

JOHOR TENGAH AND TANJONG PENGGERANG
REGIONAL MASTER PLAN

SUPPORTING
REPORTS

TO

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GOVERNMENT OF MALAYSIA AND THE STATE OF JOHOR

JOHOR TENGAH AND TANJONG PENGGERANG
REGIONAL MASTER PLAN

SUPPORTING REPORT I

THE PHYSICAL ENVIRONMENT

JANUARY 1971

Hunting Technical Services Ltd.

Binnies & Partners . Overseas Development Group . Shankland Cox Overseas
University of East Anglia

C O N T E N T S

	Page No.
1. CLIMATE	1
2. TOPOGRAPHY	2
2.1 Johor Tengah	3
2.2 Tanjong Penggerang	4
3. SOILS	4
3.1 Parent Material	4
3.2 Soil Classification	5
3.3 Johor Tengah	5
3.4 Tanjong Penggerang	6

TABLES

1. Terrain Classes & Acreages	3
2.	7

FIGURES

1.4 Mean Annual Rainfall	1
1.5 Temperature, Relative Humidity & Sunshine Hours	2
1.6 Surface Winds Kluang & Singapore	2
1.7 Johor Tengah - Terrain Classification	3
1.8 Tanjong Penggerang - Terrain Classification	3
1.9 Johor Tengah - Soils	5
1.10 Soils Legend	5
1.11 Tanjong Penggerang - Soils	5

SUPPORTING REPORT I

THE PHYSICAL ENVIRONMENT

1. CLIMATE

The SE Johor area, in common with all but the NW tip of West Malaysia, has a typical 'Tropical Wet' climate which gives rise to a climax vegetation of 'Tropical Wet Rainforest'. There are no recognisable seasons, all months being warm and wet. Although the area is subject to a monsoon regime of winds, the climate is not of the 'Monsoon Tropic' type with a distinct dry season, nor are the monsoon winds strong and consistent inland from the windward coasts. The NE monsoon prevails from December to mid March and the SW monsoon, which is manifest in the area as a south wind, blows from mid May to mid September. Rainfall within the area varies from 90 to 120 inches annually and is of three types: convectional, which usually falls as afternoon storms; orographic or coast and hill rains; and boundary rain, in the doldrum periods. Various combinations of these provide the rainfall of the area. Rain falls on an average of 130 to 170 days of the year, as recorded at stations in the project area (Figure I 4).

During each 24 hour period there is a very considerable variation in the factors which collectively make up the weather pattern. The sun rises throughout the year after 6 a.m. when the temperature is at its lowest, averaging 73°F. The air is saturated and mist and dew are common. Temperatures increase rapidly, reaching an average maximum of 86°F at 1 p.m., at which time the relative humidity is at its lowest (67 percent). During the morning the sky is usually clear but in the afternoon the cumulus clouds build up to cumulonimbus and on most days even though rain may not fall, thunder is heard. Prior to a storm breaking, gusts of turbulent high winds or thundersqualls are common. These may very occasionally be of such strength as to cause localised wind damage, even toppling or breaking small numbers of trees. About 80 percent of the year's rain falls between 1 p.m. and 6 p.m. with afternoon rains being

particularly dominant in March to May and September to November. From 1 p.m. the temperature falls slowly and steadily through the afternoon and night. Figure I.5 shows temperature, relative humidity and sunshine hours while Figure I.6 deals with surface winds.

Despite the absence of definite seasons, the variability in rainfall is such that droughts (10 days or more without or with very little rain) may be expected to occur in some months more than others. They are most common in the NE monsoon period; from January to March a drought of 20 days is probable. The only other months in which such dry periods are likely to occur are June and July during the SW monsoon.

Rainfall is generally of high intensity (0.26 inches/hour) and for short periods during many storms the intensity exceeds 3 inches/hour. Very high rainfalls in a single day are experienced only from November to February. December is the month most likely to have the highest precipitation (e.g. 14.3 inches in one day, 22.7 inches in 2 days and 26.8 in 4 days all recorded at Nam Heng estate in 1968).

Hours of bright sunshine vary somewhat between the months; Kluang experiences more than 7 hours per day in February but only 4 hours in November. Inland the sky is significantly more cloudy than on the coastal strip, the average yearly figure for sun hours per day at Mersing being 6.30 as compared with Kluang's 5.35.

2. TOPOGRAPHY

The topography of the Project Area is mature or sub-mature, in the sense that slopes lack irregularities and have, under natural conditions, in the main reached a state of equilibrium in erosion. The various elements of the land forms are best described in terms of terrain classes, that is the nature of the terrain produced by a combination of slopes within a given range. The terrain classes used are those laid down by the Soil Science Division of the Division of Agriculture, Malaysia.

TABLE 1 Terrain Classes and Acreages

Terrain Class	Slope range (in degrees)	Description	Johor Tengah		Tanjong Penggerang	
			acres	percent	acres	percent
1	0 - 2	Level or nearly level	49,830	15	149,370	44
2	2 - 6	Undulating	77,150	24	80,319	23
3	6 - 12	Rolling	106,735	33	80,870	23
4	12 - 20	Hilly	34,790	11	24,088	7
		Limit for Agricultural development				
5	20 - 25	Steep	48,195	15	6,175	2
6	Over 25	Very Steep	7,850	2	2,456	1
			324,550	100	343,278	100

Note, the total acreages given in this table and Table 2 will differ from the acreage available for development. In Johor Tengah the survey covered land alienated to GSA and other schemes and in Tanjong Penggerang it covered the current FLDA schemes.

2.1 Johor Tengah

This region consists mainly of rolling or undulating terrain, the steepland being confined to large tracts along the north-eastern project boundary and rising to 3,313 feet at Blumut.

Several slow flowing rivers dissect the area (Figure I.7), forming narrow flood plains which are in general liable to frequent inundation and consist of poorly drained soils. The terrain is very variable in the north and east of the area, especially in the upper valley of the S. Linggiu. In the west however more extensive areas of regular terrain occur. (Figures I.2 and I.3 show all topographic locations).

2.2 Tanjong Penggerang

The balance of terrain classes (Table 1) differs from that in Johor Tengah. The majority of the area consists of level or nearly level land with very little steep land. In the higher areas, where slopes are steep, erosion is still active. The topography is generally more complicated than in Johor Tengah, due to the underlying parent material. Mapping units are smaller and more complex (Figure I.8). Furthermore, in the undulating to hilly classes, valley incision in some localities is severe. These latter areas have been mapped separately and are indicated by the Suffix 'V' after the class number. Incisions are usually between 25 and 35 feet deep but may reach 40 feet. The west and northwest of the area consists mainly of undulating to hilly terrain. A central spinal ridge runs from a point about 8 miles from Kota Tinggi on the Sedili road, in a south east direction to the coast. A distinct single crest occurs in the central area rising to 611 feet at Bukit Tangga Tujoh. Another pronounced hill is located near the Kota Tinggi to Sedili road rising to 629 feet.

South and northeast of the S. Papan the area is a complex of the undulating to hilly classes. The main feature along the east and south coasts are the extensive peat swamps which lie behind an advancing coast line. The general elevation of these swamps is 5 to 30 feet above sea level.

With the exception of the Lebam, Papan and Santi major river systems the valleys are generally narrow belts liable to frequent flooding.

Terrain is an important factor in the classification of the potential land use of the two areas. This is further discussed in Supporting Report V.

3. SOILS

3.1 Parent Material

The regional geology (Supporting Report III) gives an overall picture of the parent material from which the soils were derived.

Because various formations have had to be grouped together in the geological legend, an area of older alluvium in the Johor Tengah area is not shown. This alluvium occurs in the south of the area and east of Layang Layang, and overlies granite and sedimentary material as a thin capping, generally less than 5 feet in depth.

3.2 Soil Classification

The main characteristics of the soils are a result of an excess of rainfall over evaporation for a considerable time: all soils are therefore highly weathered and leached. Chemical analyses have revealed very low cation exchange capacities and base saturation percentages.

Physically most soils in the Project Area are characterised by fairly compact blocky subsoil horizons of moderate porosity. Most show moderately to strongly developed clay skins on the surface of the natural aggregates. The increase in clay content from the topsoil to the underlying horizon is gradual and rather low. Many soils contain concretionary material somewhere in the profile.

The classification system used is that devised by the Soils Science Division, Research Branch, Division of Agriculture, Kuala Lumpur. In this system, classification is based on grouping according to parent material as the major factor in soil formation. This grouping of soils with similar profile characteristics developed from the same or similar parent materials constitutes the soil series and these are the units mapped. Differences of texture and/or depth within a series have been separated as phases. In cases where soils occur as units too small to be mapped the series have been combined to form an association of two or more series. Generalised reductions (Figures I.9 and I.11) of the one inch to one mile soil map series have been compiled and show the location and inter-relationship of the soils in the two regions.

3.3 Johor Tengah (Figure I.9)

The two series Rengam and Harimau (Table 2) are found extensively throughout the area. They are deep and moderately friable soils with a good available water capacity. Throughout the Rengam Series a coarse

sandy clay phase occurs and throughout the Harimau Series a moderately deep phase (20 to 40 inches deep). Both these phases have a restricted rooting depth and may also have a poorer available water capacity.

The Yong Peng Series, a heavy textured, rather compacted moderately deep to deep soil, has an available water capacity satisfactory for the needs of crops suited to the area.

In the valley of the Linggiu upstream of its confluence with the S. Tengkil, the soil pattern lacks uniformity. The majority of the soils are derived from shales and sandstones and vary in their textural characteristics according to the parent material. Many of these series are either very sandy or shallow, both of which factors will limit root development of agricultural crops.

Riverine Alluvium and Local Alluvium are soils located in river valleys and vary considerably in their texture and drainage; they are also liable to flooding.

3.4 Tanjong Penggerang (Figure I.11)

The distribution and range of the soils series in this area are more complex than in Johor Tengah. The Rengam Series is again the predominant one. As in Johor Tengah it includes a coarse sandy clay phase, (approximately 2,000 acres). The Rengam is mainly concentrated north of the S. Lebam up to the northern boundary.

The Yong Peng Series in Tanjong Penggerang includes a coarse phase (approximately 9,500 acres) which is similar to the normal series except that quartz grit occurs within a depth of 24 inches; however this does not hamper root development. This series is concentrated along the S. Johor and around the headwaters of the S. Sebina and S. Santi.

A large number of soils series, derived from sandstones, shales and metasediments but not described here, are to be found in very small areas throughout the peninsula.

TABLE 2

Soil Series	Johor Tengah		Tanjong Penggerang	
	Acres	Percent	Acres	Percent
Yong Peng	11,985	4	22,272	6
Kulai			384	<1
Jerangau	535	<1	5,504	2
Rengam	124,740	38	87,936	26
Masai	1,065	<1	3,008	<1
Prang	485	<1	256	<1
Seremban			3,584	1
Batang Merbau			2,202	<1
Serdang	19,835	6	8,800	3
Serdang moderately deep and Bungor	320	<1		
Serdang and Munchong moderately deep	1,365	<1		
Kedah			128	<1
Bungor	4,165	1	8,896	3
Marang			20,064	6
Kemuning			3,136	1
Munchong	550	<1		
Durian	24,490	8	9,754	3
Durian-Bungor-Munchong	4,480	1		
Apek			384	<1
Pohoi			2,848	1
Malacca	265	<1	10,560	3
Tavy			3,117	1
Harimau	39,960	13	8,000	2
Ulu Tiram	1,650	<1		
Tampoi			448	<1
Holyrood	1,670	<1	2,579	1
Lunas			512	<1
Colluvium	1,255	<1		
Local Alluvium	14,245	4	40,032	12
Riverine Alluvium	11,955	4	7,738	2
Kranji			12,224	4
Rudua - Rusila			15,040	4
Peat			45,248	13
Muck			17,024	5
Disturbed land	3,200	1	1,600	1
Steepland	56,335	17		
	324,550		343,278	

NOTE: Unless otherwise stated figures for the soil series include phases of that series or associations under the predominant series Percentages have been calculated from the total surveyed area and rounded to show less than 1 percent rather than fractions.

The Marang Series occur along the east coast and in the head waters of the S. Papan. This series has a fine sandy loam friable topsoil overlying a firm compacted sandy clay loam. Vein quartz fragments commonly occur within the compacted layer restricting rooting depth. Soil depth is very variable and ranges from shallow to moderately deep and deep.

Riverine Alluvium, Local Alluvium and Organic Clays and Mucks together represent 20 percent of the area.

Peat occurs in two large areas along the east coast with a maximum depths of more than 10 feet. The peat is poorly humified, woody and very acid with a recorded pH of around 3.5. Most of the peat is underlain by sand.

More than 30 soil series have been recorded in the project area; physically Jerangau, Rengam, Prang, Serdang (sandy clay phase), Munchong, Pohoi and Harimau are the more useful soils. This has a marked effect on the potential land use pattern of the area, which is discussed in Supporting Report V.

GOVERNMENT OF MALAYSIA AND THE STATE OF JOHOR

JOHOR TENGAH AND TANJONG PENGGERANG
REGIONAL MASTER PLAN

SUPPORTING REPORT II

WATER RESOURCES AND DEVELOPMENT

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C O N T E N T S

	Page No.
1. AVAILABILITY AND QUALITY OF WATER RESOURCES	1
1.1 Availability of water	1
1.1.1 Introduction	1
1.1.2 Natural Surface Flows	1
1.1.3 Groundwater Potential	2
1.1.4 Potential for Regulation of Surface Water Flows	3
1.2 Quality of water	4
2. EXISTING WATER RESOURCE DEVELOPMENTS	5
2.1 Water Supply Development	5
2.1.1 Sources & Supply Areas	5
2.1.2 Potential of existing JKR water supply sources	6
2.1.3 Water supplies other than JKR piped supplies within the Project Area	8
2.2 Other Developments	8
3. FORECAST OF DEMAND FOR WATER	8
3.1 Existing JKR Supply Areas	8
3.2 Projected Industrial Area & Port near Kampong Pasir Gudang.	9
3.3 PUB offtake on S. Johor	10
3.4 Project Area - Existing Population	10
3.5 Project Area - Project Developments	10
3.5.1 Village Domestic Water Supplies	10
3.5.2 Agricultural Processing and Industrial Water Supplies	11
3.5.3 Tourist Industry	11
3.5.4 Dairy & Beef Enterprises	11
4. FUTURE WATER RESOURCE DEVELOPMENTS	12
4.1 Introduction	12
4.2 Water Supply Developments	12
4.2.1 Kluang	12
4.2.2 Kota Tinggi	13
4.2.3 Johor Baharu, Pontian & Pasir Gudang Industrial Estate	14
4.2.4 Project Area - Johor Tengah	16
4.2.5 Project Area - Tanjong Penggerang	16

CONTENTS (Cont.)

	Page No.
4.3 Other Developments	18
4.3.1 Flood Mitigation	18
4.3.2 Land Drainage	19
4.3.3 Irrigation	19
4.3.4 Regulation of the S. Johor	19
4.4 Further Studies	21

TABLES

1.	2
2.	7
3.	9
4.	9
5.	12
6.	14
7.	15

FIGURES

II.1 Hydrological Stations, Storage Sites & Groundwater - Johor Tengah	1
II.2 Hydrological Stations, Storage Sites & Groundwater - Tanjong Penggerang	1
II.3 Run of River Yields	2
II.4 Existing Water Resource Developments	8
II.5 Water Supply Development - Johor Tengah	12
II.6 Water Supply Development - Tanjong Penggerang	17

SUPPORTING REPORT II

WATER RESOURCES AND DEVELOPMENT

1. AVAILABILITY AND QUALITY OF WATER RESOURCES

1.1 Availability of Water

1.1.1 Introduction

To evaluate the water resources potential of the project area hydrological stations were established to supplement the existing Drainage and Irrigation Department network. The location and type of project stations are shown in Figures II.1 and II.2.

1.1.2 Natural Surface Flows

One of the requirements of the Terms of Reference is a study of the effects of jungle clearance and land development on natural river flows. Very limited information is available on this and much of the hydrological fieldwork and analysis has been directed towards evaluating these effects with a view to providing a more reliable basis in the future for design of water supply schemes based on run-of-river flows.

The most significant effects of jungle clearance on natural surface flows are:-

- (a) the lowering of run-of-river flows during periods of drought.
- (b) an increase in peak discharge during flood periods.

In addition the quality of water in rivers and streams is adversely affected by certain development activities in their catchments.

For a return period of 1 year in 10 years and catchment sizes of 20, 100 and 200 square miles run-of-river low flows (cusecs/square mile), are estimated as follows:-

TABLE 1

LOCATION and TYPE	FLOW - CUSECS/SQ. MILE		
	Catchment Area 20 sq. mile	Catchment Area 100 sq. mile	Catchment Area 200 sq. mile
<u>NW Tengah</u>			
Jungle catchment	0.15	0.25	0.32
Developed catchment	0.07	0.07	0.07
<u>Remainder of Project Area</u>			
Jungle catchment	0.20	0.32	0.40
Developed catchment	0.10	0.10	0.10

Figure II.3 summarises the results of the low flow analysis. Distinction has been made between NW Tengah and the remainder of the project area, as NW Tengah in general experiences lower run-of-river flows. The selected low flow return periods, 1 in 10 years and 1 in 5 years, are shown. In the time available no study has been possible to differentiate between the effects of different types of land development (e.g. rubber, oil palm, grass etc.) and "development" has been considered to include all developments which involve removal of the natural primary jungle cover.

Peak flood discharges can be expected to increase in catchments cleared of jungle. Flood hydrographs from two adjacent catchments (less than 10 square miles), one jungle covered and one developed, suggest that peak discharges could increase by from 30 to 100 percent due to jungle clearance.

These results are primarily based on the short records of the project river gauging stations. It is considered essential that, to confirm these conclusions, the gauging stations should continue in operation both during and after land clearance.

1.1.3 Groundwater Potential

So far as is known, no groundwater investigations have previously been made in the project area. Groundwater investigations are excluded

from the Terms of Reference but a study of the geological maps, field inspections and the results of groundwater investigations adjacent to the project area, have indicated that groundwater potential in the project area is unlikely to be extensive.

The most promising area is located in central Johor Tengah. Other possible areas have also been identified in Tanjong Penggerang (Figures II.1 and II.2). Investigatory drilling would be essential before reliable supplies could be evaluated. All project supplies subsequently described are based on surface water flows, but appropriate groundwater investigations should be a part of any future water resources development studies carried out in connection with demands, in or close to, the general areas shown as having groundwater potential.

1.1.4 Potential for Regulation of Surface Water Flows

The availability of water can be increased by the provision of storage reservoirs, which can be used for direct abstraction or for the regulation of flows downstream. If sufficient storage is created at a particular site then the water available continuously at the dam would be raised to approximately 2-3 cusecs/square mile of catchment drained. Possible storage sites have been located from a study of the available maps and field inspections.

Preliminary geological appraisal has been made at the following possible storage sites. These are:

(a) Johor Tengah

- (i) Two sites (catchment areas 24 and 80 square miles) on the S. Linggiu.
- (ii) One site (catchment area 24 square miles) on the S. Kahang.
- (iii) One site (catchment area 420 square miles) on the S. Johor.

(b) Tanjong Penggerang

- (i) Two sites (catchment areas 16 and 21 square miles) on the S. Seluyut.
- (ii) One site (catchment area 29 square miles) on the S. Lebam.

Other possible sites, commanding catchment areas less than 12 square miles, exist on the S. Pelepah, S. Pengeli (2 sites), S. Papan, S. Sening, S. Layau Kiri, S. Lebam, S. Chemangar and S. Sedili Kechil (Figures II.1 and II.2).

1.2 Quality of Water

Chemical and sediment samples have been taken from jungle and developed catchments. The results of the analysis, supplemented by the records of analysis at existing Public Works Department (JKR) water supply intakes, show that present river water quality is generally good and is capable of treatment to satisfactory drinking water standards.

The main effect of jungle clearance alone is an increase in the sediment load - but this increase does not present major water treatment problems.

The main sources of pollution in the project area at the moment are from agricultural and tin mining activities. Details of the present applications of fertilizers, pesticides and weed killers to existing developed catchments are not known. The chemical analysis of samples taken do not suggest that current applications significantly affect water quality. However, arsenic concentrations of up to 0.04 ppm have been identified on occasions in the S. Sembrong Kechil. These probably originate from the application of arsenical weed killers, and the potential danger arising from their accidental spillage warrants their complete banning from water supply catchments. Health Authorities in countries such as the United States consider concentrations of arsenic greater than 0.05 ppm to be grounds for the rejection of the source of supply for drinking water. Intensive application of fertilizers and pesticides in the future may create problems in planning and operation of water treatment plants.

Effluents from rubber and palm oil factories have relatively high biochemical oxygen demand concentrations - palm oil effluent up to 20,000 ppm and rubber effluents from 2,000 - 4,000 ppm depending on the process. The effects of these effluents on river water quality in the project area do not appear to be significant at present. In the

future, when additional factories will be in operation and low river flows will be less (due to changes in catchment cover and increased abstractions for water supplies) consideration may have to be given to treating the effluents to standards sufficient to prevent unacceptable quality degradation of the receiving river. Each case would have to be considered individually. This would apply particularly to rivers being utilised for water supply purposes downstream of the effluent discharge point.

Tin mining activities on the tributaries of S. Linggiu and S. Pelepah are producing large quantities of fine colloidal matter which create problems in water treatment. One sample from the S. Tempenis, near its confluence with the S. Linggiu, has shown a concentration of 1000 ppm of suspended solids. The suspended sediment load in the S. Johor at the confluence of the S. Linggiu and S. Sayong has been found on five occasions to be in the range 200-400 tons/day, with the S. Linggiu contributing about 90 percent of the quantity of sediment although approximately only one third the quantity of water.

Supplies to fishponds may require protection from contamination by pesticides and weedkillers, however provided supplies are not required in drought periods it should be possible to meet these demands from village supply sources.

2. EXISTING WATER RESOURCE DEVELOPMENTS

2.1 Water Supply Development

2.1.1 Sources and Supply Areas.

The locations of the present (including those under construction or planning in 1970) sources of water for the main JKR piped water supply areas, within, adjacent and to the south of the project area are shown in Figure II.4. Also shown are the locations of the sources in Johor State from which the Public Utilities Board (PUB), Singapore abstract water under the terms of two Agreements dated 1961 and 1962 between Johor State and the City of Singapore. The nominal capacity of the PUB's intake on the S. Johor is 30 million gallons per day (mgd).

All JKR supplies are based on run-of-river flows with the exception of parts of the Districts of Johor Bahru and Pontian (in the near future) which are supplied through bulk purchase from the PUB. Treatment of all supplies is generally satisfactory and the average amount of water

2.1.2 Potential of existing JKR water supply sources

(a) Run-of-river Intakes

The estimated reliable yields (in mgd) of existing run-of-river sources, for return periods of 1 in 10 years, 1 in 5 years, and based on 0.2 cusecs/square mile of catchment (JKR design criteria) are shown in Table 2. In the two former cases account has been taken of the type and proportions of catchment cover (i.e. jungle covered or developed). Two values are given for the S. Semberong Kechil, S. Seluyut, S. Gembot and S. Johor as the run-of-river yields of these catchments are estimated to reduce considerably due to project land clearance and associated development.

(b) Bulk Purchase from PUB Singapore.

Under the 1961 Agreement, Johor State is entitled to 12 percent of the water passing the causeway that the PUB has abstracted from the Johor reservoirs (centred on Gunong Pulai), S. Scudai and S. Tebrau on a daily basis. The nominal combined plant capacity of the three sources is about 90 mgd and the nominal combined dry weather flow about 43 mgd.

There is provision, subject to negotiation, that the PUB supply more water if Johor State can prove that the 12 percent is inadequate. The limit of this entitlement is "the capacity of the Pulai Catchment Reserve". The Pulai Catchment Reserve is not explicitly defined in the Agreement, but assuming that it means the 10 square miles of reservoirised catchment centred on Gunong Pulai, then the limit of Johor State's present and future entitlement is estimated to have a yield of about 18 mgd.

Under the 1962 Agreement Johor State is entitled to 2 percent of the water passing the causeway that the PUB has abstracted from the S. Johor on a daily basis. The present nominal plant capacity is 30 mgd and Johor State's present entitlement is about 0.6 mgd. Johor State's future entitlement depends on the future abstraction of the PUB. This is not known. However there is provision for the PUB to abstract up to "a maximum of 250 mgd" (Clause 5) and the limit of Johor's future entitlement under this maximum abstraction rate would be about 5 mgd.

TABLE 2

Supply Area	Source (river)	Estimated Reliable Yield (mgd)		
		1 in 10 yrs.	1 in 5 yrs.	0.2 cusecs sq. mile
Kluang	Mengkibol	0.81	1.2	2.4
Kluang	Sembrong Kechil	9.0	12.0	8.7
		3.2*	4.0*	
Kota Tinggi	Pelepah	0.19	0.27	0.33
Pontian	Pontian Besar	5.3	7.3	6.3
S. Rengam	Ulu Benut	4.3	5.9	7.1
Layang ²	Sayong	2.1	2.8	3.6
Rengam	Sayong	0.38	0.54	0.78
Bukit Batu	Pontian Besar	1.7	2.3	2.3
FIDA Kulai Complex	Semangar	1.1	1.5	2.1
FIDA Ayer Tawar	Seluyut	2.8	3.8	2.5
		1.3*	1.9*	
FIDA Bukit Aping	Gembot	2.3	3.1	2.5
		1.3*	1.9*	
Penggerang Village	Small Stream	Not available	Not available	0.008
South Penggerang	Small stream mining pond	Catchment area and storage available not known - under investigation by JKR.		
PUB intake on S. Johor		111 ⁺	148 ⁺	65 ⁺
		53 ⁺	72 ⁺	

* Estimated future values due to land clearance
 + No allowance for saline intrusion.

2.1.3 Water supplies other than JKR piped supplies within the Project Area.

Private estates and small villages obtain their supplies from wells or small run-of-river intakes; the rural population from wells or by hand from nearby streams.

The JKR are at present implementing schemes to provide piped water to parts of the west and south coasts of Tanjong Penggerang.

2.2 Other Developments

There are no irrigation schemes in the project area. Existing and possibly future Department of Irrigation and Drainage (DID) irrigation schemes adjacent to the project area are shown in Figure II.4. It has been concluded from a brief study that these schemes will not be dependent on the water resources of the project area.

The DID are at present implementing a scheme for flood alleviation at Kluang. Apart from this there are no flood mitigation, hydro-power or main drainage schemes within or immediately adjacent to the project area.

3. FORECAST OF DEMAND FOR WATER

3.1 Existing JKR Supply Areas

A brief appraisal of the future demands of JKR supply areas shows that present sources are adequate for all areas except Johor Baharu, Kluang, Pontian and Kota Tinggi. These areas have therefore been included in the study and more detailed estimates have been made of their future demands (Table 3) based on the following:-

- (a) population forecasts (1957 Census and Research Paper Number 1 of 1967, published by the Department of Statistics)
- (b) extrapolation of the past consumption of individual supply areas and of Johor State over the last 7-9 years.
- (c) Nominal allowance for industry.

TABLE 3

Existing JKR Supply Areas	Estimated Demand in mgd				
	1969	1980	1985	1990	2000
Johor Baharu	6.94	13.5	18.0	25.0	47.0
Kluang	2.50	5.2	7.0	9.3	16.0
Pontian	0.84	2.0	2.8	4.0	8.0
Kota Tinggi	0.42	0.8	1.2	1.5	2.8

3.2 Projected Industrial Area and Port near Kg. Pasir Gudang

The State Engineer advises that the planned rate of increase of development for the industrial area will be about 500 acres every 5 years. The type of industries which will be established is not known. The estimated demand (Table 4) is based upon the following:-

- (a) industrial demands of 5 mgd/1000 acres
(similar to Jurong, Singapore)
- (b) 3 mgd/1000 acres (similar to Petaling Jaya, Selangor)
- (c) 15 workers per acre with family size of 5
- (d) supporting service population of 40 percent
- (e) per capita consumption of 50-60 gallons per day
(gpd) in year 2000.

TABLE 4

	Estimated Demand in mgd				
	1970	1980	1985	1990	2000
	0	8	13	18	30

3.3 PUB Offtake on S. Johor

The total water demand for Singapore is at present about 100 mgd and the demand will probably rise to 350-400 mgd by the year 2000.

If all Singapore's future demand was met by increased abstraction from the S. Johor, the maximum abstraction rate of 250 mgd (provided for by the 1962 Agreement) would be required by about 1995.

3.4 Project Area - Existing Population

The future demands of the existing population in Mukims Kluang, Rengam, Ulu S. Johor (part), Layang² (Johor Tengah); and Mukims Kota Tinggi, Sedili Besar, Johor Lama (Tanjong Penggerang) have been included in the future demands of existing or proposed JKR water supply areas.

The population in the remainder of Johor Tengah (parts of Mukims Ulu S. Johor and Kahang) and Mukim Sedili Kechil (Tanjong Penggerang) is very small and scattered and its future demand is negligible.

The existing population in Mukim Tg. Surat (Tanjong Penggerang) is largely in estates and small villages on the S. Lebam; these have their own private supplies and the future demand is estimated at about 0.25 mgd.

The existing population in Mukims Pantai Timor and Penggerang (Tanjong Penggerang) except in Kg. Pasir Gogak, will be served by the new JKR South Penggerang source and the future demand is estimated at about 1.2 mgd (including 0.12 mgd for Kg. Pasir Gogak).

3.5 Project Area - Project Developments

3.5.1 Village Domestic Water Supplies

The ultimate domestic water demand is estimated at about 4.7 mgd in Johor Tengah and 2.8 mgd in Tanjong Penggerang, assuming 48 villages with population 3000, 5 villages with population 6000 and 1 town with population 10,000.

3.5.2 Agricultural Processing and Industrial Water Supplies

The ultimate water demand for palm oil processing is estimated at 1.5 mgd in Johor Tengah and 0.9 mgd in Tanjong Penggerang, assuming total mill capacity of 320 tons fresh fruit bunches (ffb)/hour.

The ultimate water demand for rubber processing (assuming crumb) is estimated at 1.0 mgd in Johor Tengah and 0.30 mgd in Tanjong Penggerang, assuming a total factory capacity of 150 tons/day.

The principal industrial development will be timber processing (sawmilling, plymilling and chipping); the water requirements of these are negligible.

3.5.3 Tourist Industry

The water demand for the immediate recommended development is estimated at about 0.3 mgd.

The water demand for the possible ultimate development is estimated at about 9 mgd.

3.5.4 Dairy and Beef Enterprises

The total water requirement (on the farms) for dairy development is estimated at 3000 gpd in 1972 rising to a maximum of 0.6 mgd in 1991. The water requirement for beef development will be less than the above.

3.5.5 Irrigation

The only irrigation requirement is for nurseries for tree crops. These will be irrigated by overhead spraying.

The average water requirements during peak nursery activities up to 1991 is estimated at about 2.7 mgd in Johor Tengah and 1.6 mgd in Tanjong Penggerang.

4 Future Water Resource Developments

4.1 Introduction

After making allowance for the future yields of existing sources, all the demands, mentioned in Section 3 can be met from the water resources of the project area.

4.2 Water Supply Developments

4.2.1 Kluang

The studies indicate that the Kluang demand will exceed the yield of existing sources by 1981/82 and that the deficiency in yield by the year 2000 will be 13.8 mgd. Six alternative schemes to supply this demand have been considered; each includes for phased development of the source and phased expansion of the JKR treatment works under construction on the S. Semberong Kechil. The two most attractive of the alternatives considered are:-

1. Run-of-river intake on S.Semberong (downstream of confluence of S. Paloh and S.Semberong Kechil).
2. Regulating reservoir on S. Kahang and water transfer by pumping to S.Semberong Kechil catchment. (Figure II.5)

The estimated total capital costs, annual operating costs at ultimate demand and present values (1971) at discount rates of 10 percent and 15 percent are:-

Table 5

Alter- native	Total Capital Cost (Million \$)	Annual Operating Cost (Million \$)	Present Value (Million \$)	
			10%	15%
1	13.1	1.00	5.86	3.56
2	13.3	0.67	6.10	3.91

The town of Kluang is located in the catchment draining to the intake in alternative 1. In order to safeguard the quality of the water at the intake in future years, pollution would have to be controlled, by providing sewage treatment facilities at Kluang. These facilities would be expensive and their costs are not included in the above table. Assuming the costs would be chargeable to water supply then alternative 2 becomes the most favourable.

Land development plan alternatives assume that the Kahang catchment would be excluded from agricultural development and remain as jungle. This is an economic decision based on the competing values of the catchment for agricultural development and water supply. The opportunity cost of the catchment to agriculture is very small due to the availability of alternative potential agricultural land. On the other hand certain additional dam construction and water treatment costs might become necessary if the catchment were developed for agriculture. The opportunity cost of the reservoir area to mining cannot at present be estimated and has not been allowed for in the cost of the Kahang dam alternative. The advantages of this alternative suggest that prospecting should be carried out at an early date so that exploitation of any mineral potential can take place before the reservoir area is needed for water supply. The earliest date by which exploitation could be required to be completed is estimated to be 1980.

4.2.2 Kota Tinggi

The studies indicate that the Kota Kinggi present demand exceeds the yield and that the net deficiency in yield by the year 2000 will be 2.60 mgd. Two alternative schemes have been considered in detail, each involving phased development. Other alternatives were considered briefly and rejected on economic grounds.

The alternatives considered are:-

1. Run-of-river intake on S. Johor (upstream of confluence S. Panti and S. Johor).
2. Regulation reservoir on S. Pelepah Kanan above existing JKR intake.

The estimated total capital costs, annual operating costs at ultimate demand and present values (1971) at discount rates of 10 percent and 15 percent are:-

Table 6

Alternative	Capital Cost (Million dollars)	Annual operating Cost (Million dollars)	Present Value (Million \$)	
			10%	15%
1	3.43	0.16	2.14	1.61
2	5.65	0.03	4.03	3.60

Alternative 1 is therefore preferred.

4.2.3 Johor Baharu, Pontian and Pasir Gudang Industrial Estate.

Due to the relatively high future demands of Johor Baharu and the Industrial Estate, and the lack of a suitable adequate source close to Pontian, these three supply areas have been considered as one area of demand.

The yield of existing sources has been taken as 19.6 mgd; of which 18.6 mgd would be from the PUB (1961 and 1962 Agreements) and 1.00 mgd which is the capacity of the Pontian treatment works.

It is estimated that the demand will exceed the yield by 1978/79 and the net deficiency in yield by the year 2000 will be 65 mgd. Two alternative schemes have been considered in detail, each involving phased development. Other alternative sources were considered briefly but rejected because of inadequate availability of water.

The alternatives and phasings considered are:-

1. a) Increased abstractions from the PUB mains, to meet the demands up to 1978/79.
- b) Run-of-river intake, located near Kg. Semangur, on the S. Johor, to meet the increase in demand from 1978/79 to year 2000.

2. a) As 1(a) above.
- b) Construction of a barrage on the estuary of the S. Tebrau. The maximum yield of this is assumed at this stage at 35 mgd. This would meet the demand until 1992/93.
- c) Run-of-river intake on S. Johor as 1(b) above, but with a capacity to meet the increase in demand from 1992/93 to year 2000.

The estimated total capital costs, annual operating costs at ultimate demand and present values (1971) at discount rates of 10 percent and 15 percent are:-

Table 7

Alternative	Capital Cost (Million dollars)	Annual Operating Cost (Million dollars)	Present Value (Million \$)	
			10%	15%
1	94.51	3.90	38.29	25.21
2	87.14	3.72	38.15	26.81

It should be noted that the abstraction of water from the S. Johor by Johor State will affect the availability of water at the PUB intake. Neither of the above capital costs include allowance for the cost, or any part of the cost, of a regulating reservoir in the Johor catchment.

In alternative 2 the capital cost of the Tebrau barrage has been taken as \$5.50 mm (Viability Report November 1969 by Binnie & Partners (Malaysia)). A sum of \$2.7 mm has been included in Alternative 2 for pollution control at the Tebrau reservoir.

No definite conclusion on the alternatives can be made until:-

- a) A policy regarding the provision of regulatory storage in the catchment of the S. Johor is established by the Malaysian Authorities.

- b) More accurate costs and yields are available on the Tebrau barrage, which at present is being studied by Binnie and Partners (Malaysia).

4.2.4 Project Area - Johor Tengah.

Schemes have been analysed for:-

1. The project villages, including processing factories, being divided into four areas of demand and each supplied from a separate run-of-river source.
2. Supplying some of the villages from adjacent JKR sources, the remainder being supplied as (1) above.
3. Supplying each village from a separate run-of-river source.

Based on capital costs and annual operating costs at ultimate development, the most economic layout is shown in Figure II.5. The estimated total capital cost is approximately \$17 million equivalent to \$148 per head of assumed population. If the factory demands are converted into equivalent population at 40 gallons per head per day (gphd) then the capital cost per "head" reduces to \$107. Allowing an annual charge of 10 percent for capital, the cost per 1000 gallons at ultimate development, is \$1.00 approximately.

A more detailed economic analyses, allowing for phasing of capital expenditure and the build up of operation costs, will be provided in the Master Plan Report to confirm these conclusions.

4.2.5 Project Area - Tanjong Penggerang.

Schemes have been analysed for:-

1. The project villages, including processing factories, being divided into two areas of demand, and each supplied from separate sources involving small dams.

2. Sub-dividing the villages into smaller areas of demand and supplying these from alternative run-of-river sources, small dams, or JKR sources under construction.

Due to the small catchment sizes it would not be practical to supply each village from a separate run-of-river source unless return periods of failure of less than 1 in 5 years were acceptable. This applies particularly to the villages located north and south of the S. Lebam.

Kg. P. Gogak is the only existing village included. It has been assumed that the present scheme under planning and investigation by the JKR to supply the south coast of Penggerang will be successful.

Based on capital costs and annual operating costs at ultimate development, the most economic layout for villages identified as P11-P18, is shown in Figure II.6. For the remaining villages the alternatives considered gave almost identical annual costs. The initial tourist development only has been included in the study. The layout shown in Figure II.6 would be preferred if the estimated water demand (9 mgd) for the ultimate tourist development is included.

The layout includes the provision of a small reservoir on the S. Lebam which is sited in an area recommended for mineral prospecting in the geological report. The earliest date by which the area might be required for water supply purposes is estimated to be year 1978 and it is recommended that mineral prospecting be given priority, so that exploitation of any mineral potential can be carried out by 1977.

The total capital cost is estimated at \$14.9 mn; of this total about \$0.8 mn is chargeable to Kg. P. Gogak and the initial tourist development. The net capital cost chargeable to the assumed agricultural population is therefore about \$14.1 mn equivalent to \$204 per head. If the factory demands are converted into equivalent population at 40 gphd. then the capital cost per "head" reduces to \$159. Allowing an

annual charge of 10 percent for capital, the cost per 1000 gallons at ultimate development (including Kg. P. Gogak and initial tourist development), is approximately \$1.32.

A more detailed economic analyses, allowing for phasing of capital expenditure and the build up of operation costs, will be provided in the Master Plan Report to confirm these conclusions.

4.3 Other Developments

4.3.1 Flood Mitigation.

A brief study of engineering methods of flood mitigation at Kota Tinggi has been made and previously reported. Schemes considered included upstream reservoir storage, downstream barrage storage, relief channel, channel improvements and bunding. Of these only reservoir storage, relief channel and bunding were considered to give a realistic solution to flooding. However these schemes proved to be very uneconomic requiring annual subsidies of the order of \$355,000 to \$680,000. The report concluded that "Subsidies of the order indicated represent a very heavy investment indeed for the sake of avoiding periodic inconvenience and distress to the people involved. Before adopting subsidies on this scale consideration should be given to a policy of restricting development on the low ground and of encouraging relocation of existing low lying dwellings on higher ground". It is understood that the expansion plan for Kota Tinggi, being produced by the State Planning Office, will include, if necessary, the relocation of the existing town centre and other properties within the flood plain.

The channels of many of the rivers in the project area are littered with fallen trees. By removing these trees in the smaller streams, local flood levels can be reduced and drainage in the flood plain improved. De-snagging techniques, if adopted extensively, may be expected to have the effect of increasing flood discharge peaks in lower reaches of rivers.

4.3.2 Land Drainage.

No demand for drainage of the deep peats of Tanjong Penggerang exists due to the unsuitability of these soils for agricultural development.

It is possible that selected small areas elsewhere, mostly located in river valleys, may have to be artificially drained for certain crops.

The observation density of soil survey is such that there is insufficient detail available of soil type and water table level to identify these areas with accuracy. It is not expected that any elaborate drainage schemes will be required. The layout of the small drainage schemes envisaged should follow standard DID practise, and the depth and spacing of drains should take into account experience gained on similar schemes with the same crops.

4.3.3 Irrigation.

The location of nurseries, which depends on the availability of water and the detailed phasing of developments, will not be decided until the Master Planning stage. As demands are small the availability of water will not be a major constraint on location.

4.3.4 Regulation of the S. Johor

Under the 1962 Agreement between the State of Johor and the city of Singapore, the PUB Singapore operate a run-of-river intake on the south bank of the river about $1\frac{1}{2}$ miles upstream of Kota Tinggi. The Terms of Reference draw particular attention to this. Only the technical implications of regulation have been studied, as the desirability of providing regulatory storage on the S. Johor depends on factors and decisions outside the Terms of Reference.

The studies show that it is possible to regulate flows at the PUB intake up to 250 mgd (the PUB's maximum abstraction rate allowed by the Agreement), taking into account all other demands likely to be placed on the catchment by the year 2000. These other demands include;

- (i) deliveries to Johor Baharu area;
- (ii) abstraction by existing or proposed JKR intakes within the catchment;
- (iii) project abstractions for village supplies, processing factories and irrigation;
- (iv) abstractions by Kulai Sugar Co.;
- (v) the effects of land clearance (including that part of the catchment outside the project area) on river flows and
- (vi) the prevention of saline intrusion.

Alternative possible dam sites have been studied. To cater for the above maximum demands there are two possible dam sites. One on the S. Linggiu at the confluence of the S. Tempenis, the other on the S. Johor about 1 mile downstreams of the confluence of the S. Linggiu and S. Sayong. The capital costs of construction of the dams alone are estimated at \$7.4 million and \$10.7 million respectively. The reservoir on the S. Johor would have an additional benefit of reducing flood stages downstream including at Kota Tinggi. The maximum benefit is estimated at \$0.5 million; this is the present value of the annual cost of flooding which is estimated at \$45,000. The net cost of the dam attributable to regulation is therefore \$10.2 million, giving the Linggiu site an advantage of \$2.9 million on dam cost alone. A reservoir on the S. Johor suffers from the following major disadvantages:-

- (a) About 2500 acres of already developed land would be flooded; at approximately \$1000 per acre this amounts to \$2.50 million.
- (b) The reservoir would be about 10 miles long and this would provide a major constraint to access to Johor Tengah.
- (c) The reservoir could possibly flood some of the existing tin mines on the lower S. Tengkil.
- (d) Increased sedimentation of the reservoir would occur due to the discharges from the present mining operations on the S. Tengkil.

None of these disadvantages apply to the Linggiu site which has the advantage that about 50 percent of its catchment area is above the 20 degrees slope line and therefore unsuitable for agricultural development.

On the above basis the Linggiu site is to be preferred. The only factor which could alter this conclusion is the value of the mineral potential in the reservoir area. Both reservoir areas include areas recommended for prospecting in the geological report. Prospecting should be carried out at an early date to enable the opportunity cost of mining to be evaluated, and exploitation of the mineral resources of the proposed flooded areas to be carried out before construction of a reservoir. The earliest date by which exploitation could be required to be completed is estimated to be 1977.

On the assumption that a decision to provide storage to cater for the above maximum demands will be made, the land development plan alternatives allow for construction of a dam on the S. Linggiu (Figure 11.5). The plans also allow for the whole of the Linggiu catchment above the dam being excluded from agricultural development and remaining as jungle. This is an economic decision based on the fact that the maximum net opportunity cost to agriculture is very small and likely to be exceeded by the incremental cost in providing a comparable reservoir in a developed catchment rather than an undeveloped catchment.

An alternative site for a reservoir on the S. Linggiu exists suitable for a lower demand. This may be significant in the context of mineral resources development.

4.4 Further Studies

Further studies of recommended water development schemes will be required to prove their technical and economic feasibility in the light of more accurate data on physical conditions. These studies will include:-

- a) detailed topographic surveys
- b) site investigations
- c) investigations of availability of suitable construction materials.
- d) site clearance surveys.

- e) groundwater studies
- f) preliminary design studies
- g) hydrological studies.

Regarding the last of these, for accurate conclusions to be reached, it is imperative that the collection of reliable hydrological data should continue uninterrupted in the network already established. This point has already been the subject of discussions with the Federal D.I.D. Authority and detailed proposals have been submitted and accepted.

Proposals for further studies will be submitted in greater detail, together with a tentative programme for implementation, in the Master Plan Report.

GOVERNMENT OF MALAYSIA AND THE STATE OF JOHOR

JOHOR TENGAH AND TANJONG PENGGERANG
REGIONAL MASTER PLAN

SUPPORTING REPORT III

GEOLOGY AND MINERALISATION

JANUARY 1971

Hunting Technical Services Ltd.

Binnies & Partners . Overseas Development Group . Shankland Cox Overseas
University of East Anglia

C O N T E N T S

	Page No.
1. GEOLOGY AND MINERALISATION	1
1.1 General Geology	1
1.2 Metallic Mineralisation	1
1.2.1 Iron	2
1.2.2 Tin	2
1.2.3 Bauxite	2
1.3 Non-metallic Minerals	2
1.3.1 Silica Sand	2
1.3.2 Construction Materials	3

2. MINING - FUTURE PROSPECTING	3
3. DEVELOPMENT	4

TABLES

1. Mineral Production 1965 - 1969	4
-----------------------------------	---

FIGURES

III.1 Geology - Johor Tengah	1
III.2 Geology - Tanjung Penggerang	1
III.3 Mining & Metallic Minerals Johor Tengah	2
III.4 Mining & Metallic Minerals - Tanjung Penggerang	2
III.5 Non-metallic Minerals - Johor Tengah	3
III.6 Non-metallic Minerals - Tanjung Penggerang	3

SUPPORTING REPORT III

GEOLOGY AND MINERALISATION

1. GEOLOGY AND MINERALISATION

1.1 General Geology

Two generalised regional geological maps (Figures III.1 and III.2) have been prepared from a study of the existing geological information with, in the case of Tanjong Penggerang, additional information from the soil survey. Particularly in south, photogeological interpretation of aerial photographs was also used.

In Johor Tengah the predominant rock units are granite or allied rocks, and these underlie the majority of the region. The ridge north of G. Blumut and the area along the northeast project boundary consist of extensive occurrences of volcanic rocks. Between the granite and the volcanics in the northeast corner of the area there is a zone of meta-sediments, and there is a further area of metasediments near Kota Tinggi. Sedimentary formations, consisting of sands, sandstones and shales with some siltstones, clays and conglomerates, appear in a broad central band from Layang Layang to the upper Linggiu valley. A further sedimentary band lies adjacent to the Kluang-Kg. Kahang Bahru road. (Figures I.2 and I.3 show all topographic locations).

In Tanjong Penggerang a large underlying granite mass is adjacent to a broad central zone of meta-sediments. Volcanics also occur in this region on the west and south west of the granite mass.

Both areas also contain extensive alluvial deposits, especially in Tanjong Penggerang in association with peat swamps.

1.2 Metallic Mineralisation

The large granite mass associated with the metasediments and the alluvial deposits indicates the possibility of mineral occurrences in these areas. In such an environment a wide range of minerals could be expected but current evidence is that only tin occurs in any economic quantities.

1.2.1 Iron

Iron and tin have both been mined at Pelepah Kanan and other nearby mines but these deposits are almost worked out and are mined for the tin only.

Prospecting records identify iron ore deposits in the south of Tanjong Penggerang but they are not of a high commercial grade nor do they occur in significant quantities. No further deposits have been identified in the areas.

1.2.2 Tin

The Mining and Metallic Minerals maps, (Figures III.3 and III.4), indicate the extent of existing mining and prospecting. The tin mines in the Johor Tengah area have been operating for many years and are still productive. Significant tin occurrences from the Geological Survey or prospectors' reports are plotted on the maps and help to show the widespread nature of mineralisation. Available geological evidence would tend to indicate that further tin deposits could be expected in both regions but only detailed prospecting will reveal the extent and grade.

1.2.3 Bauxite

An active bauxite mining area is located in the south of Tanjong Penggerang, the deposits occurring as capping on the low lying hills in the area of volcanics. These deposits have been extensively worked and adjoining unmined areas have been thoroughly prospected. Mining is expected to continue on the present scale for several years. Two other areas within a similar environment have been indicated on the mining map; these do not appear to have been prospected and could merit investigation.

1.3 Non-metallic Minerals

1.3.1 Silica Sand

Areas of high grade silica sand are being worked particularly in the south eastern coastal strip of Tanjong Penggerang. Another area further north has been alienated for future working. In all these areas the quality of sand is good but the occurrences are sporadic and largely

1.3.2 Construction Materials

There are extensive areas of granite in both regions, Figures III.5 and III.6 show known outcrops or locations where the overburden is sufficiently shallow for economic working to be feasible.

Laterite areas are indicated together with those areas where reject grade bauxite material is available and could provide an additional source of secondary road surfacing material. Sources of construction sand are also shown.

The Sumalayang limestone, although outside the project area, is of particular interest. Investigations indicate a possible reserve of 30 million tons of limestone. This deposit could supply all agricultural requirements for lime in the project area and elsewhere in the State. It could also be of value to the construction industry as a source of ornamental or dimensional stone; it may also prove effective for stabilising soils in road construction.

2. MINING - FUTURE PROSPECTING

A study of the geological and prospecting records of both areas shows that the possibility of further deposits of economic value over the majority of the project area cannot be entirely ruled out. To prove the whole area, extensive and detailed prospecting would be required but a study, based on known mineralisation or current mining areas, shows that certain areas can be identified as having a higher probability of success. Figures III.3 and III.4 show those rivers whose tributaries should be subjected to further prospecting for tin, locations numbered 1, 2, 4, 5, 7 and 8 in Johor Tengah and 15 and 16 in Tanjong Penggerang being the most significant. Less promising rivers are shown by a broken line. (Water development priorities are in Supporting Report II).

Two areas of possible bauxite deposits have been shown in Tanjong Penggerang; however these areas are on alienated and developed agricultural land.

Without detailed prospecting it is difficult to make a reliable assessment of the extent of any deposits. Table 1 has been

included to show the significance of existing mining in or adjacent to, the project areas.

TABLE 1 Mineral Production 1965 - 1969

	1965	1966	1967	1968	1969
Tin (piculs)	25,026	37,958	85,965	39,400	30,011
Iron (tons)	12,278	35,569	56,038	103,269	nil
Bauxite (tons)	843,172	976,016	885,389	786,042	1,056,068

Figures III.5 and III.6 show possible locations of construction materials, silica sand and kaolin clay

Detailed prospecting and testing of these materials would be necessary before exploitation. The area alienated for future silica sand working will also require careful prospecting; present available evidence is that no large commercially viable deposits exist in the area. Evidence from the project surveys indicate that only the old beach sands along the coast have any potential and that behind these fringe sands the bulk of the area currently alienated is peat swamp.

3. DEVELOPMENT

Under the present system of Land Capability Classification, land possessing a high potential for mineral development is designated Class I land and it is necessary to obtain a clearance certificate from the Geological Survey before development can take place. On present geological evidence this would tend to exclude a large part of both project areas from immediate development.

It is considered that the division of the project area into graded categories with regard to mining potential would serve no useful purpose as there is insufficient conclusive evidence to permit a definitive judgment to be made on the mineral potential. Large areas are virtually unexplored and attempts to define the mineral potential in such areas are therefore valueless. Some attempt at classification has however been .

made by showing areas where mineral potential is rated very low and by indicating suitable rivers for prospecting. Deductions based on the available geological and prospecting evidence indicate only that large areas have the necessary environment for mineralisation. Areas which are considered worthy of further investigation, based on this evidence, have been indicated (Figures III.3 and III.4). More detailed geological survey will be necessary before a final assessment of mineral potential can be made (and a clearance certificate issued if the existing procedure is to be followed). After assessing the potential any likely areas would have to be opened for prospecting; evidence from the records examined suggests that several years could elapse between the opening of an area of an area for prospecting and the eventual issue of any mining licences.

In this uncertain situation it would not be justifiable to allow mineral exploration to obstruct the use of land for other purposes, except in those areas (such as dam and reservoir sites), where irrevocable decisions regarding land use have to be taken. It is suggested therefore that outside such special areas, exploration could be allowed to proceed at any time in the future. Most of the prospecting would be confined to river alluvium and would not therefore be likely to disturb agricultural land. Geological survey would, in any case, be quicker and easier on the cleared land and therefore less expensive.

Should economic mineral deposits be discovered at a later stage, then their exploitation would have to be considered in economic terms - in relation to the then use of the land and the compensation which might be needed if mining destroyed that use.

GOVERNMENT OF MALAYSIA AND THE STATE OF JOHOR

JOHOR TENGAH AND TANJONG PENGGERANG
REGIONAL MASTER PLAN

CHAPTER I CONSERVATION

1. INTRODUCTION
2. JOHOR TENGAH REGION
3. TANJONG PENGGERANG REGION
4. CONSERVATION AREA: WILD LIFE RESERVE,
AND NATIONAL PARKS

CHAPTER II FORESTRY

1. FORESTRY RESOURCES SUPPORTING REPORT IV
 - 1.1 Introduction
 - 1.2 Forest Base CONSERVATION & FORESTRY
 - 1.2.1 Johor Tengah Development Estate

2. FORESTAL

- 2.1 Inventory
 - 2.2 The Resource Base
 - 2.2.1 Johor Tengah
 - 2.2.2 Tanjung Penggerang
 - 2.3 Species and Distribution
- JANUARY 1971

3. FORESTY

- 3.1 Development and Markets
- 3.2 Logging Programme - Conventional Timber
- 3.3 Log Extraction
- 3.4 Non-Wood Product Timber
- 3.5 Other

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GOVERNMENT OF MALAYSIA AND THE STATE OF JOHOR

JOHOR TROPICAL AND TROPICAL FORESTRY
RESEARCH CENTER

REPORT NO. 14

CONSERVATION & FORESTRY

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CONTENTS

CHAPTER 1	CONSERVATION	1
1.	INTRODUCTION	1
2.	JOHOR TENGAH REGION	1
3.	TANJONG PENGGERANG REGION	2
4.	CONSERVATION AREA: WILD LIFE RESERVES, AND NATIONAL PARKS	2
CHAPTER 2 FORESTRY		6
1.	FORESTRY RESOURCES	6
1.1	Introduction	6
1.2	Forest Description	3
1.2.1	Johor Tengah Development Region	6
2.	POTENTIAL	9
2.1	Inventory	9
2.2	The Resource Base	9
2.2.1	Johor Tengah	12
2.2.2	Tanjong Penggerang	12
2.3	Criteria for Future Management/Exploitation	12
3.	UTILISATION	12
3.1	Introduction and Markets	12
3.3	Logging Programme - Conventional Timber	14
3.4	Log Extraction	15
3.5	Logging Residual Timber	16
3.6	Processing	16
3.6.1	Conventional Timber	16
3.6.2	Residual Timber	21

CONTENTS (Cont.)

	Page No.
4. DEVELOPMENT PROPOSALS	21
4.1 Residual Timber	21
4.2 Conventional Timber	22
4.3 Government Revenue	23
4.4 Logging	28
4.5 Processing	29

TABLES

IV. 1 Project Forest Areas	7
IV. 2 Forest Inventory - Johor Tengah	10
IV. 3 Estimated Volume of Timber from Project Development Area in Cubic Tons True	11
IV. 4 Indicative value of 1 ton of logs	13
IV. 5 Proposed Logging Programme Johor Tengah	15
IV. 6 Sawmill and Other Facilities to process 87,000 FD tons per annum from 92,000 acres in Johor Tengah; Economic Characteristics	18
IV. 7 Johor Wood Mills: Existing and Approved: Oct., 1970	20
IV. 8 Reserve Prices for Timber in Bidding to Exploit Forest	27

FIGURES

	Facing Page
IV. 1 Proposed National Park Johor Tengah	2
IV. 2 Tanjong Penggerang Proposed Conservation Area	2
IV. 3 Tanjong Penggerang Padang Mulud Strict Nature Reserve	2
IV. 4 Johor Tengah Forest Inventory Area and Existing Exploitation	6
IV. 5 Tanjong Penggerang Forested and other Land	6
IV. 6 Forest Reserves (2nd Malaysia Plan)	12
IV. 7 Johor Tengah Logging Plan	14
IV. 8 Timber Industry Location (Present Situation)	19

SUPPORTING REPORT IV

CONSERVATION & FORESTRY

CHAPTER 1 CONSERVATION

1. INTRODUCTION

It is important to take into account the protection of water catchment and reservoirs, the conservation of biological communities and wildlife, and the preservation of scenic assets in the interests of recreation and tourism.

2. JOHOR TENGAH REGION

Some six percent of the whole State of Johor is above the 500 foot contour. The dangers from erosion if land in the hill forest areas is cleared and developed is likely to outweigh any advantage from cultivation, and they should therefore be left under forest and managed as a conservation area and national park.

Opening up a large area of land to modern forms of development inevitably results in the destruction of much natural beauty and of plant and animal communities of biological interest. The removal of vegetation in important catchment areas may also endanger water supplies. It is therefore necessary that development plans should provide at the outset for the conservation of some of these assets for the recreational and scientific enjoyment of the public.

Such areas recommended for the Johor Tengah area (Figure IV.1) include all land above the proposed dam sites on the Kahang and Linggui rivers. The boundaries should extend eastwards into the Mersing and Kota Tinggi districts as shown on the map. This would in part compensate for the loss of the forest reserves and forest-cum-game reserves which presently cover 233,000 acres of the total 368,000 acres in the Johor Tengah development region.

3. TANJONG PENGGERANG REGION

In this region it is proposed that a part of the upper catchment of the Lebam river be treated as a protective forest area for water supply purposes as well as an amenity area backing the proposed coastal resort area (Fig. IV. 2). The existing forest reserve behind the east coast line should be extended inland to incorporate all freshwater and alluvial swamps. This area would include a strict nature or virgin jungle reserve at Padang Mulud. It is the only place where the three types of natural vegetation (raised beach forest, freshwater alluvial swamp forest and coastal forest) which have been awarded priority for conservation, occur together in a compact, almost completely undisturbed area. It has its own independent drainage system. Irrespective of any silica sand which may occur in the comparatively small area of raised beach forest, absolute priority should be given to the conservation of this area as shown (Fig. IV. 3).

4. CONSERVATION AREA: WILD LIFE RESERVES, AND NATIONAL PARKS

The existing Endau-Kota Tinggi Life (W) Reserve is located in part in the Johor Tengah development region. It comprises sections of the Lenggong and Kluang Forest Reserves and includes some State Land between the Pengelli and Linggiu rivers (See Figure IV. 1). The whole reserve covers some 311 square miles. The Endau Kota Tinggi Wild Life (E) Reserve is located outside the project area to the east of the Kota Tinggi Jemaluang road and covers an area of 72 square miles. It is shown in Figure VI. 4.

These reserves were originally one, and at the time of formation as a strict nature reserve in 1933 covered some 878 square miles. The area was reduced in 1941 and two wild life reserves created as above.

There are no wild life reserves in the Tanjong Penggerang development region. However, during the study, project staff recorded either sightings, or other visual evidence, of elephant, tiger, Malayan sun bear, four species of deer - sambhur, barking, larger and lesser mouse deer, common wild pig and smaller mammals. Larger birds seen in this

region were Argus pheasant, the black, bushy-crested and the rhinoceros hornbill. In Johor Tengah elephant, tiger, bear, deer (as above), wild pig, primates (monkeys and gibbons) and smaller mammals were observed and a Sumatran rhino footprint was again recorded in the upper Linggiu Valley.

The supplementary paper on "The Conservation of Biological Communities, Wild Life and Water in the Development Areas of South East Johor" makes positive recommendations and lays down guidelines for the selection of strict nature reserves. In addition, the forestry and agricultural supporting reports have drawn attention to the management and erosion problems in hill forest and recommend that such areas be left under forest and managed as conservation areas and national parks.

For the Johor Tengah development region and certain adjacent watersheds outside the region the creation of the Johor State Central National Park is recommended. It would be centred on Gunung Blumut and should include all land above the twenty degree slope i.e. land above the perennial agricultural crop line in what will eventually remain of the Endau Kota Tinggi Wild Life (W) Reserve and the Forest Reserves of Kluang, Lenggor, Ulu Sedili and Panti. It will however be necessary to include certain water conservation areas below such slopes eg. on the Linggiu and Kahang rivers. These areas will also provide a habitat for game who can only survive in lowland forest and river valley bottoms. The proposed park is delineated in Figure IV. 1. and the present Endau Kota Tinggi Wild Life (E) Reserve should, it is suggested, be regarded as an extension, especially as the few remaining Sumatran rhinoceros use the area as well as tiger, deer, pig, crestless fireback pheasants, jungle fowl and pied imperial pigeons. Botanically the area is of importance in view of the presence of Bornean species. If this area is not properly secured within a national park frame work then its primary purpose will soon be lost to posterity and the game become extinct.

The only objection to these proposals might come from the Jungle Warfare School who use the Panti Forest Reserve and the south east sector of the Ulu Sedili forest reserve as dry training areas, (Ref. Area Numbers 11-21 on FARELF MISC SHEET No. 1223/1 compiled from 1:63,360 sheet Nos. 126, 131). However, it is understood that the use of live ammunition,

explosives, cutting of trees and hunting are prohibited by the school. If the military authorities continue to exercise discretion damage to the flora, fauna and water catchments will be minimal. Clearly public access will be limited, but it is considered essential that the area should still be included in the national park for obvious conservation reasons. Should the G. Sumalayang limestone deposit be opened up then restrictive covenant will have to be included in the mining lease to control access, tips, damage and pollution.

The national park would require a competent park warden supplemented by one or two assistants or rangers and labourers as the facility develops. Roads, tracks, shelters and control points would also be needed. The area covered would be around 200 square miles (approximately 270 square miles if the Endau Kota Tinggi Wild Life (E) reserve is incorporated). The training of the staff would be equally important and it is suggested that one or two selected personnel might be sent to the East African College of Wild Life Management at MOSHI in Northern Tanzania, where courses are held at all levels and in all aspects of game and park management.

The above proposals accord with the recommendations made in the reports on studies carried out into the conservation of wild life and a national park system in West Malaysia under a Colombo Plan project during the two-year period 1966-1968 for the then Ministry of Lands and Mines.

For the Tanjong Penggerang region we consider that it would be unrealistic to go beyond the recommendations contained in the conservation supplementary paper and reports on tourism and forestry, which are summarised below as follows:

1. Water conservation area: The headwaters of the major tributaries of the Sungei Lebam backing the proposed tourist amenity. Some wild life will remain, provided hunting is forbidden.
2. Strict nature reserve: At Padung Mulud to preserve good examples of strand flora and three rare biological communities, namely beach forest, alluvial swamp forest and coastal hill forest.

3. Headlands: Tanjong2 Gemah, Kelesa and Siang.
4. Hills: At Bukit2 Satu, Tangga Tujoh, Sembilan; Bukit2 Belungkor, Arang, Bukit Pelai, Kangkar and Bukit Tambun Tulang to preserve the survey and flora with Bornean element. These are all areas of no agricultural potential and contain the headqaters of many of the streams which must be protected as the sources of future water supplies.

Finally it is recommended that hunting be prohibited during the development period and that attempts be made to encourage wild life to move into the protected areas and parks.

CHAPTER 2 FORESTRY

1. FORESTRY RESOURCES

1.1 Introduction

Forest, both primary and secondary, covers 64 percent of the total project area, or about 518,000 acres. (Table IV. 1).

The Johor Tengah area contains a compact block of approximately 178,000 acres of undisturbed forest in the centre and north, with two small areas of similar forest in the south east (fig. IV. 4). These lie within Kluang, Rengam, Ulu Sedili and Panti forest reserves and are bounded by areas of exploited forest in the extreme north and south.

In Tanjong Penggerang, which has been heavily logged in the past, little undisturbed forest remains except in parts of the peat swamps in the north east. There are extensive areas of secondary forest, the result, presumably, of past clearings for gambier and tapioca cultivation. (Fig. IV. 5).

Small areas of forest in Johor Tengah are presently being logged under agreements. Further small areas both in Johor Tengah and Tanjong Penggerang have also been given out for logging under licence. The latest date of expiry is 1980 for agreement areas and account of this constraint has been in logging and agricultural development programmes. The licence areas do not affect these programmes because the licences can be revoked at short notice.

1.2 Forest Description

1.2.1 Johor Tengah Development Region

The bulk of the commercially valuable forest is to be found in this part of the project area, and is sub-divided into two categories; lowland forests and hill forests, the boundary between the two being taken as the 500 foot contour.

Lowland Forest - The forest within this area is representative of the Lowland Dipterocarp type commonly found in West Malaysia up to about 1,000 feet above sea level.

TABLE IV : 1 PROJECT FOREST AREAS

<u>1. JOHOR TENGAH</u>	<u>ACRES</u>
(a) <u>Inventory Area</u>	
Hill forest above 20° slope	51,000
Lowland Agreement Areas, undisturbed	6,000
Other lowland forest undisturbed including 21,000 acres of water catchment	92,000
	<u>149,000</u>
(b) <u>Uninventoried Area</u>	
Hill forest above 20° slope	14,000
Lowland Agreement Areas, undisturbed	8,000
Other lowland forest, undisturbed	7,000
Regenerated forest	13,000
Exploited, under exploitation, secondary and other disturbed forest, including 6,000 acres in Panti Forest Reserve extension	92,000
	<u>134,000</u>
TOTAL	<u>283,000</u>
 <u>2. TANJONG PENGGERANG</u>	
Mangrove Swamp	18,000
Fresh water alluvium and Peat swamp	60,000
Exploited, under exploitation, secondary and other disturbed forest	157,000*
TOTAL	<u>235,000</u>

* Includes 57,000 acres of scattered areas of tiup-tiup (Adinandra dumosa) forest, mainly in the south central portion of the region.

NOTE: Of the above totals 77,000 acres of inventoried forest and 104,400 acres of uninventoried forest are available for agricultural development in the Johor Tengah area. This excludes 21,000 acres of water catchment in the inventoried area.

In Tanjong Penggerang 105,900 acres are available for the same purpose excluding water catchment and other areas proposed for reservation.

The principal emergent species are those of the family Dipterocarpaceae viz. red, yellow and white meranti, with red meranti predominating, keruing, merawan, balau, chengal, resak, kapur, and seraya. Kapur is only found in two small areas, in the north west and south east. Seraya, occurs only on high ridges and is for this reason, infrequent. The rest are fairly well distributed in varying densities mixed with non-Dipterocarp species, the chief of which in order of abundance are: kedondong, kelat, kempas, nyatoh, medan, kembang semangkok, bintangor, mengkulang, rengas, keranji, durian, and simpoh. Jelutong, an important commercial species, is uncommon; so is mersawa in the Dipterocarp group.

Hill Forest - In the lower altitudinal ranges the forest is typical of the Lowland Dipterocarp type, containing a high proportion of kapur, red and yellow meranti, keruing, kempas and mengkulang. The forests on the higher elevations are representative of the Hill Dipterocarp type with seraya and merpauh conspicuous on the ridge tops. Between 1,500 and 2,000 feet bintangor, kelat, merpauh and medan are commonly found mixed with some chengal, yellow meranti, seraya, kapur and nyatoh. The slopes above 2,000 feet carry only pole-sized forest of no economic significance.

1.2.2 Tanjong Penggerang Development Region

Most of this area has been heavily exploited and little big timber remains. In the south central portion considerable areas of young secondary forest exist with a high proportion (45-90 percent) of tiup-tiup (Adinandra dumosa). This type of forest is estimated to cover 57,000 acres or 13 percent of the development region.

Between Sungei Santi and the south coast, apart from the mangrove fringe along the river and the alluvial swamps on the coast, the forest has been cleared for either bauxite mining or rubber plantations. Along the east coast the majority of the strand is flanked by Barringtonia with occasional fringes of Casuarina. Coastal hill forests occur immediately behind the beach sands and swamps. Further inland, behind the more extensive peat and alluvial swamps, is the inland or lowland dipterocarp forest. The principal emergent species in these forests are red meranti, kempas and keruing.

2. POTENTIAL

2.1 Inventory

The inventory plan for the Johor Tengah region and detailed estimates of the resource base covering girth classes from 2 feet upwards are set out in Supplementary Papers. Summary estimates of the volume of timber are given in section 2.2 below. The current status of the Johor Tengah forest is illustrated in Figure IV. 4.

The inventory was confined to 149,000 acres of undisturbed forest (Table IV. 1); of this 98,000 acres are lowland forest including 6,000 acres subject to existing logging agreements.

The uninventoried portion of Johor Tengah covers about 15,000 acres of undisturbed lowland forest, including 8,000 acres under logging agreement. The remainder is mostly exploited with the exception of the proposed extension to Panti Forest Reserve, in which, 6,000 acres are capable of yielding some marketable timber.

As most of the Tanjong Penggerang region comprises exploited, secondary and disturbed alluvial and peat swamp forests a detailed inventory was not attempted because little marketable timber remains. However, enumeration took place along about 18 miles of soil survey rentises to obtain some information on the residual stand.

2.2 The Resource Base

Estimates of net volume of timber by species groups in the inventoried lowland and hill blocks are given in Table IV. 2.

Table IV. 3 gives the estimated net volume of acceptable species and the gross volume of residual timber from the development areas in Johor Tengah and Tanjong Penggerang. The figures of volume for trees of 4 feet girth and above for acceptable species are reliable minimum estimates (RME) of the net volume from trees of good form only, after a 29 percent deduction for defect. Those for residual timber are gross volume, without deduction for defect because all, or most of, this volume may be utilised for chipping.

TABLE IV: 2.

FOREST INVENTORY - JOHOR TENGAH

Volume of Commercial Timber per acre for trees
of 4 feet girth and over, after allowance for defect

Species Groups	Species	(a) Lowland		(b) Hill forest	
		Volume in cubic feet		Volume in cubic feet	
		MEAN	RME	MEAN	RME
1.	Heavy Hardwoods	280.3	250.7	224.0	197.3
2.	Kempas	97.6	85.8	39.6	33.2
3.	Keruing	127.1	103.2	102.1	87.8
4.	Kapur and Keladan	48.5	34.1	210.9	146.0
5.	Other Medium Hardwoods	342.1	324.6	267.3	248.2
	Total Medium Hardwoods	615.3	574.9	619.9	535.6
6.	Meranti Melantai	55.7	47.5	18.4	13.5
7.	Meranti Rambai Daun	21.3	16.0	19.2	14.2
8.	Meranti Sarang Punai	35.3	27.2	16.5	11.9
9.	Meranti Tembaga	58.8	47.9	47.4	38.1
10.	Seraya	21.2	12.7	116.4	97.6
11.	Nemesu, Gerutu Gerutu and other Red Meranti	172.7	133.0	85.3	68.7
12.	White Meranti	11.9	9.0	7.5	4.3
13.	Mersawa	12.4	8.8	7.2	2.9
14.	Yellow Meranti	29.8	23.3	50.5	41.4
15.	Jelutung	8.9	6.4	5.0	2.4
16.	Mengkulang	49.5	41.9	24.9	19.1
17.	Other Light Hardwoods	538.7	486.7	414.7	385.1
	Total Light Hardwoods	1,014.2	918.6	813.0	734.8
	Grand Total	1,909.8		1,656.9	

NOTE: Reliable minimum estimates (RME) are not additive as the sampling error for combined groups is less than that for the separate components.

ESTIMATED VOLUME OF TIMBER FROM PROJECT DEVELOPMENT AREA IN CUBIC TONS TRUE

	ACCEPTABLE (RME)		RESIDUAL (GROSS)	
	Area in Acres	4' girth and over	4' girth and over	2' to 4' girth
JOHOR TENGAH				
(i) Inventory area excluding 6,000 acres of Agreement Areas	92,000	23.1 tpa. 2,125,000	15 tpa. 1,065,000 (A)	20 tpa. 1,420,000 (A)
(ii) Agreement Areas (6,000 acres within Inventory Area plus 8,000 acres outside Inventory Area)	14,000	23.1 tpa. 323,000	15 tpa. 210,000	20 tpa. 280,000
(iii) Other lowland undisturbed forest including 500 acres of Virgin Jungle Reserve	7,000	23.1 tpa. 161,000	15 tpa. 105,000	20 tpa. 140,000
(iv) Panti Forest Reserve Extension (partially logged in the past)	6,000	10.0 tpa (B) 60,000 (B)	15 tpa. 90,000	20 tpa. 120,000
(v) Regenerated forests Kluang and Panti Forest Reserves not more than 20 years of age	13,000	-	-	10 tpa. 130,000
(vi) Exploited primary forests in Forest Reserves and State Land	65,400	-	15 tpa. 981,000	20 tpa. 1,308,000 (B)
(vii) Secondary forest containing some tiup-tiup (<u>Adinandra dumosa</u>)	5,000	-	-	10 tpa. 50,000 (B)
TANJONG PENGGERANG	202,400 (C)	2,669,000	2,451,000	3,448,000
(i) Exploited primary forest	48,900	-	15 tpa. 733,500	20 tpa. 978,000
(ii) Secondary forest carrying a good proportion of tiup-tiup (<u>Adinandra dumosa</u>)	57,000	-	-	10 tpa. 570,000 (B)
GRAND TOTAL	308,300	2,669,000	3,184,500	4,996,000

tpa. = (tons per acre)

(B) Estimated.

(C) Area of developable land is 181,400 acres (202,400 less 21,000 acres).

(A) 21,000 acres within the Inventory Area are proposed for reservation as Water Catchment. It is presumed that logging of acceptable species only will be permitted but not for residual timber. Therefore, for residual timber, the gross volume is calculated from 71,000 acres only.

(D) Total area developable in Johor Tengah and Tanjong Penggerang is 287,300 acres.

2.2.1 Johor Tengah

Acceptable species, i.e. species currently accepted by the trade account for 2,669,000 cubic tons ~~true~~ out of which 323,000 tons will be produced by agreement holders. Residual timber from trees of 2 feet girth and over is estimated to yield a total of nearly 6,000,000 tons.

2.2.2 Tanjong Penggerang

Little marketable timber remains and what is left can only be considered for chipping. Excluding timber in the fresh water alluvial and peat swamps, which will be difficult to ~~extract~~, and the mangrove forests currently under Forest Department working plans for production of firewood and charcoal, the estimated gross volume of residual timber from trees of 2 feet girth and over is about 2.3 million tons.

2.3 Criteria for Future Management/Exploitation

It is recommended that hill forests on the steeper terrain (over 20°) should be protected and remain unworked, for the time being at any rate. No successful regeneration techniques have been evolved for these forests and exploitation might cause erosion, the silting of streams and impair the habitat of important fauna. When satisfactory management techniques have been evolved this forest type may then make a useful contribution to the forest industry. It is about 65,000 acres in extent (Table IV. 1).

3. UTILISATION

3.1 Introduction and Markets

In 1969 Johor produced 434,000 tons of logs, about half of which came from Forest Reserve (Fig. IV. 6) and half from State land. Forty one sawmills and 5 plymills produced logs, sawn timber and plywood for local and export markets to a value of some \$55 ~~mn.~~ State royalties and premia amounted to \$7.78 ~~mn.~~ Some 5,000 people were employed in forestry, in felling and transporting logs, in ~~saw~~ sawmilling and ply manufacture. In 1970 forty one agreement area holders worked a total Forest Reserve coupe of 13,000 acres. Forty four licence holders worked in State Land

forest and four in alienated land. The largest individual coupe was 1,000 acres.

The main objectives governing the use of project area timber should be to provide maximum value added and employment in Malaysia subject to the constraint of a reasonable rate of return on capital to attract investment. High value outlets for timber of popular sizes and species have therefore been examined and new markets for timber, at present unattractive to the trade, have been assessed.

Table IV. 4 indicates the comparative current values of typical Malaysian timber processed to different stages.

TABLE IV. 4

Indicative value of 1 ton of logs

	\$
Exported as logs to Singapore (including 10 percent export duty)	90
Sold as .6 tons rough sawn air dried timber on local market	72
Sold as .6 tons pressure treated rough sawn timber on local market	100
Exported as .6 tons rough sawn air dried timber	120
Exported as .6 tons rough sawn kiln dried timber	150
Exported as .5 tons plywood	155
Exported as .4 tons mouldings	180

The best marketing strategy is to sell as much timber as possible in the following order of preference; plywood, mouldings, kiln dried export timber, air dried export timber, and pressure treated timber for local sale (especially for timber housing). Plywood is ranked first because it has a comparatively large and well known market where it will be comparatively easy to sell suitable timber in a high value form. Sales of mouldings and kiln dried timber will need the establishment of new market links, which will take some time to develop.

The most promising market for residual timber at present is as chips for export to Japan. If a use could be found for, say, three quarters of the 8 million cubic tons of residual timber estimated to be in the project area, even at the low price of \$38 per ton, which is being

currently received for rubber wood chips for export, the value added (after deducting costs) would be almost \$230 mm. This is equal to that expected from sales of conventional timber from lowland inventoried forest in Johor Tengah.

3.3 Logging Programme - Conventional timber.

There should be two major objectives in designing a working programme for the Johor Tengah forest. First the provision of a practicable phasing and distribution of logging operations; and, associated with this, the establishment of an economically viable enterprise or enterprises for the utilisation of the timber. In this case the phasing of log extraction should be compatible with the speed of land clearance for agricultural development, and the alignment of logging roads should coincide with that of permanent communications.

The total area of land suitable for agriculture in Johor Tengah is 181,400 acres. This excludes 21,000 acres to remain as forest within proposed water catchments. The present forest status of the balance is made up as follows:-

Undisturbed lowland forest excluding agreement areas	-	78,000
Agreement areas to be logged by agreement holders	-	14,000
Partially logged forest in proposed extension to Panti Forest Reserve	-	6,000
Regenerated, exploited and Secondary forest	-	83,400
		<u>181,400</u>

Logging would begin in the 6,000 acres of proposed extension to Panti Forest Reserve under normal agreement arrangements followed by 78,000 acres of undisturbed forest outside the proposed water catchments. Of this 7,000 acres in Kluang forest reserve would also be logged under agreement. The 21,000 acres within water catchments can be logged whenever convenient. (Figure IV. 7).

The 83,400 acres of regenerated, exploited and secondary forest which contain no marketable timber may be exploited for chips in accordance

with the land clearing programme.

Three rates of land clearance have been tested, ten, twelve and fifteen years. It is, however, evident that the fastest rate does not allow the most effective utilisation of the timber resource. There would be insufficient time to establish new enterprises for high priced products and to develop markets for presently unused species. In the meantime much would have to be sold in log form. Furthermore, annual coupes far in excess of anything hitherto attempted in Johor would be necessary, and the period for training new participants in the industry would be too short.

Twelve and fifteen year agricultural land clearance programmes are therefore more favourable from the forestry point of view, and in each case a fifteen year logging programme is possible (Fig. IV. 7). The shorter clearing period is feasible, because adequate timber supplies are available from outside the agricultural development area, but within Johor Tengah as a whole.

A fifteen year logging programme is preferable because it allows more time to develop the new markets referred to above, it will be more attractive to private investors in the utilisation industry, and will enable the cost of any investment to be written off over a longer period. A fifteen year logging programme has been assumed.

TABLE IV. 5 Proposed Logging Programme Johor Tengah

Area to be logged	92,000 acres
Logging period	15 years
Average logged per annum	6,100 acres
Annual outturn (thousand FD tons)	123
of which	
Peeler Logs (thousand FD tons)	36
Saw logs (thousand FD tons)	87
Forest Department (FD) tons	13 percent lower than true ton.

3.4 Log Extraction

There are two extraction techniques in current use, the older method by ~~winch~~ lorry and the other by wheeled skidders very recently

introduced in West Malaysia.

There are advantages and disadvantages in both methods and further experience is needed of the skidder system before a final comparison can be made; but the "traditional" method seems at present to be cheaper.

3.5 Logging Residual Timber

Two kinds of forest are available for harvesting for chipping.

- (1) Residual timber from virgin forest in the Johor Tengah region.
- (2) Exploited and secondary forest in Johor Tengah and Tanjong Penggerang areas.

In virgin forest concurrent harvesting of conventional timber and chippable logs will probably be cheaper and more practicable. However, organisational and cost allocation problems will arise and would need to be resolved before operations start.

In secondary forest it is suggested that harvesting for chipping can take place at clearing. A cost comparison of alternative logging and clearing methods will be needed.

3.6 Processing

3.6.1 Conventional Timber

An estimated 2.2 mn FD tons of conventional utilisable timber are available in Johor Tengah. This, together with small amounts of timber salvaged from secondary and disturbed forest would, under the present system, provide an estimated \$26 mn in royalty and \$7 mn in premium revenue to the State of Johor. Of this some \$18 mn royalty and \$5½ mn premium would come from the 92,000 acres in Johor Tengah. An alternative system, which would yield nearly double the revenue from the 92,000 acres, is described later.

Table IV. 6 sets out the economic characteristics of facilities which would be needed to process all sawlogs from the 92,000 acres in Johor Tengah into the highest value products. An annual yield of 123,000

FD tons is assumed from a 15 year working programme. Different capacities would, of course, correspond to different working periods. Peeler logs are not considered because existing industry is well able to handle prospective supplies.

Rates of return were calculated for the 92,000 acres on two processing assumptions. The 'low' processing alternative assumes that 36,000 FD tons per annum would be sold for plymilling and the rest (87,000 FD tons) would be sawn and sold as rough air-dried sawn timber. The 'high' processing alternative assumes that the processing activities described in Table IV.6 would be introduced. The rates of return are shown below for the existing and recommended royalty/premium rates.

	<u>Rate of return to the investor (percent per annum)</u>
'Low' processing alternative.	
- present royalty/premium rates ⁽¹⁾	41
- recommended 'reserve' rates ⁽¹⁾	18
'High' processing alternative	
- present royalty/premium rates	50
- recommended 'reserve' rates	38

(1) The average rate of royalty/premium levied in Johor State is about \$12 per FD ton. The recommended reserve prices are equivalent to an average rate of \$25 per FD ton.

The rates of return are clearly high enough to absorb the higher rates of royalties/premia recommended later, and still be sufficient to attract investment into the industry.

TABLE IV. 6

Sawmill and other facilities to process 87,000 FD tons per annum
from 92,000 acres in Johor Tengah; Economic Characteristics

	<u>CAPACITY</u> (Thousand tons of sawn timber per annum)	<u>CAPITAL COST</u> (\$ mn.)	<u>EMPLOYMENT</u> (Number of workers)	<u>COSTS (\$ PER TON OF SAWN TIMBER)</u>		<u>TOTAL</u>
				<u>OPERATING (1)</u>	<u>CAPITAL (2)</u>	
SAWMILL	52	4.8 (3)	215	30 (4)	20	50
DRYING KILNS	17	1.1	53	14	14	28 (5)
PRESSURE TREATMENT	7	0.1	19	26	3	29 (5)
MOULDINGS	11	0.5	45	15	11	26
	(Thousand tons of mouldings)					
MOULDINGS	7	-	-	23	16	39
TOTALS	-	6.5	330	-	-	-

- (1) Excluding costs of transport from point of manufacture.
- (2) Amortized over 15 years at 20 percent per annum.
- (3) Includes \$1.8 mn working capital based on the value of one month's supply of logs and two months' production of sawn timber.
- (4) Based on sawing medium hardwoods.
- (5) Assumes high capacity utilisation. Current charges are about \$50 and \$45 per ton of sawn timber for kiln drying and pressure treatment respectively.

The likely State log outturn has been estimated and the existing industry in Johor surveyed, (Figure IV. 10) to assess how far established industry would have the capacity and the ability to process timber from the 92,000 acres into the products suggested.

Johor's log outturn for the rest of the century will be determined mainly by the rate of land clearance. If this continues at the SMP target rate of 30,000 acres per year, (including project area development), log outturn is likely to be between 350,000 and 500,000 FD tons per year, depending upon timber yield. Of this, sawlogs would account for perhaps 230,000 to 330,000 FD tons and peeler logs 120,000 to 170,000 FD tons. On the assumption that imports into Johor continue to match exports then outturn will be equivalent to mill input.

The capacity of Johor State's plymills and sawmills is likely to rise (Table IV. 7) from 437,000 FD tons actual input in 1969 to about 800,000 FD tons of logs annually in a few years time.

If sawmills increased the intensity of operations (in 1970 only 4 out of 41 sawmills were working 2 shifts) by raising working hours to 12 per day this capacity would rise to about 1.1 million tons annually. If capacity is installed in the project area to handle 120,000 FD tons per annum then this capacity of .8 to 1.1 million tons would be competing for 230,000 to 380,000 tons of logs per annum.

Even though capacity would be adequate on existing standards, it would not be geared to meeting the opportunities of the new high value markets already referred to. Plymills within the State appear generally efficient, but sawmills show a wide range of competence. Even assuming large scale expansion in mill capacity it is believed that only a minority of mills with capacity of about 220,000 tons (one shift basis) will have both automatic headrigs and ponyrigs capable of producing timber sawn accurately enough to command the highest prices or of producing mouldings. There is at present no moulding industry and little dry kiln capacity in Johor.

If project area timber is sold to existing industry, nothing will have been done to improve the average quality and grade of Johor timber.

provide additional opportunities for new employment and skills. It is discussed in more detail under development proposals.

3.6.2 Residual Timber

Possibilities for dealing with residual timber can be regarded as complementary to the above. However it is a new venture about which so little is known that immediate investigations should be made with a view to developing a wide range of uses.

The sole operator engaged in harvesting and chipping rubber wood for export to Japan has expressed interest in handling the residual forest in the project area at a rate of one million tons of chips per annum. A plant is being installed for handling rubber wood alongside the new port area in Johor Baharu which could handle the production from Tanjong Penggerang. Residual timber from the Johor Tengah region would probably best be chipped in a new factory located at the proposed New Town.

If forest waste is exported at the same price as rubberwood - \$54 per ton weight bone dry or about \$38 per cubic ton, and all residual timber in the project area (except in the peat forests of Tanjong Penggerang) were chipped, this would produce 5.15 mn tons weight (bone dry) of chips with fob value (at current prices) of about \$300 mn.

4. DEVELOPMENT PROPOSALS

4.1 Residual Timber

Residual timber is considered first because of its large untapped potential; it is estimated that chipping three-quarters of the residual timber over 2 feet girth (excluding timber in peat swamps), could provide over 1,000 jobs while land clearance is taking place and involve investment of up to \$30 mn and sales of \$300 mn. These are higher values than those involved in handling the conventional timber from 92,000 acres in Johor Tengah.

The first and major need in furthering this possible enterprise is to get more and better information. Logging and chipping residual

forest timber (as opposed to rubber trees) is a completely new and untried proposition.

It is therefore recommended as a matter of urgency that intensive studies be undertaken, and completed preferably by August, 1971, on the following matters; the identification of possible markets for mixed hardwood chips and organisations interested in producing these chips; the determination of sizes and species of tree suitable for chipping, costs of producing chips from various types of forest and the fob price which could be obtained for mixed hardwood chips in various markets. Further points are the determination of a royalty which could reasonably be levied by the Government on this produce; the optimum organisation and timing of logging for chipping in different types of forest, and the relative merits of integrated and separate operations for harvesting conventional timber and logs for chipping in virgin forest.

It is also recommended, but at lower priority, that trial work should begin on producing blockboard using small trees below 4 feet girth of different, and mixed, species. Trial work should also begin on sawing small trees for small dimension sawn timber using small gangsaws and edgers. It is not considered appropriate to install chipboard capacity until further technical and market research has been undertaken. This trial work could be the first tasks of a small experimental unit, established with public funds and attached to a new timber complex in the Johor Tengah New Town. It does not matter where the work is carried out, but it is vital that it should be carried out with as much emphasis on problems of marketing and commercial scale production as on technical sawing properties.

4.2 Conventional Timber

The major issues requiring decisions are mentioned below and then considered in turn in more detail. The most important issue, nationally, which arises from consideration of forest exploitation is that of government revenue. Excluding current agreement areas, the other important question concerning the 92,000 acres of virgin forest in Johor Tengah are:

- i) Should the right to log be given to existing industry or should a new enterprise be set up to exploit the timber?
- ii) Should timber processing facilities be established in the project area and, if so, on what scale, and what products should it manufacture?
- iii) Who should provide capital and control the logging and processing enterprise?
- iv) Should processing facilities be linked to the logging enterprise, and thus assured of a guaranteed supply of timber?

Some of these issues are partly dependent upon a prior decision on the rate of land clearance already discussed.

4.3 Government Revenue

It is a common claim that the Malaysian timber industry is inefficient, in that the species in greatest demand (eg. Meranti and Keruing), are all taken, whereas other less popular species are either left in the forest, or are not worked up beyond the low value local market for sawn timber.

In common with many others the consultants believe that this is in large part a result of the current premium and royalty rates (and, to a lesser extent, of the small size of the individual annual coupe). Two features of the present system appear unsatisfactory: first the combined premium and royalty rates on the popular species are too low and yield excessive profits at the expense of public sector revenue. Second, the rates on the less popular species and sizes are too high and discourage their use.

The present system of taxing timber has two components, premium and royalty. Premium is charged by State Forestry Departments either as a fixed sum per acre or sometimes as a result of competitive bidding. Royalty is levied on each ton of timber extracted, with different rates for different species.

An ideal premium and royalty policy would be one that encouraged the maximum utilisation of as many species as possible while allowing a reasonable return on capital investment. At the same time the royalties and premia should be high enough to give constant encouragement to the installation of more efficient logging and milling machinery, and to stimulate new uses, methods and processing of timber.

The current combined royalty and premium rates in Johor are rarely above \$15 per ton of logs. Premia, even for Forest Reserves, are seldom above \$5 per ton. Perak, and other States, have in some instances put forest reserve areas out to bidding, which has yielded premium revenue far higher than the usual agreement rates, of the order or \$150-\$200 per acre or at least \$7.5-\$10.00 per ton.

These bid prices and the analysis of the rates of return suggest that the timber industry could absorb higher average combined royalty and premium rates. The advantages of higher average rates could be:

- (1) more intensive utilisation of species presently marketed;
- (2) utilisation of species not presently marketed;
- (3) redistribution of income from permit and licence holders to Johor State.

Excessive rates could however raise costs to such an extent that either:

- (a) the prices of logs and sawn timber would rise and thereby reduce Malaysia's export markets; or
- (b) prices would remain unaffected and profits would be depressed to such an extent that investment in timber exploitation would be discouraged.

It is unlikely that higher royalty-cum-premium rates would be passed on in higher prices because a large part of Malaysian timber is sold on the world market and Malaysia in turn provides only a small part of total supply. As a result the world market position dictates the selling prices of Malaysian timber and not vice versa.

Calculations made by the consultants suggest very high rates of return to timber operations, even on the present 'low' processing basis and it seems likely that if premium-cum-royalty rates were adjusted to allow a 20 percent rate of return on timber investment, then sufficient investment would still be attracted into the industry.

It is recommended that government revenue per ton of timber extracted should be increased. There are several alternative ways of achieving this:-

(1) Royalties and premia could be replaced by a single price for exploiting forest. Forest areas would be let to licencees as a result of competitive bidding. Sealed tenders would be invited for specific forest coupes in which a prior sample inventory would have been carried out. The inventory results would enable the Government to set a reserve price below which tenders would not be accepted. (This would be a safeguard against the possibility of tenderers forming a 'ring' to keep prices down). Paying a single sum for the total content of a forest coupe should induce the successful bidder to make a more intensive, as well as extensive, utilisation of timber in the area. Thus variable royalty rates to encourage the use of the less acceptable tree species would not be required. The possible advantages of publishing bids in national newspapers should also be considered.

(2) The present system of separate premium and royalty could be retained, with royalty rates on popular species increased and rates on less popular species reduced or eliminated.

(3) An excise duty could be imposed on logs coming out of the forest. Variable rates of duty would be imposed on different species, depending on selling price and production costs. Forest checking stations would be manned by Excise Department officials rather than forest guards.

(4) An export tax could be imposed on export sales of processed timber products and an excise duty on local sales. The duty would be a specific sum per ton of produce, depending on the species and the percentage conversion from round logs. Duties could be varied between products to encourage higher value processing. The effective rates of duty per ton of

logs could be made lower on mouldings or kiln seasoned timber than on air dried rough sawn timber.

Forest revenue accrues under the present system to State funds. Excise and export taxes, however, accrue to Federal funds. If the present premium and royalty system were replaced, or at least, supplemented by excise taxes, revenue traditionally regarded as State funds would accrue to the Federal Government. Unless it is the Government policy to pass some forest revenue to Federal funds, the first alternative seems the best, since it is the one which minimises the need for a force of officials to administer the scheme and collect revenue. This alternative would also minimise the possibility of small scale corruption.

Under this system, forest guards could be reassigned to more productive tasks, and their salaries might be reviewed in the light of their new responsibilities.

Reserve prices per ton of timber of different species under the first alternative have been calculated (Table IV. 8). They represent what the Government might realistically expect to levy from timber, allowing a reasonable (20 percent per annum) return on capital.

It is stressed that the reliability of these estimates depends crucially on the estimates of selling prices, costs of logging and sawing, and conversion from logs to sawn timber. However, the costs are, if anything, too high rather than too low, and the table is set out so that the necessary adjustments can be made on the basis of more precise estimates.

Applying this system to the 92,000 acres in Johor Tengah would raise a revenue to Johor State of \$47 mn; this compares with a revenue of \$18 mn in royalty and perhaps \$5½ mn in premium which would accrue from applying the present system.

It is also recommended that changes should be made in the policy of exporting logs. Under the present system the export of logs is allowed to Singapore, subject to an export duty of 10 percent; but export of logs elsewhere is subject to a quota, supposedly confined to logs unsaleable on the local market and comprising a maximum of 25 percent popular species.

TABLE IV. 8 ⁽⁴⁾RESERVE PRICES FOR TIMBER IN BIDDING FOR/FIGHT TO EXPLOIT FOREST

Group	1	2	3	4	5	6	7	8	9
Species	Chengal	Balau Merbau Resak	Kapor Keladan	Keruing	Meranti Jelutong Mersawa Mengkulang	Kempas	KerANJI	Other M.H.W.	Other L.H.W.
Selling Price (1)	270	200	180	165	165	120	95	95	95
Cost of sawing	54	54	51	51	48	51	54	51	48
Balance	216	146	129	114	117	69	41	44	47
Balance (2)	130	88	77	68	70	41	25	26	28
Cost of logging (5)	34	34	34	34	34	34	34	34	34
Surplus (3);	96	54	43	34	36	-	-	-	-
"Reserve price"									

- (1) Ex-mill average prices based on combination of export and local prices depending on grade outturn.
- (2) Based on 60 percent conversion from FD tons of logs to tons of sawn timber.
- (3) Strictly applicable only to medium sized logs; ideally larger logs should pay more per ton and smaller logs less.
- (4) Applicable to forest about 50-70 miles from port and consuming centres. Ideally variations in rates should be made for difference in distance from consuming centres.
- (5) Based on average distance from forest to mill of 20 miles, and 'skidding' methods ('Traditional' logging methods seem, at present, to be about \$5 per FD ton cheaper).

Since in 1969, 40 percent of logs exported (excluding exports to Singapore) were Meranti and Keruing, the rules are clearly broken, to the detriment of employment and income in Malaysia.

It is recommended that Singapore, should be treated like any other foreign country, and should no longer have favoured access to Malaysian logs. It is further recommended that the export quota be replaced with an export tax of \$10 per FD ton.

These export ~~duty~~ and royalty/premium measures would go some way in encouraging the more intensive and extensive exploitation of the forests and at the same time would transfer some of the high profits from individuals in Johor to the State Government. But the change to a general export duty would be a more effective instrument if linked with a revised royalty/premium system introduced in all States in West Malaysia. The change to an export ~~duty~~ on logs going to countries other than Singapore would be an improvement on the existing system, but the UNDP study on 'Forest Industries' should consider other incentives and methods to ensure further processing of timber. These could include specific subsidies or grants to particular processing activities, or direct investment by the State or Federal Governments using, where necessary, foreign expertise. (See 4.5).

4.4 Logging

Brief reference was made to different logging techniques in an earlier section. It would be premature to attempt any conclusion at this stage; and the issue has little relevance to this report. It will however be desirable to provide for the training of Malays in the new skidding technique if this method proves efficient and economic.

It is recommended that logging be carried out by Government, possibly in partnership with local logging interests. This would ensure that there would be participation in management and training for Malays. An alternative would be to introduce an overseas enterprise in the operation. This is discussed in more detail later.

4.5 Processing

It was shown in section 3.6 that existing Johor sawmill and plywood capacity was capable of expansion to absorb the additional output from the project area; but that there was at present no capacity for producing certain high grade products and inadequate capacity for kiln drying.

The need therefore is to make good this deficiency. It is recommended that a medium sized sawmill be established in the project area, capable of handling about 50,000 FD tons of logs a year and processing as much timber as possible into high value products. In particular the mill would give a lead in producing mouldings and kiln dried timber. Its purchases of logs would not be confined to the project area and it would buy sawn timber from existing mills for further processing in its own plant. It is important to recognise, however, that developing mouldings, kiln drying, etc. is much less important in terms of employment, investment and value added than the chipping of residual timber, to which reference has already been made.

As regards ownership and management of a new sawmill, there are three possibilities; public sector, existing industry and foreign interests. None of these three seems very promising in isolation. Public sector bodies, lacking experience, might be less competent to run a mill efficiently. Existing industry might do little or nothing to encourage Malay participation and might be reluctant to encourage further processing and the sawing of less popular species. Foreign interests might well introduce advanced, but expensive techniques and a substantial share of the profits would be repatriated abroad. The most promising organisation is therefore Government ownership with managing agents (as in Jengka), possibly with some participation by existing local interests. If the SEJDC is to participate, it must provide capital; providing land would not be enough. One source of capital would be forest royalty and premium revenue.

The final issue which must be considered is whether there should be any linkage between logging and new processing facilities. If new facilities are established there appear to be two alternatives:-

1) to guarantee at least part of project area output to the new mill (this may also require guaranteeing a supply of logs for some time after project area timber is exhausted). In return for this privilege an undertaking could reasonably be expected that the mill would not take peeler logs, but would use some of the less popular timber. Both these undertakings would have to be safeguarded.

2) to separate logging from processing completely; logs would be sold on the open market and the new processing installation would buy logs from any source, in competition with other mills. This would remove the advantage of a guaranteed supply of timber but would obviate the need for administrative control.

It is recommended that the proposed new sawmill for the project area should have no privileged access to logs, but that it should buy them, and such timber as it may require, on the open market in competition with other purchasers. This recommendation derives from the wider view that the industry is at present subject to too much administrative regulation. Market forces, aided by a modified royalty and premium system, should be allowed to exert a greater influence.

The implication of the measures recommended is that there will be much greater pressure on profits in the timber industry. The basic 20 percent return on invested capital postulated earlier for timber processing plants would only be achieved if a much higher level of capacity working or processing is attained than at present. Mills which did not, or could not, obtain enough logs to enhance their efficiency would earn lower profits.

The effect of such a change in policy would be a streamlining of milling capacity to a level more commensurate with prospective log supplies.

In this situation there would be no need to licence sawmills to keep capacity in line with log supply, and it is recommended that sawmill licensing by the Forest Department be abolished. Furthermore competitive forces should not be lessened by long term logging agreements guaranteeing a mill an assured supply of timber for up to 20 years. It is recommended that the maximum logging agreement period be reduced to 3 years. This will

be long enough to assure loggers some continuity of operation, but not long enough to allow associated milling facilities to lapse into inefficiency, assured of a guaranteed supply of timber.

REGIONAL MASTER PLAN

SCHEDULE VI

LIST OF AGENCIES REFERRED TO

JANUARY 1973

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Minister & Partners, Overseas Development Group, Chandrasekhar Centre
University of East Anglia

GOVERNMENT OF MALAYSIA AND THE STATE OF JOHOR

JOHOR TENGAH AND TANJONG PENGGERANG
REGIONAL MASTER PLAN

SUPPORTING REPORT V

LAND USE AND AGRICULTURAL DEVELOPMENT

JANUARY 1971

Hunting Technical Services Ltd.
Binnies & Partners . Overseas Development Group . Shankland Cox Overseas
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GOVERNMENT OF CANADA AND THE STATE OF TEXAS

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C O N T E N T S

	Page No.
CHAPTER 1 LAND USE	1
1.1 Present Situation	1
1.2 Potential	1
CHAPTER 2 SELECTION OF ACTIVITIES	6
2.1 Introduction	6
2.2 Criteria for evaluation & selection	7
2.3 Group 1 Activities	8
2.4 Group 2 Activities	10
2.4.1 Pineapples	10
2.4.2 Coconuts	11
2.4.3 Pepper	12
2.4.4 Pigs & Poultry	13
2.4.5 Fish	14
2.4.6 Fruits & Vegetables	15
2.4.7 Tea	15
2.5 Group 3 Activities	18
2.5.1 Cocoa	18
2.5.2 Cattle	19
2.5.3 Goats	22
2.5.4 Sugar	23
2.5.5 Short-term crops	23
2.5.6 Hybrid coconuts	25
2.5.7 Coffee	26
2.5.8 Fruit & Vegetables for processing	26
2.5.9 Mechanised Pineapple Production	27
2.6 Group 4 Activities	27
2.6.1 Bananas	27
2.6.2 Ramie	29
2.6.3 Other Group 4 Crops	29
2.7 Other Crops	29
2.7.1 Rice	29
2.7.2 Manila Hemp	30

project area. This forest must in general be left untouched, though in some places where the slope range is between twenty and twenty-five degrees a carefully controlled forest exploitation programme may be permissible.

The land below twenty degrees slope may be used for agricultural purposes or for forestry. The number of suitable crops decreases as slopes become steeper. Criteria have been laid down for cropping which must be followed if serious erosion of the land resource is to be avoided. The danger cannot be over stressed. Under the rainfall, terrain and soil conditions in south-east Johor the erosion hazard is as great as anywhere in the world, and the hazard will be increased when the forest cover is removed for agricultural development.

Provided, however, that proper precautions are taken, the equatorial climate of the project area is generally suitable for a wide range of crops. The plentiful and well ^{distributed} ~~distributed~~ rains, together with an average of about five and half hours sunshine per day, comprise excellent conditions for rapid and luxuriant vegetative growth. Grass, root crops and many tree crops thrive under such conditions; grain crops are less well suited, though satisfactory yields of the more adaptable ones, such as sorghum, may be expected if proper attention is paid to the crop calendar and good cultural standards are observed.

In addition to crop production other enterprises that are being, or might be, successfully developed are the production of poultry, pigs, goats and cattle, and fish culture.

The climatic conditions that favour vegetative growth are also those favourable for weeds, for the multiplication of many insect pests and for the rapid development of numerous fungal and bacterial diseases. The excessive rainfall has also caused thoroughly leached and impoverished soils. Thus the requirements for agricultural chemicals and fertilisers are likely to be higher than in most environments. Nevertheless a wide range of agricultural activities is possible.

The first consideration in the choice of crops or agricultural patterns from those generally suited to the environment is their suitability to the terrain. The following primary criteria have been adopted:-

- 1, Annual crops should never be grown on slopes above six degrees, and preferably not on slopes over four degrees.
2. Semi-perennial crops e.g. sugar cane, pineapples, bananas, and certain perennial crops (cocoa and coffee) should not be grown on slopes above twelve degrees.

Within these overall terrain constraints are further constraints imposed by physical soil factors, particularly those that affect rooting depth, such as concretionary or compacted layers or a high water table. In view of the wide range of possible crops, and with the conservation constraints mentioned above, a more precise classification system than the Soil Suitability Classification used by the Soil Science Division is required.

By taking into account the physical requirements of the selected crops, the constraints mentioned above, and the terrain and soil characteristics, a Land Use Potential Classification has been derived. There are six main units in the classifications:-

- (1) Suitable for annual and semi-perennial crops
- (2) Suitable for annual, semi-perennial and perennial crops
- (3) Suitable for semi-perennial and perennial crops
- (4) Suitable for perennial crops
- (5) Suitable for forest under controlled exploitation with regeneration or for reserves.
- (6) Existing developed land, including disturbed mining land.

These main units have been further subdivided into specific crop groups according to the general similarity of their agricultural demands, as follows:-

	<u>Crop Group</u>	<u>Crops</u>
Annual Crops	(1	Rice
	(2	Groundnuts, vegetables, tobacco
	(3	Cassava, Chinese yams, sweet potatoes
	(4	Pulses, maize, sorghum
Semi-perennial crops	(5	Grass
	(6	Bananas, sugar cane, ramie, papaya
	(7	Pineapples
Perennial crops	(8	Coffee, cocoa, citrus avocado, pepper, gambier.
	(9	Oil palm; rambutan, arecanut, mangosteen
	(10	Coconuts, rubber, durian, tea, guava, cashew nuts, brazil nuts, cinnamon, bamboo
	(11	Controlled exploitation with regeneration Could also include bamboo
	(12	Reserve (no exploitation)
Forest		

"Marginally suitable" implies certain obstacles to success which require additional capital input and or special managerial effort if the projected yields and profitability are to be maintained. No serious obstacles exist where land is classified as "suitable"

The extent to which natural conditions will permit any of the above crops to be grown is illustrated on the Land Use Potential maps. Which of them should be developed, the rate of development and the ultimate scale of any enterprise can only be decided after an analysis of other constraints, such as market prospects and the availability of technical knowledge. These analyses are made in the next chapter in which various enterprises are evaluated and some selections made, with recommendations on rates and scales of development. Figures V3 and V4 are generalised reductions of the one inch series Land Use Potential maps referred to.

CHAPTER 2

SELECTION OF ACTIVITIES

2.1 Introduction

The rate of development and ultimate scale of any activity are not determined by natural factors only. Two important constraints that require analysis are market prospects and the availability of basic technical knowledge. To facilitate their examination the list of environmentally suitable activities was divided into the following four groups, each of which is considered in this chapter.

- (1) Activities known to be commercially exploitable immediately and on a large scale. Rubber, oil palms.
- (2) Activities known to be commercially exploitable immediately but on a restricted scale. Pineapples (by hand methods), pepper, coconuts (from local selected seed), fruits and vegetables (fresh), pork, poultry, fish, tea.
- (3) Activities thought to give promise of commercial exploitation, but requiring a period of commercial scale testing.
airy and beef cattle, goats, annual grain and legume pulses and groundnuts, cocoa, sugar cane, coffee, starchy root crops, coconuts (from hybrids), pineapples (mechanised) fruit and vegetables (canning).
- (4) Activities possibly suitable to the environment, but requiring research and experimentation before development, e.g. avocado pears, seedless limes, ramie, gambier, bananas, (for export for human consumption), essential oils.

Broadly speaking the main constraint for the activities in groups 1 and 2, which are known to be commercially exploitable, is likely to be the size and profitability of the market.

For activities in groups 3 and 4 the qualifications about their commercial potential spring primarily from a lack of proven technical information. Some data are available for those in group 3, but not enough to warrant immediate full scale development; almost nothing is known about the agronomic requirements of the crops in group 4 in the south-east Johor environment. Research is obviously highly desirable.

2.2 Criteria for evaluation and selection

a) The internal rate of return worked at three levels for activities beginning in 1972. The commercial rate of return results from the evaluation of all inputs and outputs at market prices. It is, however, before deduction of income or corporation taxes, as the effect of these will vary according to the type of investor. The government financial rate of return represents the return to government after adding back export taxes and land rents, but still with all costs at market prices. The social rate of return indicates the return to the West Malaysian economy, after applying to the government financial rate of return a shadow wage of \$40 per month, which is assumed to reflect the real value of unskilled labour to the economy at the present time.

b) Net present value per acre is the capitalised value when all income and expenditure streams are discounted at 15 percent.

c) Capital costs per acre are presented as the financial expenditure to the year of first net receipt. This is the total amount that would have to be borrowed by the activity, but excludes interest charges as these will vary considerably between investors.

d) Employment criteria are shown in acres per worker at maturity on a 300 work day/year basis. The capital cost per job is obtained by applying the undiscounted capital cost per acre to acres per worker.

e) The product price levels used in the calculation are the farm gate or 'free on board' (fob) prices thought most likely to prevail.

f) The comparative advantage of the project area for an activity is indicated by a subjectively assessed star grading system.

**** The activity developed in the project area has a distinct advantage compared with the same activity in other new areas in West Malaysia by reason of physical environment or market proximity.

*** The activity is expected to do at least as well in the area as anywhere else in West Malaysia.

** There is no particular reason for choosing the project area and other areas may be better.

* Indicates that the activity may be at a positive disadvantage in the project area compared with other areas in West Malaysia.

2.3 Group 1 Activities

There is enough technical knowledge and practical experience of both rubber and oil palm production to allow both to be expanded rapidly. As far as rubber is concerned Malaysia is well served by its research service - indeed the Rubber Research Institute may fairly be said to be leading the world in research on rubber and has regularly introduced improved and ever higher yielding clones. Peak yields of 2000 pounds of rubber in the 14th year of tapping can reasonably be expected from current plantings, and even higher yields (up to 3000 pounds) from plantings after 1975. Recent work with the new yield stimulant, ethrel, could raise productivity per unit of land or labour even further and possible effects have been examined in a supplementary paper. At present the long term effects must be regarded as speculative, and the use of ethrel has not been taken into account in evaluation in this report.

Research on oil palms is conducted by the private sector and by the Department of Agriculture, and is providing an adequate technical

base from which to launch an expanded planting programme. Yields of 10 tons ffb per acre in the 7th year from planting out have been assumed in the evaluation of current plantings. Later plantings may give up to 12 tons per acre from the 6th year and sustain this yield for nine years. The effects of these more speculative yield projections are examined in a supplementary paper.

World-wide production of natural rubber has expanded at a rate of about 3 percent per annum during the 1960's. During the same period the total world consumption of elastomers has increased at almost 7 percent per annum. The rapidly expanding synthetic rubber industry has increased its share of the total elastomer market from 40 percent in the late fifties to over 60 percent at the present time. At the same time the price of natural rubber has fallen almost by half from just over \$1.00 per pound in 1960 to an average of 50-60 cents in 1970.

The price of rubber is likely to become lower until the mid-seventies as Malaysian production expands rapidly and synthetic plants now planned come on stream. As crumb and other special rubbers, manufactured to more stringent specifications, take up a greater share of Malaysian production, and as the rate of growth of Malaysian output slows towards the end of the decade, the price drop may be arrested. There may also be a chance to exploit the relationship between natural and synthetic rubber by combining the materials at source if a petrochemical industry is established in Malaysia. For purposes of evaluation a constant price 50 cents per pound has been assumed to prevail throughout the planning period.

The oil palm yields two types of oil; palm oil and palm kernel oil. The oils and fats market, on which they are sold, is extremely complex and comprises about 15 different animal, vegetable and marine products produced in all parts of the world. The world-wide prospect is for increasing supplies of these products as a whole coupled with attempts by many importing countries to support home producers. In this situation a steady fall in price of palm oil must be expected. However, if an oil fractionation process, at present under investigation, can be introduced

The assumed prices for palm oil and kernels are shown in Table 3.1

TABLE 2.1 Major Commodity Price Projections (fob Singapore/Johor Bahru).

<u>Commodity</u>	<u>Units</u>	<u>1975</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Rubber	cts/lb.	50	50	50	50
Palm Oil	\$/ton	420	380	361	344
Palm Kernel	\$/ton	370	360	351	343

TABLE 2.2 Summary Evaluation of Group 1 Activities

	<u>Oil Palms</u>	<u>Rubber</u>
1. Internal rate of return	Percent	Percent
a) Commercial	8	8
b) Government financial	12	10
c) Social	24	18
2. Net present value	\$/acre	\$/acre
a) Commercial	-716	-790
b) Government financial	-335	-540
c) Social	+350	+239
3. Capital cost	\$/acre	\$/acre
a) Undiscounted negative cash flow	1950	1808
b) First positive cash flow	Year 5	Year 7
4. Employment		
a) Acres per worker at maturity	9	6.6
b) Capital cost per worker	\$17,550	\$11,930
5. Comparative advantage rating	****	***
6. Scale of enterprise evaluated	10,000	10,000
	acres gross	acres gross
7. Type of enterprise evaluated	Estate	Estate

commercially, such a decline in price might be arrested, since each fraction might be sold on a specific market. Palm kernel oil is rather more specialised in use, having similar characteristics to coconut oil, and will be discussed later in connection with that crop.

2.4 Group 2 Activities

Most of the activities in this group are already carried on commercially in or near the project area, but only coconuts and pineapples cover more than a small area. Both these crops are supported by commodity research stations. There is also a Government poultry breeding station in Johor Baharu.

2.4.1 Pineapples

Exports of canned pineapples from Malaysia-Singapore have doubled over the past 10 years and the bulk of this increase in output has come from West Johor. Malaysian exports in 1968 amounted to 66,000 tons. About 30,000 tons of Malaysian fruit were also exported to Singapore mainly for canning at the one remaining factory there. Prices throughout this period for the canned product have been fairly stable, averaging around \$750 per ton. Exports to U.K., originally the largest market, have been expanding very slowly and the major growth in sales has been to North America and Western Europe, especially Germany. Since Hawaiian production is not expanding, prospects of producing for the continued growth of the market in N. America are reasonably favourable. A potentially large but untapped market exists in U.S.S.R. and E. Europe. Competition in canned fruits is keen and prices must be expected to fall slightly e.g. to about \$675-\$700 per ton fob by 1980.

Malaysian production could double again in the next decade, with expansion of acreages in Selangor and Trengganu and in West Johor round the new cannery near Pontian. New crop strains capable of raising yields per acre to an average of 40-45 tons over a five year cycle may become available before the end of the decade.

At present a 5-year cycle yield of 30-35 tons may reasonably be assumed. At this level pineapples grown under a labour intensive system on upland soils show a very low financial rate of return and have a very low comparative advantage rating. They will do better as a sole crop on the west coast peats where frequent replanting is not necessary. In the longer term however the advantage may shift to mineral soils as labour costs rise, because most machinery cannot be used on the Malaysian peats. Because the required techniques have not yet been tried in Malaysia, production of the crop by more mechanised methods has been considered in Group 3.

2.4.2 Coconuts

Coconuts and palm kernels produce similar cooking oils, and to some, but unknown, extent millers in Malaysia substitute palm kernel oil for the traditional coconut oil. It has been estimated that the demand for the two oils in W. Malaysia for cooking purposes and soap manufacture will grow some $2\frac{1}{2}$ times to about 190,000 tons by 1990. Copra output in W, Malaysia has been virtually static at around 150,000 tons for several years, and it appears likely that there will be increased use of palm kernels.

Demand for coconut for confectionery purposes will also grow at least in line with population growth in W. Malaysia and South and East Asia generally. Thus, while some fall in price from the present high level is expected as coconut supplies from the Philippines increase and palm kernel exports from Nigeria recover, the general downward trend is expected to be much slower than for palm oil.

TABLE 2.3 Projected Prices of Palm Kernels, Copra and Crude Coconut Oil
(\$/ton fob Singapore)

	Palm kernels	Copra	Coconut Oil
1975	370	450	750
1980	360	438	730
1985	351	429	715
1990	343	420	700

A planting programme of 20-30,000 acres in the project area using improved local tall strains could yield 20-30,000 tons of copra per annum at maturity. However current strains of coconuts on inland soils show a relatively low financial return and a low rate of labour use. Better returns and labour use are obtained when coconuts are mixed with beef, cocoa, goats, pineapples or perhaps short term crops. The complementary relationship and coefficients of this type of mixed activity have still to be tested in practice. Hybrid coconuts (selected semi-tall West African males crossed with Malaysian dwarf yellow females) may yield up to $1\frac{1}{2}$ tons copra per acre, 50 percent more than the existing local seedlings. Their commercial introduction however must be preceded by a period of development and testing and they are therefore considered in Group 3.

2.4.3 Pepper

Pepper is a traditional crop in Johor State, and is grown on about 2,000 acres. The crop has a major place in the research programme of the Sarawak Department of Agriculture, and it requires only a well ordered communications channel to ensure that the Johor agricultural extension service can keep farmers aware of improved technology.

World production of pepper amounts to about 80,000 tons per year. The principal producers are Indonesia, India, Malaysia, Ceylon and Brazil (in that order). Most of this enters world trade. Yields in Sarawak average 30 cwt or more per acre while India's 250,000 acres of crop average only 2 cwt. There is obviously great scope for increased output in that country. Brazil has increased output considerably in the past 20 years. World demand is increasing at about $2\frac{1}{2}$ percent per year or 2-3,000 tons. This amounts to 1-1,500 acres at Malaysian yields and there is therefore no scope for a great increase in acreage here. A national figure of 400-500 acres might be reasonable with perhaps about 100-200 in Johor. Prices are subject to marked short-term fluctuations, but will probably average around \$120 per pikul for white and \$90 for black (unground, fob Singapore).

The peak yield is assumed to reach 2 tons per acre in the 9th year after planting and to remain at this level for five years. On these assumptions pepper gives acceptable financial returns on the level price basis, but is very sensitive to the valuation put on labour input. The risk associated with price fluctuations makes it relatively unattractive as a sole source of income.

2.4.4 Pigs and Poultry

The output of pig and poultry products has been expanding at a rapid rate in recent years. Both these commodities have relatively high income elasticities of demand, i.e. consumers tend to increase their purchases of them as their incomes rise. Thus consumption within West Malaysia is expected to grow steadily over the study period. Estimated levels of consumption for 1970 and expected levels in 1980 and 1990 are as follows:-

Item	Unit	Estimated Total Consumption		
		1970	1980	1990
Poultry meat	Mil. lbs.	135	231	398
eggs	Million	1,146	1,883	3,130
Pork	Mil. lbs.	124	210	355

Requirements of pig and poultry products are mainly locally produced, with occasional imports. Provided feed supplies are adequate there is no reason why output should not expand in line with demand. Expected price levels ex-farm are:-

Poultry meat	90 cents/kati liveweight falling to 75 cents in 1990
eggs	7.5 cents each falling to 6.2 cents in 1990
Pork	\$1.00/kati liveweight falling to 90 cents in 1990.

Egg production at a yield of 200-220 eggs per hen housed at point of lay can show a reasonable profit. Poultry and pig meat production can also show quite good commercial rates of return. All three activities are extremely sensitive to changes in feed cost and feed conversion rates.

These activities have been evaluated as independent operations, but all are capable of sub-division and combination with others. There will generally be no common costs with any other activities, and so all costs, labour use and income will be in addition to those required for the other activities.

None of the activities is expected to have a marked comparative advantage in the project area and can be equally profitable if undertaken elsewhere. On the other hand, there is a place for most of them to the extent that demand generated in the project area can be met from production within the area.

2.4.5 Fish

There is an unsatisfied demand for freshwater fish. It is projected that if supplies were available per caput consumption in rural areas would rise to 25 pounds per annum, that is about one-third of the total fish intake. Urban dwellers buy freshwater fish on special occasions. The total 1990 requirement for freshwater fish in places that could be served by the project area is estimated at 5,000,000 pounds.

There are no large rivers and freshwater lakes within the project area, and the natural freshwaters are poor in nutrient salts and of low productivity. They have a low potential for fisheries exploitation. However there are numerous perennial streams which, on gently sloping sites, could be used to develop fish farming projects. There are also valleys liable to localised and intermittent flooding, which, with flood control measures, could be made suitable for fish pond development. The projected 1990 requirement could be met from 2000 acres of fish ponds.

The main constraint on the development of fish culture schemes is the high cost of pond construction. However, yields per acre of pond can be high, varying with good management between 2800 and 3500 pounds per annum according to the system adopted, and internal rates of return over 20 years could be of the order of 25-30 percent. Another constraint is the present poor supply of fish fry. In the Second Malaysia Plan a fry

multiplication station for Johor is proposed. By the time the project area is fully developed there could be an annual demand for some five million fry, and to supply this quantity more than one station would be required.

Fish culture technology is developing very rapidly in many countries and it is gratifying that valuable knowledge and experience will continue to flow from the excellent fishery research stations in Malaysia.

2.4.6 Fruits and Vegetables

Fruits and vegetables are grown throughout the country. Production is usually on a small scale for local consumption, except for a specialised development in Cameron Highlands. There is some export of fresh produce to Singapore. The market could be expanded by an extension of processing activities - perhaps in combination with the processing of sea food and pineapple products. There are technical problems to be overcome in this field, and crops for canning re-considered in Group 3. Some production for local consumption is expected around the towns and villages in the project area; but it is of little planning significance.

2.4.7 Tea.

World production of tea has risen at an average rate of about 2 percent per year over the past fifteen years. At the same time the average price of tea sold at London auctions has fallen from 126 to 104 pence per kilogramme. This has resulted from the extremely slow growth in demand from the major importing countries, especially the U.K. This trend appears likely to continue. Discussions have taken place under the auspices of FAO on the possibility of establishing an international tea agreement to regulate the tea trade. Since Malaysia is not a large exporter such an agreement would probably preclude her entry into the world market on any scale.

There are a great number of types of tea. Malaysian production is of leaf type and about half the output is exported. Imports, which exceed exports in most years in quantity though not in value, are principally of cheaper tea dust from Indonesia or Ceylon, and of Chinese tea.

Overall local demand is likely to double in the next 20 years, and some scope therefore exists for a limited increase in production. Given an increase in yield the acreage required might increase from the present 7,500 to 12,000 acres.

Most of the country's tea is grown in the Cameron Highlands. Although field practices need to be modified for production at low altitudes, this should not present any serious difficulty to an experienced highland tea planter. On the other hand there are no experienced tea workers in Johor and it would seem better to concentrate further development nearer existing producing areas.

TABLE 2.4 Summary Evaluation of Group 2 Activities

	Pineapples	Pepper	Coco-	Pork	Poultry		Fish
	hand		nuts		Meat	Eggs	
1. Internal rate of return				per 30 sow unit	per unit		
a) Commercial	6%	17%	7%	16%	17%	17%	27%
b) Government financial	8%	18%	10%	18%	20%	19%	27%
c) Social	25%	35%	14%	24%	30%	30%	30%
2. Net present value 15%	\$/acre	\$/acre		\$/unit	\$/unit	\$/unit	\$/acre
a) Commercial	-470	+350	-600	+2450	+1200	+2600	2442
b) Government financial	-400	+444	-309	+5800	+3900	+5300	2542
c) Social	+470	5790	- 55	+17600	+12600	+17100	3642
3. Capital cost	\$/acre	\$/acre	\$/acre	\$/unit	\$/unit	\$/unit	\$/acre
a) Undiscounted negative cash flow	1081	3869	1340	42500	15900	22757	4720
b) Year of first positive cash flow	Year	Year	Year	Year	Year	Year	Year
	2	3	8	2	2	2	2
4. Employment							
a) Acres per	9.25	1	20	n.a.	n.a.	n.a.	7
b) Capital cost per worker	\$ 9,500	\$ 3,869	\$ 26,800	\$ 42,500	\$ 15,900	\$ 22,760	\$ 30,873
5. Comparative advantage rating	***	***	***	***	***	***	***
a. Scale of activity evaluated	1000 acres	1 acre	20 acres	30 sow unit	500 Bird Broiler Unit	3000 layer unit	7 acres
b. Type of activity	Estate	Small-holder	Small-holder	Small-holder Specialist	Small-holder Specialist	Small-holder Specialist	Small-holder Specialist

2.5 Group 3 Activities

The activities in this group are ones which are (i) already well established in other parts of Malaysia, e.g. cocoa; (ii) now being tried commercially in south Johor e.g. sugar cane, tapioca; (iii) the subject of research and experiment, e.g. grassland and dairy cattle and goats at the Central Animal Husbandry Research Station near Kluang; annual grain and pulse crops, groundnuts, sweet potatoes at the Federal Experiment Station, Serdang; (iv) grown in or near the project area, e.g. coffee,

For all these activities some sort of technical constraint exists which must be removed by further experiment or testing before large scale development can proceed with reasonable certainty of ultimate success. The nature and severity of the constraints vary between enterprises and are discussed below.

2.5.1 Cocoa

Cocoa is well suited to the climate of south-east Johor; indeed the climate is probably more suitable than that of the more strictly monsoonal parts of West Malaysia. The main doubts centre round the suitability of the soils. Most of the cocoa in the north is grown under coconut on soil types absent or seldom found in the project areas, where the two main soil series are Rengam and Harimau. Observed plantings in the vicinity of the project area are not entirely convincing. Yields above 1000 pounds per acre must be the aim, and the capability of the Rengam and Harimau series to sustain yields of this order needs to be proved before large scale development is undertaken. It is also necessary to consider the relative advantage of the project area compared to other parts of Malaysia, (East and West) where the climate may be equally suitable and the soils superior for this crop. It would be desirable for small pilot plantations of perhaps 200 acres to be developed under the auspices of MARDI, one on a deep Rengam soil and another on a deep Harimau soil. These estates should be run on strictly commercial lines

and costed to enable valid comparison to be made with known results in East Malaysia and other parts of West Malaysia.

Cocoa prices have traditionally been subject to wide year to year fluctuations, which result from a combination of low price elasticity of demand, and year to year fluctuations in supplies. In the period 1953-1965 world production grew from 800 to 1500 thousand tons per year or a growth rate of about 4.3 percent per year. Since 1965 production has fluctuated between 1.2 and 1.4 million tons, levelling off because of disease and pest problems in the main West African growing areas and reduced planting in the late 1950's and early 1960's. Prices are now at an historically high level. World consumption (at constant prices) is expected to continue to rise to about 2,400,000 tons by 1985 or at about 3.5 percent per annum.

A number of countries have large planting or rehabilitation programmes planned or under way. Present high prices should stimulate them. As these plans come to fruition a downward trend in the price of cocoa is likely, at least until 1985. World price trends (Malaysian cents per pound, fob Singapore) are forecast to be in the following range:-

1975	75 - 85 cents/pound
1980	65 - 80
1985	60 - 75
1990	60 - 75

It would not seem unreasonable for Malaysia to aim to produce 150-200,000 tons of cocoa by 1990 or 5-7 percent of world production. This would require some 300-400,000 acres.

2.5.2 Cattle.

The most suitable crop for a large scale diversification programme in the project area is grass. The rainfall and sunshine condition are excellent for it; the soils are suitable and the crop is appropriate for much of the terrain. It is one crop for which the conditions in south-east Johor are better than in other parts of Malaysia. Here the environment is right for the crop and the location is right for the

marketing of products from grassland, particularly milk, but also beef.

Enough has been learned from the work at the Central Animal Husbandary Research Station to prove that high yielding grass pastures can be established and maintained. It has also been shown that crossing local Indian Dairy cattle with Friesian bulls can produce a productive dairy cow of good conformation. The animal disease status is known and the control measures are understood. This information is enough to be sure that there are no insuperable technical difficulties to the establishment of a good dairy industry. Much additional information needs to be obtained, for example on types of pasture/legume mixtures; their establishment and maintenance under different grazing intervals and stocking rates; the best type of animal to breed; stock management techniques. However enough is known for activities to be started on a commercial scale, provided that they are carefully mentioned and backed at the same time by a strong, commercially orientated, research and experiment programme to aid development.

The main constraints on the rate and scale of development of both the dairy and beef industries are the virtual absence of management expertise at all levels, and the storage of suitable female breeding stock. The expertise must be imported for at least the first stage of development; possible sources are Queensland and some of the Central American and Caribbean countries, where the environment is similar to Johor's. The shortage of breeding stock is more serious among beef than among dairy animals. Several experienced expatriate beef producers have expressed interest in the prospects for beef in Johor, and their entry would provide both breeding stock and good management. For dairy cattle, if later it is desired to step up the rate of development, the import of female breeding stock should be considered.

The demand for both beef and milk is expected to grow rapidly as follows:-

<u>Iten</u>	<u>Unit</u>	<u>Estimated Total Consumption</u>		
		1970	1980	1990
Beef	Mil. lbs.	40	63	102
Milk	Mil. galls.	20	37	69

At present about 10 percent of beef supplies are imported, mainly as live animals from Thailand. This appears likely to rise if domestic production is not increased. Prices at the farm gate are assumed to remain at 80 cents per kati liveweight throughout the period, with variations depending on quality.

The milk consumption figures quoted refer to fresh and powdered milk only. Total present dairy product consumption in Malaysia is estimated to be equivalent to some 50 million gallons of fresh milk. More than half this is consumed as condensed milk. Given the problems of expanding milk production in Malaysia it is not considered likely that any of this market will be filled by domestic milk production in the study period. Fresh milk will in the near future be a partial substitute only for imported canned and powdered forms. The future price level will depend very much on the growth of local production, but the most likely trend is for a steady fall in price from \$2.75 per gallon at the farm to \$1.80 in 1990. In addition to the Malaysian market, Johor is ideally suited to supply fresh milk to Singapore. The future size of this market is estimated to be about half that of W. Malaysia, i.e. 35 million gallons in 1990.

Evaluation has been based on the use of cross-bred cows, which allows a considerable offtake of beef from the dairy herd as steers. With half the culled dairy cows being used for breeding and rearing beef animals the output of beef can be nearly doubled. On current calculations, admittedly using many input/output assumptions, the profitability both of the build-up phase and of small and large dairy farms starting in say 10 years time, is high. The activity remains profitable even if yields fall 40 percent below the assumed level of 510 gallons of milk per cow per year.

Beef production alone is a much less attractive proposition. It has a very low labour utilisation per acre and a lower rate of return than dairying at the assumed offtake of 450-500 pounds liveweight per acre per year. A modest (say 5000 acre) unit would be justified to

provide some good quality meat and good grade breeding stock for use with culled dairy cows and local stock. The rearing and fattening of such cross-bred dairy/beef cattle could provide useful additional income to smallholders particularly in combination with coconuts. Although the project area would be well suited physically for large scale beef raising it would seem to make better sense to locate large scale projects in East Malaysia where population pressure on land is not so great.

2.5.3 Goats

Another enterprise under trial at the CAHRS is goat production by intensive methods.

Enough information has been obtained and will continue to become available to justify a gradual development of this activity among small farmers - either as a specialised undertaking or on a mixed holding. It would be particularly useful in existing areas of currently low yielding coconuts, where fodder grass could be established.

Mutton is obtained from two sources in Malaysia, goats and sheep. At present locally produced goat supplies about 30 percent of the market, the rest being imported as meat or live sheep. Consumption in 1970 is estimated at 9 million pounds and is expected to rise to 27 million pounds by 1990. Local mutton commands a premium price over the imported product, but prices must come down if its share of the market is to increase. A price trend from present wholesale levels of \$1.35 per kati liveweight down to \$1.00 per kati by 1990 has been assumed.

Goats may suffer a disadvantage in the project area due to their susceptibility to respiratory diseases caused by the high rainfall conditions. This factor effectively restricts production to those systems in which goats are housed and their feed cut and carried. The financial return is low but the social return is acceptable at an annual offtake of 1762 pounds liveweight per acre of fodder.

2.5.4 Sugar

Attempts are being made in the private sector to establish sugar production in several parts of the country including Johor. Schemes proposed to date could extend to about 80,000 acres and meet virtually all the country's present consumption of about 200,000 tons per annum.

It is not yet certain which part of the country is best suited to cane production. The north with its monsoonal climate and distinct dry season can produce crops with a higher sucrose content than under the uniform rainfall pattern of Johor. On the other hand irrigation could well be required for maximum yield in the north, but not in Johor.

Sugar, although subject to fairly wide fluctuations in price, should continue to be freely available on the world market at around \$250 per ton. It would therefore seem to be unwise to extend sugar cane cultivation in the project area, or elsewhere, until the present enterprises have been established for some years and the relative performance and profitability of cane growing in the north and south have been determined beyond doubt.

2.5.5 Short-term Crops.

Development of livestock production on the scale suggested earlier would mean a rapid increase in demand for animal feeds. To estimate this demand potential feeds have been broken down for convenience into two groups, carbohydrate-rich feeds and protein-rich feeds. The quantities which would be required are:-

	1970 est.	1980	1990
		Thousand tons	
Carbohydrate feeds	372	769	1,490
Protein feeds	107	234	461

Carbohydrate feed sources include rice bran, maize, sorghum, tapioca and sweet potato. Protein feeds include coconut oil meal, palm kernel meal, soyabean meal, groundnut meal, fish meal and meat and bone meal. The quantities in the above tables are very approximate and the actual quantities used would depend upon the mixture of feeds used.

It is estimated that domestic rice bran production will rise from 113,000 tons in 1970 to 275,000 tons in 1990.

Tapioca at present makes up about 20 percent of animal feed, or about 70,000 tons of dry feed (equivalent to about 250,000 tons of wet root). Assuming this proportion is maintained the potential demand would be 250-300,000 tons of dried roots (1,000,000 tons wet root) by 1990. Part of this could be contributed by sweet potato. At expected grain price levels, tapioca root prices must be around \$1.70/pikul at factory to be competitive. Predictions of export markets vary widely, but it may be possible to export a similar quantity as chips, pellets or starch products.

On the basis of the above predictions there will still be a demand for nearly a million tons of carbohydrate feeds to be made up by grains. Maize and sorghum are both under trial in Malaysia and are promising. Long-run prices are expected to be about \$11.30 per pikul for maize and \$10.40 per pikul for sorghums ex-farm to compete with imported supplies,

Present supplies of protein feeds are mainly from coconut oil meal, palm kernel meal, plus some imported oil cakes and fish meal.

Domestic supplies of copra are expected to grow only slowly and become relatively less important as an animal feed source. Palm kernel production will expand rapidly and could, if all is crushed for oil in Malaysia, yield up to 330,000 tons of oil cake by 1990. But the meal is relatively fibrous and cannot be used for some stock as the sole source of protein. However these two sources could supply one-third of requirements by 1990.

Alternative domestic oil seed production could come from soyabeans or groundnuts. It is expected that the import price for soyabeans will remain at about \$330 per ton. This implies an ex-farm price in Malaysia of \$19 per pikul.

Groundnuts can be used for both oil production and as a confectionery item. Malaysian production at present is almost entirely used for the latter purpose. Ex-farm prices vary widely but average round \$70 per pikul for shelled nuts. At this price oil and meal production is not economic. It has been estimated that for feed purposes the price of groundnuts would have to be about \$27.50 for shelled nuts.

The profitability of large scale mechanised production of short-term rotation crops could be high, but there are formidable obstacles to overcome before they can be widely grown in the project area. They must in any event be restricted to areas with an average slope of not more than 6 degrees, and preferably not more than 4 degrees. Even so problems of soil conservation will be substantial and suitable field layouts will have to be worked out to safeguard the soil and at the same time to permit economical mechanical cultivation. A high degree of mechanisation will be required for good profitability, but mechanised harvesting, particularly of grain crops, will present many difficulties in the climate of the project area. Much information will have to be obtained about the performance of untried machinery and, even when the right machinery and techniques are established, the continuous vagaries of the weather will increase the risk of unsuccessful operations and harvest.

Some information is available from experiments at Serdang about the performance on a small scale of different varieties of sorghum, sweet potatoes, soya beans, cowpeas, groundnuts, and cassava. Cultural trials and fertiliser experiments have been carried out. Further experiments at a research station and commercial scale testing are certainly warranted, with the emphasis on root crops, for which the harvest risks are less.

Evaluations have indicated that cassava as a monocrop can show reasonable returns if yields of 15 tons per acre can be obtained beyond the third to fourth year. That this is feasible has not yet been demonstrated; such yields have so far been maintained only in rotations with other short term crops. The commercial rate of return on cassava is highest for a scheme relying on casual labour and this type of enterprise could provide useful and profitable employment in the early years of rubber and oil palm schemes.

2.5.6 Hybrid Coconuts

This activity is included in group 3 because hybrids have not yet been produced in the country. Imports of pollen from West Africa will be necessary for cross fertilising with the Malayan Yellow Dwarf coconut.

Yields are potentially high at 1½ tons of copra per acre, but the first commercial plantings may well be several years distant. The activity could be useful in smallholder development, particularly in the right association with other crops.

2.5.7 Coffee.

Some liberica coffee is grown in Johor and is processed locally. Both liberica and robusta coffee are being tested at the crop testing station at Kong Kong. Robusta coffee was not growing as vigorously as liberica, and appeared to be much more susceptible to berry borers. The market for liberica coffee is very limited and it is doubtful whether the crop is worth expansion. Robusta coffee development would require a further period of research and field trial under MARDI auspices before large scale plantings could safely be undertaken.

2.5.8 Fruit and Vegetables for Processing.

The Government food technology institute at Serdang is investigating problems of preservation. However, even if these are solved the industry is likely to expand only slowly unless improved cultivation techniques are introduced to increase the output of vegetables per worker.

The impression gained from a brief examination of the industry is that canners and growers suffer from a lack of up to date information. The Department of Agriculture, which is responsible for research into both cultivation and preservation problems, is in a position to take the initiative to improve communications. The pineapple research station has been examining other crops recently and might usefully expand its programme further in this respect. The technical publications on pineapples from this station are impressive both in quality and quantity; if similar publications on other canning crops could be produced by this station and or the Department of Agriculture and disseminated to growers and canners, the impact could be considerable.

2.5.9 Mechanised pineapple production

As noted previously (Section 2.4.1) the mechanisation of pineapple production appears to be more profitable than exclusively hand methods, and this could make production on mineral soils more attractive than on peat soils. The exploitation of this potential will depend upon the successful introduction of tractor drawn sprayers for the application of liquid fertilisers, herbicides, growth regulators and insecticides. Partial mechanisation of harvesting would also increase profitability. Thorough soil conservation measures would be essential, and the crop should be restricted to areas with an average slope of less than 6 degrees.

2.6 Group 4 Activities

The crops in this group require considerable research effort before they can be recommended for development.

2.6.1 Bananas.

The banana is widely grown on small-holdings throughout West Malaysia. The total acreage of the crop is estimated by the Ministry of Agriculture to be about 40,000 acres, of which 6,000 are in Johor. The existing and foreseeable domestic and Singapore demands are, and can be expected to remain, fulfilled without any expansion of acreage in the project area. The varieties at present grown in Malaysia are not suitable for export. It would therefore first be necessary to identify from among the existing local cultivars those that would be acceptable to an importing country or to import and test new varieties. The chosen cultivar would also have to be amenable to transport without undue wastage. Recent work on the preservation of bananas, in particular by the process of lyophilisation, may to some extent overcome the long standing hazards associated with exporting fresh bananas. But the commercial production of bananas for export is a long way off.

TABLE 2.5 Summary Evaluation of Group 3, Activities:

	Dairy	Beef	Goats	Tapioca	Cocoa	Short Term Crops	Hybrid Coco- nuts	Mecha- nised Pine- apples
1) Internal rate of return (percent)								
(a) Commercial	23	9	5	16	7	17	13	18
(b) Government financial	24	10	6	19	9	20	15	20
(c) Social	25	12	20	26	21	23	20	26
2) Net present value at 15% (\$/acre)								
(a) Commercial	1400	-155	-2000	60	-690	+117	-189	190
(b) Government financial	1500	-115	-1900	180	-580	+271	- 60	270
(c) Social	1720	- 95	890	510	+435	+473	+329	760
3) Capital costs per acre								
(a) Undiscounted negative cash flow	2120	-320	3560	870	1640	890	+1282	980
(b) Year of first positive cash flow	5	4	2	3	5	3	6	2
4) Employment								
(a) Acres per worker	15	120	3	10	8	40	14	14
(b) Capital cost per worker	32000	38400	10700	8700	13100	35600	18000	13,700
5) Comparative advantage rating	****	****	***	***	***	*	***	****
6) Scale of enterprise evaluated	2200 acres	6000 acres	3 acres	1000 acres	1000 acres	1150 acres	1000 acres	1100 acres
7) Type of enterprise evaluated	Estate	Estate	Small- holder	Estate	Estate	Estate	Estate	Estate

2.6.2 Ramie.

Ramie fibre can be used in the textile industry especially for high-quality suitings. Production of the crop has been tried in a number of countries, but has seldom reached any scale mainly because of problems associated with degumming the decorticated fibre. Malaysia imports about 5,000 tons of cotton (worth about \$7 million) and 2,000 tons cotton yard worth some \$15 million per year. It is possible that part of this could be substituted by ramie. A full programme of varietal testing and cultural experiments, which should include testing compatibility with rubber and/or other tree crops, plus work on fibre extraction, would be required before commercial development could be contemplated.

2.6.3 Other Group 4 Crops.

Both avocado pears and seedless limes are known to grow well in climates with a similar rainfall distribution to that of the project area, and gambier used to be grown widely in Johor in the last century as a source of tannin. These crops would all be worth trying in a research programme. Patchouli, an essential oil once grown in Penang and recently the subject of some observation at Serdang and in Kedah, might also be tested under Johor conditions.

2.7 Other Crops

Two other crops, not specifically mentioned in the original list of possibilities, should nevertheless be mentioned. They are rice and Manila hemp.

2.7.1 Rice.

No large areas suitable for intensive padi production have been identified in the project area; but small local schemes are possible. However, as the country is expecting to achieve self-sufficiency in rice production by 1975, and as Malaysian rice is not suitable for an unpromising export market, it has not been included in any development plan for the project area.

2.7.2 Manila Hemp

Manila hemp yields a "hard" fibre used for twines, nets etc. The main fibres in this class are sisal and henequen. The markets for these fibres are under considerable pressure from changes in techniques in agriculture, which reduce the demand for agricultural twines, and because of the introduction of synthetic substitutes, adhesive tapes and other packaging material. The world market outlook for these commodities is uncertain, but a continued decline in **prices** and sales is expected. There appears to be no advantage in attempting to enter this market.

2.8 Summary of Prospective Activities

The foregoing examination of potential agricultural activities for the project area emphasises that there are at present many physical, technical and market limitations on choice. The following conclusions and recommendations can be made:-

- (a) In the first 6-10 years of development large scale commercial enterprise will have to be limited to oil palms and rubber.
- (b) During the immature period of these crops supplementary crops of tapioca are a possibility, providing advantages of increased production and employment.
- (c) Small livestock and fresh-water fish production can also be developed without delay on a modest scale to supplement income.
- (d) Coconuts interplanted with cocoa, pineapples or grass may be introduced at an early stage on a small scale.
- (e) Cattle - primarily for dairy purposes, but also possibly for beef - offer excellent prospects for large scale diversification. An early start should be made and the present constraints of lack of breeding stock and management expertise should be surmounted as soon as possible.
- (f) The prospects of hybrid coconuts warrant high priority for the necessary preliminary breeding programme and associated research.

CHAPTER 3

DEVELOPMENT PLANNING

3.1 It is evident from the conclusions of the preceeding chapter that planning must be based initially mainly on the production of palm oil and rubber together with certain minor crops. The most hopeful prospects for substantial diversification lie in dairying (to a lesser extent, beef), hybrid coconuts, cocoa and cassava which are not yet ready for full scale development.

In this chapter these activities are examined further with a view to making recommendations about the approximate proportion and location of land devoted to them, the rate of land development, the organisations most appropriately responsible for development participation.

3.2 Diversification

Because diversification is an important aim of development policy the activities contributing to this aim will be considered first. The evaluation made in Chapter 2 shows that the development of the dairying industry can be very profitable and the returns to individual producers, at quite modest productivity standards, are so high that a good income can be obtained from a holding as small as 11 acres. In terms of potential employment creation it compares well with oil palms, and as a new enterprise it is favourable to participation by Malays from the outset.

The potential financial returns could well make this enterprise attractive to the private sector. A suitable organisation for establishing it would be a nucleus estate, which would first multiply breeding stock, train workers and work out the best techniques of pasture and animal management. It would later sell stock to selected producers, operate extension services and perhaps marketing and processing facilities in the vicinity. A nucleus estate of this type lands itself to management by public and private sectors either singly or as a joint-venture. If the private sector can be induced to participate in management it would be responsible for obtaining the necessary expatriate expertise. If the development is

entirely by the public sector, this expertise could perhaps be obtained from International Technical Assistance sources. Beef production can be a profitable side-line to dairying.

In addition there are hopeful opportunities for large scale diversification in the development of cocoa, hybrid coconuts and selected annual crops. The latter may have only limited importance within the project area on account of the undulating nature of most of the terrain; but they might be grown widely on the flatter land outside the area. Enough general agronomic information is available about all these activities to justify planning their development on a limited scale. This period of limited development is required to confirm the appropriate management techniques for the specific conditions in the project area and to prove the commercial viability of the enterprises using them.

The proper body for guiding these investigational programmes would appear to be the recently established Malaysian Agricultural Research and Institute (MARDI). This institute is already seeking suitable land in the project area on which to build a research centre, and it is of the utmost importance that it be given as early as possible the necessary powers and facilities to ensure that properly conducted, commercially orientated, development programmes are initiated and implemented, either directly by itself or by other agencies under its guidance. The following programmes should be put in hand at once:-

- 1) The multiplication of crossbred dairy stock and the evaluation of satisfactory systems of livestock and grassland management. This programme should be given the highest priority. Later, if desired the importation of female dairy breeding cattle, for a rapid herd build-up could be considered.
- 2) Testing cocoa cultivation on the Rengam soil series.
- 3) Testing hybrid coconuts on Rengam or Harimau soils. If successful then the development of nurseries for the most rapid multiplication of hybrids should be undertaken.

- 4) The testing of annual crops in rotations and pineapples under proper systems of land and soil conservation layouts.

In addition to activities justifying immediate limited development, there are a few crops, notably bananas and ramie, that are recommended for inclusion in a research and experiment programme to ascertain their suitability for subsequent expansion. This programme should also be carried out by MARDI, but should receive lower priority than that set out above because existing field performance data are scanty or not available.

Diversification of agriculture in Johor is desirable, it could be profitable in the project area, and the maximum advantage would be obtained by an early initiation of new enterprises. No firm recommendations can be made now about their ultimate share in the cropping pattern or on their rate of development. This will depend upon the success of the investigational programmes and upon market considerations, which must be kept under constant review. However, the cattle and hybrid coconut enterprises depend to an important extent upon breeding programmes and, in comparative terms, the immediate scope for their contribution to diversification is limited.

Rubber and oil palms, therefore, inevitably dominate early planning considerations. For purposes of evaluating the agricultural sector's probable contribution to the development of the project area, it has been assumed that diversification enterprises will finally occupy about 15 percent of the land available for developments as follows:-

Grass and short term crops, (chiefly cassava)	30,400 acres
Other tree crops (cocoa, coconuts)	8,500 acres

However development of the project area will not be completed until 1989, and at end of 1980 more than 80,000 acres (most of it at present assumed to be planted with rubber and oil palms) will still be uncleared. Much of this land is suitable for one or more of the suggested diversification activities, and those appropriate to the market situation at the time could be substituted for rubber or oil palms, if enough agronomic

and management knowledge had been obtained. Further land for diversification will also become available after the year 2000 when early planting of oil palms and rubber would become due for replanting.

3.3 Rubber and Oil Palms

The evaluation of rubber and oil palms (Supplementary Papers "rubber" and Oil palms") indicate that, using the input and output assumptions made, the likely ranges of profitability of the two crops overlap to a large extent. Oil palms are perhaps slightly more profitable; however the potential for increase in yield and productivity in the foreseeable future looks greater for rubber, and the present apparent advantage of oil palms in this respect could well become smaller over time or disappear altogether.

Under existing Malaysian practice in the immature periods of the two crops more workers are employed on a given area of oil palms than on rubber. This position is reversed after the crops reach maturity. The capital cost per job created is less for rubber than for oil palms. A more flexible use of labour is also possible in rubber, since different tapping systems can be adopted to change the unit labour requirements. The advent of the newest yield stimulant, ethrel, enhances these possibilities of markedly increasing returns to labour. Further, product quality need not be adversely affected by these changes in tapping systems, whereas in oil palms alterations to the harvesting labour input can easily result in appreciable deterioration of fruit quality.

Clearly, where environmental conditions are suitable for both crops, neither has such a marked advantage over the other as to justify it being given a predominant place in any plan. However there are locations where the land is rated as suitable for rubber and marginal for oil palms. Such areas are assumed in all plans to be planted with rubber.

Because the present financial advantage of oil palms over rubber may decrease overtime, and because oil palms employ more workers in the early years and produce a return earlier than rubber, more emphasis

should be placed on oil palms than rubber in the SMP period. Conversely rubber will become increasingly important in later years because of its greater flexibility for changes in labour utilisation if, as seems possible, labour costs per acre rise over time.

In deciding the correct balance between them in the project area developments outside it should also be considered. Whereas other areas may be equally suitable for rubber, Johor, with its equatorial environment and proximity to a port, may have a comparative advantage for oil palms. The appropriate final ratio of oil palms to rubber is likely to be between 60 : 40 and 50 : 50.

It is emphasised that these recommendations with regard to the phasing of new planting oil palm and rubber and the final cropping pattern are made on present day assumptions of future price and yield trends. These assumptions need to be reviewed continually, and planting programmes changed appropriately. The project area is fortunately placed to permit this flexibility as most of the area suited to oil palms is equally suited to rubber.

3.4 Location of Early Development

The selected sequence of cropping and the cropping pattern determine to some extent the time at which any particular part of the project area should be developed. The choice of location in relation to phasing is also restricted by access constraints, by logging programmes in Johor Tengah and by existing licences in some forest areas. The combined effect of all these factors makes it obligatory to develop as much of Tanjong Penggerang as possible in the period 1972-1975. Fortunately the decision has been taken already to give priority to the building of a spinal highway through the peninsula; this will open up 47,700 acres for development in these four years and all alternative plans assume that this acreage will be taken up within this first period. The initial emphasis in Tanjong Penggerang will not prejudice the immediate start of dairying in Johor Tengah.

3.5 Rates of Development

The preceding sections indicate that at present there is little room for choice between different cropping patterns, between the sequence of early planting of the two main crops and between the location of early development. The Second Malaysia Plan land development targets for Johor State suggest that the early rate of development in the project area is also to a great extent predetermined. The provisional target allocated to the State is 150,000 acres, of which 125,000 acres is in the public sector and 25,000 acres in the private sector. Of the public sector allocation 30,000 acres is earmarked for development outside the project area, and 15,000 acres within the area is scheduled for completion in 1971 before the project starts. Thus 80,000 acres are left for public sector development between 1972 and 1975. It seems realistic to assume that the State target is most likely to be attained if the major contribution by both public and private sectors is concentrated in the area where the resources have been evaluated, where some development planning has been done, and where a large development agency (FLDA) is already at work. Further, the target is most likely to be achieved if the largest share of the land is left to this agency and if desirable modifications are made to it rather than that effectively on a large scale.

It is therefore assumed in all alternative programmes that:-

- (1) The SMP land development target for Johor State is desirable, realistic and about the maximum attainable.
- (2) That its attainment will necessitate the development of 80,000 acres in the Project area between 1972 and 1975, of which 60,000 acres will be in the public sector and 20,000 acres in the wholly private sector; that is three-quarters of the maximum acreage available to the public sector and three-quarters of the private sector SMP target.
- (3) That the bulk of this early public sector development remains in the hands of established organisations, in particular FLDA.

Differences between rates of development, therefore, can occur only after 1975.

There are conflicting interests to be reconciled in deciding what rates of development to consider for the project area. The severe under-employment and unemployment in the State call for a rapid rate and a large scale of land development. On the other hand, if maximum benefit is to be obtained from the existing forest resource in Johor Tengah, it is not the rate of land clearance, but the speed at which timber can be extracted and a timber industry complex organised that determines the rate of land development.

There are some 70,000 acres of forest to be logged over in areas recommended for agricultural development. At a rate of 6100 acres per year this would entail a 12 year programme, and to set up the additional logging and utilisation operations to exploit the produce from an annual coupe of this size would take at least two years. It would be unrealistic to assume that these operations would start before 1974 or be completed before the end of 1975. Agricultural development could begin in 1972 in Tanjong Penggerang and later in logged-over areas of Johor Tengah and, by careful coordination of the forestry and agricultural programmes, 90 percent of the agricultural land could be developed in 12-years.

This rate of land development appears to be the fastest that can be achieved without any adverse effect on the timber industry. The programme is illustrated in Figs. V.5 and V.6 which show the location of the development areas, the time of their development, the cropping pattern and the type of implementing organisation proposed. These models take account of the following factors:-

- (1) Crop suitability, in accordance with the criteria used to make the land use potential classification.
- (2) Natural features, such as rivers, drainage lines and ridges.
- (3) The location and shape of annual forest coupes and their timing, in order that land clearance should catch up with the logging programme as late as possible.

(4) Accessibility in relation to the available capacity to build roads, and provide essential services.

(5) The desirability of a mixture of implementing agencies to ensure diversity of opportunities to the rural population.

The outcome of the programme is in Tables 2.6, 2.7, 2.8 and 2.9.

12-Year Development Programme

Table 2.6 Final Cropping and Organisation Pattern

Crop	Public Sector Settlement	Public Sector and Joint venture Farms	Private Sector Farms	Total	
	Acres	Acres	Acres	Acres	per cent
Oil palms	30,400	51,100	25,200	136,700	47
Rubber	36,100	64,800	6,200	107,100	37
Grass and short-term crops	300	23,900	6,200	30,400	11
Other tree crops	-	8,500	-	8,500	3
Research centre	-	3,000	-	3,000	1
Town reserve	1,800	-	-	1,800	1
Total	68,600	151,300	67,600	287,500	100
Percent	24	52	24	100	

Table 2.7 Phasing of Development

	Oil palms	Rubber	Other Enterprises	Total
	Acres	Acres	Acres	Acres
1975	44,850	17,750	17,800	80,400
1980	115,100	55,800	32,100	203,000
1983	127,900	89,900	41,100	258,900
1985	136,700	97,700	42,400	276,800
1989	136,700	107,100	43,700	287,500

- 12 years

Table 2.8

12-Year Development Programme

	<u>Summary of Outcome</u>					
	1975	1980	1985	1990	1995	2000
Total Sales (\$'000)	6,600	56,100	129,900	191,700	216,600	227,500
Land Rent & Premia	1,700	3,000	3,000	3,000	3,000	3,000
Export Duties	90	3,400	8,300	11,800	13,100	13,700
Wages	7,100	24,200	36,600	47,500	49,600	49,600
Management	2,400	6,900	10,200	11,700	11,600	11,600
Other Inputs	20,900	40,000	46,000	45,700	46,400	47,100
Cash Flow	-25,600	-21,300	25,800	72,100	93,000	102,600

Total outlay to first positive cash flow = \$229,900,000

Year of first positive cash flow = 1982

Note all infrastructure costs are excluded.

Table 2.9 Direct Employment Creation

Type	1975	1980	1985	1990	1995	2000
Full time	3,500	13,000	19,900	26,100	27,200	27,300
Casual ⁺	900	1,300	1,500	1,500	1,500	1,500
Stockmen	200	300	400	700	700	700
Clearance and Planting	3,900	3,900	1,000	-	-	-
Total	8,500	18,500	22,800	28,300	29,400	29,500

+ Expressed as full-time equivalent assuming 300 working days per year.

As indicated, this development programme calls for the clearance of about 200,000 acres by 1980 and a total of 260,000 in the first 12 years of development. It has been concluded that the relative advantage of oil palm over rubber lies in plantings in the first few years of the project. Therefore of the 200,000 acres cleared by 1980 115,100 have been allocated to palms, 56,000 rubber and 32,000 to other crops.

i.e. 57 percent oil palms, 28 percent rubber and 15 percent other crops and activities. By the completion of development the balance will have switched to 47 percent oil palms, 37 percent rubber and 16 percent other activities.

By 1980 it is estimated that some 14,600 people would be employed directly in the agricultural sector in the project area. In addition agriculture would spend \$40 million on inputs from other sectors of the economy, and the agricultural output of the area would be worth more than \$50 million per year.

The project would be fully developed by the year 2000, although much rubber planted after 1980 would not have reached maximum yield. The value of agricultural output at projected prices would be over \$200 million per annum and purchases from other sectors would approach \$50 million per annum. If present production techniques continue direct agricultural employment would be about 29,500.

To test the sensitivity of this programme two other development rates were examined, one in which the land is developed in 15 years, the other with the land developed in 10 years. The outcomes of the two are summarised in tabular form below.

Table 2.10 Ten and Fifteen Year Development Programmes

Crop	<u>Final Cropping Pattern</u>			
	<u>10-Year Programme</u>		<u>15-Year Programme</u>	
	Acres	Percent	Acres	Percent
Oil Palms	128,700	45	135,700	47
Rubber	110,600	38	107,200	37
Grass/Short term crops	34,900	12	31,300	11
Other tree crops	8,500	3	8,500	3
Research Centre	3,000	1	3,000	1
Town Reserve	1,800	1	1,800	1
	287,500	100	287,500	100

Table 2.11

Phasing of Development

	Oil palms		Rubber		Other Enterprise		Total	
	10-year prog- ramme	15-year prog- ramme	10-year prog- ramme	15-year prog- ramme	10-year prog- ramme	15-year prog- ramme	10-year prog- ramme	15-yr. prog- ramme
	Acres	Acres						
1975	47,150	46,950	17,050	14,550	17,800	17,800	82,900	79,300
1980	116,000	114,800	66,500	51,600	36,600	32,100	219,600	198,500
1981	118,500	-	91,800	-	42,100	-	252,400 ⁺	-
1985	126,200	127,300	105,500	90,600	47,200	37,400	278,900	255,300
1986	-	129,000	-	91,900	-	38,100	-	259,000 ⁺⁺
1989 [@]	128,700	-	110,600	-	48,200	-	287,500	-
1990	128,700	135,700	110,600	107,200	48,200	42,200	287,500	285,100
1991 [@]	128,700	135,700	110,600	107,200	48,200	44,600	287,500	287,500

+ 88 percent after 10-years

++ 90 percent after 15-years

@ completion year.

Table 2.12 Direct Employment Creation (Non-management)

Year	10-year programme	Full-time 15-year programme	Casual (2)		Stockmen		Total	
			10-year programme	15-year programme	10-year programme	15-year programme	10-year programme	15-year programme
1975	7,700 ⁽¹⁾	6,900 ⁽¹⁾	1,000	1,000	200	200	9,400	8,600
1980	19,600 ⁽¹⁾	15,700 ⁽¹⁾	1,700	1,300	300	300	22,700	18,200
1985	20,500 ⁽¹⁾	20,400 ⁽¹⁾	1,800	1,300	400	400	23,900	23,100
1990	26,500	25,300 ⁽¹⁾	1,800	1,600	700	700	30,100	28,100
1995	27,200	26,200	1,800	1,600	700	700	30,700	28,900
2000	27,200	26,900	1,800	1,600	700	700	30,700	29,000

(1) Includes employment in land clearance and planting.

(2) Expressed as full-time equivalents assuming 300 working days per year.

Table 2.13 Financial Outcome (\$ 100000)

Item	Programme	1975	1980	1985	1990	1995	2000
Total Sales	10 year	6,600	58,900	135,800	196,500	218,400	232,700
	15 year	6,500	56,000	133,000	180,900	207,700	221,400
Rents	10 year	1,700	3,300	3,000	2,900	2,900	2,900
	15 year	1,700	2,800	2,900	3,200	2,900	2,900
Duties	10 year	90	3,500	8,500	11,900	13,100	13,900
	15 year	90	3,400	8,600	11,200	12,700	13,500
Wages	10 year	7,300	26,300	36,600	48,300	49,500	49,600
	15 year	6,500	23,500	36,600	45,500	47,900	49,000
Management	10 year	2,500	7,300	10,100	11,500	11,500	11,500
	15 year	2,300	6,700	9,800	11,400	11,500	11,500
Other Inputs	10 year	21,700	46,600	46,800	44,800	45,800	46,900
	15 year	19,600	36,900	42,400	50,500	48,500	47,700
Cash Flow	10 year	-26,600	-28,200	30,800	77,200	95,400	107,900
	15 year	-23,800	-17,400	33,500	59,200	84,100	96,700

Year of first positive net cash flow - 10 year programme = 1982
 15 year programme = 1983

Total outlay to first positive net cash flow

(a) 10 year programme = \$248,600,000
 15 year programme = \$219,900,000

As can be seen from the tables the differences between the rates of development are relatively small. This is due mainly to the fact that they are virtually identical in the Second Malaysian Plan period. Thus in 1980 the 10 year programme ^{to} clear 220,000 acres approximately as against 200,000 for the 15 year programme, a difference of only 10 percent. This difference is reflected in lower wage and salary payments in the 15 year programme at that time and correspondingly fewer jobs.

Slight differences also occur between the programmes because of differences in cropping programme and phasing. The shorter gestation period and faster yield build up of oil palm compared with rubber result in a more marked levelling off of the cash flow in the early 1980's in the 10 year programme than in the others.

The outcome figures for the 12 year programme fall, as would be expected, between those of the 10 and 15 year programmes, and are only marginally different from both. Since the implementation of the 10-year plan would result in a loss of income to the forestry sector and would be very difficult to implement it can not be recommended. It is considered that the aim should be to complete land clearance in 12 years. However, provided that the first four year schedule is achieved, extension of the whole programme from 12-15 years would make little overall difference. It is clear that the rate of development between the range 12-15 years is not in itself an important factor, and can legitimately be regarded as an outcome of programmes determined by more important considerations. This element of flexibility is desirable. Figure V7 illustrates a 15 year pattern of development for Johor Tengah and is included to show the comparison with the 12 year pattern.

GOVERNMENT OF MALAYSIA AND THE STATE OF JOHOR

JOHOR TENGAH AND TANJONG PENGGERANG
REGIONAL MASTER PLAN

SUPPORTING REPORT VI

TOURISM & INDUSTRY

JANUARY 1971

Hunting Technical Services Ltd.
Binnies & Partners . Overseas Development Group . Shankland Cox Overseas
University of East Anglia

C O N T E N T S

	Page No.
1. TOURISM	1
1.1 Introduction	1
1.2 The potential market	1
1.3 Possible Tourist Development Projects	2
1.4 Alternative Development Projects	3
1.5 Estimated Costs & Returns of Initial Tourist Development Project	5
1.5.1 Capital Investment	5
1.5.2 Income	5
1.5.3 Public/Private Sector Participation	6
1.5.4 Job Creation & Costs	6
1.5.5 Market Viability	7
1.5.6 Conclusions	7
2. INDUSTRY	7

FIGURES

VI.1 Possible Tourist Projects	2
VI.2 Tanjong Penggerang Tourist Resort	4
VI.3 Outline Tourist Development	6

CONTENTS

Page No.

1	FOREWORD	1
2	Introduction	11
3	The potential market	14
4	Industrial Township Development Projects	15
5	Alternative Development Projects	16
6	Selected Cases & Lessons of Indian Township Development Project	19
7	1.1.1 Capital Investment	19
8	1.1.2 Labour	19
9	1.1.3 Public/Private Sector Participation	19
10	1.1.4 Top Location & Cost	19
11	1.1.5 Market Potential	19
12	1.1.6 Government	19
13	2. INDUSTRIAL TOWNSHIP	20

ANNEXURE

14	VI.1 Possible Township Projects	21
15	VI.2 Township Preparation Township Report	21
16	VI.3 Outline Township Development	21

SUPPORTING REPORT VI

TOURISM & INDUSTRY

1. TOURISM

1.1. Introduction

At state and national level, there is a growing realisation of the economic importance of the tourist industry. Several possible tourist and recreation developments have been identified in South East Johor, and other possibilities elsewhere in the state are either under way or being considered. There is a substantial and expanding market, at present largely unrealised, for holidays in Johor, mainly from the people of Singapore.

1.2. The potential market

The population of Singapore is the probable main source of demand, but significant numbers of international tourists and Malaysian citizens can be expected to visit any attractive facilities developed. By 1975, over 33 percent of Singapore residents are likely to take holidays of up to 10 days a year, and by 1990 this proportion could be in excess of 67 percent. There are over 300,000 international visitors to Singapore a year at present, and this number is increasing at 25-30 percent per annum. The average length of stay is 3-4 nights, and more than 55 percent of visitors seek recreation and enjoyment. By 1990, it is probable that between 600,000 and 1 million of the Malaysian citizens will be able to afford holidays who could be attracted to resorts in Johor.

Life in Singapore is becoming more urban and more expensive; the few beaches on the island are overcrowded, the sea around the city is polluted, and the number of people having access to a privately owned car is expected to rise from 440,000 today to 1.6 million by 1990.

The search for rest and relaxation by people living in Singapore and Johor Baharu already reaches as far as Port Dickson, Penang and the

Cameron Highlands. The only area of the state receiving significant numbers of tourists at present is Johor Baharu, where the mosques and palaces attract day trips from international visitors staying in Singapore. The number, quality and variety of facilities, particularly hotels, at the other existing tourist developments (Mersing, Lombong, Palm Beach near Masai, and Jason's Bay) are extremely limited, and cannot attract large numbers of visitors.

1.3 Possible Tourist Development Projects

Two possible major tourist projects have been identified in the study area (Figure VI.1). These are:-

i) A National Park in the Johor Tengah Region, including a hill station/hotel complex at over 2,000 feet above sea level on Gunung Blumut, with a golf course, high and low primary forest, wild life and forest conservation areas, together with a lake required for water supply. At the southern end of this area, an extension of the existing restaurant and chalet development at Lombong Waterfalls could include a hotel, lake and golf course above the waterfalls.

ii) The Tanjong Penggerang Beaches.

Extensive beaches are found throughout the length of the South China Sea coast south of Sedili Besar, but the 12 mile strip between T. Siang and T. Punggai offers the greatest potential for development.

Extensive areas of suitable land will lie conveniently close to any road system required for the agricultural development of the peninsula and will be within $1\frac{1}{2}$ hours travel time of the causeway. The nearby headwaters of the S. Lebam can provide potable water. The quality of the sand, and the colour and clarity of the sea, are better than to the north and south, and the topography and views are more interesting and of greater variety. Despite some unfavourable weather during the north east monsoon, enjoyable visits may be made to this area throughout the year.

Other possible State Government investments to serve the potential market are in Johor Baharu - the golf course, hotel, conference and

recreation complex; the "Lido" development; and the "Tropical Paradise" waterside park in the Endau/Mersing area, where a series of projects is being considered (particularly relying on the islands off Mersing); and in the jungle and mountains of the north and west of the State.

Attempts are being made to develop scenic routes for travel to these points and to other attractions north of the State.

1.4 Alternative Development Projects

The main factors to be considered in appraising the potential projects described in 1.3 are:

- (i) Short and long term income and job creation potential.
- (ii) Economic viability to private and public investors, especially the development costs and returns, particularly on government investment in infrastructure, and the practicality and timing of the provision of necessary services.
- (iii) Accessibility from major areas of demand.
- (iv) Suitability for development to attract large numbers of visitors from the major sectors of the potential market.
It should be noted that tourist development thrives on economies of scale.
- (v) Comparability with other major development proposals outside the state.

From a preliminary assessment of the alternative prospects using these criteria, the major potential for Johor State during the next 20 years lies in creating a tourist resort on the Penggerang coast between T. Siang and T. Pungai.

By 1990 this could grow to accommodate a maximum of 90,000 visitors at any time, of whom 40,000 might be day trippers, generating 25-30,000 full-time jobs in tourism, and (assuming a further 25 to 30 percent of jobs in supporting services) a total population of 100,000. The assumptions behind this evaluation are given in section 1.5 following, and

are discussed more fully in the supplementary paper on tourism.

The Jungle Reserve in Johor Tengah which provides the basis for a national park development will be necessary in any event, because of erosion, water supply, and other conservation factors. However, the high development costs and the limited scale of accommodation that can be built, suggest that the building of hotels and other facilities should await a proven demand, a committed private sector developer, and the completion and successful operation of similar schemes already under way in the more mountainous northern states.

Developments in Johor Baharu are largely part of the function of a state capital. As the population and economy of the city grow, successful hotel, amenity and recreation projects can be expected, particularly to serve the day tour market from Singapore. The town is not in itself suitable for development as holiday resort.

The islands lying off Mersing can be reached from the causeway only by an 80 mile journey by road and a further boat journey; in all two hours further than the longest route to the southern Penggerang beaches. This suggests that developments here will be best orientated towards the longer staying, more prosperous, boat owners or users. The existing demand for such facilities is being stimulated by current state and federal promotion. However, this area provides no substitute for developing the Penggerang coast, where the beach and land capacity are so much greater, the necessary infrastructure is likely to cost less and be available sooner, and the major market is so much closer.

Studies indicate that the market could eventually support all the suggested developments. However, initial development is recommended in the Penggerang resort for the reasons above. In the longer term, the beaches north of T. Siang, and south of T. Punggai offer further development potential, but in view of the high cost of infrastructure, it is recommended that the planning of further developments should await the completion of the tourist resort proposed above.

In the following section the costs and returns to be expected for Stage 1 of this development are estimated.

1.5 Estimated Costs and Returns of Initial Tourist Development Project

1.5.1 Capital Investment

	<u>Cost \$ Million</u>	<u>Totals</u>
1. <u>Hotel Complex with 3 classes of Accommodation</u>		8.5
100 Hotel Rooms Medium/Luxury Class	2.5	
200 Hotel Rooms Medium Class	4.0	
100 Family Houses (400 rooms)	2.0	
(inclusive of all on site facilities; restaurants, bars, swimming pools, play areas, dance halls, cinema, gardens, shops, etc.)		
2. <u>Additional Facilities</u> (Golf course, club house, restaurants, picnic areas, shops, etc.)	1.3	9.8
3. <u>External Infrastructure</u> (Roads, electricity, telephone, water sewerage)	2.0	11.8
4. Contingencies (10 percent)	1.2	<u>13.0 (Total)</u>

1.5.2 Income

Based on 70 percent occupancy of the higher accommodation levels and 50 percent rate for the family accommodation, an initial estimate of the number of day visitors, and current patterns of expenditure in Singapore and Malaysian tourist enterprises, an annual income of \$10.5 mn can be expected, with an annual surplus of revenue over expenditure of \$2.5 mn. This gives a financial rate of return (assuming the normal 15-20 year life of such investments) of 17-18 percent on the total investment, and on the hotel complex alone of 24-25 percent.

These costs and returns do not include accommodation and other facilities for the population employed, which, it is assumed, will be paid for out of earnings, although government and/or private finance would be necessary initially to provide accommodation and infrastructure. Several assumptions must be made in estimating these costs, for example: workers per family, employment of large numbers of Malay youths, use of underemployed workers on land development schemes. The assessments therefore can only be approximate. However, based on one worker per family, family homes in a village development scheme, an initial investment of \$1.8 mn would be required. It should be noted that substantial employment of young people and people from neighbouring settlements could considerably reduce this figure.

1.5.3 Public/Private Sector Participation

The investment appears to be financially attractive. It is recommended that the enterprise should be developed as a joint venture between the Government and experienced private hotel company, thus securing professional management expertise. The minimum government investment would be \$5.3 mn for infrastructure and housing including golf courses and other works outside the hotel complex, leaving \$9.5 mn for private investment. But government could increase its share of the total and secure a proportion of the equity. However, a detailed study is required to establish an appropriate investment and development plan.

1.5.4 Job Creation and Costs

Based on evidence from various parts of the world of the relationship between the number of beds and the number of jobs directly created, and with special reference to current practice in Singapore and Malaysia, the initial development is estimated to create full-time employment for about 600 people, as well as considerable part-time employment at week-ends and other peak periods. The investment costs per job would thus be of the following order:-

Public Finance	8,900 dollars per employee (full time)
Private Finance	<u>15,900 dollars</u>
Total	<u>24,800 dollars</u>

It should be noted that this is a maximum figure, based on a conservative estimate of employment creation, high initial infrastructure costs, and generous allowances for housing. In the long term for large scale development a considerable reduction of these investments costs per job might be expected. The gross annual income per worker would be approximately 17,500 dollars.

1.5.5 Market Viability

The required occupancy of the initial project to secure the returns outlined above, discounting all visits by international and Malaysian tourists is equivalent at only 4-8 percent of the potential market in Singapore (assumed first operational year).

1.5.6 Conclusions

Tourism could be a major new industry in SE Johor. The successful achievement of its potential depends on the early development of the right scale and variety of attractive facilities. This will only occur if the initial development scheme has strong government backing, and secures the involvement of experienced professional and technical expertise from the private sector. Therefore, a detailed study is now required to establish an investment and development plan for the initial project in conjunction with potential developers.

2. INDUSTRY

Industry is considered under three headings -

- 1) Processing of agricultural products grown in the project areas.
- 2) Industries primarily serving the needs of the project areas (transport, distribution, repair facilities, etc.)

3) Industries primarily serving markets outside the project area.

For some crops - rubber, oil palm and tapioca - processing facilities will best be located in the centre of producing areas. In all these cases there are small but demonstrable economies of large scale production, but these advantages must be weighed against the need to coordinate processing facilities with units of land ownership.

For other crops processing will best take place outside the project area, close to market centres in the case of milk packaging or in existing mills in the case of coconuts and crops for animal feedstuffs. For timber where a complex could provide over 300 jobs, the arguments for and against processing facilities in the project area are set out in Supporting Report IV

Industries serving the needs of the project areas will develop both inside and outside them, especially in Kluang and Kota Tinggi and later in the proposed new towns. It is not considered that any special economic planning should be made for this type of activity beyond the provision of small sites suitable for workshops, shophouses, and so on; activities should be allowed to develop according to market forces.

As regards industries serving national or export markets, there is in West Malaysia, as in most countries, a strong tendency for industry to locate in major urban areas. A shortage of suitable industrial sites has developed in the Johor Baharu area and the Government has responded by planning to provide 1500 acres of industrial land in hitherto undeveloped areas at Pasir Gudang. Manufacturing employment in Johor State appears to have been rising recently at a rate of about 3000 jobs per year; this could well increase, to perhaps 5000 jobs a year, of which some 4000 would be in South Johor. At this rate of growth the proposed industrial estate at Pasir Gudang and existing small sites at Kluang will be full by the late 1970's and new sites will have to be found.

To create diversified settlements in the project areas it would be desirable to encourage manufacturing industry, but this will be difficult so long as alternative sites continue to be offered, often on a subsidised

basis, near large urban centres, providing plentiful labour supplies, commercial and service facilities, and good communications.

It is not thought that special subsidies to attract industry into the project areas are justified, but a site of about 200 acres should be allocated for industrial development in each of the two proposed new towns. Provision of infrastructure should be planned to service these areas from the late 70's onwards. When full, they would employ perhaps 8000 people or 20 percent of new manufacturing employment in South Johor in the 1980's.

These areas would be additional to sites for processing timber and other agricultural products from local centres of construction and of transport repair and maintenance in the major settlements although they could be in the same location.

... near large urban centers, providing essential labor, services, and good construction.

It is not thought that special attention to attract industry into the project area is justified, but a site of about 500 acres should be allocated for industrial development in each of the two proposed towns. Provision of infrastructure should be planned to service these areas from the late 1960's onwards. Water will, of course, supply perhaps 5000 people or 20 percent of the manufacturing employment in South London in the 1980's.

There are a number of additional factors for consideration. The other agricultural products from local sources of construction and of transport require and maintenance in the region although they could be in the same location.

GOVERNMENT OF MALAYSIA AND THE STATE OF JOHOR

JOHOR TENGAH AND TANJONG PENGERANG
REGIONAL MASTER PLAN

SUPPORTING REPORT VII

DEVELOPMENT FRAMEWORK

JANUARY 1971

Hunting Technical Services Ltd.
Binnies & Partners • Overseas Development Group • Shankland Cox Overseas
University of East Anglia

C O N T E N T S

	Page No.
1. SETTLEMENT SYSTEM	1
1.1 Villages	1
1.2 Minor Service Centres	2
1.3 New Major Services Centres	2
1.4 Existing Major Service Centres	2
2. COMMUNICATIONS	2
2.1 Roads	2
2.2 Rail	6
2.3 Sea & Inland Waterways	7
2.4 Air	7
2.5 Telecommunications	8
3. SERVICES	8
3.1 Power	8
3.2 Sewerage	9
3.3 Water Supply	10
3.4 Health, Welfare, Employment & Rural Development Services	10
3.5 Education	10
3.6 Housing	11
3.7 Transport	12
3.8 Local Commerce	12

TABLES

1. Regional Roads	4
-------------------	---

FIGURES

VII.1 Regional Roads	2
----------------------	---

SUPPORTING REPORT VII

DEVELOPMENT FRAMEWORK

Much of the proposed physical development is common to all strategies. Alternatives have been examined and as far as possible eliminated. The remaining choices depend either on policy decisions about activities, organisations, short and long term income opportunities, and phasing, or on the rate of development of commerce, industry, tourism, livestock and new crops.

Certain of the constraints used to decide town and village size will change with time. As more people own cars or motor-cycles, or earn greater incomes, they will be able to travel further to work and social facilities than they walk or cycle at present, in the same time and for the same proportion of their income. And as the population grows and the desire for greater incomes increases, more people may be expected to work in urban activities.

The proposed framework is designed to accommodate such changes both in project planning and subsequent implementation.

1. SETTLEMENT SYSTEM

1.1 Villages (44-48 depending on strategy chosen)

A village serves an average of 4,750 net agricultural acres in Tanjong Penggerang, and 5,500 in Johor Tengah. Depending on the choice of strategy, the number of households for agricultural workers varies from 280 to 460 in Penggerang, and 400 to 550 in Johor Tengah. Preliminary village sites of 200-300 acres have been identified, and an average residential density of four dwellings per acre is proposed. Including the families of those employed in local services, the population of each village is likely to be between 2,000 and 3,000.

1.2 Minor Service Centres (5)

For each group of 5-7 villages, a minor service centre (master village) is proposed. As well as fulfilling the same function as the village in relation to the surrounding agricultural areas, they are proposed as local centres for processing, distribution, marketing, social services, commerce, entertainment, and recreation for the existing and new population within 5-8 miles. Three such villages are proposed in Penggerang, two in Tengah (population 4-6,000).

1.3 New Major Services Centres(2)

In each region, a new town is proposed. They would start as villages and minor service centres. The areas they serve are more than 12-15 miles from Kluang or Kota Tinggi, and they would each be the main service centre for 14-20 villages, i.e. 30-60,000 people. In Johor Tengah, the proposed site would include the timber industries complex, and also provide a base for construction and transportation. Initially, long term urban expansion areas would be available for agricultural use; the plan allows for growth to 30-50,000 population. In Tanjong Penggerang, the growth of the new major service centre will be a large extent depend on the scale, speed, and character of tourist development. The plan allows for growth to 60-100,000.

1.4 Existing Major Service Centres

The plan allows for the phased growth of Kluang from 60,000 today to 200,000 by 1990, and of Kota Tinggi from 9,000 to 30-50,000 including the relocation on high ground of property liable to flood,

2. COMMUNICATIONS

2.1 Roads

The main existing routes (fig. VII, 1) likely to serve the project regions are:-

- i) The new north-south national route (Route 1) (Kuala Lumpur/Johor Baharu) and link (Rengam/Kluang).

- ii) The east coast route (Mersing/Kota Tinggi/Johor Baharu).
- iii) The northern east-west cross route (Mersing/Kluang/Route 1/
Batu Pahat).
- iv) The southern east-west cross route (Kota Tinggi/Kulai/Route 1)
- v) The Kota Tinggi/Lombong Road.
- vi) Road under construction (FLDA Kulai/Ulu Tiram/Johor Baharu).

These existing routes, with the exception of stretches of Route 1, have considerable spare capacity at present. They are main routes for bus, taxi and goods transport services in the region. The only roads within the project areas are harvesting networks on existing estates, a dispersed pattern of mining and logging tracks, the first eight miles of the FLDA Ayer Tawar road from Kota Tinggi into Tanjung Penggerang, and the route running the length of the southern coast of the Penggerang peninsula, where a public bus service operates.

The above routes provide potentially important external and internal links for the project regions, but in location and condition do not provide a system that gives access of the necessary standards to the major potential areas of development. A new road system for both project regions is a prerequisite to major development.

Following the choice of a strategy for the Master Plan, detailed estimates of traffic will be made, and the appropriate road design group chosen. On the basis of preliminary estimates of traffic, the hierarchy of roads envisaged at present is summarised in Table 1.

TABLE 1

No.	CATEGORY	Highway Design Group (20)	Pavement Width (feet)	Reserve Width (feet)	Cost per mile Flat (thousand dollars)	Cost per mile Rolling	Notes
<u>Primary Roads</u>							
1.	Regional routes (urban reserve)	05 (06)	24	120-150	385	548	(a) All weather surface
<u>Secondary Roads</u>							
2.	Main distributors (regional and urban)	03	20	70-100	283	399	(b) All weather surface
3.	Harvesting collectors	n.a.	16	30-50	15	22	Rolled laterite or other crushed rock or graded suitable material
4.	Harvesting roads	n.a.	10-12	Nil	7	4	Depends on crop,
5.	Village links to 1 and 2	As 2					
6.	Town and village local distributors		16	30-50	89	113	(c) All weather surface
7.	Housing roads in towns and villages	n.a.	As 3				Different to design group 02(1) owing to lower design speed 30 m.p.h.

(a) Malaysian General Transportation Study (MGTS), adjusted by PWD

(b) Add 15 percent for design, survey, supervision, administration, financing and escalation.

(c) Jengka Report costs revised in light of MGTS and discussions with JKR and FLDA.

The criteria for routing the regional development road system are:-

- i) A wide area of developable land to be opened up on either side of new regional roads.
- ii) Direct links into the existing and probable future national road network to allow movement of products to export points and markets.
- iii) A system that can be economically phased to allow staged development.
- iv) A system which routes traffic away from areas of urban growth and possible congestion, and yet gives direct access to existing and future urban centres.
- v) Ease, speed, and economy of construction in relation to topography, geology, and soil characteristics.

After testing a series of networks, the following regional road network is proposed.

Johor Tengah (Fig. VII.1)

- i) The extension of the Kulai FLDA regional road northwestwards, crossing the S. Sayong, running east and north of the S. Pengelli to Kluang, and crossing
- ii) a new link from the existing Kluang/Mersing road near Kampong Gajah to the existing Simpang Rengam/Rengam Kluang road near Rengam
- iii) a new road from i) near Bukit Besar FLDA northeastwards crossing the S. Johor.

Tanjong Penggerang

- i) The continuance of the Ayer Tawar FLDA road southeastwards to meet the existing road at the southern end of the peninsula, near Tanjong Ramunia, bridging the three rivers near the confluence of the S. Lebam (Penggerang highway).

ii) A new road running east/west from (i) above through the area south of the S. Lebam and north of the S. Sabina to a possible vehicle ferry across the S. Johor to the proposed new port and Johor Bahru.

iii) A new road between the Penggerang hills and the swamp area adjacent to the coast, from the Kota Tinggi/Mersing road near Bukit Apping FLDA scheme to join the Penggerang highway north of the S. Lebam.

iv) A new east coast road from near the junction of i) and iii) to the coast near Tanjong Balau, and running southwards, set back $\frac{1}{4}$ -1 mile from the coast to join the existing road along the southern coast of the peninsula.

These routes, the existing state, federal, and private road systems in and around the region, and new secondary roads will allow access to all potential development areas. Their phasing will be decided by examination of the timing of the development projects.

Phased construction will as far as possible be proposed, according to the type of design applicable, and the build-up of the loadings on the various sectors. In Johor Tengah, the logging and forest industry routes have been worked out to take account of the long term needs of potential development schemes, so that the basis of the permanent road system will be provided in advance of clearance and development.

Improved roads in the towns of Johor Bahru, Kluang and Kota Tinggi, and improvements on National Route 1, the Kota Tinggi - Johor Bahru road and the Kulai FLDA and Ulu Tiram road will in time be necessary to avoid heavy transportation user costs through delay and congestion.

2.2 Rail

The main north/south national railway line runs along the western boundary of Johor Tengah. There are passenger stations at Kulai, Layang Layang, Rengam and Kluang. In Kluang, an area for a possible railway siding and industrial estate is proposed in the existing town plan

The proximity of the large export points and markets (Singapore/proposed Johor Bahru port), the extent of double handling, and the distance

of most of the project area from the railway, preclude major developments of rail traffic. However, the proposed railway siding industrial area at Kluang should be reserved for any developers who consider the volume and nature of their raw materials or produce suitable for railway transportation.

The road system proposed will provide adequate access to the stations along the railway line for passenger travel.

2.3 Sea & Inland Waterways

The proposed Johor Bahru port, and the ports of Singapore and Port Swettenham, will provide adequate facilities for the potential imports and exports of the project regions. The only ocean going vessels calling in the project regions are those carrying bauxite from southern Penggerang.

The only local waters used to a significant extent for the movement of goods and people are the S. Johor south from Kota Tinggi and the Johor Strait. From existing estates and villages on the western and southern sides of Tanjong Penggerang, small passenger ferries run to Langsat and Kong Kong on the western side of the river, and to Johor Bahru, Changi and Kota Tinggi.

Improved water communications, unlike roads, are not a prerequisite to the development of the project area. However, it is desirable to improve access to services in Johor Bahru from southern Penggerang. When agricultural and tourist traffic reaches a level to secure an adequate social return from the investment, the provision of a car ferry will be justified. Terminal locations have been identified, together with links from the proposed road system. Improved passenger ferry services (Changi-Penggerang) may be justified in the later periods of the plan, depending on the success of tourist developments.

2.4 Air

International and national air services at present serving Southern Johor operate through Singapore and Malacca. These and the proposed Johor Bahru airstrip, and, possibly in the long term, commercial use of the military air field at Kluang will provide adequate services for

the development of the project regions. There are privately owned light plane airstrips at Kota Tinggi and Kahang, about 20 miles towards Mersing from Kluang. Should further airstrips, helicopter pads, etc. for emergency, sporting or business use be required, and economically justified at any point in time, no problem is anticipated in making the necessary land available.

2.5 Telecommunications

The existing network of telephone and telegraph services operates from Johor Bahru to Kluang and Kota Tinggi. The provision of modern telecommunication services in the project region will be vital to their economic and social development. Therefore public call boxes, lines to social administration units (Schools, Police Stations, Post Offices, etc.) and to the offices of commercial enterprises will be required in each village. In towns, including the tourist developments, sufficient lines will need to be available for government agencies, industrial and commercial enterprises, and residential subscribers.

The Telecommunications Department foresee no problems in extending services from Johor Bahru, Kota Tinggi, and Kluang to serve the project regions. They are at present producing an estimate of the future regional network including a telegraph/telex system based on town post offices. This network will be phased according to the chosen strategy for development.

3. SERVICES

3.1 Power

Part of a future national grid system exists in the 132 KV line from Johor Bahru power station to Kluang. This is energized to 66 KV at present. There is also a 22 KV link from Johor Bahru to Kota Tinggi, where supplementary power is produced from a bulk supply station. All other electricity supplies in and around the project areas are by local oil generators.

Countrywide consumption of electricity is rising rapidly. To meet this demand extended and new power stations, major new grid links, step down facilities and rural electrification programmes are under

construction; for the foreseeable future, priority is likely to be given to major industrial and urban expansion areas. Thus it is probable that grid electricity will not be available in the project regions until the demand is sufficient to rank priority. However, for tourist and industrial development and to meet the aspirations of the population, the availability of power, as well as lighting, in the regions is essential in the longer term. Therefore, it is proposed that an initial system of local generators be constructed followed by a long term grid and transmission network - Johor Bahru/Kluang/Johor Tengah/Kulai/Kota Tinggi/Tanjong Pengerang.

The National Electricity Board are producing an estimate of the distribution system for the development of the project regions.

3.2 Sewerage

In the project regions, and Johor Tengah in particular, development will bring the risk of pollution of southern Johor's major water supply catchments, streams and rivers.

In the long term the number of industrial plants producing a noxious or toxic waste, eg. rubber and oil palm processing factories, will increase to a level where treatment will be required to render the water in the major rivers suitable for domestic consumption. It is far cheaper to treat such waste at source before it enters the land drainage system than to treat the water after intake for distribution.

Legislation needs to be considered to make the discharge of trade effluents conform to standards acceptable in the water supply system.

Proposed villages will use the standard pit latrine for house lots, and septic tanks for grouped higher density uses, eg. the village centres and schools.

Proposed towns would use a similar system in their early stages of development with the higher density housing, commercial, industrial and social land uses initially requiring septic tank or cess pool systems. Town planning must allow for the subsequent provision of sewerage treatment works. In this way, for the minimum cost, pollution of water supplies

will be avoided, and acceptable sanitary standards be attained.

3.3 Water Supply

Supplies from the project regions to the various development schemes and to external areas have been described in Supporting Report II. In view of dental health problems, it is suggested that the fluoridation of water supplies be carried out at all treatment works. For water supplies within villages and towns, it is proposed initially to use the FLDA system of the village reticulation scheme with one standpipe to every six families. Depending on detailed design and topography, it may prove possible in certain situations to reduce the number of standpipes and still give the same quality access. People desiring and able to afford individual connections should pay for them.

3.4 Health, Welfare, Employment, and Rural Development Services

Project studies on social service provision have identified existing facilities, policies and plans for south east Johor in a national context. These studies cover general hospitals (Johor Baharu and Kluang), district hospitals (Kota Tinggi), main and sub health centres, midwifery, malaria control, dispensaries, dental services, family planning, sewerage, water chlorination and fluoridation, children in need, reformatory services, public assistance, emergency relief, employment offices (Johor Baharu) and sub offices (Kluang), youth employment, adult education, illiteracy, Bahasa Malaysia, home economics, vocational training, libraries, etc. It is clear that most of these services in and around the project area fall short of national objectives and/or existing national ratios of facilities to population. Considerable attention to these problems will be necessary in the planning and implementation of developments in the project area.

3.5 Education

The schools in towns, villages and estates in and adjacent to the project areas are of a series of types and sizes - primary, lower secondary, lower and upper secondary, secondary with sixth form, with and without

'Remove' classes. The schools are generally crowded, and will be inaccessible from the major new areas of development. Thus existing facilities cannot supply the educational needs of a large future population influx and growth in the project regions. Sixth form education is only available in Kluang, Kulai and Johor Baharu, and secondary education in Sungei Rengit, Kota Tinggi, Kulai, Rengam, and Johor Baharu. New secondary schools in FIDA's schemes at Bukit Besar and Ayer Tawar are planned in the near future.

The social studies have high lighted a demand for good educational facilities in land development regions and in conjunction with the EPU report "The Situation of Children and Youth in West Malaysia" shown the difficulties of attaining urban educational standards in rural areas. In discussion with the State Education Office, guidelines for the establishment of economically practical primary and secondary schools conveniently accessible from new residential areas have been derived for use in Master Planning.

3.6 Housing

The Malay takes a great pride and interest in his home and garden. The variety of design, colour and decoration and the flowers and trees have created a rural environment of great character and charm.

The Malay tradition of rural housing, with the skilled use of timber and 'gotong royong' construction, is exceptional in the tropical world. We consider it important that the quality of housing and environment the people have shown they can create quickly and at low cost becomes an integral part of the development programme. The success of MARA's low cost rural housing has illustrated the possibilities of integrating these traditions with industrialised methods of construction.

During the next 15-26 years, developments in the project regions will require the construction of about 20,000 low cost houses. It is suggested that to meet the demands of different family sizes, incomes, and tastes, and to overcome the constraints imposed by rapid land settlement, a variety of house types and methods of construction should be used.

Site preparation, surveying, provision of roads and water, and sewerage and electricity arrangements will need to be carried out in advance of house construction by specialised teams. Skilled or semi-skilled construction workers should be attracted from the west coast areas and offered residence and employment in the same way as agricultural workers.

A choice between self-built, self construction of pre-cut timber and/or premade panel house types, and construction team erection of the various types should be available to migrants.

The construction labour force should be employed by enterprises set up in by such an agency as MARA, in Johor Tengah alongside the timber industries complex, and in Tanjong Penggerang in association with tourist development. The construction enterprises should offer training and career opportunities to workers, in such a way that ownership can ultimately be handed over to them.

3.7 Transport

Transport fleets will be required both for internal collection and distribution, and for exporting produce and importing materials for consumption in the project regions. By the time of full production over 700 vehicles would be operating in and out of each project region.

For public transport, regional and local bus and taxi services will be proposed. In both regions and for both forms of transport maintenance and repair depots will be required.

This employment sector, with the demands for training in modern skills, has considerable possibilities for increased Malay participation. It is suggested that MARA should have a major role in establishing these services and facilities, attracting and training the labour and ultimately handing over to local groups.

3.8 Local Commerce

There should be a programme to attract people of potential entrepreneurial ability to the project regions to man the local shops,

markets, handicraft and other potential commercial activities. Buildings will have to be provided in advance, and controlled initially by experienced personnel capable of training the labour force for a full management and ownership role.

GOVERNMENT OF MALAYSIA AND THE STATE OF JOHOR

JOHOR TENGAH AND TANJONG PENGERANG
REGIONAL MASTER PLAN

SUPPORTING REPORT VIII

SOCIOLOGICAL STUDIES

JANUARY 1971

Hunting Technical Services Ltd.

Binnies & Partners . Overseas Development Group . Shankland Cox Overseas
University of East Angles

C O N T E N T S

	Page No.
1. INTRODUCTION	1
1.1 The Studies	1
2. THE ECONOMIC SITUATION AND NEEDS	3
3. THE PROBLEMS OF MIGRATION	6
4. CRITERIA FOR LAND SETTLEMENT ORGANISATIONS AND A GENERAL SOCIOLOGICAL STRATEGY	7
5. THE ADVANTAGES AND DISADVANTAGES OF DIFFERENT LAND DEVELOPMENT ORGANISATION	10
SUPPLEMENTARY PAPERS LIST	14

CONTENTS

Page No.

1	INTRODUCTION	1
1	1.1. The Problem	
2	THE ECONOMIC SITUATION AND NEEDS	2
3	THE PROBLEMS OF NUTRITION	3
4	CRITERIA FOR LABOR SETTLEMENTS, ORGANIZATIONS AND A GENERAL SOCIOLOGICAL STUDY	4
10	THE ADVANCEMENT AND REORGANIZATION OF DISTRICT LABOR EDUCATION ORGANIZATION	10
11	SUBSIDIARY LABOR LINE	11

SUPPORTING REPORT VIII

SOCIOLOGICAL STUDIES

1. INTRODUCTION

A number of sociological studies were carried out between September 1969 and December 1970. These included a study of all available published sources, as well as various field studies. The detailed results of these studies have been embodied in supplementary papers and this report brings together the most important points and recommendations that these papers contain. (A list of the relevant papers is included at the end of this report).

These supplementary papers interpret the objectives of the government and the aspirations of the governed; and the extent to which various types of land settlement meet or, are likely to meet, the diverse needs of the rural community. Neither sociologists nor others can provide a precise long term blueprint for the development of new communities.

1.1 The Studies

The field studies were carried out in four FLDA schemes, three rural Malay kampongs, an urban kampong, two estates, a Chinese New Village, and youth schemes in Pahang, Selangor and Johor. The kampong and estate field studies covered 293 households and, in addition, 223 youths were interviewed

The samples are therefore small but in many cases there was sufficient regularity of response, in some cases continued by previous published studies so that for some fairly firm conclusions could be drawn. The samples were deliberately not random, being chosen because they represented either a particular form of organisation or set of problems. They were mostly limited to Johor, partly because Johor residents are likely to be the majority of migrants to new developed land in the State.

Few similar studies have been done before. Despite their limited nature, in terms of both geographical scope and the sizes of the sample, these sociological studies are almost certainly the most extensive and intensive studies of their type done to date in Malaysia. Indeed this is the reason for one of the most important recommendations in the reports, namely that there should be a permanent arrangement for sociological research and evaluation in the project areas (and preferably in the rest of Malaysia), so that there can be a continuing feedback of information on land settlement schemes. It is proposed that a small committee be established, with a regular budget, and consisting of members from the government and the universities and possibly the project area, should consider research proposals and make grants to individuals or institutions, inside or outside government service, for studies both of immediate practical problems and of long-term or theoretical problems.

The sociological studies can be broadly split into four parts;

(i) a study of the economic situation and needs of potential migrants into the project areas (employment, incomes, population pressure on land, the extent and meaning of 'land hunger', that is the demand for ownership of separate plots of land, and the likely consequences of meeting or not meeting this demand);

(ii) a study of the problems of migration;

(iii) an examination of the criteria for choosing between alternative forms of organisation for land settlement and tentative recommendations for a general sociological strategy for meeting some of the objectives; and

(iv) a study of the alternative forms of organisation for land settlement and agricultural production, and a study of the extent to which the existing forms and possible new forms meet, or are likely to meet, the objectives of participants and of the project.

Before each of these aspects is summarised, one point needs to be made. In the same way as veterinary students begin with the anatomy of a horse and then study other animals as they differ from the horse, we use FLDA as our horse and consider each form of organisation for land

settlement as an improvement on, or an imperfect copy of FLDA, or as an alternative way of meeting similar needs. The studies are therefore often critical of FLDA, but this is not because FLDA deserves criticism more than the alternatives. It is rather because FLDA is the one great social experiment in Malaysian land settlement and it is therefore vitally important to learn from its experience.

2. THE ECONOMIC SITUATION AND NEEDS

The population of the project areas is at the present time very small, about 30,000 excluding 'fringe' towns and villages. The development of the areas will therefore involve the settlement of virtually the whole community. A brief account of the present population of the areas including orang asli or aborigines is given in the supplementary paper on Sociology.

Since the areas where most of the orang asli live will not be cleared for development but will be kept as forest or water reserves, it is recommended that the best policy with regard to the orang asli is to continue the present policy of special educational assistance and welfare services, to allow the orang asli to take up new economic opportunities as and when they choose to do so, but to avoid a policy of forced settlement or assimilation.

As far as underemployment and unemployment are concerned, Johor State seems, from the limited data available, to reflect the situation in West Malaysia as a whole. Youth unemployment is, as in West Malaysia, running at a high level, much higher than the unemployment average. The reasons are briefly that, compared to the rest of the population, youths (aged 15-24) are more mobile, more educated (and this is not a disadvantage) more ambitious, and, in some cases, less realistic, especially the youngest.

From information gathered in the studies of the kampongs, New Village and non-FLDA estates and also in the agricultural survey done by the SEJP in S Johor, there are, in rural Johor, what can only be described as areas of acute poverty and deprivation, affecting Chinese and Indians as well as Malays. For example in two of the kampongs studied, the

majority of households were receiving a cash income of less than \$100 per month. On the FLDA schemes studied something like half the households studied had an income of less than \$100 per month before they joined FLDA. On the same FLDA schemes the majority of households on the 4 schemes studied now received a cash income of less than \$120 per month, although the variation between incomes for those on new schemes and those on older schemes was very large.

The two kampongs referred to above are both in areas of acute population pressure on land which, in Johor State, are the western districts of Muar, Batu Pahat and Pontian. The extent of the poverty is almost certainly not as great as that found in some of the east coast states or possibly even in Malacca. Furthermore, cash incomes do not of course tell the whole story. On the basis of the data gathered in the field studies, each household in the 'older' settlements has a subsistence income (from the food grown, fish caught and clothes made by the household itself) of something like \$15-30 per month. This represents, in the poorer households, something like 20 percent or more of their total income. These 2 kampongs show the classic syndrome of over-population, underemployment, debt, malnutrition and lack of energy to make improvements. The poverty is reflected in the amenities which they have: of the households studied in the kampongs and non-FLDA estates, only 1 percent owned a car, only 18 percent owned a motorcycle, less than a half had access to electricity, and only just over a third had piped water. About half the households owned its house-site, but considerably more than half owned little or no land at all. The project's agricultural survey showed that a Malay farm family in South Johor typically earns more cash income outside its own farm (median \$60 per month) than on it (\$40); the very low household incomes in the Batu Pahat and Muar kampongs studied are largely the result of the relative lack of outside employment opportunities in the first kampong and the almost complete lack in the second.

The field studies give descriptions of various groups of potential migrants, such as rural Malays in areas of acute population pressure; Chinese smallholders or rural workers; Indian estate labourers and urban youth.

The problems of trying to discover the aspirations of people in an existing situation but even more so of trying to gauge their likely reactions to a new, largely hypothetical situation are emphasised. The poorer sections of the rural community studied do however distinguish sharply between the status of a landowner (with a secure source of income) and a 'labourer' (the same term being used for casual labourers and for regular share-tappers or wage-earners). In this situation few people are willing to consider any alternative to separate plots of land; but the alternatives of sharing land (as possibly on FLIDA oil palm schemes) or renting it with secure tenure or other alternatives have not been presented to them as real possibilities.

Rural people in similar situations tend to see private land ownership as the one condition for security, income and independence. This assessment is rational, given the alternatives known to them. It can be expected to change if they are presented with an alternative package offering similar advantages. In addition to package deals of organisations, the use of special measures to meet part of these requirements should also be considered (e.g. the introduction of a more comprehensive pensions scheme to reduce insecurity).

The quest for security and independence goes a long way in explaining the general aversion to estate work, and to a lesser extent in explaining the relative popularity of government jobs and the low esteem in which agricultural work is held among the young. Even among youth, the theme that ran through their apparent aspirations was the search for security and the regularity of an income that would appear month by month without being affected by outside factors. But there were noticeable variations in the esteem attached to agriculture. Those young people who had had some close contact with agriculture in which there was considerable security, some independence, and, relative to most other parts of the agriculture sector, a high income or at least reasonable prospects of a high income in the not-too-distant future attached a much higher status to agricultural work than did others without this experience.

This difference in attitude was shown by the children of FLDA settlers who showed a much greater willingness to consider a career in agriculture than other youths; at least they seemed to be prepared to accept a somewhat lower immediate income for a place in such an organisation than did other youths without the same experience who expected an income of around \$150 per month before they would go into agriculture.

The reluctance of youths (other than FLDA youths) to consider employment in agriculture is not of course solely a matter of low incomes. Agricultural work in the rural areas is unpopular for a number of reasons - the low status attached to it in the schools, the lack of security, and the lack of urban facilities in the rural areas. Aspects of town life which attract are not cinemas and restaurants (which are beyond the financial scope of most young people) but electricity, piped water, good communications, sports facilities, shops and meeting places and better health and educational facilities. There is, it must be emphasised, no reason to deplore younger people's preferences for town life. Their choice is rational, given the present structure of the community, and moral exhortation to live in remote areas is unlikely to be very effective without the provision of better incentives.

3. THE PROBLEMS OF MIGRATION

The chief problems people anticipate when considering a move into a newly developed area are the expenses of moving (likely to be as much as \$100 per household) and the difficulty of educating children. Malays are not very concerned to have relatives in a new place, though this does not mean that contacts with the relatives back in the kampongs should be discouraged by FLDA (see below, under 4). When people consider moving they have two destinations in mind: to new FLDA schemes in the rural areas, otherwise to towns.

It is hard for potential migrants to make a rational assessment of the advantages and disadvantages of moving and tentative suggestions are made for improving channels of communications and giving rural people a more accurate picture of the prospects in newly developed areas.

One of the chief obstacles to, and difficulties experienced in, migration is the loss of educational opportunities for children (because of the restricted choice of schools in new areas, low incomes in the early years, etc.). These opportunities are lost for ever and it is recommended that in rural areas school transport, books and meals should be subsidised to make 'free' education really free at least in the early years of new land development.

In addition to this, it is recommended that FLDA should raise the 'subsistence income' guaranteed to settlers in the early years of a scheme. The present subsistence loan of \$2.90 a day is too low to support, feed and educate a family even when it is more than the cash income that some settlers received in their kampongs. On a newly-developed FLDA scheme, settlers do not have the same access to subsidiary employment and subsistence food supplies that they have in the kampongs, and FLDA should give high priority to offering the settler the option of spreading his income more evenly over the life of the crop. The settler should be offered the option of taking a subsistence loan of at least \$100 per month.

There is some evidence to suggest that poverty in the immature years of a scheme leads not only to lower school enrolments (especially in secondary education) but also to a high rate of absenteeism from school. Furthermore because of the lack of access to leafy vegetables, fruit and small fish, migration can, and does in some cases, reduce the levels of nutrition. Malaria is also a serious problem in newly-cleared areas of Johor, and until the National Malaria Eradication Programme reaches the State in the middle of the '70's, a careful watch should be kept on the incidence of malaria in newly-cleared areas especially in Kota Tinggi District. But, it should be noted, health and nutrition do not appear to be serious direct disincentives to migration.

4. CRITERIA FOR LAND SETTLEMENT ORGANISATIONS AND A GENERAL SOCIOLOGICAL STRATEGY.

It is a mistake to regard the problem of adapting the rural population (esp. Malays) to high-income activities as one of moving from a traditional environment (with associated complex of values) to a modern

environment with the need for a clean break and a set of disincentives to prevent them from falling back into their traditional environment.

Kampong life does not of itself necessarily discourage innovation: and has some advantages (especially diversity) which new schemes lack. The problem is not to get rid of kampong ways of living but to change the situation in specific ways so that existing potentialities for economic growth and social equality can be realised.

The concentration should not be on the difference between two whole environments, but between two kinds of relations; those of 'contract' and 'status'. This is an important distinction, and some economic failures, as in the case of Malay village shopkeepers, are directly attributable to a confusion between these two things. This confusion is perpetuated, for example, on FLDA schemes where the manager is expected to supervise everything, including the settlers' personal problems; or where the scheme is regarded as a total way of life, to which settlers should give undivided loyalty, rather than an organisation with specific economic functions.

The status/contract distinction throws some light on the problems of reducing inequalities and tensions between ethnic groups. The problem is that each race tends to act according to the stereotype that others have of it. Thus racial characteristics are largely the result of a historical division of social relations into status relations within each race and contractual relations between them. Once the idea of the separation of roles and a clear distinction between contractual and status relations is generally accepted, these self-perpetuating racial characteristics should become less important.

Incentives to make people more achievement-oriented should not be relied upon, nor is there a great danger of sapping self-reliance through subsidies (even if these can be defined). The main problem is not lack of motivation; it is that of creating conditions in which existing motivation can become effective and in which incentives can be intelligibly related to effort and initiative.

A list of guiding considerations shows how the suggested strategy can be translated into action;

(i) Wherever possible avoid tied housing (tied to a particular job) and company towns (dominated by a particular enterprise). Housing for workers in one or several enterprises, established in the same village area, should be provided by a housing co-operative borrowing from the government; by a building society; or by loans to settlers to enable them to buy land and build privately. To give workers as wide a choice as possible, the possibility of semi-industrialised self-built housing should be considered. Such housing schemes could be administered by an existing organisation (such as MARA or the SEDCO), by a new regional organisation such as the proposed SE Johor Development Corporation (SEJDC) or by a new Federal organisation specially established for the purpose (a Federal Rural Housing Corporation?). The interest rates charged on finance provided by these bodies should in any case be no more than four percent per annum, the difference being borne by the Government in the same way that housing loans channelled through the Treasury's Housing Loans Division to Government servants are now subsidised.

(ii) The settlement should wherever possible have easy access to a number of different employing organisations and opportunities for self-employment. Settlers or labourers working on FLDA, Government farms or similar schemes should be allowed to open private or co-operative workshops in the scheme or settlement area or shops in competition with the Authority's shops. This recommendation is made despite the failures revealed by the studies of FLDA settlements. An expanded service on the lines of FLDA's Settler Development programme should help residents in the project area with advice, material assistance and contracts to enable them to set up their businesses. This service could be provided by the proposed SEJDC.

(iii) Once the principle that the organisation of the settlement should be separated from the organisation of the enterprise is accepted, two kinds of participation are required. Trade unions or co-operatives or works councils to represent workers; and elected local bodies (either reorganised Local Councils or consultative committees) in which the same people take part as inhabitants of a settlement.

FLDA management should be defined more specifically as a technical job, and divorced from overseeing everything on schemes. Settlers should be allowed and even encouraged to open workshops and retail shops, if necessary in direct competition with the Authority. If the principle of separating the settlement from the production activity is accepted, existing FLDA settlers' committees should specialise either in representing the workers or landowners or in serving the settlement, not both; or they should be divided.

(ii) the phasing of income and the level of charges

Settlers should be given the choice of taking a larger loan or subsistence income in the early, immature years up to, say, a maximum of \$100 per month, and the options should be made clear - that more now means less later.

In addition in order to live up to its motto of 'Bagaimana di-tanam, begitu-lah di-tuai' (which translated is 'As you sow, so shall you reap'), FLDA should review the charges which it levies, especially the palm oil mill capital and operating and internal transport charges, and FLDA and the Government should together review the rubber replanting cess, since this affects smallholders as well as FLDA settlers. FLDA should review these charges to see whether they correspond to the actual costs incurred. The Authority should also consider giving the settler the option of paying into the replanting reserve fund on oil palm. It seems unreasonable to force the settler to save for the planting of a scheme in about 1995 in addition to paying for the development of a scheme planted in 1970.

(iii) the opportunities for 'horizontal' and 'vertical' mobility

The FLDA should expand the 'horizontal' opportunities for the settler by making it easier for him to leave the scheme without undue sacrifice and by encouraging the development of ancillary activities in which settlers may work full time. The Authority should also expand the 'vertical' opportunities for the settler by making promotion within a scheme easier for settlers.

As far as the first is concerned, FLDA should make the position of the settler at any point in time as clear as possible. This means that the settler should:

(i) know how much he owes to, or is owed by, the Authority. The settlers' accounts were until recently about a year out-of-date, although now all accounts for settlers on yielding schemes are said to be up-to-date:

(ii) know how much (if any) is payable to him in the form of compensation, if he leaves the scheme. The settler leaving an FLDA scheme for approved reasons is supposed to get some compensation, but settlers do not seem to know this

(iii) not have to leave his house if he leaves the Authority, provided that he maintains the repayments on his house loan (see above);

and (iv) know exactly what his status will be when the repayment period is over. The present form of supplemental agreement between a settler on an oil palm scheme and the FLDA states that at the end of the repayment period, the FLDA will revert to the State government the settler's area which will then be alienated either to a co-operative or to the individual settler for a period of not less than 99 years. It is thought that there may be some difficulty in operating oil palm on a smallholder basis, (see The 1969 Annual Report, FLDA) and it therefore appears that the present intention is to hand over the scheme to some form of co-operative for joint cultivation. How this co-operative is to be organised, what relation it will have to the present settlers' committee (JKKR) and how it is to manage the land, are not spelt out in the agreement. These points should be clarified as soon as possible in discussion with the settlers themselves.

The sociological studies could not draw any firm conclusions as to the acceptability of joint cultivation on FLDA schemes to settlers and potential settlers, but rented holdings might in any case be worth considering as an alternative either to joint cultivation or to smallholdings.

As far as 'vertical' opportunities are concerned, FLDA should eliminate the points at which promotion is blocked. In particular FLDA mandors seldom rise to become Field Assistants and yet mandors from

private estates can become Field Assistants. It seems illogical for FLDA to accept settlers' children for training for management, but not settlers themselves.

Finally FLDA and the Government should review the objectives of FLDA and in particular which groups of the community FLDA is to help. The criteria for settler selection were changed in 1969 with more emphasis being placed on youth and literacy. It is suggested that the Government should year to reconsider the criteria, especially after the census data are made available.

Supplementary Papers

- a. 'Sociology and the South East Johor Project' - 19 September 1970
- b. 'FLDA' - C. Abraham, Sociologist (preliminary draft 15 September 1970; now under revision)
- c. Field Study reports:
 - Volume 1 - Kampongs and estates.
 - Volume 2 - Kampongs and estates - statistical appendix.
 - Volume 3 - FLDA estates.
 - Volume 4 - FLDA estates - statistical appendix
- d. Youth: Aspects of Land development and Employment - main report and Appendices.

GOVERNMENT OF MALAYSIA AND THE STATE OF JOHOR

JOHOR TENGAH AND TANJONG PENGGERANG
REGIONAL MASTER PLAN

SUPPORTING REPORT 9

THE DEVELOPMENT CORPORATION

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C O N T E N T S

	Page No.
1. INTRODUCTION	1
2. GENERAL	2
3. MAIN ORGANISATION FOR CARRYING OUT THE MASTER PLAN	4
3.1 Composition of Mixed Policy Board	9
3.2 General Powers of the Development Corporation	13
3.3 Financial Arrangements	14
3.4 Establishment Policy	16
4. REGIONAL RELATIONSHIPS	17
5. LOCAL AND STATE LINKING OF COMMUNITIES AND ACTIVITIES IN THE PROJECT AREA	18
APPENDIX	22
CHART 1 South East Johor Development Corporation	25
CHART 2 Senior Officers Group & Support Services	25
CHART 3 Simplified Organisational Chart	25

SUPPORTING REPORT IX

THE DEVELOPMENT CORPORATION

1. INTRODUCTION

From an organisational point of view the South East Johor Development Project is notable for two characteristics - scale and complexity.

The development area covers a total of 742,212 acres, providing a proposed addition of 287,000 acres to land already developed. From agricultural and tourist development, service industries and public employment, some 70,000 new jobs could be generated in the area and in consequence a total of some 400,000 people would be added to the existing population of some 135,000 (including Kluang and Kota Tinggi).

Major tasks will include negotiation with a wide variety of developers - private and public, Malaysian and foreign, to cover clearance, infrastructure, estate development, forest exploitation and management, tourist development, service industries, commerce, transportation, public services - federal, state and local - recreation and cultural facilities, processing plants and housing, light and power, water and sewerage, telecommunications and so on. The influx of population will require 40-50 new villages and two new towns.

The total likely capital expenditure at current prices could exceed \$1,500 million.

Within the total area there are already concessions which involve a number of different private and public organisations. Development of the remaining land will require a number of operating agencies. Some of the tasks outlined above may have to be executed directly by the development corporation proposed here.

Dealing with the sheer volume of operations and to contain their varied character, and ensuring smooth development including the co-ordination of the many developers involved will present a management problem of considerable complexity. Operations will have to be planned some years ahead, with every aspect of economically productive development being

coordinated and related to the provision of physical infrastructure, of places to live, work and shop, and of services for the very large numbers of people who will be moving into the area. Moreover the management of the area will have to be of a calibre which ~~must not~~ only control all the on-going activities, but can adapt to changes which may be generated externally to the project or which may come from the need to reappraise objectives or methods, or both. There will be need for the qualities of determination, percipience and intelligence of a high order, understanding and experience of the role, responsibilities and possibilities of management if results are to be achieved with maximum economy and maximum human satisfaction.

Those who are made responsible for the operations of the Development Corporation will need to take account, as the proposals that follow have taken account, of the relevant existing administrative organisations and arrangements. Provision is made for securing maximum consultation and collaboration between them and the Corporation. To meet the demands of the increased population in the area, the existing capacity of all field services will have to be expanded in phase with the programme of development. To speed up the development programme certain modifications in existing procedures have been suggested.

The proposals that follow are divided into four parts:-

- I general
- II main organisation for project-plan implementation
- III regional relationships
- IV local and state linking of communities and activities created in the project area

2. GENERAL

Report is based on the following assumptions:

- (a) that master plan for development should be implemented by a public corporation type of agency. This appears to be accepted in Malaysia and abroad as being the form of organisation most conducive to efficient management,

allowing for flexibility, quick decisions on the basis of circumstances rather than precedents; being uninhibited by the civil service's overriding concern for equity and the protection of their Ministers from criticism on account of departmental mistakes; and, amongst its other virtues, is more concerned with social effects and national objectives and amenable to parliamentary and governmental influence over these, than a private organisation.

- (b) that the organisation must be capable of accommodating political pressures and containing them. It is not necessary to spell these out other than to emphasise that just as the economic assumptions and priorities may change over two decades, so may political ones; and that in a very large undertaking such as this is, there are bound to be pressures from interest groups and individuals which can only be resisted politically.
- (c) that a Regional organisation is required to re-assess the master plan as time passes and to link the effects thereof to the State of Johor and neighbouring States. A project of this size affects the economic and social activity of the State and its neighbours, and is affected by other similar projects, and all cumulatively affect national economic planning.
- (d) that the citizens who will live in the project area have the same rights and ways of expressing them, and the same duties and ways of discharging them as any other citizen. This is self-evident, it provides democratic education and a safety value against unrest.
- (e) that services and governmental institutions be organised in ways that have regard to socio-economic-geographical unities. The interlocking nature of economic, social and environmental planning is evident in the planning approach and in thinking about institutions generally, it is therefore

proper that in this report organisation at the field and local level of government should be shaped in accordance with principles which will also be in the minds of the Federal Government when tackling reform proposals in this area of administration. The legal and geographical separation of municipality, board and village are no longer relevant to modern society and the pattern of movement of people today.

3. MAIN ORGANISATION FOR CARRYING OUT THE MASTER PLAN

The public development corporation is apparently favoured by Government. This report proceeds on this basis and on assumptions 2(a) and (b) and sets out in chart form a possible organisation for a South-East-Johor Development Corporation (SEJDC).

The following points are made in relation to the chart:

- (1) the heart and brain of the organisation is the Senior Staff Group, - corporately responsible for forward planning, preparing policy alternatives and appraisal for the Policy Board's decision; executing these decisions, and monitoring and evaluating them. Initially these appointments should be approved by the Prime Minister. It may be advisable in the early years to seek overseas advisers or technical support staff for some of the posts
- (2) the General Manager is leader of this Group, - appointed by the Prime Minister after consultation with the co-Chairmen at a salary equivalent to or higher than the top commercial posts; can only be dismissed by the Prime Minister after consultation with the co-Chairmen; has power to hire and fire all senior staff; is given complete discretion to implement all policies approved by the Board (which starts by accepting the Master Plan as its own Plan); has control over the financial affairs of the Board through a Financial Controller; to be full member of the Policy Board with voting rights

- (3) the Policy Board will authorise all major policy proposals, plans and recurrent and capital budgets submitted by the General Manager. The details of its powers in this respect are set out below. The Board would consist of two co-Chairmen, the Menteri Besar and a Minister or Assistant Minister responsible to the Prime Minister for all Development Corporations; together with 6 State, 6 Federal members and 2-6 appointed from outside. The General Manager would be a **full** member
- (4) through the Board Chairmen there would be links - through the Menteri Besar with the Executive Council, the Johor State Assembly and the State Administration (including the District Officers) whose early and active collaboration would often be of vital importance; through the Federal Minister (or Assistant) with a Committee of "plenipotentiaries" from all the Departments and Agencies whose services and aid are needed by the SEJDC in fulfilling its plan or in the project area as a result of the movement of population into the area. The decisions of this committee would commit the Departments, FLDA and other Agencies to the collaboration and help required by the Board, i.e. it is a facilitating committee. The General Manager should attend by invitation. Close contact would be maintained by the Senior Officers of the SEJDC, with Officers in the Field.

The link with the State Government should ensure the co-operation of the State Department and the Senior Officers of the SEJDC would establish close liaison with State Officers and their colleagues in the Field. The two links together should smooth out any problems of liaison with officers who have dual responsibilities to State and Federal Government

- (5) the SEJDC Land Office would be a State Land Office with State Land Revenue Officer(s) being posted to it - (the SEJDC could reimburse the State for the costs involved and also

supply the accommodation and equipment). Once land has been alienated in designated blocks to the SEJDC, alienation of lots and parcels should take no more than 2-3 days

- (6) the SEJDC Survey Office should be manned by a Licensed Surveyor whose surveys would be accepted by the State Surveyor and the Surveyor General in Kuala Lumpur and automatically ratified. A title survey can thus be given with all land sold
- (7) the Operating Agencies are those not part of the Corporation's organisation, but carefully supervised and controlled by it. In some instances the Corporation would provide (in some cases sell) services eg. engineering, lay-out, design etc.
- (8) the Corporation should be required to provide, and the Treasury to make financial provision for, an extensive training programme at all levels in technical skills and particularly in management and administration. Such a programme will provide staff for other Corporations, for government agencies and for industry. Training should be predominantly on the job training, but provision will be required for a training centre and for supernumerary staff adequate in numbers to enable a training programme to proceed without interrupting or slowing down the other functions of the Corporation. The size of the Corporation's programme, the range of its activities, and the interlocking organisation pattern proposed for planning and execution presents the country with an unrivalled opportunity for management training on the job
- (9) the concentration of authority in one identifiable person - the General Manager - facilitates negotiations and discussions with other agencies, particularly the private sector, who wish to be assured that discussions are being conducted by those responsible both for long range planning and for providing the infrastructure at the agreed time

- (10) it is essential that the Senior Staff Group have strong supporting services. Finance would be under a Financial Controller responsible to the General Manager for functions shown on Figure 2. Finance is regarded here as a servant of the management functions, not its director. Personnel, administration, training, management development; the group of services responsible for supplying information, monitoring progress, and analysing information; and the programme planning section are all under the supervision of the Deputy General Manager. Each section would have its controller. It is envisaged that the information and control section would provide a check both of the actual execution of the programme and of changes in the general situation which might affect the broad strategy of the Corporation. It should therefore contain resource personnel and technical staff engaged in internal analysis, control of implementation, quality checks, and forward planning
- (11) the Deputy General Manager would be responsible to the General Manager, and in his absence, would take his place at the meetings of Policy Board and Senior Staff Group. In developing the internal organisation of the Corporation his staff would consult with the DAU and others expert in the field of management and organisation
- (12) each of the Senior Staff Group would have a Director of Services or a Programme Controller responsible for the smooth running of the particular group of activities and for the execution of its responsibilities, thus leaving the Senior Staff member responsible for top level corporate management and planning of the whole. It will probably be necessary to have two Directors/Controllers in some groups to supervise operations in each of the areas - Johor Tengah and Tanjong Penggerang.

It has been assumed that the Board will be composed of a mixture of politicians, officials and others. It could be either

executive

policy making

advisory

An executive Board containing politicians would be impossible since it would be bound to involve itself in details of management, when what is required is unified, purposive management at all levels; it would introduce self-seeking pressures upon the political members who would be involved in executive decisions.

A policy making board could provide valuable political balance - the Senior Staff may have unexpressed, possibly unrecognised, political bias; it could introduce a broader view of national and state priorities into the decisions of the organisation; it could provide a buffer against political, group and personal pressures; it could ensure closer collaboration with the agencies and departments of various levels of government.

On the other hand if given unlimited power it has all the disadvantages of an executive board - weakens Senior Staff Group, imposes highly political decisions; delays decisions; puts plans out of phase; creates a gap between planning and execution. The Chairman could become the General Manager by constant and detailed control.

An advisory board leaves real power with General Manager as regards the immediate programme. Over long term considerable influence could be exerted over him by the Prime Minister's representative and by the Treasury. An advisory Board enables the General Manager to invoke State and Federal aid to secure collaboration; keeps the General Manager informed of and sensitive to political climate; and would provide a political buffer against political and personal pressures. However it is unlikely that a Federal Minister and the Menteri Besar would agree to sit on a Board with only advisory powers.

It is therefore recommended that a Policy Board should be created, and that its power be carefully defined by Statute so as to confine it to the broadest policy matters.

This policy Board can be:

Federal controlled

State controlled

'mixed' Federal/State controlled

A Federal controlled board has advantages for the Federal Government and might make the General Manager freer and more strongly supported because of unity of accountability. It would certainly lose State support - if not antagonise it. Menteri Besar might not defend it in State legislature, and could impede administrative support and collaboration. Land alienation could be held up.

A State controlled board would be incompatible with level of State capacity and resources. Neither Federal Government nor international financial agencies would be likely to agree.

Mixed control could satisfy both State and personal sensitivities; satisfy Federal Government regarding overall effectiveness; provide political leadership and protection at both levels; and ensure co-operation from both State and Federal services.

Whilst not satisfying either level of government completely, the compromise of a mixed State/Federal Board is recommended. As the next section shows, position to the State and power to the Federal Government has been secured.

3.1 Composition of Mixed Policy Board

The composition of the Board is suggested below. It would number between 17 and 21 - thus providing a range of talents which could be of great value to the General Manager politically, officially, and through the breadth of other experience of industry, commerce, agriculture, etc.

The suggested composition is:

- Co-Chairmen - Menteri Besar and Assistant Minister responsible to Prime Minister or Federal Minister
- State Legislature - two members of the Executive Council
- State Officers - State Secretary
State Finance Officer
Commissioner for Lands and Mines
Executive Director, S.E.D.C.
- Federal Officers representing - Treasury
E.P.U.
G.P.U. or Ministry of National Unity
Ministry of National and Rural Development
Ministry of Agriculture, Lands and Mines
Ministry of Commerce and Industry
- General Manager - with power to vote
- Others (without voting powers) - not less than 2 and not more than 6 persons resident in Malaysia to be appointed jointly by the co-Chairmen in consultation with the General Manager from among those appearing to be qualified by shown capacity and/or with experience in matters relating to finance, manufacturing, housing and town development, commerce, local government, forestry, agriculture, tourism, administration and management, or others qualified in any appropriate learned profession

or otherwise suitable by virtue of their special knowledge and experience. It would be preferable that none of these should be directly engaged in or represent bodies engaged in developments in the area.

The co-Chairmen would alternate at meetings. They would exercise any powers jointly. The Menteri Besar would be responsible for ensuring political and administrative co-operation and support at the State Level and his co-Chairman at the Federal level.

It may be considered advisable to see the role of the Federal Minister or the Assistant Minister to the Prime Minister in a wider context. With the present and future growth of Development Boards and Corporations - mostly with very mixed responsibilities, spending large sums of Federal money - it would be appropriate to create a central point for Federal monitoring, for purposes of accountability to Parliament, and for ensuring that the programmes of the Corporations are co-ordinated and matched with other developments in their Regions so as to provide a balanced and integrated development over-all throughout the regions. "Region" is used in this report to indicate an area of the country which may contain more than one State. The report does not seek to define the basis for delineating the Region but does suggest that the information collected, its interpretation and the consequent action which may have to be taken is not likely to be confined within the boundaries of any particular State. Within the Prime Minister's office, these responsibilities might be discharged by the Assistant Minister acting on his behalf and responsible to him. Presumably the Menteri Besar would need to be satisfied as to the status of his co-Chairman.

If not in the P.M.'s office, the Minister designated should not be a Minister responsible also for another development agency which might be operating in the S.E.J. area - eg. F.L.D.A. - when differences with the Board might be resolved by internal pressures within the Ministry.

The two members of the Ex-Co have been suggested tentatively as it may prove necessary to take counsel with politicians over the sub-alienation of some of the lots.

The Board after proper consideration

- (a) shall approve the recurrent and capital budgets within one month of their being submitted by the General Manager,
- (b) shall approve all plans - both for immediate period and long range ones - the former within one month and the latter within three months of their submission by the General Manager,
- (c) shall approve any proposals by the General Mznager for variations of land zoning from that already approved,
- (d) whenever it thinks fit may make proposals amending (a) and (b) above, but NOT (c), subject to the following procedure:

If the General Manager is of the opinion that these are of major significance, or require further investigation, then these proposed amendments shall be remitted to the Senior Staff Group for evaluation and appraisal as to the direct consequences of the proposed amendments, and their effect upon other parts of policies, plans and budgets, existing, proposed, or envisaged. The full evaluation shall be reported back to the Policy Board as soon as possible, and its decision will be binding upon the General Manager.

- (e) may require the General Manager to submit a report on any aspect of the SEJDC's working and plans, policy proposals or budgets

The Board shall not discuss, pass resolutions, nor seek either as a corporate body or individually to influence the General Manager or any other employees of the Corporation over any of the following:

- (a) the alienation of land or of any natural resources, other than the broad zoning thereof,
- (b) the award of particular contracts or particular financial arrangements with individuals or any body,
- (c) the appointment or dismissal of or any matter concerning any member of staff other than cases specifically provided under regulations,
- (d) intervention in any matters which are considered by the General Manager to be matters of administration and management and which are not matters arising under the provisions of section (1) above.

The General Manager shall refer to the Board any proposals or plans which deviate substantially from the Master Plan and particularly he must obtain the Board's approval for changes in land zone designation from that previously approved. He shall provide the Board with information in a form which will enable the Board to monitor the progress of plan implementation. He shall make available to the Policy Board information to enable them to discharge other duties as set out in the preceding paragraphs. Wherever possible, he shall indicate what alternative choices are open to the Policy Board. He shall take into account opinions expressed by the Policy Board. In matters of urgency, which would normally be settled by the Policy Board, he shall consult with the co-Chairmen and act on their advice, but if they are not both available he may act himself, notifying the co-Chairmen of the circumstances. Such action shall be reported to the Board at its next meeting.

The first General Manager shall be appointed by the Prime Minister. Subsequent G.M.'s shall be appointed by the Prime Minister after consulting the co-Chairmen. He may be removed by the Prime Minister after consultation with the co-Chairmen.

3.2 General Powers of the Development Corporation

These will be put together by legal draftsmen but care should be taken to ensure that the points set out in the appendix are covered.

Where any of these affect the financial interests of the State, arrangements shall be made between the Board and the State for reasonable compensation in the form of premia or royalties at the time of alienation of the designated blocks.

It will be necessary to provide for the freezing of all land in the project area before the Master Plan is approved. The State should also consider freezing all land within a reasonable distance of the project boundaries in order to preserve its betterment rights.

Following the approval of the Master Plan and the setting up of the SEJDC it is essential that all land within the area shall be ceded immediately to the SEJDC to develop and alienate in accordance with the zoning proposals contained in the Master Plan. The freezing of land must be continued until this ceding takes place. Special arrangements will also be needed to ensure that the leasing of land by the SEJDC is carried through expeditiously and delegated powers from the Executive Council will be necessary.

The proposals in the appendix are not comprehensive but merely indicate some matters which must be provided for in the Act establishing the Board.

3.3 Financial Arrangements

This is likewise a very complex matter and must be dealt with by the specialists in the field. There are some matters which must be mentioned, however.

Firstly, finance will have to come mainly, at least in the first phase, from the Federal Government or by way of it, if international sources are involved. As the development proceeds income will accrue to the SEJDC from land and other development, from providing services to subordinate developers, and from the sale of land it has developed.

The forward planning of operations will require commitment of phased capital and recurrent expenditure for long periods ahead. A rolling five or six year capital budget and revenue budget for a shorter period are essential.

As regards Treasury control, the financial arrangements made by the Board should be only after careful consultation with the Treasury to satisfy it that proper skills and arrangements exist for the development of accurate accounting, and the development of procedures appropriate to a public company; that proper arrangements exist for costing new proposals and that forward budgeting is as accurate as can be reasonably expected. The budgets as approved by the Policy Board together with the Master Plan should be sufficient for the Treasury to appraise block requests for funds for recurrent and capital expenditure, and for the forward commitment of funds. The General Manager, a first class Financial Controller, and the Treasury representative on the Policy Board, should ensure a blend of prudent house-keeping and enterprising decisions - possibly faulty from time to time. There are no clear rules for Managers in new development situations and mistakes are bound to occur and must be accepted as one of the costs of intensive development, rapid growth and of gaining experience. He should be judged by his overall performance, by whether he makes more right decisions than wrong.

Nothing is more pathetic than staff who are afraid to take decisions because of pettifogging criticisms, enquiries and inquests. Whilst, very properly, broad enquiries should be made by the auditors, detailed inquests and fault-finding will inhibit action. The key to financial arrangements being made which positively contribute to the task of management is to establish arrangements which encourage and enable the staff at all levels to act quickly and resolutely at any time, and which secure the confidence of the Treasury and the E.P.U.

It is quite illogical, and in fact absurd, to set up a Development Corporation to achieve purposeful, dynamic administration and then to render it ineffective by subjecting it to hampering regulations as though it were a government department engaged in routine administration rather than development functions. The result is likely to be an ineffectively feeble agency, possibly more ineffective than a government department would have been.

3.4 Establishment Policy

In addition to delegating to the General Manager or the Senior Staff Group all the powers required to control operations with freedom from financial controls which can cramp decisive action, there is need also for a similar policy regarding establishments. Many development corporations in different countries, as well as in Malaysia, have been severely handicapped by a very restrictive policy over engaging staff to meet the urgent needs of the moment, dismissing incompetent personnel, providing incentives to encourage initiative and hard-work, and encouraging recruitment through salary scales and conditions which are competitive in the open market.

To provide the minimum of restrictions to the executive body, it is suggested that a block estimate by the General Manager for salaries and wages be approved by the Policy Board and that within this total the General Manager and his Senior Staff engage staff in accordance with a manpower budget which would be for guidance, for balancing the needs of different sections, rather than mandatory. This manpower budget, consisting of broad categories, would be submitted as one of the annual documents, to the Policy Board, so that they could judge changes over time and express opinions upon these. The manpower budget for the ensuing year would be incorporated in a long-range manpower budget and forward planning would include recruitment and training.

Within the total of money allocated to salaries, wages, allowances etc. the General Manager would be authorised to make the best use of the money available, to appoint whoever is needed for the effective execution of the Master Plan. Flexibility and speed over establishment matters is essential if management is to be effective.

In consultation with the Policy Board, and after hearing the advice of the P.S.C. and of employers from other sectors of Malaysian life, internal regulations should be issued regarding discretion at different levels to hire and fire, the creation of interviewing committees for the more senior posts (or those likely to be promoted to them) and general rules made regarding conditions, promotion and discipline which are intelligible, equitable and easy to operate.

Regard should be paid to the way in which the NEB operates and even to the establishment policies of Public Corporations in Britain, Ceylon, Ghana, and the U.A.R. Particular regard might be paid to the establishment problem encountered by India, for example, in developing its river valley projects.

Non-transferability of pension funds often precludes desirable mobility between various types of public and semi-public organisations. Some thought should be given to establishing a pension fund common to all Boards and Corporations with full transferability to and from the existing Public Service pension fund.

4. REGIONAL RELATIONSHIPS

It will be necessary for the Federal Government to make arrangements for the consideration over a period of time of changes in circumstances basic to the Master Plan projections and recommendations; for considering the implications for the State of Johor and for neighbouring States of the rapid development assumed in the Master Plan; for considering the affect that the creation and growth of other Development Corporations may have upon the SEJDC's forward planning; and for phasing and controlling developments in the wider Region (including the rephasing or revision, if necessary, of the SEJDC programme) so as to provide in the Region as a whole a balanced and integrated development.

To provide for some of these concerns at present, there exists a Steering Committee. Once the Master Plan has been accepted by the Governments, the Steering Committee will presumably cease to function. The burden of tasks, outlined above, will fall on E.P.U.

It is suggested that this should be supplemented by establishing a regional unit responsible for collecting information and for processing and interpreting it. The basis of collection has already been established by the Consultants. The processed information might be passed to the State Government concerned to aid their planning; to the other Corporations in the area; and to E.P.U. It is urged that E.P.U. should set up a small group of very senior officers from the Ministries and Agencies

concerned with the formulation of development proposals and their execution, to consider and make policy recommendations for the Region (as previously defined) to the Assistant Minister to the Prime Minister. Some of the recommendations approved by the Assistant Minister would be amendments to the SEJP Master Plan and thus be embodied within the planning framework of the SEJDC. It is further recommended that appropriate steps be taken to ensure that recommendations affecting other Ministries and Agencies operating within the Region are implemented by them; and it is suggested that these proposals should apply to all special Boards and to all regions.

A truly regional unit would economise in highly-skilled, scarce manpower as, failing its creation, each Corporation would have to set up an elaborate unit and the States, to be able to collect relevant information, and prepare an appreciation of its economic, social and environmental consequences, would have to extend considerably their present organisation. Such information should make a valuable contribution to the preparation of the TMP.

It is suggested, therefore, that the Federal Government establishes such a regional unit for the purposes mentioned above, which would be responsible to E.P.U. and to the Assistant Minister to the Prime Minister through the small group of officers proposed.

5. LOCAL AND STATE LINKING OF COMMUNITIES AND ACTIVITIES IN THE PROJECT AREA

By the end of the development period in 1990, the project area, the greater part of which is unpopulated at the moment - could have a total population of 500,000. This would be spread between some 60 new villages and small towns, two new towns and the considerably enlarged Kluang and Kota Tinggi. The towns and villages would be connected by a very good road net-work and the mobility of the population will have increased considerably. So also will their education and their demands upon community services, - health, education, welfare, and for leisure, as well as upon the provision of economic opportunity.

If assumptions (d) and (e) on page 3 are accepted, then the implications must be set against the new physical pattern and the emerging social pattern. The SEJDC will have to build, directly or through operating agencies, new villages and towns and help with the replanning and extension of the existing towns of Kluang and Kota Tinggi. As soon as a substantial number of the new inhabitants have arrived, the Corporation will have to establish committees of citizens for the new towns, large and small, until such time as it can set up appropriate authorities. The Corporation will also have to establish committees for the expression of opinion and the involvement of people in the improvement of villages and provide for the expression of opinion and positive contributions to government and development in the project area of the two districts of Kluang and Kota Tinggi. The existing arrangements of village councils here and there, development committees at kampong and district level and a benevolent hierarchy of officials will meet neither the need nor the demand of the late 1970's let alone the 1980's.

The logic of the situation would suggest certain changes in the existing arrangements - partly because these are no longer appropriate and partly because the Corporation, the State and the Federal Governments would no doubt wish to try to stem the drift to the urban areas by making rural life more attractive in every way. (The population estimates for Johor Bahru by 1990 are over 500,000). There have to be improvements in government in the rural areas and in the expression of people's needs, problems and proposals and for services and facilities available.

Taking all this into account and looking at the distribution of populations it would seem that the first aim should be to create local authorities that recognise urban-rural interdependence, socially and economically, and in the provision of rural amenities for the townfolk and urban services for the countrymen. If this were done it would be appropriate, at least at first, to use the district boundaries, with some adjustment to allow for the growth, say, of Kluang, to mark out district councils. Within these there would be a structure of village committees, according to size. Most of these the Corporation will have to create as it builds, or causes to be built, towns and villages. Corporation

committees in these places should become properly constituted authorities as soon as practicable, and these should be brought under the aegis of the district council.

Whilst in most of these places the aspirations of the leading citizens may exceed their capacity for, and experience of, self government, the Corporation should be prepared, through its Community Service and Public Relations cluster of services, to foster and help forward the new citizens. In this the Local Government Departments of State and Federal Government will need to play a large part in guidance, encouragement and supervision of the emerging councils and councillors.

The rate of emergence, the speed of development of a graduated democracy from that of nomination by State Officers or Federal Officers seconded to State service, will be a matter for careful experiments, the results of which will affect the speed with which the Corporation can discard its responsibilities in this field.

It will have to be equally careful regarding the transfer of responsibilities for maintenance, improvement, town planning etc. Likewise the State and Federal services which ultimately should be co-ordinated by the new District Councils under the guidance of the District Officer as first, Executive Chairman, (and perhaps later, as Executive Secretary), will have to be knitted together by careful planning of Corporation functions and powers and existing field services supplied by State and Federal agencies. There may well be short periods when the Corporation has to subsidise these pending adequate finance being available. However, the rate of handover to this new structure of local authorities by the Board and the degree to which these can assume control should also be gradual and regulated, based upon experience and shown capacity of councillors in these areas.

It could be that experience in the Community Relation group of activities would be a valuable training ground for the administrative and management staffs required in the new authorities. It would certainly be likely to be one of the training areas which the Federal Local Government Department and the Training Division of the Public Service Department

would wish to use, along with the many other training provisions that will have to be made, to produce a local government services for the country as a whole.

Whilst this section is based upon conjecture, it would seem likely to be close to any proposals to be made for local government reform which were based upon the blending of general principles and local understanding. It is important that the Corporation should be able to plan for this vital provision along with its economic plans and other social plans.

Until some co-ordinating mechanism is established through a district council and a district officer working with it, the Corporation will have to establish strong links with service departments based in Johor Bahru and Kuala Lumpur, and with their officers in the field. The powers outlined help the Corporation to support and facilitate the provision of such services, and the organisation of the Corporation should make for maximum co-operation and effective co-ordination with both capitals.

It is suggested that the Corporation would be aided by an early decision regarding the new local government structure and that it should be empowered to anticipate the actual introduction of new arrangements. It is suggested that it should be a major responsibility of the Corporation to ensure adequate services and adequate opportunities for the voicing of civic rights and the discharge of civic responsibilities.

APPENDIX

General Powers of the South East Johor Development Corporation

- (1) Draw up rules for internal organisations and financial and accounting procedures.
- (2) Approve its own establishment and personnel arrangements regarding promotion, discipline, appointments and dismissal - subject to the provisions concerning the General Manager - and provide appropriate salary ranges and scales having discussed these with Treasury and Public Service Department; to give such allowance as may be necessary and appropriate.
- (3) Establishment of Pension Funds
- (4) Appoint as agents - other agencies of government - state or federal - local authorities, public companies, and any **other** body or individual helpful to fulfill its ends.
- (5) Invite or coopt persons to the Policy Board meetings but without power to vote.
- (6) Do all such things and matters as are necessary to implement the Master Plan or amendments thereto which have been duly authorised.
- (7) Act as a local authority in areas outside existing local authorities' boundaries or within such areas subject to the agreement of the Local Government Department and in consultation with the local authority and appoint such officers as it may seem necessary.
- (8) Vest property in local authorities
- (9) Carry out necessary or desirable work in local authority areas after consultation with the authority and the Local Government Department of the State.
- (10) Promote residential, industrial, agricultural, commercial development and tourism.

- (11) Purchase, exchange, lease and hold, for any period and sell land and buildings,
or develop to resell to the public or another governmental agency.
or to provide open spaces and recreational grounds, cemeteries and crematoria
or for any public service provided by any agency of government or a voluntary or other body
or to lease any land to others etc.
- (12) Enforce, according to existing law, any plans or planning regulations which are properly drawn up; and to incorporate special requirements in leases or contracts of sale.
- (13) Build houses, flats, tenements, shops, shop-houses, factories, public buildings, offices, and carry out any works in connection with these.
- (14) Clear and plant land; administer forests; provide water and drainage; power, roads and communications and do any other things as may be necessary for development whether other existing agencies are available or not.
- (15) Aid financially and in any other way voluntary societies and agencies
- (16) Develop directly or indirectly all aspects of the tourist industry.
- (17) Develop directly or indirectly all mineral resources and any other assets.
- (18) Provide low cost or subsidised housing; assist social services and public health services.
- (19) Do anything which may be desirable, requisite, advantageous or convenient for the economic, physical, social educational, cultural and moral well being of the people in the area which is not the responsibility of another government agency or which that agency is unable to discharge at the time required.

(20) Provide a training programme, establish a training centre, employ training staff, and engage supernumerary staff and do any other things necessary to discharge their training responsibilities for any or all of their staff, industrial, technical, professional, administration or managerial including sending them overseas for training courses and visits.

(21) Require private agencies or individual already operating in the area to comply with the reasonable request of the Corporation.

GOVERNMENT OF MALAYSIA AND THE STATE OF JOHOR

JOHOR TENGAH AND TANJONG PENGGERANG
REGIONAL MASTER PLAN

SUPPORTING REPORT X

EMPLOYMENT AND UNEMPLOYMENT IN JOHOR STATE 1970-1980

JANUARY 1971

Hunting Technical Services Ltd.
Binnies & Partners . Overseas Development Group . Shankland Cox Overseas
University of East Anglia

C O N T E N T S

	Page No.
SUMMARY	1
1. UNEMPLOYMENT AND LABOUR FORCE	3
1.1 Unemployment	3
1.2 Increase in Labour Force	5
2. JOB CREATION	8
2.1 Emigration/immigration	9
2.2 Agriculture	9
2.3 Mining and Manufacturing	11
2.4 Others	12

T A B L E S

1. Employment and Unemployment in Johor State - 1970-80	2
2. Unemployment by age in the South Zone (Johor and Malacca States) in 1967 (according to the SES)	4
3. Participation Rates by Age-Group: West Malaysia - 1962-67	5
4. Population and Labour Force - Johor State 1970-80 Number in Age-Group (all races, both sexes)	7
5. The Employment Multiplier	13

SUPPORTING REPORT X

EMPLOYMENT AND UNEMPLOYMENT IN JOHOR STATE 1970-1980

SUMMARY

In the paper 'A survey of labour utilisation in West Malaysia, 1971-75' it is estimated that the maximum number of new jobs likely to be created between 1971 and 1975 in all sectors in West Malaysia will be 437,000. In this paper, which has a crude look at possible unemployment in Johor State in the 1970's, it is assumed that the maximum of jobs likely to be created in the SMP period in Johor is between 65,000 and 91,000. This is between 15 and 20 percent of all jobs in West Malaysia, which, given the fact that Johor State contains something like 15 percent of the population of West Malaysia, seems reasonable.

The above paper calculated that unemployment in West Malaysia would worsen from about 7 percent in 1967 to a little over 9 percent in 1975. This paper calculates that unemployment in Johor State in 1975 will be equally as bad as, and probably worse than, unemployment in 1967. In the TMP period, job creation should keep pace with the expansion in the labour force but by 1980 it is likely that the number of unemployed in Johor State will be at least 60,000 or about 9-10 percent of the labour force in the same year (see Table 1).

It should be remembered that the assumptions behind these calculations are far from pessimistic and that the projections in the paper were also far from pessimistic. It assumed a growth rate in output of nearly 7 percent per annum.

The worsening unemployment projected in the second part of the paper is an outcome which has been stated by the Economic Committee of the Cabinet to be unacceptable. The EPU is preparing a paper on employment policy for consideration by the NDPC and subsequently by the Economic Committee of the Cabinet which will deal with policy measures which will aim at reducing the likely level of unemployment.

TABLE 1

Employment and Unemployment in Johor State - 1970-80
 (All figures denote '000 of people unless otherwise stated)

	2nd Malaysian Plan (SMP) period (1971-75)		3rd Malaysian Plan (TMP) period (1976-80)	
	Min.	Max.	Min.	Max.
1. Unemployment and Labour Force				
1.1 Unemployment at start of period	50	50	49	80
1.2 Increase in Labour Force	90	95	110	110
1.3 People looking for work	140	145	159	190
2. Job Creation				
2.1 Jobs in Singapore less immigration into Johor	-	5	-	5
2.2 Agriculture, fishing, forestry ⁽¹⁾	12	16	15	20
2.3 Mining and manufacturing ⁽²⁾	15	20	20	25
2.4 Others	38	50	60	76
Total jobs provided in Johor	65	91	95	126
3. Unemployment at the end of the period⁽³⁾	49	80	66	64
Unemployment as a percentage of the Labour Force	8 - 9	13 - 14	9 - 10	
Assumed "employment multiplier" (see text)		2.4		2.7

(1) Includes the processing of export crops (see text)

(2) Excludes the processing of export crops (see text)

(3) Matching the "minimum supply" with the "minimum demand".

1. UNEMPLOYMENT AND LABOUR FORCE

1.1 Unemployment

Unemployment in Johor and Malacca State (South Zone) according to the Socio-Economic Survey of 67/68 was 47,500. The proportion of population in Johor State of the total in the South Zone was about 75 percent according to the 1967 Population Estimates of the Department of Statistics (Research Paper No.1). On the basis of this proportion, unemployment in Johor State was about 36,000. But it seems that the S.E.S. underestimated the population of both West Malaysia and the South Zone. Comparative figures are given below:-

Population (Million) in 1967

	<u>Research Paper No. 1</u>	<u>S.E.S.</u>	<u>Difference</u>	<u>Difference as a % of RP No. 1 figures</u>
West Malaysia	8.79	7.89	0.90	10.2
South Zone (Johor & Malacca States)	1.76	1.55	0.21	11.9

Given the methods used in each case, the estimates contained in RP. No. 1 could be more reliable. According to the S.E.S., however, unemployment as a percentage of labour force was about 9-10 percent in the South Zone in 1967, which was somewhat higher than the estimated rate of about 7 percent for West Malaysia in the same year⁽¹⁾. If the labour force

(1) There seems to be some confusion as to the percent unemployment rate even at the 'national' (West Malaysian) level. The Budget speech by Tan Siew Sin referred to an unemployment rate in West Malaysia of 9 percent of the labour force, whereas a paper by the EPU, entitled 'Employment, production and racial economic balance targets for the SMP' and dated 14th June 1970, referred to a rate of 6.3 percent in 1970, compared to a rate of 6.6 percent in 1967.

is calculated on the basis of both the 1967 Estimates and the projections contained in RP. No. 4 (for further comments on the labour force, see the sections below), and unemployment in Johor is assumed to be about 10 percent of the labour force, then about 50,000 people were unemployed in Johor State in 1970. (This total of 50,000 excludes the "underemployed" - those working less than, say, 25 hours a week. The number of "underemployed" is not known, but in 1967, according to the Socio-Economic Survey, about 12 percent of the total employed in the South Zone were "family workers without pay".)

Unemployment by age-group in Johor State (or at least the South Zone) seems to reflect the situation in West Malaysia in as much as unemployment among the younger age groups seems to be very much higher than for all age groups.

TABLE 2 Unemployment by age in the South Zone
(Johor and Malacca States)
in 1967 (according to the SES)

Age group (Years)	Employed	Unemployed	Labour Force	Unemployed as a % of the labour
15 - 19	66.4	25.2	91.6	27
20 - 24	68.2	11.5	79.7	14
25 - 29	63.0	3.5	66.5	5
30 - 34	57.8	2.4	60.2	4
35 - 44	90.0	2.6	92.6	3
45 and above	101.0	2.3	103.3	2
Totals	446.4	47.5	493.9	10

1.2 Increase in Labour Force

Participation rates remained fairly constant between 1962 and 1967 (See Table 2 and other sections of EPU's "The Employment Problem in West Malaysia - 1962-1975"). The participation rates (%) by age-group are shown below in Table 3.

TABLE 3 Participation Rates by Age-Group:
West Malaysia - 1962-67

Age Group	Male		Female		Total	
	1962	1967	1962	1967	1962	1967
15 - 19	58	58	39	37	49	47
20 - 24	92	92	46	46	69	68
25 - 29	97	97	41	40	68	68
30 - 39	97	97	42	44	69	70
40 - 49	95	96	45	46	71	71
50 - 59	89	87	38	38	67	63
60 - 64	70	70	25	26	50	49
65 - 69	-	60	-	21		6(1)
10 - 14						15(1)
70 and above					64	65

(1) Estimated as being 70 percent of participation rates for these age groups in 1957.

SOURCES:- "Measuring Labour Force, Employment and Underemployment - 1962-67" EPU; 18/6/69 - Table 6, Page 11.

See also Table A.6. of "A Survey of Labour Utilisation in West Malaysia, 1971-75" EPU, 21/11/70.

If the following assumptions are made:-

- (1) that the population in West Malaysia grows between 1970 and 1980 according to Medium A assumption (see Research Paper No.4);
- (2) that the population in Johor State is 15 percent of the population in West Malaysia;
- (3) that participation rates (of people in specific age-groups) between 1970 and 1980 will be as follows:-

<u>Age Group</u>	<u>% of people in age-group looking for work</u>
15 - 19	45
20 - 24	69
25 - 59	
60 and over	<u>33</u>
15 - 65 (on 1975 basis) -	60 —

The labour force in Johor State will grow by about 200,000 between 1970 and 1980 (see Table 4). About 90,000 more people will be looking for work in Johor between 1971 and 1975 and about 110,000 between 1976 and 1980. The proportion of the population looking for work rises from about 32 percent in 1967 to 37 percent in 1980 because of the increasing proportion of population in the working age-group. Between 1970 and 1980, about one-third of the expansion in the labour force will consist of 'youth' (those in the age-group 15-24).

TABLE 4 Population and Labour Force - Johor State

1970-80

Number in Age-Group
(all races, both sexes)

1. Population

		0-14	15-19	20-24	25-59	80+	Total
		- (000) -					
<u>W. Malaysia</u>	<u>Source</u>						
1967	Table 3.5, RP4	3,876	917	682	2,787	523	8,785
1972	Table 3.5, RP4	4,273	1,130	911	3,128	667	10,109
1977	Table 3.5, RP4	4,741	1,295	1,123	3,678	785	11,622
1982	Table 3.5, RP4	5,349	1,404	1,289	4,433	884	13,359
		- Millions -					
1970)	Interpolated from above	4.08	1.05	0.83	2.95	0.61	9.52
1975)		4.55	1.23	1.04	3.45	0.74	11.01
1980)		5.03	1.36	1.23	4.15	0.85	12.62
		- (000) -					
<u>Johor State</u>							
1967 -	Table 4, RPI	620.0	146.0	97.0	392.0	77.0	1,332.0
% of W. Malaysia		15.9	15.9	14.2	14.0	14.7	15.1
		- (000) -					
1970)	15% of W. Malaysia	612	158	125	443	92	1,430
1975)		683	185	156	518	111	1,653
1980)		755	204	185	623	128	1,895

2. Labour Force in Johor State

Participation Rate (%)	NIL	45	69	69	33	-(32 in 1967)
- (000) -						
1970	-	71	86	306	30	493(34)
1975	-	83	108	357	37	585(35)
1980	-	92	128	430	42	692(37)

NOTE:- are the overall participation rate for the whole population the overall participation rate for the population 15 and over is 60-61% in all years.

2. JOB CREATION

Employment in West Malaysia in 1967 and growth in employment as a percentage of the growth in value added in each sector in 1957-62 and 1962-67 were as follows:-

	<u>W. Malaysia</u>		<u>Employment</u>		<u>Elasticity⁽¹⁾</u>	
	<u>000</u>	<u>%</u>	<u>1957-62</u>	<u>1962-67</u>	<u>57-67</u>	
1. Agriculture, forestry and fishing	1389	50	0.34	0.24	0.30	
2. Mining	69	2	-	1.52	0.41	
3. Manufacturing	261	9	0.53	0.54	0.53	
4. Construction	95	3	0.35	0.46	0.38	
5. Utilities	17	1	0.51	0.38	0.43	
6. Transport Storage & communication	108	4	0.40	0.67	0.52	
7-8. Commerce	323	12	0.92	1.18	1.02	
10. Public Administration & Defence	210	8	-	1.00	0.49	
11. Services	<u>290</u>	<u>10</u>	<u>0.75</u>	<u>0.63</u>	<u>0.69</u>	
	<u>2,763</u>	<u>100</u>	<u>0.41</u>	<u>0.50</u>	<u>0.45</u>	

(1) This denotes the relationship between the percentage change in employment in the sector and of the percentage change in output (%) increase in value added.

SOURCE: From Tables 6 and 7, Page 15 of "A Survey of Labour Utilisation in West Malaysia 1971-75" EPU, 21/11/1970.

2.1 Emigration/immigration

One of the difficulties in projecting unemployment and employment is the nature and scale of feedbacks. For example, it is reasonable to assume with increasing unemployment, that there would be a fall in participation rates, that is, that fewer people would look for work if the job prospects were worsening. Similarly if unemployment rises in Malacca, Negri Sembilan and Selangor but falls in Johor it is reasonable to assume that there would be net immigration into Johor from the States to the north. On the other hand, there are likely to be some jobs provided for Malaysian citizens in Singapore. The 'worst' assumption made in this paper is that jobs provided in Singapore will be counterbalanced by immigration into Johor. The 'best' assumption is that there will be a surplus of 'jobs outside' over 'immigrant workers' of about 1,000 per annum.

2.2 Agriculture

The 'Johor 1990' paper ("The State of Johor and the Project Regions: 1970-1990 - People, Jobs, Urban and Rural Development") assumed that, between 1970 and 1980, about 480,000 acres (gross) of new land would be developed for agriculture in Johor State. This compares with a 'national' (West Malaysian) target of 750,000 acres in 1971-75 and say one million acres between 1976 and 1980. The amount assumed in the 1990 paper to be developed in Johor State represents about 28 percent of the 'national' total compared to 20 percent assumed in one rate of development being considered for SEJP areas.

The "Johor 1990" paper assumed the creation of something like 39,000 jobs in agriculture from 1970 to 1980. Since most of these (about 38,000) were assumed to be generated in rubber, oil palm, pineapple, tapioca, sugar, and short-term crops, the gross acres-worker ratio assumed was $480,000 \div 39,000 = 12-13$.

This compares with a gross acre/man ratio of about 194,000 acres + 15,000 jobs = 15 acres per job revealed by one strategy of the SEJP. (The net or cropped acre-job ratio is about 10.5 to 11).

If we assume that Johor State manages to develop about 20 percent of the national target and if we take one SEJP strategy, we get;

<u>'000 Gross Acres</u>	<u>1971-75 (SMP)</u>	<u>1976-80 (TMP)</u>
- in SEJP	77.6	116.2
- outside SEJP	<u>76.5</u>	<u>83.8</u>
	<u>154.5</u>	<u>200.0</u>

On the basis of 12 to 13 gross acres per job, the following numbers of jobs will be created in Johor from new land development:

	<u>SMP</u>	<u>TMP</u>
12 acres/job	13,000	16,500
13 acres/job	12,000	15,000

In addition some jobs will be generated in forestry and fishing. On the other hand there will almost certainly be some further laying-off of labour on existing estates, unless a radical change to a substantial payroll subsidy is made by the government. The total effect is difficult to predict. A note by Jim Goering (EPU) of 21st July, 1970 suggested that a rate of expansion in agricultural employment of 1.5 percent per annum during the SMP was probably realistic. On the other hand projections in another paper by the EPU of 14/6/70 suggested that the growth in employment in agriculture in the SMP would be less than 1 percent per annum (see the final table in the paper entitled 'Data, Assumptions, Targets and Derived Projections for the SMP'). The growth rate in agricultural employment that is assumed in this paper for Johor is about 1 percent per annum or an average of something like 12-16 thousand jobs in the SMP and about 15-20,000 jobs in the TMP.

2.3 Mining and Manufacturing

Employment in mining in Johor State is assumed to remain static from 1970-1980.

Between 1962 and 1967 employment in manufacturing (including processing of export crops) in West Malaysia grew by about 14,000 per annum. See Table 6 of "A Survey of Labour" op. cit. In his paper "Income Employment and Racial Disparity: Malaysia's Development Alternatives to 1985", D. Snodgrass (EPU) assumed that an average of 12,000 jobs per annum could be created in manufacturing between 1967 and 1975 and about 27,000 per annum between 1975 and 1985. T. Osgood⁽¹⁾ and D. Pearson⁽²⁾ assumed that 10,000-15,000 jobs could be created in the SMP period. How many of these jobs will be created in Johor State? Between 1962 and 1967 manufacturing employment (excluding processing of export crops) probably grew by 2,000-3,000 per annum in Johor State. The number of extra manufacturing jobs available in Johor will almost certainly be considerably above this in the SMP and TMP periods, but in view of the competing demands of Penang⁽³⁾, Ipoh and Selangor, optimistic assumptions seem to be 4,000 per annum in the SMP period and 5,000 per annum in the TMP period. On the other hand less optimistic (but not particularly pessimistic) assumptions would be 3,000 per annum in the SMP period and 4,000 per annum in the TMP period.

-
- (1) "Potential Industrial Output and Employment in West Malaysia 1965-85" - 24/6/68 - T.K. Osgood, EPU.
 - (2) "Investment Requirements of Industry 1971-75" 26/2/70 - Don Pearson, FLDA.
 - (3) The Draft Fihal Report by Robert Nathan consultant's on Penang suggested that unemployment in Penang in 1969 was about 15 percent of the labour force (p. 149) and that, to keep unemployment at this level, something like 5,000 manufacturing jobs per annum would be needed in the period of 1975.

2.4 Others

This heterogeneous category includes construction, utilities, transport, commerce, public administration, defence and services (including tourism). In 1967, employment in these sectors represented about 40 percent of total employment in West Malaysia, but these sectors include the faster growing sectors of the economy. The relationships between these "other sectors" and "agriculture-plus-manufacturing" assumed in various papers are shown in Table 5 on the next page.

The "employment multiplier" (if one regards the agricultural, mining and manufacturing sectors as 'leading' sectors) therefore varies between 1.6, 3.0, although each paper is admittedly dealing with different time periods and acres (detailed in the table). From 1957 to 1962, this "employment multiplier" was 2.0, and from 1962-67, it was 2.4 (see columns 2 and 3 in the table). In 1967 the ratio between total employment and employment in agriculture, mining and manufacturing was 1.6 (see column 1).

One of the problems in projecting the size of the 'multiplier' when it is expressed in this way is that if agricultural output is assumed to expand very rapidly but because of reductions in underemployment, growth in agricultural employment is assumed to be slow, the 'employment multiplier' will be somewhat higher than if the expansion in agricultural output were reflected in a somewhat faster growth of agricultural employment. For this reason, in this paper the same employment multiplier has been linked to the 'low' and 'high' growth rates in 'leading sector' employment.

(1) "Potential Industrial Output and Employment in West Malaysia" 1963-67 - I.L.O. - T.L. O'Connell, I.L.O.

(2) "Investment Requirements of Industry 1963-67" I.L.O. - Don Foreman, I.L.O.

(3) The Draft Final Report by Robert Nathan, Commission on Planning, suggested that unemployment in 1967 was about 12 percent of the labor force (p. 148) and that to keep unemployment at this level, needing the 2,000 manufacturing jobs per annum would be needed in the period of 1975.

TABLE 5

"THE EMPLOYMENT MULTIPLIER"

(ADDITIONAL EMPLOYMENT IN "OTHERS" AS A PERCENTAGE OF ADDITIONAL EMPLOYMENT IN AGRICULTURE, MINING AND MANUFACTURING, EXCEPT FOR 1ST COLUMN WHICH SHOWS THE RELATIONSHIP IN 1967)

Area	WM	WM	WM	WM	WM	WM	Johor	WM	WM	Johor	Johor	Johor	Johor	
Period (date)	1967	1957-62	1962-67	1957-67	1967-75	1967-75	1970-75	1970-75	1970-80	1970-80	1970-85	1970-90	1971-75	1976-80
Sector	WM	WM	WM	WM	WM	WM	WM	WM	Johor	WM	WM	Johor	Johor	Johor
Construction	6	12	8	10	12	12	24	4	4	14	12	29	10-15	15
Utilities	1	2	2	2	2	3	7	-	-	5	5	3	3	4
Transport	6	10	12	11	7	7	11	29	29	8	10	20	10-12	13-15
Commerce	19	50	44	47	48	51	69	14	14	68	66	52	45-50	60-70
Public Administration	12	(12)	39	16	24	32	46	15	15	26	20	79	18-25	20-25
Services	17	39	35	37	36	38	42	15	15	49	42	45-50*	45-50*	50-55
	61	101	140	123	129	143	199	62	62	170	155	183	130-155	162-184

'Employment multiplier'
Source:

n.a.	2.0	2.4	2.2	2.3	2.4	2.4	3.0	1.6	2.7	2.6	2.8	2.4	2.7
1	1	1	1	2	3	3	4	5	2	3	6	7	7

NOTE :

1. Table 6, page 15 - EPU paper of November, 1970.
2. D. Snodgrass, Table 10 Strategy 1.
3. D. Snodgrass, Table 10 Strategy 2.
4. Final Table of EPU 'Data paper of June, 1970.
5. P. 32 'Johor 1980'
6. Tables 7/8 'Johor 1990' paper*.
7. This Paper's Assumptions.

+ Includes services to tourists and therefore pushed up to allow for fast tourist development in Johor.
* The "Johor 1990" estimates were derived from applying the occupations split for West Malaysia in Table 7 of that paper to the estimated labour force in Johor State in 1970 and comparing these with the 'Medium Agriculture' jobs given in Table 8 of the paper to derive the increment in jobs for Johor from 1970-1990

GOVERNMENT OF MALAYSIA AND THE STATE OF JOHOR

JOHOR TENGAH AND TANJONG PENGERANG
REGIONAL MASTER PLAN

INTRODUCTION

THE RFP OBJECTIVES AND THE RFP OBJECTIVES

QUANTITATIVE MEASURES OF RFP OBJECTIVES

3.1

3.2 Conclusions

SUPPORTING REPORT XI

OBJECTIVES

JANUARY 1971

Hunting Technical Services Ltd.
Binnie & Partners . Overseas Development Group . Shankland Cox Overseas
University of East Anglia

C O N T E N T S

SUPPORTING REPORT II		Page No.
1	INTRODUCTION	1
2	THE NEP OBJECTIVES AND MALAY/NON-MALAY PARTICIPATION	1
3	QUANTITATIVE MEASURE OF ECONOMIC DISPARITIES	4
	3.1	4
	3.2 Conclusions	6

2. THE NEP OBJECTIVES AND MALAY/NON-MALAY PARTICIPATION

The general interpretation of the first NEP objective - the reduction of disparity in income between rich and poor - requires measures to adjust income distribution and to increase the share of the poorer groups in total income. The second and third objectives of employment creation and growth require general stimulation of demand as well as projects for the development of production. No specific assumptions have been made in the Draft Project Report about new policies or measures in these directions that may be introduced at the national level in the second Malaysia Plan. They will be taken into account in the preparation of the Master Plan for the project areas.

With regard to the objective of reduction of economic disparities between Malays and other ethnic groups, our assumptions were based on the following considerations:

The national development programme comprises many projects, in some of which Malay participation is intentionally high while in others it is low, with some total combined result. The development of South East Johor is sufficiently large and diverse to be treated in a similar

SUPPORTING REPORT XI

OBJECTIVES

1. INTRODUCTION

The objectives of the New Economic Policy are discussed in relation to the development of the project areas in Chapter 4 of the Draft Project Report. This Supporting Report does not repeat that discussion, but takes it as read. The first section gives additional comments on assumptions, with particular reference to Malay and non-Malay participation. The second section is concerned mainly with the quantitative measure of economic disparities.

2. THE NEP OBJECTIVES AND MALAY/NON-MALAY PARTICIPATION

The general interpretation of the first NEP objective - the reduction of disparity in incomes between rich and poor - requires measures to adjust income distribution and to increase the share of the poorest groups in total income. The second and third objectives of employment creation and growth require general stimulation of demand as well as projects for the development of production. No specific assumptions have been made in the Draft Project Report about new policies or measures in these directions that may be introduced at the national level in the Second Malaysia Plan. They will be taken into account in the preparation of the Master Plan for the project areas.

With regard to the objective of reduction of economic disparities between Malays and other ethnic groups, our assumptions have been based on the following considerations.

The national development programme comprises many projects, in some of which Malay participation is intentionally high, while in others it is low, with some total combined result. The development of South East Johor is sufficiently large and diverse to be treated in a similar

way. Thus some specific production units - for example some individual settlement schemes - may be almost entirely Malay; but in none of the leading sectors as a whole is it assumed that the Federal or State Governments will decide to aim at a proportion of Malays much higher than the two thirds or so Malay proportion of the rural population in Johor. In some economic sectors the proportion of Malay participants will be much lower than this.

In the new agricultural activities it is assumed that a target may be adopted of 70-75 percent Malay participation. A higher target does not seem desirable, partly on general grounds that new opportunities should be open to all ethnic groups, partly for specific reasons related to particular activities. In the main new activity of dairy farming, for example, participation of Indian cattle-owners will be desirable if the rate of growth of cattle numbers is to be reasonably high. The most important impact of the adoption of such a target would be on the proportions of youths selected for training on public schemes or in joint ventures under public auspices.

In the new activity of tourism, similar considerations apply. Given the heavy dependence of tourism development on the Singapore market and connections, a strong Chinese element is essential. If the development grows large enough to justify a local training centre, a target intake of 50 percent Malay, 50 percent non-Malay youths might be adopted: this could provide the basis for essential cooperation in the future.

In forestry and the timber industry, participation by existing interests implies a significant share for non-Malays.

In the main employment creating activities of oil palm and rubber production, conflicting considerations arise. If the proposed emphasis on public farms is adopted, it is intended that these should recruit workers on normal employment criteria of skill, experience etc., rather than "selecting settlers" for permanent settlement. It is also proposed that the market for private land and acquisition of house and shop lots in villages should be as free from restrictions as possible. Both of these should lead to voluntary mixtures of ethnic groups. Nevertheless,

the choice of combination of types of agencies and the methods and the methods and channels of their presentation will influence the proportions of various ethnic groups who select themselves to work and reside in the project areas; and public authority retains power to control participation on public schemes and the initial allocation of land to private holders. In the short or medium term, a very high proportion of the additional employment for otherwise unemployed Malays would improve their relative economic position; but in the longer run, correction of imbalances between ethnic groups requires maintenance and perhaps an increase of the non-Malay population engaged in agriculture in rural areas. Assuming that, in Johor as elsewhere, significant efforts are being made by Government to increase employment of Malays in industry and commerce in towns, it is proposed that if the Malay proportion of employment in oil palm and rubber turns out to be close to but less than two thirds, this may be acceptable. It is not proposed that any one production unit should itself aim at this or any other specific proportion - it should recruit from among those who apply. The mix of organisations can be adjusted as development proceeds if the actual out-turn differs markedly from the desired proportion. Adoption of a non-Malay proportion of one third or more implies that some public schemes must be set up which attract non-Malays as much as Malays.

Questions arise on the extent to which applications for work or for land should be deliberately invited from outside the State of Johor, and on whether they should be regarded as in any way different from applications from Johor residents.

Guidance on this last point and confirmation or modification of the assumptions outlined earlier in this section will be required for Master Plan preparation.

3. QUANTITATIVE MEASURE OF ECONOMIC DISPARITIES

3.1

The extent of economic disparity between ethnic groups is described, in the DNU paper of 18 March, 1970 on the New Economic Policy¹, as the excess of "average income per capita" of non-Malays" over that of Malays. This excess is estimated at 75 percent or more. This section is concerned with the quantitative measure of disparity and with the implications of possible interpretations for the South East Johor Project.

In papers other than the DNU paper quoted, this average 75 percent disparity appears as a result of comparisons between "productivity" per worker in various occupations, taking account of the ethnic composition of the labour force in those occupations (and estimates of grades of Malay and non-Malay workers etc.). "Productivity" equals Value Added, so the measure compares averages of Total Value Added in various activities divided by the number of workers employed in those activities. The "traditional rural" sector has low "productivity" per worker - hence much of the disparity between rural and urban areas. It also has a predominantly Malay labour force - hence much of the disparity between Malays and non-Malays. This measure leads to the prescription - move Malays into "high productivity" occupations.

However, this measure of "productivity" differences does not measure the difference between average (mean) personal incomes received by Malay and non-Malay members of the labour force (including unemployed). Nor, of course, does it indicate the difference between median incomes received by Malays and non-Malays (the median would take some account of the distribution of incomes within a sector or an ethnic group whereas the average or mean income does not).

1 The New Economic Policy Jabatan Perdana Negara (DNU), 18 March, 1970: issued to the Director General, Economic Planning Unit, by the Chief Secretary to Government on 2 April, 1970.

It is assumed that the objective of reduction of disparity is concerned with reduction of differences in personal incomes received. This is consistent with the presentation of this objective as the reduction in the gap between "haves" and "have-nots", which indicates emphasis on raising the absolute income level (and, if possible, also the relative level) of the poorest groups of the population - the lower paid workers, the unemployed and the seriously underemployed.

The measure of differences in "productivity" may be the nearest available approximation to differences in personal incomes received;² but it has serious limitations. Strict adherence to this measure might have different implications for policy.

Value added per worker may be high because large amounts of capital or of highly paid skilled personnel are used, while the incomes of most of the workers may be relatively low, with little scope for increase. Where, after deduction of costs of capital and skilled personnel, the remainder of value added per worker is high, the share of most of the workers may still be low, with the share of profits high - i.e. the distribution of the value added per worker is important if the emphasis is on improving the economic position of the poor.

If disparity is measured by value added per employed worker this leaves out of account the effects of providing additional paid employment for the now unemployed, even at relatively low wage rates. Value added per employed worker can very often be increased merely by replacing unskilled labour with capital: if this reduces employment, the average economic position of the poorest groups is worsened. An example relevant to the SEJP areas is land clearing by mechanical methods or manual methods. The former has high value added per employed worker; the latter employs

² The DNU paper on Racial Disparity and Economic Growth, December, 1969 and its Appendix: Statistical Notes and Detailed Tables, November, 1969, which have not been available to the consultants, may cover this point and other points made later in this section.

15 times as many men per acre, at slightly lower average wages. Clearly, in an unemployment situation, manual methods are normally to be preferred (as the comparison using shadow wages indicates) if the outcome is the same; but use of mechanical methods would appear to contribute more to measured reduction of disparity, if the measure is confined to employed workers.

3.2 Conclusions

Our interpretation of the first objective of the N.E.P., with respect to the majority of the potential workers in the South East Johor Project areas, is that we should be concerned with

- a) possible improvements in the economic position of the poorest groups (families with less than \$100 per month) with some but far from exclusive emphasis on Malays, and therefore with -
- b) the ways in which income from production is distributed by production agencies,
- and c) additional income-earning employment for the unemployed.

Examples of some implications are:

- a) this quantitative measure will take account of additional employment in a "modern sector" activity such as oil palm production, but not of the distribution of income from production. Our interpretation of the N.E.P. objective implies that organisations in which the bulk of the income goes to lower paid workers or is used for the benefit of other poor are preferred to those in which this does not happen;
- b) additional work in oil palm or rubber production may be measured as contributing to reduction of disparity; but if for a time the additional workers are paid little or nothing, during that time this does not contribute to the first N.E.P. objective. That is, the creation of employment, in the second objective, is interpreted as, preferably, the creation of income-earning employment.

- c) techniques which provide more employment are preferred to those which provide less employment when **this is** indicated by valuation, using a shadow wage, of alternative techniques even if the value added per worker is relatively low.

SUMMARY REPORT XII

ALTERNATIVE STRATEGIES

JANUARY 1971

Centre for Technical Services Ltd.

Kinross & Partners, Overseas Development Group, Macquarie University
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GOVERNMENT OF MALAYSIA AND THE STATE OF JOHOR

JOHOR TENGAH AND TANJONG PENGGERANG
REGIONAL MASTER PLAN

SUPPORTING REPORT XII

ALTERNATIVE STRATEGIES

JANUARY 1971

Hunting Technical Services Ltd.

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C O N T E N T S

		Page No.
1.	INTRODUCTION	1
	1.1	1
2.	ASSUMPTIONS	1
	2.1 Project Area	1
	2.2 Forestry and Tourism	1
	2.3 Rate of land Development Acreage Cleared (Cumulative) - Item 1 in Table 1	3
	2.4	3
	2.5	3
	2.6 Households & Labour Force Available (Items 4 & 5)	3
	2.7 "Development Costs"	5
	2.7.1 Agricultural "Development Costs" - Common Assumptions	5
	2.7.2 Agricultural Development Costs in Strategy 3	6
	2.7.3 Infrastructure Costs	6
3.	"DELIBERATE PARTIAL EMPLOYMENT" ASSUMPTION	11
	3.1	11
	3.2 Services	11
4.	IMPLEMENTATION	15
	4.1 Public and private sector shares in short run and long run	15
	4.2 Allocation of land for private estates and smallholdings	16
	4.3 Public Farms	17
	4.4 Smallholdings	19
	4.5 FLDA	21
5.	STRATEGIES 2A AND 3	22
	5.1 Strategy 3 - assumptions about rate of development	22
	5.2 Strategy 3 - potential smallholders	22
	5.3 Malay and non-Malay participation	24
	5.4 Strategies 2A and 3	24

TABLES

1.	Comparison of Alternative Strategies Agricultural Production	2
2.		8

SUPPORTING REPORT XII

ALTERNATIVE STRATEGIES

1. INTRODUCTION

1.1 In Chapter 7 of the Draft Project Report four alternative strategies are compared. This supporting report contains explanations of the assumptions on which the comparative values of items 1-6 in Table 7.2 are based (Sections 2 and 3) and some further discussion of implementation (Sections 4 and 5). Values of items 1-6 are given in Table 1 of this report at 5 yearly intervals.

The four strategies in the Draft Project Report are:-

- 1 75 percent public, existing organisations
- 2A 75 percent public, high proportion of public farms
fulltime work
- 2B 75 percent public, high proportion of public farms,
deliberate partial employment
- 3 40 percent public, 60 percent private.

2. ASSUMPTIONS

2.1 Project Area

2.1.1 For the purposes of comparison, the area has been taken as 285,000 acres suitable for agricultural development. Of these 105,000 acres are in Tanjong Penggerang and 180,000 acres in Johor Tengah.

2.1.2 The net area is averaged at 85 percent of the gross area.

2.2 Forestry and Tourism

The logging pattern, timber utilisation and tourist development are assumed to be the same in all strategies. The comparison is therefore confined to agricultural production and associated employment and population.

TABLE 1 Comparison of Alternative Strategies : Agricultural Production

	Year	Existing Organisations	High Public		High-Private
		1	2A	2B	3
1. ACREAGE CLEARED (CUMULATIVE - Thousand acres)	5	108	105	105	105
	10	198	215	215	215
	15	270	265	265	265
	20	285	285	285	285
2. GROSS SALES (\$ millions)	5	11	11	11	11
	10	67	73	73	73
	15	149	146	146	146
	20	189	189	189	189
	30	223	223	223	223
3. LABOUR REQUIREMENTS IN FULL TIME WORK (Thousand jobs)	5	2.6	3.7	3.7	3.7
	10	13.2	16.5	16.5	16.5
	15	20.3	24.2	24.2	24.2
	20	25.3	27.1	27.1	27.1
	20+	26.2	28.0	28.0	28.0
4. LABOUR FORCE AVAILABLE (Thousand)	5	4.6	3.7	5.2	3.7
	10	19.5	16.5	23.1	16.5
	15	33.9	26.0	36.3	26.0
	20	48.2	34.9	48.9	34.9
	25	54.0	39.5	55.5	39.5
5. HOUSEHOLDS (Thousand)	5	2.4	1.9	2.7	1.9
	10	10.2	8.7	12.2	8.7
	15	16.1	12.7	17.8	12.7
	20	20.1	14.3	20.0	14.3
	25	20.3	14.7	20.6	14.7
6. GROSS PUBLIC FINANCE INPUT (\$ million)	1-5	88	119	123	99
	6-10	211	215	226	183
	11-15	196	158	164	118
	16-20	98	80	84	52
	20+	16	21	23	11

2.3 Rate of Land Development : Acreage Cleared (Cumulative) - Item 1
in Table 1

All four strategies assume clearance of the whole 285,000 acres by year 20, and very similar rates of clearance in years 1-5.

Differences in rates of clearance between strategy 1 and strategies 2A, 2B, 3 appear particularly in years 6-10, when 90,000 acres are assumed cleared in strategy 1 compared with 110,000 acres in the other three strategies. This difference arises from assumptions of a somewhat lower rate of road construction by existing capacity of PWD and a roughly constant annual rate of clearance (15,000 acres p.a.) by FLDA, the main agency in strategy 1.

2.4 Gross sales of agricultural produce (in Millions of dollars) (item 2) depend on acreages previously cleared and planted using assumptions about yields and prices which are common to all strategies.

2.5 Labour requirements (item 3) are expressed in numbers of workers in fulltime work required for agricultural production. They depend on previously planted acreages.

An average of one fulltime worker to 8 acres of crop land is assumed for workers brought in to work newly developed land up to year 9. Thereafter the ratio is assumed to rise to 1 fulltime worker to 10 acres of crop land.

Strategy 1 has a lower labour requirement than the other strategies for the full 285,000 acres (in year 20 and later) because a larger proportion of the land is brought under cultivation in years 10-20.

2.6 Households and Labour Force Available (Items 4 and 5)

2.6.1 In all strategies households are assumed to enter the project areas with the head of the household aged, on average, 30 years, and with an average of 1.9 workers per household, rising to 2.8 workers per household after 10 years of residence. These averages are based on information about household formation obtained in sociological field studies.

2.6.2 Assumptions about entry of households differ between organisations and strategies.

In strategy 1 land under FLDA brings in 1 household per settler's lot of 10 acres up to year 9 and, after year 9, 1 household per 12 acres. Settlers' households are assumed to enter in the fifth year after clearing, on average.

2.6.3 In strategies 2A, 2B and 3 and other organisations in strategy 1, the numbers of households and workers depend on labour requirements. Households are assumed to enter in the fourth year after clearing, on average (some will be engaged in the early work of clearing and planting - work which under FLDA is done by contractors, not settlers).

2.6.4 In the organisations assumed in strategies 2A and 3 the number of workers brought into a newly developed area for agricultural work is assumed to be just sufficient to meet the labour requirements in fulltime work. The number of households brought in is the number of workers required divided by 1.9 (workers per household, as in 2.6.1 above). Over time the number of workers in these households rises - to 2.8 workers per household. For simplicity, it is assumed that none of these additional workers are taken into agricultural land which is developed in later periods in other parts of the project areas.

Thus the labour force available equals labour requirements in year 10 and then begins to exceed requirements as the average number of workers per household rises.

2.6.5 Strategy 2B assumes deliberate creation of underemployment, in order to spread income widely to recipients on a scheme. The number of workers entering a scheme area initially for agricultural work is taken as 40 percent more than the number of fulltime workers required. The number of households is derived by dividing this larger number of workers by 1.9, the average number of workers per household. The average number of workers per household is again assumed to rise to 2.8 after 10 years.

Various different assumptions could be made which would have similar general effects.

The assumptions in 2.6.4 and 2.6.5 are discussed further in section 3 below.

2.7 "Development Costs"

Item 6 in the table shows comparative figures of the gross public finance components of the "development costs" of agriculture and infrastructure in the four strategies. The main difference in the public component appears in the comparison between strategy 3, with high private share, and strategies 1, 2A and 2B, with high public share.

"Development costs" are defined below. It must be emphasised that the figures given in the table are intended for purposes of illustrative comparison only.

2.7.1 Agricultural "Development Costs" - Common Assumptions

- 1 Public and private sector agricultural development costs are assumed to be the same for any given area developed.
- 2 For the purposes of comparison only, the average input of capital is taken to be \$1510 per net cropped acre. This is the negative cash flow for an average acre developed with oil palm and rubber 50/50.
- 3 Most cropping patterns are assumed to be similar - tests have in fact shown similar financial outcomes for several realistic balances of crops.
- 4 The average year of expenditure is taken to be year 4 of development of any particular area. Tests have shown this to be accurate within a five year period to about 10 percent.
- 5 No account has been taken of income arising from development, i.e. income arising in the future from a developed area does not offset the costs to year of first positive cash flow. Equally, income from an area developed early in the project's life is not used to offset agricultural development costs on an area developed later. This assumption is necessary for the purposes of comparison. One effect is that the figures

overstate the actual financial capital that will be required by an agency which develops a substantial part of the areas and uses any part of the income from early development for later investment.

- 6 Housing for workers is not included as a cost in the agricultural costs. It is included at \$1600 per house in the infrastructure costs.

2.7.2 Agricultural Development Costs in Strategy 3

In strategies 1, 2A and 2B the private share of agricultural development is assumed to be wholly financed from private sources. Strategy 3 assumes 60 percent of agricultural production under private agencies - half estates and half smallholders. In this strategy it is assumed that some public funds are used to provide incentives for smallholders. For the purposes of this exercise it is assumed that half the smallholders' land will be cleared and all will be provided with roads of harvesting road standard at public expense either as grants or as loans to the smallholders. The costs assumed are \$170 per acre for land clearance and \$120 per acre for harvesting roads.

It is also assumed in strategy 3 that village infrastructure is provided for smallholders.

2.7.3 Infrastructure costs

Scope

- 1 Total costs of infrastructure include costs of regional and other roads and village and service centres. Urbanisation costs in Kluang and Kota Tinggi and other external costs are excluded. Recurrent costs are excluded (these could be taken as 5 percent of total capital invested at any point in time).

Capital costs are gross and take no account of return flows.

2 Sources of data and estimates were:

1. Malaysian General Transportation Study (and JKR later amendments).
2. Jengka Stage II Estimates by FLDA in conjunction with JKR (also JENGKA Report).
3. A Project Survey of current costs by contract and direct labour in Johor (JKR, FLDA, etc.).
4. Advice from other central Government Departments - Department of Telecommunications; FLDA, NEB, etc.
5. Other detailed Project Studies, e.g. Water Costs by Binnie and Partners.

3 Method

1. Village & Service Centre Costs

- (i) For each region, the average acreage served by each village was calculated.
- (ii) From this alternative acreages per fulltime worker in time, and alternative workers per household assumptions for each strategy could be applied to derive an average number of households and population per village for each strategy at each point in time.
- (iii) The full components of a village
(Housing, roads, water supply, electricity, telephones, schools and other public buildings, sewerage, open spaces, site development costs, etc.).

The proportion of costs fixed for each village e.g. link roads, water supply systems were calculated and separated from the costs which varied with number of families (housing, estate roads, etc.). The village costs could then be adjusted according to the number of households for each strategy in each year.
- (iv) A similar exercise was undertaken for Master Villages to include Secondary Schools, Health Centres, etc.

2. Roads

- (i) The initial estimates of traffic loadings enabled a design standard and cost for each stretch of road to be derived.
- (ii) The cost of each section could then be taken off for each strategy.
- (iii) On the basis of a fifteen year clearance programme phasing diagrams for road and village construction were used to spread expenditure over a number of years, as appropriate for the type of area being developed (areas to be logged; not to be logged; areas with or without existing access, etc.) and the development agency mix.

4 Constant assumptions

Village costs would be spread over 5 years, with the following proportions in each year of the 5 : 30, 30, 10, 10, 20. The average intake period of population into the village was taken as the third year.

Fixed and variable village costs were calculated separately for Tanjong Penggerang and Johor Tengah, related to the numbers of households per village - assumed the same in strategies 1 and 2B and the same in strategies 2A and 3.

As below -

<u>Village costs</u>	1970-1980		1981-1990	
	Tanjong Penggerang	Johor Tengah	Tanjong Penggerang	Johor Tengah
Average Households per village				
Strategies 1 and 2B	475	550	396	458
Strategies 2A and 3	340	460	280	380
<u>Costs:</u>	\$ million	\$ million	\$ million	\$ million
Total: strategies 1 and 2B	3.56	3.64	3.19	3.21
Total: strategies 2A and 3	2.89	3.21	2.58	2.81
Cost per village fixed	1.16	1.04	1.16	1.04
Cost per household variable	(\$5080)	(\$4720)	(\$5080)	(\$4720)

(additional data for Master Villages was used giving similar differentials).

5 Assumptions Varying According to Strategy

1. Assumptions about rate of development, labour force available etc. are as described in previous sections.
2. Public/private proportions: in strategies 1, 2A and 2B all costs are assumed to be met initially from public finance. In strategy 3 a proportion of village development costs is assumed to be privately financed (see 4 below).
3. For strategies 2A, 2B and 3 development is assumed to proceed at a rate compatible with the forestry clearance programme simultaneously in both regions.

For strategy 1, assumption of JKR regional road building capacity at 8 miles per annum, together with necessary village links, village roads, and other secondary routes. This would see an initial concentration in Penggerang, with a major switch to Johor Tengah only occurring in 1978. Road and Village Costs phased accordingly.

4. In strategy 3, for smallholders, all village development costs are assumed publicly financed; their housing is provided and financed privately. A proportion of variable village development costs attributable to households employed on private estates is assumed to be recovered in advance from the estates as part of an increased premium per acre of agricultural land.

6 Comparative figures of gross input of public finance for infrastructure under the various strategies are shown below.

Years	1	2A	2B	3
0- 5	48.4	71.4	75.7	69.2
6-10	110.4	114.5	126.0	107.3
11-15	100.2	73.8	80.3	68.5
16-20	60.1	46.5	49.7	43.7
20+	16.1	11.4	12.0	10.7
<hr/> TOTAL	<hr/> 335.0	<hr/> 317.0	<hr/> 344.0	<hr/> 300.0

7 Note For any development strategy for the project areas, including one in which agricultural development is 100 percent private, the unavoidable gross input of public finance - for regional roads, secondary schools, water supplies etc. for the whole region has been estimated at around \$225 million.

Cooperative figures of those who are registered in the region...

Years	1	2	3	4	5
0-5	1000	1000	1000	1000	1000
6-10	1000	1000	1000	1000	1000
11-15	1000	1000	1000	1000	1000
16-20	1000	1000	1000	1000	1000
20+	1000	1000	1000	1000	1000

3. "DELIBERATE PARTIAL EMPLOYMENT" ASSUMPTION

3.1 Section 2.6 explained the assumptions which have been used (for the present purpose of comparison between the different strategies only) about numbers of households entering the areas in connection with agricultural work and the later growth in numbers of workers per household. The different employment assumptions in strategies 2B and strategies 2A and 3 need further discussion, with reference to jobs outside agriculture. It is simplest to consider this in relation to a single village.

Around the village are public schemes which offer either fulltime work (as in 2A), or part time work for a larger number (as in 2B), with the intention of distributing the agricultural income as 'target incomes' to a larger number of recipients in the scheme area.

In 2A, the number of workers recruited for agriculture is equal to labour requirements in fulltime work. The "labour force available" is equal to "labour required", leaving no "spare labour".

In 2B, the "labour force available" exceeds "labour required" by an amount of "spare labour" initially equal to 29 percent of the agricultural labour force. (Note that all workers are assumed to be willing to work fulltime).

3.2 Services

3.2.1 The agricultural workers will require shops and other services in the village.

In 2A these services can only be provided by other immigrant workers, additional to those recruited for fulltime work in agriculture. To compare this with possibilities in 2B, the following symbols are used:

A = labour requirements (in fulltime work) in agriculture

S = labour requirements (in fulltime work) in services

L = workers recruited for fulltime or part-time work in agriculture when the village is first established.

M = other potential workers immigrating to the village

L-A has been defined as "spare labour".

A is the same in strategies 2A and 2B

L is bigger in 2B than in 2A

S and M may or may not be the same in 2A and 2B

Discussion is in terms of relationships between these variables.

3.2.2 In 2A

1. $L = A$

2. M may be of any size equal to or greater than S. Consider three possibilities:-

(i) $M = S$; so $L + M = A + S$

(ii) M is greater than S, so that a proportion of M are unemployed or underemployed, which equals the proportion of unemployment/underemployed in similar areas elsewhere;

(iii) M is greater than in (ii), so that the same proportion (as in (ii)) of $L + M$ together are unemployed or underemployed.

In (i) there is no unemployment or underemployment. In (ii) the proportion of the total village labour force ($L + M$) that is unemployed or underemployed is smaller than it is elsewhere. In (iii) this proportion is the same as elsewhere.

These three can be taken to represent the changing unemployment position in the village through time, with immigration and natural increase of labour force increasing unemployment or underemployment from the initial low proportion eventually to about the same proportion as elsewhere.

3.2.3 In 2B

In 2B the number of workers recruited for agriculture exceeds labour requirements in fulltime work. But if the difference is not great, the outcome in unemployment or underemployment in the village can be the same in 2B as in 2A. Indeed, if those who are initially recruited for agriculture take service jobs, the first position of no unemployment may be reached in 2B as well as in 2A.

L is greater than A; but provided that $L - A$ lies within certain ranges, the three possibilities in 2A can be matched in 2B. In the equations $M + L - A$ (i.e. "spare labour" plus immigrants) is substituted

for M (immigrants).

For example (i) and (iii) :-

(i) $M + L - A = S$ (so long as $L - A$ is not greater than S)

or $M + L = A + S$

(iii) $M + L$ is greater than $A + S$ so that the proportion unemployed or underemployed is the same as in similar areas elsewhere.

3.2.4 In (i) some or all of the service jobs are taken by the "spare labour" ($L - A$). It is important to note that this conflicts with the assumptions made about strategy 2B for the purposes of comparison with the other strategies. The assumed purpose of creating partial employment in agriculture is to distribute 'target incomes' to as many recipients as possible. If L are receiving 'target incomes' from part-time work in agriculture and, at the same time, receiving additional incomes from work in services, their average income will be greater than the 'target income'. The larger total income from agriculture and services, now (i) received by L , could be distributed as 'target incomes' to a larger number of recipients; or L could receive 'target incomes' only from agriculture and leave the incomes from service jobs to others.

In the evaluation of 2B it is assumed that, as in 2A, all or most of the service jobs are filled by workers other than those recruited for agriculture, who are additional immigrants to the village. These additional immigrants bring additional households whose average number of workers increases through time. The number of workers in households initially coming to the village for agricultural work also grows through time - on the assumptions used here the number increases in 2B to 206 percent of labour requirements in agriculture by year 10, assuming no emigration. Few service jobs are likely to be available for this "spare labour", if additional households have entered the village earlier to provide services.

3.2.5 In practice, however, it is probable that many of the service jobs will be taken by the "spare (agricultural)labour". In most settlement schemes, for example, there are pressures keeping down the number of additional immigrants and encouraging the settlers to take on additional part-time work inside or outside the scheme area. If the result is that all settlers are as fully occupied with paid work as they want to be, this is good for their incomes, but it conflicts with the original purpose of bringing in "spare labour" (as indicated in 3.2.4 above). The objective of spreading "reasonable" incomes as widely as possible is no better served by bringing in people who work full time, mixing part-time agriculture with part-time work outside, than by bringing in the same number, of whom some work full-time in agriculture and the remainder work full-time outside. That is unless incomes from full-time work outside agriculture are well below the "reasonable" level.

In sum -

- 1) the offer of full-time work on public agricultural schemes does not prevent underemployment from arising eventually in the area;
- 2) the deliberate creation of partial employment on public schemes may in practice not be as effective a device as it seems at first sight for spreading incomes as widely as possible.

4. IMPLEMENTATION

4.1 Public and private sector shares in short run and long run

Strategies 2A, 2B and 3 all envisage development by a variety of agencies, public and private. The choice of higher or lower public participation is a choice of the emphasis to be placed, in the initial establishment of production, on agencies set up under public auspices and financed in the early stages from public sources. The choice of a high public share, as in 2A or 2B, does not imply permanent public sector involvement in the greater part of agricultural production in the areas. Many, perhaps all of the public schemes will be transferred in various ways to private control and ownership, some quite rapidly.

For example, a possible outcome of strategy 2A by the year 2000 is shown below.

Example of proportions of agricultural production under various agencies

	Development 1971-75	Total project area development by 1985-90	Year 2000
Public settlement schemes (FLDA, FLCRA etc.)	50-65 ⁺	20-25	5
Public farms	10-25	50-55	15-25
Private estates and smallholdings	25	20-30	70-80
	<u>100</u>	<u>100</u>	<u>100</u>

⁺including FLDA development in 1971 in Tanjong Penggerang.

Public schemes are seen as instruments for rapid development of agricultural production which can be fitted to particular groups of participants. While they must be set up initially by Government decision, it is not intended that they should continue for long to be subject to detailed control and management by higher authority; but rather that they should be frameworks which offer ample scope for the exercise and development of the individual initiative of participants.

4.2 Allocation of land for private estates and smallholdings

Estimates of private demand for land in the project areas cannot be made in advance on any firm basis. The best evidence of potential demand will be provided by the initial response to offers of land for private development, provided that a large total area is offered and with as few restrictions as possible.

The following approach to the allocation of land to private agencies is assumed. With the agreement of the State Government, the proposed Development Corporation for the project areas will allocate areas in blocks for private development and invite applications for these blocks or for lots within them. The total area offered, especially in the early stages of project area development, should be large - say, 20-30,000 acres - in order to give ample scope for private demand to show itself. The size and speed of the initial response would provide evidence (which is lacking at present) of potential scale, preferences for location and size of holding, and characteristics of potential private developers. Blocks should be allocated provisionally for smallholdings (up to 100 acres) and for larger private estates. Their location should take account of existing and prospective developments of agriculture, infrastructure and processing facilities, and of the criteria for choice of implementing agencies listed in Supporting Report V, 3.5 (pp 37-38).

It is proposed that, apart from division into smallholdings and larger estates, there should be no restriction on the size of holdings that may be taken up, at least in the first years of development. Moreover there should be as few restrictions on crop as are compatible with good land use. It is desirable that some of the land offered to smallholders in particular should be already cleared and planted with a cover crop and that, on other land, smallholders should have the opportunity to pay for clearance to be done for them where possible. This could be done on holdings adjacent to new private estates or public farms which are being developed at the same time. Although in general it seems undesirable to place minimum or maximum limits on size of smallholding, there should be some preference for holdings of not less than 10 acres.

One purpose of making land available almost without restriction, especially to smallholders, is to allow private interests to add as much as possible to the rate of land development particularly in the early years. It also provides opportunities for certain groups who may not be attracted to schemes under public sector auspices; this point is developed in section 5, which is concerned with the different emphasis of strategies 2A and 3.

4.3 Public Farms

It is suggested that public farms should be established under a subsidiary of the South East Johor Development Corporation, in cooperation on some farms with the Johor State Economic Development Corporation or MARA. Other possible sponsoring agencies are a new Federal public farm agency or FLDA.

A subsidiary (or more than one) of the South East Johor Development Corporation would have advantages, including a common approach to the Master Plan; but its control should be sufficiently independent to ensure separation of village and residence (villages will be established by the Corporation) from employment.

Public farms should recruit a labour force on normal criteria of skill, experience etc.; some perhaps should direct their recruitment towards particular areas or groups. Public farms should be managed initially by experienced managing agents under contract to the sponsoring agency to manage production, provide training and gradually to introduce innovations in organisation and management which are agreed between the managing agents and the sponsoring agency to be compatible with maintenance of standards of production. The supply of competent managing agents (local as well as expatriate) can be expected to expand if growing demand for them is indicated well in advance.

Even if public farms are all established under the auspices of one agency, it is important that they should gradually adopt a variety of forms of internal organisation and policies towards workers' participation and acquisition of assets (in shares or in other forms) by workers (and, possibly, by outside shareholders).

Public farms, in general, are intended to be agencies which enable agricultural production to be rapidly established and competently maintained; given this, they provide a framework or an 'umbrella' within which social experiments can be carried out - as in FLDA, but without the initial restrictions imposed by the requirements of settlement schemes for settlers whose numbers are determined from the beginning.

Some public farms can be used by the Development Corporation as short term instruments to get agricultural development moving, without longterm involvement. For example the provision of cleared land for smallholders has already been mentioned; public farms might be used further to bring a planted crop to maturity and then sell or rent the greater part to smallholders in a form of nucleus estate. Some instrument of this kind will be needed for short term development of production particularly if private interest is slow to establish itself.

Most public farms will be established with the intention of longer term involvement. In these an important group of innovations will be the gradual adaptation of patterns of work and discipline to the preferred work habits of workers. These will have to be evolved through time on each public farm by management and workers. Once the basic agricultural production and marketing processes are established a public farm should be in a position to take some risks - for example in delegation. The risks can be limited - eg. to possible short term reduction of incomes of some individuals who have accepted this possibility - but they can be greater than those which a private commercial estate would normally consider worthwhile. An obvious example of such a limited risk experiment is the delegation of cultivation and harvesting of an area of the farm to a group of workers who have applied to manage the work themselves - this might lead to hiving off this area to a cooperative on a longterm tenancy basis, and possibly to eventual sale. Similarly, there is room for experiment with payment systems and flexibility and length of hours of work.

In overall organisation and finance public farms provide frameworks within which developments of workers' participation, the possible establishment of cooperatives and various forms of share issue and private

financial participation can be tried out. Examples are given in Supporting Report VIII and the supplementary papers on sociological studies and estates under public sector auspices. Some experiments will fail, but the effects of failure can be limited within such a framework. Evaluation and comparison of these experimental developments will be necessary.

It is important to recognise that, while the initial task of public farms is to establish agricultural production, they are intended to provide 'packages' which meet the realistic aspirations of participants in different ways from settlement schemes and to perform some experimental functions. Unless their emphasis on these two objectives is greater than that of "reasonably good" private estate employers, there may be little gain from their establishment.

It should be noted that public farms are not, in general, intended to recruit workers from particular ethnic groups. The great majority of settlers selected for FLDA schemes are Malay, partly as a result of channels of selection, partly because the form and auspices of the organisation seem less attractive to non-Malays. Public farms can be organised to attract Chinese and Indian recruits as much as Malays, possibly in a combination of mixed and separate schemes. They may in fact have to overcome some reluctance on the part of Malays to work on what may appear to be "estates" - although this may not be a serious problem in a situation of unemployment.

4.4 Smallholdings

A substantial part of agricultural production in strategies 2A and 2B and a yet larger part in strategy 3 is proposed to be developed under smallholdings (up to 100 acres). In the State of Johor during the 1960's some 50,000 acres have been cleared and planted in smallholdings on GSA schemes, almost entirely without assistance from public funds. Many of these schemes are highly successful. Where they have failed, the reasons are usually easily identifiable; they include -

- (a) unsuitable land, e.g. swampy, steep, subject to flood or faulty recommendation, e.g. rubber on peat;

- (b) poor initial survey - plots not related to lay of land;
- (c) poor access to scheme area from road;
- (d) distance of scheme from village and schools - disincentive to move house to land;
- (e) inability of settlers to coordinate efforts - e.g. for drainage works etc.
- (f) difficulty of combining other work with land development, particularly the major task of land clearance;
- (g) little or no technical assistance or advice given;
- (h) inadequate capital.

Most of these problems can be avoided by sensible planning using the results of soil surveys, coordinating provision of services and infrastructure, in some areas clearing the land and in others clearing and planting the main crop, employing potential smallholders in these processes. The proposed Development Corporation would have the functions of planning, coordination of development of smallholding areas and arranging for land clearance and planting of cover crop or main crop by FLDA, public farm agency or private estate if developing nearby.

The intention is, generally, that smallholdings should be made available to families to be worked as family farms with only a small amount of casual wage labour. Provided that other land is available to applicants who want small estates over 100 acres, most of the applicants for smallholdings can be expected to fit in with this intention, without any special attempt to screen initial applications on this point. The appropriate size of holding will range up to 50 or even 100 acres and should not be restricted. Applicants particularly for larger holdings should be required to show competence and access to adequate capital and labour to be able to work their holdings. The main test, however, is what they do in practice. It is therefore worth considering the adoption, in certain smallholding areas, of longterm (10-15 year) tenancy arrangements to be followed by permanent title.

It is normally difficult to make provision for later expansion of a holding without the larger holding being fragmented; but it may be

possible to make arrangements in certain areas. For example, where smallholdings are associated with a nucleus estate and factory, the initial size and arrangement of the nucleus estate can allow for enlargement of some holdings without fragmentation. In general, arrangements need to be made to improve the marketability of land. In this the Development Corporation might act as a clearing house and as guarantor of a proportion of mortgage or other loan on the land.

4.5 FLDA

Strategy 1 (existing organisations and methods) would rely heavily on land development and establishment of settlement schemes of the present kind by FLDA. On completion of development of the project areas, FLDA settlement schemes would cover 208,000 acres in the project areas, or a total of 262,000 acres including schemes already developed by FLDA in Tanjong Penggerang. Much of the remaining 80,000 acres is assumed to be under GSA smallholding schemes of the present kind. It is assumed that FLDA, being able to formulate longterm plans for the areas in cooperation with other agencies, would maintain a high rate of development; priority would have to be given by JKR, with its existing capacity, to infrastructure serving the project areas.

In strategies 2A, 2B and 3, public settlement schemes are assumed to produce 25 percent of the agricultural production in the project areas. A much higher proportion of the area to be developed in the SMP period is assumed to be under settlement schemes, mainly FLDA with modifications to present practice. From 1974 or 1975, it is assumed that, in the project areas, FLDA continues to have an important role in clearing and planting of land, but transfers about two thirds of the land once developed to other agencies, establishing settlement schemes on the rest. Gradually increasing concentration on land development in the project areas would reduce the commitment of FLDA capacity to these areas well below strategy 1.

It is assumed that where FLDA processing facilities are appropriately located, arrangements can be made for processing the produce of some smallholdings and, perhaps, some public farms.

5. STRATEGIES 2A AND 3

5.1 Strategy 3 - assumptions about rate of development

Strategy 3 assumes 60 percent of the agricultural production in the project areas to be established by private estates and smallholders, compared with 25 percent in Strategy 2A. In both strategies the private share has been assumed to be divided equally between the smallholdings (up to 100 acres) and larger estates. This assumption is made for purposes of comparison only - these proportions should be regarded as very flexible.

A larger private proportion than 60 percent was not considered realistic if the project areas were to be developed rapidly. At present most larger scale private sector enterprises do not seem to show great interest in agriculture, but are diversifying out of it; development based on smallholdings would - it was assumed - take some time to reach the relatively high rate of about 8,000 acres per annum. To achieve rates of development, employment creation and growth of production similar to those of strategy 2A, a public sector share of 40 percent, particularly in the initial stages, was considered necessary. A reduction in the public share to 25 percent (to be compared with 75 percent in 2A) would not be made up by private interests within a similar time period for development.

5.2 Strategy 3 - potential smallholders

In assuming a greater proportion of the areas to be developed by smallholders in particular, strategy 3 places greater emphasis than strategy 2A on two groups of participants.

The first group are small kampong landholders - principally Malay. These have now some direct stake in agriculture and some capital, frequently in the form of 2-4 acres of old rubber or an acre of sawah. Such a holding provides low income which has to be supplemented, where possible, by outside work. Improved techniques of production will not significantly help this group as their holdings are too small. GSA

schemes have had mixed success but are becoming less effective as land within easy reach of the major settled areas becomes scarce. These people are probably not interested in employment on public farms nor do they need the full 'package' provided by FLDA: they need some help in mobilising the resources which they already have in order to develop more land. Finance might be organised through Farmers Associations of which they are members, CMSA or, perhaps, FLCRA - since the development of new land might be linked with consolidation of holdings in existing settled areas to create fewer more viable units.

The emphasis here is on general improvement of agricultural structure through development by existing small landholders.

The second group are rural poor non-Malays. One of the first national policy objectives is to increase Malay participation in the "modern" sectors of the economy, and especially in the "urban" sectors of commerce and industry. In a full employment situation this would have the corollary that the non-Malay share in agriculture should be increased or at least maintained. In a situation of general unemployment, however, there is some conflict between this aim of reduction of imbalances in participation in the long run and the aim of reduction of disparities in per capita incomes between Malays and non-Malays: the latter suggests short run emphasis on additional paid employment (of any kind) for Malays, while the former suggests emphasis on employment of non-Malays in agriculture.

Up to now, non-Malays have been a small minority of settlers on FLDA public settlement schemes; but the Chinese in particular have been successful on GSA schemes in Johor. Many non-Malays in New Villages and other rural areas are now finding it difficult to obtain new land: if it cannot be obtained, youths from these areas are likely to drift to the towns, to compete with Malay youths for available jobs. Given the success of past GSA schemes, opportunities to acquire smallholdings should attract many to stay in rural areas in agricultural work. It is proposed that assistance should be given in the establishment of

smallholdings - by provision of access and village infrastructure, by arrangements for land clearing and by provision of processing facilities, in some cases on nucleus estates.

The development of smallholder areas, with the consequent increase in labour supplies' could have the additional effect of increasing the attractions of the areas to larger private investors.

5.3 Malay and non-Malay participation

Without special emphasis on development by existing small landholders, private interest in oil palm and rubber production may be largely non-Malay. If public schemes were designed to attract a majority of Malays (say 65-75 percent) the proportions 25 percent private and 75 percent public in strategy 2A would give 55-65 percent Malay employment in these crops. On similar assumptions strategy 3 would give 40-45 percent Malay employment.

It should be noted that the assumption about public schemes implies that non-Malays comprise a substantially higher proportion than they do at present on FLDA schemes.

In the new agricultural activities, initiated in the project areas under public auspices and offering prospects of growth and high incomes per worker, the objective of reduction of disparity will be served by training a higher proportion of Malays - say 70-75 percent.

5.4 Strategies 2A and 3

Strategy 2A gives greater emphasis than strategy 3 to creation of paid employment for the unemployed and landless and to initial public control over development and the distribution of benefits. Strategy 3 gives greater emphasis to private development in general and in particular by the two groups of potential smallholders described in 5.2. But neither emphasis is exclusive.

Both strategies 2A and 3 require initial emphasis on public sector

participation in order to promote a rapid rate of development. For the same reason, it is proposed in both that substantial amounts of land be offered, in the early stages, for private development.

It is important, in 2A, that the total area offered for private development in the first five years or so should be large, to give ample scope for private interest to show itself. If land is taken up more quickly than assumed in this strategy, the private/public proportions in the later stages can be revised in the direction of strategy 3.