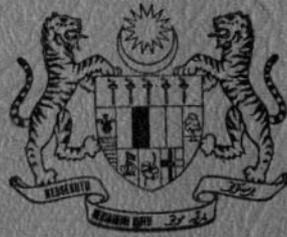


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LAND CAPABILITY CLASSIFICATION REPORT  
MALACCA STATE

TECHNICAL SUB-COMMITTEE  
ON  
LAND CAPABILITY CLASSIFICATION

ECONOMIC PLANNING UNIT  
PRIME MINISTER'S DEPARTMENT  
MALAYSIA

OCTOBER, 1968



LAND CAPABILITY CLASSIFICATION REPORT  
MALACCA STATE

Prepared from Land Alienation and Gazettement, Land Use and Natural Resource Survey data supplied by Federal or State Departments of Survey, Land, Mines, Agriculture, Forest, Geological Survey, Game, Orang Asli, Veterinary, Drainage and Irrigation, Public Works, and the National Electricity Board. Mechanical data processing undertaken by the Department of Statistics. Compiled under the direction of the Technical Sub-Committee on Land Capability Classification by the Natural Resource Evaluation Section, Regional Planning Division, of the Economic Planning Unit, Prime Minister's Department.

ECONOMIC PLANNING UNIT,  
PRIME MINISTER'S DEPARTMENT,  
MALAYSIA  
1968

LAND CAPABILITY CLASSIFICATION REPORT  
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## INTRODUCTION:

This report comprises a review of the natural resources for the State of Malacca and includes a summary of their potentials for development in the form of a Land Capability Classification and Map. It compares the natural resource potentials with the present development pattern and gives a number of broad suggestions which could aid in a realistic development of these resources in conformity with sound conservation principles. Resource development on these lines is likely to achieve the greatest benefit for the State.

The Report should be read in conjunction with the Land Capability and Land Alienation and Gazettement Maps, reduced and simplified copies of which are attached. Copies of the original maps, for each of the three administrative districts, on a scale of 1 inch to a mile, are available for reference in the Economic Planning Unit, Prime Minister's Department.

## PRESENT LAND UTILISATION:

The State of Malacca covers an area of approximately 408,000 acres. The alienation pattern, which is derived from State survey and land office records, indicates that it is relatively highly developed and there are very few areas of undeveloped State land. In this respect Malacca is similar to other states situated on the west side of West Malaysia.

Land alienated on agricultural title, or contained within agricultural development schemes which are scheduled for alienation in due course and land on approved applications, amounts to approximately 347,000 acres. This land is well distributed throughout the State, and comprises the largest land alienation category, as can be seen from Table 1.

Land alienated on mining title is relatively small in extent and covers approximately 1,000 acres, principally in the areas around Kampong Chin Chin, Kesang Pajak and Kuala Linggi.

As compared with other states in West Malaysia, Malacca has a relatively small proportion of its land in the gazetted forest reserve category (8.4% or approximately 34,000 acres)

Land alienated on town land title or reserved for purposes other than agriculture or mining is concentrated in two main areas, namely, the land utilised for urban development purposes in and around Malacca town, and the Commonwealth Military Base at Terendak, near the coast a few miles to the northwest of Malacca town.

A recently prepared acreage statement derived from a present land use survey, based on 1966 aerial photography (Table 5) summarises the manner and extent to which the land is presently utilised. Both this table and Table 1 illustrate the dominant position of agriculture in the pattern of land use, and a comparison between the figures for alienated land on Table 1 and land under agricultural usage aggregated from items in Table 5 indicates that approximately 90% of the land alienated on agricultural title is being utilised at the present time for crop production purposes, (assuming that no extensive areas of illegal cultivation occur).

TABLE 1\*  
STATE OF MALACCA  
ESTIMATED AREAS OF ALIENATED AND GAZETTED LAND IN ACRES

L.C.T. Card Column 17 Code Nos:

DISTRICT	STATE LAND	ALIENATED FOR AGRICULTURE	ALIENATED FOR MINING	MALAY RESERVES (UNALIENATED)	GRAZING RESERVES	ORANG ASLI RESERVES	FOREST RESERVES	GAME RESERVES	ALIENATED/RESERVED FOR OTHER PURPOSES	TOTAL
JASIN	5,796	133,308	--	--	--	621	28,773	--	207	168,705
MELAKA TENGAH	4,347	61,893	--	--	--	--	1,656	--	6,210	74,106
ALOR GAJAH	9,315	151,524	--	--	--	414	3,933	--	297	165,393
STATE TOTAL:	19,458 (4.77%)	346,725 (84.94%)	--	--	--	1,035 (0.25%)	34,362 (8.42%)	--	6,624 (1.62%)	408,204 (100%)

TABLE 2\*  
STATE OF MALACCA  
ESTIMATED AREAS OF MINERAL POTENTIALITY, CATEGORIES IN ACRES

L.C.T. Card Column 14 Code Nos:

DISTRICT	CURRENT MINING	POTENTIAL MINING	POSSIBLE MINING	NON MINING	TOTAL
JASIN	828	1,449	15,111	151,317	168,705
MELAKA TENGAH	--	621	3,519	69,966	74,106
ALOR GAJAH	--	414	12,834	152,145	165,393
STATE TOTAL:	828 (0.20%)	2,484 (0.61%)	31,464 (7.71%)	373,428 (91.48%)	408,204 (100%)

TABLE 3\*  
STATE OF MALACCA  
ESTIMATED AREAS OF SOIL SUITABILITY CATEGORIES IN ACRES

L.C.T. Card Column 15 Code Nos:

DISTRICT	NO LIMITATIONS	FEW MINOR LIMITATIONS	ONE SERIOUS LIMITATION	MORE THAN ONE SERIOUS LIMITATION	VERY SERIOUS LIMITATION(S)	TOTAL
JASIN	80,730	43,470	32,913	2,898	8,694	168,705
MELAKA TENGAH	9,315	30,636	19,044	11,383	3,726	74,106
ALOR GAJAH	46,575	72,657	34,983	6,003	5,175	165,393
STATE TOTAL:	136,620 (33.47%)	146,763 (35.95%)	86,940 (21.30%)	20,286 (4.96%)	17,595 (4.31%)	408,204 (100%)

TABLE 4\*  
STATE OF MALACCA  
ESTIMATED AREAS OF FOREST PRODUCTIVITY CATEGORIES IN ACRES

L.C.T. Card Column 16 Code Nos:

DISTRICT	HIGHLY PRODUCTIVE	PRODUCTIVE	MARGINALLY PRODUCTIVE	UNPRODUCTIVE	TOTAL
JASIN	10,557	11,385	4,761	141,588	168,705
MELAKA TENGAH	--	1,863	--	72,243	74,106
ALOR GAJAH	--	2,484	1,656	161,667	165,393
STATE TOTAL:	10,557 (2.59%)	15,732 (3.85%)	6,417 (1.57%)	375,498 (91.99%)	408,204 (100%)

\*NOTE:

1. The estimates shown in these tables include a bias of +.2%
2. The accuracy of the estimates can be determined from the standard error tables included in the appendix
3. -- = nil or negligible.

TABLE 5 \*  
STATE OF MALACCA  
ESTIMATED AREAS OF LAND USE CATEGORIES

	JAS IN	MELAKA TENGAH	ALOR GAJAH	STATE TOTAL	%
URBAN	765	4,591	1,590	6,946	1.71
ESTATE BUILDING	558	121	466	1,135	0.28
TIN MINING	271	1	153	425	0.10
OTHER MINING/QUARRYING	182	80	96	358	0.09
TRANSMISSION LINE	216	87	237	540*	0.13
MIXED HORTICULTURE	4,953	5,062	6,750	16,765	4.12
MARKET GARDENING	151	736	601	1,488	0.37
AGRICULTURAL STATIONS	6	59	63	128	0.03
RUBBER	100,385	30,850	115,519	246,754*	60.58
OIL PALM	587	-	240	827	0.23
COCONUTS	5,242	3,502	2,705	11,449	2.79
PEPPER	-	-	15	15	0.00
SAGO	242	120	642	1,004	0.25
BANANAS	-	-	28	28	0.01
FISH AND HYACINTH ORCHARDS	-	186	-	186	0.05
PADI	443	159	166	768	0.19
PADI	6,461	13,805	11,593	31,859	7.82
DIVERSIFIED	310	68	133	511	0.13
SCRUB GRASSLAND	4,061	1,195	2,770	8,026	1.97
FOREST	31,074	4,579	12,391	48,044	11.80
SCRUB	4,003	939	3,463	8,405	2.06
NEWLY CLEARED LAND	1,569	338	749	2,656	0.65
SWAMP	4,745	6,335	3,877	14,957	3.67
UNUSED LAND	9	189	5	203	0.05
UNCLASSIFIED	3,031	297	510	3,838	0.94
TOTAL:	169,264	73,209	164,752	407,315	100%

\* This table has been compiled from the interpretation of 1966 aerial photographs on scale of 1:25,000, and is not strictly comparable with the other tables included in this report, which have been compiled from land quality data superimposed on 1:63,360 topographic maps.

When allowance is made for waste land, such as undrainable swamp, and access roads, estate buildings etc., which also occur within the boundaries of title areas, this figure represents a relatively high level of utilisation by West Malaysian standards. The dominant position of rubber, occupying 79% of the total cropped area or 60% of the area of the State, is also well illustrated by these tables.

#### NATURAL RESOURCES:

##### (1) Mineral Resource

Except for the extreme eastern portion, the State has been mapped geologically on a scale of 1 inch to a mile (1:63,360) by the Geological Survey. Prospecting has been carried out in various parts of the State for many years, mainly for tin, gold and iron ore, and active alluvial tin mining is taking place in the south-eastern part of Alor Gajah District, and in the valley of the Sungei Kesang and the Kesang Pajak area of Jasin District. An alluvial tin mining area on the west side of Alor Gajah District ceased production in 1945. Prospecting for tin has indicated small areas of possible economic significance in the west and northeastern parts of Melaka Tengah District, while heavy mineral concentrates containing significant amounts of cassiterite have been obtained from Pulau Besar, a granite island situated some three miles from the coast, although detailed prospecting has not yet been carried out in this area.

Traces of gold were reported in the north-eastern part of Jasin District in 1927, while the mineral investigation unit of the Mines Department has reported the presence of euxenite and xenotime in the western part of the same district. A mining certificate has been issued for a manganese occurrence near Bukit Lintang in Melaka Tengah District, but little is known about the geology of this deposit.

A deposit of clay suitable for low grade ceramics and home industries is located near Batu Berendam in Melaka Tengah District. Bauxite and aluminium-rich laterite deposits are present east of Malacca town in the vicinity of Bukit Lintang Estate. A considerable tonnage of low grade bauxite ore, containing relatively large amounts of iron oxide and silica, was obtained from these deposits by Japanese operators during the Second World War. The ore probably is suitable for blending with low grade clay deposits used in the production of certain types of low grade ceramic products and for high alumina refractory brick.

Information concerning mineral potentiality given in this report is derived from a mineral potentiality map, based on available survey and prospection data, according to the following classification:-

- (1) Current Mining Land - Land covered by current mining leases.
- (2) Potential Mining Land - Land shown by prospecting results or inferred from geological records to contain more than 0.2 kati of cassiterite per cubic yard, or workable surface deposits of other minerals, e.g. iron-ore.

- (3) Possible Mining Land - Land for which present evidence indicates a possible mineral potential but which needs to be more thoroughly examined before commercial development can take place; or unknown areas.
- (4) Non-Mining Land - Land which has been prospected and shown to have no mineral potential, or which on geological evidence is unlikely to have any mineral potential.

## (2) Soil Resource

Recently completed schematic-reconnaissance soil surveys of the State of Malacca have shown that a very high proportion of the land in the State is topographically and pedologically suitable for agricultural development, with the only extensive exception being an area of coastal alluvial soils which occur principally in Melaka Tengah District, in the Mukims of Rambai, Bukit Baru, Duyong, Alai and Kandang, and around Kampong Sungei Baru in Alor Gajah District, where the highly acid and sulphurous condition of the soils contributes towards the very poor padi yields obtained from those areas under cultivation. In other coastal areas similar soils are not developed for agriculture but support mangrove swamps which are saline and subject to tidal influences, as at the estuary of the Linggi River near the Negeri Sembilan border.

Land which is too steep for agricultural development is found mainly in the Batang Melaka, Bukit Tengah and Bukit Sedanan forest reserves in the northern part of Jasin District and around Brisu, Taboh Naning, and Melaka Pindah in the northern part of Alor Gajah District.

Good quality soils derived from acid igneous rocks, including granite and granodiorite, occur extensively in the inland part of the State, where there is an aggregate of approximately 127,000 acres. A further 2,000 acres of these soils occurs near Sungei Udang New Village, in the north-western corner of Melaka Tengah District.

A large proportion of the remaining area of the State is occupied by soils of average to below average quality derived from shales, sandstones, siltstones and schists. These soils sometimes have very firm subsoils or very often contain nodular or massive lateritic bands of varying thickness and depth from the surface. Not infrequently the laterite may be exposed on the surface. The aggregate area is approximately 145,000 acres.

Soils of above average quality derived from riverine alluvium are found in the area east of Merlimau, where they occupy the west bank of the Kesang river over an area of about 20,000 acres.

Information on soil suitability given in this report is derived from a soil suitability map, based on the results of the recently completed schematic-reconnaissance soil survey. The classification used is as follows:-

- (1) Soils with no limitations to agricultural development.
- (2) Soils with few minor limitations to agricultural development.
- (3) Soils with at least one serious limitations to agricultural development.

- (4) Soils with more than one serious limitation(s) to agricultural development.
- (5) Soils with at least one very serious limitation to agricultural development.

(3) Forest Resource

Malacca has nine small forest reserves with a total area of 30,528 acres of which 443 acres is mangrove forest. The largest forest reserve is Bukit Senggeh Forest Reserve with an area of only 8,656 acres. The area of State land forest is insignificant.

Very little of the forest reserves are still unlogged, but where they still stand, the forests are quite good, being mainly red meranti forests of productivity class II. These areas are in Bukit Senggeh, Batang Melaka and Brisu Forest Reserves. Small patches of highly productive (Class I) seraya forest occur on the ridges of Batang Melaka and Bukit Senggeh Forest Reserves. In Bukit Senggeh Forest Reserve there are areas of productive red meranti - balau laut forest and seraya - kekatong forest, while in the south of Batang Melaka Forest Reserve is an area of rich balau laut forest. There are also patches of poor forest such as the merbatu-kelat-kedondong forest in Bukit Sedanan and Brisu Forest Reserves and the Melembu-Sentang forest at the southeastern parts of Batang Melaka Forest Reserve.

There is an area of productive mangrove forests along the Sungei Linggi with a small reserved forest at its mouth. Fresh water swamps are quite extensive, being mainly gelam swamp in central Malacca and riverine swamps along the Sungei Kesang in the south. These forests are unproductive.

Some of the oldest and best regenerated forests in West Malaysia are in Malacca, the oldest now being nearly 40 years old. These areas are very rich in red meranti species and occur in all the inland forest reserves except Brisu and Bukit Bruang. The second rotation crop is unfortunately not uniform throughout the area classed as regenerated, and is often patchy and uneven, but where regeneration is present they have a very high stocking per acre of commercial species.

Large areas of forest reserves have been felled and silviculturally treated in all the inland forest reserves except Brisu and Bukit Bruang. These forests are in different stages of regeneration and are classified as potentially productive. Another category of 'treated' forest is forest areas in which enrichment planting has been carried out. These areas are not extensive but occur in a few compartments in Ayer Panas and Bukit Sedanan Forest Reserves.

There are quite extensive forest plantations covering many compartments in Ayer Panas, Merlimau and Ramuan China Forest Reserves. A range of species have been planted since 1948 including various red meranti species, kapur, yemane, merbau, mahogany and Eucalyptus species, together with a variety of other species. These plantations are in various stages of growth and periodic treatment is carried out to enhance growth.

Malacca has quite a large area of devastated forest resulting from uncontrolled felling and planting of food crops within forest reserves during the Japanese occupation period. This has resulted in these areas being devoid of any tree crop, and

belukar with dense climbers taking over. They are mainly in the south and east of Bukit Sedanan Forest Reserve and the southern parts of Merlimau Forest Reserve bordering the swamps. Much of these areas have been rehabilitated by planting.

Forest productivity data given in this report is derived from a forest productivity map, based on the results of a recently completed forest resource survey. The classification used is as follows:-

- (1) Highly productive forest with a basal area of commercial species of at least 50 square feet, or an approximate equivalent of at least 25 tons of round timber per acre.
- (2) Productive forest with a basal area of commercial species between 35 and 50 square feet, or an approximate equivalent of 15 to 25 tons of round timber per acre.
- (3) Marginal forest with a basal area of commercial species below 20 square feet or an approximate equivalent of less than 20 tons of round timber per acres.

(4) Water Resource

Runoff is utilised locally for padi irrigation purposes throughout the State, either in the narrow valleys of the Sungei2 Siput, Baru, Tampin, Melaka, Kesang, and Ayer Panas, or on the coastal flats in the neighbourhood of Malacca town. Catchments utilised at present for potable water supply purposes are confined to the centre-north part of the State, and serve the Malacca, Tampin, and Alor Gajah supply areas.

Six drainage scheme areas occur along the coast, namely Merlimau, Padang Temu/Alai, Paya Dalam, Kuala Linggi/Kuala Sungei Baru, Tanjong Minyak and Umbai Sekam.

LAND CAPABILITY CLASSIFICATION:

From the natural resource survey data, of which the above is a very brief summary, a land capability map has been prepared in accordance with the following classification:-

- Class I : Land possessing a high potential for possible mineral development.
- Class II : Land possessing a high potential for possible agricultural development with a wide range of crops.
- Class III : Land possessing a moderate potential for possible agricultural development because of a limitation in the range of crops.
- Class IV : Land possessing a high potential for possible forest development.
- Class V : Land possessing little or no mineral, agricultural, or forest development potential, but suitable for possible alternative development such as protective forest reserves, water catchment areas, game reserves, recreation, etc.

This classification and map can be used to indicate the broad purpose for which the land might be utilised in order to derive the best economic benefit from the inherent natural resources. A realistic plan of physical development should make allowance for a proportion of the land being used for purposes related to classes lower than that indicated by the capability classification, for nature conservation or aesthetic reasons, while other areas will inevitably have to be used for purposes not included in this classification. The term agriculture can be extended to include plantation forest, and possibly some types of highly productive regenerated forest, which in economic terms are comparable with other forms of agriculture on an area basis, without disturbing the validity of the above classification. An overall plan of development, designed to meet probable demands in the future as well as immediate needs, must use the present land use pattern as a starting point, and for planning purposes the land capability map data should therefore be compared with the data for existing alienation, as indicated by cadastral survey records, and for present land use as revealed by analysis of recent aerial photographs.

The boundary lines between the capability groups shown on the map at page 15 are not necessarily accurate in detail. They give the broad pattern of capability only, and it is recommended that more specific information on the relative potentials should be sought before preparing detailed future land use plans concerned with resource development for particular areas.

Copies of draft maps, on a scale of 1:63,360 (one inch to a mile) showing the boundaries of the resource classes detailed above, could be useful for detailed planning purposes and are obtainable from the resource survey agencies responsible for their compilation or from the Economic Planning Unit.

#### Reliability:

Some variation exists in the reliability of the boundary detail for the five capability classes, depending on the accuracy of the records for the relevant resource surveys from place to place. The following summary may assist in assessing the reliability which can be attached to the boundaries shown in the capability map:-

#### Class I:

The boundary for this class has been either deduced from prospecting and mining records available to the Geological Survey, or inferred from published or unpublished geological maps and records.

The Class I boundary shown on the land capability classification map was taken from a mineral potentiality map prepared by the Geological Survey.

#### Class II and III:

The boundaries for these classes have been deduced from unpublished soil maps and records available to the Department of Agriculture, and are largely derived from a recently completed schematic-reconnaissance soil survey of the State.

Classes II and III boundaries shown on the land capability classification map were taken from a soil suitability map prepared by the Division of Agriculture.

Classes IV and V:

The boundary between these two classes has been deduced from data on the distribution of the main forest types which was prepared from a study of the most recent aerial photographs available to the Forest Department, and with limited field checking.

The Class IV boundary shown on the land capability classification map was taken from a forest productivity map prepared by the Forest Department.

TABLE 6\*  
STATE OF MALACCA  
ESTIMATED AREAS OF LAND CAPABILITY CATEGORIES  
IN ACRES

I.C.T. Card DISTRICT	Column 14 Nos: 1 and 2 POTENTIAL MINING	Column 15 Nos: 1 and 2 POTENTIAL AGRICULTURE 1*	Column 15 No: 3 POTENTIAL AGRICULTURE 2*	Column 16 Nos: 1, 2 and 3 POTENTIAL FORESTRY	Column 16 No. 4 POTENTIAL PROTECTIVE FORESTRY	TOTAL
JAS IN	2,277	122,958	32,499	6,624	4,347	168,705
MELAKA TENGAH	621	39,537	18,637	207	14,904	74,106
ALOR GAJAH	414	118,818	34,983	1,449	9,729	165,393
STATE TOTAL:	3,312 (0.81%)	281,313 (68.91%)	86,319 (21.15%)	8,280 (2.05%)	28,980 (7.10%)	408,204 (100%)

- \*NOTE:
1. The estimates shown in the table include a bias of  $\pm 2\%$
  2. The accuracy of the estimates can be determined from the standard error tables included in the appendix
  3. - = nil or negligible.

TABLE 7\*  
STATE OF MALACCA  
AREAS OF PRESENTLY UTILISED IRRIGATION AND DRAINAGE SCHEMES IN ACRES

I.C.T. Card Column 18, Code Nos:	0	3	5	TOTAL
DISTRICT	NIL	IRRIGATION SCHEMES	DRAINAGE SCHEMES	
JAS IN	147,798	5,589	15,318	168,705
MELAKA TENGAH	58,788	11,799	3,519	74,106
ALOR GAJAH	159,390	6,003	-	165,393
STATE TOTAL:	365,976 (89.66%)	23,391 (5.73%)	18,837 (4.61%)	408,204 (100%)

TABLE 8\*  
ESTIMATED AREAS OF PRESENTLY UTILISED WATER CATCHMENTS IN ACRES

I.C.T. Card Column 24, Code Nos:	0	1	2	3	4	5	6	7	TOTAL
DISTRICT	NOT UTILISED	IRRIGATION HYDRO-ELECTRIC AND POTABLE INDUSTRIAL	IRRIGATION AND HYDRO-ELECTRIC	IRRIGATION AND POTABLE/ INDUSTRIAL	HYDRO-ELECTRIC AND POTABLE/ INDUSTRIAL	IRRIGATION ONLY	HYDRO-ELECTRIC ONLY	POTABLE/INDUSTRIAL ONLY	
JAS IN	77,832	-	-	3,312	-	70,380	-	17,181	168,705
MELAKA TENGAH	56,997	-	-	621	-	16,767	-	621	74,106
ALOR GAJAH	42,642	-	-	50,715	-	48,438	-	23,598	165,393
STATE TOTAL:	176,571 (43.26%)	-	-	54,648 (13.39%)	-	135,585 (33.21%)	-	41,400 (10.14%)	408,204 (100%)

TABLE 9\*  
STATE OF MALACCA  
ESTIMATED AREAS OF LAND SUBJECT TO DIFFERENT ANNUAL RAINFALL INTENSITIES IN ACRES

I.C.T. Card Column 26 Code Nos.	0	1	2	3	4	5	6	7	8	9	TOTAL
DISTRICT	LESS THAN 70 INCHES	70-80 INCHES	80-90 INCHES	90-100 INCHES	100-110 INCHES	110-120 INCHES	120-130 INCHES	130-140 INCHES	140-150 INCHES	MORE THAN 150 INCHES	
JAS IN	23,598	65,205	65,412	14,490	-	-	-	-	-	-	168,705
MELAKA TENGAH	-	6,624	67,482	-	-	-	-	-	-	-	74,106
ALOR GAJAH	-	3,312	96,669	65,412	-	-	-	-	-	-	165,393
STATE TOTAL:	23,598 (5.78%)	75,141 (18.41%)	229,563 (56.24%)	79,902 (19.57%)	-	-	-	-	-	-	408,204 (100%)

TABLE 10\*  
STATE OF MALACCA  
ESTIMATED AREAS OF LAND BETWEEN DIFFERENT CONTOURS IN ACRES

I.C.T. Card Column 22 Code Nos:	0	1	2	3	4	5	6	7	8	TOTAL
DISTRICT	0-449	500-999	1,000-1,999	2,000-2,999	3,000-3,999	4,000-4,999	5,000-5,999	6,000-6,999	7,000-7,999	
JAS IN	163,737	3,519	1,449	-	-	-	-	-	-	168,705
MELAKA TENGAH	74,106	-	-	-	-	-	-	-	-	74,106
ALOR GAJAH	164,772	621	-	-	-	-	-	-	-	165,393
STATE TOTAL:	402,615 (98.63%)	4,140 (1.01%)	1,449 (.36%)	-	-	-	-	-	-	408,204 (100%)

\*NOTE:

1. The estimates shown in these tables include a bias of +.2%
2. The accuracy of the estimates can be determined from the standard error tables included in the appendix
3. - = nil or negligible.

NATURAL RESOURCE DEVELOPMENT OPPORTUNITIES:

The foregoing summary of the present land use pattern and the natural resources of Malacca State illustrates the considerable extent to which land has been developed for a variety of use purposes. The greater part of the area is devoted to agriculture, and this situation is likely to continue during the foreseeable future, with some encroachment into existing agricultural areas caused by expansion of areas of urban settlement and possibly also of mining.

The problems of land allocation for resource use in Malacca are similar in character to those faced by other west coast states in West Malaysia, where pressure for new agricultural land is often intense, and is directed particularly towards the few remaining areas of lowland forested terrain, the bulk of which are usually gazetted forest reserves. Under these circumstances, with the pressure for additional agricultural land unlikely to recede, the long term future of the remaining areas of forest becomes problematical, particularly in view of the fact that many of these areas are known to be well suited to agricultural development with a wide variety of agricultural crops.

A comparison between the natural resource and land use data, illustrated respectively by the land capability and land alienation and gazettment maps attached to this report, suggests the following opportunities for further resource development:-

(1) Mining

The available information suggests that opportunities for further mining development in Malacca State are rather limited, and confined to small extensions around the existing alluvial tin fields along the Sungei Kesang in Jasin District, and possibly also in the vicinity of Sempang Gading and in the region around Kampong Ayer Hitam Hulu in Alor Gajah District, where a prospecting programme appears warranted.

Home industries and small manufacturing operations might be able to utilise local clays, particularly in Malacca Tengah District, but the scale of this development is likely to be small.

(2) Agriculture

The potential for increasing the area of agricultural land in Malacca State is relatively limited, and as explained above the areas where such development might take place are mainly in the less steeply sloping areas of several forest reserves and one or two small areas of State land where problems of drainage and other unsatisfactory soil properties have effectively prevented development in the past.

In Jasin District the Bukit Sedanan Forest Reserve contains about 6,300 acres of good quality soils derived from granites and granodiorites. These soils are well suited for the cultivation of diversification crops particularly oil palm. The Bukit Senggeh Forest Reserve also contains soils derived from granite and granodiorite but of rather lower quality on account of their occasional compact subsoils, nevertheless, it is considered that with good management oil palm could be grown satisfactorily in this area, and 5,000 acres of forest reserve land are believed suitable for the purpose.

The Ayer Panas Forest Reserve is also classed as a 'mining reserve' but if mineral prospection does not confirm the mining potential of this land and if the area can be released for agriculture then the 3,000 acres of good quality soils derived from acid igneous rocks occurring in this area could be confidently recommended for oil palm cultivation.

About 1,000 acres in the western side of the Merlimau Forest Reserve contains soils of similar quality which are suitable for oil palm cultivation. The remainder of the reserve, about 1,600 acres in extent contains soils of average to slightly above average quality derived from shales and sandstones. Laterite is often common in this area and rubber might be the preferred crop for extensive agriculture.

The only extensive area of undeveloped state land in Jasin District occurs in the area lying between the state boundary with Johore and the Merlimau Forest Reserve in the mukim of Semujuk where about 4,000 acres of soil derived from riverine alluvium are found. This area is flat and is subject to flooding. With a good drainage system the area could probably grow oil palm. However, a more detailed evaluation is recommended before any firm plans for development can be drawn up.

In Melaka Tengah District the areas of possible agricultural development are even more limited, and include the Bukit Bruang Forest Reserve which covers an area of nearly 1,200 acres having average to below average quality soils derived from sedimentary rocks and schists. The soils often contain laterite reaching up to the surface. Rubber appears to be the most suitable crop for this area.

2,400 acres of state land containing soils derived from sandstones, shales and schists are located south of Ayer Keroh Village. As in Bukit Bruang Forest Reserve, laterite is also present, and rubber is again considered to be the safest crop to recommend for this area.

In the area around Batu Berendam poor quality soils derived from marine alluvial clays are to be found. This area of state land is adjacent to the Fish Culture Centre and is probably best developed for fish farming considering the high acidity and sulphurous condition of the majority of the soils which severely limits their usefulness for agriculture.

In Alor Gajah District the Ramuan China Forest Reserve contains 2,200 acres of soils of average to below average quality. Laterite is often present in these soils which also possess very firm subsoils. In view of these factors, rubber appears to be the agricultural crop best suited to this area. The Linggi Forest Reserve which covers an area of 800 acres and 3,200 acres of state land adjoining it and running along the banks of the Linggi River contains marine alluvial soils of very poor quality. Parts of this area consist of mangrove swamp. These coastal alluvial soils have been drained by the Kuala Linggi/Kuala Sungei Baru drainage scheme and soil, agronomic, and other studies would appear advisable in the area to guide future agricultural development in view of the strongly sulphurous conditions of many of these sediments.

The Brisu and Cape Rachado Forest Reserves and the state land around Taboh Naning and Melaka Pindah are considered too steep for agricultural development, and from the conservation viewpoint appear better suited to permanent protective cum productive forest reservation purposes.

The soil suitability pattern in Malacca State indicates that the majority of the soils on undulating and rolling terrain are of above average quality, and these soils cover some 65 per cent of the total land area. At the present time the greater part of this land is cultivated with rubber, but many of these soils are considered suitable for a wide range of diversification crops. Oil palm is one promising alternative to rubber in these areas and the recent trend toward replanting of rubber land with oil palm on the part of the estate industry represents a healthy step toward greater agricultural diversification. The development of a similar trend on the part of rubber smallholders, who cultivate more than 50% of the total rubber acreage in the State, appears worthy of consideration, but such a development is unlikely to take place without some government encouragement.

### (3) Forestry

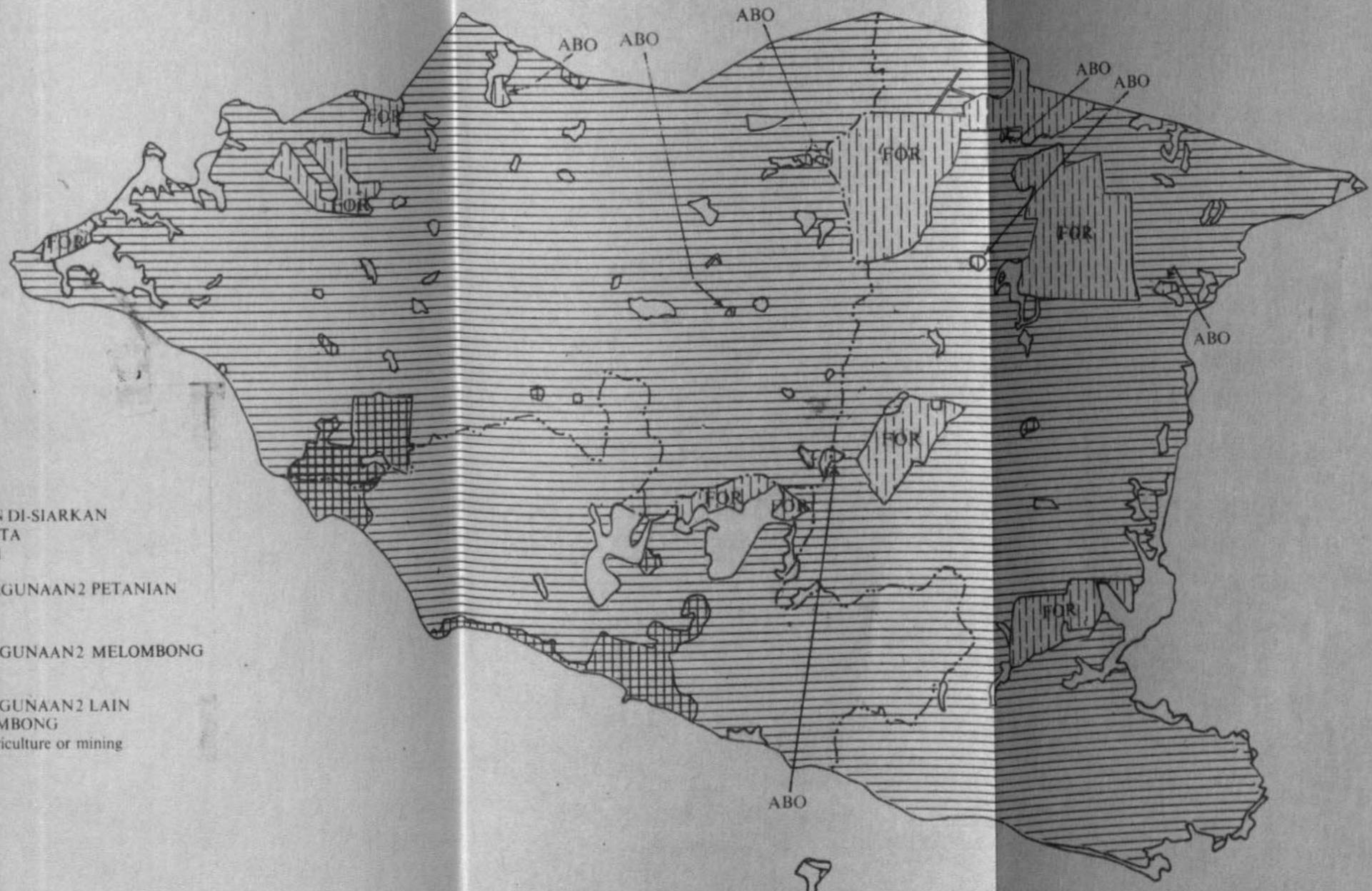
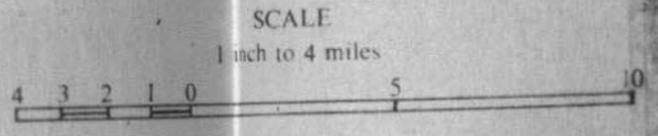
If soil and topographic suitability for agricultural crops were to be the only criteria influencing land development decisions, then Malacca would probably lose all her forest reserves except Batang Melaka Forest Reserve which is quite hilly and steep, and a few small pockets of excessively steep land or poor soils which would not comprise effective forest management units.

However, other criteria besides suitability of the land for agriculture in its commonly understood sense should be considered when planning for overall land use, and in partially forested area such as Malacca the contribution which a profitable forest industry could make to the economy of the state should be taken into account, in addition to the possible conservation role of the forest, which is likely to be confined to the relatively small areas of steepest land or poorest soil.

The absence of conclusive data dealing with the economics of a small forest industry suited to Malacca circumstances is regrettable, and because of this the case for retaining as forest reserves those reserves possessing alternative resource development prospects cannot be convincing in the Malacca context where there is an acute need for additional agricultural land. In view of the stalemate which has been reached in the forest versus agriculture debate, and the fact that reasonable doubt exists on this question, a thorough economic appreciation of the place of a forest industry in the Malacca of the future would be advisable before a final development commitment is made concerning the few remaining forest reserve areas. Such a study would need to take into account the possibility of meeting the local timber deficit from neighbouring states, or even on a pan-Malaysian or wider international basis. At the same time, the economics of utilising all non-productive or marginally productive areas of forest reserve, state land, or even military reserves such as the Terendak Commonwealth Military Base, through the adoption of intensive management and silvicultural techniques and the introduction of fast growing species would need to be considered. Fact finding and studies carried out in recent years in other parts of West Malaysia could be relevant to the situation in Malacca, and could considerably reduce the period required for a local study. In addition, the United Nations Timber Industry Development Project, currently being undertaken on a pan-Malaysian basis, will provide useful guidance on this issue, the results of which will be available within five years.

# PETA TANAH YANG DI-KELUARKAN DAN DI-SIARKAN DALAM WARTA KERAJAAN LAND ALIENATION AND GAZETTEMENT MAP

## MALACCA



### TANDA Legend

TANAH YANG DI-KELUARKAN DAN DI-SIARKAN  
KERAJAAN DALAM WARTA  
Alienated and gazetted land

-  TANAH DI-KELUARKAN UNTUK KEGUNAAN2 PETANIAN  
Land alienated for agricultural purposes
-  TANAH DI-KELUARKAN UNTUK KEGUNAAN2 MELOMBONG  
Land alienated for mining purposes
-  TANAH DI-KELUARKAN UNTUK KEGUNAAN2 LAIN  
DARIPADA PERTANIAN DAN MELOMBONG  
Land alienated for purposes other than agriculture or mining
-  RESAB MELAYU  
Malay reserve
-  PADANG KERBAU  
Grazing reserve
-  RESAB ORANG ASLI  
Aborigine reserve
-  HUTAN SIMPAN  
Forest reserve
-  RESAB MERGASETUA  
Game reserve
-  TANAH KERAJAAN  
State land

SELECTED CROSS-TABULATIONS:

The extent of the opportunities and problems, in area terms, in respect of the alienation and present land use patterns and the development of the natural resources can best be appreciated by making cross-tabulations between different data categories, and in order to illustrate the range and usefulness of these cross-referencing possibilities two cross-tabulation tables have been prepared (table 11 and 12).

The first of these tables has been drawn up to show the extent of the opportunity for agricultural development within the State Land category. It should be noted that the areas of agricultural development opportunity, corresponding to only 3.4% of the total area of the State, are well distributed over the three districts, and, apart from numerous relatively small, irregular shaped patches of land which do not offer any sizeable opportunity for land development schemes or large scale alienation, are largely accounted for by the recently degazetted portion of the Bukit Bruang forest reserve in Malacca/District and the Terendak Camp (Commonwealth Military Base) area in Alor Gajah District, together with the Paya Jenuang Lanjut in Jasin District, where poor drainage and susceptibility to flooding has effectively precluded agricultural development in the past.

Another major land use category known to possess a considerable potential for agricultural development is that of Forest Reserves, and Table 12 illustrates the extent of this potential. Jasin District contains the bulk of this agriculturally suitable land category, located in the Bukit Sedanan, Bukit Senggeh, Ayer Panas and Merlimau forest reserves; together with smaller areas occurring in the Ramuan China forest reserve in Alor Gajah District and the Bukit Bruang forest reserves in Malacca Tengah District.

TABLE 11\*  
STATE OF MALACCA  
ESTIMATED AREAS OF STATE LAND POSSESSING AGRICULTURAL DEVELOPMENT POTENTIALS

(C.T. Card Column 15 Code Nos:	1	2	3	(Cross-tabulated against Column 17 Code No: 0)
DISTRICT	SOILS WITH NO LIMITATIONS TO AGRICULTURAL DEVELOPMENT	SOILS WITH FEW MINOR LIMITATIONS TO AGRICULTURAL DEVELOPMENT	SOILS WITH AT LEAST ONE SERIOUS LIMITATION TO AGRICULTURAL DEVELOPMENT	TOTAL
JAS IN	207	3,933	1,242	5,382
MELAKA TENGAH	--	1,863	207	2,070
ALOR GAJAH	1,035	4,140	1,449	6,624
STATE TOTAL:	1,242 (8.82%)	9,936 (70.59%)	2,698 (20.59%)	14,076 (100%)

TABLE 12\*  
ESTIMATED AREAS OF GAZETTED FOREST RESERVES POSSESSING AGRICULTURAL  
DEVELOPMENT POTENTIALS

I.C.T. Card Column 15, Code Nos:	1	2	3	(Cross-tabulated against Column 17 Code No: 6)
DISTRICT	SOILS WITH NO LIMITATIONS TO AGRICULTURAL DEVELOPMENT	SOILS WITH FEW MINOR LIMITATIONS TO AGRICULTURAL DEVELOPMENT	SOILS WITH AT LEAST ONE SERIOUS LIMITATION TO AGRICULTURAL DEVELOPMENT	TOTAL
JAS IN	13,248	7,245	1,656	22,149
MELAKA TENGAH	--	1,656	--	1,656
ALOR GAJAH	--	414	2,277	2,691
STATE TOTAL:	13,248 (50.00%)	9,315 (35.15%)	3,933 (14.84%)	26,496 (100%)

\*NOTE:

1. The estimates shown in these tables include a bias of +.2%
2. The accuracy of the estimates can be determined from the standard error tables included in the appendix
3. -- = nil or negligible.

APPENDIX

AREA SUMMATION METHOD:

The area estimates given in the preceeding report and its accompanying tables were prepared by mechanical data processing methods, using I.C.T. punch cards. The land use, natural resource, and other land quality data on the contributed maps have been coded on a point basis using a linear random sampling pattern afforded by the intersection points of the 1,000 yard grid squares, which are shown on all 1:63,360 published topographic maps of West Malaysia.

The percentage standard error for individual acreage estimates can be determined from the following table:-

PERCENTAGE STANDARD ERROR TABLE  
(Based on Sample Area of 1,000 Sampling Points, Approximately equivalent to the State and to the larger districts).

Percentage Standard Error	Total number of sampling points with particular land quality*
100	1
30	11
25	16
20	24
15	43
10	91
5	286
4	385
3	526
2	714
1	909
0.5	976

\*  
The exact plain acreage equivalent of a 1,000 yard square is 206.61116 acres, but in order to facilitate the calculations necessary for preparing the acreage tables presented in the preceeding report, the area equivalent of each sampling point has been taken as 207 acres, thus introducing a bias of +.2% into the quoted figure. In order to determine the number of sampling points related to a given acreage, the acreage figure should be divided by 207.

For example, Alor Gajah District with a total estimated area of 165,393 acres corresponds to 799 sample points or approximately 1,000. The percentage standard error for the area of land in this district having no, or only few, minor limitations in terms of soil suitability (table 3) is found by dividing the area figure (46,782+71,622 = 118,404) by 207, which gives 572, corresponding to the number of sampling points represented by this figure. This is most nearly equivalent to the figure 526 in the right hand column of the table, which in turn corresponds to a 3% standard error, as indicated by the figure in the left hand column.

9th October, 1968  
Regional Planning Division,  
Economic Planning Unit.

