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REGIONAL WATER RESOURCES STUDY OF SOUTH JOHOR

VOL. 8
ANNEX

M. LAND USE IN THE PROPOSED RESERVOIR AREA
N. ENVIRONMENTAL IMPACT OF PROPOSED PLAN
O. LEGAL AND INSTITUTIONAL ARRANGEMENT

DECEMBER 1985

JAPAN INTERNATIONAL COOPERATION AGENCY

NATIONAL WATER RESOURCES STUDY, MALAYSIA

REGIONAL WATER RESOURCES STUDY OF SOUTH JOHOR

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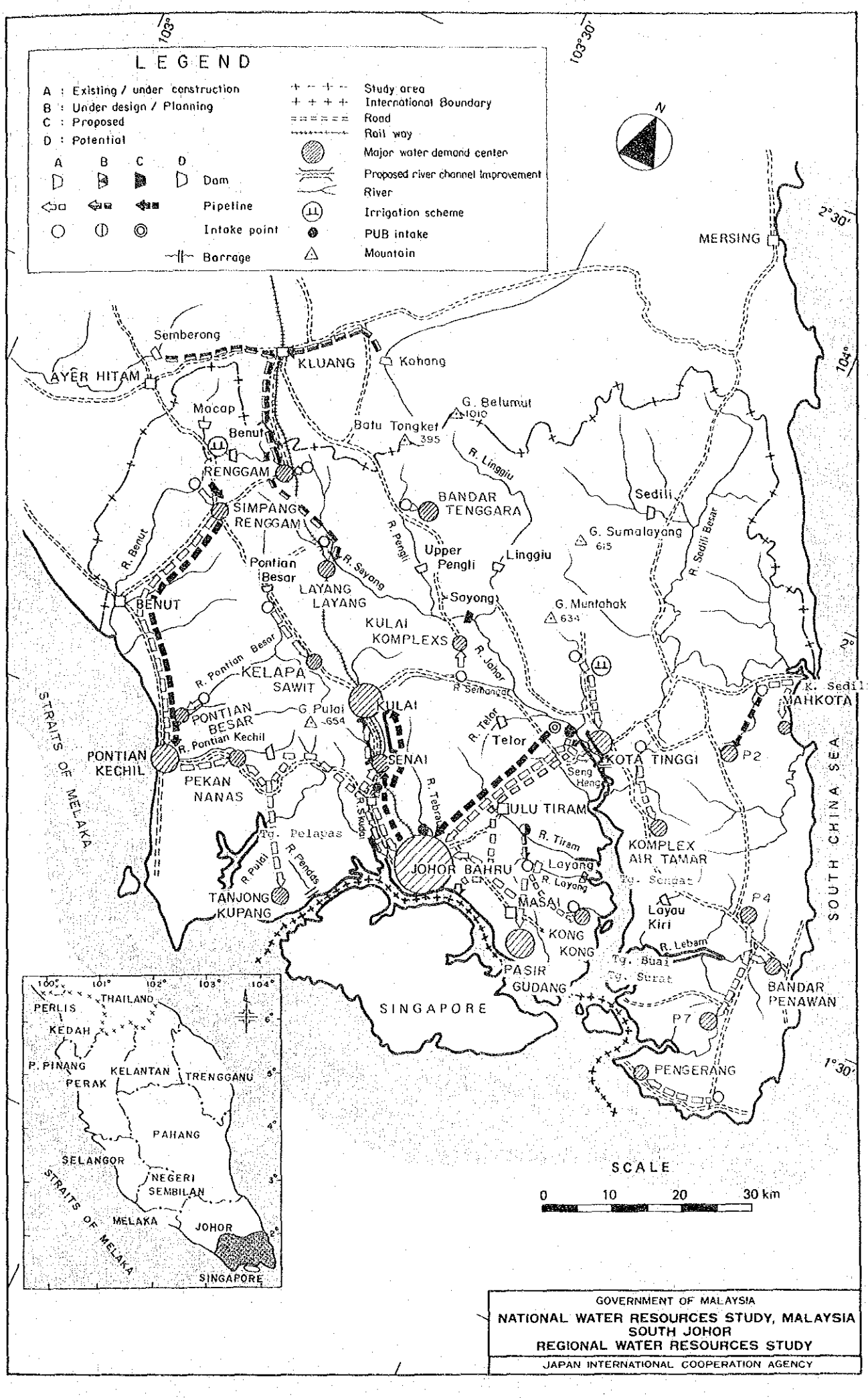
LEGEND
A : Existing / under construction
B : Under design / Planning
C : Proposed
D : Potential
A B C D
Dam
Pipeline
Intake point
Barrage
Study area
International Boundary
Road
Rail way
Major water demand center
Proposed river channel improvement
River
Irrigation scheme
PUB intake
Mountain
N
103°
103°30'
2°30'
104°
2°
1°30'
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REGIONAL WATER RESOURCES STUDY
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ABBREVIATIONS

(1) Oreganization/Plan

4MP (5MP)	:	Fourth (Fifth) Malaysia Plan
DID (JPT)	:	Drainage and Irrigation Department
DOA	:	Department of Agriculture
DOE	:	Department of Environment
EPU	:	Economic Planning Unit
FELCRA	:	Federal Land Consolidation and Rehabilitation Authority
FELDA	:	Federal Land Development Authority
GSD	:	Geological Survey Department
JICA	:	Japan International Cooperation Agency
KEJORA	:	Lembaga Kemajuan Johor Tenggara
MOA	:	Ministry of Agriculture
MOH	:	Ministry of Health
MTR	:	Mid-Term Review of 4MP
NEB	:	National Electricity Board
NWRS	:	National Water Resources Study
PUB	:	Public Utility Board (Singapore)
PWD (JKR)	:	Public Works Department
RESP	:	Rural Environmental Sanitation Program
RISDA	:	Rubber Industry Smallholders Development Authority
WHO	:	World Health Organization

(2) Others

B	:	Benefit
BOD	:	Biochemical Oxygen Demand
C	:	Cost
COD	:	Chemical Oxygen Demand
D & I	:	Domestic and Industrial
dia.	:	Diameter
DRC	:	Dry Rubber Content
EIRR	:	Economic Internal Rate of Return
EL.	:	Elevation Above Mean Sea Level
Eq.	:	Equation
FFB	:	Fresh Fruit Bunch
Fig.	:	Figure
GDP	:	Gross Domestic Project
GNP	:	Gross National Product
GRP	:	Gross Regional Project
HWL	:	Normal High Water Level
O & M	:	Operation and Maintenance
Q	:	Discharge
Ref.	:	Reference
SS	:	Suspended Solid
VA	:	Value Added

ABBREVIATIONS OF MEASUREMENT

Length

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

Area

cm^2 = square centimeter
m^2 = square meter
ha = hectare
km^2 = square kilometer

Volume

cm^3 = cubic centimeter
l = lit = liter
kl = kiloliter
m^3 = cubic meter

Weight

mg = milligram
g = gram
kg = kilogram
ton = metric ton

Time

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

Other Measures

% = percent
° = degree
' = minute
" = second
°C = degree in centigrade
10^3 = thousand
10^6 = million

Derived Measures

m^3/s = cubic meter per second
Mgd = million gallon per day
Mld = million litre per day

Money

M$ = Malaysian Ringgit
M¢ = Malaysian Cent

CONVERSION FACTORS

	From Metric System	To Metric System
Length	1 cm = 0.394 inch 1 m = 3.28 ft = 1.094 yd 1 km = 0.621 mile	1 inch = 2.54 cm 1 ft = 30.48 cm 1 yd = 91.44 cm 1 mile = 1.609 km
Area	1 cm^2 = 0.155 sq.in 1 m^2 = 10.76 sq.ft 1 ha = 2.471 acres 1 km^2 = 0.386 sq.mile	1 sq.ft = 0.0929 m^2 1 sq.yd = 0.835 m^2 1 acre = 0.4047 ha 1 sq.mile = 2.59 km^2
Volume	1 cm^3 = 0.0610 cu.in 1 lit = 0.220 gal.(imp.) 1 kl = 6.29 barrels 1 m^3 = 35.3 cu.ft 10^6 m^3 = 811 acre-ft	1 cu.ft = 28.32 lit 1 cu.yd = 0.765 m^3 1 gal.(imp.) = 4.55 lit 1 gal.(US) = 3.79 lit 1 acre-ft = 1,233.5 m^3
Weight	1 g = 0.0353 ounce 1 kg = 2.20 lb 1 ton = 0.984 long ton = 1.102 short ton	1 ounce = 28.35 g 1 lb = 0.4536 kg 1 long ton = 1.016 ton 1 short ton = 0.907 ton
Energy	1 kWh = 3,413 BTU	1 BTU = 0.293 Wh
Temperature	°C = (°F - 32)·5/9	°F = 1.8°C + 32
Derived Measures	1 m^3/s = 35.3 cusec 1 kg/cm^2 = 14.2 psi 1 ton/ha = 891 lb/acre 10^6 m^3 = 810.7 acre-ft 1 m^3/s = 19.0 mgd	1 cusec = 0.0283 m^3/s 1 psi = 0.703 kg/cm^2 1 lb/acre = 1.12 kg/ha 1 acre-ft = 1,233.5 m^3 1 mgd = 0.0526 m^3/s
Local Measures	1 lit = 0.220 gantang 1 kg = 1.65 kati 1 ton = 16.5 pikul	1 gantang = 4.55 lit 1 kati = 0.606 kg 1 pikul = 60.6 kg

Exchange Rate

(1985)

US$1 = M$2.41

¥100 = M$0.980

ANNEX M
LAND USE IN THE PROPOSED RESERVOIR AREA

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1. INTRODUCTION

This report was prepared to support the main report as the ANNEX REPORT describing the present and potential land uses in the proposed reservoir areas and the estimated costs of compensation for the proposed reservoirs. The general condition of land use in the Region are presented in ANNEX A Socio-Economy and ANNEX D Agriculture & Irrigation.

The data used in this study was obtained through collection in the offices concerned, the interview-surveys and the field reconnaissance carried out during the period from August, 1984 to August, 1985.

The land use study was intended to identify the location and type of land use, the houses/buildings, factories and the location and type of public facilities in the proposed reservoir areas, including the evaluation and estimation of the influence of the proposed reservoirs to these items.

The information of land use in each reservoir area was obtained by the land use maps for 1981, prepared by MOA. MOA prepared the map basing on the data collected by the Land Sat in 1981. These were supplemented by the land use map for 1974 issued by MOA, the field surveys and the maps prepared by KEJORA, FELDA, the Forest Department, the Mining Department, the Towns and Countries Department and the district offices.

The location of houses/buildings was identified by the field reconnaissance and from maps prepared by the Malaria Department and the Towns and Countries Department. Topographic maps in scales of 1:10,000 prepared by JICA and 1:63,360 issued by the National Mapping were also used.

The location map of the public facilities was provided by the State PWD for roads and pumping stations, by NEB for the power transmission line, and by PETRONAS Gas Co. for the proposed gas pipeline.

The effects to be brought about to the land use condition by the proposed reservoirs were estimated by means of laying out the proposed

reservoir areas and each item on the topographic maps of 1:63,360 or 1:10,000 scale.

Compensation costs consist of the costs for land acquisition for right of way and the relocation of public facilities. The land acquisition costs include the cost to purchase the land alienated from the Government to public or private sectors or individuals, the costs to compensate the activities and assets in the land leased to public or private sectors including buildings and factories. The public facilities to be relocated are main roads wider than two-lane paved roads, power transmission line and pumping station.

The compensation costs was estimated based on the market prices as of the beginning of 1984. The land prices were estimated on the basis of data and information provided by the Valuation Department of the State Government. The prices of houses were estimated based mainly on the surveyed costs in the field classfying houses by their scales.

The relocation cost was the cost to provide new facilities which are furnished with the equivalent functions as the facilities to be affected. The construction cost was estimated based mainly on the data and information provided by the agencies concerned.

The compensation cost were estimated in correspond to the varying reservoir water levels. The estimated results are summarized in the tables and the figures that show the compensation cost curves against the water levels, were also developed as shown in the tables and figures attached hereinafter.

2. PRESENT AND POTENTIAL LAND USE

Department of Agriculture prepared a land use map in a scale at 1 to 126,720. The map shows the land use of the Region in 1974, and is revised in 1981 by reflecting latest changes on land use. The information in the maps were confirmed by interviews and reconnaissance surveys conducted by the Study. Various governmental offices and corporations furnished the Study team with various maps, which demarcate forest reserve, plantations, towns, villages and other land use, were obtained and analyzed.

The Region covers the area of 7,700 km^2 in the southermost part of peninsular Malaysia. A land use map of the Region is shown in Fig. 1. Agricultural land of 395,702 ha occupying 54% of the Region comprised 155,223 ha of rubber 167,967 ha of oil palm, 15,053 ha of coconuts, 14,148 ha of pineapple, 9,155 ha of sugarcane and 34,156 ha of other crop areas. Forest of 228,275 ha (31%) mostly cover mountaineous area in the northeast of the Region. Swamps of 71,791 ha (10%) develop coastal plains. Non-agricultural lands such as urban estate buildings, mining area and others are 39,232 ha (5%). Compared with the land use in 1974, agricultural land increased by 56,000 ha and non-agricultural land expanded by 30,000 ha. On the other hand, forest reduced by 58,000 ha and swamps decreased by 28,000 ha. In agricultural land, rubber decreased by 27,000 ha. Expansion of agricultural land is largely attributable to the development of oil palm.

2.1 The Benut Reservoir Area

2.1.1 Present land use

The land use pattern in the proposed reservoir area is mainly divided into two patterns; (1) rubber plantation in the northern part and (2) Oil palm plantation in the southern part. These plantations are developed and managed by the private enterprises.

There are a few villages around the proposed reservoir area and they are; Wessing Estate Div. II (population: 288, houses: 100 nos.), Ldg. CEP III (Consolidated Plantation) Div. III (population 548, houses: 115 nos.) and BKT-Benut Estate Div. II (population 470, houses: 102). These villages won't be affected by the reservoir development schemes.

Present land use in the proposed reservoir area is shown in Plate 1.

Total area to be submarged and required for dam and related facilities are 43 ha, 162 ha and 662 ha if the reservoir water level is set at EL. 15.2 m, EL. 22.9 m and EL. 30.5 m respectively as shown in Table 1.

2.1.2 Potential land use

No particular future development plan exists in the proposed reservoir area.

2.2 The Pontian Besar Reservoir Area

2.2.1 Present land use

The present land use in the proposed reservoir is rather complicated as shown in Plate 2. The land use pattern is classified into eight categories such as oil palm, rubber, pepper, crops and vegitable, forest, grass land, residential land and brick factory area.

A national road of 7.3 m in width runs through the southern part of the proposed reservoir area linking Kulai with Simpang Renggam. Along the national road, 5 bric factries with total area of 123 ha exist near the T junction with the road to Layang Layang. Meanwhile there exists oil palm plantation of 741 ha which has been developed by FELDA Layang Layang in the nothern part of the proposed reservoir area near.

Four villages surround the proposed reservoir area and they are; Kg. Mulayu Bukit Batu (population: 843, houses: 190), Kg. Pisang

(population: 243, houses 53 nos.), Kulai Besar Bhg. Utara (population: 222, houses 60 nos.) and Kawasan Jalan Johor.

Estimated total areas to be acquired are 209 ha, 718 ha and 1,944 ha when a reservoir water level is set at EL. 15.2 m, EL. 22.9 m and EL. 30.5 m respectively as shown in Table 2.

FELDA plantation named Layang Layang will be exempted from submergence upto the water level at EL. 22.9 m. However, in case the water level is set at EL. 30.5 m, FELDA plantation area of 114 ha will be submerged.

Lot of brick factories above-mentioned will be submarged by the construction of a reservoir on a scale of 43 ha and 80 ha if the water level is set at EL. 22.9 m and EL. 30.5 m, respectively.

The above-mentioned four villages are affected by reservoir development scheme. The estimated number of houses to be submerged are 4, 87 and 90 or more if the water level is set at EL. 15.2 m, EL. 22.9 m and EL. 30.5 m respectively.

2.2.2 Potential land use

According to the interview survey at FELDA and Town and Country Department, District office and agencies concerned, no future scheme has planned yet in and around the proposed reservoir area.

2.3 The Linggiu Reservoir Area

2.3.1 Present land use

The land in the proposed reservoir area is occupied by the forest and mining land having no residential area as shown in Plate 3. The land of forest is the State owened and no-alienated land. A part of the forest area is designated to the forest reserve area by the State Government.

A part of forest area with area of 4,828 ha has been leased out for logging to Sindora Co., a subsidiary company of KEJORA since 1975. The right of lease for logging in and around the proposed reservoir area will be expired in 1990. Reportedly the company plans logging from 1988 to 1989 in the area corresponding to the development of Sg. Jengeli Kanan by KEJORA. (Refer to 2.3.2)

The four leased area for tin mining exist around the proposed reservoir area such as MC-1021, MC-1102, MC-900 and MC-899. The leased area for mining of MC-1021 is 79 ha and its contracted lease period is 10 years starting from September 1975. Estimated amount of tin deposit is around 80 t at a annual product rate of 7 t.

The leased area for MC-1102 is 15 ha for the period of 5 years starting June 1980. Estimated amount of deposit is 79 t at an annual product rate of 20 t.

The Mines Department of the South Johor State expects no renewal of the lease contract for mining area MC-1021 and MC-1102 which will expire in 1985.

Mining area MC 899 and MC 900 the lease contract to which was renewed in 1981 and will expire in 1986, has been worked out already.

The area to be acquired at each water level are 1,277 ha, 2,281 ha and 4,971 ha if the water level is set at EL. 30.5 m, EL. 38.1 m and EL. 45.7 m respectively as shown in Table 3. The influence to the mining area is summarized in Table 4.

A part of the mining area of MC-1021 will be submerged if the water level is set at EL. 30.5 m while other mining areas such as MC-899, MC-900 and MC-1102 will be submerged if the reservoir water level is set at EL. 45.7 m or at a higher one.

2.3.2 Potential land use

As shown in Plate 4, there exist mining areas, such as G.S.B.L-422, G.S.B.L-332 and G.S.B.L-331 which are under application. Among them, mining area G.S.B.L-422 are located within the proposed reservoir area.

KEJORA has been developing plan for oil palm plantation in westside area of the proposed reservoir area named Sg. Jengeli Kanan and Sg. Jengeli Kiri, in 1988 to 1990. The planned oil palm plantation is to be managed by Johor Tenggara Oil Palm Co. (JTOP), a subsidiary company of KEJORA, however the plantation scheme will not be affected by the construction of dam and reservoir at the envisaged water level in the Master Plan.

2.4 The Upper Pengli Reservoir Area

2.4.1 Present land use

The proposed reservoir area mainly consist of forest and oil palm plantation managed by FELDA and KEJORA, as shown in Plate 5. Oil palm plantation developed by KEJORA are Ulu Cenas II of 1,853 ha and Ulu Sebol of 4,060 ha. Both oil plantations are developed and managed by the KEJORA LUTH which is a subsidiary company of KEJORA.

FELDA has developed oil palm plantations, namely Ulu Pengli of 2,884 ha and Bkt. Tongkat of 1,987 ha, in the northwest of the reservoir area. FELDA village of Ulu Pengli with a population of 2,989 and 558 houses is located near the upper limit of the reservoir.

Along the right bank of the Pengli river, Bandar Tenggara town has been developed, the population of which is 3,700 as of 1984, but expected to be 26,800 in 1995. The town will not be affected by the construction.

A pump station exists on the dam axis which is supplying water for town and villages such as Bandar Tenggara, Ulu Pengli, Inas and Pengli Timor Sg. Sebol. The pump station will be relocated when the dam and reservoir scheme is realized.

In the northern part of the proposed reservoir area, a highway, which was constructed as a part of Johor Tenggara Project, runs from Kluang to Kota Tinggi.

The area to be acquired are 277 ha, 1,662 ha and 3,571 ha if the reservoir water level is set at EL. 30.5 m, EL. 38.1 m and EL. 45.7 m. Land use at each water level is tabulated in Table 5 and the influence to each FELDA and KEJORA land is summarized in Tables 6 and 7, respectively.

The construction of dam and reservoir will affect the residential area developed by FELDA or KEJORA. If the water level is set at EL. 45.7 m, a part of 485 ha of Ulu Pengli will be submerged. At the same water level, part of KEJORA Ulu Cenas II and Ulu Sebol will be submerged also.

2.4.2 Potential land use

There are two oil palm plantation schemes, namely, Ulu Cenas I of 1,479 ha and Pengli Kechil of 1,408 ha, from the middle to east of the reservoir area.

Those plantations are planned to be started by JTOP in 1985 and 1986.

The land for Ulu Cenas I has been alienated and the land for Pengli Kechil leased for 99 years, both to KEJORA from the State.

The influence to both lands is included in Table 7. The land use plan in the area is shown in Plate 6.

2.5 The Proposed Sayong Reservoir Area

2.5.1 Present land use

There are 16 towns and villages along the Sayong River including Layang Layang (population: 3,906; houses: 632), and FELDA villages such as Permai (population: 1,847; houses: 265), Inas (houses: 255), Sg. Sayong (population: 3,118; houses: 450), and Pengli Timor/Sg. Sebol (houses: 880).

A highway which connects Bandar Tanggara to the existing highway by way of Sg. Sayong runs across the Sayong River at 3.5 km above the dam site. The other highway of Kota Tinggi runs in the northern part of the river, diverting from the above-mentioned highway. The other main roads in the area are the road connecting Layang Layang and the existing national road from Simpang Renggam to Kulai and the road to Kulai by way of Murni Jaya.

The railway from Johor Bahru to the north approaches the Saong River and passes Layang Layang.

The transmission line of 132 KV crosses the Sayong River 0.2 km downstream from the confluence with the Inas river. The transmission line supplies electricity to Bandar Tenggara area fromt the Kulai Substation.

Three palm oil mills are located in and around the reservoir area. They are Eng. Hwe Kilang Kelapa with the capacity of 10 ton/h, FELDA Pengli of 54 ton/h and KEJORA Ule Sebol of 40 ton/h.

Table 8 summarizes the present land use corresponding to the reservoir level of EL. 17.5 m, 20.0 , 22.5 m and 30.5 m.

The influence to the towns and villages are as follows:

When the reservoir water level is EL. 17.5 m, 22 houses at Kg. Sayong (population: 88; houses: 21), which is located in the aborigine reserve of 117 ha, and Kg. Muda Jaya (house: 1) will be totally

submerged or removed, because the dam axis is passing through Kg. Sg. Sayong.

When the water level is set at EL. 20.0 m, Kg. Siam (population: 310; houses: 68) will be affected in addition to the above-mentioned villages and the number of houses to be removed totals to 33.

When the water level is EL. 22.5 m, 339 houses will be required to be removed in total at Layang Layang, Kg. Paya (population: 270; houses: 49), Kg. Jaya Sepapakat (population: 370; houses: 67), Kg. Murni Jaya (population: 1,402; houses: 260), Pengli Timor/Sg. Sebol FELDA and the above-mentioned villages. In Layang Layang, 276 houses will be affected, which are almost newly constructed and located along the boundary of Johor Bahru District.

When the water level is set at EL. 30.5 m, more than 2,301 houses in 16 towns and villages will be affected. Moreover, in Bandar Tenggara, a portion of the area reserved for new house construction will be affected.

2.5.2 Potential land use

Land development plans in and around the proposed Sayong reservoir area are: 1) housing development plan in Layang Layang, 2) Pengli Kechil development plan along Pengli river, 3) oil palm plantation plan in Ulu Cenas I, and Expansion plan of Bandar Tenggara. And also, construction of a gas pipeline is expected to commence from 1986.

2.6 The Telor Reservoir Area

2.6.1 Present land use

The reservoir area is covered with forest and oil palm; there are no villages and roads as shown in Plate 9.

The forest occupies almost all the reservoir area and belongs to the State. The area of forest had been alienated to a private firm and planted with sugarcane. The State, however, recovered the area after the firm went bancrupt. At prsent, the Johor Education Foundation has the right to use the area of 8,369 ha, including the reservoir area.

The oil palm plantation is located in the southern part of the reservoir area and belongs to the Ulu Tebrau FELDA with the total extent of 2,748 ha.

Table 9 summarizes the present land use. The total land to be acquired is 112 ha for EL. 15.2 m, 392 ha for EL. 22.9 m and 1,242 ha for EL. 30.5 m. The oil palm plantation is not affected when the water level is below EL. 22.9 m.

2.6.2 Potential land use

The Johor Education Foundation is planning to plant oil palm in the whole area of 2,748 ha from 1986. Compensation will not be required if the state gives an equal extent of land to be submerged, according to the Foundation.

2.7 The Sedili Reservoir Area

2.7.1 Present land use

The proposed Sedili reservoir area is almost of all covered with forest as shown in Plate 10.

The forest in the area is designated as forest reserve area in which an afforestation plan has been implemented by the finance of ADB. The afforestation of 88 ha will be affected if the water level is set at EL. 15.2 m.

In the proposed reservoir area, mining lease area of MC1126 and MC1100 are located. Mining lease contract will expire in 1990 at latest.

Present land use is tabulated in Tables 10 and 11.

2.7.2 Potential land use

The Forest Department of the State has planned to go on Compensatory plantation project, afforestation program, by 1987. At the moment, the Department contemplates to exclude the area of proposed reservoir area from their program.

Some mining lease application are made in the proposed resrvoir area. This will be clarified in the Draft Final Report. Potential land use is shown in Plate 11.

2.8 The Layau Kiri Reservoir Area

2.8.1 Present land use

The proposed Layau Kiri reservoir is almost of all covered with oil palm plantation and partly with rubber plantation and forest as shown in Plate 12.

Oil palm plantation has been developed by FELDA. The plantation consists of Air Tawar IV (2,132 ha), Air Tawar V (3,232 ha) and Semanchu (2,774 ha). Rubber plantation in the area belongs to Ulu Papan of KEJORA.

Residential land in the area are Air Tawar IV (2,890 people, 490 houses) on the right bank of Layau Kiri river and Air Tawar V (3,280 people, 566 houses) on the left bank of the river.

Present land use corresponding to water level are shown in Tables 12 and 13.

2.8.2 Potential land use

No future development plan is established in the proposed reservoir area.

3. COMPENSATION COST

3.1 Compensation Cost on Land

Land acquisition costs were accounted for all categories of land use. Table 14 shows the unit prices applied to the eight (8) proposed reservoirs, which were estimated on the basis of information provided by the Evaluation Department.

Benut

Compensation for the rubber and the oil palm plantations are implicated in the land acquisition cost of Benut Dam construction. The present market price of lands are estimated at M$15,000/ha for rubber plantation and M$19,800/ha for oil palm plantation.

Pontian Besar

In Pontian Besar Reservoir, there are agricultural land, factory land, residential land and alienated forest land. The unit price of agricultural land are estimated at M$15,000/ha for rubber plantation and M$19,800/ha for oil palm plantation. The market value of lands used for other agricultural purposes are assumed unique to be M$15,000/ha. Residential land is estimated at M$22,300/ha, factory land, M$50,000/ha and alienated forest land, M$8,600/ha.

Linggiu

No land is alienated in the proposed Linggiu Reservoir area. As for the logging area leased to SINDORA Co., compensation is not also required, because the trees can be logged within a short period. According to the firm, one year advance notice is sufficient to log the trees.

Upper Pengli

Land in the Upper Pengli Reservoir is covered with oil palm and forest. The forest land is classified into alienated and leased land. The market price of oil palm land is estimated at M$16,500/ha.

According to the estimation made by KEJORA, the compensation cost for leased forest land is M$4,900/ha. The alienated forest land in the proposed reservoir is assumed to cost M$7,400/ha and residential land, M$30,000/ha, based on the hearing surveys.

Sayong

The reservoir surface area are covered by rubber, and oil palm plantations, residential land, forest and others. The price of M$13,500/ha was assumed to estimate the compensation cost for rubber land, based on the average of the market prices which were between M$12,000/ha and M$15,000/ha in the reservoir area. Similarly, the unit compensation cost for oil palm land is estimated at M$16,500/ha, in view of the market prices that vary from M$14,000/ha to M$21,000/ha.

Other agricultural land, grassland and alienated forest land are assumed to be M$13,500/ha, M$10,800/ha and M$7,400/ha, respectively. The residential land is classified into three categories, namely; Layang Layang, FELDA community and other villages, the compensation costs of which are M$80,000/ha, M$30,000/ha and M$18,000/ha, respectively.

Telor

There is oil palm land which should be compensated, because most portions of the reservoir area belong to the State. The compensation cost is assumed to be M$16,500/ha for the oil palm land.

Sedili

Land compensation is not required for the Sedili Reservoir since the area is substantially covered by natural forest and no alienated land exist within the proposed reservoir area. Compensatory Plantation

Project is being implemented directly by the State Forest Department. The proposed reservoir area will inundate a part of envisaged area to plant Acacia Mangium by the Project.

Layau Kiri

Compensation is required for rubber, oil palm, forest and residential land in the Layau Kiri Reservoir area. The cost of M$12,500/ha applies to the compensation for rubber as the average market prices of M$10,000/ha to M$16,000/ha.

Other compensation prices are estimated at M$16,000/ha for oil palm land, M$18,000/ha for residential land and M$7,000/ha for alienated forest land.

3.2 Compensation Cost for Removal

Compensation cost for removal is considered for the residential houses and other buildings in Pontian Besar, Upper Pengli, Sayong and Layau Kiri reservoirs.

For cost estimation, the houses and buildings to be affected were classified into three ranks according to their unit prices determined mainly from field reconnaissance, namely; (1) houses of less than M$5,000 in cost, (2) those between M$5,000 and M$10,000, and (3) those of more than M$10,000. Tables 15 to 19 show the number of houses and buildings in the aforesaid proposed reservoirs.

In this addition, if Pontian Besar Dam is constructed, five (5) brick factories will be affected by the reservoir water. The compensation cost for the brick factories was estimated as the product of the total present value of the factories and the ratio of the submerged area to the total area of the factories.

The present value of the factories, which consist of offices, kilns, sheds, quarters and so on, is estimted at M$4.1 million, as shown

in Table 20, based on the information provided by the Town Council of Kulai.

3.3 Compensation Cost on Mine

Several tin mines are located in the proposed reservoirs. However, compensation on mine is not required since the ore will be exhausted by present exploitation in the near future on the basis of the estimated tin ore depost, according to the Mining Department.

3.4 Cost for Road Relocation

Road relocation is required in Pontian Besar, Upper Pengli, Sayong and Layau Kiri reservoirs where paved two-lane main roads will be submerged.

The construction cost is estimated at M$900/m for a new road of the same dimension, based on the cross section provided by PWD and M$5,000/m for new bridges.

Table 21 shows the length of road and bridge(s) to be constructed and the construction cost corresponding to the reservoir water levels for each reservoir.

3.5 Relocation Cost for Power Transmission Line

Construction of Sayong Reservoir incurs the relocation of the existing power transmission line of 132 KV to supply electricity to Bandar Tenggara Area.

The new transmission line is planned to cross the narrowest part of the reservoir without constructing any tower in the proposed reservoir area. The decided length of the line is 2.0 km for the reservoir water level of EL. 15.2 m, 3.0 km for EL. 22.9 m and 8.0 km for EL. 30.5 m.

According to NEB, the prevailing construction cost of the planned power transmission line is M$250,000/km, including towers, foundations, stringing and land acquisition for the right-of-way.

3.6 Relocation Cost for Gas Pipeline

The relocation of the proposed gas pipeline in Sayong Reservoir is not considered since significant change is not entailed by the provision of the reservoir because the pipeline is designed to cross the proposed reservoir area which is swampy and submerged frequently. The pipeline is designed to be buried with a minimum cover of three feet, according to PETRONAS Gas Co.

3.7 Compensation Cost for Varying Reservoir Water Level

Tables 22 to 27 and Fig. 1 show the estimated compensation cost corresponding to the varying reservoir levels for the six reservoirs Besar, Upper Pengli, Sayong, Telor and Layau Kiri. The proposed Linggiu and Sedili reservoirs are not implicated in the tables and the figures because these two reservoirs incur no compensation..

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TABLES

Table 1 PRESENT LAND USE IN BENUT RESERVOIR AREA

	Land Use	Unit	Reservoir Water Level (EL. m) 15.2	22.9	30.5
1.	Rubber				
	1.1 FELDA	ha	-	-	-
	1.2 Others	ha	43	151	310
	Sub-total	ha	43	151	310
2.	Oil Palm				
	2.1 FELDA	ha	-	-	-
	2.2 Others	ha	-	11	352
	Sub-total	ha	-	11	352
3.	Cocoa	ha	-	-	-
4.	Sugarcane	ha	-	-	-
5.	Pepper	ha	-	-	-
6.	Crops and Vegetables	ha	-	-	-
7.	Grassland	ha	-	-	-
8.	Residential Land	ha	-	-	-
9.	Forest Land				
	9.1 Unalienated	ha	-	-	-
	9.2 Alienated	ha	-	-	-
	Sub-total	ha	-	-	-
10.	Mine	ha	-	-	-
	Total Land Area	ha	43	162	662
11.	Houses/Buildings	nos	-	-	-
12.	Road	km	-	-	-
13.	Transmission Line	km	-	-	-
14.	Railway	km	-	-	-
15.	Gas Pipe Line	km	-	-	-
16.	Pumping Station	nos	-	-	-

Table 2 PRESENT LAND USE IN PONTIAN BESAR RESERVOIR AREA

	Land Use	Unit	Reservoir Water Level (EL. m) 15.2	22.9	30.5
1.	Rubber	ha	-	-	-
	1.1 FELDA	ha	20	337	925
	1.2 Others				
	Sub-total	ha	20	337	925
2.	Oil Palm	ha	-	-	114
	2.1 FELDA	ha	62	179	302
	2.2 Others				
	Sub-total	ha	62	179	416
3.	Cocoa	ha	-	-	-
4.	Sugarcane	ha	-	-	-
5.	Pepper	ha	24	31	69
6.	Crops and Vegetables	ha	24	32	70
7.	Grassland	ha	-	-	-
8.	Residential Land				
	8.1 Kawasan Jalan Johor	ha	-	-	***
	8.2 Ldg. Kulai Besar Bkg. Utara	ha	-	6	6
	8.3 Kg. Pisang	ha	-	1	1
	8.4 Kg. Melayu Bukit Batu	ha	-	2	2
	Sub-total	ha	-	9	9
8.	Factory Area	ha	-	43	80
9.	Forest				
	9.1 Unalienated	ha	-	-	-
	9.2 Alienated	ha	79	87	375
	Sub-total	ha	79	87	375
	(Forest Reserve)	(ha)	(-)	(-)	(375)
10.	Mine	-	-	-	-
	Total Land Area ha	ha	209	718	1,944
11.	Houses/Buildings				
	11.1 Kawasan Jalan Johor	nos	-	-	***
	11.2 Ldg. Kulai Besar Bkg. Utara	nos	-	60	60
	11.3 Kg. Pisang	nos	3	5	8
	11.4 Kg. Melayu Bukit Batu	nos	1	22	22
	Sub-total	nos	4	87	90
12.	Road	km	7.0	7.3	8.9
13.	Transmission Line	km	-	-	-
14.	Railway	km	-	-	-
15.	Gas Pipe Line	km	-	-	-
16.	Pumping Station	nos	-	-	-

Remarks: *** : Numbers are not available.
Number of houses/buildings to be removed was estimated on the maps prepared by the Malaria Department.

Table 3 PRESENT LAND USE IN LINGGIU RESERVOIR AREA

Land Use	Unit	Reservoir Water Level (EL. m) 30.5	38.1	45.7
1. Rubber				
1.1 FELDA	ha	-	-	-
1.2 Others	ha	-	-	-
Sub-total	ha	-	-	-
2. Oil Plm				
2.1 FELDA	ha	-	-	-
2.2 Others	ha	-	-	-
3. Cocoa	ha	-	-	-
4. Sugarcane	ha	-	-	-
5. Pepper	ha	-	-	-
6. Crops and Vegetables	ha	-	-	-
7. Grassland	ha	-	-	-
8. Residential Land	ha	-	-	-
9. Forest Land				
9.1 Unalienated	ha	1,238	2,193	4,859
9.2 Alienated	ha	-	-	-
Sub-total	ha	1,238	2,193	4,859
(Forest Reserve)	(ha)	(126)	(329)	(2,149)
10. Mine	ha	39	88	112
Total Land Area	ha	1,277	2,281	4,971
11. Houses/Buildings	nos	-	-	-
12. Road	km	-	-	-
13. Transmission Line	km	-	-	-
14. Railway	km	-	-	-
15. Gas Pipe Line	km	-	-	-
16. Pumping Station	nos	-	-	-

Table 4 MINING LEASE IN LINGGIU RESERVOIR AREA

Unit: ha

	Name	Reservoir Water Level (EL. m) 30.5	38.1	45.7
1.	MC1021	39	84	88
2.	MC1102	-	4	8
3.	MC900	-	-	8
4.	MC899	-	-	8
	Total	39	88	112

Table 5 PRESENT LAND USE IN UPPER PENGLI RESERVOIR AREA

	Land Use	Unit	Reservoir Water Level (EL. m) 30.5	38.1	45.7
1.	Rubber				
	1.1 FELDA	ha	-	-	-
	1.2 KEJORA	ha	-	-	-
	1.3 Others	ha	-	-	-
	Sub-total	ha	-	-	-
2.	Oil Palm				
	2.1 FELDA	ha	-	24	754
	2.2 KEJORA	ha	-	-	352
	2.3 Others	ha	122	279	344
	Sub-total	ha	122	303	1,450
3.	Cocoa	ha	-	-	-
4.	Sugarcane	ha	-	-	-
5.	Pepper	ha	-	-	-
6.	Crops and Vegetables	ha	-	-	-
7.	Grassland	ha	-	-	-
8.	Residential Land				
	8.1 Ulu Pengli (FELDA)	ha	-	-	20
	Sub-Total	ha	-	-	20
9.	Forest Land				
	9.1 Unalienated	ha	59	207	344
	9.2 Alienated	ha	96	1,152	1,757
	Sub-total	ha	155	1,359	2,101
10.	Mine	ha	-	-	-
	Total Land Area	ha	277	1,662	3,571
11.	Houses/Buildings				
	11.1 Ulu Pengli	nos	-	-	155
	Sub-total	nos	-	-	155
12.	Road	km	-	-	5.4
13.	Transmission Line	km	-	-	-
14.	Railway	km	-	-	-
15.	Gas Pipe Line	km	-	-	-
16.	Pumping Station	nos	1	1	1

Table 6 FELDA LAND IN UPPER PENGLI RESERVOIR AREA

Unit: ha

Name	Reservoir Water Level (EL. m) 30.5	38.1	45.7
1. Bkt Tongkat (1,987 ha)			
1.1 Oil Palm	-	-	269
Sub-Total	39 (2.0%)	88 (4.4%)	269 (13.5%)
2. Ulu Pengli (2,884 ha)			
2.1 Oil Palm	-	24	485
Sub-total	-	24 (0.8%)	485 (16.8%)
3. Total FELDA Land			
3.1 Oil Palm	-	24	754
Total	-	24	754

Table 7 KEJORA LAND IN UPPER PENGLI RESERVOIR AREA

Unit: ha

Name	Reservoir Water Level (EL. m) 30.5	38.1	45.7
1. Ulu Cenas I (1,479 ha)			
1.1 Forest	40	269	1,163
Sub-total	40 (2.7%)	269 (18.2%)	1,163 (78.6%)
2. Ulu Cenas II (1,853 ha)			
2.1 Oil Palm	-	-	188
Sub-total	-	-	188 (10.1%)
3. Ulu Sebol (4,060 ha)			
3.1 Oil Palm	-	-	164
Sub-total	-	-	164 (4.0%)
4. Pengli Kechil (1,408 ha)			
4.1 Forest (Leased)	59	207	344
Sub-total	59	207	344 (24.4%)
5. Total KEJORA Land			
5.1 Oil Palm	-	-	352
5.2 Forest	99	476	1,507
Total	99	476	1,859

Table 8 PRESENT LAND USE IN SAYONG RESERVOIR AREA

Land Use	Unit	Reservoir Water Level (EL. m) 15	17.5	20	22.9	30.5
1. Rubber						
1.1 FELDA	ha	-	-		-	617
1.3 Others	ha	5	77	195	537	3,400
Sub-total	ha	5	77	195	537	4,0177
2. Oil Palm						
2.1 FELDA	ha	850	1,078	1,177	1,658	3,632
2.2 KEJORA	ha	-	-	-	-	156
2.3 Others	ha	308	506	605	706	3,845
Sub-total	ha	1,158	1,584	1,782	2,364	7,633
3. Cocoa						
3.1 FELDA	ha	104	154	217	316	345
Sub-total	ha	104	154	217	316	345
4. Crops and Vegetables	ha	14	18	81	139	201
5. Grassland	ha	89	113	185	252	165
6. Residential Land						
8.1 Kg. Tengah	ha	-	-	-	-	*2
8.2 Kg. Bahru	ha	-	-	-	-	*2
8.3 Twitchin Estate	ha	-	-	-	-	18
8.4 Kg. Melayu	ha	-	-	-	-	6
8.5 Layang Layang	ha	-	-	-	6	85
8.6 Kg. Paya	ha	-	-	-	1	4
8.7 Kg. Jaya Sepapakat	ha	-	-	-	2	4
8.8 Kg. Siam	ha	-	-	-	4	5
8.9 Kg. Murni Jaya	ha	-	-	-	2	18
8.10 Permai FELDA	ha	-	-	-	-	48
8.11 Kg. Bahru MCA	ha	-	-	-	-	20
8.12 Inas FELDA	ha	-	-	-	-	34
8.13 Sg. Sayong FELDA	ha	-	-	-		18
8.14 Bandar Tenggara	ha	-	-	-	-	72
8.15 Pengli Timor FELDA	ha	-	-	-	-	58
8.16 Muda Jaya	ha	-	-	-	-	-
8.17 Kg. Sayong Pinang (State land)	ha	-	-	-	-	-
Sub-total	ha	-	-	-	15	394
9. Forest						
9.1 Unalienated	ha	355	380	790	903	1,070
9.2 Alienated	ha	435	587	890	1,233	5,120
Sub-total	ha	790	967	1,680	2,136	6,190
10. Mine	ha	-	-	-	-	-
Total Land Use	ha	2,160	2,913	4,140	5,759	18,945
11. Houses/Buildings						
11.1 Kg. Tengan	nos	-	-	-	-	*10
11.2 Kg. Bahru	nos	-	-	-	-	*10
11.3 Twitchin Estate /1	nos	-	-	-	-	184
11.4 Kg. Malayu /1	nos	-	-	-	-	59
11.5 Layang Layang /2	nos	-	-	-	276	1,427
11.6 Kg. Paya /1	nos	-	-	-	13	44
11.7 Jaya Sepapakat /1	nos	-	-	-	21	38
11.8 Kg. Siam /1	nos	-	-	11	39	46
11.9 Kg. Murni Jaya /1	nos	-	-	-	10	176
11.10 Permai FELDA /3	nos	-	-	-	-	103
11.11 Kg. Bahru MCA /3	nos	-	-	-	-	24
11.12 Inas FELDA /2	nos	-	-	-	-	18
11.13 Sg. Sayong FELDA /2	nos	-	-	-	-	19
11.14 Bandar Tenggara /4	nos	-	-	-	-	-
11.15 Pengli Timor/ Sg. Selol FELDA /4	nos	-	-	-	-	141
11.16 Muda Jaya /1	nos	-	1	1	1	1
11.17 Kg. Sayong Pinang /5	nos	-	21	21	21	21
Sub-total	nos	-	22	33	399	2,321
12. Road	km	4.5	4.7	4.9	5.0	19.7
13. Transmission Line	km	2.0	2.3	2.7	3.0	9
14. Railway	km	-	-	-	-	*1
15. Gas Pipe Line	km	-	-	-	-	-
16. Pumping Station	nos	-	-	-	-	1
17. Palm Oil Mill	nos	-	-	1	2	2

Remarks:
- * : Numbers are assumed.
- /1 : Estimated by the maps prepared by Malaria Department.
- /2 : Estimated by the maps prepared by Town and Country Planning Department.
- /3 : Estimated by the ratio of the area to be submarged to the total area.
- /4 : Estimated by the maps preapred by KEJORA.
- /5 : Estimated by the maps prepared by aborigines Department.

Table 9 PRESENT LAND USE IN TELOR RESERVOIR AREA

	Land Use	Unit	Reservoir Water Level (EL. m) 15.2	22.9	30.5
1.	Rubber				
	1.1 FELDA	ha	-	-	-
	1.2 Others	ha	-	-	-
	Sub-total	ha	-	-	-
2.	Oil Palm				
	2.1 FELDA	ha	-	-	60
	2.2 Others	ha	-	-	-
	Sub-total	ha	-	-	60
3.	Cocoa	ha	-	-	-
4.	Sugarcane	ha	-	-	-
5.	Pepper	ha	-	-	-
6.	Crops and Vegetables	ha	-	-	-
7.	Grassland	ha	-	-	-
8.	Residential Land	ha	-	-	-
9.	Forest Land				
	9.1 Unalienated	ha	112	392	1,182
	9.2 Alienated	ha	-	-	-
	Sub-total	ha	112	392	1,182
10.	Mine	ha	-	-	-
	Total Land Area	ha	112	392	1,242
11.	Houses/Buildings	nos	-	-	-
12.	Road	km	-	-	-
13.	Transmission Line	km	-	-	-
14.	Railway	km	-	-	-
15.	Gas Pipe Line	km	-	-	-
16.	Pumping Station	nos	-	-	-

Table 10 PRESENT LAND USE IN SEDILI RESERVOIR AREA

	Land Use	Unit	Reservoir Water Level (EL. m) 15.2	30.5	45.7
1.	Rubber				
	1.1 FELDA	ha	-	-	-
	1.2 KEJORA	ha	-	-	-
	1.3 Others	ha	-	-	-
	Sub-total	ha	-	-	-
2.	Oil Palm				
	2.1 FELDA	ha	-	-	-
	2.2 KEJORA	ha	-	-	-
	2.3 Others	ha	-	-	-
	Sub-total	ha	-	-	-
3.	Cocoa	ha	-	-	-
4.	Sugarcane	ha	-	-	-
5.	Crops and Vegetables	ha	-	-	-
7.	Grassland	ha	-	-	-
8.	Residential Land	ha	-	-	-
9.	Forest Land				
	9.1 Unalienated	ha	773	6,224	11,090
	(Forest Plantation)	(ha)	(88)	(248)	(440)
	9.2 Alienated	ha	-	-	-
	Sub-total	ha	773	6,224	11,090
	(Forest Reserve)	(ha)	(773)	(6,224)	(11,078)
10.	Mine	ha	-	32	96
	Total Land Area	ha	757	6,256	11,186
11.	Houses/Buildings	nos	-	-	-
12.	Road	km	-	-	-
13.	Transmission Line	km	-	-	-
14.	Railway	km	-	-	-
15.	Gas Pipe Line	km	-	-	-
16.	Pumping Station	nos	-	-	-

Table 11 MINING LEASE IN SEDILI RESERVOIR AREA

Unit: ha

	Name	Reservoir Water Level (EL. m) 15.2	30.5	45.7
1.	MC1126	-	32	60
2.	MC1100	-	-	36
	Total	-	32	96

Table 12 PRESENT LAND USE IN LAYAU KIRI RESERVOIR AREA

Land Use	Unit	Reservoir Water Level (EL. m) 15.2	22.9	30.5
1. Rubber				
1.1 FELDA	ha	-	-	-
1.2 KEJORA	ha	-	-	56
Sub-total	ha	-	-	56
2. Oil Palm				
2.1 FELDA	ha	320	586	1,195
2.2 Others	ha	-	-	-
Sub-total	ha	320	586	1,195
3. Cocoa	ha	-	-	-
4. Sugarcane	ha	-	-	-
5. Pepper	ha	-	-	-
6. Crops and Vegetables	ha	-	-	-
7. Grassland	ha	-	-	-
8. Residential Land	ha	-	-	-
8.1 Air Tawar IV FELDA	ha	-	-	48
8.2 Air Tawar V FELDA	ha	20	44	80
Sub-total	ha	20	44	128
9. Forest Land				
9.1 Unalienated	ha	-	-	-
9.2 Alienated	ha	-	-	32
Sub-total	ha	-	-	32
10. Mine	ha	-	-	-
Total Land Area	ha	340	640	1,411
11. Houses/Building				
11.1 Air Tawar IV FELDA	nos	-	-	63
11.2 Air Tawar V FELDA	nos	-	23	320
Sub-total	nos	-	23	383
12. Road	km	7.3	7.6	8.0
13. Transmission Line	km	-	-	-
14. Railway	km	-	-	-
15. Gas Pipe Line	km	-	-	-
16. Pumping Station	nos	-	-	-

Remarks: Number of houses/buildings to be removed was estimated by the maps prepared by the Town and Country Planning Department.

Table 13 FELDA LAND IN LAYAU KIRI RESERVOIR AREA

Unit: ha

Name	Reservoir Water Level (EL. m) 15.2	22.9	30.5
1. Air Tawar IV (2,132 ha)			
1.1 Oil Palm	28	80	352
Sub-total	28 (1.3%)	80 (3.8%)	352 (16.5%)
2. Air Tawar V (3,232 ha)			
2.1 Oil Palm	353	567	823
Sub-total	353 (10.9%)	567 (17.5%)	823 (25.5%)
3. Sg. Semanchu (2,774 ha)			
3.1 Oil Palm	-	-	20
Sub-total	-	-	20 (0.7%)
4. Total FELDA Land			
4.1 Oil Palm	381	647	1,195
Total	381	647	1,195

Table 14 UNIT PRICE OF LAND

Unit: M$/ha

Land Use	Benut	Pontian Besar	Linggiu	Upper Pengli	Sayong	Telor	Sedili	Layau Kiri
Rubber	15,000	15,000	-	-	13,500	-	-	12,500
Oil Palm	19,800	19,800	-	16,500	16,500	16,500	-	16,000
Cocoa	-	-	-	-	13,500	-	-	-
Pepper	-	15,000	-	-	13,500	-	-	-
Crops and Vegetables	-	15,000	-	-	13,500	-	-	-
Grass Land	-	-	-	-	10,800	-	-	-
Residential Land/Quarter	-	22,300	-	30,000	18,000 - 80,000	-	-	18,000
Factory Area	-	50,000	-	-	-	-	-	-
Alienated Forest	-	8,600	-	7,400	7,400	-	-	7,000
Leased Forest	-	-	-	4,900	4,900	-	-	-

Table 15 NUMBER OF HOUSES AND BUILDINGS IN PONTIAN BESAR RESERVOIR AREA

Unit: Nos.

Town/Village	EL. 15.2 m			EL. 22.9 m			EL. 30.5 m		
	-M$5,000	M$5,000-M$10,000	M$10,000-	-M$5,000	M$5,000-M$10,000	M$10,000-	-M$5,000	M$5,000-M$10,000	M$10,000-
1. Kawasan Jalan Johor	-	-	-	-	-	-	*	*	*
2. Ldg. Kulai Besar Bhg. Utara	-	-	-	60	0	0	60	0	0
3. Kg. Pisang	3	0	0	5	0	0	8	0	0
4. Kg. Melayu Bukit Batu	1	0	0	21	1	0	21	1	0

Remarks: *: The number of houses and buildings is not estimated.

Table 16 NUMBER OF HOUSES AND BUILDINGS IN UPPER PENGLI RESERVOIR AREA

Unit: Nos.

Town/Village	EL. 30.5 m			EL. 38.1 m			EL. 45.7 m		
	-M$5,000	M$5,000-M$10,000	M$10,000-	-M$5,000	M$5,000-M$10,000	M$10,000-	-M$5,000	M$5,000-M$10,000	M$10,000-
1. Ulu Pengli FELDA	-	-	-	-	-	-	0	155	0

Table 17 NUMBER OF HOUSES AND BUILDINGS IN SAYONG RESERVOIR AREA (1/2)

Unit: Nos.

Name of Town/Village	EL. 17.5 m			EL. 20.0 m			EL. 22.5 m			EL. 30.5 m		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
1. Kg. Tengah	-	-	-	-	-	-	-	-	-	*	*	*
2. Kg. Bahru	-	-	-	-	-	-	-	-	-	*	*	*
3. Twitchin Estate	-	-	-	-	-	-	-	-	-	184	0	0
4. Kg. Melayu	-	-	-	-	-	-	-	-	-	0	59	0
5. Layang Layang	-	-	-	-	-	-	0	19	257	0	665	762
6. Kg. Paya	-	-	-	-	-	-	0	13	0	0	44	0
7. Kg. Jaya Sepapakat	-	-	-	-	-	-	21	0	0	38	0	0
8. Kg. Siam	-	-	-	11	0	0	32	7	0	39	7	0
9. Permai FELDA	-	-	-	-	-	-	-	-	-	0	103	0
10. Kg. Murni Jaya	-	-	-	-	-	-	5	5	0	105	70	1
11. Kg. Bahru MCA	-	-	-	-	-	-	-	-	-	0	24	0
12. Inas FELDA	-	-	-	-	-	-	-	-	-	18	0	0
13. Sg. Sayong FELDA	-	-	-	-	-	-	-	-	-	4	15	0

Remarks: (a): -M$5,000
(b): M$5,000-M$10,000
(c): M$10,000-

* : The number of houses and buildings is not estimated.

Table 18 NUMBER OF HOUSES AND BUILDINGS IN SAYONG RESERVOIR AREA (2/2)

Unit: Nos.

Town/Villate	EL. 17.5 m			EL. 20.0 m			EL. 22.5 m			EL. 30.5 m		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
14. Badar Tenggara	-	-	-	-	-	-	0	0	0	0	0	0
15. Pengli Timor/Sg. Sebol FELDA	-	-	-	-	-	-	18	0	0	141	0	0
16. Muda Jaya	1	0	0	1	0	0	1	0	0	1	0	0
17. Kg. Sayong Pinang	20	1	0	20	1	0	20	1	0	20	1	0

Remarks: (a): ~M$5,000
(b): M$5,000-M$10,000
(c): M$10,000~

Table 19 NUMBER OF HOUSES AND BUILDINGS IN LAYAU KIRI RESERVOIR AREA

Unit: Nos.

Town/Village	EL. 15.2 m			EL. 22.9 m			EL. 30.5 m		
	-M$5,000	M$5,000-M$10,000	M$10,000-	-M$5,000	M$5,000-M$10,000	M$10,000-	-M$5,000	M$5,000-M$10,000	M$10,000-
1. Air Tawar IV FELDA	-	-	-	-	-	-	63	0	0
2. Air Tawar V FELDA	-	-	-	18	4	1	315	4	1

Table 20 PRESENT VALUE OF BRICK FACTORIES

Facilities	Unit Price (M$/ft^2)	Area (10^3ft^2)	Cost (M$10^6)
1. Office	25.0	9.08	0.2
2. Kiln	4.5	78.73	0.4
3. Shed	3.5	566.43	2.0
4. Quarter	15.0	31.41	0.5
5. Others	15.0	67.80	1.0
Total			4.1

Table 21 ESTIMATED QUANTITIES AND CONSTRUCTION COST FOR ROAD RELOCATION

Reservoir	Reservoir Water Level (EL.m)	Length of Road (km)	Length of Bridges (m)	Construction Cost (M$10^6)
Pontian Besar	15.2	7.3	-	6.6
	22.9	8.9	-	8.0
	30.5	9.5	-	8.6
Upper Pengli	30.5	-	-	-
	38.1	-	-	-
	45.7	5.4	950	9.7
Sayong	15.2	4.5	-	4.1
	22.9	5.0	700	8.8
	30.5	19.7	1400	24.7
Layau Kiri	15.2	7.3	-	6.6
	22.9	7.6	-	6.8
	30.5	8.0	-	7.2

Table 22 ESTIMATED COMPENSATION COST FOR BENUT RESERVOIR AREA

Unit: M$ 10^6

Land Use	Reservoir Water Level (EL. m) 15.2	22.9	30.5
A. Land			
1. Rubber (M$15,000/ha)			
1.1 Others	0.6	2.3	4.7
2. Oil Palm (M$19,800/ha)			
2.1 Others	-	0.2	7.0
Total	0.6	2.5	11.7
B. Removal	-	-	-
C. Relocation	-	-	-
Grand Total	0.6	2.5	11.7

Table 23 ESTIMATED COMPENSATION COST FOR THE PONTIAN BESAR RESERVOIR AREA

Unit: M$ 10^6

	Reservoir Water Level (EL.m)		
	15.2	22.9	30.5
A. Land			
1. Rubber (M$15,000/ha)			
1.1 Others	0.3	5.1	13.9
2. Oil Palm (M$19,800/ha)			
2.1 FELDA	-	-	2.3
2.2 Others	1.2	3.5	6.0
Sub-total	1.2	3.5	8.3
3. Pepper (M$15,000/ha)	0.4	0.5	1.0
4. Crops and Vegetables (M$15,000/ha)	0.4	0.5	1.1
5. Residential Land/Quater			
5.1 Kawasan Jalan Johor (M$22,300/ha)	-	-	***
5.2 Ldg. Kulai Besar Bhg. Utara (M$22,300/ha)	-	0.1	0.1
5.3 Kg. Pisang (M$22,300/ha)	-	0	0
5.4 Kg. Melayu Bukit Batu (M$22,300/ha)	-	0	0
Sub-total	-	0.1	0.1
6. Factory Area (M$50,000/ha)	-	2.2	4.0
7. Forest			
7.1 Alienated (M$8,600/ha)	0.7	0.7	3.2
Total	3.0	12.6	31.6
B. Removal			
1. Kawasan Jalan Johor	-	-	***
2. Ldg. Kulai Besar Bhg. Utara	-	0.2	0.2
3. Kg. Pisang	0	0	0
4. Kg. Melayu Bukit Batu	0	0.1	0.1
5. Brick Factories	-	1.4	2.6
Total	0	1.7	2.9
C. Relocation			
1. Road	6.6	8.0	8.6
Grand Total	9.6	22.3	43.1

Remarks : *** : Compensation cost is not estimated.

Table 24 ESTIMATED COMPENSATION COST FOR UPPER PENGLI RESERVOIR AREA

Unit: M$ 10^6

Land Use	Reservoir Water Level (El.m) 30.5	38.1	45.7
A. Land			
1. Oil Palm (M$16,500/ha)			
1.1 FELDA	-	0.4	12.4
1.2 KAJOLA	-	-	5.8
1.3 Others	2.0	4.5	5.7
Sub-total	2.0	5.0	23.9
2. Residential Land/Quarter			
2.1 Ulu Pengli FELDA (M$30,000/ha)	-	-	0.6
Sub-total	0	0	0.6
3. Forest			
3.1 Alienated (M$7,400/ha)	0.7	8.5	13.0
3.2 Leased (M$4,900/ha)*	0.3	1.0	1.7
Sub-total	1.0	9.5	13.7
Total	3.0	14.5	39.2
B. Removal			
1. Ulu Pengli FELDA	-	-	1.2
Total	0	0	1.2
C. Relocation			
1. Road	-	-	9.7
2. Pumping Station	0.1	0.1	0.1
Total	0.1	0.1	9.8
Grand Total	3.1	14.6	50.2

Remarks; *: Leased to KEJORA (Pengli Kechil)

Table 25 ESTIMATED COMPENSATION COST FOR SAYONG RESERVOIR AREA

		Reservoir Water Level (m)									
		15		17.5		20		22.5		30.5	
	Unit Price ($M\$10^6$/ha)	Area (ha)	Cost ($M\$10^6$)	Area (ha)	Cost ($M\$10^6$)	Area (ha)	Cost ($M\$10^6$)	Area (ha)	Cost ($M\$10^6$)	Area (ha)	Cost ($M\$10^6$)
A. Land											
1. Rubber											
1.1 FELDA	0.0135	0	0.00	0	0.00	0	0.00	0	0.00	617	8.33
1.2 Others	0.0135	5	0.07	77	1.04	195	2.63	537	7.25	3,400	45.90
Sub-total		5	0.07	77	1.04	195	2.63	537	7.25	4,017	54.23
2. Oil Palm											
2.1 FELDA	0.165	850	14.03	1,078	17.79	1,177	19.42	1,658	27.36	3,632	59.93
2.2 KEJORA	0.165	0	0.00	0	0.00	0	0.00	0	0.00	156	2.57
2.3 Others	0.165	308	5.08	506	8.35	605	9.98	706	11.65	3,845	63.44
Sub-total		1,158	19.11	1,584	26.14	1,782	29.40	2,364	39.01	7,633	125.94
3. Cocoa											
3.1 FELDA	0.0135	104	1.40	154	2.08	217	2.93	316	4.27	345	4.66
4. Crops & vegetables	0.0135	14	0.19	18	0.24	81	1.09	139	1.88	201	2.71
5. Grassland	0.0108	89	0.96	113	1.22	185	2.00	252	2.27	165	1.78
6. Residential Land											
Sub-total						1	0.04	15	0.60	390	15.00
7. Forest											
7.1 Unalienated	0.0049	355	1.74	380	1.86	790	3.87	903	4.42	1,070	5.24
7.2 Alienated	0.0074	435	3.22	587	4.34	890	6.59	1,233	9.12	5,120	37.89
Sub-total		790	4.96	967	6.21	1,680	10.46	2,136	13.55	6,190	43.13
Total of Item A		2,160	26.69	2,913	36.92	4,140	48.55	5,759	69.27	18,941	247.46
B. Removal			0.00		0.10		0.10		4.70		20.50
C. Relocation			2.90		3.10		6.60		16.80		19.30
Total of Item A-C			29.59		40.12		55.25		90.77		287.26

Table 26 ESTIMATED COMPENSATION COST FOR TELOR RESERVOIR AREA

Unit: M$ 10^6

Land Use	Reservoir Water Level (EL. m) 15.2	22.9	30.5
A. Land			
1. Oil Palm (M$16,500/ha)			
1.1 FELDA	-	-	1.0
2. Sugarcane (M$13,500/ha)	0.3	1.1	5.7
Total	0.3	1.1	6.7
B. Removal	-	-	-
C. Relocation	-	-	-
Grand Total	0.3	1.1	6.7

Table 27 ESTIMATED COMPENSATION FOR LAYAU KIRI RESERVOIR AREA

Unit: M$ 10^6

Land Use	Reservoir Water Level (EL. m) 15.2	22.9	30.5
A. Land			
1. Rubber (M$12,500/ha)			
1.1 Others	-	-	0.7
2. Oil Palm (M$16,000/ha)			
2.1 FELDA	5.1	9.4	19.1
3. Residential Land/Quarter			
3.1 Air Tawar IV FELDA (M$18,000/ha)	-	-	0.9
3.2 Air Tawar V FELDA (M$18,000/ha)	0.4	0.8	1.4
Sub-Total	0.4	0.8	2.3
4. Forest			
4.1 Alienated (M$7,000/ha)	-	-	0.2
Total	5.5	10.2	22.3
B. Removal			
1. Air Tawar IV FELDA	-	-	0.3
2. Air Tawar V FELDA	-	0.1	1.3
Total	0	0.1	1.6
C. Relocation			
1. Road	6.6	6.8	7.2
Grand Total	12.1	17.1	31.1

FIGURES

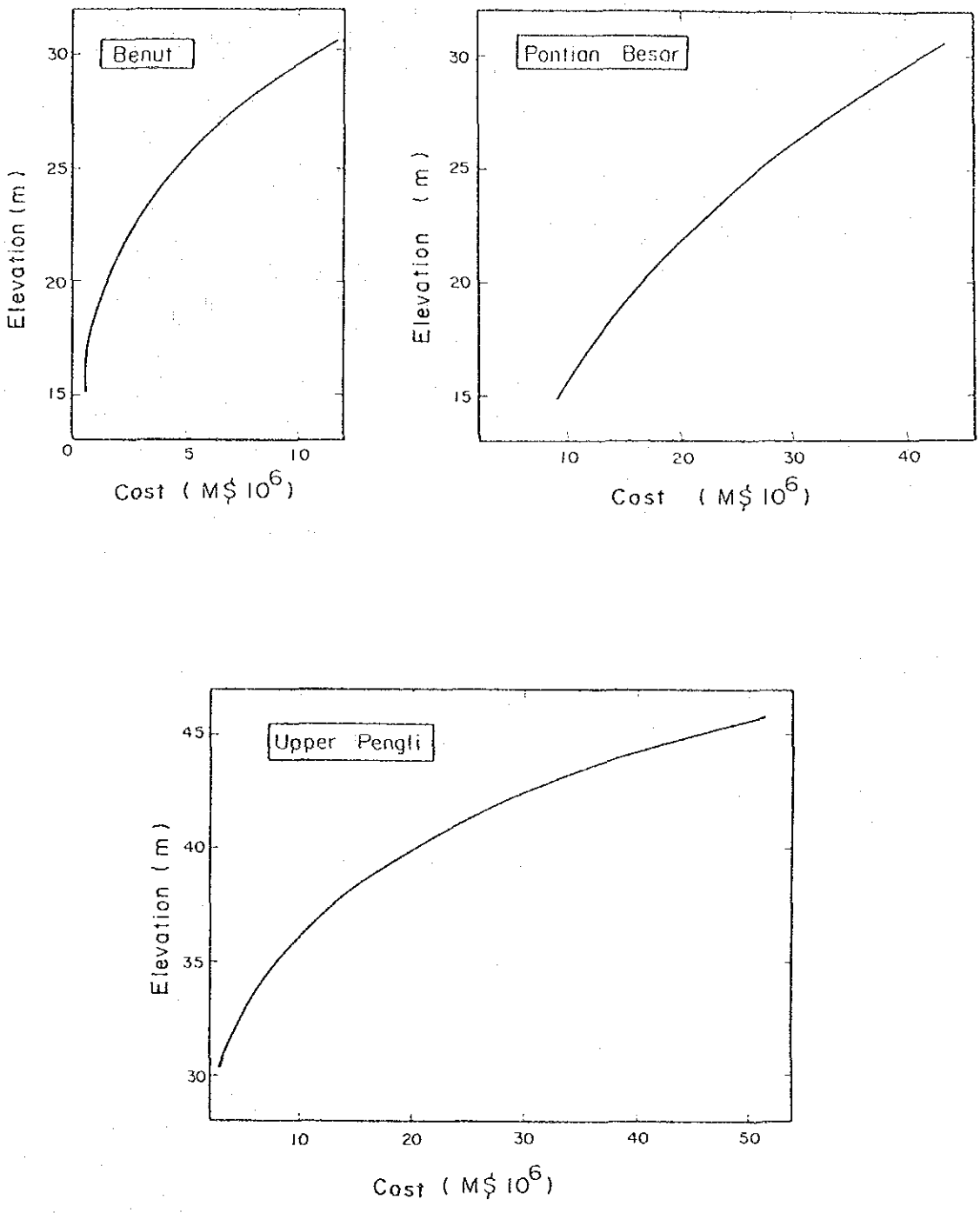

Fig. 1 Compensation Cost (1/2)

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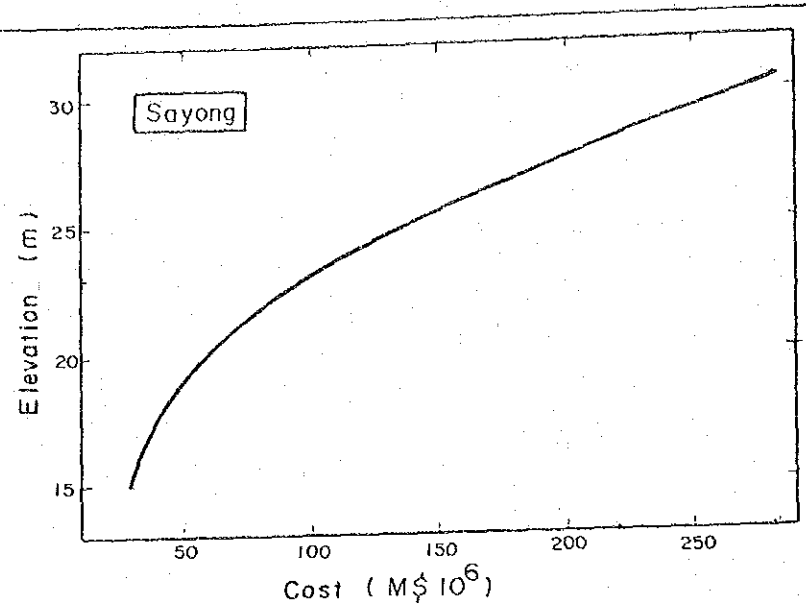

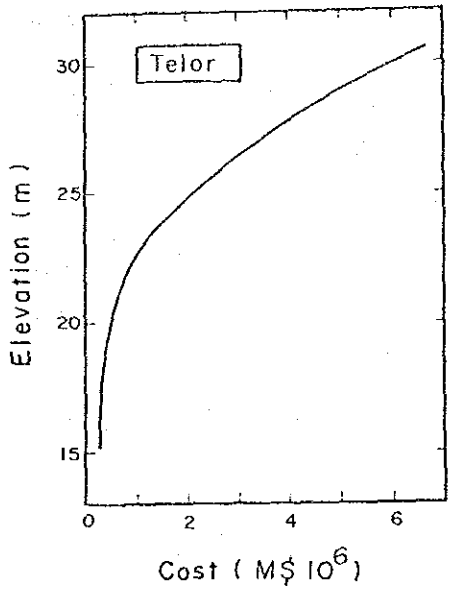

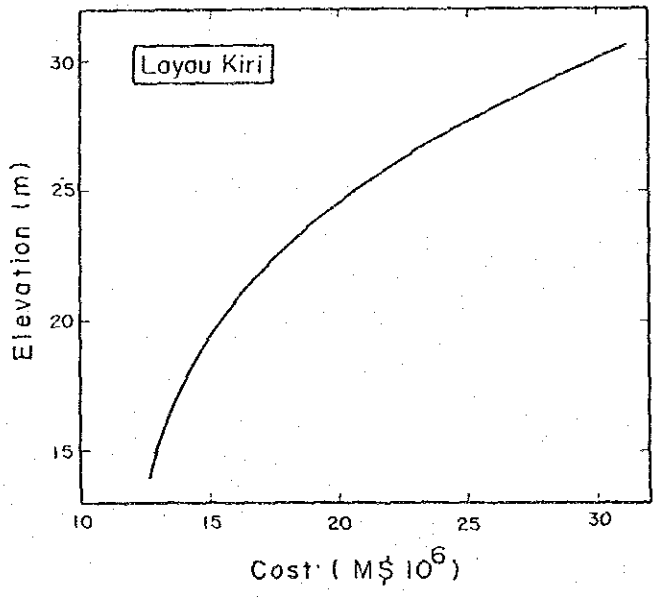

Fig. 2 Compensation Cost (2/2)

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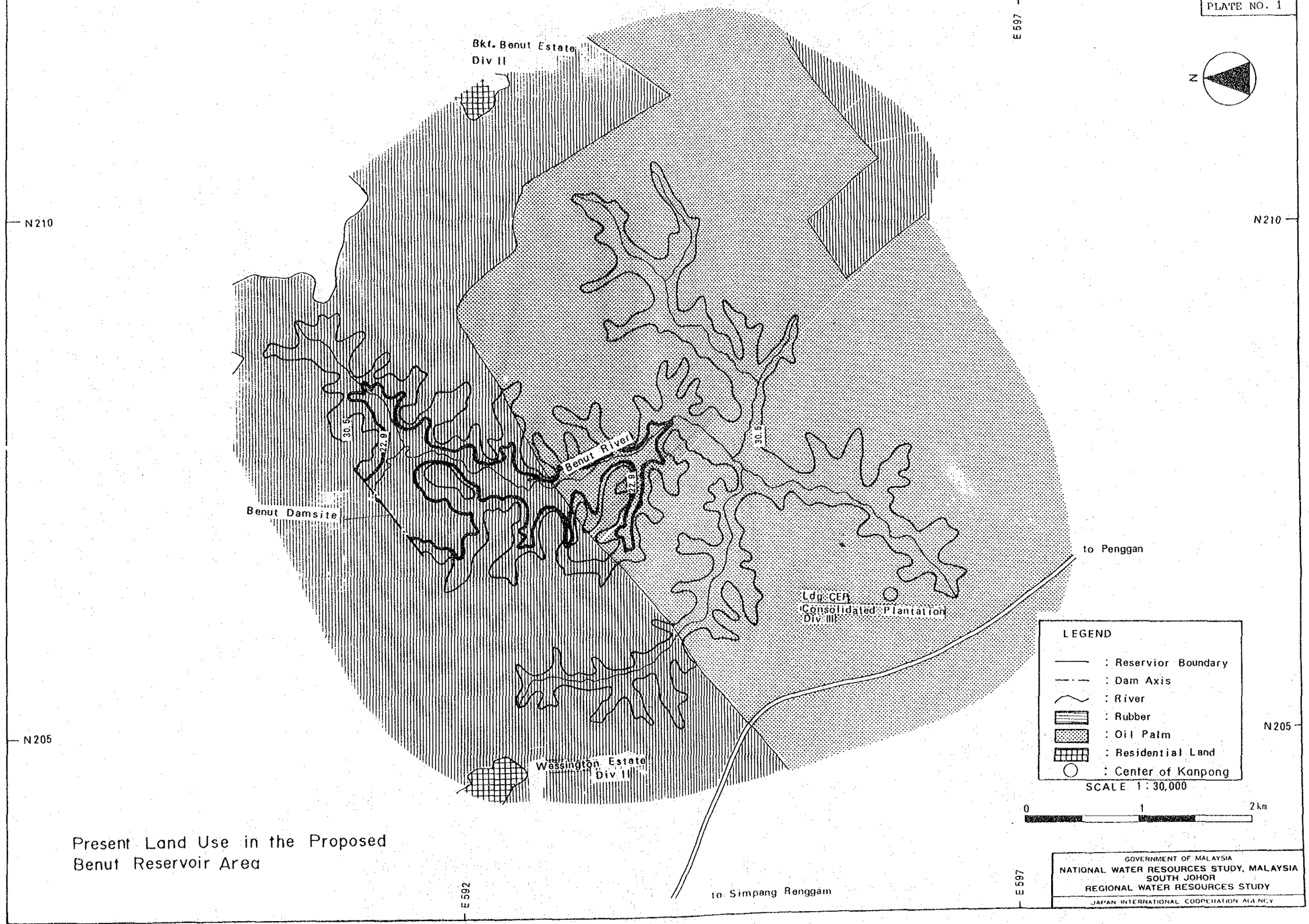
PLATES

PLATE NO. 1



Present Land Use in the Proposed Benut Reservoir Area

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PLATE NO. 2

N 605

E 600

to Layang Layang

to Kulai

Kg. Pisang

Pontian Besar Damsite

Kg. Melayu Bukit Batu

Ldg. Kulai Besar
Bhg. Utara

FELDA
(Layang Layang)

Pontian Besar River

Kawasan Jalan Johor

30.5

22.9

15.2

to Simpang Renggam

LEGEND

- : Reservoir Boundary
- : Dam Axis
- : River
- : Main Road
- : FELDA Boundary
- : Oil Palm
- : Rubber
- : Pepper
- : Crops and Vegetables
- : Grass Land
- : Forest
- : Factory
- : Center of Konpong

SCALE 1 : 30,000

0 1 2km

N 190

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Present Land Use in the Proposed Pontian Besar Reservoir Area

PLATE NO. 3

N 220

N 210

E 635

E 625

MC 899

MC 900

MC 1102

MC 1021

Forest Reserve

Forest Reserve

Linggiu River

Linggiu Damsite

30.5

38.1

45.7

N

LEGEND

- : Reservoir Boundary
- : Dam Axis
- : River
- : Forest Reserve Boundary
- : Logging lease Boundary
- : Mine
- : Forest

SCALE 1 : 63,360

0 1 2 3 4 km

Present Land Use in the Proposed Linggiu Reservoir Area

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PLATE NO. 4

N220

N210

E635

E625

N

GSB L 442

GSB L 332

L 311

Linggiu Damsite

Linggiu River

Sg. Jengeli Kanan (KEJORA)

Sg. Jengeli Kiri (KEJORA)

46.7

30.5

38.1

LEGEND

- Reservoir Boundary
- Dam Axis
- KEJORA New Scheme
- Application for Mining

SCALE 1 : 63,360

0 1 2 3 4km

Land Use Plan in the Proposed Linggiu Reservoir Area

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