

Table 10-2 Unit Costs of Civil Works

Item	Unit	(M\$)						
		Rockfill Dam	Concrete Dam	Spillway	Diver-sion	Intake	Pen-stock	Power Plant Tail-race
earth ex-cavation	m <sup>3</sup>		4.5	4.5	4.5	4.5	4.5	4.5
rock ex-cavation	m <sup>3</sup>		15.0	15.0	15.0	15.0	15.0	15.0
stripping	m <sup>3</sup>	3.5						
rock filling	m <sup>3</sup>	11.0						
rock filling (appropri-ate)	m <sup>3</sup>	1.5						
earth filling	m <sup>3</sup>	8.5						
tunnel driving	m <sup>3</sup>				64		64	
steel rib support	ton				3,000		3,000	
concrete	m <sup>3</sup>		200	250	250	250	220	270
secondary coffering concrete	m <sup>3</sup>		220					
tunnel concrete	m <sup>3</sup>				270		270	
blocking concrete	m <sup>3</sup>				220			
steel bar	ton		1,500	1,500	1,500	1,500	1,500	1,500
grout hole drilling	m	140	140		140			
grout cement	ton	1,220	1,220		1,220			

**Table 11-1**  
**Present Land Use in the Coastal Region, Kelantan**  
**-Without the KRBS-Irrigation Projects-**

No.	Category	Kelantan	Coastal	%	%	B/A (%)
		Ha (A)	Ha (B)			
	<b>Agriculture</b>	256,569.1	164,221.6	100.0	69.8	64.0
1	Padi	75,226.2	71,356.6	43.4	30.3	94.9
2	Rubber	129,603.4	53,221.6	32.4	22.6	41.1
3	Mixed Horticulture	34,350.9	27,534.0	16.8	11.7	80.2
4	Coconut	7,662.9	7,544.9	4.6	3.2	98.5
5	Oil Palm	5,258.6	2,150.5	1.3	0.9	40.9
6	Diversified Crops	2,269.1	1,401.9	0.9	0.6	61.8
7	Orchards	1,040.1	1,012.1	0.6	0.4	97.3
8	Shifting Cultivation	1,157.9	0	0	0	0
	<b>Other Land Use</b>	1,247,623.5	71,165.8	100.0	30.2	5.7
9	Urban	3,065.9	2,497.6	3.5	1.1	81.5
10	Grass Land	17,986.6	12,065.9	17.0	5.1	67.1
11	Forest	1,104,339.9	15,313.6	21.5	6.5	1.4
12	Scrub Forest	55,690.4	13,305.4	18.7	5.7	23.9
13	Swamp	25,951.4	22,892.4	32.2	9.7	88.2
14	Unclassified	40,589.3	5,090.9	7.2	2.2	12.5
	<b>Total</b>	<b>1,504,192.6</b>	<b>235,387.4</b>		<b>100.0</b>	<b>15.6</b>

(Source - KRBS, 1977)

Note: KRBS means "Kelantan River Basin Study".

Table 11-2 Annual Cost of Alternative Thermal Power Plant

I) Capital Cost of Notional Thermal

	M Dol./kW Escala- (1978.1 Est.) (78.1 - 79.12)	tion (78.1 - 79.12)	M Dol./kW IDC (1979.12) (8-0/0)	Cap. Value M Dol./kW	Stn. Loss Factor	Cap. Value M Dol./kW
Steam Plant	834.0	10-0/0	917.4	12.7- 0/0	1.15	1189.0
Gas Turbine	469.0	10/0/0	515.9	4-0/0	1.15	617.0

II) Operation and Maintenance Cost

A) Fixed cost

	Fixed Cost (1978.1) M Dol./kW	Escalation (78.1 - 79.12)	Fixed Cost (1979.12) M Dol./kW	Over- head M Dol./kW	Insurance M Dol./kW	Fixed Cost M Dol./kW
Steam Plant	12.08	10-0/0	13.29	39-0/0	2.58	21.05
Gas Turbine	4.41	10-0/0	4.85	39-0/0	1.34	8.08

B) Variable Cost

	Variable Cost (1978.1) M Dol./kWh	Escalation (1978.1 - 1979.12)	Variable Cost (1979.12) M Dol./kWh
Steam Plant	0.00124	89 %	0.00234
Gas Turbine	0.00195	89 %	0.00369

III) Fuel Cost for Notional Thermal Plant

	Fuel Cons. kg/kWh	Fuel Price (1978.1) M Dol./L.Ton	Escalation (1978.1 - 1979.12)	Fuel Price (1979.12) M Dol./L.Ton	Fuel Cost M Dol./kWh
Steam Plant	0.256	199	89 %	376.1	0.0948
Gas Turbine	0.320	314	89 %	593.5	0.1869

Annual cost of the notional thermal alternatives is obtained as described in the following formulas.

Formula I

$$P = PS + PG \quad (1)$$

$$E = 8760 (PS \times 0.80 + PG \times 0.05) \quad (2)$$

From the above formulas,

$$PS = (E/0.75 - 0.05/0.75)P$$

$$PG = (0.8/0.75 - E/0.75)P$$

Where

P : Max. output of hydro project (kW)

E : Annual energy product of hydro project (kWh)

F : Plant factor of hydro project (E/PX8760)

PS : Output of steam plant

PG : Output of gas turbine

If the kW value and the kWh value of steam plant and gas turbine are shown as follows,

Steam Plant :

$$VS1 : 1189 \times C \cdot R \cdot F + 21.05 \text{ (M Dol./kW, } C \cdot R \cdot F = 0.0937)$$

$$VS2 : 0.0023 + 0.0948 \text{ (M Dol./kWh)}$$

Gas Turbine :

$$VG1 : 617 \times C \cdot R \cdot F + 8.08 \text{ (M Dol./kW, } C \cdot R \cdot F = 0.0937)$$

$$VG2 : 0.0037 + 0.1869 \text{ (M Dol./kWh)}$$

**B (hydro power benefit) = Annual cost of the alternative thermal,**  
which can be written in the following formula,

$$B = PS(VS1 + VS2 \times 8760 \times 0.8) + PG (VG1 + VG2 \times 8760 \times 0.05)$$

Therefore,

$$B = 1105.1P + 0.1010B$$

Note : B : (H Dol.)

**Table 11-3 Basic Factors in Agricultural Net Production Value**

(\$Million on Constant 1976 Price Level)

No.	Irrigation Project	Year Com- missioned	Base Year (1976)	Ultimate N.P.V.	Status Year Achieved	Future (2025)
<b>(A) Without the Lebir Dam Project</b>						
	W/O Irrigation Project		72.32			
4.	ADB: Kemasin-Semerak	1986	82.36	236.26	N. 2011 W. 2017	
5.	KBRS-Lemal, Alor Pasir & Pasir Mas Ext					
6.	KBRS-North Lemal KBRS-Rantau Panjang					
7.	KBRS-Ulu Lemal					
8.	KBRS-Upper Ulu Lemal					
9.	KBRS-Sa Raan	1989	89.81	263.58	N. 2012 W. 2018	
10.	KBRS-Tasek Garu	1995	93.80	318.85	N. 20.13 W. 20.19	
11.	KBRS-Kenabu & Salor Ext					
12.	KBRS-Sg. Sat					
13.	KBRS-Pertak & Putat Ext	1999	97.28	281.35	N. 2014 W. 2020	395.65
(Water shortage will occur in 1996)						
<b>(B) With the Lebir Dam Project</b>						
	W/O Irrigation Project		72.32			
4.	ADB: Kemasin-Semerak	1986	82.32	236.26	N. 2011 D. 2010	
5.	KBRS-Lemal, Alor Pasir & Mas Ext					
6.	KBRS-North Lemal KBRS-Rantan Panjang					
7.	KBRS-Ulu Lemal					
8.	KBRS-Upper Ulu Lemal					
9.	KBRS-Sg. Bagar	1989	89.81	263.82	D. 2011	
10.	KBRS-Tasek Garu	1995	93.80	319.58	D. 2012	
11.	KBRS-Kenabu & Salor Ext					
12.	KBRS-Sg. Sat					
13.	KBRS-Pertak & Putat Ext	1999	97.28	282.64	D. 2013	416.97

\*/..... N=Normal time horizon, W=Water shortage

D=After completion of Lebir Dam, less 1 year from N.

N.P.V.= Net production value

Table 11-4 Agricultural Benefit with the Lebir Dam

(\$ Million on Constant 1976 Price Level)

Project Year	Benefits			Direct Water Deficit Costs		
	w/o-NPV	w - NPV	Benefits	w/o-Dam	w/Dam	Increment
	(A)	(B)	(B)-(A)	(C)	(D)	(D)-(C)
1979	80.90	80.90	0	0	0	0
1980	83.76	83.76	0	0	0	0
1981	86.63	86.63	0	0	0	0
2	89.49	89.49	0	0	0	0
3	92.35	92.35	0	0	0	0
4	95.21	95.21	0	0	0	0
5	98.07	98.07	0	0	0	0
6	114.40	114.40	0	0	0	0
7	130.73	130.73	0	0	0	0
8	135.13	135.13	0	0	0	0
9	146.11	147.27	1.16	0	0	0
1990	157.08	159.41	2.33	0	0	0
1	161.92	164.39	2.47	0	0	0
2	166.76	169.36	2.60	0	0	0
3	171.60	174.33	2.73	0	0	0
4	176.44	179.30	2.86	0	0	0
5	169.45	199.27	2.82	0	0	0
6	216.45	219.23	2.78	2.00	0	-2.00
7	220.90	225.50	4.60	2.50	0	-2.50
8	225.35	231.78	6.43	3.00	0	-3.00
9	247.29	257.08	9.79	3.50	0	-3.50
2000	269.22	282.38	13.16	4.00	0	-4.00
1	274.83	290.08	15.26	4.00	0	-4.00
2	280.43	297.80	17.37	4.00	0	-4.00
3	286.04	305.52	19.48	4.00	0	-4.00
4	291.65	313.23	21.58	4.00	0	-4.00
5	297.26	320.94	23.68	4.00	0	-4.00
6	302.86	328.65	25.79	4.00	0	-4.00
7	308.47	336.36	27.89	4.00	0	-4.00
8	314.08	344.08	30.00	4.00	0	-4.00
9	318.68	351.79	32.11	4.00	0	-4.00
2010	325.29	359.50	34.21	4.00	0	-4.00
1	330.90	367.21	36.31	4.00	0	-4.00
2	336.50	374.92	38.42	4.00	0	-4.00
3	342.11	382.64	40.53	4.00	0	-4.00
4	347.72	385.50	37.78	4.00	0	-4.00
5	353.33	388.36	35.03	4.00	0	-4.00
6	358.93	391.22	32.29	4.00	0	-4.00
7	364.54	394.08	29.54	4.00	0	-4.00
8	370.15	396.95	26.80	4.00	0	-4.00
9	375.75	399.81	24.06	4.00	0	-4.00
2020	381.35	402.67	21.32	4.00	0	-4.00
1	384.21	405.53	21.32	4.00	0	-4.00
2	387.07	408.39	21.32	4.00	0	-4.00
3	389.93	411.25	21.32	4.00	0	-4.00
4	392.79	414.11	21.32	4.00	0	-4.00
5	395.65	416.97	21.32	4.00	0	-4.00
6	398.52	419.83	21.32	4.00	0	-4.00
7	401.38	422.69	21.32	4.00	0	-4.00
8	402.24	425.56	21.32	4.00	0	-4.00
9	407.10	428.42	21.32	4.00	0	-4.00
2030	409.96	431.28	21.32	4.00	0	-4.00
1	412.82	434.14	21.32	4.00	0	-4.00
2	415.68	436.99	21.32	4.00	0	-4.00
3	418.54	439.86	21.32	4.00	0	-4.00
4	421.20	442.52	21.32	4.00	0	-4.00
2035	424.06	445.38	21.32	4.00	0	-4.00

Table 11-5 Comparison of Flood Damage Amount for Each Year and Case on the Basis of

ENEX Report

(No. 1 Agricultural Damage) (10<sup>3</sup> M\$)

Year	Condition as of 1976			Future Condition			Remarks
	A	B	C	A	B	C	
1				1,595	1,557	1,542	
2				3,991	3,610	3,306	
3				3,903	3,003	2,851	
4				917	915	908	
5				2,189	2,198	2,189	
6				1,657	1,587	1,555	
7				2,101	1,776	1,758	
8				1,538	1,549	1,549	
9				2,806	2,743	2,716	
10				1,871	1,638	1,603	
11				3,652	3,657	3,657	
12				3,108	3,082	3,072	
13				2,716	2,652	2,630	
14				3,285	3,266	3,266	
15				2,488	2,452	2,437	
16				2,004	1,994	1,989	
17				358	348	346	
18				4,928	4,687	4,562	
19				19,971	16,097	15,204	1967
20				2,773	2,255	1,950	
21				2,304	2,318	2,318	
22				3,464	3,044	3,013	
23				4,220	3,484	3,468	
24				3,111	2,510	2,475	
25				6,131	3,093	2,161	1973
26				9,494	6,253	5,094	
27				3,277	3,208	3,191	
Total				99,852	84,935	83,882	
Average				3,698	3,146	3,107	

A: without Dam Construction  
 B: Dabong Dam  
 C: Dabong and Lebri Dams



Table 11-6 Comparison of Flood Damage Amount for  
Each Year and Case on the Basis of  
ENEX Report

Year	(No. 2 Social Damage)			(10 <sup>3</sup> M\$)			Remarks
	A	B	C	A	B	C	
1	366	354	347	1,089	1,051	1,033	
2	1,387	629	520	3,828	1,846	1,555	
3	1,920	840	586	5,089	2,365	1,635	
4	110	109	108	329	327	324	
5	365	340	337	1,101	1,039	1,031	
6	367	336	327	1,091	1,000	974	
7	460	403	304	1,366	1,200	908	
8	186	146	145	552	435	432	
9	308	311	305	915	923	906	
10	516	404	361	1,424	1,165	1,059	
11	225	226	212	670	671	631	
12	724	629	623	2,164	1,881	1,863	
13	323	300	289	970	902	879	
14	205	242	238	610	721	708	
15	234	186	180	696	554	536	
16	196	191	187	586	573	560	
17	37	35	33	109	103	97	
18	1,591	1,051	975	4,601	3,108	2,898	
19	39,068	21,489	19,359	102,773	57,386	51,698	1967
20	1,700	364	217	4,302	1,038	645	
21	274	262	267	821	784	800	
22	1,590	928	884	4,509	2,759	2,627	
23	2,778	1,688	1,689	7,120	4,446	4,443	
24	498	369	328	1,419	1,064	956	
25	6,094	1,465	601	15,506	3,993	1,742	1973
26	9,390	5,483	3,781	24,202	14,115	9,832	
27	697	610	595	2,072	1,820	1,776	
<b>Total</b>	<b>71,609</b>	<b>39,390</b>	<b>33,798</b>	<b>189,914</b>	<b>107,269</b>	<b>92,548</b>	
<b>Average</b>	<b>2,652</b>	<b>1,459</b>	<b>1,252</b>	<b>7,034</b>	<b>3,973</b>	<b>3,428</b>	

Table 11-7 Flood Mitigation at Guillemard Bridge

Return Period (Years)	Fluctuation (m <sup>3</sup> /S)	Remarks
100	17,100	
50	13,600	
20	10,500	

Mitigated Amount of the Flood Damage

Discharge	Property	Crop	Total (M\$ x 10 <sup>6</sup> )
19,600	119	22	141
17,100	108.5	21	129.5
15,800	99	19.5	118.5
13,600	77.5	17	94.5
12,400	63	14	77
10,500	36	8.5	44.5
			32.5

Flood Mitigation Benefit

Return Period (Years)	Occurrence Probability	Flood Mitigation	Expectation
20	0.0267	32.5	0.867
30	0.0114	29.6	0.337
40	0.0063	26.8	0.169
50	0.0040	24	0.096
60	0.0028	21.4	0.060
70	0.0021	18.9	0.040
80	0.0016	16.4	0.026
90	0.0012	14.0	0.017
100	0.0010	11.5	0.012
Total			1.624
After Escalation			2.072

Escalation =  $(1.05)^5 = 1.276$

Table 11-8

Flood Control Benefit

## I) Free Overflow

(E.L.M) H.W.L.	(M) Crest Length	N.W.L.	Damage Mitigation in Each Scale $10^6$ M\$			Expected Flood Control Benefit $10^6$ M\$
			1/20	1/50	1/100	
90	80	81.9	41.5	30.0	18.2	2.72
90	120	83.0	35.7	27.5	14.0	2.30
90	160	83.8	31.2	25.3	12.3	2.07
90	200	84.3	28.0	23.5	11.5	1.89
80	80	70.0	28.0	23.5	10.5	1.86
80	120	71.6	23.0	18.0	7.0	1.49
80	160	72.7	20.0	15.2	5.6	1.29
80	200	73.4	18.0	13.5	5.0	1.15
70	80	58.2	13.0	9.5	4.0	0.83
70	120	60.4	10.0	7.5	3.0	0.64
70	160	61.7	7.9	6.3	2.7	0.51
70	200	62.7	6.5	5.5	2.5	0.44

## II) Gate Operation

H.W.L.	N.W.L.	Damage Mitigation in Each Scale ( $10^6$ M\$)			Expected Floor Control Benefit ( $10^6$ M\$)
(E.L.M)	(E.L.M)	1/20	1/50	1/100	
90	85.8	39.0	25.0	15.0	2.38
80	75.9	23.5	16.0	6.5	1.45
70	66.4	15.0	8.0	4.5	0.85

**3.1.1. Hourly Discharge**

Station Number	Period of Observation	Remarks
(Gullemard) 5721442	1965 - 1977	Only in Nov., Dec. and Jan.

**3.1.2. Hourly Water Stage**

Station Number	Period of Observation	Remarks
(Tualang) 5222452	25 Nov., 1975 - Nov., 1977	
(Bertan) 5120401	Nov., 1975 - Jan., 1977	
(Dabong) 5320443	Nov., 1975 - Jan., 1977	

3.1.3. Daily Discharge

Station Number	Period of Observation	Remarks
5221442	1965 - 1978	

3.1.4. Daily Rainfall

Station Number	Period of Observation	Remarks
6019004	1967	
6021010	"	
6021060	"	
6022062	"	
6023072	"	
6024074	"	
6021063	"	
6121066	"	
6121067	"	
6122064	"	
4620045	"	
4819001	"	
5419036	1972 - 1973	
5718033	1972	
5721002	1971 - 1976	
5120401	July 1970 - Aug. 1974	
5522047	July 1970 - Jan. 1977	
5718001	July 1970 - May 1978	
5721001	Dec. 1970 - April 1978	

Station Number	Period of Observation	Remarks
5322044	Oct. 1971 - Feb. 1978	
4819027	Nov. 1971 - Feb. 1978	
5521050	July 1970 - May 1978	
5419036	July 1970 - Feb. 1978	
5622048	July 1970 - May 1978	
5320443	Oct. 1971 - Feb. 1978	
5422046	July 1970 - May 1978	
5721001	Jan. 1971 - May 1978	
5722057	July 1970 - Aug. 1978	
5320039	June 1970 - April 1978	
5718033	Sept. 1972 - Feb. 1978	
5720055	July 1970 - May 1977	
5621052	July 1970 - March 1978	
5621051	Sept. 1970 - March 1978	
5518035	July 1970 - May 1978	
4923001	July 1977 - Feb. 1978	

3.1.5. Daily Water Stage

Station Number	Period of Observation	Remarks
5120401	1975 - 1977	
522452	1975 - 1977	
5320443	1972 - 1977	

3.1.6. List of Books on Hydrology

Title	Publisher or Writer
Estimation of the Design Rainstorm Magnitude and Frequency of Floods in Peninsular Malaysia	Agriculture and Fisheries Dept.
Rational Method of Flood Estimation for Rural Catchments in Peninsular Malaysia	"
Hydrological Station Numbering System	"
Hydrological Station Registers	"
Field Installation and Maintenance of Capricoder 1598 Digital Event Water Level Recorder	Agriculture and Rural Development
Stage-Discharge Curves	Agriculture
Design Flood Hydrograph Estimation for Rural Catchments in Peninsular Malaysia	"
Magnitude and Frequency of Low Flows in Peninsular Malaysia	"
The Estimation of Storage-Draft Rate Characteristics for Rivers in Peninsular Malaysia	"
Graphical Recorders Instructions for Chart Changing and Annotation	"
River Discharge Measurement by Current Meter	"
Estimating Potential Evapotranspiration using the Penman Procedure	"
Hydrological Design of Agricultural Drainage Systems	"
The Determination of Suspended Sediment Discharge	"
Hydrological Aspects of Agricultural Planning and Irrigation Design	"
Rainfall Records (1879 - 1975)	Drainage & Irrigation Department
Streamflow Records (1971 - 1970)	"
Enex Reports Volume 1, Hydrology	ENEX
Rating-Curve (Batu, Lembu, Bertan, Dabong)	"
Stage-Discharge Curve (Tualang, Cullenaard)	"
Enex Reports Volume 2, Drainage and Irrigation	ENEX
Enex Reports Volume 3, Flood Mitigation Project	ENEX
Water Quality Records (1974 - 1976)	Ministry of Agriculture and Rural Development

3.2. Meteorology

Title	Publisher
Meteorological Data (1948 - 1972) Service	Malaysia Meteorological

3.3. Topography

Title	Publisher or Writer
Detailed and Locality Plan of Cross-section	ENEX
Kota Bharu (Sg. Kelantan) Dabong (Sg. Galas) of Cross-Section	"
Master Cross Section Gullénard, Batu Lembu, Tualang, Bertan, Dabong	"
1/25000, 1/63360 (Western Malaysia)	Government of Malaysia

3.4. Geology

Title	Publisher or Writer
Geology and Mineral Resources of North Kelantan and North Trengganu	S. Mac Donald, Ministry of Lands and Mines, Malaysia
South-east Asia: A Systematic Geography	Chia Lin Sien & Others, Oxford University Press
Field Record Vol. III South Kelantan	Che Mohd. Sanibin Abnan.
Geological Map of West Malaysia (1/500,000)	Geological Survey, Malaysia
Hydrogeological Map of Peninsular Malaysia (1/500,000)	"
Geological Map of Peninsular Malaysia (1/2,000,000)	Geological Survey, Malaysia



Title	Publisher or Writer
Sungai Aring (46-58) Geological Map (1/63,360)	Geological Survey, Malaysia
Mineral Distribution Map of Peninsular Malaysia (1/500,000)	Geological Survey, Malaysia
Reconnaissance Soil Map Peninsular Malaysia (1/500,000)	Ministry of Agriculture & Fisheries, Malaysia
Semenanjung Malaysia (1/760,000)	National Mapping, Malaysia
Semenanjung Malaysia Kelantan (1/190,080)	National Mapping, Malaysia

### 3.5. Land Development

Title	Publisher
VLY Kelantan Land Settlement Project, Loan No. 4/8 as revised on March 15, 1979	Federal Land Development Authority (FELDA)
21 years of land development by Tunku Shamsul	FELDA
Penyata Tahunan 1978 Jabatan, Hutan, Kelantan	State Ministry of Forestry Annual Report
Development and rehabilitation project E.P.U. Kelantan	State Land Development Board, Kelantan
Potensi Perhutanan Di Wilayah Pembangunan Kelantan Selatan	Minco State Ministry of Forestry
Enex Reports Volume 5: Land Use Effects	ENEX
Enex Reports Volume 6: Basin Develop- ment Plan	

### 3.6. Power Transmission

Title	Publisher or Writer
Lightning Performance of N.E.B.'s 275 kV Transmission Line	A. Maglay (Dec. 1977)
Drawings of Tanah Merah S/S	N.E.B. (Aug. 1978)
How to Estimate Construction Costs of Electrical Power Substations	J.M. Bifulco (1973)
Single Line Diagram of National Power System	N.E.B.
Semenanjung Malaysia at a Scale 1/260,000 SY/I	National Mapping
Kelantan at a Scale of 1/190,000 SY/I	"
Topographical Maps at a Scale of 1/25,000 and 1/63,690 for Proposed Transmission Lines Routes Area	"
Three Dimensional Monte Carlo Determination of the Performance of Overhead Lightning Shield Systems	Thun Peng Chew Liew An Choy (Dec. 1977)
Trengganu River Basin Study Feasibility Report on Multi-Purpose Dam Project, Vol. 6 Hydro Power Development, Volume 7 Power Stations and Power System	Snowy Mountain Engineering Corp. (July, 1976)
Transmission Developments Temengor-Tanah Merah, K.L. North Kampong-Awah, P.C.R. Project	P.C.R.

### 3.7. Finance and Economics

#### 3.7.1. Socio-Economic Aspect

Mid-term Review of the 3rd Malaysia Plan	(1976 - 1980)
Trade Classification and Customs Tariffs	1978
Annual Reports of the Ministry of Labour and Manpower for 1976	
Law of Malaysia, Act A387 Land Acquisition Act 1977	
Land Acquisition Act 1960 (No. 34 of 1960) Reprint No. 3 of 1976	
Outline Perspective Plan (Chap. IV) Third Malaysia Plan	(1976 - 1980)
Bank Negara Malaysia, Quarterly Economic Bulletin	(May & June, 1978)
Bank Negara Malaysia, Annual Report and Statement of Accounts 1978 and Extracts from 1971, 75, 76, 77 Reports	
Bank Negara Malaysia, Annual Report and Statement of Accounts 1978 and Extracts from 1971, 75, 76, 77 Reports	
Kelantan, An Economic Survey and Implementation Programme, Kuala Lumpur	10/5/1979
State and Rural Development Project, Government of Malaysia UNDP/World Bank, Report 1	
UNDP/World Bank Development Strategy for Kelantan Part II Strategy and Impact Assessment	
UNDP/World Bank No. 5 Infrastructure In Kelantan	(July, 1978)
UNDP/World Bank A Development Strategy for Kelantan Part I. Development Goals and Existing Situation	
Ministry of Labour and Manpower	
A. Quarterly report	1st quarter 1978
B. " "	4th " 1977
C. " "	3rd " 1977
D. " "	2nd " 1977
Occupational Wage Surveys Peninsular Malaysia	1977

---

Handbook of Labour Statistics, Peninsular Malaysia  
Ministry of Labour and Manpower, 1977

---

Consumer Price Index for Peninsular Malaysia  
Dept. of Statistics, April, 1979

---

Population Projection for the State of Peninsular Malaysia  
(1970 - 1980)

---

Yearly Employment Survey on Rubber, Oil Palm, Coconut and Tea  
Estate in Peninsular Malaysia 1975

---

The produced Price Index for Peninsular Malaysia  
Dept. of Statistics, (1973 - 1975)

---

1970 Input - Output Tables, Peninsular Malaysia  
Dept. of Statistics

---

Monthly Statistical Bulletin Malaysia  
Peninsular Malaysia 1979

---

Annual Statistical Bulletin Malaysia 1977

---

1970 Population and Housing of Malaysia Vol 1

---

Kelantan Urban Development and Industrial Priority Study  
(Draft Final Report)  
Technical Appendix A  
Economic Strategy  
by Consult United Canada

---

Draft Report on Economic Survey of Kelantan Development Bank  
of Malaysia 1st Aug. 1978

---

Report on Socio - Economic Survey of Kelantan  
Kelantan Irrigation District  
Federal Land Consolidation and  
Rehabilitation Authority Oct., 1977

---

District Data Bank VLV Kelantan  
State E.P.U.

---

Survey of Payment Scheme for Jobs in Kelantan (Draft)

---

Kelantan, an Advantageous Location for International Industrial  
Investment in Eighties State E.P.U.

---

Malaysia Builder Directory (1976 - 1977)  
(List of Government Organization)

---

---

National Parameters for Project Appraisal in Malaysia  
Vol. I, II, III

U.N.D.P., World Bank Study  
State and Rural Development Project

---

Information Malaysia

Malaysian Yearbook 1978/1979

---

Pattern of Labour Utilization in Peninsular Malaysia  
Research Paper No. 14

Dept. of Statistics

---

Rubber Institute of Malaysia

Annual Report (1977)

### 3.7.2. Hydroelectric Aspects

---

N.E.B. Trengganu Hydro-electric Project Economic Review

by Th'ng Yong Huat April, 1978

---

Hydro-power Potential and Development in Malaysia

by Th'ng Yong Huat

I.E.S./I.E.H. Engineering Convention

---

N.E.B. Trengganu Hydro-electric Project Supplement to "Economic Review"

Internal Economic Rate of Return 6/1978

by Th'ng Yong Huat

---

Tariff Booklet

Rates for Supply of Electricity

N.E.B.

1964

---

Tembeling Multi-purpose Dam Project

An Appraisal of Project Proposals and Implementation Issues

by Th'ng Yong Huat

---

Trengganu River Basin Study

Water Resources of the Basin. Vol.4. Multi-purpose Dam Project

April, 1978

by Snowy Mountain Engineering Corp.

---

Trengganu River Basin Study

Feasibility Report on Multi-purpose Dam Project

Economic Evolution July, 1976

---

The Kelantan River Basin Study

ENEX

1978

---

Supplement to 28th Annual Report	ENEX 1978
Trengganu River Basin Study Feasibility Report on Multi-purpose Dam Project Vol. 1 General Report 1976	Snowy Mountain Engineering Corp.
Trengganu River Basin Study Feasibility Report on Multi-purpose Dam Project Vol. 2 Irrigation and Drainage 1976	
N.E.B. Accounts for the years 1978, 1977, 1976, 1975, 1974, 1973, 1972 and 1971	
N.E.B. Capital Assets Classification	

**3.7.3. Flood Control**

Flood Report for November 1979	State D.I.D. Kelantan
Preliminary flood report for January 1967	State D.I.D. Kelantan
Flood report for December 1973	State D.I.D. Kelantan
Flood report for December 1974/January 1975	State D.I.D. Kelantan
Flood Maps (Road Damage) of Kelantan 1969, 1973	State D.I.D. Kelantan

### 3.8. Agriculture

- 
- Malaysia, Muda II Irrigation Project  
Staff Appraisal Report  
Report No. 2344-MA IBRD 16 May, 1979
- 
- North Kelantan Rural Development Project  
IBRD Report
- 
- Bahagian, III Harga-Harga Maksimum Beras Iualan Secara Runcit
- 
- Review of Agricultural Economics  
Malaysia (PAMA)  
Vol. 2 No. 2      Vol. 3 No. 1      Vol. 3 No. 2  
Vol. 4 No. 1      Vol. 4 No. 2      Vol. 5 No. 1  
Vol. 5 No. 2      Vol. 6 No. 1      Vol. 6 No. 2
- 
- FAMA Agricultural Economic Bulletin No. 6  
Production Costs of Miscellaneous Agricultural Commodities
- 
- Market Potential for Crops recommended under Green  
Book Programme (Phase II) 1978
- 
- Table B1 Area Planted with Different Types of Padi  
by State Ministry of Agriculture
- 
- Off-Season Padi Production Costing  
State E.P.U. Kelantan
- 
- North Lemat Irrigation Project File 1978  
Phase I - Stage I  
Preinvestment report  
Project plan
- 
- Feasibility Report on Tertiary  
Irrigation Feasibilities for Agricultural Development in the Muda  
Irrigation Scheme  
Malaysia Part I, Vol. II June, 1977  
Muda agricultural development authority
- 
- Tenancy among Cultivators in Malaysia  
A study of tenancy conditions and laws affecting land-tenancy  
relations
- 
- Paddy Statistics 1976 Peninsular Malaysia  
Ministry of Agriculture, 1978
- 
- Area Planted with Different Types of Padi  
State Ministry of Agriculture  
1976/77
-

- Padi Production Survey - Yield  
Padi Yield Rates and Percentage Standard Error  
Min. of Agriculture
- 
- Ministry of Agriculture Statistical Digest 1975
- 
- Ministry of Agriculture Area of Miscellaneous Crops 1976
- 
- Main Season Crops, Peninsular Malaysia  
State yield rates of Padi  
Yield measured on day of harvest,  
average yield per acre based on  
planted average
- 
- Padi Yield in Machang, Kelantan  
(Draft paper by E.P.O. - State staff)
- 
- Perangkaan Asas Pertanian Negeri Kelantan  
(Padi Yield Statistics 1977)
- 
- An Economic Analysis of Padi Production in Kelantan  
Kota Bharu 1/1973  
Dept. of Agriculture, Kelantan
- 
- Number of Man/days Utilized in Padi Cultivation (Paddy)  
Table 38, Page 85  
(Socio-economic study of padi farmers 1968, The Kemubu area of  
Kelantan)  
Min. of Agriculture
- 
- Padi Yield from 1972 - 1978 in Main Season and Off-season  
Dept. of Statistics
- 
- Economic Survey of Kemubu Irrigation Scheme, Kelantan  
Summary and Recommendation Oct. 1969
- 
- Cost and Returns to Padi (Paddy) Production in Kelantan 1978
- 
- An Agro-economic Survey on Padi (Paddy) Farmers in Meranti,  
Kubong, Batang, Lundang, Paku, Kelantan
- 
- Sociological Aspects and Implementation of Padi (Paddy) Irrigation  
in Malaysia
- 
- A Handbook of Agricultural Tables and Statistics for Extension  
Workers 1972
- 
- Water Resources for Irrigation of Upland Crops in South Kelantan  
1977



### 3.9. Environment

Title	Publisher
Mammals of Malaysia	
National Parks of Malaysia	
Man's Impact on the Primates of Peninsular Malaysia	Games Dept.
Our Health Services in the Seventies	Medical Record Dept.
Bilahan Pusat - Pusat Kesihatan (Medical facilities)	
Laporan Tahunan 1977 (Annual Report)	Health Dept. of Kelantan
Trengganu River Basin Study Vol. 8	N.E.B.
Scientific and Administrative Basic for Management Measures in Aquatic Pollution Control in Malaysia	Environmental Dept.
Soil Conservation Guidelines	"
Proposed Procedure and Methodology for Environmental Impact Assessment in Malaysia	"
1970 Population & Housing Census	Statistics
Annual Report 1973 - 1974 (Health)	Medical Record Dept.
Monthly Statistical Bulletin MAC 1979	Statistics
Statistical Handbook of Peninsular Malaysia 1979	"
Census of Loggers 1972	"
Report of the Labour Force Survey 1975	"
The Population of Malaysia	"
An Interim Report on the Post Enumeration Survey	"
Social Statistic Bulletin 1976	"
Protection of Wild Life Act 1972	Printing Dept.
Environmental Quality Act 1974	"

Environmental Quality Act 1974 (Crude palm-oil regulations 1977)	Printing Dept.
Environmental Quality Act 1974 (Raw natural rubber regulations 1978)	"
Some Socio-Economic and Medical Aspects of Malay Mortality in Urban and Rural Areas	"
A list of Fresh Water Fishes of Selangor	University of Agriculture
The Livestock Industry in Malaysia	"



(6)

(7)

(8)

(9)



JICA