

TABLES
SECTOR VII
SOCIO-ECONOMY

TABLE VII.I.1.1 GROSS DOMESTIC PRODUCT (GDP) AND GROSS NATIONAL PRODUCT (GNP)
1988 - 1993

Items	1988	1989	1990	1991	1992	1993	Average Annual
							Growth Rate (%) 1988-1993
A. at Current Prices							
GDP (RM Million)	90,861	102,587	115,828	129,559	147,784	163,039	12.40
Net Factor Payments (RM Million)	-5,084	-5,903	-5,064	-6,800	-8,006	-8,256	-
GNP (RM Million)	85,777	96,684	110,764	122,759	139,778	154,783	12.53
Per Capita GNP (RM)	5,063	5,571	6,235	6,752	7,509	8,126	9.92
B. at the 1978 Constant Prices							
GDP (RM Million)	66,303	72,409	79,463	86,345	93,072	100,838	8.75
Net Factor Payments (RM Million)	-3,701	-4,085	-3,425	-4,638	-5,199	-5,320	-
GNP (RM Million)	62,602	68,324	76,038	81,707	87,873	95,518	8.82
Per Capita GNP (RM)	3,695	3,937	4,280	4,494	4,873	5,015	6.30

Source: Yearbook of Statistics, 1992 and 1993, Department of Statistics

TABLE VIII.1.2 GDP BY ACTIVITY AT THE 1978 CONSTANT PRICES, 1988-1993

Unit: RM Million

Activity	1988	1989	1990	1991	1992	1993	Average Annual Growth Rate(%) 1988-1993	Share of Activity in 1993(%)
1. Agriculture, livestock, forestry & fishing	13,933	14,768	14,827	14,828	15,468	16,077	2.90	15.9
2. Mining & quarrying	6,803	7,383	7,757	7,944	8,075	8,031	3.37	8.0
3. Manufacturing	16,151	18,444	21,340	24,307	26,859	30,324	13.43	30.1
4. Construction	2,133	2,389	2,832	3,240	3,619	4,023	13.53	4.0
5. Electricity, gas & water	1,211	1,344	1,526	1,697	1,931	2,172	12.39	2.2
6. Transport, storage & communication	4,412	4,839	5,487	6,079	6,479	6,998	9.66	6.9
7. Trade, hotels & restaurants	6,988	7,687	8,807	10,068	11,181	12,298	11.97	12.2
8. Finance, insurance, real estates & business services	6,088	6,771	7,759	8,733	9,659	10,761	12.07	10.7
9. Government services	7,819	8,185	8,579	8,964	9,466	10,376	5.82	10.3
10. Other services	1,454	1,522	1,678	1,831	1,983	2,146	8.10	2.1
11. Less: Imputed bank service charges	-2,820	-3,356	-4,076	-4,804	-5,376	-6,411	17.85	-6.4
12. Plus: Import duties	2,131	2,442	2,947	3,458	3,728	4,043	13.66	4.0
GDP	66,303	72,409	79,463	86,345	93,072	100,838	8.75	100.0

Source: Yearbook of Statistics 1992 and 1993, Department of Statistics

TABLE VII.1.2.1 IMPORTS, EXPORTS AND BALANCE OF TRADE

Unit: RM Million

Period	Imports (c.i.f.)	Exports (f.o.b.)	Balance of Trade
1988	43,293.4	55,260.0	11,966.6
1989	60,858.1	67,824.5	6,966.4
1990	79,118.6	79,646.4	527.8
1991	100,831.1	94,496.6	-6,334.5
1992	101,440.5	103,656.7	2,216.2
1993	117,404.7	121,237.5	3,832.8
Average Annual Growth Rate(%) for 1988-1993	22.08	17.02	-

Source: Yearbook of Statistics 1992 and 1993, Department of Statistics

TABLE VII.1.2.2 VALUE OF EXPORTS ACCORDING TO SITC SECTION

Unit: RM Million

No.	SITC Section	1988	1989	1990	1991	1992	1993	Average Annual Growth Rate(%) 1988-1993
0	Food	2,851.4	3,128.9	3,453.2	3,651.6	3,762.3	3,975.2	6.87
1	Beverages & tobacco	83.1	80.2	95.4	169.2	192.2	184.7	17.32
2	Crude materials (inedible)	12,418.0	12,656.9	11,480.2	11,139.9	11,080.5	10,983.7	-2.42
3	Mineral fuels, lubricants, etc.	8,731.3	11,023.6	14,594.9	14,658.7	13,418.0	12,470.9	7.39
4	Animal & vegetable oils and fats	5,762.6	6,197.4	5,679.7	6,226.8	6,874.7	7,242.1	4.68
5	Chemicals	1,220.5	1,234.2	1,304.0	1,666.7	2,123.0	2,639.2	16.68
6	Manufactured goods	4,487.8	5,712.2	6,329.3	7,360.0	8,830.8	11,600.1	20.92
7	Machinery & transport equipment	15,665.7	21,982.9	28,429.8	38,865.6	45,410.8	58,796.8	30.28
8	Miscellaneous manufactured articles	3,829.5	5,606.7	7,955.5	10,319.8	11,504.5	12,523.7	26.74
9	Miscellaneous transactions & commodities	210.1	201.5	324.3	438.5	459.9	821.0	31.34
	Total	55,260.0	67,824.5	79,646.3	94,496.8	103,656.7	121,237.4	17.02

Source: Yearbook of Statistics 1992 and 1993, Department of Statistics

Note: SITC means the Standard International Trade Classification.

TABLE VII.1.2.3

VALUE OF IMPORTS ACCORDING TO SITC SECTION

Unit: RM Million

No.	SITC Section	1988	1989	1990	1991	1992	1993	Average Annual Growth Rate(%) 1988-1993
0	Food	3,825.9	4,613.9	4,582.5	5,138.9	5,469.9	5,816.1	8.74
1	Beverages & tobacco	208.2	241.5	292.9	423.8	399.2	390.8	13.42
2	Crude materials (inedible)	1,815.5	2,488.9	2,551.2	2,809.8	2,630.2	3,263.7	12.45
3	Mineral fuels, lubricants, etc.	2,317.5	2,911.1	4,021.0	4,253.3	4,242.9	4,247.5	12.88
4	Animal & vegetable oils and fats	267.2	257.1	218.0	394.8	331.3	403.9	8.61
5	Chemicals	4,781.9	5,412.7	6,716.8	7,663.4	8,163.1	8,848.1	13.10
6	Manufactured goods	7,167.2	9,919.3	12,499.1	15,923.7	16,270.2	17,704.7	19.83
7	Machinery & transport equipment	19,521.6	29,233.1	39,740.5	54,164.6	55,711.3	65,439.4	27.37
8	Miscellaneous manufactured articles	2,467.4	3,257.5	4,496.8	5,650.2	5,868.5	6,521.0	21.45
9	Miscellaneous transactions & commodities	920.9	2,522.8	3,999.6	4,408.5	2,353.8	4,769.7	38.95
	Total	43,293.3	60,857.9	79,118.4	100,831.0	101,440.4	117,404.9	22.08

Source: Yearbook of Statistics 1992 and 1993, Department of Statistics

Note: SITC means the Standard International Trade Classification.

TABLE VII.1.2.4 BALANCE OF INTERNATIONAL PAYMENTS

Unit: RM Million

Item	1988	1989	1990	1991	1992	1993
Current account	4,739	-574	-2,483	-11,644	-4,675	-6,349
Merchandise balance(f.o.b.)	14,524	10,599	7,093	1,449	8,599	8,193
Services	-10,180	-11,392	-9,723	-13,195	-13,611	-14,951
Transfers	395	219	147	107	337	409
Capital account	-3,218	2,702	3,473	10,331	10,328	14,415
Basic balance	1,521	2,128	990	-1,313	5,653	8,066
Short-term private capital, errors & omissions	-2,625	1,204	4,375	4,740	11,091	21,173
Overall balance	-1,104	3,332	5,365	3,427	16,744	29,239

Source: Yearbook of Statistics 1992 and 1993, Department of Statistics

TABLE VII.1.3.1 FEDERAL GOVERNMENT REVENUE

Unit: RM Million

Item	1988	1989	1990	1991	1992	1993	Average Annual Growth Rate(%) 1988-1993
A. Total direct taxes	7,509	7,793	10,402	13,251	15,403	17,070	17.9
Companies	3,146	3,402	4,497	5,352	7,524	8,531	22.1
Individuals	1,779	2,043	2,506	2,989	3,444	4,248	19.0
Petroleum	2,208	1,817	2,644	4,052	3,417	2,859	5.3
Others	376	501	755	858	1,021	1,412	30.3
B. Total indirect taxes	7,199	8,881	10,842	12,580	13,369	14,830	15.6
Rubber	168	58	3	0	0	0	.
Tin	0	2	0	0	0	0	.
Palm oil	10	14	2	4	7	7	-6.9
Petroleum	1,149	1,432	1,910	1,981	1,645	1,429	-4.5
Other export duties	68	82	55	44	37	28	-16.3
Import duties & surtax	2,406	2,899	3,420	4,107	4,383	4,566	13.7
Excise	1,536	1,932	2,266	2,819	3,062	3,713	19.3
Sales tax	1,456	1,912	2,442	2,763	3,082	3,468	19.0
Service tax	73	94	121	134	322	613	53.0
Other indirect taxes	333	456	623	698	831	1,006	24.7
C. Total non-tax revenue	7,259	8,599	8,277	8,222	10,478	9,791	6.2
D. Total revenue	21,967	25,273	29,521	34,053	39,250	41,691	13.7

Source: Yearbook of Statistics 1992 and 1993, Department of Statistics

TABLE VII.3.2

FEDERAL GOVERNMENT OPERATING EXPENDITURE

Unit: RM Million

Item	1988	1989	1990	1991	1992	1993	Average Annual Growth Rate(%) 1988-1993
(i) By Objects							
Enrolments	7,964	8,451	9,164	9,944	11,660	11,803	8.2
Pension & gratuities	961	1,073	1,154	1,815	2,183	2,320	19.3
Debt service charge	6,178	6,743	6,830	7,048	7,304	7,166	3.0
Grants to State Governments	987	1,220	1,457	1,333	1,219	1,302	5.7
Supplies & services	2,403	2,631	2,931	3,341	3,707	4,150	11.5
Subsidies	320	389	494	965	560	589	13.0
Others	2,999	2,474	2,996	3,850	5,442	4,887	10.3
Total	21,812	22,981	25,026	28,296	32,075	32,217	8.1
(ii) By Sectors							
Security	3,341	3,540	3,807	4,070	4,796	5,430	9.0
Social services	5,871	6,429	7,296	8,001	9,608	10,381	12.1
Economic services	1,904	1,984	2,293	2,480	3,498	2,511	5.7
Debt service charges	6,178	6,743	6,830	7,048	7,304	7,166	3.0
Transfer payments	2,274	1,410	2,492	3,692	3,341	3,263	7.5
General administration	2,244	2,876	2,308	3,005	3,528	3,766	10.9
Total	21,812	22,982	25,026	28,296	32,075	32,217	8.1

Source: Yearbook of Statistics 1992 and 1993, Department of Statistics

TABLE VII.1.3.3

FEDERAL GOVERNMENT DEVELOPMENT EXPENDITURE

Item	1988	1989	1990	1991	1992	1993	Average Annual Growth Rate(%) 1988-1993
1. Security							
Defence	195	614	738	1,866	1,629	1,729	51.7
Internal security	165	232	323	345	544	529	26.2
Total	360	846	1,061	2,211	2,173	2,258	41.1
2. Social Services							
Education	865	1,242	1,634	1,285	1,205	1,177	6.4
Health	69	218	461	572	602	425	43.8
Housing	58	182	43	66	91	167	23.6
Others	173	305	479	503	752	451	21.1
Total	1,165	1,947	2,617	2,426	2,653	2,220	13.8
3. Economic Services							
Agriculture & rural development	1,010	1,140	1,298	1,126	1,098	1,276	4.8
Public utilities	656	1,013	798	681	834	610	-1.4
Commerce & industry	834	948	2,726	969	648	660	-4.6
Transport	1,065	1,545	1,845	1,897	1,896	2,678	20.3
Communication	4	2	2	1	4	5	4.6
Others	16	16	32	10	24	36	17.6
Total	3,585	4,664	6,701	4,684	4,504	5,265	8.0
4. General administration							
	121	239	310	244	358	381	25.8
5. Grand Total							
	5,231	7,696	10,689	9,565	9,688	10,124	14.1

Source: Yearbook of Statistics 1992 and 1993, Department of Statistics

TABLE VII.1.4.1 CONSUMER PRICE INDEX FOR MAIN GROUPS IN PENINSULAR MALAYSIA
(1990 = 100)

Item	Weight	1987	1988	1989	1990	1991	1992	1993	Average Annual
									Rise Rate(%) 1987-1993
General	100.0	91.8	94.3	96.9	100.0	104.5	109.7	113.8	3.6
Food	33.8	88.7	92.1	95.6	100.0	105.0	112.4	115.2	4.5
Beverages & tobacco	4.5	93.8	95.3	96.5	100.0	108.2	118.2	136.2	6.4
Clothing & footwear	3.9	94.4	96.6	98.1	100.0	106.5	109.9	110.1	2.6
Gross rent, fuel & power	20.0	102.4	100.5	99.5	100.0	103.5	107.5	111.7	1.5
Furniture, furnishings and household equipment & operator	5.8	92.4	95.5	98.1	100.0	104.5	107.3	108.9	2.8
Medical care & health expenditure	1.8	94.5	95.7	97.2	100.0	105.4	109.1	114.7	3.3
Transport & communication	18.8	83.3	89.5	95.3	100.0	104.1	108.3	114.1	5.4
Recreation, entertainment & cultural services	5.4	97.0	98.5	99.1	100.0	103.0	106.4	107	1.6
Miscellaneous goods & services	6.0	92.6	94.5	97.0	100.0	103.6	105.5	108.3	2.6

Source: Yearbook of Statistics 1992 and 1993, Department of Statistics

**TABLE VII.2.1.1 AREAS OF STATES AND DISTRICTS
IN THE STUDY AREA**

States	Districts	Area (sq.km)	Distribution (%)
Kedah	Baling	1,529	13.6
	Bandar Baharu	269	2.4
	Kota Setar	665	5.9
	Kuala Muda	923	8.2
	Kubang Pasu	948	8.4
	Kulim	765	6.8
	Langkawi	467	4.2
	Padang Terap	1,357	12.1
	Sik	1,635	14.5
	Yan	242	2.2
	Pendang	626	5.6
	Total of Keda	9,426	83.8
Perlis	Perlis	795	7.1
Pulau Pinang	Seberang Perai Tengah (Bukit Mertajam)	235	2.1
	Seberang Perai Utara (Butterworth)	262	2.3
	Seberang Perai Selatan (Nibong Tebal)	241	2.1
	Timur Laut	119	1.1
	Barat Daya	173	1.5
	Total of Pulau Pinang	1,031	9.2
Total of Three States		11,252	100.0

Source: Yearbook of Statistics 1993, Department of Statistics

TABLE VII.2.2.1 POPULATION, POPULATION GROWTH RATE AND POPULATION DENSITY BY STATE, MALAYSIA

State	Area (sq. km)	Population			Average Annual Growth Rate (%)			Population Density (per sq. km)		
		1970	1980	1991	1970-	1980-	1991	1970	1980	1991
Johor	18,986	1,277,180	1,580,423	2,074,297	2.13	2.47	67	83	109	
Kedah	9,426	954,947	1,077,815	1,304,800	1.21	1.74	101	114	138	
Kelantan	14,943	684,738	859,270	1,181,680	2.27	2.90	46	58	79	
Melaka	1,650	404,125	446,769	504,502	1.00	1.10	245	271	306	
Negeri Sembilan	6,643	481,563	551,442	691,150	1.35	2.05	72	83	104	
Pahang	35,965	504,945	768,801	1,036,724	4.20	2.72	14	21	29	
Perak	21,005	1,569,139	1,743,655	1,880,016	1.05	0.68	75	83	90	
Perlis	795	121,062	144,782	184,070	1.79	2.18	152	182	232	
Pulau Pinang	1,031	776,124	900,772	1,065,075	1.49	1.52	753	874	1,033	
Sabah	73,620	636,431	929,299	1,736,902	3.79	5.69	9	13	24	
Sarawak	124,449	976,269	1,235,553	1,648,217	2.36	2.62	8	10	13	
Selangor	7,956	982,090	1,426,250	2,289,236	5.73	4.30	123	179	288	
Terengganu	12,955	405,368	525,255	770,931	2.59	3.49	31	41	60	
Federal Territory										
-Kuala Lumpur	243	648,276	919,610	1,145,075	3.50	1.99	2,668	3,784	4,712	
-Labuan	91	17,173	26,413	54,307	4.31	6.55	189	290	597	
Malaysia	329,758	10,439,430	13,136,109	17,566,982	2.30	2.64	32	40	53	

Source: Population and Housing Census of Malaysia 1991, Preliminary Count Report, Department of Statistics

TABLE VII.2.2.2 NUMBER OF HOUSEHOLDS AND AVERAGE NUMBER OF PERSONS
PER HOUSEHOLD BY STATE, MALAYSIA

State	Number of Households			Average Number of Persons per Household		
	1970	1980	1991	1970	1980	1991
Johor	214,804	287,527	425,981	5.95	5.50	4.87
Kedah	185,080	215,596	272,783	5.16	5.00	4.78
Kelantan	145,380	177,799	252,572	4.71	4.83	5.08
Melaka	68,238	81,102	102,470	5.92	5.51	4.92
Negeri Sembilan	86,171	105,336	144,654	5.59	5.24	4.78
Pahang	98,407	151,409	209,698	5.13	5.08	4.94
Perak	279,299	333,207	399,692	5.62	5.23	4.70
Perlis	25,175	32,009	40,116	4.81	4.52	4.59
Pulau Pinang	134,514	164,242	213,278	5.77	5.48	4.99
Sabah	120,922	173,057	337,002	5.26	5.37	5.15
Sarawak	163,365	226,585	351,874	5.98	5.45	4.97
Selangor	283,488	267,384	467,586	5.75	5.33	4.90
Terengganu	85,433	107,305	145,496	4.74	4.89	5.30
Federal	-	188,969	246,024	-	4.87	4.65
-Kuala Lumpur	-	4,768	10,790	-	5.54	5.03
-Labuan	-	-	-	-	-	-
Malaysia	1,890,276	2,516,295	3,580,016	5.21	5.22	4.91

Source: Population and Housing Census of Malaysia 1991,
Preliminary Count Report, Department of Statistics

TABLE VII.2.3 AREA, POPULATION, POPULATION GROWTH RATE AND POPULATION DENSITY BY DISTRICT IN THE STUDY AREA

State & District	Area (sq.km)	Population		Average Annual Growth Rate (%) of Population		Population Density (per sq.km)	
		1980	1991	1980-1991	1991	1980	1991
Kedah	9,426	1,077,815	1,304,800	1.74		114	138
Baling	1,529	104,838	114,489	0.80		69	75
Bandar Baharu	269	31,724	32,957	0.35		118	123
Kota Setar	665	279,567	323,580	1.33		420	487
Kuala Muda	923	192,308	255,091	2.57		208	276
Kubang Pasu	948	129,808	158,189	1.80		137	167
Kulim	765	92,525	128,394	2.98		121	168
Langkawi	467	28,340	42,755	3.74		61	92
Padang Terap	1,357	40,428	50,734	2.06		30	37
Sik	1,635	43,366	54,653	2.10		27	33
Yan	242	59,030	60,823	0.27		244	251
Pendang	626	75,861	83,135	0.83		121	133
Perlis	795	144,782	184,070	2.18		182	232
Perlis	795	144,782	184,070	2.18		182	232
Pulau Pinang	1,031	900,772	1,065,075	1.52		874	1,033
Seberang Perai Tengah	235	161,975	236,319	3.43		689	1,006
Seberang Perai Utara	262	199,449	225,769	1.13		761	862
Seberang Perai Selatan	241	71,558	84,568	1.52		297	351
Timur Laut	119	391,400	395,232	0.09		3,289	3,321
Barat Daya	173	76,390	123,187	4.34		442	712
Study Area	11,252	2,123,369	2,553,945	1.68		189	227

Source: Population and Housing Census of Malaysia 1991, Preliminary Count Report, Department of Statistics

TABLE VII.2.2.4 POPULATION, NUMBER OF HOUSEHOLDS AND AVERAGE NUMBER OF PERSONS PER HOUSEHOLD BY DISTRICT IN THE STUDY AREA

State & District	Population		Number of Households		Average Annual Growth Rate (%) of HH Number (1980-1991)		Average Number of Persons per Household		Average Annual Growth Rate (%) of Persons/HH (1980-1991)	
	1980	1991	1980	1991	1980	1991	1980	1991	1980	1991
Kedah	1,077,815	1,304,800	215,596	272,783	2.14		5.00	4.78	-0.40	
Baling	104,858	114,489	21,744	24,302	1.01		4.82	4.71	-0.21	
Bandar Baharu	31,724	32,957	6,150	6,891	1.03		5.16	4.78	-0.69	
Kota Setar	279,567	323,580	53,867	66,955	1.98		5.19	4.83	-0.65	
Kuala Muda	192,308	255,091	37,242	53,817	3.35		5.16	4.74	-0.78	
Kubang Pasu	129,808	158,189	27,470	33,269	1.74		4.73	4.75	0.06	
Kulim	92,525	128,394	17,944	26,423	3.52		5.16	4.86	-0.54	
Langkawi	28,340	42,755	6,250	9,092	3.41		4.53	4.70	0.33	
Padang Temp	40,428	50,734	8,463	10,829	2.24		4.78	4.69	-0.18	
Sik	43,366	54,653	9,222	11,421	1.94		4.70	4.79	0.16	
Yan	59,030	60,823	11,900	12,283	0.29		4.96	4.95	-0.02	
Pendang	75,861	83,135	15,344	17,501	1.20		4.94	4.75	-0.36	
Perlis	144,782	184,070	32,009	40,116	2.05		4.52	4.59	0.13	
Perlis	144,782	184,070	32,009	40,116	2.05		4.52	4.59	0.13	
Pulau Pinang	900,772	1,065,075	164,242	213,278	2.38		5.48	4.99	-0.85	
Seberang Perai Tengah	161,975	236,319	29,342	47,885	4.45		5.52	4.94	-1.02	
Seberang Perai Utara	199,449	225,769	37,462	44,382	1.54		5.32	5.09	-0.41	
Seberang Perai Selatan	71,558	84,568	12,585	16,393	2.40		5.69	5.16	-0.88	
Timur Laut	391,400	395,232	70,612	79,651	1.10		5.54	4.96	-1.01	
Barat Daya	76,390	123,187	14,241	24,967	5.10		5.36	4.93	-0.76	
Study Area	2,123,369	2,593,945	411,847	526,177	2.23		5.16	4.85	-0.55	

Source: Population and Housing Census of Malaysia 1991, Preliminary Count Report, Department of Statistics

TABLE VII.2.2.5 (1/5)

POPULATION, NUMBER OF HOUSEHOLDS AND AVERAGE NUMBER OF PERSONS PER HOUSEHOLD BY MUKJM IN THE STUDY AREA

State/ District	Mukim	Population		Average Annual Growth Rate(%) of Population	Number of Households		Average Annual Growth Rate(%) of HH Number	Average Number of Persons per Household		Average Annual Growth Rate(%) of Persons/HH
		1980	1991	(1980-1991)	1980	1991	(1980-1991)	1980	1991	(1980-1991)
Kedah		1,077,815	1,304,800	1.74	215,596	272,783	2.14	5.00	4.78	-0.40
Baling		104,858	114,489	0.80	21,744	24,302	1.01	4.82	4.71	-0.21
	Bakai	12,482	12,552	0.05	2,493	2,572	0.28	5.01	4.83	-0.23
	Behang	8,190	8,166	-0.03	1,582	1,766	1.00	5.18	4.62	-1.03
	Bongor	4,901	5,584	1.19	1,021	1,182	1.33	4.80	4.72	-0.15
	Kupang	21,607	23,442	0.74	4,436	4,768	0.66	4.87	4.92	0.08
	Pulai	17,345	19,972	1.28	3,522	4,209	1.44	4.83	4.75	-0.16
	Siong	11,117	11,842	0.57	2,305	2,456	0.58	4.82	4.82	0.00
	Tawar	16,899	18,284	0.72	3,496	3,838	0.85	4.83	4.76	-0.13
	Telui Kanan	12,255	14,647	1.62	2,818	3,491	1.95	4.35	4.20	-0.33
	Wayfarers	62			1					
Bandar Baharu		31,724	32,957	0.35	6,150	6,891	1.03	5.16	4.78	-0.69
	Bagan Samak	12,425	12,699	0.20	2,429	2,668	0.85	5.12	4.76	-0.65
	Kuala Selama	3,810	3,559	-0.62	731	765	0.41	5.21	4.65	-1.03
	Pelan	1,831	2,083	0.93	384	460	1.64	4.90	4.53	-0.71
	Serdang	8,579	9,478	0.91	1,581	1,882	1.58	5.43	5.04	-0.68
	Sungai Bata	3,257	3,200	-0.16	684	710	0.34	4.76	4.51	-0.50
	Sungai Kechil									
	Hilir	1,772	1,938	0.81	311	406	1.59	5.20	4.77	-0.77
Kota Setar		279,567	323,580	1.33	53,867	66,955	1.98	5.19	4.83	-0.65
	Akor Malai	20,728	29,733	3.28	3,864	6,328	4.48	5.36	4.70	-1.20
	Akor Merah	11,785	12,174	0.30	2,128	2,345	0.88	5.54	5.19	-0.59
	Anak Bukit	5,739	8,322	3.38	1,084	1,886	5.03	5.29	4.41	-1.66
	Bukit Lada	3,997	4,418	0.91	907	1,027	1.13	4.41	4.30	-0.22
	Bukit Pinang	5,056	6,272	1.96	1,037	1,228	1.54	4.88	5.11	0.42
	Derang	2,614	3,564	2.82	570	671	1.48	4.59	5.31	1.34
	Derang	19,742	22,411	1.15	3,744	4,697	2.06	5.27	4.77	-0.91
	Gajah Mati	8,379	9,284	0.93	1,657	1,888	1.19	5.06	4.92	-0.25
	Gunong	6,754	6,937	0.24	1,386	1,469	0.53	4.87	4.72	-0.29
	Hutan Kampong	3,205	4,669	3.42	625	985	4.14	5.13	4.74	-0.72
	Jabi	6,077	7,619	2.06	1,251	1,592	2.19	4.86	4.79	-0.14
	Kangkong	6,309	7,008	0.96	1,275	1,452	1.18	4.95	4.83	-0.23
	Kota Setar	47,879	36,721	-2.41	8,805	7,527	-1.43	5.44	4.88	-0.99
	Kuala Kedah	14,998	16,378	0.80	2,703	3,187	1.50	5.55	5.14	-0.70
	Kobang Rotan	5,058	5,099	0.07	1,043	1,056	0.11	4.85	4.83	-0.04
	Langgar	6,404	7,150	1.00	1,369	1,489	0.76	4.68	4.80	0.24
	Lengkras	1,310	1,272	-0.27	271	269	-0.07	4.83	4.73	-0.20
	Lepai	2,370	2,570	0.74	524	542	0.31	4.52	4.74	0.43
	Lesong	5,424	5,679	0.42	1,157	1,154	-0.02	4.69	4.92	0.44
	Libong	1,313	1,445	0.87	278	318	1.22	4.72	4.54	-0.35
	Mercong	7,459	12,353	4.59	1,422	2,634	5.60	5.25	4.69	-1.02
	Padang Hiang	4,449	4,322	-0.26	878	882	0.04	5.07	4.90	-0.30
	Padang Lalang	7,178	7,876	0.84	1,482	1,672	1.10	4.84	4.71	-0.25
	Pengkalan Kundur	31,018	37,806	1.80	5,520	7,568	2.87	5.62	5.00	-1.07
	Pumpang	5,450	14,853	9.11	1,042	3,074	9.83	5.23	4.83	-0.72
	Sala Kechil	6,343	7,998	2.10	1,208	1,700	3.11	5.25	4.70	-1.01
	Sungai Baharu	1,829	1,770	-0.30	377	402	0.58	4.85	4.40	-0.88
	Tajar	9,162	9,888	0.69	1,790	1,956	0.81	5.12	5.06	-0.11
	Tebeagas	3,931	4,074	0.32	837	857	0.21	4.70	4.75	0.11
	Telaga Mas	2,251	2,418	0.65	487	522	0.63	4.62	4.63	0.02
	Telok Chengai	2,018	3,605	5.27	429	745	5.02	4.70	4.84	0.26
	Telok Kechai	3,123	7,245	7.65	624	1,543	8.23	5.00	4.70	-0.58
	Titi Gajah	4,167	4,474	0.65	824	950	1.29	5.06	4.71	-0.65
	Tualang	6,043	6,173	0.19	1,269	1,340	0.49	4.76	4.61	-0.30

Source: Population and Housing Census of Malaysia 1991,
Preliminary Count Report, Department of Statistics

TABLE VII.2.2.5 (2/5)

POPULATION, NUMBER OF HOUSEHOLDS AND AVERAGE NUMBER OF PERSONS PER HOUSEHOLD BY MUKJM IN THE STUDY AREA

State/ District	Mukim	Population		Average Annual Growth Rate (%) of Population	Number of Households		Average Annual Growth Rate (%) of HH Number	Average Number of Persons per Household		Average Annual Growth Rate (%) of Persons/HH
		1980	1991	(1980-1991)	1980	1991	(1980-1991)	1980	1991	(1980-1991)
Kuala Muda		192,308	255,091	2.57	37,242	53,817	3.35	5.16	4.74	-0.78
	Bojang	5,204	5,897	1.14	1,144	1,275	0.99	4.55	4.63	0.15
	Bukit Meriam	4,766	4,977	0.39	992	1,063	0.63	4.80	4.68	-0.23
	Gurun	27,509	31,929	1.35	5,238	6,561	2.05	5.25	4.87	-0.69
	Haji Kodong	1,183	1,149	-0.27	270	258	-0.41	4.38	4.45	0.15
	Kota	2,643	2,974	1.07	561	635	1.13	4.71	4.68	-0.05
	Kuala	2,322	2,603	1.04	512	541	0.50	4.54	4.81	0.54
	Merbok	12,562	12,433	-0.08	2,476	2,808	1.14	5.07	4.43	-1.22
	Pekula	6,262	8,632	2.92	1,342	1,862	2.98	4.67	4.61	-0.06
	Pinang Tunggal	3,823	3,420	-1.01	751	701	-0.66	5.07	4.89	-0.35
	Rantau Panjang	2,564	2,684	0.42	561	570	0.14	4.57	4.71	0.27
	Semeling	13,489	13,656	0.11	2,640	2,693	0.18	5.11	5.07	-0.07
	Sidam Kiri	7,210	6,914	-0.38	1,480	1,469	-0.07	4.87	4.71	-0.31
	Simpur	4,416	4,694	1.19	858	960	1.02	4.80	4.89	0.17
	Sungai Pasir	20,532	44,628	7.06	4,095	10,055	8.17	5.01	4.41	-1.11
	Sungai Petani	68,917	99,445	3.33	12,411	20,462	4.52	5.54	4.86	-1.19
Teloi Kiri	9,206	9,036	-0.17	1,878	1,904	0.12	4.90	4.75	-0.29	
Kubang Pasu		129,808	158,189	1.80	27,470	33,269	1.74	4.73	4.75	0.06
	Ah	6,468	7,063	0.80	1,350	1,432	0.54	4.79	4.93	0.26
	Binjal	2,680	3,008	1.05	620	682	0.87	4.32	4.41	0.18
	Bukit Tinggi	3,989	5,713	3.27	798	1,229	3.93	5.00	4.65	-0.66
	Gelong	5,212	5,693	0.80	1,030	1,151	1.01	5.06	4.95	-0.21
	Husba	2,785	2,651	-0.45	597	596	-0.02	4.66	4.45	-0.43
	Jeram	8,203	8,098	-0.12	1,798	1,774	-0.13	4.56	4.57	0.02
	Jerlan	18,374	18,561	0.09	3,787	3,833	0.11	4.85	4.81	-0.02
	Jitra	10,941	17,019	4.02	2,312	3,670	4.20	4.73	4.61	-0.18
	Kepeta	9,301	9,237	-0.06	2,166	2,164	-0.01	4.29	4.27	-0.05
	Kubang Pasu	3,005	2,625	-1.23	621	575	-0.70	4.84	4.57	-0.53
	Malau	2,373	2,684	1.12	520	599	1.29	4.56	4.48	-0.17
	Naga	11,889	17,649	3.59	2,334	3,775	4.37	5.09	4.68	-0.78
	Pedang Perabu	3,303	3,296	-0.02	739	725	-0.17	4.47	4.55	0.15
	Pelubang	1,774	1,991	1.05	362	436	1.69	4.90	4.57	-0.64
	Pering	6,605	6,954	0.47	1,493	1,565	0.43	4.42	4.41	0.01
	Putat	4,827	5,138	0.57	1,000	1,076	0.67	4.83	4.78	-0.10
	Sanglang	9,217	9,371	0.15	1,934	1,966	0.15	4.77	4.77	0.00
	Sungai Laka	3,772	7,523	6.28	819	1,608	6.13	4.61	4.68	0.14
	Temin	6,997	15,516	7.24	1,524	2,583	4.80	4.59	6.01	2.44
Tanjung	6,816	6,900	0.23	1,377	1,498	0.77	4.95	4.67	-0.54	
Wang Tepus	1,277	1,409	0.89	289	334	1.32	4.42	4.22	-0.42	
Kulim		92,525	128,394	2.98	17,944	26,423	3.52	5.16	4.86	-0.54
	Bagan Sena	5,197	5,352	0.27	1,032	1,089	0.49	5.04	4.91	-0.22
	Junjong	3,642	4,027	0.91	706	806	1.20	5.16	5.00	-0.29
	Karangau	4,696	6,949	3.56	982	1,312	2.63	4.78	5.30	0.93
	Keladi	3,515	14,066	12.61	719	3,180	13.52	4.89	4.32	-0.91
	Kulim	21,231	30,470	3.28	4,080	6,431	4.14	5.20	4.74	-0.83
	Lunas	7,202	11,078	3.91	1,362	2,177	4.26	5.29	5.09	-0.35
	Mahang	3,247	3,214	-0.09	663	657	-0.08	4.90	4.89	-0.01
	Naga Lalin	5,564	6,714	1.71	1,003	1,367	2.81	5.55	4.91	-1.11
	Padang China	8,069	7,865	-0.23	1,505	1,587	0.48	5.36	4.56	-0.72
	Padang Meha	7,762	7,587	-0.21	1,497	1,497	0.00	5.19	5.07	-0.21
	Sedim	3,998	3,336	-1.65	737	663	-1.21	5.28	5.03	-0.44
	Sedim Kanan	7,750	9,594	1.94	1,539	1,911	2.11	5.04	4.94	-0.17
	Sungai Seluang	4,009	10,494	8.75	751	2,125	9.46	5.34	4.94	-0.71
	Sungai Ular	2,652	3,334	2.08	554	682	1.89	4.79	4.89	0.19
	Terap	3,969	4,314	0.76	793	909	1.24	5.01	4.75	-0.48
Wayfarers	22			1						
Langkawi		28,340	42,755	3.74	6,250	9,092	3.41	4.53	4.70	0.33
	Ayer Itang	4,309	6,850	4.21	857	1,458	4.83	5.03	4.70	-0.62
	Boboi	2,156	3,247	3.72	480	695	3.36	4.49	4.67	0.36
	Kedawang	3,626	5,550	3.87	837	1,185	3.16	4.33	4.68	0.71
	Kuah	10,404	15,489	3.62	2,283	3,318	3.40	4.56	4.67	0.22
	Padang Masirat	4,170	5,960	3.25	917	1,151	2.07	4.55	5.18	1.18
Ulu Melaka	3,638	5,659	4.02	875	1,285	3.49	4.16	4.40	0.52	
Wayfarers	37			1						

Source: Population and Housing Census of Malaysia 1991, Preliminary Count Report, Department of Statistics

TABLE VII.2.2.5 (35)

POPULATION, NUMBER OF HOUSEHOLDS AND AVERAGE NUMBER OF PERSONS PER HOUSEHOLD BY MUKIM IN THE STUDY AREA

State/ District	Mukim	Population		Average Annual Growth Rate(%) of Population (1980-1991)	Number of Households		Average Annual Growth Rate(%) of HH Number (1980-1991)	Average Number of Persons per Household		Average Annual Growth Rate(%) of Persons/HH (1980-1991)
		1980	1991		1980	1991		1980	1991	
Padang Terap		40,428	50,734	2.06	8,463	10,829	2.24	4.78	4.69	-0.18
	Batang Tunggang									
	Ranan	999	1,226	1.86	222	269	1.75	4.50	4.56	0.12
	Batang Tunggang Kili	885	1,270	3.28	214	273	2.21	4.14	4.65	1.07
	Belimbing Kanan	5,489	7,102	2.34	1,121	1,502	2.66	4.90	4.73	-0.32
	Bekimbiang Kili	2,030	2,516	1.95	425	546	2.28	4.78	4.61	-0.33
	Kurong Hitam	1,874	2,407	2.28	404	509	2.10	4.64	4.73	0.18
	Padang Temak	4,257	4,738	0.97	892	1,050	1.48	4.77	4.51	-0.51
	Padang Terap Kanan	1,295	1,610	1.98	282	344	1.81	4.59	4.68	0.17
	Padang Terap Kili	2,855	4,008	3.08	685	982	3.27	4.17	4.08	-0.19
	Peja	4,811	5,310	0.90	937	1,115	1.58	5.13	4.76	-0.68
	Tekai	14,547	18,405	2.14	2,989	3,799	2.18	4.87	4.84	-0.04
	Tolak	1,386	2,142	3.96	292	440	3.73	4.75	4.87	0.23
	Sik		41,366	54,653	2.10	9,222	11,421	1.94	4.70	4.79
Jeneri		10,892	11,608	0.58	2,395	2,496	0.38	4.55	4.65	0.20
Sik		26,859	35,019	2.41	5,586	7,325	2.46	4.81	4.78	-0.05
Sok		5,615	8,026	3.25	1,241	1,600	2.31	4.52	5.02	0.94
Yan		59,030	60,823	0.27	11,900	12,283	0.29	4.96	4.95	-0.02
	Dulang	4,471	4,396	-0.15	889	918	0.29	5.03	4.79	-0.45
	Sala Besar	23,562	25,666	0.78	4,611	4,893	0.48	5.08	5.25	0.30
	Singkir	2,988	2,920	0.01	639	646	0.10	4.68	4.63	-0.09
	Sungai Dau	11,541	11,666	0.10	2,299	2,348	0.19	5.02	4.97	-0.09
	Yan	16,449	16,105	-0.19	3,431	3,478	0.12	4.79	4.63	-0.32
	Wayfarers	19	-	-	1	-	-	-	-	-
Pendang		75,861	83,135	0.83	15,344	17,501	1.20	4.94	4.75	-0.36
	Ayer Puteh	24,296	27,583	1.15	4,766	5,717	1.65	5.10	4.82	-0.50
	Bukit Raya	13,034	12,770	-0.19	2,460	2,479	0.07	5.30	5.15	-0.26
	Guar Kepayang	6,528	7,117	0.79	1,413	1,579	1.01	4.62	4.51	-0.22
	Padang Kerbau	9,663	9,831	0.16	1,960	2,219	1.13	4.93	4.43	-0.97
	Padang Pelang	2,406	3,816	4.19	513	816	4.55	4.69	4.51	-0.35
	Padang Pusing	7,999	8,735	0.80	1,703	1,854	0.77	4.70	4.71	0.03
	Rambai	6,727	7,557	1.06	1,432	1,624	1.14	4.70	4.65	-0.09
	Tobiar	5,208	5,726	0.86	1,077	1,183	0.69	4.75	4.84	0.18
Perlis	144,782	184,070	2.18	32,009	40,116	2.05	4.52	4.59	0.13	
Perlis		144,782	184,070	2.18	32,009	40,116	2.05	4.52	4.59	0.13
	Abi	1,889	2,106	0.99	408	489	0.40	4.04	4.31	0.59
	Arau	10,309	16,405	4.22	2,190	2,929	2.64	4.71	5.60	1.58
	Beseri	6,907	11,341	4.51	1,667	2,447	3.49	4.14	4.63	1.02
	Chuping	8,078	10,990	2.80	2,000	2,546	2.19	4.04	4.32	0.60
	Jejawi	3,719	6,796	5.48	793	1,506	5.83	4.69	4.51	-0.35
	Kayang	9,367	9,970	0.57	1,983	2,188	0.89	4.72	4.56	-0.33
	Kecoh	5,863	6,850	1.41	1,280	1,419	0.94	4.58	4.83	0.48
	Kuala Perlis	11,227	13,483	1.66	2,199	2,873	2.43	5.11	4.69	-0.77
	Kurong Anai	9,889	10,377	0.44	2,155	2,306	0.62	4.59	4.50	-0.18
	Kurong Batang	2,047	2,598	2.17	494	597	1.72	4.14	4.35	0.45
	Ngolang	2,426	2,719	1.04	566	639	1.10	4.29	4.26	-0.07
	Orau	1,820	3,297	5.40	427	786	5.55	4.26	4.19	-0.15
	Padang Pauh	3,040	3,527	1.35	728	838	1.28	4.18	4.21	0.07
	Padang Siding	4,755	5,977	2.11	1,169	1,323	1.13	4.07	4.53	0.98
	Paya	4,034	4,713	1.41	1,005	1,120	0.98	4.01	4.21	0.43
	Sanglang	14,385	15,131	0.46	3,035	3,316	0.66	4.66	4.56	-0.20
	Sena	9,654	13,384	2.97	1,918	2,783	3.24	4.96	4.81	-0.27
	Seriap	4,474	5,834	2.41	970	1,269	2.44	4.61	4.60	-0.03
	Sungai Adam	1,307	1,563	1.63	309	358	1.34	4.23	4.37	0.29
Titi Tinggi	12,045	15,730	2.43	2,602	3,701	3.20	4.63	4.25	-0.78	
Utan Aji	12,315	13,824	1.05	2,788	3,020	0.73	4.42	4.58	0.32	
Wang Binting	5,188	7,435	3.27	1,182	1,663	3.10	4.39	4.47	0.17	
Wayfarers	41	-	-	1	-	-	-	-	-	

Source: Population and Housing Census of Malaysia 1991,
Preliminary Count Report, Department of Statistics

TABLE VII.2.2.5 (4/5)

POPULATION, NUMBER OF HOUSEHOLDS AND AVERAGE NUMBER OF PERSONS PER HOUSEHOLD BY MUKIM IN THE STUDY AREA

State/ District	Mukim	Population		Average Annual Growth Rate(%) of Population (1980-1991)	Number of Households		Average Annual Growth Rate(%) of HH Number (1980-1991)	Average Number of Persons per Household		Average Annual Growth Rate(%) of Persons/HH (1980-1991)
		1980	1991		1980	1991		1980	1991	
Pulau Pinang		900,772	1,065,075	1.52	161,242	213,278	2.38	5.48	4.92	-0.85
Seberang Perai										
	Teengah	161,975	236,319	3.43	29,342	47,885	4.45	5.51	4.94	-1.02
	Mukim 1 Bandar Prai (Mukim 1A)	18,672	46,305	8.26	3,774	10,004	8.86	4.95	4.63	-0.61
	Mukim 2	9,252	9,999	0.71	1,750	2,094	1.63	5.29	4.78	-0.93
	Mukim 3	4,312	5,039	1.42	792	963	1.78	5.41	5.23	-0.36
	Mukim 4	4,116	5,266	2.24	813	1,078	2.56	5.06	4.88	-0.32
	Mukim 5	7,189	7,650	0.57	1,364	1,537	1.09	5.27	4.98	-0.52
	Mukim 6	3,336	3,890	1.40	694	820	1.52	4.81	4.74	-0.12
	Mukim 7	5,791	13,048	7.38	1,108	2,765	8.31	5.23	4.72	-0.93
	Mukim 8	2,090	2,772	2.57	438	581	2.57	4.77	4.77	0.00
	Mukim 9	10,978	10,373	-0.52	1,775	1,938	0.80	6.18	5.35	-1.31
	Mukim 10	11,299	12,000	0.55	1,768	2,288	2.34	6.39	5.24	-1.80
	Mukim 11	23,251	20,414	-1.18	3,863	3,830	-0.08	6.02	5.33	-1.10
	Mukim 12	8,558	24,158	9.43	1,515	4,989	10.83	5.65	4.84	-1.40
	Mukim 13	3,174	4,127	2.39	628	815	2.37	5.05	5.06	0.02
	Mukim 14	3,313	3,580	0.70	503	641	2.20	6.59	5.59	-1.50
	Mukim 15	7,504	12,550	4.68	1,269	2,440	5.94	5.91	5.14	-1.27
	Mukim 16	15,627	27,263	5.06	2,609	5,411	6.63	5.99	5.04	-1.57
	Mukim 17	6,281	7,091	1.10	1,133	1,377	1.77	5.51	5.15	-0.67
	Mukim 18	2,365	2,052	-1.29	411	433	-0.17	5.36	4.74	-1.12
	Mukim 19	1,654	2,057	1.98	289	418	3.36	5.72	4.92	-1.37
	Mukim 20	2,350	3,022	2.29	472	605	2.26	4.98	5.00	0.03
	Mukim 21	8,111	10,454	2.31	1,736	2,201	2.16	4.67	4.75	0.15
	Mukim 22	2,752	3,209	1.40	608	657	0.70	4.53	4.88	0.69
Seberang Perai Utara		199,449	225,769	1.13	37,462	44,382	1.54	5.31	5.09	-0.41
	Mukim 1	5,968	7,304	1.84	1,187	1,424	1.65	5.03	5.13	0.18
	Mukim 2	5,684	6,059	0.58	1,145	1,200	0.43	4.96	5.05	0.15
	Mukim 3	7,813	8,936	1.22	1,538	1,781	1.33	5.08	5.02	-0.11
	Mukim 4	5,626	6,702	1.59	1,149	1,384	1.69	4.90	4.84	-0.10
	Mukim 5	6,666	7,550	1.13	1,319	1,458	0.91	5.05	5.18	0.22
	Mukim 6	12,824	15,339	1.63	2,333	2,792	1.63	5.50	5.49	0.00
	Mukim 7	11,392	12,118	0.56	2,240	2,498	0.99	5.09	4.85	-0.33
	Mukim 8	7,276	9,812	2.75	1,679	2,104	2.05	4.33	4.68	0.69
	Mukim 9	10,898	15,076	2.95	1,930	2,948	3.85	5.65	5.11	-0.90
	Mukim 10	3,714	4,444	1.63	765	930	1.78	4.85	4.78	-0.14
	Mukim 11	7,924	10,661	2.70	1,686	2,109	2.04	4.70	5.06	0.66
	Mukim 12	15,254	19,001	2.00	2,845	3,671	2.31	5.36	5.18	-0.32
	Mukim 13	4,462	5,662	2.17	901	1,108	1.88	4.95	5.11	0.29
	Mukim 14	54,240	61,752	1.18	9,487	11,973	2.12	5.72	5.16	-0.94
	Mukim 15	33,640	29,178	-1.29	6,407	5,850	-0.83	5.25	4.99	-0.47
	Mukim 16	4,609	6,145	2.61	849	1,152	2.77	5.43	5.33	-0.16
	Wayfarers	1,439	-	-	2	-	-	-	-	-
Seberang Perai Selatan		71,558	84,568	1.52	12,585	16,393	2.40	5.69	5.16	-0.88
	Mukim 1	2,354	3,007	2.23	417	573	2.26	5.27	5.25	-0.03
	Mukim 2	1,156	1,249	0.70	226	250	0.92	5.12	5.00	-0.21
	Mukim 3	504	449	-1.05	95	112	1.50	5.31	4.01	-2.55
	Mukim 4	3,686	3,538	-0.37	616	691	1.04	5.98	5.12	-1.42
	Mukim 5	4,623	4,955	0.63	896	1,025	1.22	5.16	4.83	-0.59
	Mukim 6	547	479	-1.21	94	82	-1.24	5.82	5.84	0.03
	Mukim 7	4,816	6,824	3.17	807	1,263	4.07	5.97	5.40	-0.90
	Mukim 8	2,450	2,541	0.33	477	517	0.73	5.14	4.91	-0.40
	Mukim 9	7,014	10,051	3.27	1,307	2,027	3.99	5.37	4.96	-0.72
	Mukim 10	8,022	8,755	0.79	1,478	1,703	1.29	5.43	5.14	-0.49
	Mukim 11	18,229	21,442	1.48	3,095	4,079	2.51	5.89	5.26	-1.03
	Mukim 12	2,946	3,758	2.21	665	977	3.50	4.43	3.85	-1.28
	Mukim 13	1,738	1,815	0.39	321	326	0.14	5.41	5.57	0.25
	Mukim 14	5,295	6,365	1.67	805	1,126	3.05	6.58	5.65	-1.38
	Mukim 15	7,949	9,055	1.18	1,209	1,555	2.29	6.57	5.82	-1.10
	Mukim 16	193	285	3.54	46	87	5.79	4.20	3.28	-2.25
	Wayfarers	36	-	-	1	-	-	-	-	-

Source: Population and Housing Census of Malaysia 1991,
Preliminary Count Report, Department of Statistics

TABLE VII.2.2.5(5/5) POPULATION, NUMBER OF HOUSEHOLDS AND AVERAGE NUMBER OF PERSONS PER HOUSEHOLD BY MUKIM IN THE STUDY AREA

State/ District	Mukim	Population		Average Annual Growth Rate(%) of Population	Number of Households		Average Annual Growth Rate(%) of HH Number	Average Number of Persons per Household		Average Annual Growth Rate(%) of Persons/HH
		1980	1991	(1980-1991)	1980	1991	(1980-1991)	1980	1991	(1980-1991)
Timur Laut		391,400	395,232	0.09	70,612	79,651	1.10	5.51	4.96	-1.01
	Mukim 13(Paya Terubong)	73,125	108,726	3.61	12,907	21,526	4.68	5.67	5.03	-1.07
	Mukim 14(Bkt.P. Terubong)	2,796	1,728	-4.37	437	327	-2.64	6.40	5.28	-1.74
	Mukim 15(Bkt. Ayer Ram)	570	21	-30.01	87	11	-18.80	6.55	1.91	-11.21
	Mukim 16(Ayer Ram)	34,580	27,575	-2.06	6,762	6,398	-0.50	5.11	4.31	-1.55
	Mukim 17(Batu Feringgi)	3,643	6,507	5.28	569	1,303	7.53	6.40	4.99	-2.26
	Mukim 18(Tan- jong Tokong)	37,792	38,270	0.11	7,151	8,008	1.03	5.28	4.78	-0.91
	Bandaraya Georgetown	238,250	212,405	-1.04	42,698	42,008	-0.15	5.58	5.06	-0.90
	Wayfarers	645	-	-	1	-	-	-	-	-
	Barat Daya		76,390	123,187	4.34	14,241	24,967	5.10	5.36	4.93
Mukim A(Sg. Pinang)		2,375	2,553	0.66	421	488	1.34	5.61	5.23	-0.69
Mukim B(Sg. Rusa)		952	914	-0.37	174	170	-0.21	5.47	5.38	-0.16
Mukim C(Pema- tang Pasir)		1,247	1,577	2.13	252	296	1.46	4.95	5.33	0.67
Mukim D(Bagan Ayer Ram)		2,111	2,386	1.11	398	471	1.53	5.30	5.07	-0.42
Mukim E(Titi Teras)		1,740	2,178	2.04	376	467	1.97	4.63	4.66	0.07
Mukim F(Kongsi)		1,386	2,204	4.22	295	479	4.41	4.70	4.60	-0.19
Mukim G(Kampung Paya)		702	808	1.28	142	154	0.74	4.94	5.25	0.54
Mukim H(Sg. Burog)		900	1,221	2.77	176	258	3.48	5.11	4.73	-0.70
Mukim I (P.Betong)		879	1,188	2.74	185	256	2.95	4.75	4.64	-0.21
Mukim J(Dataran Ginjang)		1,004	1,275	2.17	203	266	2.46	4.95	4.79	-0.28
Mukim K(Pantai Acheh)		2,095	3,568	4.84	374	853	7.50	5.60	4.18	-2.66
Mukim 2(Telok Bahang)		3,640	3,341	-0.78	684	608	-1.07	5.32	5.50	0.29
Mukim 3(S.Rusa & B.S.Penang)		1,537	1,911	1.98	302	382	2.14	5.09	5.00	-0.16
Mukim 4(Batu Ram)		2,383	2,373	-0.04	426	489	1.25	5.59	4.85	-1.29
Mukim 5(Bkt. Balik Pulau)		576	343	-4.71	90	62	-3.39	6.40	5.53	-1.32
Mukim 6(Pondok Upeh)		3,378	4,833	3.26	655	832	2.17	5.16	5.81	1.08
Mukim 7(Bkt. Ginjang)		1,790	1,831	0.21	323	355	0.86	5.54	5.16	-0.65
Mukim 8(Bkt. Pasir Panjang)		1,020	1,020	0.00	149	182	1.82	6.85	5.60	-1.82
Mukim 9(Bkt. Gemeroh)		5,289	7,285	2.91	968	1,476	3.84	5.46	4.94	-0.92
Mukim 10(Bkt. Relau)		1,388	1,468	0.51	209	247	1.52	6.64	5.91	-1.01
Mukim 11(Telok Kumbang)		4,587	6,854	3.65	900	1,381	3.89	5.10	4.96	-0.24
Mukim 12(Bayau Lepas)		35,411	72,056	6.46	6,539	14,795	7.42	5.42	4.87	-0.96
Total		2,123,369	2,553,945	1.68	411,847	526,177	2.23	5.16	4.85	-0.55

Source: Population and Housing Census of Malaysia 1991,
Preliminary Count Report, Department of Statistics

TABLE VIII.1.6(1/2) CONDITIONS FOR POPULATION PROJECTIONS BY MUKIM IN KEDAH STATE

District	Mukim	Population Census			Forecast of Annual Growth Rate (%)						Remarks
		Population		1991	Average Annual		Period: 1991-2000			2000-2010	
		1989	1990		Growth Rate (%)	Period: 1991-2000	Expo- -polation	Expo- -polation			
1970	1980	1985	1970-80	1980-91	1991-2000	2000-2010	2000-2010				
1 Baling											
	1 Bakai	12,874	12,482	12,552	-0.31	0.05	-0.13	0.41	0.09	0.23	
	2 Baling	8,359	8,190	8,166	-0.20	-0.03	-0.12	0.15	-0.01	0.06	Baling Small Industrial Estate -KEDA
	3 Beegor	4,769	4,901	5,584	0.27	1.17	0.72	2.08	1.27	1.62	
	4 Kupang	21,103	21,607	23,442	0.24	0.73	0.43	1.23	0.79	0.93	Kupang Small Industrial Estate -KEDA
	5 Pulau	12,669	12,345	19,972	-0.18	1.27	0.54	2.73	1.43	1.59	
	6 Siang	10,324	11,117	11,842	0.74	0.57	0.65	0.39	0.55	0.48	Forest (89%)
	7 Tawar	18,363	16,899	18,284	-0.83	0.71	-0.06	2.24	0.83	1.47	19. Kuala Keit Industrial Estate.
	8 Teluk Kanan	10,657	12,255	14,647	1.41	1.61	1.51	1.81	1.63	1.71	
	Wayfarers		62								
	Total	104,118	104,858	114,489	0.07	0.79	0.43	1.51	0.88	1.15	
2 Badar Baru											
	1 Bagan Samak	12,833	12,425	12,699	-0.32	0.20	-0.06	0.71	0.25	0.45	24. IKS Keda Park. Small Indust. Estate-KEDA.
	2 Kuala Selama	3,856	3,810	3,559	-0.12	-0.61	-0.36	-1.10	-0.66	-0.85	
	3 Relau	2,034	1,831	2,083	-0.78	0.92	0.07	2.61	1.10	1.76	Forest (90%)
	4 Serdang	9,207	8,579	9,478	-0.70	0.90	0.09	2.50	1.07	1.69	
	5 Sungai Batu	3,466	3,257	3,200	-0.62	-0.16	-0.39	0.30	-0.11	0.07	
	6 Sungai Kechil Hilir	1,814	1,772	1,938	-0.23	0.80	0.28	1.84	0.92	1.32	Forest (80%)
	Total	33,210	31,724	32,957	-0.46	0.34	-0.06	1.14	0.45	0.74	
3 Kota Setar											
	1 Aloi Malai	11,514	20,728	29,733	6.06	3.28	4.65	0.51	2.97	1.88	Urban area (100%)
	2 Aloi Merah	8,215	11,785	12,174	3.67	0.29	1.97	2.00	0.16	-0.32	Urban area (70%)
	3 Anak Bukit	5,070	5,739	8,322	1.25	3.38	2.30	5.51	3.62	4.41	
	4 Bukit Lada	3,676	3,997	4,418	0.84	0.90	0.87	0.96	0.91	0.93	
	5 Bukit Pinang	4,192	5,056	6,272	1.89	1.95	1.92	2.00	1.95	1.97	
	6 Derang	2,075	2,614	3,564	2.34	2.81	2.57	3.29	2.87	3.05	
	7 Derga	8,588	19,742	22,411	8.68	1.14	4.84	-2.00	1.26	1.70	
	8 Gajah Mati	7,069	8,379	9,284	1.71	0.92	1.32	0.13	0.83	0.53	
	9 Gunung	6,415	6,754	6,937	0.52	0.24	0.38	-0.04	0.21	0.10	
	10 Hutan Kampong	2,558	3,205	4,669	2.28	3.43	2.84	4.57	3.55	3.99	
	11 Jabu	4,979	6,077	7,619	2.01	2.05	2.03	2.08	2.05	2.06	
	12 Kangkong	5,725	6,309	7,008	0.98	0.95	0.96	0.91	0.94	0.93	
	13 Kota Setar	53,234	47,879	36,721	-1.05	-2.35	-1.71	-2.00	-2.00	-1.36	Urban and industrial areas (100%)
	14 Kuala Kedah	12,230	14,998	16,378	2.06	0.79	1.42	-0.48	0.65	0.15	
	15 Kubang Rotan	4,492	5,058	5,099	1.19	0.07	0.63	-1.65	-0.05	-0.49	
	16 Langgar	5,292	6,404	7,150	1.93	0.99	1.46	0.06	0.89	0.52	
	17 Leangkuas	1,219	1,310	1,272	0.72	-0.26	0.23	-1.25	-0.37	-0.76	
	18 Lepai	1,994	2,370	2,570	1.74	0.73	1.23	-0.29	0.62	0.22	
	19 Lesong	4,875	5,424	5,679	1.07	0.41	0.74	-0.25	0.34	0.08	
	20 Limbong	1,353	1,313	1,445	-0.30	0.86	0.28	2.02	0.99	1.41	
	21 Mergong	4,066	7,459	12,353	6.26	4.62	5.42	2.98	4.44	3.79	4. Mergong II Industrial Estate.
	22 Padang Hang	4,519	4,449	4,322	-0.16	-0.26	-0.21	-0.36	-0.27	-0.31	
	23 Padang Lalang	6,484	7,178	7,876	1.02	0.83	0.93	0.65	0.81	0.74	
	24 Pengkalan Kedondong	25,335	31,018	37,806	2.04	1.79	1.91	1.53	1.76	1.66	6. Pekoh Sena Industrial Estate.
	25 Pungong	4,790	5,450	14,853	1.30	9.39	5.21	8.00	8.00	3.81	
	26 Sala Keitil	5,721	6,348	7,998	1.05	2.69	1.56	3.13	2.20	2.61	
	27 Sungai Baharu	1,780	1,829	1,770	0.27	-0.29	-0.01	-0.86	-0.36	-0.58	
	28 Tejar	7,664	9,162	9,888	1.80	0.69	1.24	-0.43	0.56	0.13	
	29 Tebengau	3,572	3,931	4,074	0.95	0.32	0.64	-0.31	0.25	0.00	
	30 Telaga Mas	2,066	2,251	2,418	0.85	0.61	0.75	0.42	0.62	0.53	
	31 Telok Chengal	1,706	2,018	3,605	1.69	5.33	3.48	8.00	5.51	6.15	5. Mergong Barrage Industrial Estate.
	32 Telok Kechai	2,741	3,123	7,245	1.31	7.82	4.48	8.00	7.12	4.66	
	33 Titi Gajah	3,728	4,167	4,474	1.12	0.64	0.88	0.16	0.59	0.40	
	34 Tualang	5,252	6,043	6,173	1.41	0.19	0.80	-1.03	0.06	-0.42	
	Total	234,189	279,567	323,580	1.79	1.32	1.53	0.85	1.46	1.06	
4 Kuala Muda											
	1 Bujang	4,911	5,204	5,897	0.52	1.13	0.82	1.73	1.19	1.43	
	2 Bukit Meriam	4,567	4,766	4,977	0.43	0.39	0.41	0.35	0.38	0.37	
	3 Gurun	23,675	27,509	31,929	1.51	1.34	1.43	1.17	1.32	1.26	Jeniang Small Industrial Estate-KEDA.
	4 Haji Kudong	1,180	1,183	1,149	0.03	-0.26	-0.12	-0.55	-0.29	-0.40	
	5 Kota	2,470	2,643	2,974	0.68	1.06	0.87	1.44	1.10	1.25	
	6 Kuala	1,949	1,332	2,603	1.77	1.03	1.40	0.29	0.93	0.66	
	7 Merbok	10,979	12,562	12,453	1.36	-0.08	0.64	-1.51	-0.24	-0.80	
	8 Pekula	4,937	6,262	8,632	2.41	2.92	2.66	3.42	2.97	3.16	20 Industrial Estate.
	9 Pinang Tunggal	3,935	3,823	3,420	-0.34	-0.99	-0.67	-1.65	-1.06	-1.32	
	10 Rantau Panjang	2,433	2,564	2,684	0.53	0.41	0.47	0.19	0.40	0.35	
	11 Semeling	11,153	13,489	13,656	1.92	0.11	1.01	-1.70	-0.09	-0.80	
	12 Sidam Kiri	7,082	7,210	6,914	0.18	-0.37	-0.10	-0.93	-0.44	-0.65	
	13 Simpor	3,543	4,116	4,694	1.51	1.18	1.35	0.86	1.15	1.02	
	14 Sungai Pasir	13,938	20,532	44,628	3.95	7.20	5.53	8.00	7.01	6.33	14. Bakar Arang Industrial Estate.
	15 Sungai Petani	54,695	63,917	99,415	2.34	3.34	2.83	4.34	3.45	3.83	IKONK Indust. centre & Bakar Arang Estate.
	16 Teluk Kili	8,573	9,206	9,036	0.71	-0.17	0.27	-1.05	-0.26	-0.61	
	Total	160,070	192,308	255,091	1.94	2.56	2.18	3.18	2.78	2.80	

TABLE VII.1.2.6(2/1) CONDITIONS FOR POPULATION PROJECTIONS BY MUKIMIN KEDAH STATE

District	Mukim	Population Census			Forecast of Annual Growth Rate (%)						Remarks
		Population		Average Annual Growth Rate (%) 1970-83	1991-2000		2000-2010		Extrapolation	Extrapolation	
		1970	1980		Extrapolation	Extrapolation					
		1970	1980	1991	1970-83	1991-2000	2000-2010	Extrapolation	Extrapolation		
		Jun. 11	Aug. 14	Aug. 14							
5	Kubang Pasu										
	1 Ab	6,095	6,468	7,063	0.60	0.79	0.69	0.99	0.81	0.89	
	2 Binjal	2,840	2,680	3,008	-0.58	1.04	0.23	2.66	1.22	1.84 Binjal Small Industrial Estate-KEDA.	
	3 Bukit Tioggi	3,597	3,989	5,713	1.04	3.27	2.14	5.50	3.51	4.37	
	4 Gelong	4,981	5,212	5,693	0.45	0.79	0.62	1.13	0.83	0.96	
	5 Husba	3,308	2,785	2,651	-1.82	-0.44	-1.64	1.94	-0.18	0.74	
	6 Jeram	8,396	8,203	8,098	-0.23	-0.12	-0.17	0.00	-0.10	-0.06	
	7 Jerlun	16,886	18,374	18,561	0.85	0.09	0.47	-0.67	0.01	-0.29	
	8 Jitra	7,755	10,941	17,019	3.50	4.03	3.76	4.57	4.09	4.29 Industrial Estate.	
	9 Kepelu	8,318	9,301	9,237	1.12	-0.06	0.53	-1.25	-0.19	-0.66	
	10 Kubang Pasu	1,712	3,005	2,625	5.79	-1.20	2.23	-2.00	-0.62	1.43 Industrial Estate (2 IKS Keda Park).	
	11 Malau	2,145	2,373	2,684	1.02	1.11	1.06	1.20	1.12	1.15	
	12 Naga	10,702	11,889	17,649	1.06	3.60	2.31	6.14	3.88	4.86 3.Darulaman Industrial Estate.	
	13 Padang Perahu	3,458	3,303	3,296	-0.45	-0.02	-0.24	0.42	0.03	0.20	
	14 Pelubang	1,870	1,774	1,991	-0.53	1.04	0.25	2.60	1.21	1.82	
	15 Pering	6,256	6,605	6,954	0.54	0.46	0.50	0.38	0.45	0.42	
	16 Putat	4,952	4,827	5,138	-0.26	0.56	0.15	1.38	0.65	0.97	
	17 Sungai	9,252	9,217	9,371	-0.04	0.15	0.06	0.33	0.17	0.24	
	18 Sungai Laka	2,348	3,772	7,523	4.85	6.38	5.59	7.90	6.54	7.11 Bukit Kayu Hitam Industrial Estate.	
	19 Temoi	5,684	6,997	15,515	2.10	7.39	4.68	8.00	6.92	5.29	
	20 Turang	6,331	6,816	6,990	0.66	0.23	0.44	-0.21	0.18	0.01	
	21 Wang Tepus	1,067	1,277	1,409	1.81	0.88	1.35	-0.04	0.78	0.42	
	Total	118,403	129,808	158,189	0.92	1.79	1.33	2.65	2.06	2.19	
6	Kulim										
	1 Bagan Sena	5,417	5,197	5,352	-0.41	0.26	-0.08	0.94	0.34	0.60	
	2 Junjong	3,657	3,642	4,027	-0.04	0.90	0.43	1.85	1.01	1.37	
	3 Karangau	4,465	4,696	6,949	0.51	3.57	2.02	6.64	3.90	5.08	
	4 Keloh	3,110	3,515	14,066	1.23	13.22	6.95	8.00	8.00	1.73 near Pulau Pinang state & IHP.	
	5 Kulim	20,376	21,231	30,470	0.41	3.29	1.83	6.16	3.60	4.71 Major urban centre.	
	6 Lunas	6,543	7,201	11,078	0.96	3.93	2.43	6.90	4.25	5.39 near Kulim Indust. Estate, IHP & Butterworth.	
	7 Mahang	2,965	3,247	3,214	0.91	-0.09	0.41	-1.10	-0.20	-0.59 Forest (80%).	
	8 Naga Lilit	6,101	5,564	6,714	-0.92	1.70	0.38	4.31	1.98	2.99 has impact from Kulim Indust. Estate & IHP.	
	9 Padang China	7,337	8,069	7,865	0.96	-0.23	0.36	-1.41	-0.36	-0.82 An industrial centre in Kulim District, IHP.	
	10 Padang Meha	7,780	7,762	7,587	-0.02	-0.20	-0.11	-0.38	-0.22	-0.29 Minor effect of IHP.	
	11 Seidin	4,733	3,998	3,336	-1.67	-1.61	-1.64	-1.54	-1.60	-1.58	
	12 Sidam Kanan	6,815	7,750	9,594	1.29	1.93	1.61	2.56	2.00	2.24	
	13 Sungai Seluang	2,812	4,009	10,494	3.61	9.00	6.22	8.00	8.00	5.22 Kulim Indust. near 21,22 and 23 Indust. Estates.	
	14 Sungai Ular	2,674	2,652	3,334	-0.08	2.07	0.99	4.22	2.31	3.14 adjacent to Kulim mukim & IHP.	
	15 Terap wayfarers	3,636	3,969	4,314	0.88	0.75	0.81	0.62	0.73	0.68	
	Total	68,421	92,525	128,394	0.45	2.98	1.65	5.50	3.24	4.18	
7	Langkawi										
	1 Ayer Hangat	2,988	4,309	6,850	3.73	4.24	3.97	4.75	4.29	4.48	
	2 Boboi	1,887	2,156	3,247	1.34	3.73	2.52	6.13	3.99	4.91	
	3 Kedawang	3,413	3,626	5,550	0.61	3.88	2.22	7.16	4.24	5.50	
	4 Kuah	8,717	10,404	15,489	1.78	3.63	2.69	5.47	3.83	4.54 Small Industrial Estate-KEDA.	
	5 Padang Masingrat	3,813	4,170	5,960	0.90	3.25	2.06	5.60	3.51	4.41	
	6 Ulu Melaka wayfarers	3,001	3,638	5,659	1.94	4.03	2.97	6.13	4.26	5.07	
	Total	23,819	28,340	42,755	1.75	3.75	2.74	5.75	3.97	4.73	
8	Padang Terap										
	1 Batang Tunggang Kanan	661	999	1,226	4.22	1.85	3.02	-0.52	1.59	0.66	
	2 Batang Tunggang Kiri	768	885	1,270	1.43	3.29	2.35	5.14	3.49	4.20	
	3 Belimbing Kanan	4,502	5,489	7,102	2.00	2.33	2.16	2.66	2.37	2.50	
	4 Belimbing Kiri	1,586	2,030	2,516	2.50	1.94	2.22	1.38	1.88	1.66	
	5 Kurong Hitam	1,386	1,874	2,407	3.06	2.27	2.66	1.47	2.18	1.86	
	6 Padang Temak	3,418	4,257	4,738	2.22	0.96	1.59	-0.29	0.82	0.33	
	7 Padang Terap Kanan	1,117	1,295	1,610	1.49	1.97	1.73	2.45	2.02	2.21 Existing Industrial Area.	
	8 Padang Terap Kiri	1,830	2,855	4,068	4.55	3.08	3.81	1.62	2.92	2.34 Existing Industrial Area.	
	9 Pedu	4,024	4,811	5,310	1.80	0.89	1.34	-0.03	0.79	0.43	
	10 Telak	10,247	14,547	18,405	3.57	2.13	2.84	0.69	1.97	1.40	
	11 Telak	841	1,386	2,142	5.12	3.97	4.54	2.83	3.84	3.39	
	Total	30,380	40,428	50,734	2.90	2.05	2.47	1.21	1.98	1.63	
9	Sik										
	1 Jeneri	9,115	10,892	11,608	1.80	0.57	1.18	-0.65	0.44	-0.04	
	2 Sik	26,282	26,859	35,019	0.22	2.40	1.30	4.59	2.64	3.49 Sik Small Industrial Estate-KEDA.	
	3 Sok	3,654	5,615	8,026	4.39	3.25	3.81	2.11	3.12	2.67	
	Total	39,051	43,366	54,653	1.05	2.09	1.57	3.13	2.24	2.61	
10	Yan										
	1 Dulang	4,678	4,471	4,396	-0.45	-0.15	-0.30	0.15	-0.12	0.00	
	2 Sala Besar	20,121	23,562	25,666	1.59	0.77	1.18	-0.05	0.68	0.36	
	3 Singkir	3,154	2,988	2,990	-0.54	0.01	-0.27	0.55	0.07	0.28	
	4 Sungai Daun	12,001	11,541	11,666	-0.39	0.10	-0.15	0.58	0.15	0.34	
	5 Yan wayfarers	15,017	16,449	16,105	0.91	-0.19	0.36	-1.29	-0.31	-0.74 8. Yan Industrial Estate.	
	Total	54,972	59,030	60,823	0.71	0.27	0.49	-0.18	0.22	0.04	
11	Padang										
	1 Ayer Puteh	21,976	24,296	27,583	1.01	1.14	1.07	1.28	1.16	1.21 9. IKS Keda Park (Industrial Estate).	
	2 Bukit Raya	11,007	13,034	12,770	1.70	-0.18	0.76	-2.00	-0.38	-1.06	
	3 Guar Kepayang	5,543	6,528	7,117	1.64	0.78	1.21	-0.09	0.68	0.34	
	4 Padang Kerbau	9,335	9,663	9,831	0.35	0.15	0.25	-0.04	0.13	0.06 Sungai Tiang Small Industrial Estate-KEDA.	
	5 Padang Peliang	1,837	2,406	3,816	2.74	4.22	3.46	5.70	4.38	4.94	
	6 Padang Pusing	7,183	7,999	8,735	1.08	0.79	0.94	0.50	0.76	0.65	
	7 Rambai	6,465	6,727	7,557	0.40	1.05	0.72	1.70	1.12	1.37	
	8 Tobiar	4,765	5,208	5,726	0.89	0.85	0.87	0.81	0.83	0.83	
	Total	68,116	75,861	83,435	1.08	0.82	0.95	0.56	0.84	0.69	
Kedah State Grand Total		954,749	1,077,815	1,304,800	1.22	1.73	1.45	2.23	1.84	2.09	

TABLE VII.2.2.7 CONDITIONS FOR POPULATION PROJECTIONS BY MUKIM IN PERLIS STATE

District	Mukim	Population Census				Forecast of Annual Growth Rate (%)				Remarks
		Population		Average Annual Growth Rate (%)		Period: 1991-2000		Period: 2000-2010		
		1970	1980 Jun. 11	1991 Aug. 14	1970-80	1980-91	Expo- nential	Extra- polation	Expo- nential	
Perlis										
	1 Abi	1,793	1,889	2,106	0.52	0.98	0.75	1.43	1.03	1.21
	2 Arau	9,280	10,309	16,405	1.06	4.25	2.63	7.44	4.59	5.82
	3 Beseri	5,860	6,907	11,341	1.66	4.51	3.08	7.42	4.85	5.96
	4 Chuping	5,639	8,078	10,990	3.66	2.79	3.22	1.93	2.70	2.36
	5 Jejawi	3,350	3,719	6,796	1.05	5.55	3.25	8.00	5.58	5.71
	6 Kayang	8,465	9,367	9,970	1.02	0.56	0.79	0.10	0.51	0.33
	7 Kechor	4,642	5,863	6,850	2.36	1.40	1.88	0.41	1.30	0.92
	8 Kuala Perlis	9,908	11,227	13,483	1.26	1.65	1.45	2.05	1.70	1.85
	9 Kurong Anai	8,582	9,859	10,377	1.43	0.43	0.93	-0.56	0.32	-0.07
	10 Kurong Batang	1,670	2,047	2,598	2.06	2.16	2.10	2.26	2.17	2.20
	11 Ngolang	2,175	2,426	2,719	1.10	1.03	1.06	0.95	1.02	0.99
	12 Oran	1,726	1,820	3,297	0.53	5.46	2.95	8.00	5.47	5.49
	13 Padang Pauh	2,780	3,040	3,527	0.90	1.34	1.12	1.78	1.39	1.56
	14 Padang Siding	2,403	4,755	5,997	7.06	2.10	4.55	-2.00	1.73	0.45
	15 Paya	3,519	4,034	4,713	1.38	1.40	1.39	1.43	1.41	1.41
	16 Sanglang	13,911	14,385	15,131	0.31	0.45	0.38	0.59	0.47	0.52
	17 Sena	7,417	9,654	13,384	2.63	2.97	2.79	3.31	3.00	3.13
	18 Seriap	3,521	4,474	5,834	2.42	2.40	2.41	2.38	2.40	2.39
	19 Sungai Adam	1,107	1,307	1,563	1.67	1.61	1.64	1.55	1.61	1.58
	20 Titi Tinggi	9,318	12,045	15,730	2.60	2.42	2.51	2.24	2.40	2.32
	21 Utan Aji	9,503	12,315	13,824	2.63	1.04	1.83	-0.55	0.86	0.24
	22 Wang Bintong Wayfarers	4,362	5,188	7,435	1.75	3.27	2.50	4.80	3.44	4.03
	Total	120,991	144,782	184,070	1.81	2.17	1.98	2.53	2.68	2.74

TABLE VIII.2.14 CONDITIONS FOR POPULATION PROJECTIONS BY MUKIM IN PULAU PINANG STATE

District	Mukim	Population Census			Forecast of Annual Growth Rate (%)				Remarks		
		1979 11 Jun.	1980 14 Aug.	1991	Average Annual Growth Rate (%) 1978-83	1983-91	Period: 1991-2000 Expo- neusal	Period: 2000-2010 Expo- polation		Period: 2010-2018 Extra- polation	
1 Seberang Perai Tengah											
Mukim	1	3,318	18,672	46,335	18.86	8.47	8.00	-1.92	6.82	-2.00	Urban area (90%)
Mukim	2	3,952	4,312	5,039	0.88	1.40	1.14	1.93	1.44	1.67	
Mukim	3	3,341	4,116	5,266	1.99	2.23	2.11	2.47	2.25	2.35	
Mukim	4	5,934	7,189	7,630	1.94	0.56	1.24	-0.82	0.46	-0.13	
Mukim	5	2,816	3,336	3,890	1.71	1.38	1.55	1.06	1.36	2.12	
Mukim	6	4,096	5,791	13,018	3.52	7.54	5.48	8.00	7.29	5.94	
Mukim	7	3,665	1,090	2,772	2.30	2.56	2.43	2.82	1.58	2.69	
Mukim	8	10,116	10,978	10,373	0.82	-0.51	0.16	-1.80	-0.61	-1.17	
Mukim	9	9,131	11,799	12,000	2.15	0.54	1.34	-1.07	0.42	-0.27	Urban area (70%)
Mukim	10	19,641	23,251	20,414	1.70	-1.16	0.26	-2.00	-1.08	-0.58	Urban area (100%)
Mukim	11	5,116	8,558	24,158	5.28	9.74	7.42	8.00	8.00	5.69	Urban area (80%)
Mukim	12	2,740	3,174	4,127	1.48	1.38	1.93	3.28	2.44	2.82	
Mukim	13	2,776	3,313	3,580	1.78	0.70	1.34	-0.39	0.62	0.15	
Mukim	14	6,645	7,504	12,550	1.22	4.71	2.94	8.00	4.99	6.23	
Mukim	15	9,706	15,627	17,263	4.88	5.11	4.98	5.34	5.12	5.21	
Mukim	16	5,567	6,281	7,091	1.21	1.09	1.15	0.97	1.08	1.03	
Mukim	17	3,100	2,365	2,052	7.96	-1.25	3.24	-2.00	-0.71	2.51	Forest (80%)
Mukim	18	1,405	1,654	1,057	1.64	1.97	1.81	2.30	2.00	2.13	
Mukim	19	2,137	2,350	3,022	0.95	2.28	1.61	3.60	2.38	2.93	
Mukim	20	6,477	8,111	10,454	2.28	2.30	2.28	2.32	2.30	2.31	
Mukim	21	2,438	2,752	3,209	1.22	1.38	1.30	1.55	1.40	1.47	
Mukim	1A	7,557	9,252	9,999	2.04	0.70	1.37	-0.65	0.60	0.02	
Total		117,714	161,975	236,319	3.24	3.44	3.28	3.64	4.98	6.47	
2 Seberang Perai Utara											
Mukim	1	5,249	5,968	7,304	1.29	1.82	1.56	2.36	1.87	2.09	
Mukim	2	5,107	5,684	6,039	1.08	0.57	0.82	0.07	0.54	0.32	
Mukim	3	6,171	7,813	8,936	2.39	1.21	1.80	6.03	1.12	0.62	
Mukim	4	5,097	5,626	6,702	0.99	1.58	1.28	2.17	1.62	1.87	
Mukim	5	6,290	6,666	7,550	0.58	1.12	0.85	1.66	1.16	1.39	
Mukim	6	10,827	12,824	15,339	1.71	1.62	1.66	1.53	1.51	1.57	
Mukim	7	8,485	11,392	12,118	2.99	0.55	1.76	-1.08	0.37	-0.67	
Mukim	8	6,633	7,276	9,842	0.93	2.74	1.83	4.55	2.87	3.64	
Mukim	9	6,917	10,898	15,076	4.65	1.95	3.79	1.24	2.82	2.09	Urban area (80%)
Mukim	10	3,286	3,714	4,444	1.43	1.62	1.42	2.01	1.63	1.81	
Mukim	11	6,633	7,924	10,661	1.79	2.69	2.24	3.59	2.76	3.14	
Mukim	12	13,450	13,354	19,001	1.27	1.99	1.62	2.71	2.04	2.34	
Mukim	13	4,192	4,462	5,662	0.63	2.16	1.39	3.68	2.17	2.91	
Mukim	14	39,502	54,240	61,732	3.22	1.17	2.19	-0.89	1.02	0.14	Urban area (100%)
Mukim	15	30,035	33,640	29,178	1.14	-1.27	-0.07	-2.00	-1.20	-0.81	Urban area (80%)
Mukim	16	3,441	4,609	6,145	2.97	2.61	1.78	2.15	2.58	2.43	
Wayfarers			1,459								
Total		161,317	199,449	225,769	1.94	1.12	1.62	0.29	6.41	2.41	
3 Seberang Perai Selatan											
Mukim	1	2,165	2,354	3,007	0.84	2.22	1.52	3.59	2.32	2.90	
Mukim	2	1,109	1,156	1,249	0.42	0.70	0.56	0.97	0.72	0.83	
Mukim	3	457	504	449	0.98	-1.03	-0.03	-1.00	-1.03	-1.00	
Mukim	4	4,441	3,686	3,538	-1.85	-0.37	-1.11	1.11	-0.26	0.37	
Mukim	5	3,454	4,623	4,955	2.84	0.62	1.72	-1.39	0.46	-0.49	
Mukim	6	611	547	479	-1.26	-1.18	-1.22	-1.10	0.20	-1.14	
Mukim	7	3,694	4,816	6,834	2.69	3.17	2.92	3.65	3.20	3.40	
Mukim	8	2,490	2,450	1,541	-0.16	0.33	0.08	0.82	0.36	0.57	
Mukim	9	5,977	7,014	10,051	1.58	3.27	2.42	4.97	3.40	4.11	
Mukim	10	7,459	8,022	8,755	0.73	0.79	0.76	0.84	0.79	0.81	
Mukim	11	16,190	18,229	21,442	1.19	1.46	1.33	1.73	1.48	1.60	
Mukim	12	2,273	2,946	3,758	2.43	2.20	2.41	1.78	2.17	1.99	
Mukim	13	1,535	1,738	1,815	1.25	0.39	0.82	-0.47	0.33	-0.04	
Mukim	14	4,674	5,295	6,365	1.26	1.66	1.46	2.07	1.69	1.86	
Mukim	15	6,735	7,949	9,055	1.67	1.17	1.42	0.68	1.14	0.92	
Mukim	16	253	193	285	-2.67	3.55	0.38	8.00	3.74	4.83	Forest (80%)
Wayfarers			36								
Total		63,587	71,558	84,568	1.19	1.51	1.34	1.83	1.76	3.38	
4 Timur Laut											
Mukim	13	49,572	73,125	108,726	3.96	3.61	3.78	3.17	3.59	3.43	
Mukim	14	805	2,796	1,718	13.26	-4.12	4.14	-2.00	-2.00	6.36	
Mukim	15	153	570	21	14.06	-25.59	-2.00	-2.00	-2.00	8.00	Forest (95%)
Mukim	16	22,332	34,580	37,575	4.47	-2.01	1.18	-2.00	-1.54	1.18	Forest (80%)
Mukim	17	3,219	3,642	6,507	1.24	5.33	3.33	8.00	5.41	5.92	Forest (95%)
Mukim	18	16,872	37,792	38,170	3.47	0.11	1.78	-2.00	0.05	-0.34	Urban area (60%)
Bandar Raya											
Georgetown		269,247	238,150	212,405	-1.22	-1.02	-1.12	-0.83	-1.01	-0.93	Urban area (100%)
Wayfarers			615								
Total		372,209	391,800	395,232	0.50	0.09	0.28	-0.33	1.07	1.35	
5 Barat Daya											
Mukim	A	2,675	2,375	2,553	-1.18	0.65	-0.27	2.48	0.78	1.56	
Mukim	B	992	952	914	-0.41	-0.36	-0.39	-0.32	-0.36	-0.34	
Mukim	C	1,334	1,247	1,577	-0.67	2.12	0.71	4.92	2.33	3.31	
Mukim	D	2,154	2,111	2,386	-0.20	1.10	0.45	2.41	1.20	1.75	
Mukim	E	2,118	1,740	2,178	-1.55	2.03	0.02	6.01	2.32	4.00	
Mukim	F	975	1,385	2,204	3.58	4.24	3.50	4.90	4.29	4.56	
Mukim	G	595	701	808	1.67	1.27	1.47	0.87	1.24	1.07	
Mukim	H	813	900	1,221	1.02	2.77	1.89	4.52	2.90	3.63	
Mukim	I	870	879	1,188	0.70	2.73	1.71	4.77	2.88	3.74	
Mukim	J	1,041	1,004	1,275	-0.36	2.16	0.89	4.69	2.35	3.41	
Mukim	1	2,549	2,095	3,568	-1.94	4.88	1.40	8.00	4.82	4.32	
Mukim	2	2,640	3,640	3,341	3.26	-0.76	1.23	-2.00	-0.65	-0.01	
Mukim	3	6,595	1,537	1,911	-0.37	1.97	0.79	4.31	2.14	3.13	
Mukim	4	2,567	2,383	2,373	-0.74	-0.04	-0.39	0.67	0.01	0.31	
Mukim	5	574	576	343	0.03	-4.53	-1.00	-2.00	-1.00	0.53	Forest (90%)
Mukim	6	3,622	3,378	4,833	-0.69	3.26	1.26	7.31	3.55	5.21	
Mukim	7	1,629	1,790	1,821	0.95	0.20	0.57	-0.54	0.15	-0.17	
Mukim	8	1,022	1,020	1,020	-0.02	0.00	-0.01	0.03	0.00	0.01	
Mukim	9	4,912	5,289	7,283	0.74	2.91	1.81	5.07	3.07	3.98	
Mukim	10	1,387	1,388	1,468	0.01	0.50	0.25	1.00	0.54	0.75	
Mukim	11	2,674	4,587	6,854	3.54	3.66	4.59	1.78	3.52	2.71	
Mukim	12	11,934	35,411	72,056	4.91	6.57	5.71	8.00	6.64	7.14	
Total		60,622	76,500	113,187	2.34	4.37	3.31	6.40	3.45	8.00	
Pulau Pinang State											
Grand Total		775,430	900,772	1,065,075	1.51	1.51	1.48	1.51	2.98	4.12	

TABLE VII.2.19 (U2) POPULATION PROJECTIONS BY MUKIM IN KUDAH STATE

District	Mukim	Projection for Year 2000						Projection for Year 2010					
		Average Annual Growth Rate (%) for 1991-2000			Population 2000			Average Annual Growth Rate (%) for 2000-2010			Population 2010		
		High	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium
1 Baling													
	1 Bahai	0.50	-0.10	0.14	13,117	12,442	12,708	0.30	0.00	0.16	13,516	12,442	12,912
	2 Baling	0.20	-0.10	0.02	8,311	8,094	8,179	0.10	-0.10	0.03	8,395	8,014	8,202
	3 Bongor	2.10	0.70	1.40	6,709	5,939	6,313	1.70	1.20	1.45	7,941	6,691	7,290
	4 Kupang	1.30	0.50	0.86	26,274	24,497	25,275	1.00	0.70	0.88	29,023	26,267	27,593
	5 Pulau	2.80	0.50	1.63	25,487	20,874	23,042	2.00	1.40	1.71	31,069	23,984	27,307
	6 Siang	0.70	0.40	0.51	12,594	12,267	12,400	0.60	0.40	0.51	13,371	12,766	13,052
	7 Tawai	2.30	-0.10	1.09	22,350	18,123	20,121	1.50	0.80	1.17	25,938	19,626	22,612
	8 Telui Kanan	1.90	1.50	1.66	17,295	16,705	16,937	1.80	1.60	1.67	20,673	19,579	19,987
	Total	1.63	0.43	0.99	132,138	118,938	124,975	1.27	0.84	1.07	149,925	129,369	138,960
2 Bandar Baharu													
	1 Bagan Samak	0.80	0.00	0.31	13,625	12,699	13,068	0.50	0.20	0.35	14,321	12,955	13,537
	2 Kuala Selama	-0.30	-1.10	-0.73	3,466	3,228	3,336	-0.60	-0.90	-0.76	3,263	2,949	3,092
	3 Relau	2.70	0.10	1.34	2,635	2,101	2,343	1.80	1.10	1.33	3,150	2,344	2,701
	4 Serdang	2.50	0.10	1.29	11,787	9,562	10,618	1.70	1.00	1.48	13,951	10,562	12,180
	5 Sungai Batu	0.30	-0.30	-0.04	3,285	3,116	3,188	0.10	-0.20	-0.02	3,319	3,054	3,183
	6 Sungai Keehil Hilir	1.90	0.30	1.06	2,288	1,990	2,128	1.40	0.90	1.12	2,630	2,176	2,379
	Total	1.34	-0.09	0.58	37,087	32,676	34,680	0.92	0.40	0.67	40,635	34,042	37,071
3 Kota Setar													
	1 Alor Malai	4.70	0.50	2.58	44,603	31,072	37,217	3.00	1.80	2.43	59,943	37,140	47,315
	2 Alor Merah	2.00	-1.00	-0.02	14,500	10,185	12,157	0.20	-0.40	-0.08	14,793	9,785	12,056
	3 Anak Bukit	5.50	2.30	3.91	13,352	10,173	11,677	4.50	3.60	4.03	20,735	14,489	17,330
	4 Bukit Lada	1.00	0.80	0.92	4,824	4,740	4,785	1.00	0.90	0.92	5,328	5,184	5,247
	5 Bukit Pinang	2.00	1.90	1.96	7,470	7,406	7,445	2.00	1.90	1.96	9,106	8,940	9,044
	6 Derang	3.30	2.50	2.93	4,747	4,432	4,600	3.10	2.80	2.96	6,442	5,842	6,156
	7 Derga	4.90	-2.00	1.42	34,191	18,749	25,385	1.70	1.20	1.43	40,469	21,125	29,411
	8 Gajah Mati	1.40	0.10	0.72	10,497	9,566	9,894	0.90	0.50	0.68	11,481	9,845	10,588
	9 Gunung	0.40	0.00	0.17	7,186	6,937	7,042	0.30	0.10	0.16	7,404	7,007	7,152
	10 Husa Kampong	4.60	2.80	3.71	6,945	5,958	6,439	4.00	3.50	3.77	10,281	8,405	9,323
	11 Jabi	2.10	2.00	2.05	9,151	9,075	9,116	2.10	2.00	2.05	11,268	11,062	12,170
	12 Kangkong	1.00	0.90	0.94	7,652	7,585	7,610	1.00	0.90	0.94	8,452	8,196	8,352
	13 Kota Setar	-1.70	-2.00	-1.85	31,562	30,721	31,130	-1.30	-2.00	-1.68	27,691	25,102	26,280
	14 Kuala Kedah	1.50	-0.40	0.47	18,679	15,809	17,074	0.70	0.10	0.40	20,029	15,967	17,773
	15 Kubang Rotan	0.70	-1.00	-0.21	5,423	4,666	5,006	0.00	-0.50	-0.27	5,423	4,438	4,872
	16 Langgar	1.50	0.00	0.76	8,155	7,150	7,642	0.90	0.50	0.71	8,919	7,516	8,199
	17 Leangkuas	0.30	-1.20	-0.51	1,306	1,143	1,216	-0.30	-0.80	-0.56	1,267	1,055	1,149
	18 Lepai	1.30	-0.20	0.47	2,880	2,525	2,679	0.70	0.20	0.42	3,089	2,576	2,793
	19 Lesong	0.80	-0.20	0.25	6,093	5,579	5,804	0.40	0.00	0.21	6,341	5,579	5,927
	20 Limbong	2.10	0.20	1.15	1,736	1,471	1,599	1.50	0.90	1.21	2,015	1,609	1,804
	21 Mercong	5.50	3.00	4.20	19,819	16,037	17,768	4.50	3.70	4.11	30,779	23,063	26,583
	22 Padang Hang	-0.20	-0.30	-0.28	4,246	4,209	4,215	-0.20	-0.40	-0.29	4,162	4,043	4,094
	23 Padang Lalang	1.00	0.60	0.79	8,599	8,303	8,441	0.90	0.70	0.78	9,495	8,903	9,119
	24 Pengtalan Kundor	2.00	1.50	1.72	45,030	43,118	43,959	1.80	1.60	1.71	53,824	50,535	52,070
	25 Pempooq	8.00	5.20	6.61	29,305	23,239	26,130	8.00	3.80	5.91	63,268	33,743	46,403
	26 Sala Kecil	3.20	1.50	2.35	10,563	9,122	9,818	2.70	2.20	2.41	13,787	11,339	12,454
	27 Sungai Baharu	0.00	-0.80	-0.43	1,770	1,649	1,703	-0.30	-0.60	-0.47	1,718	1,553	1,626
	28 Tajar	1.30	-0.40	0.41	11,083	9,544	10,247	0.60	0.10	0.34	11,766	9,640	10,604
	29 Tebengau	0.70	-0.30	0.16	4,333	3,967	4,132	0.30	0.00	0.12	4,465	3,967	4,183
	30 Telaga Mas	0.80	0.40	0.59	2,594	2,505	2,546	0.70	0.50	0.58	2,782	2,633	2,697
	31 Telok Chengai	8.00	3.50	5.74	7,113	4,885	5,901	6.20	5.50	5.83	12,980	8,344	10,399
	32 Telok Kechai	8.00	4.50	6.24	14,295	10,686	12,364	7.20	4.60	5.89	28,650	16,755	21,913
	33 Titi Gajah	0.90	0.10	0.52	4,842	4,514	4,683	0.60	0.40	0.49	5,141	4,697	4,918
	34 Tualang	0.80	-1.00	-0.12	6,623	5,649	6,110	0.10	-0.50	-0.18	6,689	5,373	5,999
	Total	2.74	0.63	1.63	411,170	342,169	373,558	2.57	1.46	1.99	529,891	395,550	455,012
4 Kuala Muda													
	1 Bujang	1.80	0.80	1.28	6,903	6,327	6,596	1.50	1.10	1.31	8,011	7,058	7,512
	2 Bukit Meriam	0.50	0.30	0.38	5,201	5,110	5,146	0.40	0.30	0.38	5,413	5,266	5,343
	3 Gurun	1.50	1.10	1.30	36,415	35,167	35,785	1.40	1.20	1.29	41,847	39,623	40,682
	4 Haji Kodong	-0.10	-0.50	-0.33	1,139	1,099	1,116	-0.70	-0.40	-0.35	1,116	1,056	1,077
	5 Kota	1.50	0.80	1.16	3,392	3,191	3,292	1.30	1.10	1.18	3,859	3,560	3,701
	6 Kuala	1.40	0.20	0.84	2,943	2,649	2,803	1.00	0.60	0.80	3,251	2,813	3,036
	7 Merbok	0.70	-1.50	-0.44	13,244	10,897	11,980	-0.20	-0.80	-0.52	12,982	10,056	11,374
	8 Pkuda	3.50	2.60	3.04	11,696	10,828	11,245	3.20	2.90	3.07	16,026	14,411	15,211
	9 Pinang Tuangal	-0.60	-1.60	-1.16	3,243	2,966	3,086	-1.00	-1.40	-1.19	2,933	2,576	2,737
	10 Rantau Panjang	0.50	0.20	0.38	2,805	2,732	2,776	0.40	0.30	0.38	2,919	2,815	2,882
	11 Semeling	1.00	-1.70	-0.34	14,910	11,737	13,246	0.00	-0.80	-0.41	14,910	10,831	12,669
	12 Sidam Kiri	-0.10	-0.90	-0.51	6,853	6,384	6,607	-0.40	-0.70	-0.54	6,521	5,950	6,256
	13 Simpoh	1.40	0.80	1.10	5,307	5,036	5,171	1.20	1.00	1.08	5,979	5,563	5,759
	14 Sungai Pasir	8.00	5.50	6.76	88,052	71,602	79,546	7.10	6.30	6.67	174,837	131,904	151,703
	15 Sungai Petani	4.40	2.80	3.58	145,448	126,906	135,703	3.90	3.40	3.64	213,238	177,291	193,980
	16 Teluk Kiri	0.30	-1.00	-0.39	9,278	8,269	8,731	-0.20	-0.70	-0.44	9,694	7,708	8,358
	Total	3.86	2.26	3.04	356,830	310,501	332,830	3.90	3.26	3.56	523,000	428,482	472,282

TABLE VII.2.19 (2/3) POPULATION PROJECTIONS BY MUKIM IN KUDAH STATE

District	Mukim	Projection for Year 2000						Projection for Year 2010					
		Average Annual Growth Rate (%) for 1991-2000			Population 2000			Average Annual Growth Rate (%) for 2000-2010			Population 2010		
		High	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium
5 Kubang Pasu													
	1 Ab	1.00	0.60	0.84	7,712	7,416	7,604	0.90	0.80	0.85	8,434	8,064	8,276
	2 Binjal	2.70	0.20	1.41	3,806	3,062	3,413	1.90	1.20	1.33	4,594	3,449	3,973
	3 Bukit Tinggi	3.50	2.10	3.82	9,166	6,854	7,954	4.40	3.50	3.94	14,099	9,682	11,206
	4 Celong	1.20	0.60	0.88	6,315	6,002	6,150	1.00	0.80	0.90	6,987	6,500	6,724
	5 Husba	1.00	-1.60	0.15	3,158	2,299	2,687	0.80	-0.20	0.28	3,419	2,151	2,763
	6 Jeram	0.00	-0.10	-0.09	8,098	8,027	8,037	0.00	-0.10	-0.08	8,098	7,947	7,973
	7 Jerlun	0.50	-0.60	-0.10	19,377	17,600	18,399	0.10	-0.30	-0.14	19,592	17,079	18,142
	8 Jitra	4.60	3.70	4.15	25,316	23,456	24,397	4.30	4.00	4.19	38,569	34,714	36,782
	9 Kepele	0.60	-1.20	-0.36	9,738	8,303	8,948	-0.10	-0.70	-0.42	9,641	7,740	8,576
	10 Kubang Pasu	2.30	-2.00	0.12	3,209	2,196	2,652	1.50	-0.70	0.41	3,724	2,047	2,762
	11 Malau	1.20	1.00	1.13	2,982	2,930	2,964	1.20	1.10	1.14	3,360	3,269	3,319
	12 Naga	6.20	2.30	4.23	30,019	21,574	25,410	4.90	3.80	4.37	48,434	31,325	39,006
	13 Padang Perabu	0.50	-0.20	0.09	3,444	3,238	3,322	0.20	0.00	0.11	3,514	3,238	3,361
	14 Peribang	2.60	0.20	1.43	2,477	2,026	2,256	1.90	1.20	1.51	3,015	2,283	2,632
	15 Pering	0.50	0.30	0.44	7,267	7,140	7,130	0.50	0.40	0.44	7,639	7,431	7,552
	16 Putat	1.40	0.10	0.76	5,809	5,184	5,495	1.00	0.60	0.81	6,417	5,503	5,956
	17 Sanglang	0.40	0.00	0.20	9,707	9,371	9,534	0.30	0.10	0.21	10,002	9,465	9,731
	18 Sungai Laka	7.99	5.50	6.74	14,722	13,070	13,384	7.20	6.50	6.81	29,592	22,657	25,895
	19 Temin	8.00	-4.60	6.34	30,613	23,080	26,698	7.00	5.20	6.11	60,221	38,318	48,294
	20 Tunjung	0.50	-0.20	0.12	7,305	6,868	7,062	0.20	0.00	0.09	7,452	6,868	7,128
	21 Wang Tepus	1.40	0.00	0.65	1,593	1,409	1,492	0.80	0.40	0.60	1,725	1,465	1,584
	Total	3.35	1.43	2.39	211,884	180,146	195,119	3.48	2.53	3.00	298,444	231,307	262,124
6 Kulim													
	1 Bagau Sena	1.00	-0.10	0.43	5,844	5,305	5,560	0.60	0.30	0.47	6,204	5,466	5,827
	2 Junjong	1.90	0.40	1.14	4,755	4,171	4,451	1.40	1.00	1.19	5,464	4,608	5,010
	3 Karangan	6.70	2.00	4.33	12,320	8,277	10,101	5.10	3.90	4.49	20,260	12,134	15,678
	4 Kelah	7.00	6.90	7.47	25,564	25,354	26,580	8.00	1.70	4.86	55,191	30,009	42,741
	5 Kulim	6.20	1.80	4.00	51,837	33,669	43,072	4.80	3.60	4.15	82,826	50,802	64,710
	6 Lunas	6.90	2.40	4.66	19,968	13,659	16,365	5.40	4.20	4.82	33,786	20,610	26,531
	7 Mahang	0.50	-1.10	-0.34	3,359	2,915	3,118	-0.20	-0.60	-0.40	3,292	2,745	2,996
	8 Naga Lilit	4.40	0.30	2.34	9,820	6,894	8,239	3.00	1.90	2.49	13,197	8,322	10,533
	9 Padang Chioa	0.40	-1.40	-0.53	8,147	6,944	7,507	-0.30	-0.90	-0.59	7,906	6,344	7,075
	10 Padang Meha	-0.10	-0.30	-0.25	7,520	7,388	7,422	-0.20	-0.30	-0.26	7,371	7,170	7,132
	11 Sedim	-1.50	-1.50	-1.59	2,919	2,919	2,895	-1.50	-1.60	-1.59	2,510	2,484	2,467
	12 Sidam Kanan	2.60	1.60	2.09	12,035	11,038	11,513	2.30	2.00	2.12	15,107	13,455	14,203
	13 Sungai Selusang	8.00	6.20	7.11	20,705	17,849	19,245	8.00	5.20	6.61	44,700	29,633	36,504
	14 Sungai Ular	4.30	1.00	2.60	4,835	3,640	4,184	3.20	2.30	2.72	6,625	4,570	5,472
	15 Terap	0.90	0.60	0.72	4,669	4,548	4,595	0.80	0.60	0.71	5,056	4,828	4,931
	Total	4.78	2.26	3.56	194,286	156,570	175,046	4.77	2.64	3.71	309,497	203,181	251,908
7 Langkawi													
	1 Ayer Hangat	4.80	3.90	4.35	10,363	9,603	9,984	4.50	4.20	4.39	16,093	14,490	15,336
	2 Bobor	6.20	2.50	4.32	5,523	4,038	4,719	5.00	3.90	4.45	8,996	5,920	7,296
	3 Kedawang	7.20	2.20	4.69	10,254	6,726	8,321	5.50	4.20	4.87	17,516	10,149	13,387
	4 Kwah	5.50	2.60	4.08	24,851	19,429	22,051	4.60	3.80	4.18	38,964	28,212	33,214
	5 Padang Masirat	5.60	2.00	3.83	9,643	7,099	8,306	4.50	3.50	3.96	14,975	10,014	12,245
	6 Ulu Melaka	6.20	2.90	4.55	9,623	7,284	8,382	5.10	4.20	4.66	15,829	10,991	13,122
	Total	5.76	2.71	4.23	70,259	54,179	61,762	4.81	3.95	4.37	112,373	79,776	94,701
8 Padang Terap													
	1 Batang Tunggang Kanan	3.10	-0.50	1.25	1,605	1,173	1,369	1.60	0.60	1.12	1,831	1,245	1,530
	2 Batang Tunggang Kiri	5.20	2.30	3.75	1,987	1,552	1,757	4.20	3.40	3.85	2,998	2,169	2,563
	3 Belimbing Kanan	2.70	2.10	2.41	8,986	8,533	8,767	2.50	2.30	2.43	11,502	10,711	11,149
	4 Bekimbing Kiri	2.30	1.30	1.80	3,075	2,820	2,945	1.90	1.60	1.77	3,712	3,505	3,509
	5 Kerong Hitam	2.70	1.40	2.07	3,045	2,721	2,883	2.20	1.80	2.02	3,286	3,253	3,522
	6 Padang Temak	1.60	-0.20	0.65	5,451	4,655	5,016	0.90	0.30	0.58	5,962	4,797	5,313
	7 Padang Terap Kanan	2.50	1.70	2.09	2,002	1,868	1,932	2.30	2.00	2.11	2,513	2,278	2,381
	8 Padang Terap Kiri	3.90	1.60	2.71	5,619	4,611	5,077	3.00	2.30	2.63	7,551	5,768	6,582
	9 Pe-do	1.40	0.00	0.66	6,004	5,310	5,627	0.80	0.40	0.61	6,502	5,525	5,978
	10 Telak	2.90	0.60	1.77	23,690	19,403	21,482	2.00	1.40	1.69	28,878	22,297	23,292
	11 Telak	4.60	2.80	3.68	3,186	2,733	2,948	3.90	3.30	3.62	4,071	3,782	4,203
	Total	2.77	0.99	1.87	64,651	55,380	59,802	2.15	1.64	1.89	79,958	65,151	72,125
9 Sik													
	1 Jeneri	1.20	-0.60	0.26	12,897	11,007	11,882	0.50	-0.10	0.20	13,557	10,898	12,117
	2 Sik	4.60	1.30	2.95	52,092	39,250	45,250	3.50	2.60	3.06	73,490	50,735	61,196
	3 Sok	3.90	2.10	2.96	11,252	9,643	10,385	3.20	2.60	2.90	15,417	12,464	13,818
	Total	3.82	1.04	2.41	76,241	59,900	67,517	3.00	2.15	2.58	102,455	74,097	87,130
10 Yan													
	1 Dulang	0.20	-0.30	-0.08	4,474	4,281	4,366	0.00	-0.20	-0.06	4,474	4,196	4,340
	2 Sala Besar	1.20	0.00	0.56	28,517	25,666	26,969	0.70	0.30	0.52	30,577	26,446	28,397
	3 Singkil	0.60	-0.20	0.14	3,152	2,938	3,028	0.30	0.00	0.17	3,248	2,938	3,080
	4 Sungai Daun	0.60	-0.10	0.22	12,259	11,563	11,892	0.40	0.10	0.24	12,800	11,680	12,187
	5 Yan	0.40	-1.20	-0.47	16,683	14,477	15,455	-0.30	-0.80	-0.53	16,189	13,359	14,659
	Total	0.77	-0.36	0.16	65,125	58,924	61,711	0.33	-0.05	0.15	67,288	58,619	62,663
11 Padang													
	1 Ayer Puteh	1.30	1.00	1.18	30,915	30,116	30,581	1.30	1.10	1.18	35,178	33,598	34,397
	2 Bukit Raya	0.80	-2.00	-0.62	13,701	10,684	12,086	-0.30	-1.10	-0.72	13,295	9,565	11,245
	3 Guar Kepayang	1.20	0.00	0.56	7,908	7,117	7,477	0.70	0.30	0.51	8,479	7,333	7,868
	4 Padang Kerbau	0.30	0.00	0.11	10,095	9,831	9,924	0.20	0.00	0.10	10,298	9,831	10,019
	5 Padang Pelang	5.70	3.40	4.58	6,226	5,127	5,666	5.00	4.30	4.66	10,141	7,810	8,935
	6 Padang Pusing	1.00	0.50	0.72	9,537	9,128	9,303	0.80	0.60	0.70	10,328	9,691	9,979
	7 Rambai	1.70	0.70	1.21	8,770	8,037	8,403	1.40	1.10	1.24	10,078	8,566	9,509
	8 Tobiar	0.90	0.80	0.84	6,197	6,143	6,166	0.90	0.80	0.84	6,778	6,653	6,704
	Total	1.31	0.41	0.85	93,348	85,183	89,608	1.14	0.81	0.97	104,576	93,448	98,657
Kedah State Grand Total		3.13	1.23	2.17	1,713								

TABLE VII.2.2.10 POPULATION PROJECTIONS BY MUKIM IN PERLIS STATE

District	Mukim	Projection for Year 2000						Projection for Year 2010					
		Average Annual Growth Rate (%) for 1991-2000			Population 2000			Average Annual Growth Rate (%) for 2000-2010			Population 2010		
		High	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium
Perlis	1 Abi	1.50	0.70	1.09	2,402	2,240	2,318	1.30	1.00	1.12	2,733	2,474	2,590
	2 Arau	7.50	2.60	5.03	31,068	20,578	25,309	5.90	4.50	5.21	55,115	31,957	42,040
	3 Besen	7.50	3.00	5.25	21,478	14,723	17,817	6.00	4.80	5.41	38,463	23,530	30,161
	4 Chuping	3.30	1.90	2.58	14,639	12,977	13,756	2.70	2.30	2.53	19,108	16,290	17,655
	5 Jejawi	8.00	3.20	5.63	13,409	8,975	11,021	5.80	5.50	5.65	23,564	15,331	19,086
	6 Kayang	0.80	0.10	0.45	10,697	10,058	10,369	0.60	0.30	0.42	11,356	10,364	10,813
	7 Kechor	1.90	0.40	1.16	8,089	7,096	7,885	1.30	0.90	1.11	9,204	7,761	8,469
	8 Kuala Perlis	2.10	1.40	1.75	16,199	15,244	15,716	1.90	1.70	1.77	19,554	18,043	18,734
	9 Kurong Anai	1.00	-0.50	0.18	11,330	9,928	10,546	0.40	-0.10	0.13	11,791	9,829	10,681
	10 Kurong Batang	2.30	2.10	2.18	3,176	3,121	3,143	2.20	2.10	2.19	3,948	3,842	3,902
	11 Ngolang	1.10	0.90	1.01	2,995	2,943	2,971	1.10	0.90	1.00	3,341	3,219	3,283
	12 Oran	8.00	2.90	5.48	6,505	4,244	5,279	5.50	5.40	5.48	11,112	7,180	8,928
	13 Padang Pauh	1.80	1.10	1.45	4,129	3,885	4,005	1.60	1.30	1.47	4,839	4,420	4,635
	14 Padang Siding	4.60	-2.00	1.27	8,921	5,017	6,707	1.80	0.40	1.09	10,663	5,222	7,476
	15 Paya	1.50	1.30	1.41	5,375	5,282	5,333	1.50	1.40	1.41	6,238	6,070	6,134
	16 Sanglang	0.60	0.30	0.49	15,952	15,537	15,796	0.60	0.40	0.50	16,935	16,169	16,598
	17 Sena	3.40	2.70	3.05	17,981	16,934	17,450	3.20	3.00	3.07	24,638	22,758	23,606
	18 Seriap	2.50	2.30	2.40	7,255	7,131	7,192	2.40	2.30	2.40	9,197	8,952	9,114
	19 Sungai Adam	1.70	1.50	1.60	1,814	1,783	1,798	1.70	1.50	1.59	2,147	2,009	2,106
	20 Titi Tinggi	2.60	2.20	2.37	19,731	19,063	19,346	2.40	2.30	2.36	25,013	23,930	24,430
	21 Utan Aji	1.90	-0.50	0.61	16,323	13,225	14,627	0.90	0.20	0.55	17,854	13,492	15,458
	22 Wang Bintong	4.80	2.50	3.65	11,248	9,246	10,204	4.10	3.40	3.73	16,810	12,917	14,722
	Total	3.54	1.45	2.46	250,713	209,230	228,286	3.20	2.42	2.79	343,622	265,821	300,691

TABLE VIII.2.11 POPULATION PROJECTIONS BY MUKIM IN PULAU PINANG STATE

District	Mukim	Average Annual Growth Rate (%) for 1991-2000			Population 2000			Projection for Year 2010			Population 2010		
					High	Low	Medium	Average Annual Growth Rate (%) for 2000-2010			High	Low	Medium
		High	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium
1 Seberang Perai Tengah													
	Mukim 1	8.00	-1.90	3.04	91,642	39,060	60,400	6.90	-2.00	2.41	178,597	31,915	76,632
	Mukim 2	2.00	1.10	1.54	6,007	5,554	5,769	1.70	1.40	1.56	7,109	6,381	6,732
	Mukim 3	2.50	2.10	2.29	6,555	6,332	6,437	2.40	2.20	2.30	8,310	7,871	8,080
	Mukim 4	1.30	-0.80	0.21	8,579	7,124	7,795	0.50	-0.20	0.15	9,017	6,983	7,921
	Mukim 5	1.60	1.00	1.30	4,478	4,249	4,363	1.40	1.20	1.29	5,146	4,787	4,961
	Mukim 6	8.00	5.40	6.74	25,823	20,804	23,270	7.30	5.90	6.61	52,241	36,906	44,149
	Mukim 7	2.90	2.40	2.62	3,572	3,421	3,488	2.70	2.50	2.63	4,663	4,379	4,523
	Mukim 8	0.20	-1.80	-0.84	10,558	8,829	9,626	-0.60	-1.20	-0.89	9,942	7,825	8,804
	Mukim 9	1.30	-1.00	0.14	13,575	10,977	12,145	0.50	-0.30	0.08	14,269	10,652	12,237
	Mukim 10	0.30	-1.00	-0.87	20,964	17,063	18,892	-0.50	-1.10	-0.83	19,939	15,278	17,385
	Mukim 11	8.00	7.40	7.71	47,811	45,506	46,693	8.00	5.60	6.84	103,221	78,471	90,527
	Mukim 12	2.30	1.90	2.10	5,504	4,877	5,182	1.90	2.40	2.63	7,326	6,182	6,711
	Mukim 13	1.30	-0.30	0.42	4,015	3,486	3,717	0.70	0.10	0.38	4,305	3,521	3,962
	Mukim 14	8.00	2.90	5.47	14,838	16,173	20,127	6.30	4.90	5.58	45,756	26,093	34,642
	Mukim 15	5.30	4.90	5.16	43,468	-41,673	42,591	5.30	5.10	5.16	72,854	68,530	70,466
	Mukim 16	1.20	0.90	1.06	7,882	7,678	7,787	1.10	1.00	1.06	8,794	8,481	8,650
	Mukim 17	3.30	-1.00	0.62	2,737	1,715	2,168	1.60	-0.80	0.90	3,538	1,583	2,370
	Mukim 18	2.30	1.80	2.05	2,517	2,410	2,465	2.20	2.00	2.06	3,129	2,937	3,021
	Mukim 19	3.60	1.60	2.61	4,136	3,479	3,796	3.00	2.30	2.65	5,558	4,367	4,933
	Mukim 20	2.40	2.20	2.30	12,902	12,680	12,792	2.40	2.30	2.30	16,355	15,917	16,063
	Mukim 21	1.60	1.30	1.43	3,694	3,599	3,638	1.50	1.40	1.43	4,287	4,135	4,194
	Mukim 1A	1.40	-0.60	0.36	11,311	9,479	10,322	0.60	0.00	0.31	12,009	9,479	10,647
	Total	4.24	1.77	3.24	362,568	276,166	313,463	5.10	2.76	3.62	596,361	362,674	447,523
2 Seberang Perai Utara													
	Mukim 1	2.40	1.50	1.96	9,014	8,335	8,674	2.10	1.80	1.98	11,096	9,963	10,550
	Mukim 2	0.90	0.00	0.45	6,560	6,059	6,304	0.60	0.30	0.43	6,965	6,243	6,580
	Mukim 3	1.80	0.00	0.91	10,468	8,936	9,687	1.20	0.60	0.87	11,794	9,487	10,564
	Mukim 4	2.20	1.20	1.72	8,129	7,450	7,800	1.90	1.60	1.75	9,812	8,732	9,275
	Mukim 5	1.70	0.80	1.26	8,768	8,193	8,433	1.40	1.10	1.28	10,015	9,040	9,573
	Mukim 6	1.70	1.50	1.59	17,813	17,505	17,647	1.70	1.50	1.59	21,084	20,315	20,661
	Mukim 7	1.80	0.00	-0.06	14,196	12,118	12,056	0.40	-0.70	-0.15	14,774	11,296	11,878
	Mukim 8	4.60	1.80	3.19	14,667	11,529	13,093	3.70	1.80	3.26	21,092	15,196	17,915
	Mukim 9	3.80	1.20	2.52	20,987	16,759	18,795	2.90	2.00	2.45	27,933	20,429	23,554
	Mukim 10	2.10	1.40	1.72	5,344	5,027	5,168	1.90	1.60	1.73	6,450	5,892	6,135
	Mukim 11	3.60	2.20	2.91	14,589	12,931	13,755	3.20	2.70	2.95	19,991	16,878	18,391
	Mukim 12	2.80	1.60	2.16	24,275	21,874	22,975	2.40	2.00	2.19	30,772	26,664	28,536
	Mukim 13	3.70	1.30	2.53	7,815	6,349	7,070	3.00	2.20	2.59	10,503	7,893	9,131
	Mukim 14	2.20	-0.80	0.65	74,900	57,506	65,414	1.10	0.10	0.58	83,559	58,083	69,239
	Mukim 15	0.00	-2.00	-1.04	29,178	24,391	26,605	-0.80	-1.20	-1.00	26,926	21,617	24,054
	Mukim 16	2.80	2.20	2.52	7,851	7,453	7,661	2.60	2.40	2.50	10,148	9,448	9,810
	Total	2.23	0.32	1.20	274,552	232,325	251,047	1.64	1.02	1.31	312,973	257,176	286,286
3 Seberang Perai Selatan													
	Mukim 1	3.60	1.90	2.56	4,115	3,432	3,762	2.90	2.30	2.61	5,477	4,308	4,867
	Mukim 2	1.00	0.50	0.76	1,364	1,305	1,336	0.90	0.70	0.78	1,492	1,400	1,444
	Mukim 3	0.00	-2.00	-1.01	449	375	410	-1.00	-1.10	-1.01	406	336	370
	Mukim 4	1.20	-1.10	0.00	3,933	3,207	3,539	0.40	-0.30	0.06	4,093	3,112	3,559
	Mukim 5	1.80	-1.50	0.07	5,805	4,333	4,984	0.50	-0.50	-0.01	6,101	4,111	4,976
	Mukim 6	-1.10	-1.20	-1.16	434	430	432	0.20	-1.20	-0.47	443	381	412
	Mukim 7	3.70	2.20	3.29	9,419	8,794	9,091	3.40	3.20	3.30	13,158	11,049	12,582
	Mukim 8	0.90	0.00	0.45	2,751	2,541	2,644	0.60	0.30	0.47	2,921	2,618	2,770
	Mukim 9	5.00	2.40	3.69	15,494	12,404	13,863	4.20	3.40	3.75	23,380	17,329	20,040
	Mukim 10	0.90	0.70	0.80	9,479	9,314	9,396	0.90	0.70	0.80	10,368	9,987	10,177
	Mukim 11	1.80	1.30	1.53	25,118	24,045	24,535	1.60	1.40	1.54	29,439	27,631	28,591
	Mukim 12	2.50	1.70	2.10	4,678	4,364	4,517	2.20	1.90	2.08	5,815	5,268	5,550
	Mukim 13	0.90	-0.40	0.17	1,965	1,752	1,840	0.40	-0.10	0.14	2,045	1,734	1,869
	Mukim 14	2.10	1.40	1.76	7,653	7,200	7,432	1.90	1.60	1.78	9,238	8,439	8,863
	Mukim 15	1.50	0.60	1.05	10,333	9,548	9,932	1.20	0.90	1.03	11,643	10,443	11,004
	Mukim 16	8.00	0.30	4.19	564	299	410	4.90	3.70	4.29	910	421	624
	Total	2.31	1.12	1.69	103,555	93,338	98,126	2.06	1.62	1.84	126,930	109,579	117,698
4 Timur Laut													
	Mukim 13	3.80	3.20	3.52	151,357	143,771	147,820	3.60	3.40	3.51	215,577	200,853	208,715
	Mukim 14	4.60	-2.00	1.07	2,575	1,445	1,899	6.40	-2.00	2.18	4,789	1,180	1,357
	Mukim 15	-2.00	-2.00	-2.00	18	18	18	8.00	-2.00	3.00	38	14	34
	Mukim 16	1.30	-2.00	-0.41	30,922	23,051	26,585	1.20	-1.60	-0.18	34,840	19,617	26,113
	Mukim 17	8.00	3.20	5.63	12,878	8,604	10,573	6.00	5.40	5.67	23,063	14,559	18,246
	Mukim 18	1.80	-2.00	-0.11	44,831	31,991	37,893	0.10	-0.40	-0.14	45,282	30,735	37,549
	Bandar Raya Georgetown	-0.80	-1.10	-0.97	197,799	191,555	194,718	-0.90	-1.10	-0.97	180,701	172,393	176,668
	Total	1.23	0.18	0.67	440,380	401,436	419,516	1.36	0.91	1.13	504,288	439,351	469,571
5 Barat Daya													
	Mukim A	2.50	-0.20	1.10	3,178	2,508	2,814	1.60	0.70	1.17	3,715	2,689	3,162
	Mukim B	-0.30	-0.40	-0.35	890	882	886	-0.30	-0.40	-0.35	864	847	855
	Mukim C	5.00	0.70	2.82	2,431	1,678	2,018	3.60	2.30	2.92	3,462	2,106	2,691
	Mukim D	2.50	0.40	1.43	2,970	2,472	2,705	1.80	1.20	1.48	3,550	2,785	3,132
	Mukim E	6.10	0.00	3.01	3,683	2,178	2,834	4.00	2.30	3.16	5,451	2,734	3,868
	Mukim F	4.90	3.90	4.40	3,369	3,095	3,229	4.60	4.20	4.42	5,282	4,669	4,977
	Mukim G	1.50	0.80	1.17	922	867	896	1.30	1.00	1.15	1,049	958	1,004
	Mukim H	4.60	1.80	3.20	1,820	1,430	1,615	3.70	2.90	3.27	2,617	1,904	2,217
	Mukim I	4.80	1.70	3.24	1,801	1,380	1,576	3.80	2.80	3.31	2,615	1,818	2,183
	Mukim J	4.70	0.80	2.79	1,916	1,368	1,627	3.50	2.30	2.88	2,703	1,718	2,162
	Mukim K	1.80	1.40	1.60	7,061	4,036	5,362	4.90	4.50	4.67	11,393	6,268	8,464
	Mukim L	2.10	-0.00	-0.39	3,747	2,793	3,229	0.00	-0.70	-0.33	3,747	2,603	3,124
	Mukim M	3.40	0.70	2.55	2,800	2,033	2,389	3.20	2.10	2.64	3,836		

TABLE VII.2.3.1 GDP OF KEDAH STATE AND MALAYSIA
(AT THE 1978 CONSTANT PRICES)

Unit: RM Million

Items	Kedah State					Malaysia				
	1980	1990	1993	2000	Average Annual Growth Rate (%) 1980-1990 1990-1993 1990-2000	1980	1990	1993	2000	Average Annual Growth Rate (%) 1980-1990 1990-1993 1990-2000
	1980	1990	1993	2000	1980-1990 1990-1993 1990-2000	1980	1990	1993	2000	1980-1990 1990-1993 1990-2000
I. GDP										
Amount	2,284	3,567	4,689	7,700	4.6	44,511	79,455	100,888	155,780	6.0
Ratio to Malaysia (%)	5.1	4.5	4.7	4.9	-	100	100	100	100	-
					8.0					8.3
					9.5					-
					-					-
2. Value Added by Indust. Sector										
2.1 Amount										
Primary	1,131	1,272	1,342	1,628	1.2	-	22,584	24,108	-	2.2
Secondary	251	869	1,534	2,698	13.2	-	24,172	34,347	-	12.4
Tertiary	845	1,477	1,903	3,484	5.7	-	33,836	44,751	-	9.8
Total	2,227	3,618	4,779	7,810	5.0	44,511	80,592	103,206	155,780	6.1
					8.0					8.6
					9.7					-
2.2 Share (%)										
Primary	50.8	35.2	28.1	20.8	-	-	28.0	23.4	-	-
Secondary	11.3	24.0	32.1	34.5	-	-	30.0	33.3	-	-
Tertiary	37.9	40.8	39.8	44.6	-	-	42.0	43.4	-	-
Total	100	100	100	100	-	-	100	100	-	-
					7.8					4.2
3. Per Capita GDP										
Amount (RM)	2,051	2,653	3,327	4,768	2.6	3,208	4,433	5,015	7,017	3.3
Ratio to Malaysia (%)	63.9	59.8	66.3	67.9	-	-	-	-	-	-
					6.0					4.7
					-					-

Sources: A Study of Industrialization in Kedah Darulaman, 1992
Kedah Development Action Plan 1991-2000, February 1994
Development Statistics of Kedah Darulaman, April 1993 and February 1994
Yearbook of Statistics, 1993, Department of Statistics, Malaysia

TABLE VII.2.3.2 GDP OF PERLIS STATE AND MALAYSIA
(AT THE 1978 CONSTANT PRICES)

Unit : RM Million

Items	Perlis State			Malaysia			Average Annual Growth Rate (%)	
	1980	1990	1993	1980	1990	1993	1980-1990	1990-1993
							Average Annual Growth Rate (%)	
1. GDP								
Amount	329	570	704	44,511	79,455	100,838	6.0	8.3
Ratio to Malaysia (%)	0.7	0.7	0.7	100	100	100	-	-
2. Per Capita GDP								
Amount (RM)	2,211	3,528	4,252	3,208	4,433	5,015	3.3	4.2
Ratio to Malaysia (%)	68.9	79.6	84.8	100	100	100	-	-

Sources : Development Statistics of Kedah Darulaman, February 1994
Perlis Master Plan Study, 1985
Yearbook of Statistics, 1993, Department of Statistics, Malaysia

TABLE VII.2.3.3 GDP OF PULAU PINANG STATE AND MALAYSIA
(AT THE 1978 CONSTANT PRICES)

Unit: RM Million

Items	Pulau Pinang State						Malaysia							
	1980-1990		1990-1993		2000		1980-1990		1990-1993		2000			
	Average Annual Growth Rate (%)						Average Annual Growth Rate (%)							
I. GDP	3,413	5,820	7,677	11,754	5.5	9.7	7.3	44,511	79,455	100,838	155,780	6.0	8.3	7.0
Amount	7.7	7.3	7.6	7.5	-	-	-	100	100	100	100	-	-	-
Ratio to Malaysia (%)														
2. Value Added by Indust. Sector														
2.1 Amount														
Primary	241	215	-	231	-1.1	-	0.7	-	22,584	24,108	-	-	2.2	-
Secondary	1,542	2,838	-	6,148	6.3	-	8.0	-	24,172	34,347	-	-	12.4	-
Tertiary	1,630	2,741	-	5,375	5.3	-	7.0	-	33,836	44,751	-	-	9.8	-
Total	3,413	5,794	-	11,754	5.4	-	7.3	44,511	80,592	103,206	155,780	6.1	8.6	6.8
2.2 Share (%)														
Primary	7.1	3.7	-	2.0	-	-	-	-	28.0	23.4	-	-	-	-
Secondary	45.2	49.0	-	52.3	-	-	-	-	30.0	33.3	-	-	-	-
Tertiary	47.8	47.3	-	45.7	-	-	-	-	42.0	43.4	-	-	-	-
Total	100	100	-	100	-	-	-	-	100	100	-	-	-	-
3. Per Capita GDP														
Amount (RM)	3,570	5,274	6,728	8,354	4.0	8.5	4.7	3,208	4,433	5,015	7,017	3.3	4.2	4.7
Ratio to Malaysia (%)	111.3	119.0	134.2	119.0	-	-	-	-	-	-	-	-	-	-

Sources: Penang into the 21st Century, 1992
Development Statistics of Kedah Darulaman, February 1994
Yearbook of Statistics, 1993, Department of Statistics, Malaysia

TABLE VII.3.2.1 EFFECTIVE WATER VOLUME PRODUCED BY BERIS
DAM, JENIANG TRANSFER, NAOK DAM AND REMAN DAM

Year	Facilities	Domestic Water Incremental Supply Volume (1,000 m ³)	Possible Irrigation Area (ha)	Decrease in Irrigation Area (%)		Reduced Area of Water deficit Accumulation Each Facility (ha)		
				Without Project (A)	With Project (B)			
1993	Existing	928	0	117,288	8.5	8.5	0	0
2001	Beris D.	1,070	142	114,599	8.3	7.3	1.0	1,146
2006	Jeniang T. & Naok D.	1,374	304	113,379	8.2	3.7	4.5	3,956
2008	Reman D.	1,768	394	112,158	8.1	2.2	5.9	6,617

**TABLE VII.3.2.2 VALUE AND PRODUCTION COST OF PADDY
AT FARM GATE, 1994**

Item	Financial Conversion		Financial Prices
	Prices	Factors	
I. Paddy price			
1 Yield (tons/ha)	4.0	-	4.0
2 Farm gate price (RM/ton)	460.0	1.00	460.0
3 Value (RM/ha)	1,840.0	-	1,840.0
II. Production Cost of Paddy	(RM/ha)		(RM/ha)
1 Labour cost	347.0	0.83	288.0
2 Land preparation	242.0	0.82	198.4
3 Planting Materials	70.0	0.91	63.7
4 Irrigation water charge	40.7	-	0.0
5 Fertilizers	142.5	0.91	129.7
6 Chemicals	126.0	0.91	114.7
7 Machinery and equipment	226.0	0.90	203.4
8 Transport	155.8	0.79	123.1
9 Land tax	11.5	-	0.0
Total	1,361.5	-	1,121.0
III. Net Revenue (Benefit)	478.5	-	719.0
IV. Subsidies			
1 Fertilizer	135.6	-	0.0
2 Paddy	992.4	-	0.0
IV. Net Income(Benefit)	1,606.5	-	719.0

TABLE VII.3.2.3 (1/2)

CALCULATION OF ECONOMIC COST

I. Beris Dam

(1) Financial Cost

1	Classification of Costs	Unit: RM 1,000		
		1996		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	1,300	0	1,300
3	Engineering Services	0	0	0
4	Land Acquisition	25,000	0	25,000
5	Evacuation	15,000	0	15,000
6	Physical Contingency	4,130	0	4,130
	Sub-total	45,430	0	45,430
7	price Escalation	3,236	0	3,236
	Grand Total	48,666	0	48,666 OM Cost

2

2	Classification of Costs	Unit: RM 1,000		
		1997		
		L.C.	F.C.	Total
1	Construction Cost	7,564	11,346	18,910
2	Administration	1,040	0	1,040
3	Engineering Services	624	936	1,560
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	923	1,228	2,151
	Sub-total	10,151	13,510	23,661
7	price Escalation	1,104	1,253	2,357
	Grand Total	11,255	14,763	26,018 OM Cost

3

3	Classification of Costs	Unit: RM 1,000		
		1998		
		L.C.	F.C.	Total
1	Construction Cost	13,236	19,855	33,091
2	Administration	1,040	0	1,040
3	Engineering Services	1,248	1,872	3,120
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	1,552	2,173	3,725
	Sub-total	17,076	23,900	40,976
7	price Escalation	2,519	3,000	5,519
	Grand Total	19,595	26,900	46,495 OM Cost

4

4	Classification of Costs	Unit: RM 1,000		
		1999		
		L.C.	F.C.	Total
1	Construction Cost	11,345	17,018	28,363
2	Administration	1,040	0	1,040
3	Engineering Services	1,248	1,872	3,120
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	1,363	1,889	3,252
	Sub-total	14,996	20,779	35,775
7	price Escalation	2,815	3,310	6,125
	Grand Total	17,811	24,089	41,900 OM Cost

(2) Economic Cost

1	Classification of Costs	Unit: RM 1,000		
		1996		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	1,066	0	1,066
3	Engineering Services	0	0	0
4	Land Acquisition	22,000	0	22,000
5	Evacuation	13,200	0	13,200
6	Physical Contingency	3,627	0	3,627
	Sub-total	39,893	0	39,893
7	price Escalation	0	0	0
	Grand Total	39,893	0	39,893 OM Cost

2

2	Classification of Costs	Unit: RM 1,000		
		1997		
		L.C.	F.C.	Total
1	Construction Cost	6,354	11,346	17,700
2	Administration	853	0	853
3	Engineering Services	512	936	1,448
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	772	1,228	2,000
	Sub-total	8,490	13,510	22,000
7	price Escalation	0	0	0
	Grand Total	8,490	13,510	22,000 OM Cost

3

3	Classification of Costs	Unit: RM 1,000		
		1998		
		L.C.	F.C.	Total
1	Construction Cost	11,118	19,855	30,973
2	Administration	853	0	853
3	Engineering Services	1,023	1,872	2,895
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	1,299	2,173	3,472
	Sub-total	14,294	23,900	38,194
7	price Escalation	0	0	0
	Grand Total	14,294	23,900	38,194 OM Cost

4

4	Classification of Costs	Unit: RM 1,000		
		1999		
		L.C.	F.C.	Total
1	Construction Cost	9,530	17,018	26,548
2	Administration	853	0	853
3	Engineering Services	1,023	1,872	2,895
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	1,141	1,889	3,030
	Sub-total	12,547	20,779	33,326
7	price Escalation	0	0	0
	Grand Total	12,547	20,779	33,326 OM Cost

TABLE VII.3.2.3 (2/2)

CALCULATION OF ECONOMIC COST

I. Beris Dam

(1) Financial Cost

Classification of Costs	2000		
	L.C.	F.C.	Total
1 Construction Cost	9,455	14,182	23,637
2 Administration	780	0	780
3 Engineering Services	1,040	1,560	2,600
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	1,128	1,574	2,702
Sub-total	12,403	17,316	29,719
7 price Escalation	2,843	3,360	6,203
Grand Total	15,246	20,676	35,922 OM Cost

Total

Classification of Costs	Total		
	L.C.	F.C.	Total
1 Construction Cost	41,600	62,401	104,001
2 Administration	5,200	0	5,200
3 Engineering Services	4,160	6,240	10,400
4 Land Acquisition	25,000	0	25,000
5 Evacuation	15,000	0	15,000
6 Physical Contingency	9,096	6,864	15,960
Sub-total	100,056	75,505	175,561
7 price Escalation	12,517	10,923	23,440
Grand Total	112,573	86,428	199,001 OM Cost

(2) Economic Cost

Classification of Costs	2000		
	L.C.	F.C.	Total
1 Construction Cost	7,942	14,182	22,124
2 Administration	640	0	640
3 Engineering Services	833	1,560	2,413
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	943	1,574	2,518
Sub-total	10,378	17,316	27,694
7 price Escalation	0	0	0
Grand Total	10,378	17,316	27,694 OM Cost

Total

Classification of Costs	Total		
	L.C.	F.C.	Total
1 Construction Cost	34,944	62,401	97,345
2 Administration	4,264	0	4,264
3 Engineering Services	3,411	6,240	9,651
4 Land Acquisition	22,000	0	22,000
5 Evacuation	13,200	0	13,200
6 Physical Contingency	7,782	6,864	14,646
Sub-total	85,601	75,505	161,106
7 price Escalation	0	0	0
Grand Total	85,601	75,505	161,106 OM Cost

TABLE VII.3.2.4 (1/2) CALCULATION OF ECONOMIC COST

U. Jenlang Transfer canal and Naok Dam

(1) Financial Cost

1	Classification of Costs	Unit: RM 1,000		
		1998		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	659	0	659
3	Engineering Services	1,417	842	2,289
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	211	84	295
	Sub-total	2,317	926	3,243
7	price Escalation	342	116	458
	Grand Total	2,659	1,042	3,701 OM Cost

(2) Economic Cost

1	Classification of Costs	Unit: RM 1,000		
		1998		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	540	0	540
3	Engineering Services	1,187	842	2,029
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	173	84	257
	Sub-total	1,900	926	2,826
7	price Escalation	0	0	0
	Grand Total	1,900	926	2,826 OM Cost

2

2	Classification of Costs	1999		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	659	0	659
3	Engineering Services	2,818	1,665	4,483
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	348	167	514
	Sub-total	3,825	1,832	5,656
7	price Escalation	718	292	1,010
	Grand Total	4,543	2,124	6,666 OM Cost

2

2	Classification of Costs	1999		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	540	0	540
3	Engineering Services	2,311	1,665	3,976
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	285	167	452
	Sub-total	3,136	1,832	4,968
7	price Escalation	0	0	0
	Grand Total	3,136	1,832	4,968 OM Cost

3

3	Classification of Costs	2000		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	782	0	782
3	Engineering Services	559	299	858
4	Land Acquisition	1,924	0	1,924
5	Evacuation	213	0	213
6	Physical Contingency	348	30	378
	Sub-total	3,826	329	4,155
7	price Escalation	877	64	941
	Grand Total	4,703	393	5,096 OM Cost

3

3	Classification of Costs	2000		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	641	0	641
3	Engineering Services	458	299	757
4	Land Acquisition	1,693	0	1,693
5	Evacuation	187	0	187
6	Physical Contingency	298	30	328
	Sub-total	3,278	329	3,607
7	price Escalation	0	0	0
	Grand Total	3,278	329	3,607 OM Cost

4

4	Classification of Costs	2001		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	1,317	0	1,317
3	Engineering Services	0	0	0
4	Land Acquisition	2,024	0	2,024
5	Evacuation	300	0	300
6	Physical Contingency	364	0	364
	Sub-total	4,005	0	4,005
7	price Escalation	1,091	0	1,091
	Grand Total	5,096	0	5,096 OM Cost

4

4	Classification of Costs	2001		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	1,080	0	1,080
3	Engineering Services	0	0	0
4	Land Acquisition	1,781	0	1,781
5	Evacuation	264	0	264
6	Physical Contingency	313	0	313
	Sub-total	3,438	0	3,438
7	price Escalation	0	0	0
	Grand Total	3,438	0	3,438 OM Cost

5

5	Classification of Costs	2002		
		L.C.	F.C.	Total
1	Construction Cost	7,691	4,964	12,655
2	Administration	1,194	0	1,194
3	Engineering Services	203	131	334
4	Land Acquisition	43	0	43
5	Evacuation	37	0	37
6	Physical Contingency	917	510	1,426
	Sub-total	10,085	5,605	15,689
7	price Escalation	3,195	1,495	4,690
	Grand Total	13,280	7,100	20,379 OM Cost

5

5	Classification of Costs	2002		
		L.C.	F.C.	Total
1	Construction Cost	6,460	4,964	11,424
2	Administration	979	0	979
3	Engineering Services	166	131	297
4	Land Acquisition	38	0	38
5	Evacuation	33	0	33
6	Physical Contingency	768	510	1,277
	Sub-total	8,444	5,605	14,049
7	price Escalation	0	0	0
	Grand Total	8,444	5,605	14,049 OM Cost

TABLE VII.3.2.4 (2/2)

CALCULATION OF ECONOMIC COST

U. Jeniang Transfer canal and Naek Dam

(1) Financial Cost

Classification of Costs	2003		
	L.C.	F.C.	Total
1 Construction Cost	24,040	13,884	37,924
2 Administration	659	0	659
3 Engineering Services	872	511	1,383
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	2,557	1,440	3,997
Sub-total	28,128	15,835	43,963
7 price Escalation	10,207	4,826	15,033
Grand Total	38,335	20,661	58,996 OM Cost

Classification of Costs	2004		
	L.C.	F.C.	Total
1 Construction Cost	28,272	16,150	44,422
2 Administration	659	0	659
3 Engineering Services	1,244	711	1,955
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	3,018	1,686	4,704
Sub-total	33,193	18,547	51,740
7 price Escalation	13,628	6,378	20,006
Grand Total	46,821	24,925	71,746 OM Cost

Classification of Costs	2005		
	L.C.	F.C.	Total
1 Construction Cost	20,386	11,759	32,145
2 Administration	659	0	659
3 Engineering Services	897	517	1,414
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	2,194	1,228	3,422
Sub-total	24,136	13,504	37,640
7 price Escalation	11,102	5,189	16,291
Grand Total	35,238	18,693	53,931 OM Cost

Classification of Costs	Total		
	L.C.	F.C.	Total
1 Construction Cost	80,389	46,757	127,146
2 Administration	6,588	0	6,588
3 Engineering Services	8,040	4,676	12,716
4 Land Acquisition	3,991	0	3,991
5 Evacuation	550	0	550
6 Physical Contingency	9,956	5,143	15,099
Sub-total	109,514	56,576	166,090
7 price Escalation	41,160	18,360	59,520
Grand Total	150,674	74,936	225,610 OM Cost

(2) Economic Cost

Classification of Costs	2003		
	L.C.	F.C.	Total
1 Construction Cost	20,194	13,884	34,078
2 Administration	540	0	540
3 Engineering Services	715	511	1,226
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	2,145	1,440	3,584
Sub-total	23,594	15,835	39,428
7 price Escalation	0	0	0
Grand Total	23,594	15,835	39,428 OM Cost

Classification of Costs	2004		
	L.C.	F.C.	Total
1 Construction Cost	23,748	16,150	39,898
2 Administration	540	0	540
3 Engineering Services	1,020	711	1,731
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	2,531	1,686	4,217
Sub-total	27,840	18,547	46,387
7 price Escalation	0	0	0
Grand Total	27,840	18,547	46,387 OM Cost

Classification of Costs	2005		
	L.C.	F.C.	Total
1 Construction Cost	17,124	11,759	28,883
2 Administration	540	0	540
3 Engineering Services	736	517	1,253
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	1,840	1,228	3,068
Sub-total	20,240	13,504	33,744
7 price Escalation	0	0	0
Grand Total	20,240	13,504	33,744 OM Cost

Classification of Costs	Total		
	L.C.	F.C.	Total
1 Construction Cost	67,527	46,757	114,284
2 Administration	5,402	0	5,402
3 Engineering Services	6,593	4,676	11,269
4 Land Acquisition	3,512	0	3,512
5 Evacuation	484	0	484
6 Physical Contingency	8,352	5,143	13,495
Sub-total	91,870	56,576	148,446
7 price Escalation	0	0	0
Grand Total	91,870	56,576	148,446 OM Cost

TABLE VII.3.2.5 (1/2)

CALCULATION OF ECONOMIC COST

III. Reman Dam

(1) Financial Cost

1	Classification of Costs	Unit: RM 1,000		
		2000		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	524	0	524
3	Engineering Services	848	1,234	2,082
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	137	123	261
	Sub-total	1,509	1,357	2,867
7	price Escalation	346	263	609
	Grand Total	1,855	1,620	3,476 OM Cost

2

2	Classification of Costs	Unit: RM 1,000		
		2001		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	524	0	524
3	Engineering Services	848	1,234	2,082
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	137	123	261
	Sub-total	1,509	1,357	2,867
7	price Escalation	411	312	723
	Grand Total	1,920	1,669	3,590 OM Cost

3

3	Classification of Costs	Unit: RM 1,000		
		2002		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	1,047	0	1,047
3	Engineering Services	0	0	0
4	Land Acquisition	9,090	0	9,090
5	Evacuation	1,500	0	1,500
6	Physical Contingency	1,164	0	1,164
	Sub-total	12,801	0	12,801
7	price Escalation	4,055	0	4,055
	Grand Total	16,856	0	16,856 OM Cost

4

4	Classification of Costs	Unit: RM 1,000		
		2003		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	1,047	0	1,047
3	Engineering Services	0	0	0
4	Land Acquisition	21,210	0	21,210
5	Evacuation	3,500	0	3,500
6	Physical Contingency	2,576	0	2,576
	Sub-total	28,333	0	28,333
7	price Escalation	10,282	0	10,282
	Grand Total	38,615	0	38,615 OM Cost

5

5	Classification of Costs	Unit: RM 1,000		
		2004		
		L.C.	F.C.	Total
1	Construction Cost	3,856	5,607	9,463
2	Administration	524	0	524
3	Engineering Services	113	164	277
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	449	577	1,026
	Sub-total	4,942	6,348	11,290
7	price Escalation	2,029	2,183	4,212
	Grand Total	6,971	8,531	15,502 OM Cost

(2) Economic Cost

1	Classification of Costs	Unit: RM 1,000		
		2000		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	430	0	430
3	Engineering Services	695	1,234	1,929
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	113	123	236
	Sub-total	1,238	1,357	2,595
7	price Escalation	0	0	0
	Grand Total	1,238	1,357	2,595 OM Cost

2

2	Classification of Costs	Unit: RM 1,000		
		2001		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	430	0	430
3	Engineering Services	695	1,234	1,929
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	113	123	236
	Sub-total	1,238	1,357	2,595
7	price Escalation	0	0	0
	Grand Total	1,238	1,357	2,595 OM Cost

3

3	Classification of Costs	Unit: RM 1,000		
		2002		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	859	0	859
3	Engineering Services	0	0	0
4	Land Acquisition	7,999	0	7,999
5	Evacuation	1,320	0	1,320
6	Physical Contingency	1,018	0	1,018
	Sub-total	11,196	0	11,196
7	price Escalation	0	0	0
	Grand Total	11,196	0	11,196 OM Cost

4

4	Classification of Costs	Unit: RM 1,000		
		2003		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	859	0	859
3	Engineering Services	0	0	0
4	Land Acquisition	18,665	0	18,665
5	Evacuation	3,080	0	3,080
6	Physical Contingency	2,260	0	2,260
	Sub-total	24,864	0	24,864
7	price Escalation	0	0	0
	Grand Total	24,864	0	24,864 OM Cost

5

5	Classification of Costs	Unit: RM 1,000		
		2004		
		L.C.	F.C.	Total
1	Construction Cost	3,239	5,607	8,846
2	Administration	430	0	430
3	Engineering Services	93	164	257
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	376	577	953
	Sub-total	4,138	6,348	10,486
7	price Escalation	0	0	0
	Grand Total	4,138	6,348	10,486 OM Cost

TABLE VII.3.2.5 (2/2)

CALCULATION OF ECONOMIC COST

III. Reman Dam

(1) Financial Cost

Classification of Costs	2005		
	L.C.	F.C.	Total
1 Construction Cost	11,569	16,820	28,389
2 Administration	524	0	524
3 Engineering Services	452	658	1,110
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	1,255	1,748	3,002
Sub-total	13,800	19,226	33,025
7 price Escalation	6,347	7,387	13,734
Grand Total	20,147	26,613	46,759 OM Cost

Classification of Costs	2006		
	L.C.	F.C.	Total
1 Construction Cost	7,712	11,213	18,925
2 Administration	524	0	524
3 Engineering Services	339	493	832
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	858	1,171	2,028
Sub-total	9,433	12,877	22,309
7 price Escalation	4,821	5,483	10,304
Grand Total	14,254	18,360	32,613 OM Cost

Classification of Costs	2007		
	L.C.	F.C.	Total
1 Construction Cost	5,142	7,476	12,618
2 Administration	524	0	524
3 Engineering Services	226	329	555
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	589	781	1,370
Sub-total	6,481	8,586	15,067
7 price Escalation	3,655	4,022	7,677
Grand Total	10,136	12,608	22,744 OM Cost

Classification of Costs	Total		
	L.C.	F.C.	Total
1 Construction Cost	28,279	41,116	69,395
2 Administration	5,238	0	5,238
3 Engineering Services	2,826	4,112	6,938
4 Land Acquisition	30,300	0	30,300
5 Evacuation	5,000	0	5,000
6 Physical Contingency	7,164	4,523	11,687
Sub-total	78,807	49,751	128,558
7 price Escalation	31,946	19,650	51,596
Grand Total	110,753	69,401	180,154 OM Cost

(2) Economic Cost

Classification of Costs	2005		
	L.C.	F.C.	Total
1 Construction Cost	9,718	16,820	26,538
2 Administration	430	0	430
3 Engineering Services	371	658	1,029
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	1,052	1,748	2,800
Sub-total	11,570	19,226	30,796
7 price Escalation	0	0	0
Grand Total	11,570	19,226	30,796 OM Cost

Classification of Costs	2006		
	L.C.	F.C.	Total
1 Construction Cost	6,478	11,213	17,691
2 Administration	430	0	430
3 Engineering Services	278	493	771
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	719	1,171	1,889
Sub-total	7,904	12,877	20,781
7 price Escalation	0	0	0
Grand Total	7,904	12,877	20,781 OM Cost

Classification of Costs	2007		
	L.C.	F.C.	Total
1 Construction Cost	4,319	7,476	11,795
2 Administration	430	0	430
3 Engineering Services	185	329	514
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	493	781	1,274
Sub-total	5,428	8,586	14,013
7 price Escalation	0	0	0
Grand Total	5,428	8,586	14,013 OM Cost

Classification of Costs	Total		
	L.C.	F.C.	Total
1 Construction Cost	23,754	41,116	64,870
2 Administration	4,295	0	4,295
3 Engineering Services	2,317	4,112	6,429
4 Land Acquisition	26,664	0	26,664
5 Evacuation	4,900	0	4,900
6 Physical Contingency	6,143	4,523	10,666
Sub-total	67,574	49,751	117,325
7 price Escalation	0	0	0
Grand Total	67,574	49,751	117,325 OM Cost

TABLE VII.3.2.6 ECONOMIC ANALYSIS FOR WATER RESOURCES MANAGEMENT PLAN

Unit: RM 1,000

Year	Economic Cost			Economic Benefit (B)	(B)-(C)
	Construction	O&M	Total (C)		
1 1996	39,893	0	39,893	0	-39,893
2 1997	22,000	0	22,000	0	-22,000
3 1998	41,020	0	41,020	0	-41,020
4 1999	38,294	0	38,294	0	-38,294
5 2000	33,896	0	33,896	0	-33,896
6 2001	6,033	487	6,520	11,190	4,670
7 2002	25,245	487	25,732	18,270	-7,462
8 2003	64,292	487	64,779	25,351	-39,428
9 2004	56,873	487	57,360	32,431	-24,929
10 2005	64,540	487	65,027	39,512	-25,515
11 2006	20,781	1,058	21,839	46,592	24,753
12 2007	14,013	1,058	15,071	72,614	57,543
13 2008	0	1,382	1,382	98,635	97,253
14 2009	0	1,382	1,382	98,635	97,253
15 2010	0	1,382	1,382	98,635	97,253
16 2011	0	1,382	1,382	98,635	97,253
17 2012	0	1,382	1,382	98,635	97,253
18 2013	0	1,382	1,382	98,635	97,253
19 2014	0	1,382	1,382	98,635	97,253
20 2015	0	1,382	1,382	98,635	97,253
21 2016	0	1,382	1,382	98,635	97,253
22 2017	0	1,382	1,382	98,635	97,253
23 2018	0	1,382	1,382	98,635	97,253
24 2019	0	1,382	1,382	98,635	97,253
25 2020	0	1,382	1,382	98,635	97,253
26 2021	0	1,382	1,382	98,635	97,253
27 2022	0	1,382	1,382	98,635	97,253
28 2023	0	1,382	1,382	98,635	97,253
29 2024	0	1,382	1,382	98,635	97,253
30 2025	0	1,382	1,382	98,635	97,253
31 2026	0	1,382	1,382	98,635	97,253
32 2027	0	1,382	1,382	98,635	97,253
33 2028	0	1,382	1,382	98,635	97,253
34 2029	0	1,382	1,382	98,635	97,253
35 2030	0	1,382	1,382	98,635	97,253
36 2031	0	1,382	1,382	98,635	97,253
37 2032	0	1,382	1,382	98,635	97,253
38 2033	0	1,382	1,382	98,635	97,253
39 2034	0	1,382	1,382	98,635	97,253
40 2035	0	1,382	1,382	98,635	97,253
41 2035	0	1,382	1,382	98,635	97,253
42 2037	0	1,382	1,382	98,635	97,253
43 2038	0	1,382	1,382	98,635	97,253
44 2039	0	1,382	1,382	98,635	97,253
45 2040	0	1,382	1,382	98,635	97,253
46 2041	0	1,382	1,382	98,635	97,253
47 2042	0	1,382	1,382	98,635	97,253
48 2043	0	1,382	1,382	98,635	97,253
49 2044	0	1,382	1,382	98,635	97,253
50 2045	0	1,382	1,382	98,635	97,253
51 2046	0	1,382	1,382	98,635	97,253
52 2047	0	1,382	1,382	98,635	97,253
53 2048	0	1,382	1,382	98,635	97,253
54 2049	0	1,382	1,382	98,635	97,253
55 2050	0	1,382	1,382	98,635	97,253
56 2051	0	895	895	87,445	86,550
57 2052	0	895	895	87,445	86,550
58 2053	0	895	895	87,445	86,550
59 2054	0	895	895	87,445	86,550
60 2055	0	895	895	87,445	86,550
61 2056	0	324	324	52,043	51,719
62 2057	0	324	324	52,043	51,719
Total	426,880	60,100	495,980	5,028,576	4,532,596

Discount Rate (%)	B/C	EIRR (%)		NPV
		14.61		
		PV(RP Million)		
		Cost	Benefit (RP Million)	
15	0.96	192,321	185,322	-6,999
12	1.31	221,739	290,701	68,962
10	1.66	245,778	407,087	161,310

TABLE VII.3.3.1(1/4) NUMBER AND AREA OF ASSETS SUBMERGED BY FLOOD

I. Muda River Lower Basin

(1) 2-Year Return Period

Depth(m)	Water			Agricultural Crops (ha)						
	Farm H.	Buildings Residence	S.O.F	Total	Paddy Farm Crops	Tree Crops	Oil Palm	Rubber	Total	
1 0.0-0.5	1,023	256	84	1,363	696	57	57	1	18	839
2 0.5-1.0	326	81	40	447	328	30	30	0	0	388
3 1.0-1.5	149	37	17	203	88	14	15	0	0	117
4 1.5-2.0	1	0	0	1	0	0	0	0	0	0
5 2.0-over	0	0	0	0	0	0	0	0	0	0
Total	1,499	374	141	2,014	1,112	101	102	1	18	1,334

Note: S.O.P = Shop, Office and Factory, etc.

(2) 5-Year Return Period

Depth(m)	Water			Agricultural Crops (ha)						
	Farm H.	Buildings Residence	S.O.F	Total	Paddy Farm Crops	Tree Crops	Oil Palm	Rubber	Total	
1 0.0-0.5	1,382	345	110	1,837	1,163	126	126	19	130	1,564
2 0.5-1.0	678	170	67	915	787	45	46	2	25	905
3 1.0-1.5	275	69	31	375	253	28	29	0	0	310
4 1.5-2.0	65	16	7	88	40	5	6	0	0	51
5 2.0-over	0	0	0	0	0	0	0	0	0	0
Total	2,400	600	215	3,215	2,243	204	207	21	155	2,830

Note: S.O.P = Shop, Office and Factory, etc.

(3) 10-Year Return Period

Depth(m)	Water			Agricultural Crops (ha)						
	Farm H.	Buildings Residence	S.O.F	Total	Paddy Farm Crops	Tree Crops	Oil Palm	Rubber	Total	
1 0.0-0.5	1,372	343	113	1,828	816	143	144	32	133	1,268
2 0.5-1.0	979	245	89	1,313	1,217	70	70	8	79	1,444
3 1.0-1.5	326	81	37	444	346	30	31	0	0	407
4 1.5-2.0	134	34	14	182	86	12	13	0	0	111
5 2.0-over	1	0	0	1	0	0	0	0	0	0
Total	2,812	703	253	3,768	2,465	255	258	40	212	3,230

Note: S.O.P = Shop, Office and Factory, etc.

(4) 20-Year Return Period

Depth(m)	Water			Agricultural Crops (ha)						
	Farm H.	Buildings Residence	S.O.F	Total	Paddy Farm Crops	Tree Crops	Oil Palm	Rubber	Total	
1 0.0-0.5	1,201	300	106	1,607	584	144	144	38	121	1,031
2 0.5-1.0	1,378	344	110	1,832	1,206	107	108	20	115	1,556
3 1.0-1.5	476	119	51	646	670	40	40	3	31	784
4 1.5-2.0	228	57	25	310	163	24	24	0	0	211
5 2.0-over	29	7	3	39	17	2	2	0	0	21
Total	3,311	828	295	4,434	2,640	317	318	61	267	3,603

Note: S.O.P = Shop, Office and Factory, etc.

(5) 50-Year Return Period

Depth(m)	Water			Agricultural Crops (ha)						
	Farm H.	Buildings Residence	S.O.F	Total	Paddy Farm Crops	Tree Crops	Oil Palm	Rubber	Total	
1 0.0-0.5	1,139	285	67	1,491	460	125	126	24	71	806
2 0.5-1.0	1,429	357	122	1,908	743	147	148	38	134	1,210
3 1.0-1.5	941	235	88	1,264	1,159	70	71	14	87	1,401
4 1.5-2.0	349	87	37	473	311	34	34	1	11	391
5 2.0-over	123	31	12	166	84	12	12	0	0	108
Total	3,981	995	326	5,302	2,757	388	391	77	303	3,916

Note: S.O.P = Shop, Office and Factory, etc.

(6) 100-Year Return Period

Depth(m)	Water			Agricultural Crops (ha)						
	Farm H.	Buildings Residence	S.O.F	Total	Paddy Farm Crops	Tree Crops	Oil Palm	Rubber	Total	
1 0.0-0.5	1,099	275	51	1,425	400	114	114	19	58	705
2 0.5-1.0	1,318	329	118	1,765	623	149	150	38	123	1,083
3 1.0-1.5	1,194	298	105	1,597	1,191	93	94	23	110	1,511
4 1.5-2.0	441	110	46	597	454	40	41	3	27	565
5 2.0-over	191	48	19	258	139	19	20	0	0	178
Total	4,242	1,061	339	5,642	2,807	415	419	83	318	4,012

Note: S.O.P = Shop, Office and Factory, etc.

TABLE VII.3.3.1(2/4) NUMBER AND AREA OF ASSETS SUBMERGED BY FLOOD

H. Kuala Ketil Town

(1) 2-Year Return Period

Depth(m)	Water		Buildings		Agricultural Crops (ha)					Total
	Farm H.	Residence	S.O.F	Total	Paddy	Farm Crops	Tree Crops	Oil Palm	Rubber	
1 0.0-0.5	28	0	0	28	0	1	2	0	3	6
2 0.5-1.0	0	0	0	0	0	0	0	0	0	0
3 1.0-1.5	0	0	0	0	0	0	0	0	0	0
4 1.5-2.0	0	0	0	0	0	0	0	0	0	0
5 2.0-over	0	0	0	0	0	0	0	0	0	0
Total	28	0	0	28	0	1	2	0	3	6

Note: S.O.P = Shop, Office and Factory, etc.

(2) 5-Year Return Period

Depth(m)	Water		Buildings		Agricultural Crops (ha)					Total
	Farm H.	Residence	S.O.F	Total	Paddy	Farm Crops	Tree Crops	Oil Palm	Rubber	
1 0.0-0.5	47	37	19	103	0	8	9	0	11	28
2 0.5-1.0	36	0	0	36	0	2	2	0	4	8
3 1.0-1.5	0	0	0	0	0	0	0	0	0	0
4 1.5-2.0	0	0	0	0	0	0	0	0	0	0
5 2.0-over	0	0	0	0	0	0	0	0	0	0
Total	83	37	19	139	0	10	11	0	15	36

Note: S.O.P = Shop, Office and Factory, etc.

(3) 10-Year Return Period

Depth(m)	Water		Buildings		Agricultural Crops (ha)					Total
	Farm H.	Residence	S.O.F	Total	Paddy	Farm Crops	Tree Crops	Oil Palm	Rubber	
1 0.0-0.5	114	85	24	223	0	18	18	0	7	43
2 0.5-1.0	47	37	19	103	0	8	9	0	11	28
3 1.0-1.5	36	0	0	36	0	2	2	0	4	8
4 1.5-2.0	0	0	0	0	0	0	0	0	0	0
5 2.0-over	0	0	0	0	0	0	0	0	0	0
Total	197	122	43	362	0	28	29	0	22	79

Note: S.O.P = Shop, Office and Factory, etc.

(4) 20-Year Return Period

Depth(m)	Water		Buildings		Agricultural Crops (ha)					Total
	Farm H.	Residence	S.O.F	Total	Paddy	Farm Crops	Tree Crops	Oil Palm	Rubber	
1 0.0-0.5	139	97	22	258	0	19	19	0	2	40
2 0.5-1.0	59	66	28	153	0	13	13	0	12	38
3 1.0-1.5	55	10	5	70	0	4	5	0	8	17
4 1.5-2.0	9	0	0	9	0	0	1	0	1	2
5 2.0-over	0	0	0	0	0	0	0	0	0	0
Total	262	173	55	490	0	36	38	0	23	97

Note: S.O.P = Shop, Office and Factory, etc.

(5) 50-Year Return Period

Depth(m)	Water		Buildings		Agricultural Crops (ha)					Total
	Farm H.	Residence	S.O.F	Total	Paddy	Farm Crops	Tree Crops	Oil Palm	Rubber	
1 0.0-0.5	40	82	29	151	0	4	4	2	0	10
2 0.5-1.0	150	97	21	268	0	21	22	0	3	46
3 1.0-1.5	41	55	28	124	0	11	11	0	13	35
4 1.5-2.0	53	0	0	53	0	3	3	0	6	12
5 2.0-over	0	0	0	0	0	0	0	0	0	0
Total	284	234	78	596	0	39	40	2	22	103

Note: S.O.P = Shop, Office and Factory, etc.

(6) 100-Year Return Period

Depth(m)	Water		Buildings		Agricultural Crops (ha)					Total
	Farm H.	Residence	S.O.F	Total	Paddy	Farm Crops	Tree Crops	Oil Palm	Rubber	
1 0.0-0.5	18	48	18	84	0	1	2	1	0	4
2 0.5-1.0	108	92	24	224	0	14	15	1	1	31
3 1.0-1.5	88	76	26	190	0	16	16	0	9	41
4 1.5-2.0	51	24	12	87	0	6	7	0	10	23
5 2.0-over	23	0	0	23	0	1	1	0	3	5
Total	288	240	80	608	0	38	41	2	23	103

TABLE VII.3.3.1(3/4) NUMBER AND AREA OF ASSETS SUBMERGED BY FLOOD

III. Six Tonn

(1) 2-Year Return Period

Depth(m)	Water				Agricultural Crops (ha)						
	Farm H.	Residence	S.O.F.	Total	Paddy	Vegetables	Tree Crops	Oil Palm	Rubber	Total	
1 0.0-0.5	0	4	12	16	0	1	1	0	0	2	
2 0.5-1.0	0	0	0	0	0	0	0	0	0	0	
3 1.0-1.5	0	0	0	0	0	0	0	0	0	0	
4 1.5-2.0	0	0	0	0	0	0	0	0	0	0	
5 2.0-over	0	0	0	0	0	0	0	0	0	0	
Total	0	4	12	16	0	1	1	0	0	2	

Note: S.O.F. = Shop, Office, Factory, etc.

(2) 5-Year Return Period

Depth(m)	Water				Agricultural Crops (ha)						
	Farm H.	Residence	S.O.F.	Total	Paddy	Vegetables	Tree Crops	Oil Palm	Rubber	Total	
1 0.0-0.5	0	14	44	58	0	3	4	0	0	7	
2 0.5-1.0	0	0	0	0	0	0	0	0	0	0	
3 1.0-1.5	0	0	0	0	0	0	0	0	0	0	
4 1.5-2.0	0	0	0	0	0	0	0	0	0	0	
5 2.0-over	0	0	0	0	0	0	0	0	0	0	
Total	0	14	44	58	0	3	4	0	0	7	

Note: S.O.F. = Shop, Office, Factory, etc.

(3) 10-Year Return Period

Depth(m)	Water				Agricultural Crops (ha)						
	Farm H.	Residence	S.O.F.	Total	Paddy	Vegetables	Tree Crops	Oil Palm	Rubber	Total	
1 0.0-0.5	0	18	42	60	0	2	3	0	0	5	
2 0.5-1.0	0	7	21	28	0	1	2	0	0	3	
3 1.0-1.5	0	0	0	0	0	0	0	0	0	0	
4 1.5-2.0	0	0	0	0	0	0	0	0	0	0	
5 2.0-over	0	0	0	0	0	0	0	0	0	0	
Total	0	25	63	88	0	3	5	0	0	8	

Note: S.O.F. = Shop, Office, Factory, etc.

(4) 20-Year Return Period

Depth(m)	Water				Agricultural Crops (ha)						
	Farm H.	Residence	S.O.F.	Total	Paddy	Vegetables	Tree Crops	Oil Palm	Rubber	Total	
1 0.0-0.5	0	17	39	56	0	2	3	0	0	5	
2 0.5-1.0	0	10	33	43	0	2	3	0	0	5	
3 1.0-1.5	0	0	0	0	0	0	0	0	0	0	
4 1.5-2.0	0	0	0	0	0	0	0	0	0	0	
5 2.0-over	0	0	0	0	0	0	0	0	0	0	
Total	0	27	72	99	0	4	6	0	0	10	

Note: S.O.F. = Shop, Office, Factory, etc.

(5) 50-Year Return Period

Depth(m)	Water				Agricultural Crops (ha)						
	Farm H.	Residence	S.O.F.	Total	Paddy	Vegetables	Tree Crops	Oil Palm	Rubber	Total	
1 0.0-0.5	0	19	25	44	0	1	2	0	0	3	
2 0.5-1.0	0	17	41	58	0	2	3	0	0	5	
3 1.0-1.5	0	8	27	35	0	2	2	0	0	4	
4 1.5-2.0	0	0	0	0	0	0	0	0	0	0	
5 2.0-over	0	0	0	0	0	0	0	0	0	0	
Total	0	44	93	137	0	5	7	0	0	12	

Note: S.O.F. = Shop, Office, Factory, etc.

(6) 100-Year Return Period

Depth(m)	Water				Agricultural Crops (ha)						
	Farm H.	Residence	S.O.F.	Total	Paddy	Vegetables	Tree Crops	Oil Palm	Rubber	Total	
1 0.0-0.5	0	19	12	31	0	1	1	0	0	2	
2 0.5-1.0	0	18	29	47	0	1	2	0	0	3	
3 1.0-1.5	0	16	44	60	0	2	3	0	0	5	
4 1.5-2.0	0	5	16	21	0	3	4	0	0	7	
5 2.0-over	0	0	0	0	0	0	0	0	0	0	
Total	0	58	101	159	0	7	10	0	0	17	

Note: S.O.F. = Shop, Office, Factory, etc.

TABLE VII.3.3.1(4/4) NUMBER AND AREA OF ASSETS SUBMERGED BY FLOOD

IV. Baling Town

(1) 2-Year Return Period

Depth(m)	Water		Buildings		Agricultural Crops (ha)					Total
	Farm	H. Residence	S.O.F.	Total	Paddy	Farm Crops	Tree Crops	Oil Palm	Rubber	
1 0.0-0.5	0	14	0	14	0	1	1	0	0	2
2 0.5-1.0	0	0	0	0	0	0	0	0	0	0
3 1.0-1.5	0	0	0	0	0	0	0	0	0	0
4 1.5-2.0	0	0	0	0	0	0	0	0	0	0
5 2.0-over	0	0	0	0	0	0	0	0	0	0
Total	0	14	0	14	0	1	1	0	0	2

Note: S.O.F. = Shop, Office, Factory, etc.

(2) 5-Year Return Period

Depth(m)	Water		Buildings		Agricultural Crops (ha)					Total
	Farm	H. Residence	S.O.F.	Total	Paddy	Farm Crops	Tree Crops	Oil Palm	Rubber	
1 0.0-0.5	0	44	22	66	0	2	3	0	0	5
2 0.5-1.0	0	17	0	17	0	1	1	0	0	2
3 1.0-1.5	0	0	0	0	0	0	0	0	0	0
4 1.5-2.0	0	0	0	0	0	0	0	0	0	0
5 2.0-over	0	0	0	0	0	0	0	0	0	0
Total	0	61	22	83	0	3	4	0	0	7

Note: S.O.F. = Shop, Office, Factory, etc.

(3) 10-Year Return Period

Depth(m)	Water		Buildings		Agricultural Crops (ha)					Total
	Farm	H. Residence	S.O.F.	Total	Paddy	Farm Crops	Tree Crops	Oil Palm	Rubber	
1 0.0-0.5	0	35	21	56	0	2	4	0	0	6
2 0.5-1.0	0	30	9	39	0	2	2	0	0	4
3 1.0-1.5	0	7	0	7	0	0	1	0	0	1
4 1.5-2.0	0	0	0	0	0	0	0	0	0	0
5 2.0-over	0	0	0	0	0	0	0	0	0	0
Total	0	72	30	102	0	4	7	0	0	11

Note: S.O.F. = Shop, Office, Factory, etc.

(4) 20-Year Return Period

Depth(m)	Water		Buildings		Agricultural Crops (ha)					Total
	Farm	H. Residence	S.O.F.	Total	Paddy	Farm Crops	Tree Crops	Oil Palm	Rubber	
1 0.0-0.5	0	26	18	44	0	2	3	0	0	5
2 0.5-1.0	0	33	21	54	0	2	4	0	0	6
3 1.0-1.5	0	31	11	42	0	1	3	0	0	4
4 1.5-2.0	0	9	0	9	0	0	1	0	0	1
5 2.0-over	0	0	0	0	0	0	0	0	0	0
Total	0	99	50	149	0	5	11	0	0	16

Note: S.O.F. = Shop, Office, Factory, etc.

(5) 50-Year Return Period

Depth(m)	Water		Buildings		Agricultural Crops (ha)					Total
	Farm	H. Residence	S.O.F.	Total	Paddy	Farm Crops	Tree Crops	Oil Palm	Rubber	
1 0.0-0.5	0	31	16	47	0	2	2	0	0	4
2 0.5-1.0	0	24	18	42	0	2	3	0	0	5
3 1.0-1.5	0	37	22	59	0	2	3	0	0	5
4 1.5-2.0	0	25	7	32	0	1	2	0	0	3
5 2.0-over	0	7	0	7	0	0	1	0	0	1
Total	0	124	63	187	0	7	11	0	0	18

Note: S.O.F. = Shop, Office, Factory, etc.

(6) 100-Year Return Period

Depth(m)	Water		Buildings		Agricultural Crops (ha)					Total
	Farm	H. Residence	S.O.F.	Total	Paddy	Farm Crops	Tree Crops	Oil Palm	Rubber	
1 0.0-0.5	0	25	16	41	0	2	3	0	0	5
2 0.5-1.0	0	30	17	47	0	2	3	0	0	5
3 1.0-1.5	0	27	20	47	0	2	4	0	0	6
4 1.5-2.0	0	37	16	53	0	2	3	0	0	5
5 2.0-over	0	12	0	12	0	1	1	0	0	2
Total	0	131	69	200	0	9	14	0	0	23

Note: S.O.F. = Shop, Office, Factory, etc.

TABLE VII.3.3.2 APPRAISAL VALUES OF ASSETS

Amount	Appraisal of Buildings (RM/Buld.)		Appraisal of HH Effects (RM/HH)		Yield of Crops (RM/ha)					
	Farm H. Residence	S.O.F	Farm H. Residence	S.O.F	Paddy Farm Crops	Tree Crops	Oil Palm Rubber			
15,450	21,600	23,400	16,650	17,250	42,150	1,840	1,180	2,000	4,300	3,660

Note: S.O.F. = Shop, Office and Factory

TABLE VII.3.3.3 DAMAGE RATE OF ASSETS SUBMERGED BY FLOOD

Water Depth(m)	Damage to Buildings(%)		Damage to HH Effects(%)		Damage to Crops (%)					
	Farm H. Residence	S.O.F	Farm H. Residence	S.O.F	Paddy Farm Crops	Tree Crops	Oil Palm Rubber			
1 0.0-0.5	5	5	5	5	16	21	27	5	3	3
2 0.5-1.0	7	7	30	19	30	44	48	10	5	5
3 1.0-1.5	10	10	37	29	37	54	67	20	10	10
4 1.5-2.0	12	12	42	38	42	75	90	40	15	15
5 2.0-over	14	14	47	46	47	90	90	80	20	20

Note: S.O.F. = Shop, Office and Factory

TABLE VII.3.3.4 ESTIMATES OF FLOOD DAMAGE BY RETURN PERIOD

I. Muda River Lower Basin													Unit: RM	
Return Period (Year)	Buildings			Household Effects			Agricultural Crops			Losses of Pub. Facilities and Business Activities			Grand Total	
	Farm Houses	Residences	Total	Farm Houses	Residences	Total	Faddy	Farm Crops	Tree Crops	Oil Palm	Rubber	Total		
2	1374,308	479,693	2,057,581	5275,852	830,011	1,337,420	621,920	46,221	17,700	129	1,976	687,946	3,898,346	14,017,133
5	2,346,299	820,066	3,497,006	9,217,706	1,542,461	2,196,437	1,393,119	93,078	38,200	2,881	18,849	1,546,128	6,581,444	24,561,181
10	2,873,267	1,003,493	4,280,644	11,499,656	1,962,291	2,712,353	1,763,051	121,670	51,200	5,848	29,060	1,970,829	8,181,977	30,607,750
20	3,637,919	1,271,506	5,412,992	14,832,220	2,620,896	3,403,191	2,120,839	165,719	74,400	10,492	45,677	2,417,127	10,597,720	39,194,146
50	4,791,972	1,674,864	7,094,190	19,370,743	3,605,457	4,259,679	2,499,143	227,280	117,000	17,931	70,199	2,931,553	13,792,028	50,993,650
100	5,349,037	1,869,566	7,908,670	21,441,604	4,100,636	4,664,319	2,699,022	256,898	143,800	22,446	83,960	3,206,127	15,246,091	56,567,445
II. Kuala Kedil Town													Unit: RM	
2	21,630	0	21,630	74,592	0	74,592	0	319	200	0	329	848	38,489	135,559
5	75,242	39,960	137,432	305,028	57,443	128,136	0	3,682	1,300	0	1,940	6,921	251,215	886,175
10	194,516	147,744	59,202	401,462	760,239	253,230	0	11,847	4,400	0	4,246	20,493	726,817	2,564,351
20	272,847	226,152	83,304	582,303	1,066,766	416,933	0	16,579	7,300	0	5,893	29,772	1,058,563	3,794,741
50	354,732	354,024	133,848	842,604	1,479,020	720,360	0	25,051	11,600	258	8,601	45,510	1,575,911	5,561,200
100	410,970	417,312	154,908	983,190	1,666,165	913,560	0	28,332	16,800	344	11,163	56,639	1,842,283	6,504,628
III. Sik Town													Unit: RM	
2	0	4,320	14,040	18,360	0	6,210	80,928	0	319	100	0	419	42,199	148,116
5	0	15,120	51,480	66,600	0	21,735	296,736	0	956	400	0	1,356	154,028	540,455
10	0	30,024	83,538	113,562	0	50,888	548,793	0	1,204	700	0	1,904	285,277	1,000,443
20	0	33,480	99,684	133,164	0	59,168	680,301	0	1,770	900	0	2,670	349,053	1,224,356
50	0	63,504	159,588	223,092	0	125,255	1,108,124	0	3,033	1,600	0	4,633	582,580	2,043,663
100	0	95,256	209,430	304,686	0	201,308	1,417,083	0	5,652	4,900	0	10,552	769,231	2,702,859
IV. Baling Town													Unit: RM	
2	0	15,120	0	15,120	0	21,735	0	319	100	0	0	419	14,742	52,016
5	0	73,224	25,740	98,964	0	124,028	148,368	0	1,204	500	0	1,704	148,544	521,607
10	0	98,280	39,312	137,592	0	187,680	255,429	0	1,770	1,200	0	2,970	232,280	815,951
20	0	163,264	81,198	249,462	0	362,995	538,488	0	2,561	3,100	0	5,661	468,218	1,644,423
50	0	235,656	119,340	354,996	0	531,300	802,536	0	4,413	5,200	0	9,613	675,533	2,373,978
100	0	262,872	138,294	401,166	0	609,960	918,027	0	6,537	6,500	0	13,037	771,661	2,713,851

TABLE VII.3.3.5(1/2) ESTIMATE OF ECONOMIC COST

I. Mada Downstream

(1) Financial Cost

1	Classification of Costs	Unit: RM1,000		
		2000		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	1,218	0	1,218
3	Engineering Services	2,954	4,243	7,197
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	417	424	842
	Sub-total	4,589	4,667	9,257
7	price Escalation	1,665	1,423	3,088
	Grand Total	6,254	6,090	12,345 OM Cost

2	Classification of Costs	2001		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	1,218	0	1,218
3	Engineering Services	2,954	4,243	7,197
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	417	424	842
	Sub-total	4,589	4,667	9,257
7	price Escalation	1,884	1,605	3,489
	Grand Total	6,473	6,272	12,746 OM Cost

3	Classification of Costs	2003		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	1,827	0	1,827
3	Engineering Services	0	0	0
4	Land Acquisition	6,842	0	6,842
5	Evacuation	1,863	0	1,863
6	Physical Contingency	1,053	0	1,053
	Sub-total	11,585	0	11,585
7	price Escalation	5,329	0	5,329
	Grand Total	16,914	0	16,914 OM Cost

4	Classification of Costs	2006		
		L.C.	F.C.	Total
1	Construction Cost	11,637	16,716	28,353
2	Administration	1,827	0	1,827
3	Engineering Services	591	849	1,440
4	Land Acquisition	6,842	0	6,842
5	Evacuation	1,863	0	1,863
6	Physical Contingency	2,276	1,757	4,033
	Sub-total	25,036	19,322	44,358
7	price Escalation	12,795	8,226	21,021
	Grand Total	37,831	27,548	65,379 OM Cost

5	Classification of Costs	2007		
		L.C.	F.C.	Total
1	Construction Cost	33,119	47,575	80,694
2	Administration	1,827	0	1,827
3	Engineering Services	985	1,414	2,399
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	3,593	4,899	8,492
	Sub-total	39,524	53,888	93,412
7	price Escalation	22,290	25,249	47,539
	Grand Total	61,814	79,137	140,951 OM Cost

(2) Economic Cost

1	Classification of Costs	Unit: RM1,000		
		2003		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	999	0	999
3	Engineering Services	2,422	4,243	6,665
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	342	424	766
	Sub-total	3,763	4,667	8,430
7	price Escalation	0	0	0
	Grand Total	3,763	4,667	8,430 OM Cost

2	Classification of Costs	2004		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	999	0	999
3	Engineering Services	2,422	4,243	6,665
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	342	424	766
	Sub-total	3,763	4,667	8,430
7	price Escalation	0	0	0
	Grand Total	3,763	4,667	8,430 OM Cost

3	Classification of Costs	2005		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	1,498	0	1,498
3	Engineering Services	0	0	0
4	Land Acquisition	6,021	0	6,021
5	Evacuation	1,639	0	1,639
6	Physical Contingency	916	0	916
	Sub-total	10,074	0	10,074
7	price Escalation	0	0	0
	Grand Total	10,074	0	10,074 OM Cost

4	Classification of Costs	2006		
		L.C.	F.C.	Total
1	Construction Cost	9,775	16,716	26,491
2	Administration	1,498	0	1,498
3	Engineering Services	485	849	1,334
4	Land Acquisition	6,021	0	6,021
5	Evacuation	1,639	0	1,639
6	Physical Contingency	1,942	1,757	3,699
	Sub-total	21,360	19,322	40,682
7	price Escalation	0	0	0
	Grand Total	21,360	19,322	40,682 OM Cost

5	Classification of Costs	2007		
		L.C.	F.C.	Total
1	Construction Cost	27,820	47,575	75,395
2	Administration	1,498	0	1,498
3	Engineering Services	808	1,414	2,222
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	3,013	4,899	7,911
	Sub-total	33,138	53,888	87,026
7	price Escalation	0	0	0
	Grand Total	33,138	53,888	87,026 OM Cost

TABLE VII.3.3.5(2/2) ESTIMATE OF ECONOMIC COST

I. Mada Downstream

(1) Financial Cost

6	Classification of Costs	2008		
		L.C.	F.C.	Total
1	Construction Cost	26,854	38,575	65,429
2	Administration	1,827	0	1,827
3	Engineering Services	985	1,414	2,399
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	2,967	3,999	6,966
	Sub-total	32,633	43,988	76,621
7	price Escalation	20,189	22,548	42,737
	Grand Total	52,822	66,536	119,358 OM Cost

(2) Economic Cost

6	Classification of Costs	2008		
		L.C.	F.C.	Total
1	Construction Cost	22,557	38,575	61,132
2	Administration	1,498	0	1,498
3	Engineering Services	808	1,414	2,222
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	2,486	3,999	6,485
	Sub-total	27,350	43,988	71,337
7	price Escalation	0	0	0
	Grand Total	27,350	43,988	71,337 OM Cost

7	Classification of Costs	2009		
		L.C.	F.C.	Total
1	Construction Cost	17,902	25,716	43,618
2	Administration	1,218	0	1,218
3	Engineering Services	985	1,414	2,399
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	2,011	2,713	4,724
	Sub-total	22,116	29,843	51,959
7	price Escalation	14,936	16,652	31,588
	Grand Total	37,052	46,495	83,547 OM Cost

7	Classification of Costs	2009		
		L.C.	F.C.	Total
1	Construction Cost	15,038	25,716	40,754
2	Administration	999	0	999
3	Engineering Services	808	1,414	2,222
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	1,684	2,713	4,397
	Sub-total	18,529	29,843	48,372
7	price Escalation	0	0	0
	Grand Total	18,529	29,843	48,372 OM Cost

8	Classification of Costs	2010		
		L.C.	F.C.	Total
1	Construction Cost	8,951	12,858	21,809
2	Administration	1,218	0	1,218
3	Engineering Services	394	566	960
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	1,056	1,342	2,399
	Sub-total	11,619	14,766	26,386
7	price Escalation	8,529	8,929	17,458
	Grand Total	20,148	23,695	43,844 OM Cost

8	Classification of Costs	2010		
		L.C.	F.C.	Total
1	Construction Cost	7,519	12,858	20,377
2	Administration	999	0	999
3	Engineering Services	323	566	889
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	884	1,342	2,226
	Sub-total	9,725	14,766	24,491
7	price Escalation	0	0	0
	Grand Total	9,725	14,766	24,491 OM Cost

Total	Classification of Costs	Total		
		L.C.	F.C.	Total
1	Construction Cost	98,463	141,440	239,903
2	Administration	12,180	0	12,180
3	Engineering Services	9,848	14,143	23,991
4	Land Acquisition	13,684	0	13,684
5	Evacuation	3,726	0	3,726
6	Physical Contingency	13,790	15,558	29,348
	Sub-total	151,691	171,141	322,832
7	price Escalation	87,617	84,632	172,249
	Grand Total	239,308	255,773	495,081 OM Cost

Total	Classification of Costs	Total		
		L.C.	F.C.	Total
1	Construction Cost	82,709	141,440	224,149
2	Administration	9,988	0	9,988
3	Engineering Services	8,075	14,143	22,218
4	Land Acquisition	12,042	0	12,042
5	Evacuation	3,279	0	3,279
6	Physical Contingency	11,609	15,558	27,168
	Sub-total	127,702	171,141	298,843
7	price Escalation	0	0	0
	Grand Total	127,702	171,141	298,843 OM Cost

TABLE VII.3.3.6

ESTIMATE OF ECONOMIC COST

11. Kuala Ketil Stretch

(1) Financial Cost

1	Classification of Costs	Unit: RM 1,000		
		2001		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	109	0	109
3	Engineering Services	491	347	838
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	60	35	95
	Sub-total	660	382	1,042
7	price Escalation	180	88	268
	Grand Total	840	470	1,310 OM Cost

2	Classification of Costs	2002		
		L.C.	F.C.	Total
		1	Construction Cost	0
2	Administration	253	0	253
3	Engineering Services	0	0	0
4	Land Acquisition	301	0	301
5	Evacuation	225	0	225
6	Physical Contingency	78	0	78
	Sub-total	857	0	857
7	price Escalation	272	0	272
	Grand Total	1,129	0	1,129 OM Cost

3	Classification of Costs	2003		
		L.C.	F.C.	Total
		1	Construction Cost	2,973
2	Administration	217	0	217
3	Engineering Services	98	69	167
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	329	217	546
	Sub-total	3,617	2,389	6,006
7	price Escalation	1,313	728	2,041
	Grand Total	4,930	3,117	8,047 OM Cost

4	Classification of Costs	2004		
		L.C.	F.C.	Total
		1	Construction Cost	5,204
2	Administration	145	0	145
3	Engineering Services	229	162	391
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	558	384	942
	Sub-total	6,136	4,225	10,361
7	price Escalation	2,519	1,453	3,972
	Grand Total	8,655	5,678	14,333 OM Cost

Total	Classification of Costs	Total		
		L.C.	F.C.	Total
		1	Construction Cost	8,177
2	Administration	724	0	724
3	Engineering Services	818	578	1,396
4	Land Acquisition	301	0	301
5	Evacuation	225	0	225
6	Physical Contingency	1,025	636	1,661
	Sub-total	11,270	6,996	18,266
7	price Escalation	4,284	2,269	6,553
	Grand Total	15,554	9,265	24,819 OM Cost

(2) Economic Cost

1	Classification of Costs	Unit: RM 1,000		
		2001		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	89	0	89
3	Engineering Services	403	347	750
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	49	35	84
	Sub-total	541	382	923
7	price Escalation	0	0	0
	Grand Total	541	382	923 OM Cost

2	Classification of Costs	2002		
		L.C.	F.C.	Total
		1	Construction Cost	0
2	Administration	207	0	207
3	Engineering Services	0	0	0
4	Land Acquisition	265	0	265
5	Evacuation	198	0	198
6	Physical Contingency	67	0	67
	Sub-total	737	0	737
7	price Escalation	0	0	0
	Grand Total	737	0	737 OM Cost

3	Classification of Costs	2003		
		L.C.	F.C.	Total
		1	Construction Cost	2,497
2	Administration	178	0	178
3	Engineering Services	80	69	149
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	276	217	493
	Sub-total	3,031	2,389	5,420
7	price Escalation	0	0	0
	Grand Total	3,031	2,389	5,420 OM Cost

4	Classification of Costs	2004		
		L.C.	F.C.	Total
		1	Construction Cost	4,371
2	Administration	119	0	119
3	Engineering Services	188	162	350
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	468	384	852
	Sub-total	5,146	4,225	9,371
7	price Escalation	0	0	0
	Grand Total	5,146	4,225	9,371 OM Cost

Total	Classification of Costs	Total		
		L.C.	F.C.	Total
		1	Construction Cost	6,869
2	Administration	594	0	594
3	Engineering Services	671	578	1,249
4	Land Acquisition	265	0	265
5	Evacuation	198	0	198
6	Physical Contingency	860	636	1,496
	Sub-total	9,456	6,996	16,452
7	price Escalation	0	0	0
	Grand Total	9,456	6,996	16,452 OM Cost

TABLE VII.3.3.7 ESTIMATE OF ECONOMIC COST

III. S&K Stretch

(1) Financial Cost

1	Classification of Costs	Unit: RM 1,000		
		2001		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	59	0	59
3	Engineering Services	187	110	297
4	Land Acquisition	105	0	105
5	Evacuation	840	0	840
6	Physical Contingency	119	11	130
	Sub-total	1,310	121	1,431
7	price Escalation	357	28	385
	Grand Total	1,667	149	1,816 OM Cost

(2) Economic Cost

1	Classification of Costs	Unit: RM 1,000		
		2001		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	48	0	48
3	Engineering Services	153	110	263
4	Land Acquisition	92	0	92
5	Evacuation	739	0	739
6	Physical Contingency	103	11	114
	Sub-total	1,137	121	1,258
7	price Escalation	0	0	0
	Grand Total	1,137	121	1,258 OM Cost

2	Classification of Costs	2002		
		L.C.	F.C.	Total
		1	Construction Cost	1,560
2	Administration	148	0	148
3	Engineering Services	62	37	99
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	177	95	272
	Sub-total	1,917	1,046	2,993
7	price Escalation	617	279	896
	Grand Total	2,564	1,325	3,889 OM Cost

2	Classification of Costs	2002		
		L.C.	F.C.	Total
		1	Construction Cost	1,310
2	Administration	121	0	121
3	Engineering Services	51	37	88
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	148	95	243
	Sub-total	1,631	1,046	2,677
7	price Escalation	0	0	0
	Grand Total	1,631	1,046	2,677 OM Cost

3	Classification of Costs	2003		
		L.C.	F.C.	Total
		1	Construction Cost	1,560
2	Administration	89	0	89
3	Engineering Services	62	37	99
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	171	95	266
	Sub-total	1,882	1,046	2,928
7	price Escalation	683	319	1,002
	Grand Total	2,565	1,365	3,930 OM Cost

3	Classification of Costs	2003		
		L.C.	F.C.	Total
		1	Construction Cost	1,310
2	Administration	73	0	73
3	Engineering Services	51	37	88
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	143	95	239
	Sub-total	1,578	1,046	2,624
7	price Escalation	0	0	0
	Grand Total	1,578	1,046	2,624 OM Cost

Total	Classification of Costs	Total		
		L.C.	F.C.	Total
		1	Construction Cost	3,120
2	Administration	296	0	296
3	Engineering Services	311	184	495
4	Land Acquisition	105	0	105
5	Evacuation	840	0	840
6	Physical Contingency	467	201	668
	Sub-total	5,139	2,213	7,352
7	price Escalation	1,657	626	2,283
	Grand Total	6,796	2,839	9,635 OM Cost

Total	Classification of Costs	Total		
		L.C.	F.C.	Total
		1	Construction Cost	2,621
2	Administration	243	0	243
3	Engineering Services	255	184	439
4	Land Acquisition	92	0	92
5	Evacuation	739	0	739
6	Physical Contingency	395	201	596
	Sub-total	4,345	2,213	6,558
7	price Escalation	0	0	0
	Grand Total	4,345	2,213	6,558 OM Cost

TABLE VII.3.3.8

ESTIMATE OF ECONOMIC COST

IV. S Balling Stretch

(1) Financial Cost

1	Classification of Costs	Unit: RM1,000		
		2001		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	79	0	79
3	Engineering Services	199	151	350
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	28	15	43
	Sub-total	306	166	472
7	price Escalation	83	38	121
	Grand Total	389	204	593 OM Cost

2	Classification of Costs	2002		
		L.C.	F.C.	Total
		1	Construction Cost	0
2	Administration	199	0	199
3	Engineering Services	0	0	0
4	Land Acquisition	161	0	161
5	Evacuation	1,960	0	1,960
6	Physical Contingency	232	0	232
	Sub-total	2,552	0	2,552
7	price Escalation	808	0	808
	Grand Total	3,360	0	3,360 OM Cost

3	Classification of Costs	2003		
		L.C.	F.C.	Total
		1	Construction Cost	3,313
2	Administration	119	0	119
3	Engineering Services	132	100	232
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	356	261	617
	Sub-total	3,920	2,867	6,787
7	price Escalation	1,423	874	2,297
	Grand Total	5,343	3,741	9,084 OM Cost

Total	Classification of Costs	Total		
		L.C.	F.C.	Total
		1	Construction Cost	3,313
2	Administration	397	0	397
3	Engineering Services	331	251	582
4	Land Acquisition	161	0	161
5	Evacuation	1,960	0	1,960
6	Physical Contingency	616	276	892
	Sub-total	6,778	3,033	9,811
7	price Escalation	2,314	912	3,226
	Grand Total	9,092	3,945	13,037 OM Cost

(2) Economic Cost

1	Classification of Costs	Unit: RM1,000		
		2001		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	65	0	65
3	Engineering Services	163	151	314
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	23	15	38
	Sub-total	251	166	417
7	price Escalation	0	0	0
	Grand Total	251	166	417 OM Cost

2	Classification of Costs	2002		
		L.C.	F.C.	Total
		1	Construction Cost	0
2	Administration	163	0	163
3	Engineering Services	0	0	0
4	Land Acquisition	142	0	142
5	Evacuation	1,725	0	1,725
6	Physical Contingency	203	0	203
	Sub-total	2,233	0	2,233
7	price Escalation	0	0	0
	Grand Total	2,233	0	2,233 OM Cost

3	Classification of Costs	2003		
		L.C.	F.C.	Total
		1	Construction Cost	2,783
2	Administration	98	0	98
3	Engineering Services	108	100	208
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	299	261	559
	Sub-total	3,288	2,867	6,154
7	price Escalation	0	0	0
	Grand Total	3,288	2,867	6,154 OM Cost

Total	Classification of Costs	Total		
		L.C.	F.C.	Total
		1	Construction Cost	2,783
2	Administration	326	0	326
3	Engineering Services	271	251	522
4	Land Acquisition	142	0	142
5	Evacuation	1,725	0	1,725
6	Physical Contingency	525	276	800
	Sub-total	5,771	3,033	8,804
7	price Escalation	0	0	0
	Grand Total	5,771	3,033	8,804 OM Cost

TABLE VII.3.3.9(1/3) ECONOMIC ANALYSIS FOR FLOOD MITIGATION PLAN

I. Muda Downstream Stretch						II. Kuala Kelel Stretch					
Year	Unit: RM 1,000					Year	Unit: RM 1,000				
	Economic Cost		Economic Benefit (B)	(B)-(C)			Economic Cost		Economic Benefit (B)	(B)-(C)	
	Construction	OM Total (C)					Construction	OM Total (C)			
1 1996	0	0	0	0	0	1 1996	0	0	0	0	0
2 1997	0	0	0	0	0	2 1997	0	0	0	0	0
3 1998	0	0	0	0	0	3 1998	0	0	0	0	0
4 1999	0	0	0	0	0	4 1999	0	0	0	0	0
5 2000	0	0	0	0	0	5 2000	0	0	0	0	0
6 2001	0	0	0	0	0	6 2001	923	0	923	0	-923
7 2002	0	0	0	0	0	7 2002	737	0	737	0	-737
8 2003	8,430	0	8,430	0	-8,430	8 2003	5,420	0	5,420	0	-5,420
9 2004	8,430	0	8,430	0	-8,430	9 2004	9,371	23	9,394	301	-9,093
10 2005	10,074	0	10,074	0	-10,074	10 2005		63	63	843	780
11 2006	40,682	0	40,682	0	-40,682	11 2006		63	63	863	800
12 2007	87,026	132	87,158	2,398	-84,760	12 2007		63	63	882	819
13 2008	71,337	509	71,846	9,459	-62,387	13 2008		63	63	903	840
14 2009	48,372	815	49,187	15,493	-33,694	14 2009		63	63	923	860
15 2010	24,491	1,019	25,510	19,817	-5,693	15 2010		63	63	945	882
16 2011		1,121	1,121	22,302	21,181	16 2011		63	63	966	903
17 2012		1,121	1,121	22,815	21,694	17 2012		63	63	989	926
18 2013		1,121	1,121	23,339	22,218	18 2013		63	63	1,011	948
19 2014		1,121	1,121	23,876	22,755	19 2014		63	63	1,035	972
20 2015		1,121	1,121	24,425	23,304	20 2015		63	63	1,058	995
21 2016		1,121	1,121	24,987	23,866	21 2016		63	63	1,083	1,020
22 2017		1,121	1,121	25,562	24,441	22 2017		63	63	1,108	1,045
23 2018		1,121	1,121	26,150	25,029	23 2018		63	63	1,133	1,070
24 2019		1,121	1,121	26,751	25,630	24 2019		63	63	1,159	1,096
25 2020		1,121	1,121	27,366	26,245	25 2020		63	63	1,186	1,123
26 2021		1,121	1,121	27,996	26,875	26 2021		63	63	1,213	1,150
27 2022		1,121	1,121	28,640	27,519	27 2022		63	63	1,241	1,178
28 2023		1,121	1,121	29,299	28,178	28 2023		63	63	1,270	1,207
29 2024		1,121	1,121	29,972	28,851	29 2024		63	63	1,299	1,236
30 2025		1,121	1,121	30,662	29,541	30 2025		63	63	1,329	1,266
31 2026		1,121	1,121	31,367	30,246	31 2026		63	63	1,359	1,296
32 2027		1,121	1,121	32,088	30,967	32 2027		63	63	1,391	1,328
33 2028		1,121	1,121	32,826	31,705	33 2028		63	63	1,423	1,360
34 2029		1,121	1,121	33,581	32,460	34 2029		63	63	1,455	1,392
35 2030		1,121	1,121	34,354	33,233	35 2030		63	63	1,489	1,426
36 2031		1,121	1,121	35,144	34,023	36 2031		63	63	1,523	1,460
37 2032		1,121	1,121	35,952	34,831	37 2032		63	63	1,558	1,495
38 2033		1,121	1,121	36,779	35,658	38 2033		63	63	1,594	1,531
39 2034		1,121	1,121	37,625	36,504	39 2034		63	63	1,631	1,568
40 2035		1,121	1,121	38,491	37,370	40 2035		63	63	1,668	1,605
41 2036		1,121	1,121	39,376	38,255	41 2036		63	63	1,706	1,643
42 2037		1,121	1,121	40,281	39,160	42 2037		63	63	1,746	1,683
43 2038		1,121	1,121	41,208	40,087	43 2038		63	63	1,786	1,723
44 2039		1,121	1,121	42,156	41,035	44 2039		63	63	1,827	1,764
45 2040		1,121	1,121	43,125	42,004	45 2040		63	63	1,869	1,806
46 2041		1,121	1,121	44,117	42,996	46 2041		63	63	1,912	1,849
47 2042		1,121	1,121	45,132	44,011	47 2042		63	63	1,956	1,893
48 2043		1,121	1,121	46,170	45,049	48 2043		63	63	2,001	1,938
49 2044		1,121	1,121	47,232	46,111	49 2044		63	63	2,047	1,984
50 2045		1,121	1,121	48,318	47,197	50 2045		63	63	2,094	2,031
51 2046		1,121	1,121	49,429	48,308	51 2046		63	63	2,142	2,079
52 2047		1,121	1,121	50,566	49,445	52 2047		63	63	2,191	2,128
53 2048		1,121	1,121	51,729	50,608	53 2048		63	63	2,242	2,179
54 2049		1,121	1,121	52,919	51,798	54 2049		63	63	2,293	2,230
55 2050		1,121	1,121	54,136	53,015	55 2050		63	63	2,346	2,283
56 2051		1,121	1,121	55,381	54,260	56 2051		63	63	2,400	2,337
57 2052		1,121	1,121	56,655	55,534	57 2052		63	63	2,455	2,392
58 2053		1,121	1,121	57,958	56,837	58 2053		63	63	2,512	2,449
59 2054		1,121	1,121	59,291	58,170	59 2054		63	63	2,569	2,506
60 2055		1,121	1,121	60,655	59,534	60 2055					
61 2056		1,121	1,121	62,050	60,929	61 2056					
62 2057		1,121	1,121	63,477	62,356	62 2057					
63 2058		1,121	1,121	64,937	63,816	63 2058					
64 2059		1,121	1,121	66,431	65,310	64 2059					
65 2060		1,121	1,121	67,959	66,838	65 2060					
Total	298,812	58,525	357,367	2,100,207	1,742,840	Total	16,451	3,173	19,624	77,924	58,300

Discount Rate (%)	B/C	EIRR (%) 8.57		
		PV(RP Million)		NPV
		Cost	Benefit (RP Million)	
15	0.51	55,358	28,179	-27,279
12	0.67	76,646	51,125	-25,521
10	0.83	95,953	79,822	-16,131
5	1.79	174,702	311,017	138,315

Discount Rate (%)	B/C	EIRR (%) 6.38		
		PV(RP Million)		NPV
		Cost	Benefit (RP Million)	
15	0.38	5,238	1,967	-3,270
12	0.49	6,566	3,209	-3,357
10	0.61	7,677	4,648	-3,028
5	1.27	11,678	14,853	3,175

TABLE VII.3.3.9(2/3) ECONOMIC ANALYSIS FOR FLOOD MITIGATION PLAN

III. Six Stretch						IV. Baling stretch					
Unit: RM 1,000						Unit: RM 1,000					
Year	Economic Cost			Economic Benefit (B)	(B)-(C)	Year	Economic Cost			Economic Benefit (B)	(B)-(C)
	Construction	OM	Total (C)				Construction	OM	Total (C)		
1 1996	0	0	0	0	0	1 1996	0	0	0	0	0
2 1997	0	0	0	0	0	2 1997	0	0	0	0	0
3 1998	0	0	0	0	0	3 1998	0	0	0	0	0
4 1999	0	0	0	0	0	4 1999	0	0	0	0	0
5 2000	0	0	0	0	0	5 2000	0	0	0	0	0
6 2001	1,258	0	1,258	0	-1,258	6 2001	417	0	417	0	-417
7 2002	2,677	0	2,677	0	-2,677	7 2002	2,233	0	2,233	0	-2,233
8 2003	2,624	11	2,635	198	-2,437	8 2003	6,154	0	6,154	0	-6,154
9 2004		22	22	404	382	9 2004		26	26	361	335
10 2005		22	22	414	392	10 2005		26	26	369	343
11 2006		22	22	423	401	11 2006		26	26	378	352
12 2007		22	22	433	411	12 2007		26	26	387	361
13 2008		22	22	443	421	13 2008		26	26	396	370
14 2009		22	22	453	431	14 2009		26	26	405	379
15 2010		22	22	463	441	15 2010		26	26	414	388
16 2011		22	22	474	452	16 2011		26	26	423	397
17 2012		22	22	485	463	17 2012		26	26	433	407
18 2013		22	22	496	474	18 2013		26	26	443	417
19 2014		22	22	507	485	19 2014		26	26	453	427
20 2015		22	22	519	497	20 2015		26	26	464	438
21 2016		22	22	531	509	21 2016		26	26	474	448
22 2017		22	22	543	521	22 2017		26	26	485	459
23 2018		22	22	556	534	23 2018		26	26	497	471
24 2019		22	22	569	547	24 2019		26	26	508	482
25 2020		22	22	582	560	25 2020		26	26	520	494
26 2021		22	22	595	573	26 2021		26	26	532	506
27 2022		22	22	609	587	27 2022		26	26	544	518
28 2023		22	22	623	601	28 2023		26	26	556	530
29 2024		22	22	637	615	29 2024		26	26	569	543
30 2025		22	22	652	630	30 2025		26	26	582	556
31 2026		22	22	667	645	31 2026		26	26	596	570
32 2027		22	22	682	660	32 2027		26	26	609	583
33 2028		22	22	698	676	33 2028		26	26	623	597
34 2029		22	22	714	692	34 2029		26	26	638	612
35 2030		22	22	730	708	35 2030		26	26	652	626
36 2031		22	22	747	725	36 2031		26	26	667	641
37 2032		22	22	764	742	37 2032		26	26	683	657
38 2033		22	22	782	760	38 2033		26	26	698	672
39 2034		22	22	800	778	39 2034		26	26	714	688
40 2035		22	22	818	796	40 2035		26	26	731	705
41 2036		22	22	837	815	41 2036		26	26	748	722
42 2037		22	22	856	834	42 2037		26	26	765	739
43 2038		22	22	876	854	43 2038		26	26	782	756
44 2039		22	22	896	874	44 2039		26	26	800	774
45 2040		22	22	917	895	45 2040		26	26	819	793
46 2041		22	22	938	916	46 2041		26	26	838	812
47 2042		22	22	959	937	47 2042		26	26	857	831
48 2043		22	22	981	959	48 2043		26	26	877	851
49 2044		22	22	1,004	982	49 2044		26	26	897	871
50 2045		22	22	1,027	1,005	50 2045		26	26	917	891
51 2046		22	22	1,050	1,028	51 2046		26	26	939	913
52 2047		22	22	1,075	1,053	52 2047		26	26	960	934
53 2048		22	22	1,099	1,077	53 2048		26	26	982	956
54 2049		22	22	1,125	1,103	54 2049		26	26	1,005	979
55 2050		22	22	1,151	1,129	55 2050		26	26	1,028	1,002
56 2051		22	22	1,177	1,155	56 2051		26	26	1,052	1,026
57 2052		22	22	1,204	1,182	57 2052		26	26	1,076	1,050
58 2053		22	22	1,232	1,210	58 2053		26	26	1,101	1,075
59 2054						59 2054					
60 2055						60 2055					
61 2056						61 2056					
62 2057						62 2057					
63 2058						63 2058					
64 2059						64 2059					
65 2060						65 2060					
Total	6,559	1,111	7,670	37,409	29,739	Total	8,804	1,300	10,104	33,247	23,143

Discount Rate (%)	B/C	EIRR (%) 7.56			
		PV (RP Million)		NPV	(RP Million)
		Cost	Benefit		
15	0.45	2,460	1,102	-1,357	
12	0.58	2,986	1,745	-1,242	
10	0.73	3,415	2,476	-939	
5	1.53	4,877	7,512	2,616	

Discount Rate (%)	B/C	EIRR (%) 5.17			
		PV (RP Million)		NPV	(RP Million)
		Cost	Benefit		
15	0.30	3,088	977	-2,161	
12	0.39	3,794	1,488	-2,307	
10	0.49	4,372	2,130	-2,242	
5	1.03	6,385	6,592	208	

TABLE A.3.9 (A3) ECONOMIC ANALYSIS FOR FLOOD MITIGATION PLAN

Unit: RM 1,000

Year	Economic Cost			Economic Benefit (B)	(B)-(C)
	Construction	OM	Total (C)		
1 1996	0	0	0	0	0
2 1997	0	0	0	0	0
3 1998	0	0	0	0	0
4 1999	0	0	0	0	0
5 2000	0	0	0	0	0
6 2001	2,598	0	2,598	0	-2,598
7 2002	5,647	0	5,647	0	-5,647
8 2003	22,628	11	22,639	198	-22,441
9 2004	17,891	71	17,962	1,066	-16,896
10 2005	10,074	111	10,185	1,626	-8,559
11 2006	40,682	111	40,793	1,661	-39,132
12 2007	87,026	243	87,269	4,100	-83,169
13 2008	71,337	620	71,957	11,200	-60,757
14 2009	48,372	926	49,298	17,274	-32,024
15 2010	24,491	1,130	25,621	21,639	-3,982
16 2011	0	1,232	1,232	24,166	22,934
17 2012	0	1,232	1,232	24,721	23,489
18 2013	0	1,232	1,232	25,290	24,058
19 2014	0	1,232	1,232	25,872	24,640
20 2015	0	1,232	1,232	26,467	25,235
21 2016	0	1,232	1,232	27,075	25,843
22 2017	0	1,232	1,232	27,698	26,466
23 2018	0	1,232	1,232	28,335	27,103
24 2019	0	1,232	1,232	28,987	27,755
25 2020	0	1,232	1,232	29,654	28,422
26 2021	0	1,232	1,232	30,336	29,101
27 2022	0	1,232	1,232	31,033	29,801
28 2023	0	1,232	1,232	31,747	30,515
29 2024	0	1,232	1,232	32,477	31,245
30 2025	0	1,232	1,232	33,224	31,992
31 2026	0	1,232	1,232	33,989	32,757
32 2027	0	1,232	1,232	34,770	33,538
33 2028	0	1,232	1,232	35,570	34,338
34 2029	0	1,232	1,232	36,388	35,156
35 2030	0	1,232	1,232	37,225	35,993
36 2031	0	1,232	1,232	38,081	36,849
37 2032	0	1,232	1,232	38,957	37,725
38 2033	0	1,232	1,232	39,853	38,621
39 2034	0	1,232	1,232	40,770	39,538
40 2035	0	1,232	1,232	41,707	40,475
41 2036	0	1,232	1,232	42,667	41,435
42 2037	0	1,232	1,232	43,648	42,416
43 2038	0	1,232	1,232	44,652	43,420
44 2039	0	1,232	1,232	45,679	44,447
45 2040	0	1,232	1,232	46,730	45,498
46 2041	0	1,232	1,232	47,804	46,572
47 2042	0	1,232	1,232	48,904	47,672
48 2043	0	1,232	1,232	50,029	48,797
49 2044	0	1,232	1,232	51,179	49,947
50 2045	0	1,232	1,232	52,356	51,124
51 2046	0	1,232	1,232	53,561	52,329
52 2047	0	1,232	1,232	54,792	53,560
53 2048	0	1,232	1,232	56,053	54,821
54 2049	0	1,232	1,232	57,342	56,110
55 2050	0	1,232	1,232	58,661	57,429
56 2051	0	1,232	1,232	60,010	58,778
57 2052	0	1,232	1,232	61,390	60,158
58 2053	0	1,232	1,232	62,802	61,570
59 2054	0	1,184	1,184	61,861	60,677
60 2055	0	1,121	1,121	60,655	59,534
61 2056	0	1,121	1,121	62,050	60,929
62 2057	0	1,121	1,121	63,477	62,356
63 2058	0	1,121	1,121	64,937	63,816
64 2059	0	1,121	1,121	66,431	65,310
65 2060	0	1,121	1,121	67,959	66,838
Total	330,656	64,109	394,765	2,248,787	1,854,022

Discount Rate (%)	B/C	EIRR (%)		NPV
		PV(RP Million) Cost	PV(RP Million) Benefit	
15	0.49	66,143	32,126	-34,018
12	0.64	89,993	57,567	-32,426
10	0.80	111,417	89,077	-22,340
5	1.73	197,661	341,974	144,313
3	2.64	254,862	673,901	419,039

TABLE VII.3.4.1 ESTIMATION OF NUMBER OF VISITORS AT SIMILAR PARKS

Park	Area (ha)	Average Number of Visitors per day							Number of Visitors			
		Sun	Mon.	Tue.	Wed.	Thur.	Fri.	Sat.	Total Holiday*1	per Annum	per day	
I. Number of Visitors												
1 Pedu Resort	116	350	300	300	300	400	500	500	2,650	500	139,508 *2	382
2 Bukit Hijau	108	2,600	200	200	200	200	200	840	4,440	2,600	253,039	693
3 Lata Bayu	15	300	40	40	40	40	40	160	660	300	36,667	100
4 Iboi	9	150	30	30	30	30	30	80	380	150	20,862	57
II. Percent Distribution												
1 Pedu Resort	116	13	11	11	11	15	19	19	100	-	-	-
2 Bukit Hijau	108	59	5	5	5	5	5	19	100	-	-	-
3 Lata Bayu	15	45	6	6	6	6	6	24	100	-	-	-
4 Iboi	9	39	8	8	8	8	8	21	100	-	-	-

Note:

*1 National holidays are assumed to be 10 days per annum.

*2 Visitors stayed at hotel are estimated at about 20 % of the whole visitors, according to information from the hotel manager.

TABLE VII.3.4.2 (1/4)

CALCULATION OF ECONOMIC COST FOR
RIVER ENVIRONMENTAL IMPROVEMENT PLAN

(1) Financial Cost				(2) Economic Cost			
1	Classification of Costs	Unit: RM 1,000		1	Classification of Costs	Unit: RM 1,000	
		1996	Total			1996	Total
		L.C.	F.C.			L.C.	F.C.
1	Construction Cost	0	0	1	Construction Cost	0	0
2	Administration	84	0	2	Administration	69	0
3	Engineering Services	202	82	3	Engineering Services	166	82
4	Land Acquisition	0	0	4	Land Acquisition	0	0
5	Evacuation	0	0	5	Evacuation	0	0
6	Physical Contingency	29	8	6	Physical Contingency	23	8
	Sub-total	315	90		Sub-total	258	90
7	price Escalation	22	5	7	price Escalation	0	0
	Grand Total	337	95		Grand Total	258	90
			432 OM Cost				348 OM Cost
			0				0
2							
2	Classification of Costs	1997		2	Classification of Costs	1997	
		L.C.	F.C.			L.C.	F.C.
1	Construction Cost	0	0	1	Construction Cost	0	0
2	Administration	84	0	2	Administration	69	0
3	Engineering Services	269	109	3	Engineering Services	221	109
4	Land Acquisition	0	0	4	Land Acquisition	0	0
5	Evacuation	0	0	5	Evacuation	0	0
6	Physical Contingency	35	11	6	Physical Contingency	29	11
	Sub-total	388	120		Sub-total	318	120
7	price Escalation	42	11	7	price Escalation	0	0
	Grand Total	430	131		Grand Total	318	120
			561 OM Cost				438 OM Cost
			0				0
3							
3	Classification of Costs	1998		3	Classification of Costs	1998	
		L.C.	F.C.			L.C.	F.C.
1	Construction Cost	2,653	1,072	1	Construction Cost	2,229	1,072
2	Administration	168	0	2	Administration	138	0
3	Engineering Services	90	36	3	Engineering Services	74	36
4	Land Acquisition	0	0	4	Land Acquisition	0	0
5	Evacuation	0	0	5	Evacuation	0	0
6	Physical Contingency	291	111	6	Physical Contingency	244	111
	Sub-total	3,202	1,219		Sub-total	2,684	1,219
7	price Escalation	472	153	7	price Escalation	0	0
	Grand Total	3,674	1,372		Grand Total	2,684	1,219
			5,046 OM Cost				3,903 OM Cost
			0				0
4							
4	Classification of Costs	1999		4	Classification of Costs	1999	
		L.C.	F.C.			L.C.	F.C.
1	Construction Cost	2,041	825	1	Construction Cost	1,714	825
2	Administration	168	0	2	Administration	138	0
3	Engineering Services	90	36	3	Engineering Services	74	36
4	Land Acquisition	0	0	4	Land Acquisition	0	0
5	Evacuation	0	0	5	Evacuation	0	0
6	Physical Contingency	230	86	6	Physical Contingency	193	86
	Sub-total	2,529	947		Sub-total	2,119	947
7	price Escalation	474	151	7	price Escalation	0	0
	Grand Total	3,003	1,098		Grand Total	2,119	947
			4,101 OM Cost				3,066 OM Cost
			22				17

TABLE VII.3.4.2 (2/4)

CALCULATION OF ECONOMIC COST FOR
RIVER ENVIRONMENTAL IMPROVEMENT PLAN

(1) Financial Cost

Classification of Costs	2000		
	L.C.	F.C.	Total
1 Construction Cost	2,011	825	2,866
2 Administration	84	0	84
3 Engineering Services	90	36	126
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	222	86	308
Sub-total	2,437	947	3,384
7 price Escalation	558	184	742
Grand Total	2,995	1,131	4,126 OM Cost

40

Classification of Costs	2001		
	L.C.	F.C.	Total
1 Construction Cost	0	0	0
2 Administration	168	0	168
3 Engineering Services	539	218	757
4 Land Acquisition	713	0	713
5 Evacuation	700	0	700
6 Physical Contingency	212	22	234
Sub-total	2,332	240	2,572
7 price Escalation	635	55	690
Grand Total	2,967	295	3,262 OM Cost

60

Classification of Costs	2002		
	L.C.	F.C.	Total
1 Construction Cost	1,428	577	2,005
2 Administration	84	0	84
3 Engineering Services	382	154	536
4 Land Acquisition	305	0	305
5 Evacuation	300	0	300
6 Physical Contingency	250	73	323
Sub-total	2,749	804	3,553
7 price Escalation	871	215	1,086
Grand Total	3,620	1,019	4,639 OM Cost

62

Classification of Costs	2003		
	L.C.	F.C.	Total
1 Construction Cost	2,551	1,031	3,582
2 Administration	84	0	84
3 Engineering Services	45	18	63
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	268	105	373
Sub-total	2,948	1,154	4,102
7 price Escalation	1,070	352	1,422
Grand Total	4,018	1,506	5,524 OM Cost

77

(2) Economic Cost

Classification of Costs	2000		
	L.C.	F.C.	Total
1 Construction Cost	1,714	825	2,539
2 Administration	69	0	69
3 Engineering Services	74	36	110
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	185	86	272
Sub-total	2,043	947	2,990
7 price Escalation	0	0	0
Grand Total	2,043	947	2,990 OM Cost

29

Classification of Costs	2001		
	L.C.	F.C.	Total
1 Construction Cost	0	0	0
2 Administration	138	0	138
3 Engineering Services	442	218	660
4 Land Acquisition	627	0	627
5 Evacuation	616	0	616
6 Physical Contingency	182	22	204
Sub-total	2,005	240	2,245
7 price Escalation	0	0	0
Grand Total	2,005	240	2,245 OM Cost

42

Classification of Costs	2002		
	L.C.	F.C.	Total
1 Construction Cost	1,200	577	1,777
2 Administration	69	0	69
3 Engineering Services	313	154	467
4 Land Acquisition	268	0	268
5 Evacuation	264	0	264
6 Physical Contingency	211	73	285
Sub-total	2,325	804	3,130
7 price Escalation	0	0	0
Grand Total	2,325	804	3,130 OM Cost

42

Classification of Costs	2003		
	L.C.	F.C.	Total
1 Construction Cost	2,143	1,031	3,174
2 Administration	69	0	69
3 Engineering Services	37	18	55
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	225	105	330
Sub-total	2,473	1,154	3,627
7 price Escalation	0	0	0
Grand Total	2,473	1,154	3,627 OM Cost

51

TABLE VII.3.4.2 (3/4)

CALCULATION OF ECONOMIC COST FOR
RIVER ENVIRONMENTAL IMPROVEMENT PLAN

(1) Financial Cost

9	Classification of Costs	2004		
		L.C.	F.C.	Total
1	Construction Cost	2,551	1,031	3,582
2	Administration	84	0	84
3	Engineering Services	45	18	63
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	268	105	373
	Sub-total	2,948	1,154	4,102
7	price Escalation	1,210	397	1,607
	Grand Total	4,158	1,551	5,709 OM Cost

105

(2) Economic Cost

9	Classification of Costs	2004		
		L.C.	F.C.	Total
1	Construction Cost	2,143	1,031	3,174
2	Administration	69	0	69
3	Engineering Services	37	18	55
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	225	105	330
	Sub-total	2,473	1,154	3,627
7	price Escalation	0	0	0
	Grand Total	2,473	1,154	3,627 OM Cost

67

10

10	Classification of Costs	2005		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	84	0	84
3	Engineering Services	45	18	63
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	13	2	15
	Sub-total	142	20	162
7	price Escalation	65	8	73
	Grand Total	207	28	235 OM Cost

134

10

10	Classification of Costs	2005		
		L.C.	F.C.	Total
1	Construction Cost	0	0	0
2	Administration	69	0	69
3	Engineering Services	37	18	55
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	11	2	12
	Sub-total	116	20	136
7	price Escalation	0	0	0
	Grand Total	116	20	136 OM Cost

83

11

11	Classification of Costs	2006		
		L.C.	F.C.	Total
1	Construction Cost	2,041	825	2,866
2	Administration	168	0	168
3	Engineering Services	90	36	126
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	230	86	316
	Sub-total	2,529	947	3,476
7	price Escalation	1,292	403	1,695
	Grand Total	3,821	1,350	5,171 OM Cost

138

11

11	Classification of Costs	2006		
		L.C.	F.C.	Total
1	Construction Cost	1,714	825	2,539
2	Administration	138	0	138
3	Engineering Services	74	36	110
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	193	86	279
	Sub-total	2,119	947	3,066
7	price Escalation	0	0	0
	Grand Total	2,119	947	3,066 OM Cost

83

12

12	Classification of Costs	2007		
		L.C.	F.C.	Total
1	Construction Cost	2,041	825	2,866
2	Administration	168	0	168
3	Engineering Services	90	36	126
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	230	86	316
	Sub-total	2,529	947	3,476
7	price Escalation	1,426	444	1,870
	Grand Total	3,955	1,391	5,346 OM Cost

165

12

12	Classification of Costs	2007		
		L.C.	F.C.	Total
1	Construction Cost	1,714	825	2,539
2	Administration	138	0	138
3	Engineering Services	74	36	110
4	Land Acquisition	0	0	0
5	Evacuation	0	0	0
6	Physical Contingency	193	86	279
	Sub-total	2,119	947	3,066
7	price Escalation	0	0	0
	Grand Total	2,119	947	3,066 OM Cost

95

TABLE VII.3.42 (4/4)

CALCULATION OF ECONOMIC COST FOR
RIVER ENVIRONMENTAL IMPROVEMENT PLAN

(1) Financial Cost

Classification of Costs	2008		
	L.C.	F.C.	Total
1 Construction Cost	2,011	825	2,866
2 Administration	84	0	84
3 Engineering Services	90	36	126
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	222	86	308
Sub-total	2,437	947	3,384
7 price Escalation	1,507	486	1,993
Grand Total	3,944	1,433	5,377 OM Cost

193

14

Classification of Costs	2009		
	L.C.	F.C.	Total
1 Construction Cost	2,041	825	2,866
2 Administration	84	0	84
3 Engineering Services	90	36	126
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	222	86	308
Sub-total	2,437	947	3,384
7 price Escalation	1,645	529	2,174
Grand Total	4,082	1,476	5,558 OM Cost

223

15

Classification of Costs	2010		
	L.C.	F.C.	Total
1 Construction Cost	1,020	412	1,432
2 Administration	84	0	84
3 Engineering Services	90	36	126
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	119	45	164
Sub-total	1,313	493	1,806
7 price Escalation	964	298	1,262
Grand Total	2,277	791	3,068 OM Cost

255

Total

Classification of Costs	Total		
	L.C.	F.C.	Total
1 Construction Cost	22,449	9,073	31,522
2 Administration	1,680	0	1,680
3 Engineering Services	2,247	905	3,152
4 Land Acquisition	1,018	0	1,018
5 Evacuation	1,000	0	1,000
6 Physical Contingency	2,839	998	3,837
Sub-total	31,233	10,976	42,209
7 price Escalation	12,253	3,691	15,944
Grand Total	43,486	14,667	58,153 OM Cost

276

(2) Economic Cost

Classification of Costs	2008		
	L.C.	F.C.	Total
1 Construction Cost	1,714	825	2,539
2 Administration	69	0	69
3 Engineering Services	74	36	110
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	186	86	272
Sub-total	2,043	947	2,990
7 price Escalation	0	0	0
Grand Total	2,043	947	2,990 OM Cost

108

14

Classification of Costs	2009		
	L.C.	F.C.	Total
1 Construction Cost	1,714	825	2,539
2 Administration	69	0	69
3 Engineering Services	74	36	110
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	186	86	272
Sub-total	2,043	947	2,990
7 price Escalation	0	0	0
Grand Total	2,043	947	2,990 OM Cost

121

15

Classification of Costs	2010		
	L.C.	F.C.	Total
1 Construction Cost	857	412	1,269
2 Administration	69	0	69
3 Engineering Services	74	36	110
4 Land Acquisition	0	0	0
5 Evacuation	0	0	0
6 Physical Contingency	100	45	145
Sub-total	1,099	493	1,592
7 price Escalation	0	0	0
Grand Total	1,099	493	1,592 OM Cost

133

Total

Classification of Costs	Total		
	L.C.	F.C.	Total
1 Construction Cost	18,857	9,073	27,930
2 Administration	1,378	0	1,378
3 Engineering Services	1,843	905	2,748
4 Land Acquisition	896	0	896
5 Evacuation	880	0	880
6 Physical Contingency	2,385	998	3,383
Sub-total	26,238	10,976	37,214
7 price Escalation	0	0	0
Grand Total	26,238	10,976	37,214 OM Cost

140

TABLE VII.3.4.3 ECONOMIC ANALYSIS FOR RIVER ENVIRONMENTAL IMPROVEMENT PLAN

Unit: RM 1,000

Year	Economic Cost		Economic Benefit (B)		(B)-(C)
	Construction	OM Total (C)	Benefit (B)		
1 1996	348	0	348	0	-348
2 1997	438	0	438	0	-438
3 1998	3,903	0	3,903	0	-3,903
4 1999	3,066	17	3,083	1,165	-1,918
5 2000	2,990	29	3,019	1,988	-1,031
6 2001	2,245	42	2,287	2,879	592
7 2002	3,130	42	3,172	2,879	-293
8 2003	3,627	51	3,678	3,496	-182
9 2004	3,627	67	3,694	4,593	899
10 2005	136	83	219	5,690	5,474
11 2006	3,066	83	3,149	5,690	2,541
12 2007	3,066	95	3,161	6,513	3,352
13 2008	2,990	108	3,098	7,404	4,306
14 2009	2,990	121	3,111	8,295	5,184
15 2010	1,592	133	1,725	9,118	7,393
16 2011		140	140	9,598	9,458
17 2012		140	140	9,598	9,458
18 2013		140	140	9,598	9,458
19 2014		140	140	9,598	9,458
20 2015		140	140	9,598	9,458
21 2016		140	140	9,598	9,458
22 2017		140	140	9,598	9,458
23 2018		140	140	9,598	9,458
24 2019		140	140	9,598	9,458
25 2020		140	140	9,598	9,458
26 2021		140	140	9,598	9,458
27 2022		140	140	9,598	9,458
28 2023		140	140	9,598	9,458
29 2024		140	140	9,598	9,458
30 2025		140	140	9,598	9,458
31 2026		140	140	9,598	9,458
32 2027		140	140	9,598	9,458
33 2028		140	140	9,598	9,458
34 2029		140	140	9,598	9,458
35 2030		140	140	9,598	9,458
36 2031		140	140	9,598	9,458
37 2032		140	140	9,598	9,458
38 2033		140	140	9,598	9,458
39 2034		140	140	9,598	9,458
40 2035		140	140	9,598	9,458
41 2036		140	140	9,598	9,458
42 2037		140	140	9,598	9,458
43 2038		140	140	9,598	9,458
44 2039		140	140	9,598	9,458
45 2040		140	140	9,598	9,458
46 2041		140	140	9,598	9,458
47 2042		140	140	9,598	9,458
48 2043		140	140	9,598	9,458
49 2044		140	140	9,598	9,458
50 2045		140	140	9,598	9,458
51 2046		140	140	9,598	9,458
52 2047		140	140	9,598	9,458
53 2048		140	140	9,598	9,458
54 2049		140	140	9,598	9,458
55 2050		140	140	9,598	9,458
56 2051		140	140	9,598	9,458
57 2052		140	140	9,598	9,458
58 2053		140	140	9,598	9,458
59 2054		140	140	9,598	9,458
60 2055		140	140	9,598	9,458
61 2056		140	140	9,598	9,458
62 2057		140	140	9,598	9,458
63 2058		140	140	9,598	9,458
64 2059		140	140	9,598	9,458
65 2060		140	140	9,598	9,458
Total	37,214	7,871	45,085	539,613	494,528

Discount Rate (%)	B/C	EIRR (%)		NPV (RP Million)
		Cost	Benefit	
15	1.60	13,489	21,630	8,141
12	2.01	16,183	32,460	16,278
10	2.40	18,449	44,269	25,820

TABLE VI.3.5.1 ECONOMIC ANALYSIS FOR MUDA RIVER COMPREHENSIVE PLAN

Unit: RM 1,000

Year	Economic Cost			Economic Benefit (B)	(B)-(C)
	Construction	OM	Total (C)		
1 1996	40,241	0	40,241	0	-40,241
2 1997	22,438	0	22,438	0	-22,438
3 1998	44,923	0	44,923	0	-44,923
4 1999	41,360	17	41,377	1,165	-40,212
5 2000	36,886	29	36,915	1,988	-34,927
6 2001	10,876	529	11,405	14,069	2,664
7 2002	34,022	529	34,551	21,150	-13,401
8 2003	90,547	549	91,096	29,045	-62,051
9 2004	78,301	625	78,926	38,091	-40,835
10 2005	74,750	681	75,431	46,828	-28,603
11 2006	64,529	1,251	65,781	53,946	-11,835
12 2007	104,105	1,396	105,501	83,226	-22,275
13 2008	74,327	2,110	76,437	117,239	40,802
14 2009	51,362	2,429	53,791	124,205	70,414
15 2010	26,083	2,645	28,728	129,392	100,664
16 2011	0	2,754	2,754	132,399	129,645
17 2012	0	2,754	2,754	132,954	130,200
18 2013	0	2,754	2,754	133,523	130,769
19 2014	0	2,754	2,754	134,105	131,351
20 2015	0	2,754	2,754	134,700	131,946
21 2016	0	2,754	2,754	135,308	132,554
22 2017	0	2,754	2,754	135,931	133,177
23 2018	0	2,754	2,754	136,568	133,814
24 2019	0	2,754	2,754	137,220	134,466
25 2020	0	2,754	2,754	137,887	135,133
26 2021	0	2,754	2,754	138,569	135,815
27 2022	0	2,754	2,754	139,266	136,512
28 2023	0	2,754	2,754	139,980	137,226
29 2024	0	2,754	2,754	140,710	137,956
30 2025	0	2,754	2,754	141,457	138,703
31 2026	0	2,754	2,754	142,222	139,468
32 2027	0	2,754	2,754	143,003	140,249
33 2028	0	2,754	2,754	143,803	141,049
34 2029	0	2,754	2,754	144,621	141,867
35 2030	0	2,754	2,754	145,458	142,704
36 2031	0	2,754	2,754	146,314	143,560
37 2032	0	2,754	2,754	147,190	144,436
38 2033	0	2,754	2,754	148,086	145,332
39 2034	0	2,754	2,754	149,003	146,249
40 2035	0	2,754	2,754	149,940	147,186
41 2036	0	2,754	2,754	150,900	148,146
42 2037	0	2,754	2,754	151,881	149,127
43 2038	0	2,754	2,754	152,885	150,131
44 2039	0	2,754	2,754	153,912	151,158
45 2040	0	2,754	2,754	154,963	152,209
46 2041	0	2,754	2,754	156,037	153,283
47 2042	0	2,754	2,754	157,137	154,383
48 2043	0	2,754	2,754	158,262	155,508
49 2044	0	2,754	2,754	159,412	156,658
50 2045	0	2,754	2,754	160,589	157,835
51 2046	0	2,754	2,754	161,794	159,040
52 2047	0	2,754	2,754	163,025	160,271
53 2048	0	2,754	2,754	164,286	161,532
54 2049	0	2,754	2,754	165,575	162,821
55 2050	0	2,754	2,754	166,894	164,140
56 2051	0	2,267	2,267	157,053	154,786
57 2052	0	2,267	2,267	158,433	156,166
58 2053	0	2,267	2,267	159,845	157,578
59 2054	0	2,219	2,219	158,904	156,685
60 2055	0	2,156	2,156	157,698	155,542
61 2056	0	1,585	1,585	123,691	122,106
62 2057	0	1,585	1,585	125,118	123,533
63 2058	0	1,585	1,585	126,578	124,993
64 2059	0	1,585	1,585	128,072	126,487
65 2060	0	1,585	1,585	129,600	128,015
Total	794,750	142,052	936,802	7,973,105	7,036,303

Discount Rate (%)	B/C	EIRR (%)		NPV (RP Million)
		FV (RP Million) Cost	Benefit (RP Million)	
15	0.88	271,954	239,098	-32,855
12	1.16	327,915	380,839	52,924
10	1.44	375,646	540,784	165,138

SECTOR VIII

INSTITUTIONAL SETUP

SECTOR VIII
INSTITUTIONAL SETUP

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1. EXISTING INSTITUTIONAL FRAMEWORK

The activities related to river management works in both states of Kedah and Pulau Pinang are managed by various government and/or semi-government agencies under the supervision of the State Executive Council (EXCO), the State Planning Committee (SPC) and the State Economic Planning Committee (SEPC), which are all chaired by the Menteri Besar of the State of Kedah or the Chief Minister in the case of the State of Pulau Pinang.

The principal task of EXCO is to formulate the state development policies. The main functions of the State Planning Committee is to promote in the state and to advise the State Government, within the framework of the national policy, the conservation, use and development of all lands in the state. The SPC is therefore responsible for the physical planning of land use in the State.

The State Economic Planning Committee acts as the coordinating body for the development policy established by EXCO, and the development projects proposed by each agency in charge. All development projects submitted by each agency for implementation are subject to the final approval of SEPC and EXCO.

The Secretariat to SEPC is the State Economic Planning Unit (SEPU), the lead developing planning agency at State level. It acts as the liaison between the Economic Planning Unit at Federal level and the various agencies at State level. It is also responsible for the formulation of development plans and for policy advice within the state, for coordination of development initiatives among different agencies and administrative support services to EXCO and various committees regarding development issues. The main water use agencies in the states of Kedah and Pulau Pinang are as mentioned below.

The functions of the State Department of Drainage and Irrigation are to provide irrigation facilities for cultivation of padi (rice) and other crops, to provide drainage facilities for the advancement of agricultural activities, to maintain and to improve river flow which includes flood mitigation works, and to collect hydrological data for studies to evaluate the development and management of water resources.

In Kedah, domestic and industrial water supply is the responsibility of the Kedah State Public Works Department. In Pulau Pinang, however, under the Penang Water Enactment, 1972, which was passed on August 7, 1972 and became effective in January 1973, the functions and duties related to the supply of water in the State of Pulau Pinang were transferred from the City Council of George Town and the Public Works Department of Penang to the Penang Water Authority (PWA).

The Muda Agricultural Development Authority (MADA), established in 1970, is responsible for the Muda Irrigation Scheme with padi development as its main activity. Since MADA is the largest water user in the Sg. Kedah basin, it is also responsible for water allocation and management within the basin, through the operation of the Muda, Pedu and Ahning dams.

Other agencies which are indirectly involved with river management and/or river basin management are the State Forestry Department, the State Land and Mines Department, the local authorities, and the State Town and Country Planning Department.

The activities related to river management works for Muda River are herein enumerated as below:

- (a) Water resources development as well as water allocation for industrial and irrigation demand and other purposes such as navigation and fishery;
- (b) Land resources development such as urban/rural development, agricultural development, and forest reserve/management;
- (c) Tourism/public amenities development along the river and the dam reservoir; and
- (d) Mining of river sand.

2. MAJOR ISSUES AND PROBLEMS

Through the interview survey on the above institutional setup, two (2) major problems were initially recognized. The first problem is the lack of a state inter-agency coordinating body to implement a comprehensive management work. Due to the lack of such coordinating body, various inconsistent river management works are seen in each of the states of Kedah and Pulau Pinang. In the State of Kedah, the present water intake from Muda River is, for instance, made independently by PWD for the domestic/industrial demand and by MADA/DID for the irrigation demand without any coordination among them. Even the present irrigation schemes managed solely by DID have their own water intake schedule without any coordination with other schemes. SPC is apparently having a function to coordinate the inter-related agencies and to determine/approve rather general and/or broad directions of waterworks. However, the function of SPC does not extend to the formulation of a detailed and well-coordinated implementation plan for river management.

The second problem is the lack of an interstate coordinating body for the river management works among the states of Kedah, Pulau Pinang and Perlis. The present water resources of Muda River is used for the states; however, there does not exist any integrated coordinating body as well as any agreement among the states to allocate the water supply for each state. This problem is currently rather latent as the water shortage of Muda River has been seldom experienced. However, the future more intensive use of the water resources of Muda River would induce a serious argument between the states.

An interstate committee for the development of the Northern Region has been organized by four (4) states, that is, Perlis, Kedah, Perak and Pulau Pinang. The chief minister of each state is a major member of the committee, and the secretariat office is placed in the State of Pulau Pinang. The committee is likely to have a function to discuss/coordinate the development policy for Muda River, but the detailed

implementation plan for the river management works for Muda River could not be made through the committee.

The particular institutional problems in each sector related to the river management works are described as below.

(1) Water Resources Management

State DID is designated as the implementing agency to monitor the drought conditions of Muda River and report to SPC. Based on the report from DID, the SPC in the states of Kedah and Pulau Pinang prepared the policy for the water allocation of Muda River for each state territory. However, according to the field reconnaissance and interview survey, the monitoring results on the river flow discharge as well as pumping intake discharge are likely to be unreliable due to the inadequate monitoring system/facilities.

Moreover, there does not exist any definite coordinating body to manage the consistent water allocation for the water resources of Muda River among various water uses and between the states. Agricultural areas such as Muda and Seberang Perai Irrigation Scheme are directly managed by the Federal Government, and therefore, their water allocation is determined by the Federal Government.

Under the above circumstances, it is not clear which agency will initiate the necessary coordination for the water allocation during a serious drought year. Furthermore, the definite rule for water allocation has not been prepared among the states as well as the related government agencies for each state.

(2) Flood Mitigation Management

With regard to the structural measures for flood mitigation, no major development plan has been proposed for Muda River, and therefore, there is no dominant institutional problem related. Particular attention is, however, given to the existing river bund constructed along the downstream of Muda River. The river bund was constructed only on the side of the State of Pulau Pinang increasing the flood damage potential on the side of Kedah State. To avoid such inconsistent flood mitigation works, the future flood mitigation plan for Muda River should be implemented through adequate coordination between the states of Kedah and Pulau Pinang and, further, among the implementing agencies related to the flood mitigation works.

(3) Mining of River Sand

Licenses for sand mining of Muda River are currently issued by the Land and Mining Office upon approval from EXCO as well as SPC. The technical guidance for sand mining is, however, made by the State DID to maintain the appropriate conditions for river channel and the river bank. Due to such non-integrated competent authorities for the sand mining works, numerous undesirable problems are arising. Under the unfavorable conditions, improvement of the present institutional setup is urgently required in due

consideration of the present land code, the state revenue of the sand mining, and the aforesaid river reserves proposed by DID.

(4) Land Use

A number of organizations are currently related to the land development/reserve works in Muda river basin. The major state agencies related to the urban/industrial development in the Muda river basin are the State Economic Planning Unit (SEPU), the Town and Country Planning Department, the Department of Land and Mining, and the Kedah Regional Development Authority (KEDA). Moreover, agricultural development and forest reservations are managed by the Agricultural Department and the Forest Department, respectively.

Urban/industrial development are currently not insensibly made in Muda river basin, so that the related institutional problems are latent at present. Nevertheless, the establishment of a working body is indispensable to monitor the future progress of urban/industrial development and to coordinate river management works and land use with particular attention to the river reserved area.

In addition to the urban/industrial development, the logging works in the forest area will be a dominant factor affecting the river environments, particularly, in the aspects of water conservation by the catchment area and flood runoff conditions. An appropriate coordination is also required between the logging works and the river management works in the catchment area of Muda River.

3. PROPOSED INSTITUTIONAL SETUP PLAN

3.1 Review of Institutional Setup Arrangements Overseas

Many countries in the world have adopted the river basin management concept for water resources management. This concept calls for a holistic approach where all water resources, water user and all other activities including land use within the basin are seen to be interdependent, and must therefore be planned and managed in an integrated and coordinated manner.

The classical institutional arrangements for integrated river basin management and coordination comprise a coordinating river basin commission or council which decides on water policies and approves the basin water resources development and management master plan.

The commission or council is supported by a technical committee comprising government departments and agencies involved in planning and coordination, river basin development and river basin management. The adoption of the basin water resources development and management master plan integrating the various plans of the government department and agencies is by the technical committee.

The technical committee in turn is supported by a technical secretariat carrying out water management services such as assessment, planning and allocation.

A brief review of the institutional arrangements on river management of a few countries are presented below.

(1) Indonesia

In Indonesia, water resources management is based on the river basin as the management unit. Seventeen of the major river basins are designated as national river basins and are managed by river basin authorities or state-owned corporations.

To improve management of water resources, the Government recently adopted new central water management policies to (a) prepare spatial management plans, linking water and land use through river basin plans; and (b) centralize water management responsibilities by engaging beneficiaries and giving more responsibility to local entities.

(2) Italy

Since 1989, Italy has also adopted the river basin as the management unit within which the actions of different sectoral and regional institutions are regulated. The river basins are managed by independent Basin Authorities having the main function of preparing the Basin Plan.

(3) China

China has established seven river and lake basin commissions under the central Ministry of Water Resources. The duties of the commissions include water resources administration, river basin planning and data management, flood monitoring, design and execution of major water resources and hydropower projects and coordination of works on soil and water conservation. The commissions also develop river basin plans which have legal status, and development projects are required to be consistent with the provisions of the plans

(4) Britain

Britain has established in 1989, the National Rivers Authority, responsible for the regulatory and environmental functions of ten large river basins. The main strategy adopted by the National River Authority to resolve issues related to different interests of water users in a basin is to develop Catchment Management Plans.

(5) Singapore

Singapore, being an island state has no major river basin. However, river management is mainly for drainage control and flood mitigation. The river catchment is again used as the basic management unit with the development of

Catchment Drainage Master Plans and Catchment Management Systems for each of the eleven designated drainage catchments.

(6) Japan

The River Law 1964 of Japan is the basic law for river administration in Japan. Under the River Law, rivers in Japan are classified either as Class A river or Class B river. Class A rivers are administrated by the River Administrator, while class B rivers are administrated by the prefecture governor governing the prefecture where the river is located.

With regards to the part of a Class B river forming or crossing the boundary between two or more prefectures, the prefecture governors concerned may, by consultation, fix a special method of administration.

The River Administrator manages the whole river basin and is neutral to water and land users. The River Law empowers the River Administrator to enforce any of the provisions including the penal provisions.

The River Law also provides for establishment of a River Council for the purpose of investigating and deliberating on matters concerning river administration. It acts more as an advisory council preparing reports and assisting the formulation of policies on major water resources issues.

(7) France

A national Water Commission was formed in France in 1959, which outlined the principles for water management on a river basin basis, emphasizing the need for integrated long-term planning of water resources development, management and protection.

The Water Law which was enacted divided France into six groups of hydrographic basins. Each river basin has a basin committee which approves the long-term (20 to 25 years) master plan for water resources as well as 5-years action plan. The committee also decides on the annual fees to be paid by water user within the basin, one fee on the quantity of water consumed and the other one on the level of pollution at each point source.

The basin committee is supported by a water board which proposes the long-term and 5-year plans and the amount of fees to be charged. The board also collects fee and hydrological data, conduct studies and finance research programs.

The preparation of the long-term and 5-year plans is the responsibility of a technical coordinator for the basin. This person is responsible for implementing and coordinating central government policy on water rescues and ensuring that the actions of the central government and the basin committee and board are consistent.

Based on the existing institutional arrangements of both developing and developed countries as above, it is quite clear that a river basin management approach offers

many advantages. It provides integration at the level of water resources allocation, use and development and the central basin council offers a practical mechanism for coordinating the administrative units at different level of government within the river basin for water and land conservation. The preparation of a long-term and a 5-year river basin master plan for water resources development and management is also a common requirement to ensure adequate coordination and integration among the various interest groups within the basin.

3.2 Proposed Institutional Setup for Muda River

There are two major problems faced in the management of the water resources of Muda River. The first problem is the lack of an inter-agency coordinating body within each of the concerned states. As a results, various inconsistent river management practices are carried out in the states of Kedah and Pulau Pinang.

The second problem is the lack of an interstate coordinating body for river management among the states of Kedah, Pulau Pinang and Perlis. Although the majority of the catchment area of Muda River lies in the State of Kedah, nevertheless, the downstream stretch of the river flowing into the sea of about 20 km form the boundary between the states of Kedah and Pulau Pinang. In addition, over 80% of the total water used in the State of Pulau Pinang is drawn from Muda River for domestic and industrial purposes as well as for agriculture. In spite of the shared lower stretch of the river and shared utilization of the water resources of Muda River, there is no integrated coordinating body or any agreement between the states of Kedah and Pulau Pinang.

To ensure that the comprehensive management plan for Muda river basin is properly implemented and administered, three alternatives for the institutional setup of Muda river basin are proposed. The first calls for Muda River to be declared an interstate river, thereby placing it under Federal jurisdiction. Under the Legislative List in the Federal Constitution, in the Ninth Schedule, Item II includes in the Federal List Federal works and powers, including '(b) Water supplies, rivers and canals, except those wholly within one state or regulated by an agreement between all the States concerned; ..."

Since Muda River is not wholly within one state (the last 20 km stretch of the river flowing into the sea is shared), and there is no agreement between the states concerned, it is legally possible for parliament to pass an Act placing Muda River under Federal jurisdiction. However, this process is rather tedious and can become an issue affecting State-Federal relationship. In addition, after the passing of the Federal Act, the actual establishment of a Federal Agency to manage Muda river basin can be expensive and will take time. Hence this alternative is not recommended.

The second alternative is to promote an interstate agreement to be signed between the states of Kedah and Pulau Pinang. In 1963, an unsuccessful attempt was made to sign an agreement between the states concerned as part of the conditions for the World Bank Loan for the construction of the Muda Barrage. Since then there has been no further attempts, and the chances for an agreement appears to be slim at this stage. Hence this alternative is also not recommended.

The third alternative for the institutional arrangements for Muda river basin management is based on and is consistent with existing government structures in the states of Kedah and Pulau Pinang. The proposed institutional setup calls for a three tier structure, with the Muda River Basin Management Council at the top supported by a Technical Committee at the second level, and a Technical Secretariat.

The proposed structure is similar to that recommended by the National Water Resources Study Malaysia carried out by JICA in 1982 and the Report on the Proposals for a Draft National Water Code carried out by FAO in 1983. The proposed three-tier setup will improve coordination and will integrate water resources utilization, management and development by the various government department and agencies in Muda River Basin.

Through a series of discussion with and agreement from the officials concerned to the State Government of Kedah and Penang, it is provisionally proposed that the Muda River Basin Management Council shall be chaired by an appropriate Executive Council Member of the State of Kedah, and its Secretariate shall be placed in the Economic Planning Unit of Kedah State. The members shall be representative of the Federal and the departments of Kedah and Penang States including the following:

- (a) The Economic Planning Unit of Kedah and Penang State;
- (b) The Department of Irrigation and Drainage of Kedah and Penang States;
- (c) The Muda Agricultural Development Authority;
- (d) The Penang Water Authority;
- (e) The Department of Lands and Mines of Kedah and Penang States;
- (f) The Forestry Department of Kedah State; and
- (g) The Water Supply Division of the Kedah State Public Works Department.

The main functions of the Council shall be:

- (a) Approval of Long-term and Five-Year Basin Water Resources Development and Management Master Plan;
- (b) Approval of basin policies on water use priorities and allocation, flood mitigation measures, river reserves, river environment management, etc.;
- (c) Approval of emergency actions to be taken during extreme droughts and floods; and
- (d) Approval of water pricing policies both for the water abstraction from and water discharges into the Muda River.

The Technical Committee shall have the chairman from the Director of the River Division of the Federal Department of Irrigation and Drainage and be made up of the under-listed representatives of existing government, departments and agencies from the states of Kedah and Pulau Pinang, which are involved in planning and

coordination, river basin development and river basin management. Although the members of the Technical Committee appears to be duplicating those of the Council, it is not inappropriate as the functions of the bodies are quite different.

- (a) The Department of Irrigation and Drainage of Kedah and Penang States;
- (b) The Muda Agriculture Development Authority;
- (c) The Penang Water Authority;
- (d) The Water Supply Division of the Kedah State Public Work Department.
- (e) The Forestry Department of Kedah State;
- (f) The Town and Country Planning Department of Kedah State; and
- (g) The Lands and Mines Department of Kedah and Penang State.

The Terms of Reference of the Technical Committee shall include but not necessary be confined to the followings:

- (a) To promote and implement rational management of water resources of the Muda River Basin through integrated and coordinated planning of water resources development;
- (b) To prepare the Long-Term and the Five-Year Basin Water Resources Development and Management Master Plan of the Muda River basin;
- (c) To establish procedures so as to determine water use priorities during periods of inadequate water supplies due to drought or other causes;
- (d) To establish guidelines and procedures for the prevention and control of flooding, soil erosion and damage to catchment areas and water causes
- (e) To formulate policies and legal provisions for the management of the Muda River Basin for consideration and endorsement by the Muda River Basin Management Council;
- (f) To coordinate and integrate the different development and management plans and projects of the various department and agencies within the Basin; and
- (g) To coordinate land use planning and land use changes with water resources planning, development and management of the Basin.

The Technical Secretariat will be a Federal Unit of the Department of Drainage and Irrigation established in the office of the Kedah State Department of Drainage and Irrigation. The Secretariat will be the implementation arm of the Technical Committee under its direction. Its main functions are:

- (a) To collate all the hydrological data, water extraction data, water use data, water pollution data, etc., from the existing government departments and agencies in the states of Kedah and Pulau Pinang;
- (b) To collate all development plans, management plans, design standards, etc., for the preparation of the preliminary Long-Term and the Five-Year Basin Development and Management Master Plan;
- (c) To monitor all activities related to the Muda River Basin which have major negative impacts on the water resources of the Basin;
- (d) To submit proposals to the Technical Committee on resolving issues and problems encountered in the implementation of the Master Plan;
- (e) To prepare procedures for the consideration of the Technical Committee on proper management of sand mining, designation of river reserves, and issues related to the management of the Basin;
- (f) Where appropriate, and with endorsement of the Muda River Management Council, to act as the River Administrator of the Muda River; and
- (g) To enforce the emergency actions to be taken during droughts and floods as and when directed by the Muda River basin Management Council.

As described above, both of the Chairman and Secretariat for the Muda River Basin Council are entrusted to Kedah State Government instead of the neutral organization. This proposed setup is, however, agreed by both of the Economic Planning Units of Kedah and Penang State. Moreover, it is immaterial to which State Government the tasks of Chairman and Secretariat are entrusted. The important point is to ensure the function of the Technical Committee and Technical Secretariat as proposed, and to prepare an acceptable Long-Term and Five-Year Master Plan.

In the event that the Muda River Basin Management Council cannot reach a consensus or an agreement on any matter, particularly on matters of an interstate nature, the aggrieved party/State may appeal to the Northern Region Committee for a decision. The members of this Northern Region Committee are the Menteri Besar of the states of Kedah, Perlis and Perak, and the Chief Minister of the State of Pulau Pinang.

3.3 The Long-Term and Five-Year Development and Management Master Plan

To promote the rational management of the Muda river basin, long-term and 5-year policy plans should be prepared for the optimum development, use, conservation and protection of its water resources. The long-term and 5-year basin development and management master plan prepared by the Technical Secretariat should propose actions concerning the following subjects:

(1) Water Demand

The Plan should separately identify existing and projected domestic, industrial, and irrigation water demand and river maintenance flow. A list of specifically identified works or actions to be undertaken within 5 years and within 20 years, for the purpose of satisfying existing and projected water demand should be included.

(2) Flooding and Drainage

The Plan should identify areas where there exists a substantial risk of flood damage as well as urban areas suffering from inadequate drainage. A list of specifically identified works or actions to be undertaken within 5 years and within 20 years to mitigate flooding or improve urban drainage should also be included.

(3) Water Conservation

The Plan should describe all presently existing circumstances involving a substantial waste of water as well as all actions which shall be taken to conserve water. A list of specifically identified conservation measures to be undertaken within 5 years and within 20 years should also be included.

(4) River Reserves

The Plan should describe the width of land along the riverbanks to be gazetted as river reserves. A list of specifically identified works or actions to be undertaken within 5 years and within 20 years to develop recreation areas and to beautify the area should be included.

(5) Emergency Action

The Plan should describe the action which shall be taken, when one or both the states are affected by drought, flooding or other natural or man-made disasters. Such actions may include, but are not limited to, reduced or terminated water diversions by any person or any sector of the economy; the institutional or diversion priorities for particular users; and the establishment of a command structure to deal with water-related emergencies.

(6) Water Pricing Policy

The Plan should include a description of the pricing policy which will apply to the distribution of water for domestic and industrial purposes from public water supply works. Such policy should be founded upon the principle that the beneficiaries of water resources projects are expected to pay; provided that for the purpose of ensuring the minimum necessities of life, a limited amount of water may be supplied for domestic purposes at a subsidized rate. A pricing policy should also be developed for the distribution of water for irrigation purposes which policy will encourage the optimum use of land and discourage the waste of water.

One of the means to discourage the waste of water is to introduce a pricing policy with different rates dependent on the season of the year. During the wet months when water is in abundance, normal rates are charged. However, during dry months or drought periods, higher rates should be charged to reduce the unnecessary use or the wastage of water. By the same token, padi farmers who are advised to forego planting due to lack of water will be compensated for the quantity of water not utilized or saved.

At present daily domestic and industrial water use is not metered. To increase irrigation efficiency and to charge irrigation water use, the proposed Technical Secretariat shall meter the quantity of water used by each farmer or by a group of farmers. In the absence of any measurement on irrigation water use, an assessment on water not utilized or saved during droughts will have to be made based on past data. From the assessment, some form of compensation can be paid to the farmers.

Since water charges on domestic and industrial as well as irrigation water usage during droughts will be increased, the additional revenue collected could go toward payment of the compensation to those who forego planting during droughts. The detail implementation procedures will have to be worked out as one of the tasks of the Technical Secretariat.

(7) Water Project Financing Policy

The Plan should contain financing policy to apply to water resource development works including, but not limited to, multipurpose and interbasin transfer projects for the next five years. Such policy should describe the cost allocation practices to be followed in water project financing by the states and federal governments. In the development of such a policy, consideration should be given to the following factors: the relative financial position of the two states, the distribution of project benefit among and between the Federal Government, the two states and the private sector; the distribution of project impacts including direct and indirect social, economic and environmental impacts among and between the Federal Government, the two states and the private sector; and in the case of multipurpose projects, the relative cost of project components and their beneficiaries.

(8) Water Policy use

The Plan should formulate a Water Use Policy for the basin. The policy should include, but not necessarily be confined to the following:

- (a) Order of priority for water use during drought;
- (b) Relocation of heavy water user(s) from water scarce area(s) to water abundance area(s);
- (c) Conversion of heavy water user(s) activities to low water user(s) activities;
- (d) Water use charges for raw water and treated water; and

- (e) Compensation or incentives to be provided for stoppages or savings in water use.

4. IMPLEMENTATION OF THE PROPOSED INSTITUTIONAL SETUP

The proposed institutional setup can be established with the existing government departments and agencies. There will only be one new unit, the Technical Secretariat, which will be seconded from the Federal Department of Drainage and Irrigation, to the Kedah State Department of Drainage and Irrigation. Thus, the proposed institutional setup can be established almost immediately with minimal additional costs.

The existing government departments and agencies in the states of Kedah and Pulau Pinang will continue with their normal activities, but with the additional responsibility of having to integrate, cooperate and work closely with the Technical Secretariat.

The initial task of the Technical Secretariat will be to implement the Comprehensive Management Plan of Muda River Basin. As a start, it will be the central collating organization for the monitoring system of Muda river basin. It will not immediately take over the existing monitoring activities of the various government departments and agencies, but will complement and enhance the existing monitoring system by advising on additional monitoring required and providing some funds from the Federal Government for the purchase of new equipment. The Technical Secretariat will also collate and integrate all existing data collected and carry out studies and analysis on the data when necessary. As the Technical Secretariat becomes better established, it can and should slowly take over the operation and management of the whole monitoring system of Muda river basin in an integrated manner.

On water resources management, the Technical Secretariat will prepare the water allocation policy of the Basin based on the present and projected future demands of the various water users, and between the states of Kedah and Pulau Pinang. It will also prepare procedures for water allocation during serious drought years. The draft policy and procedures will be forwarded to the Technical Committee for study and reviewed before finalizing of approval by the Basin Council

As the State Irrigation and Drainage departments of Kedah and Pulau Pinang are in charge of flood mitigation management in their respective states, the Technical Secretariat shall request and advise the State Irrigation and Drainage Departments to prepare structural measures for flood mitigation along their respective bank of Muda River. The Technical Secretariat will then integrate the plans with the overall flood mitigation plan of the upper basin and submit it to the Technical Committee and the Basin Council for study and approval. The Technical Secretariat is a new unit under the Director of River Engineering Division of Federal Department of Irrigation and Drainage. However, it will be supported by the River Engineering Unit of Kedah State Department of Irrigation and Drainage for the day to day running of the Office. These situations for Technical Secretariat will be similar to those for Muda Office under Federal Department of Irrigation and Drainage. The Technical Secretariat will also collate the hydrological data being separately collected by the Hydrological Unit

of Departments of Irrigation and Drainage of Kedah and Pulau Pinang States, and utilize these data for analysis and management purposes. These functions of Technical Secretariat will be complementary and supplementary but not duplicate to the works being presently carried out by the River Engineering and Hydrological Units of State Department of Irrigation and Drainage.

The Technical Secretariat should initially take over the responsibility, from the Department of Drainage and Irrigation of each state, of providing technical guidelines on sand mining to the Land Office. By so doing, the Technical Secretariat will be able to integrate all sand mining activities along the whole Muda River. Eventually, at an appropriate time, the Technical Secretariat should be delegated the powers under the Water Enactment, which will effectively make it the River Administrator. The Technical Secretariat will then be responsible for the issuance of abstraction and impounding licenses to water users, sand mining licenses and licenses for water discharge points into the river. With the power for licensing, the Technical Secretariat will also have the power to collect fees and to prosecute offenders. All these powers will of course be under the supervision of the Basin Council.

With regard to the integration of land use changes and water resources management, the Technical Secretariat will be the coordinating body between the various government departments and agencies involved in land use conversion, land development, forest logging, etc. In the long term, the structural plans of local authorities should be extended to cover the whole Muda river basin. This would include non-urban areas as well as water catchment areas and river reserves, the management of which must be integrated with water resources management of the Basin.

To offset part of the cost for the integrated management of Muda river basin, the Council could consider charging fees for the direct abstraction of water from Muda River by the main water suppliers. The charge to be levied will be based on the quantity and the usage of the water suppliers. A fee could also be levied on the discharge of water from point sources, and the charge will be based on the quantity and the level of pollution of the water being discharged at each point. At present, there is no charge on the water abstraction or the water diverted from Muda River by the government department and/or agencies. However, it would be appropriate to institute some administrative or legal provisions to charge all abstraction or diversion of water from the Muda River. As for private abstraction, the waters enactment has provisions for the collector of Land Revenue (PHT) to charge the water users. Thus, if the proposal to charge all abstraction, whether private or government, then the collector of Land Revenue can do the collection, while the Technical Secretariat will issue the monthly or bimonthly bills to the Land Office. The same procedure can be followed for the collection of fees for water being discharged into Muda River by Town Councils and Industries.

5. REGIONAL WATER RESOURCES DEVELOPMENT CORPORATION

Both the National Water Resources Study, Malaysia (JICA, October 1982) and the Consultancy on National Water Law - Malaysia Report by Mr. Gregory

K. Wilkinson, Legal Officer, FAV, 1984, proposed the establishment through legislation of a Regional Water Resources Development Corporation for the Perlis-Kedah-Pulau Pinang Region. The functions of the Corporation are to construct, operate and maintain the multipurpose, interstate and inter-basin water resource projects which are identified and approved by the Muda River Basin Management Council. The Corporation will be under the authority of the Muda River Basin Management Council. In the mid to long term, the Corporation could replace the Technical Secretariat, thereby corporatizing and eventually privatizing the whole operation and maintenance of source works, and leaving the existing specialized departments and agencies to continue with the distribution of water to the users.

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