER DEMAND OF EACH  
DISTRICT RURAL AREA IN WATER SUPPLY REGIONS

Unit: %

Water Supply Region	District									
	3. Kubang Pasu	3. Padang Terap	5. Kota Setar	6. Pendang	7. Yan	8. Sik	9. Kuala Muda	10. Baling	11. Kulim	
3. Changlum	19									
4. Alor Setar	81		94	17						
5. Kuala Nerang		100								
6. Pendang				60	60					
7. Jeneri			6	23						
8. Jeniang						43	19			
9. Sik						57				
10. Sg. Petani					40		72			
11. Kuala Ketil							9	37	10	
12. Baling								63		
13. Kulim									71	
14. Karangan									19	
	100	100	100	100	100	100	100	100	100	100

Table 52 RATIO OF WATER DEMAND DEPENDING ON  
SURFACE WATER AT EACH INTAKE

Unit: %

Water Supply Region	Intake No.	City		Rural
1. Kangar	1/101	1. Kangar	100	-
2. Cuping	-	-		-
3. Changlun	2/102	-		100
4. Aloy Setar	3/103/5005/ 10001	2. Alor Setar 101. Jitra	100 100	56
	10002	-		24
5. Kuala Nerang	4/105	-		94
	104	-		6
6. Pendang	5	102. Guan Chempedak 103. Yan	100 100	100
7. Jeneri	106	-		50
	10003	-		50
8. Jeniang	107	-		100
9. Sik	108	-		100
10. Sg. Petani	15	-		20
	16/109	3. Sg. Petani 104. Tikan Batu	100 100	12
11. Kuala Ketil	110/10004	203. Kuala Ketil	100	100
12. Baling	18/112	-		22
	111	-		78
13. Kulim	113	4. Kulim	89	-
	114/10005	4. Kulim	11	17
14. Karangan	19	-		100

Remarks; In the rural area, the residual water demand is met by groundwater.

Table 53 PROJECTED D&I WATER ABSTRACTION  
AT THE RIVER INTAKES BY PURPOSE

Unit: 10<sup>6</sup> m<sup>3</sup>/y

State	No.	Water Supply Region	Intake No.	1982			1985			1990			2000		
				D	M	T	D	M	T	D	M	T	D	M	T
Perlis	1.	Kangar	1/101	4.7	2.4	7.1	5.3	3.7	9.0	4.8	6.0	10.8	2.9	22.8	25.7
			1001	-	-	-	-	-	-	-	-	-	-	-	-
			1002	-	-	-	-	-	-	-	-	-	-	-	-
			1003	-	-	-	-	-	-	-	-	-	-	-	-
	2.	Cuping	1004	-	-	-	-	-	-	-	-	-	-	-	-
		Sub-total		4.7	2.4	7.1	5.3	3.7	9.0	4.8	6.0	10.8	2.9	22.8	25.7
Kedah	3.	Changlun	2/102	0.7	0.0	0.7	0.8	0.1	0.9	1.1	0.1	1.2	1.6	0.1	1.7
	4.	Alor Setar	3/103/	9.5	7.1	16.6	11.5	10.4	21.9	18.5	19.4	37.9	27.4	74.4	101.8
			5005/10001	1.2	0.0	1.2	2.1	0.1	2.2	3.6	0.1	3.7	6.0	0.2	6.2
	5.	Kuala Nerang	4/105	1.3	0.0	1.3	1.6	0.6	2.2	2.4	0.6	3.0	3.6	0.6	4.2
			104	-	-	-	0.1	0.0	0.1	0.1	0.0	0.1	0.3	0.0	0.3
	6.	Pandang	5	2.3	0.3	2.6	3.6	2.2	5.8	3.0	3.6	6.6	5.8	14.1	19.9
	7.	Jeneri	6	-	-	-	-	-	-	-	-	-	-	-	-
			7	-	-	-	-	-	-	-	-	-	-	-	-
			106	-	-	-	0.5	0.1	0.6	0.9	0.0	0.9	1.3	0.0	1.3
			10003	0.9	0.0	0.9	0.6	0.0	0.6	0.8	0.1	0.9	1.2	0.1	1.3
	8.	Jeniang <sup>/1</sup>	8	1.3	0.0	1.3	-	-	-	-	-	-	-	-	-
			107	-	-	-	1.9	0.4	2.3	2.5	0.4	2.9	3.7	0.4	4.1
	9.	Sik <sup>/1</sup>	9	0.7	0.0	0.7	-	-	-	-	-	-	-	-	-
			108	-	-	-	0.9	0.5	1.4	1.3	0.4	1.7	2.0	0.4	2.4
	10.	Sg. Petani	10	-	-	-	-	-	-	-	-	-	-	-	-
			11	-	-	-	-	-	-	-	-	-	-	-	-
			12	-	-	-	-	-	-	-	-	-	-	-	-
			13	-	-	-	-	-	-	-	-	-	-	-	-
			14	-	-	-	-	-	-	-	-	-	-	-	-
			15	1.8	0.0	1.8	1.9	0.1	2.0	1.9	0.1	2.0	1.9	0.1	2.0
			16/109	5.5	9.2	14.7	6.7	7.0	13.7	10.0	13.3	23.3	9.9	52.2	62.1
	11.	Kuala Ketil	110/10004	1.8	0.2	2.0	2.2	0.3	2.5	3.3	0.3	3.6	5.3	0.3	5.6
	12.	Baling	17	-	-	-	-	-	-	-	-	-	-	-	-
			18/112	2.0	0.0	2.0	0.5	0.1	0.6	0.7	0.1	0.8	1.0	0.1	1.1
			111	-	-	-	1.8	0.4	2.2	2.6	0.3	2.9	3.7	0.3	4.0
	13.	Kulim <sup>/2</sup>	113	-	-	-	1.2	0.2	1.4	2.8	0.1	2.9	6.7	2.8	9.5
			114/10005	1.0	0.2	1.2	0.8	0.1	0.9	1.1	0.1	1.2	1.7	0.1	1.8
	14.	Karangan	19	0.3	0.0	0.3	0.3	0.1	0.4	0.4	0.1	0.5	0.7	0.1	0.8
		Sub-total		30.3	17.0	47.3	39.0	22.7	61.7	57.0	39.1	96.1	83.8	146.3	230.1
P. Pinang <sup>/3</sup>	15.	Perai &		53.0	58.3	111.3	64.3	98.3	162.6	80.9	152.5	233.4	142.3	278.9	421.2
	16.	P. Pinang													
P.K.P. Total				88.0	77.7	165.7	108.6	124.7	233.3	142.7	197.6	340.3	229.0	448.0	677.0

Remarks: <sup>/1</sup>: The figures are assumed ones for the purpose of the water balance study.  
<sup>/2</sup>: Water Supply Region 13 is provided with 3.0 x 10<sup>6</sup> m<sup>3</sup>/y (1.8 mgd) of treated water by PWA.  
<sup>/3</sup>: Since P. Pinang State can eventually be considered as one water supply area, no figure is given for each river intake in the Water Supply Regions 15 and 16.

Table 54 PROJECTED D&I WATER ABSTRACTION  
AT THE RIVER INTAKES BY TYPE

Unit: 10<sup>6</sup> m<sup>3</sup>/y

State	No.	Water Supply Region	Intake No.	1982			1985			1990			2000		
				Pub- lic	Pri- vate	T	Pub- lic	Pri- vate	T	Pub- lic	Pri- vate	T	Pub- lic	Pri- vate	T
Perlis	1.	Kangar	1/101	5.9	1.2	7.1	8.2	1.8	9.0	7.8	3.0	10.8	14.3	11.4	25.7
			1001	-	-	-	-	-	-	-	-	-	-	-	-
			1002	-	-	-	-	-	-	-	-	-	-	-	-
			1003	-	-	-	-	-	-	-	-	-	-	-	-
	2.	Cuping	1004	-	-	-	-	-	-	-	-	-	-	-	-
	Sub-total			5.9	1.2	7.1	7.2	1.8	9.0	7.8	3.0	10.8	14.3	11.4	25.7
Kedah	3.	Changlun	2/102	0.7	0.0	0.7	0.9	0.0	0.9	1.2	0.0	1.2	1.7	0.0	1.7
	4.	Alor Setar	3/103/	5005/10001	11.3	5.3	16.6	14.9	7.0	21.9	25.7	12.2	37.9	64.6	101.8
			10002		0.5	0.7	1.2	1.4	0.8	2.2	2.6	1.1	3.7	6.1	6.2
	5.	Kuala Nerang	4/105	104	1.3	0.0	1.3	1.9	0.3	2.2	2.7	0.3	3.0	3.9	4.2
			104		-	-	-	0.1	0.0	0.1	0.1	0.0	0.1	0.3	0.3
	6.	Pandang	5		2.5	0.1	2.6	4.7	1.1	5.8	4.4	2.2	6.6	12.9	19.9
	7.	Jeneri	6		-	-	-	-	-	-	-	-	-	-	-
			7		-	-	-	-	-	-	-	-	-	-	-
			106		-	-	-	0.6	0.0	0.6	0.9	0.0	0.9	1.3	1.3
			10003		0.9	0.0	0.9	0.6	0.0	0.6	0.9	0.0	0.9	1.3	1.3
	8.	Jeniang <sup>/1</sup>	8		1.3	0.0	1.3	-	-	-	-	-	-	-	-
			107		-	-	-	2.1	0.2	2.3	2.7	0.2	2.9	3.9	4.1
	9.	Sik <sup>/1</sup>	9		0.7	0.0	0.7	-	-	-	-	-	-	-	-
			108		-	-	-	1.2	0.2	1.4	1.5	0.2	1.7	2.2	2.4
	10.	Sg. Petani	10		-	-	-	-	-	-	-	-	-	-	-
			11		-	-	-	-	-	-	-	-	-	-	-
			12		-	-	-	-	-	-	-	-	-	-	-
			13		-	-	-	-	-	-	-	-	-	-	-
			14		-	-	-	-	-	-	-	-	-	-	-
			15		1.8	0.0	1.8	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0
			16/109		10.1	4.6	14.7	10.2	3.5	13.7	16.7	6.6	23.3	36.0	62.1
	11.	Kuala Ketil	110/10004		1.9	0.1	2.0	2.4	0.1	2.5	3.5	0.1	3.6	5.5	5.6
	12.	Baling	17		-	-	-	-	-	-	-	-	-	-	-
			18/112		2.0	0.0	2.0	0.6	0.0	0.6	0.8	0.0	0.8	1.1	1.1
			111		-	-	-	2.0	0.2	2.2	2.8	0.1	2.9	3.9	4.0
	13.	Kulim <sup>/2</sup>	113		-	-	-	0.9	0.5	1.4	2.0	0.9	2.9	9.5	9.5
			114/10005		0.6	0.6	1.2	0.7	0.2	0.9	1.2	0.0	1.2	1.8	1.8
	14.	Karangan	19		0.2	0.1	0.3	0.3	0.1	0.4	0.4	0.1	0.5	0.7	0.8
	Sub-total				35.8	11.5	47.3	47.5	14.2	61.7	72.1	24.0	96.1	158.7	230.1
P. Pinang	15.	Perai &			103.6	7.7	111.3	150.9	11.7	162.6	216.6	16.8	233.4	393.3	421.2
	16.	P. Pinang													
P.K.P. Total					145.3	20.4	165.7	205.6	27.7	233.3	296.5	43.8	340.3	566.3	677.0

Remarks; <sup>/1</sup>: The figures are assumed ones for the purpose of the water balance study.  
<sup>/2</sup>: Water Supply Region 13 is provided with 3.0 x 10<sup>6</sup> m<sup>3</sup>/y (1.8 mgd) of treated water by PWA.

Table 55 PROJECTED D&I WATER ABSTRACTION AT THE RIVER INTAKES BY PURPOSE UNDER THE CONDITION OF LOWER ECONOMIC GROWTH

Unit: 10<sup>6</sup> m<sup>3</sup>/y

State	No.	Water Supply Region	Intake No.	1982			1985			1990			2000		
				D	M	T	D	M	T	D	M	T	D	M	T
Perlis	1.	Kangar	1/101	4.7	2.4	7.1	4.8	3.4	8.2	6.0	3.3	9.3	9.1	6.1	15.2
			1001	-	-	-	-	-	-	-	-	-	-	-	-
			1002	-	-	-	-	-	-	-	-	-	-	-	-
			1003	-	-	-	-	-	-	-	-	-	-	-	-
	2.	Cuping	1004	-	-	-	-	-	-	-	-	-	-	-	-
Sub-total				4.7	2.4	7.1	4.8	3.4	8.2	6.0	3.3	9.3	9.1	6.1	15.2
Kedah	3.	Changlun	2/102	0.7	0.0	0.7	0.7	0.1	0.8	0.9	0.1	1.0	1.3	0.0	1.3
	4.	Alor Setar	3/103/5005/10001	9.5	7.1	16.6	10.4	8.9	19.3	13.7	12.2	25.9	19.3	19.5	38.8
			10002	1.2	0.0	1.2	1.5	0.1	1.6	2.9	0.1	3.0	4.7	0.1	4.8
	5.	Kuala Nerang	4/105	1.3	0.0	1.3	1.5	0.6	2.1	2.0	0.4	2.4	3.1	0.2	3.3
			104	-	-	-	0.1	0.0	0.1	0.2	0.0	0.2	0.2	0.0	0.2
	6.	Pendang	5	2.3	0.3	2.6	3.5	1.9	5.4	4.2	2.4	6.6	3.3	3.7	7.0
	7.	Jeneri	6	-	-	-	-	-	-	-	-	-	-	-	-
			7	-	-	-	-	-	-	-	-	-	-	-	-
			106	-	-	-	0.6	0.0	0.6	0.8	0.0	0.8	1.0	0.0	1.0
			10003	0.9	0.0	0.9	0.5	0.1	0.6	0.7	0.1	0.8	1.0	0.0	1.0
	8.	Jeniang <sup>/1</sup>	8	1.3	0.0	1.3	-	-	-	-	-	-	-	-	-
			107	-	-	-	1.6	0.4	2.0	2.1	0.3	2.4	3.0	0.2	3.2
	9.	Sik <sup>/1</sup>	9	0.7	0.0	0.7	-	-	-	-	-	-	-	-	-
			108	-	-	-	0.9	0.4	1.3	1.1	0.3	1.4	1.6	0.2	1.8
	10.	Sg. Petani	10	-	-	-	-	-	-	-	-	-	-	-	-
			11	-	-	-	-	-	-	-	-	-	-	-	-
			12	-	-	-	-	-	-	-	-	-	-	-	-
			13	-	-	-	-	-	-	-	-	-	-	-	-
			14	-	-	-	-	-	-	-	-	-	-	-	-
			15	1.8	0.0	1.8	1.9	0.1	2.0	1.9	0.1	2.0	2.0	0.0	2.0
			16/109	5.5	9.2	14.7	6.1	5.9	12.0	8.3	8.2	16.5	11.4	13.6	25.0
	11.	Kuala Ketil	110/10004	1.8	0.2	2.0	2.1	0.3	2.4	2.8	0.2	3.0	3.8	0.1	3.9
	12.	Baling	17	-	-	-	-	-	-	-	-	-	-	-	-
			18/112	2.0	0.0	2.0	0.5	0.1	0.6	0.6	0.1	0.7	0.8	0.0	0.8
			111	-	-	-	7.7	0.3	2.0	2.1	0.2	2.3	2.7	0.2	2.9
	13.	Kulim <sup>/2</sup>	113	-	-	-	0.8	0.0	0.8	1.5	0.1	1.6	2.9	0.1	3.0
			114/10005	1.0	0.2	1.2	0.7	0.0	0.7	1.0	0.1	1.1	1.3	0.0	1.3
	14.	Karangan	19	0.3	0.0	0.3	0.2	0.1	0.3	0.3	0.0	0.3	0.5	0.0	0.5
Sub-total				30.3	17.0	47.3	35.3	19.3	54.6	47.1	24.9	72.0	63.9	37.9	101.8
P. Pinang <sup>/3</sup>	15.	Perai &													
	16.	P. Pinang		53.0	58.3	111.3	60.1	86.8	146.9	69.9	115.6	185.5	111.2	182.0	293.2
P.K.P. Total				88.0	77.7	165.7	100.2	109.5	209.7	123.0	143.8	266.8	184.2	226.0	410.2

Remarks; <sup>/1</sup>: The figures are assumed ones for the purpose of the water balance study.  
<sup>/2</sup>: Water Supply Region 13 is provided with 3.0 x 10<sup>6</sup> m<sup>3</sup>/y (1.8 mgd) of treated water by PWA.  
<sup>/3</sup>: Since P. Pinang State can eventually be considered as one water supply area, no figure is given for each river intake in the Water Supply Region 15 and 16.

Table 56 PROJECTED D&I WATER ABSTRACTION AT RIVER INTAKES BY TYPE UNDER THE CONDITION OF LOWER ECONOMIC GROWTH

Unit:  $10^6 \text{ m}^3/\text{y}$

State	No.	Water Supply Region	Intake No.	1982			1985			1990			2000		
				Pub-lic	Pri-vate	T	Pub-lic	Pri-vate	T	Pub-lic	Pri-vate	T	Pub-lic	Pri-vate	T
Perlis	1.	Kangar	1/101	5.9	1.2	7.1	6.5	1.7	8.2	7.7	1.6	9.3	12.2	3.0	15.2
			1001	-	-	-	-	-	-	-	-	-	-	-	-
			1002	-	-	-	-	-	-	-	-	-	-	-	-
			1003	-	-	-	-	-	-	-	-	-	-	-	-
	2.	Cuping	1004	-	-	-	-	-	-	-	-	-	-	-	-
Sub-total				5.9	1.2	7.1	6.5	1.7	8.2	7.7	1.6	9.3	12.2	3.0	15.2
Kedah	3.	Changlun	2/102	0.7	0.0	0.7	0.8	0.0	0.8	1.0	0.0	1.0	1.3	0.0	1.3
	4.	Alor Setar	3/103/	11.3	5.3	16.6	12.8	6.5	19.3	17.4	8.5	25.9	26.3	12.5	38.8
			5005/10001	0.5	0.7	1.2	0.9	0.7	1.6	1.9	1.1	3.0	3.6	1.2	4.8
	5.	Kuala Nerang	4/105	1.3	0.0	1.3	1.8	0.3	2.1	2.2	0.2	2.4	3.2	0.1	3.3
			104	-	-	-	0.1	0.0	0.1	0.2	0.0	0.2	0.2	0.0	0.2
	6.	Pendang	5	2.5	0.1	2.6	4.5	0.9	5.4	5.4	1.2	6.6	5.2	1.8	7.0
	7.	Jeneri	6	-	-	-	-	-	-	-	-	-	-	-	-
			7	-	-	-	-	-	-	-	-	-	-	-	-
			106	-	-	-	0.6	0.0	0.6	0.8	0.0	0.8	1.0	0.0	1.0
			10003	0.9	0.0	0.9	0.6	0.0	0.6	0.8	0.0	0.8	1.0	0.0	1.0
	8.	Jeniang <sup>/1</sup>	8	1.3	0.0	1.3	-	-	-	-	-	-	-	-	-
			107	-	-	-	1.8	0.2	2.0	2.3	0.1	2.4	3.1	0.1	3.2
	9.	Sik <sup>/1</sup>	9	0.7	0.0	0.7	-	-	-	-	-	-	-	-	-
			108	-	-	-	1.1	0.2	1.3	1.3	0.1	1.4	1.7	0.1	1.8
	10.	Sg. Petani	10	-	-	-	-	-	-	-	-	-	-	-	-
			11	-	-	-	-	-	-	-	-	-	-	-	-
			12	-	-	-	-	-	-	-	-	-	-	-	-
			13	-	-	-	-	-	-	-	-	-	-	-	-
			14	-	-	-	-	-	-	-	-	-	-	-	-
			15	1.8	0.0	1.8	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0
			16/109	10.1	4.6	14.7	9.1	2.9	12.0	12.4	4.1	16.5	18.2	6.8	25.0
	11.	Kuala Ketil	110/10004	1.9	0.1	2.0	2.3	0.1	2.4	2.9	0.1	3.0	3.9	0.0	3.9
	12.	Baling	17	-	-	-	-	-	-	-	-	-	-	-	-
			18/112	2.0	0.0	2.0	0.6	0.0	0.6	0.7	0.0	0.7	0.8	0.0	0.8
			111	-	-	-	1.9	0.1	2.0	2.2	0.1	2.3	2.8	0.1	2.9
	13.	Kulim <sup>/2</sup>	113	-	-	-	0.4	0.4	0.8	1.1	0.5	1.6	2.2	0.8	3.0
			114/10005	0.6	0.6	1.2	0.5	0.2	0.7	0.9	0.2	1.1	1.3	0.0	1.3
	14.	Karangan	19	0.2	0.1	0.3	0.3	0.0	0.3	0.3	0.0	0.3	0.5	0.0	0.5
Sub-total				35.8	11.5	47.3	42.1	12.5	54.6	55.8	16.2	72.0	78.3	23.5	101.8
P. Pinang	15.	Perai &		103.6	7.7	111.3	135.9	11.0	146.9	172.0	13.5	185.5	274.1	19.1	293.2
	16.	P. Pinang													
P.K.P. Total				145.3	20.4	165.7	184.5	25.2	209.7	235.5	31.3	266.8	364.6	45.6	410.2

Remarks; <sup>/1</sup>: The figures are assumed ones for the purpose of the water balance study.  
<sup>/2</sup>: Water Supply Region 13 is provided with  $3.0 \times 10^6 \text{ m}^3/\text{y}$  (1.8 mgd) of treated water by PWA.

Table 57 COMPARISON OF POPULATION PRELIMINARILY  
PROJECTED BY MIDTERM REVIEW AND BY STUDY

Unit: 10<sup>3</sup>

Area	1980		1990		Growth Rate for 1980 - 1990 (%/y)	
	Midterm	Study	Midterm	Study	Midterm	Study
Perlis	148	157	173	191	1.57	1.98
Kedah	1,116	1,173	1,249	1,328	1.13	1.25
P/K	1,264	1,330	1,422	1,519	1.18	1.34
P. Pinang	955	970	1,105	1,133	1.47	1.57
P/K/P	2,219	2,300	2,527	2,652	1.31	1.43
Others	11,526	11,961	14,882	15,491	2.59	2.62
Malaysia	13,745	14,261	17,409	18,143	2.39	2.44

Table 58 COMPARISON OF GRP AND GDP PRELIMINARILY  
PROJECTED BY MIDTERM REVIEW AND BY STUDY

Unit: M\$10<sup>6</sup>

Area	1980		1990			Growth Rate for 1980 - 1990 (%/y)		
	Midterm	Study	Midterm	Case 1	Case 2	Midterm	Case 1	Case 2
Perlis/Kedah	1,500	1,422	2,300	3,177	2,646	4.37	8.37	6.41
P. Pinang	2,100	2,220	4,100	4,364	3,751	6.92	6.99	5.39
P/K/P	3,600	3,642	6,400	7,541	6,397	5.92	7.55	5.79
Others	22,600	21,758	40,500	47,359	36,903	6.01	8.09	5.43
Malaysia	26,200	25,400	46,900	54,900	43,300	6.00	8.01	5.48

Remarks; At factor cost in 1970 constant price.



Table 59      COMPARISON OF PER CAPITA GRP AND PER  
CAPITA GDP PRELIMINARILY PROJECTED  
BY MIDTERM REVIEW AND BY STUDY

Area	1980 (M\$)		1990 (M\$)			Growth Rate for 1980 - 90 (%/y)		
	Midterm	Study	Midterm	Case 1	Case 2	Midterm	Case 1	Case 2
Perlis/ Kedah	1,187	1,069	1,617	2,091	1,557	3.14	6.94	3.83
P. Pinang	2,199	2,289	3,710	3,852	2,994	5.37	5.34	2.72
P/K/P	1,622	1,583	2,533	2,844	2,412	4.56	6.03	4.30
Malaysia	1,906	1,781	2,694	3,024	2,387	3.52	5.44	2.97

Remarks; At factor cost in 1970 constant price

Table 60      UNIT DIRECT CONSTRUCTION COST FOR WATER MAINS

Diameter (mm)	Pipe & Valve	Civil Work	Unit: M\$/m
			Total
600	350	40	390
700	440	50	490
800	540	60	600
900	650	70	720
1,000	760	80	840
1,100	880	100	980
1,200	1,000	120	1,120
1,350	1,200	140	1,340
1,500	1,420	160	1,580
1,600	1,580	170	1,750
1,800	1,900	210	2,110

Remarks; (1): In 1982 end constant price  
(2): Excluding physical contingency

Table 61 DIRECT CONSTRUCTION COST FOR PUMP STATIONS

Item	Type									
	1	2	3	4	5	6	7	8	9	10
Discharge Q (m <sup>3</sup> /min)	10	10	50	50	50	100	100	100	200	200
Head H (m)	20	40	20	40	90	20	40	90	20	40
Motor capacity (kW)	50	100	230	550	1,250	480	980	2,200	1,100	1,850
Construction cost										
Pump cost (M\$10 <sup>3</sup> )	55	95	195	290	500	435	565	1,240	895	1,570
Civil cost (M\$10 <sup>3</sup> )	55	95	195	290	500	435	565	1,240	895	1,570
Total cost (M\$10 <sup>3</sup> )	110	190	390	580	1,000	870	1,130	2,480	1,790	3,140

Remarks; (1): In 1982 constant price  
(2): Excluding physical contingency

Table 62 UNIT LAND ACQUISITION COST

		Unit: M\$10 <sup>3</sup> /ha	
Classification	Cost	Classification	Cost
Irrigated paddy	30	Urban area class S	1,190
Rainfed paddy	18	Urban area class A	120
Tree crop field class A	18	Urban area class B	60
Tree crop field class B	12	Village area class A	60
Tree crop field class C	6	Village area class B	12
Forest class A	6		
Forest class B	1		

Remarks; (1): S = very good access      A = good access  
                  B = poor access                C = very poor access  
(2): In 1982 end constant price  
(3): Excluding physical contingency

Table 63      UNIT DIRECT CONSTRUCTION COST FOR DISTRIBUTION  
AND RETICULATION SYSTEMS

Unit: M\$/m

Diameter (mm)	Pipe & Valve	Civil Works	Total
100	45	10	55
150	65	10	75
200	80	15	95
250	100	20	120
300	130	20	150
350	160	25	185
400	190	30	220
450	220	30	260
500	255	45	300

Remarks; (1): In 1982 end constant price  
(2): Excluding physical contingency

Table 64 ESTIMATED CONSTRUCTION COST FOR  
PUBLIC WATER SUPPLY

Unit: M\$10<sup>6</sup>

State	Water Supply Region	4MP	5MP	6MP	7MP	Total
Perlis	1. Kangar	17.1	43.0	47.7	19.5	127.3
	2. Cuping	0.5	1.0	1.1	0.4	3.0
	Perlis Total	17.6	44.0	48.8	19.9	130.3
Kedah	3. Changlun	2.1	3.1	2.4	1.0	8.6
	4. Alor-Setar	53.2	135.2	150.3	60.8	399.5
	5. Kuala Nerang	5.7	9.5	7.6	3.2	26.0
	6. Pendang	13.7	29.5	30.0	12.2	85.4
	7. Jeneri	4.5	6.8	5.2	2.2	18.7
	8. Jeniang	4.2	7.1	5.8	2.4	19.5
	9. Sik	2.6	4.4	3.4	1.4	11.8
	10. Sg. Petani	24.8	70.9	82.9	33.4	212.0
	11. Kuala Ketil	5.6	10.0	9.3	3.9	28.8
	12. Baling	7.7	12.1	9.7	4.0	33.5
	13. Kulim	8.4	19.2	20.0	8.1	55.7
	14. Karangan	0.6	1.0	0.8	0.3	2.7
	Kedah Total	133.1	308.8	327.4	132.9	902.2
P. Pinang	15. Perai	118.6	293.1	323.8	129.5	865.0
	16. P. Pinang	75.8	198.6	225.7	90.3	590.4
	P. Pinang Total	194.4	491.7	549.5	219.8	1,455.5
P.K.P. Total		345.1	844.5	925.7	372.6	2,488.0

Remarks; (1): In 1982 constant price  
(2): Public water supply by PWD, PWA and RESP (MOH)

Table 65 ESTIMATED O&amp;M COST FOR PUBLIC WATER SUPPLY

Unit: M\$10<sup>6</sup>

State	Water supply Region	4MP	5MP	6MP	7MP	Total
Perlis	1. Kangar	0	2.2	6.5	11.3	20.0
	2. Cuping	0	0.1	0.2	0.3	0.6
	Perlis Total	0	2.3	6.7	11.6	20.6
Kedah	3. Changlun	0	0.3	0.6	0.8	1.7
	4. Alor-Setar	0	6.7	20.2	35.3	62.2
	5. Kuala Nerang	0	0.7	1.7	2.4	4.8
	6. Pendang	0	1.7	4.7	7.7	14.1
	7. Jeneri	0	0.6	1.2	1.8	3.6
	8. Jeniang	0	0.5	1.2	1.8	3.5
	9. Sik	0	0.3	0.8	1.1	2.2
	10. Sg. Petani	0	3.1	10.2	18.5	31.8
	11. Kuala Ketil	0	0.7	1.7	2.7	5.1
	12. Baling	0	1.0	2.2	3.2	6.4
	13. Kulim	0	1.1	3.0	5.0	9.1
	14. Karangan	0	0.1	0.2	0.3	0.6
	Kedah Total	0	16.8	47.7	80.6	145.1
P. Pinang	15. Perai	0	14.8	44.1	76.5	135.4
	16. P. Pinang	0	9.5	29.3	51.9	90.7
	P. Pinang Total	0	24.3	73.4	128.4	226.1
P.K.P. Total		0	43.4	127.8	220.6	391.8

Remarks; (1): In 1982 constant price

(2): Public water supply by PWD, PWS and RESP (MOH)

Table 66 ESTIMATED CONSTRUCTION COST FOR PUBLIC  
WATER SUPPLY UNDER THE CONDITION OF  
LOWER ECONOMIC GROWTH

Unit: M\$10<sup>6</sup>

State	Water Supply Region	4MP	5MP	6MP	7MP	Total
Perlis	1. Kangar	12.3	23.7	22.2	9.2	67.4
	2. Cuping	0.0	0.5	0.9	0.3	1.7
	Perlis Total	12.3	24.2	23.1	9.5	69.1
Kedah	3. Changlun	1.6	2.7	2.1	0.9	7.3
	4. Alor-Setar	34.3	61.2	53.9	22.2	171.6
	5. Kuala Nerang	5.3	8.6	6.8	2.9	23.6
	6. Pendang	10.3	17.2	14.6	6.0	48.1
	7. Jeneri	4.0	6.0	4.5	1.9	16.4
	8. Jeniang	3.6	5.7	4.8	2.1	16.2
	9. Sik	2.2	3.8	2.9	1.2	10.1
	10. Sg. Petani	15.6	27.8	24.2	9.8	77.4
	11. Kuala Ketil	4.4	7.4	6.0	2.5	20.3
	12. Baling	6.4	10.1	7.7	3.2	27.4
	13. Kulim	5.8	9.1	7.1	2.9	24.9
	14. Karangan	0.4	0.7	0.6	0.2	1.9
	Kedah Total	93.9	160.3	135.2	55.8	445.2
P. Pinang	15. Perai	74.1	185.9	206.6	82.7	549.3
	16. P. Pinang	41.5	104.9	117.1	46.9	310.4
	P. Pinang Total	115.6	290.8	323.7	129.6	859.7
P.K.P. Total		221.8	475.3	482.0	194.9	1,374.0

Remarks; (1): In 1982 constant price  
(2): Public water supply by PWD, PWA and RESP (MOH)

Table 67 ESTIMATED O&M COST FOR PUBLIC WATER SUPPLY  
UNDER THE CONDITION OF LOWER ECONOMIC GROWTH

Unit: M\$10<sup>6</sup>

State	Water Supply Region	4MP	5MP	6MP	7MP	Total
Perlis	1. Kangar	0.0	1.6	3.9	6.2	11.7
	2. Cuping	0.0	0.0	0.1	0.1	0.2
	Perlis Total	0.0	1.6	4.0	6.3	11.9
Kedah	3. Changlun	0.0	0.2	0.5	0.7	1.4
	4. Alor-Setar	0.0	4.3	10.5	15.9	30.7
	5. Kuala Nerang	0.0	0.7	1.5	2.2	4.4
	6. Pendang	0.0	1.3	3.0	4.5	8.8
	7. Jeneri	0.0	0.5	1.1	1.6	3.2
	8. Jeniang	0.0	0.5	1.0	1.5	3.0
	9. Sik	0.0	0.3	0.7	0.9	1.9
	10. Sg. Petani	0.0	2.0	4.7	7.2	13.9
	11. Kuala Ketil	0.0	0.6	1.3	1.9	3.8
	12. Baling	0.0	0.8	1.8	2.6	5.2
	13. Kulim	0.0	0.7	1.6	2.4	4.7
	14. Karangan	0.0	0.1	0.1	0.2	0.4
	Kedah Total	0.0	12.0	27.8	41.6	81.4
P. Pinang	15. Perai	0.0	9.3	27.9	48.5	85.7
	16. P. Pinang	0.0	5.2	15.7	27.4	48.3
	P. Pinang Total	0.0	14.5	43.6	75.9	134.0
P.K.P. Total		0.0	28.1	75.4	123.8	227.3

Remarks; (1): In 1982 constant price  
(2): Public water supply by PWD, PWA and RESP (MOH)

Table 68 ESTIMATED CONSTRUCTION COST FOR  
PRIVATE WATER SUPPLY

Unit: M\$10<sup>6</sup>

State	Water Supply Region	4MP	5MP	6MP	7MP	Total
Perlis	1. Kangar	11.6	53.7	73.4	29.3	168.0
	2. Cuping	0.0	0.0	0.0	0.0	0.0
	Perlis Total	11.6	53.7	73.4	29.3	168.0
Kedah	3. Changlun	0.0	0.0	0.0	0.0	0.0
	4. Alor-Setar	43.9	187.8	252.0	100.8	584.5
	5. Kuala Nerang	0.0	0.0	0.0	0.0	0.0
	6. Pendang	7.3	32.0	43.3	17.3	99.9
	7. Jeneri	0.0	0.0	0.0	0.0	0.0
	8. Jeniang	0.0	0.0	0.0	0.0	0.0
	9. Sik	0.0	0.0	0.0	0.0	0.0
	10. Sg. Petani	28.2	125.4	169.9	67.9	291.4
	11. Kuala Ketil	0.0	0.0	0.0	0.0	0.0
	12. Baling	0.0	0.0	0.0	0.0	0.0
	13. Kulim	3.2	13.5	18.0	7.2	41.9
	14. Karangan	0.0	0.0	0.0	0.0	0.0
	Kedah Total	82.6	358.7	483.2	193.2	1,117.7
P. Pinang	15. Perai	107.3	234.6	242.0	96.8	680.7
	16. P. Pinang	72.7	169.8	182.1	72.8	497.4
	P. Pinang Total	180.0	404.4	424.1	169.6	1,178.1
P.K.P. Total		274.2	816.8	980.7	392.1	2,463.8

Remarks; (1): In 1982 constant price



Table 69 ESTIMATED O&amp;M COST FOR PRIVATE WATER SUPPLY

Unit: M\$10<sup>6</sup>

State	Water Supply Region	4MP	5MP	6MP	7MP	Total
Perlis	1. Kangar	0	1.5	6.8	14.2	22.5
	2. Cuping	0	0	0	0	0
	Perlis Total	0	1.5	6.8	14.2	22.5
Kedah	3. Changlun	0	0	0	0	0
	4. Alor-Setar	0	5.5	24.3	49.5	79.3
	5. Kuala Nerang	0	0	0	0	0
	6. Pendang	0	0.9	4.1	8.4	13.4
	7. Jeneri	0	0	0	0	0
	8. Jeniang	0	0	0	0	0
	9. Sik	0	0	0	0	0
	10. Sg. Petani	0	3.5	16.1	33.0	52.6
	11. Kuala Ketil	0	0	0	0	0
	12. Baling	0	0	0	0	0
	13. Kulim	0	0.4	1.8	3.6	5.8
	14. Karangan	0	0	0	0	0
	Kedah Total	0	10.3	46.3	94.5	151.1
P. Pinang	15. Perai	0	13.4	36.9	61.1	111.4
	16. P. Pinang	0	9.1	26.1	44.3	79.5
	P. Pinang Total	0	22.5	63.0	105.4	190.9
P.K.P. Total		0	34.3	116.1	214.1	364.5

Remarks; (1): In 1982 constant price

Table 70 ESTIMATED CONSTRUCTION COST FOR PRIVATE  
WATER SUPPLY UNDER THE CONDITION OF  
LOWER ECONOMIC GROWTH

Unit: M\$10<sup>6</sup>

State	Water Supply Region	4MP	5MP	6MP	7MP	Total
Perlis	1. Kangar	4.1	11.2	12.8	5.1	33.2
	2. Cuping	0.0	0.0	0.0	0.0	0.0
	Perlis Total	4.1	11.2	12.8	5.1	33.2
Kedah	3. Changlun	0.0	0.0	0.0	0.0	0.0
	4. Alor-Setar	17.6	38.2	39.2	15.7	110.7
	5. Kuala Nerang	0.0	0.0	0.0	0.0	0.0
	6. Pendang	2.9	6.5	6.8	2.7	18.9
	7. Jeneri	0.0	0.0	0.0	0.0	0.0
	8. Jeniang	0.0	0.0	0.0	0.0	0.0
	9. Sik	0.0	0.0	0.0	0.0	0.0
	10. Sg. Petani	11.3	24.6	25.2	10.1	71.2
	11. Kuala Ketil	0.0	0.0	0.0	0.0	0.0
	12. Baling	0.0	0.0	0.0	0.0	0.0
	13. Kulim	1.1	2.7	3.0	1.2	8.0
	14. Karangan	0.0	0.0	0.0	0.0	0.0
	Kedah Total	32.9	72.0	74.2	29.7	208.8
P. Pinang	15. Perai	57.3	125.5	129.6	51.9	364.3
	16. P. Pinang	39.7	94.3	102.1	40.8	276.9
	P. Pinang Total	97.0	219.8	231.7	92.7	641.2
P.K.P. Total		134.0	303.0	318.7	127.5	883.2

Remarks; (1): In 1982 constant price

Table 71 ESTIMATED O&M COST FOR PRIVATE WATER SUPPLY  
UNDER THE CONDITION OF LOWER ECONOMIC GROWTH

Unit: M\$10<sup>6</sup>

State	Water Supply Region	4MP	5MP	6MP	7MP	Total
Perlis	1. Kangar	0.0	0.5	1.6	2.9	5.0
	2. Cuping	0.0	0.0	0.0	0.0	0.0
	Perlis Total	0.0	0.5	1.6	2.9	5.0
Kedah	3. Changlun	0.0	0.0	0.0	0.0	0.0
	4. Alor-Setar	0.0	2.2	6.0	9.9	18.1
	5. Kuala Nerang	0.0	0.0	0.0	0.0	0.0
	6. Pendang	0.0	0.4	1.0	1.7	3.1
	7. Jeneri	0.0	0.0	0.0	0.0	0.0
	8. Jeniang	0.0	0.0	0.0	0.0	0.0
	9. Sik	0.0	0.0	0.0	0.0	0.0
	10. Sg. Petani	0.0	1.4	3.9	6.4	11.7
	11. Kuala Ketil	0.0	0.0	0.0	0.0	0.0
	12. Baling	0.0	0.0	0.0	0.0	0.0
	13. Kulim	0.0	0.1	0.4	0.7	1.2
	14. Karangan	0.0	0.0	0.0	0.0	0.0
	Kedah	0.0	4.1	11.3	18.7	34.1
P. Pinang	15. Perai	0.0	7.2	19.7	32.7	59.6
	16. P. Pinang	0.0	5.0	14.4	24.6	44.0
	P. Pinang Total	0.0	12.2	34.1	57.3	103.6
P.K.P. Total		0.0	16.8	47.0	78.9	142.7

Remarks; (1): In 1982 constant price

Table 72 ESTIMATED OVERALL ECONOMIC CONSTRUCTION  
COST FOR WATER SUPPLY

Unit: M\$10<sup>6</sup>

State	Water Supply Region	4MP	5MP	6MP	7MP	Total
Perlis	1. Kangar	23.2	78.3	98.0	39.9	239.4
	2. Cuping	0.4	0.8	0.9	0.3	2.4
	Perlis Total	23.6	79.1	98.9	40.2	241.8
Kedah	3. Changlun	1.7	2.5	2.1	1.0	7.3
	4. Alor-Setar	78.2	260.9	323.8	130.9	793.8
	5. Kuala Nerang	4.7	8.0	6.6	2.9	22.2
	6. Pendang	16.9	49.7	59.0	23.9	149.5
	7. Jeneri	3.6	5.5	4.4	1.9	15.4
	8. Jeniang	3.4	6.1	4.8	2.1	16.4
	9. Sik	2.2	3.9	3.0	1.3	10.4
	10. Sq. Petani	42.6	158.2	202.9	81.6	485.3
	11. Kuala Ketil	4.5	8.2	8.1	3.7	24.5
	12. Baling	6.1	9.7	8.2	3.6	27.6
	13. Kulim	9.4	20.5	22.7	9.4	62.0
	14. Karangan	0.5	0.8	0.6	0.3	2.2
	Kedah Total	173.8	534.0	646.2	262.6	1,616.6
P. Pinang	15. Perai	180.8	422.2	452.6	181.1	1,236.7
	16. P. Pinang	118.8	294.7	326.3	130.5	870.3
	P. Pinang Total	299.6	716.9	778.9	311.6	2,107.0
P.K.P. Total		497.0	1,330.0	1,524.0	614.4	3,965.4

Remarks; Overall cost comprises public water supply cost and private water supply cost.

Table 73 ESTIMATED OVERALL ECONOMIC CONSTRUCTION COST  
FOR WATER SUPPLY UNDER THE CONDITION OF  
LOWER ECONOMIC GROWTH

Unit: M\$10<sup>6</sup>

State	Water Supply Region	4MP	5MP	6MP	7MP	Total
Perlis	1. Kangar	13.3	28.8	28.9	12.1	83.1
	2. Cuping	0.0	0.4	0.7	0.3	1.4
	Perlis Total	13.3	29.2	29.6	12.4	84.5
Kedah	3. Changlun	1.4	2.6	1.9	0.9	6.8
	4. Alor-Setar	41.8	81.3	76.5	31.9	231.5
	5. Kuala Nerang	4.3	7.3	5.9	2.7	20.2
	6. Pendang	10.5	20.7	20.0	8.2	59.4
	7. Jeneri	3.2	4.8	3.9	1.7	13.9
	8. Jeniang	2.9	4.7	4.3	2.0	8.4
	9. Sik	1.8	3.4	2.3	0.9	8.5
	10. Sg. Petani	21.7	42.7	40.0	16.2	120.6
	11. Kuala Ketil	3.6	6.3	5.1	2.2	17.2
	12. Baling	5.2	8.5	6.6	2.9	23.2
	13. Kulim	5.6	9.5	8.3	3.5	26.9
	14. Karangan	0.4	0.6	0.5	0.2	1.7
	Kedah Total	102.4	192.4	175.3	73.3	543.4
P. Pinang	15. Perai	105.2	249.5	269.2	107.8	731.7
	16. P. Pinang	65.0	159.8	175.5	70.4	470.7
	P. Pinang Total	170.2	409.3	444.7	178.2	1,202.4
P.K.P. Total		285.9	630.9	649.6	263.9	1,830.3

Remarks; Overall cost comprises public water supply cost and private water supply cost.

Table 74 ESTIMATED OVERALL ECONOMIC O&M COST  
FOR WATER SUPPLY

Unit: M\$10<sup>6</sup>

State	Water Supply Region	4MP	5MP	6MP	7MP	Total
Perlis	1. Kangar	0.0	3.0	10.8	20.6	34.4
	2. Cuping	0.0	0.1	0.1	0.2	0.4
	Perlis Total	0.0	3.1	10.9	20.8	34.8
Kedah	3. Changlun	0.0	0.2	0.5	0.7	1.4
	4. Alor-Setar	0.0	9.9	36.0	68.4	114.3
	5. Kuala Nerang	0.0	0.6	1.4	2.1	4.1
	6. Pendang	0.0	2.1	7.1	13.0	22.2
	7. Jeneri	0.0	0.5	1.0	1.5	3.0
	8. Jeniang	0.0	0.5	1.0	1.5	3.0
	9. Sik	0.0	0.3	0.7	1.0	2.0
	10. Sg. Petani	0.0	5.4	21.2	41.5	68.1
	11. Kuala Ketil	0.0	0.6	1.4	2.2	4.2
	12. Baling	0.0	0.8	1.8	2.6	5.2
	13. Kulim	0.0	1.2	3.8	6.9	11.9
	14. Karangan	0.0	0.1	0.1	0.2	0.4
	Kedah Total	0.0	22.2	76.0	141.6	239.8
P. Pinang	15. Perai	0.0	22.6	64.8	110.1	197.5
	16. P. Pinang	0.0	14.9	44.0	76.9	135.8
	P. Pinang Total	0.0	37.5	108.8	187.0	333.3
P.K.P. Total		0.0	62.8	195.7	349.4	607.8

Remarks; Overall cost comprises public water supply cost and private water supply cost.

Table 75 ESTIMATED OVERALL ECONOMIC O&M COST FOR  
WATER SUPPLY UNDER THE CONDITION OF  
LOWER ECONOMIC GROWTH

Unit: M\$10<sup>6</sup>

State	Water Supply Region	4MP	5MP	6MP	7MP	Total
Perlis	1. Kangar	0.0	1.7	4.6	7.5	13.8
	2. Cuping	0.0	0.0	0.0	0.1	0.1
	Perlis Total	0.0	1.7	4.6	7.6	13.9
Kedah	3. Changlun	0.0	0.2	0.4	0.6	1.2
	4. Alor-Setar	0.0	5.3	13.5	21.1	39.9
	5. Kuala Nerang	0.0	0.6	1.3	1.9	3.8
	6. Pendang	0.0	1.3	3.4	5.4	10.1
	7. Jeneri	0.0	0.4	0.9	1.3	2.6
	8. Jeniang	0.0	0.4	0.9	1.3	2.6
	9. Sik	0.0	0.3	0.6	0.8	1.7
	10. Sg. Petani	0.0	2.8	7.0	11.0	20.8
	11. Kuala Ketil	0.0	0.5	1.1	1.6	3.2
	12. Baling	0.0	0.7	1.5	2.2	4.4
	13. Kulim	0.0	0.7	1.7	2.5	4.9
	14. Karangan	0.0	0.0	0.1	0.2	0.3
	Kedah	0.0	13.2	32.4	49.9	95.5
P. Pinang	15. Perai	0.0	13.2	38.1	65.0	116.3
	16. P. Pinang	0.0	8.2	24.1	41.7	74.0
	P. Pinang Total	0.0	21.4	62.2	106.7	190.3
P.K.P. Total		0.0	36.3	99.2	164.2	299.7

Remarks; Overall cost comprises public water supply cost and private water supply cost.

Table 76 CLASSIFICATION OF MANPOWER

Grade	Category	Grade	Category
A	Engineer, Superscale F	C	Stenographer
	Engineer, Superscale G		Clerk
	Engineer, Senior Timescale		Storekeeper
	Engineer, Timescale	D	
	Quantity Surveyor		Typist
B	Technical Assistant, Special Grade		Junior Clerk
	Technical Assistant, Timescale		Junior Storekeeper
C	Special Grade Technician		Office Boy
	Timescale Technician		Drivers
	Draftsman Grade I		I.M.G.
	Draftsman Grade II		

Table 77 UNIT MANPOWER REQUIREMENT

Grade	O&M <sup>/1</sup>	Construction <sup>/2</sup>
A	1.0	2
B	1.5	2
C	7.5	2
D	60.0	2

Remarks; /1: Persons per every  $100 \times 10^3 \text{ m}^3/\text{d}$  of  
source demand  
/2: Persons per every  $100 \times 10^3 \text{ m}^3/\text{d/y}$



Table 78 ESTIMATED MANPOWER REQUIREMENT FOR PUBLIC  
WATER SUPPLY FOR PERLIS STATE

Unit: Persons				
Category	4MP	5MP	6MP	7MP
<u>Construction</u>				
Engineer	4	4	4	4
Technical Assistant	4	4	4	4
Technician	4	4	4	4
Others	4	4	4	4
Total Government Staff	16	16	16	16
<u>O &amp; M</u>				
Engineer	0	2	2	2
Technical Assistant	0	3	3	3
Technician	0	15	15	15
Others	0	120	120	120
Total Government Staff	0	140	140	140

Remarks; (1): Requirements for the recommended facilities only  
 (2): Manpower requirement for O&M is that at the end  
 of each Malaysia Plan.  
 (3): Including PWD and RESP (MOH) water supply

Table 79 ESTIMATED MANPOWER REQUIREMENT FOR PUBLIC  
WATER SUPPLY FOR KEDAH STATE

Unit: Persons				
Category	4MP	5MP	6MP	7MP
<u>Construction</u>				
Engineer	24	24	24	24
Technical Assistant	24	24	24	24
Technician	24	24	24	24
Others	24	24	24	24
Total Government Staff	96	96	96	96
<u>O &amp; M</u>				
Engineer	0	12	12	14
Technical Assistant	0	18	18	21
Technician	0	90	90	105
Others	0	720	720	840
Total Government Staff	0	840	840	980

- Remarks; (1): Requirements for the recommended facilities only  
 (2): Manpower requirement for O&M is that at the end of each Malaysia Plan.  
 (3): Including PWD and RESP (MOH) water supply

Table 80 ESTIMATED MANPOWER REQUIREMENT FOR PUBLIC  
WATER SUPPLY FOR P. PINANG STATE

Unit: Persons				
Category	4MP	5MP	6MP	7MP
<u>Construction</u>				
Engineer	4	4	4	4
Technical Assistant	4	4	4	4
Technician	4	4	4	4
Others	4	4	4	4
Total Government Staff	16	16	16	16
<u>O &amp; M</u>				
Engineer	0	3	5	7
Technical Assistant	0	5	8	11
Technician	0	23	38	53
Others	0	180	300	420
Total Government Staff	0	211	351	491

- Remarks; (1): Requirements for the recommended facilities only  
 (2): Manpower requirement for O&M is that at the end of each Malaysia Plan.  
 (3): Including PWA and RESP (MOH) water supply

Table 81 ESTIMATED MANPOWER REQUIREMENT FOR PUBLIC  
WATER SUPPLY FOR THE STUDY AREA

Category	Unit: Persons			
	4MP	5MP	6MP	7MP
<u>Construction</u>				
Engineer	32	32	32	32
Technical Assistant	32	32	32	32
Technician	32	32	32	32
Others	32	32	32	32
Total Government Staff	128	128	128	128
<u>O &amp; M</u>				
Engineer	0	17	19	23
Technical Assistant	0	26	29	35
Technician	0	128	143	173
Others	0	1,020	1,140	1,380
Total Government Staff	0	1,191	1,331	1,611

- Remarks; (1): Requirements for the recommended facilities only  
 (2): Manpower requirement for O&M is that at the end of each Malaysia Plan.  
 (3): Including PWD, PWA and RESP (MOH) water supply

Table 82 ESTIMATED MANPOWER REQUIREMENT FOR PUBLIC  
WATER SUPPLY FOR PERLIS STATE UNDER THE  
CONDITION OF LOWER ECONOMIC GROWTH

Category	Unit: Persons			
	4MP	5MP	6MP	7MP
<u>Construction</u>				
Engineer	4	4	4	4
Technical Assistant	4	4	4	4
Technician	4	4	4	4
Others	4	4	4	4
Total Government Staff	16	16	16	16
<u>O &amp; M</u>				
Engineer	0	2	2	2
Technical Assistant	0	3	3	3
Technician	0	15	15	15
Others	0	120	120	120
Total Government Staff	0	140	140	140

- Remarks; (1): Requirements for the recommended facilities only  
(2): Manpower requirement for O&M is that at the end of each Malaysia Plan.  
(3): Including PWD and RESP (MOH) water supply

Table 83 ESTIMATED MANPOWER REQUIREMENT FOR PUBLIC  
WATER SUPPLY FOR KEDAH STATE UNDER THE  
CONDITION OF LOWER ECONOMIC GROWTH

Category	Unit: Persons			
	4MP	5MP	6MP	7MP
<u>Construction</u>				
Engineer	24	24	24	24
Technical Assistant	24	24	24	24
Technician	24	24	24	24
Others	24	24	24	24
Total Government Staff	96	96	96	96
<u>O &amp; M</u>				
Engineer	0	12	12	12
Technical Assistant	0	18	18	18
Technician	0	90	90	90
Others	0	720	720	720
Total Government Staff	0	840	840	840

Remarks; (1): Requirements for the recommended facilities only  
 (2): Manpower requirement for O&M is that at the end  
 of each Malaysia Plan.  
 (3): Including PWD and RESP (MOH) water supply

Table 84 ESTIMATED MANPOWER REQUIREMENT FOR PUBLIC  
WATER SUPPLY FOR P. PINANG STATE UNDER  
THE CONDITION OF LOWER ECONOMIC GROWTH

Unit: Persons				
Category	4MP	5MP	6MP	7MP
<u>Construction</u>				
Engineer	4	4	4	4
Technical Assistant	4	4	4	4
Technician	4	4	4	4
Others	4	4	4	4
Total Government Staff	16	16	16	16
<u>O &amp; M</u>				
Engineer	0	2	3	5
Technical Assistant	0	3	5	8
Technician	0	15	23	38
Others	0	120	180	300
Total Government Staff	0	140	211	351

- Remarks; (1): Requirements for the recommended facilities only  
 (2): Manpower requirement for O&M is that at the end  
 of each Malaysia Plan.  
 (3): Including PWA and RESP (MOH) water supply

Table 85      ESTIMATED MANPOWER REQUIREMENT FOR PUBLIC  
WATER SUPPLY FOR THE STUDY AREA UNDER THE  
CONDITION OF LOWER ECONOMIC GROWTH

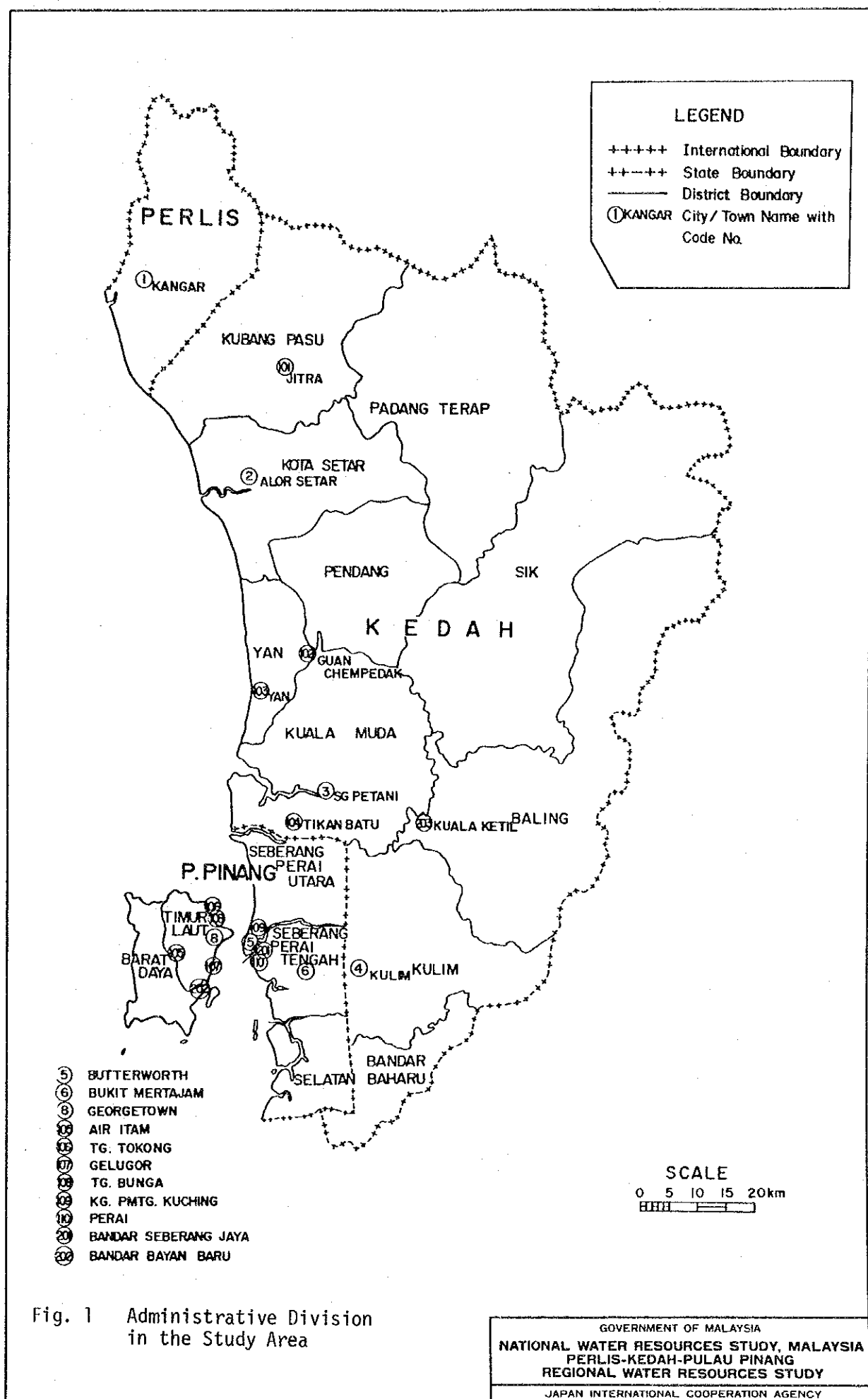
Category	Unit: Persons			
	4MP	5MP	6MP	7MP
<u>Construction</u>				
Engineer	32	32	32	32
Technical Assistant	32	32	32	32
Technician	32	32	32	32
Others	32	32	32	32
Total Government Staff	128	128	128	128
<u>O &amp; M</u>				
Engineer	0	16	17	19
Technical Assistant	0	24	26	29
Technician	0	120	128	143
Others	0	960	1,020	1,140
Total Government Staff	0	1,120	1,191	1,331

- Remarks; (1): Requirements for the recommended facilities only  
 (2): Manpower requirement for O&M is that at the end  
 of each Malaysia Plan.  
 (3): Including PWD, PWA and RESP (MOH) water supply



## ***FIGURES***





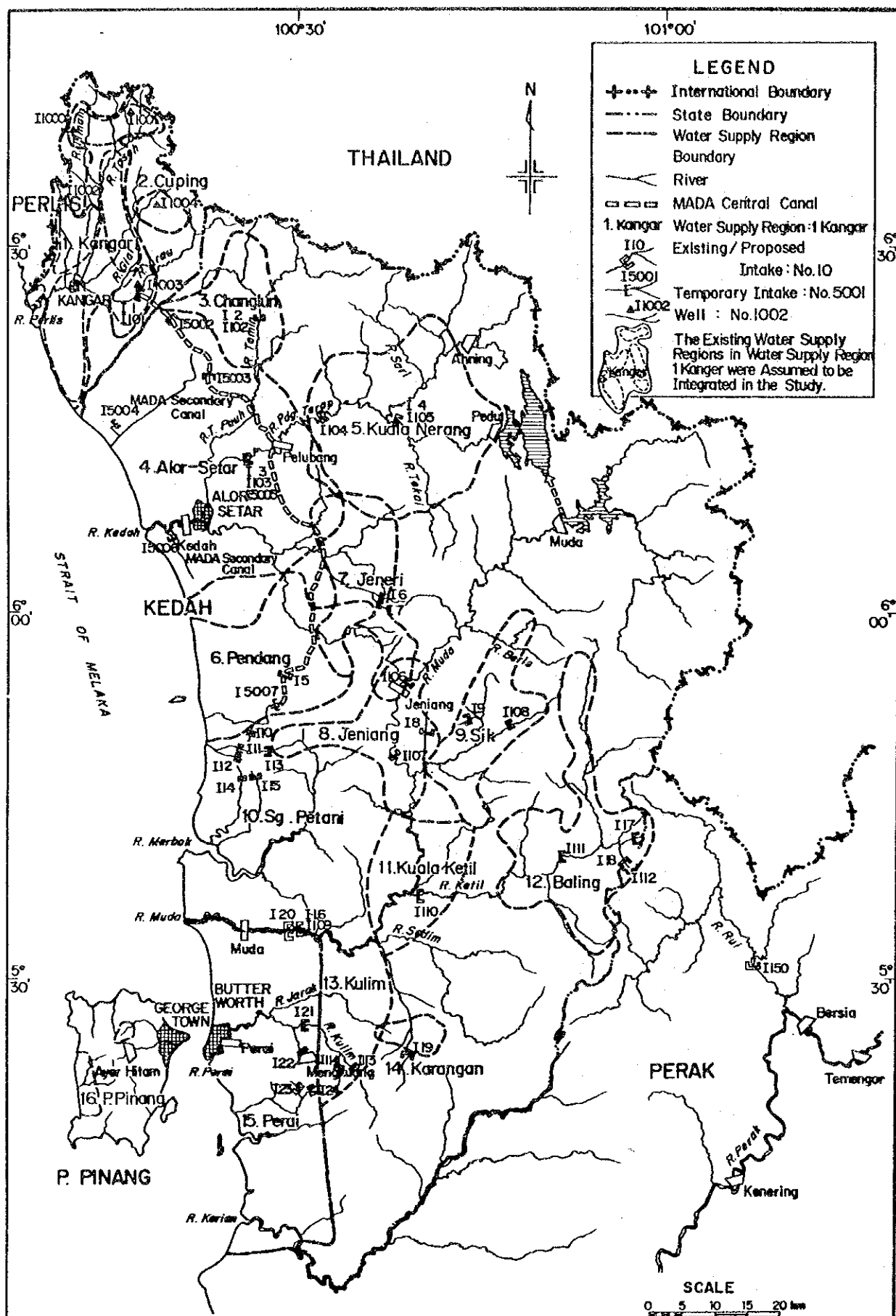


Fig. 2 Water Supply Regions and Existing/Proposed Water Intakes in Study Area

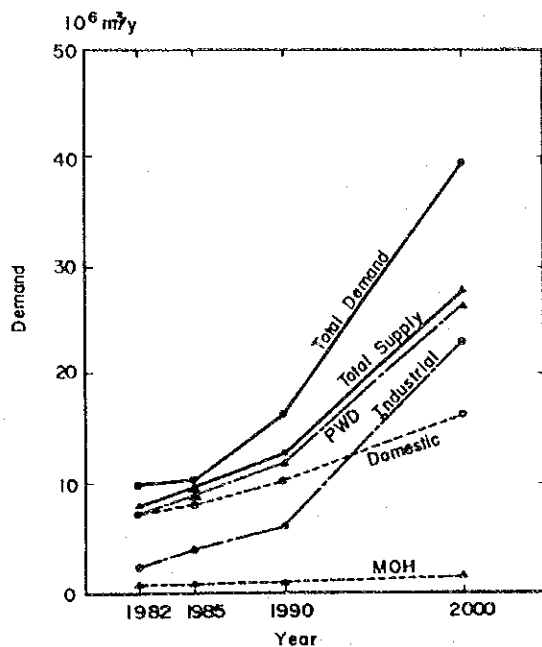


Fig. 3 Projected D&I Water Demand and Public Water Supply for Perlis State

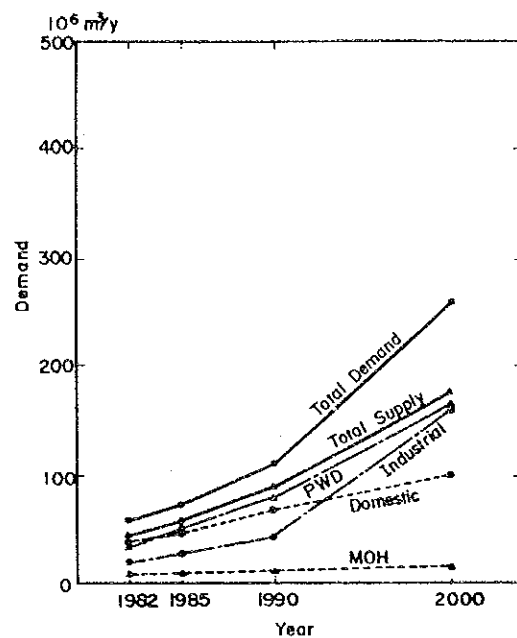


Fig. 4 Projected D&I Water Demand and Public Water Supply for Kedah State

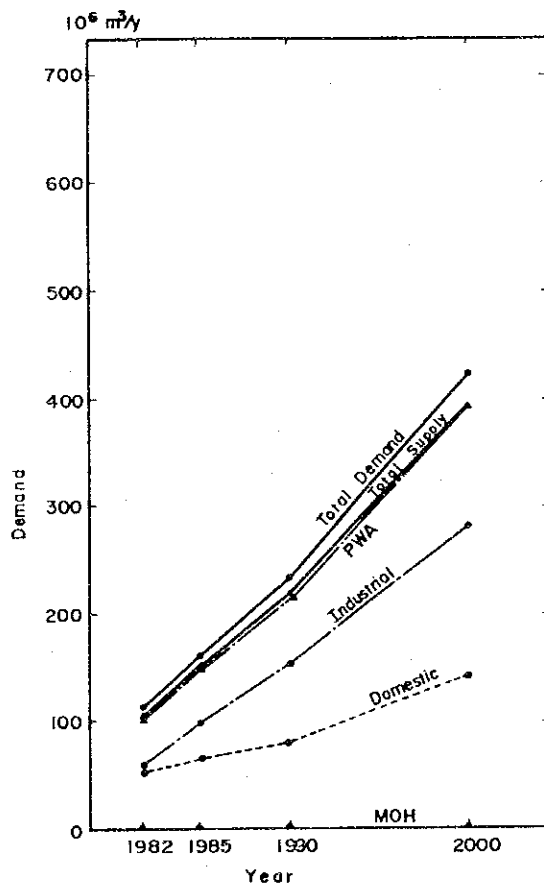


Fig. 5 Projected D&I Water Demand and Public Water Supply for P. Pinang State

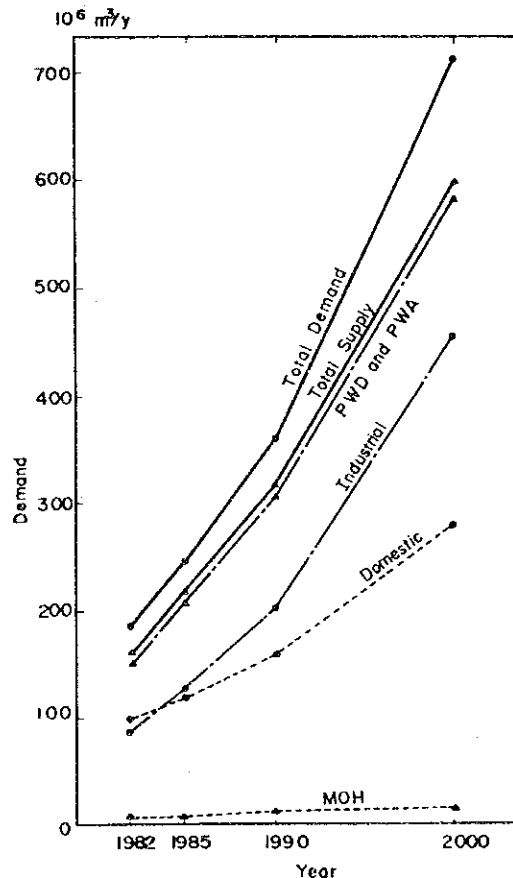


Fig. 6 Projected D&I Water Demand and Public Water Supply for the Study Area

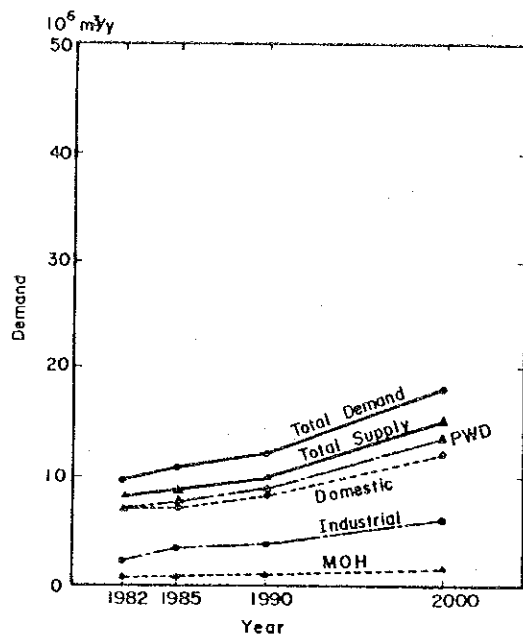


Fig. 7 Projected D&I Water Demand and Public Water Supply for Perlis State under the Condition of Lower Economic Growth

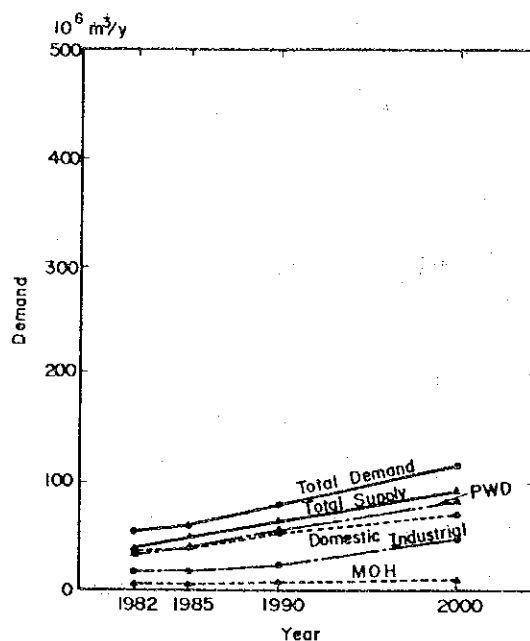


Fig. 8 Projected D&I Water Demand and Public Water Supply for Kedah State under the Condition of Lower Economic Growth

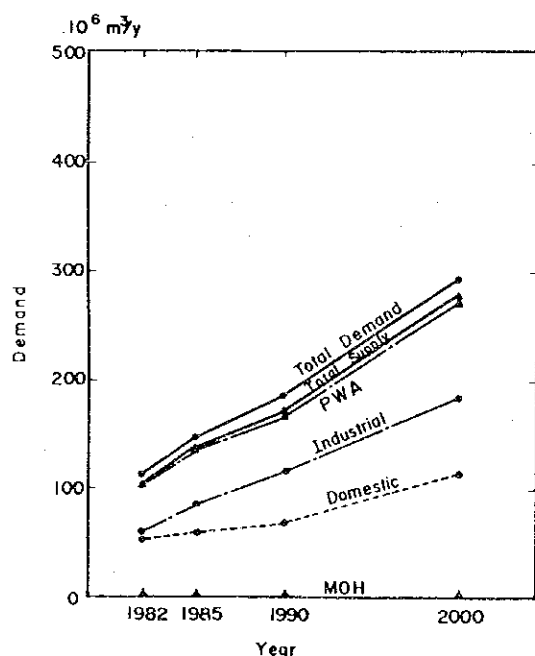


Fig. 9 Projected D&I Water Demand and Public Water Supply for P. Pinang State Under the Condition of Lower Economic Growth

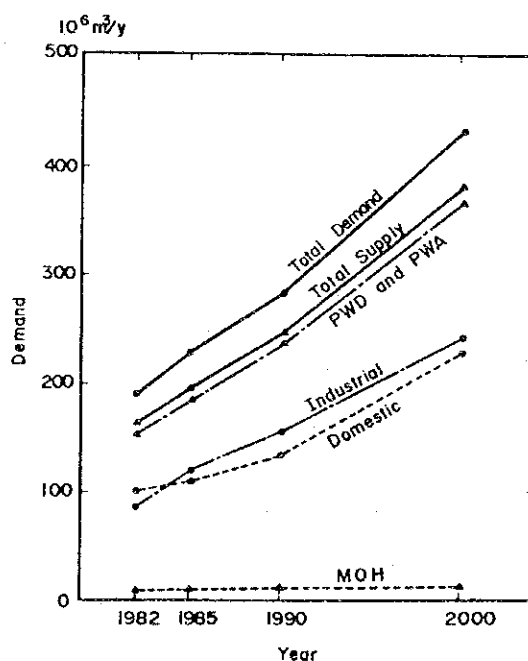


Fig. 10 Projected D&I Water Demand and Public Water Supply for Study Area Under the Condition of Lower Economic Growth



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