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THE PRESENT LAND USE
of
PERAK

by
SIEW KAM YEW

SEPTEMBER 1970

PRESENT LAND USE REPORT NO. 11

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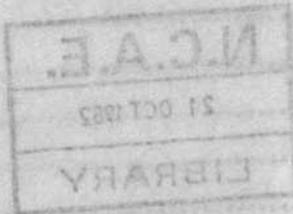
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PRESENT LAND USE SURVEY OF WEST MALAYSIA

LAND USE REPORT OF PERAK

by

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CONTENTS

<u>TEXT</u>	<u>PAGE</u>
ACKNOWLEDGEMENTS	i
INTRODUCTION	1
METHODOLOGY OF SURVEY	2
Interpretation	2
Manuscript Compilation	2
Area Measurement and Tabulation	2
Fairdrawing	3
THE PHYSICAL ENVIRONMENT	4
Location and Extent	4
Physiography and Geology	4
Drainage	4
Climate	5
Soils	5
THE PRESENT LAND USE	7
General	7
Salient Statistics	7
Urbanization	8
Mining	9
Rubber	9
Padi	10
Coconut	11
Oil Palm	11
Orchards	12
Pineapple	12
Sago	12
Fish and Hyacinth Ponds	12
Tea	13
Coffee	13
Mixed Horticulture	13
Diversified Crops	14
Tapioca	14
Banana	14
Market Gardening	14
Shifting Cultivation	15
Forest, Scrub Forest, Scrub Grassland and Swamp	15

INTRODUCTION

Before the resources of a country can be developed on a sound basis, a national resource inventory, based on scientific principles, must be carried out. With the resource inventory data at hand, sound long term development plans can be made, which when implemented can result in the development of suitable land presently unutilized and in settled areas the land use can be intensified, diversified or completely changed. One form of resource inventory is a Present Land Use Survey.

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A Present Land Use Survey will present, in some form or other, a picture of existing land utilization. The method of execution and the form of presentation depends on the scope of the survey, the degree of accuracy required, and the basic materials available. The usual end-products are a cartographical display and/or an area account of existing utilization.

The word "present" qualifies this type of survey and places emphasis on the current status. The Author is indebted to the following Sections whose efforts have made this report possible, essential in the data-gathering programme.

Until now in West Malaysia the best cartographical display of land use has been contained in the National Topographical Mapping series and in State maps at smaller scales depicting land alienation. The land use information obtainable from this mapping, however, is insufficiently detailed, often out-of-date, and in many places misleading (land alienation often bearing no relationship to actual use). Acreage statistics of major crops and some land use sub-categories are obtainable from various government departments, but the validity and accuracy of such acreages are dependent on the survey methods employed with the result that values are not always completely accurate. The Interpretation Section under the direction of Mr. J. D. McEachern, Canadian Colombo Plan Land Use Specialist/Geographer.

The Present Land Use Survey is producing a complete and accurate assessment of land use both cartographically and statistically, so that an account of all significant forms of land utilization is given and displayed for every Mukim and District of each State in the country. The Planner can thus be supplied with a complete statistical inventory of the present land use, geographically displayed and with this full understanding of the situation the formulation of development plans is facilitated. Large and small scale mapping combined with acreage figures listed for all political units ensures the comprehensive supply of "bench mark" data for both the Local and National Planner.

The Cartography Section under the direction of Mr. G. W. Millington-Hogg, Canadian Colombo Plan Cartographer.

The tangible end-products of the Survey are:-

1. Acreage statistics of all land use sub-categories.
2. Present Land Use Map (1966) at a scale of 1:25,000.
3. Present Land Use Map (1966), by States at a scale of 2 miles to an inch.
4. Present Land Use Map of West Malaysia (1966) at 1:500,000.

The Area Measurement Section under the direction of Miss Chong Sew Ying.

For many years Agricultural and Planners have realized the need for such information, but it has not been until the Colombo Plan, the Canadian Government has requested to conduct a resource type survey over West Malaysia, which from a land use point of view, would entail the supply of medium scale aerial photography and the execution of a Present Land Use Survey.

The Canadian Government contracted Lockwood Survey Corporation of Toronto to conduct this Survey and Canadian aircraft and aircraft crewed the aerial photographic phase in early 1966. Aerial photographs at the scale of 1:25,000 were taken of the entire area of West Malaysia by early 1967 and the Present Land Use Survey could then commence.

The author also wishes to record his thanks to Enche I. F. T. Wong for reading the draft and his constructive criticisms. Mr. Law Wei Min, Acting Senior Soil Scientist, is gratefully acknowledged for his advice and constant encouragement.

It was his duty to set up the Survey, under the direction of the Specialist, Division of the Department of Agriculture and to commence production as soon as possible.

INTRODUCTION

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The Present Land Use Survey is producing a complete, quick and accurate assessment of land use both cartographically and statistically, so that an account of all significant forms of land utilization is given and displayed for every Mukim and District of each State in the country. The Planner can thus be supplied with a complete statistical inventory of the present land use, geographically displayed and with this full understanding of the situation the formulation of development plans is facilitated. Large and small scale mapping combined with acreage figures listed for all political units ensures the comprehensive supply of "bench mark" data for both the Local and National Planner.

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Malaysian Agriculturists and Planners have realised for some time the need for such information, but it was not until the drawing up of the First Malaysia Plan that the requirement was crystallised into action. Under the Colombo Plan, the Canadian Government was requested to conduct a resource type survey over West Malaysia, which from a land use point of view, would entail the supply of medium scale aerial photography and the execution of a Present Land Use Survey.

The Canadian Government contracted Lockwood Survey Corporation of Toronto to conduct this Survey and Canadian aircrew and aircraft commenced the aerial photographic phase in early 1966. Aerial photographs at the scale of 1:25,000 were taken of the entire area of West Malaysia by early 1967 and the Present Land Use Survey could then commence.

Between January and July 1967, Lockwood Survey Corporation, under the Canadian Colombo Plan Programme, supplied the services of two Land Use Specialists and one Cartographic Specialist. It was their duty to set up a Land Use Section within the Soil Science Division of the Department of Agriculture and to commence production as soon as possible.

For convenience and through the helpful auspices of the Directorate of National Mapping, an Interpretation Section was established at the Directorate while an Area Measurement Section and a Cartographic Section were established in the Soil Science Division of the Department of Agriculture. The first State acreage results were produced by October 1967 and a programme has been devised to ensure that the production of all acreage results and 1:25,000 land use mapping will be completed in the latter half of 1969.

It should be remembered that the aerial photographs were taken during the period January 1966 to February 1967 so that the mapping and crop acreages which are being published will not include changes in land use which occurred subsequent to the date of actual photography.

Within a two-year period, reports will be written for all the States of West Malaysia. This particular report is on the Land Use of Perak. The principal aims of this report are:-

1. To describe the methodology adopted.
2. To qualify the acreage statistics of State land use.
(Contained in Appendix B).

At the conclusion of the Land Use Survey a comprehensive Land Use Report of West Malaysia covering all eleven States will be compiled. Then, with the availability of complete mapping coverage and acreage statistics it will be possible to discuss the land use of West Malaysia as an entity and, from the geographical point of view, to subdivide it into specific regions of characteristic land use.

METHODOLOGY OF SURVEY

An understanding of the methodology of the Present Land Use Survey can best be obtained from a brief description of the four distinct yet interlinked phases of the Survey.

Interpretation

Scaled 1:25,000 aerial photographs are stereoscopically inspected under power 3 magnification mirror stereoscopes and the photo image showing different types of land use is interpreted according to a land use classification legend (Appendix A). This legend is substantially the same as the one recommended by the Commission on World Land Use Survey (International Geographical Union) and only slightly modified to suit Malaysian conditions. Land use sub-categories of two acres or larger are delineated in ink on the aerial photographs so that this annotated photography becomes a permanent record of the survey. There are approximately 18,000 aerial photographs in this 1:25,000 photographic coverage of which about 2,639 cover the State of Perak (Figure 7).

Interpreted photographs are then closely checked by a second interpreter before being passed on for compilation.

Manuscript Compilation

The interpreted scaled photographs are keyed to the transparent compilation bases of the 1:25,000 national mapping series and the delineated land use boundaries are traced onto a manuscript of dimensionally stable film on which a certain amount of planimetric detail and all local political boundaries have been drawn. This facilitates future field orientation of the final maps and enables acreage counts to be made for the smallest political unit, namely, the Mukim.

Area Measurement and Tabulation

The manuscript is the basis for the next two phases - area measurement and fairdrawing.

On each 1:25,000 land use manuscript an acreage count, using a dot grid, is made for each sub-category and these counts are tabulated by Mukims. At this stage a valuable check is made by ensuring that the cumulative physical acreage of all the small sub-category units equals that of the total physical acreage of the gridded sheets. A further check is made by repeating the whole process and comparing the results for the same sub-category from the two counts. This double count ensures that each individual sub-category is correctly measured.

In the computation of acreage statistics a 'crop equivalent factor' is introduced to determine the 'equivalent' acreage occupied by each of the component crops where intercroppings have been mapped. In such cases the 'equivalent' total acreage may not be equal to the total physical acreage. This is because when a low crop is planted under a tree crop, e.g. coffee under coconuts, each of these crops is considered to be occupying more than half the total area of the plot but not the whole plot. As such a 'crop equivalent factor' of 75 per cent is taken, which means that the 'equivalent' acreage occupied by each of the two component crops is 75 per cent of the plot, thus giving an 'equivalent' total acreage of 150 per cent or one-and-a-half times that of the physical area of the plot. For example, in a 10 acre plot intercropped with coffee and coconuts, each crop is considered to occupy 7.5 acres so that the 'equivalent' total acreage occupied by these two crops is 15 acres. Consequently, the total land use acreage will not be equal to the physical acreage of the state where similar intercroppings have been mapped.

When a district has been interpreted and mapped in manuscript form it is possible to compile a District Abstract of land use acreage where all acreages are listed under Mukims. From this abstract a separate District Summary sheet of acreage is compiled, where the acreages of all nine land use categories and their sub-categories are presented as percentages of the district. The total acreage under agricultural use is also given and presented as a percentage of the district while agricultural categories/sub-categories are further listed as percentages of the land under agricultural use. A State Summary of land use acreage (the one for Perak is Appendix B of this report) follows substantially the same outline as the District Summary with the combined State Land Use acreages and percentages being listed as well as those for the component districts.

Fairdrawing

The final 1:25,000 map sheet is compiled by a fairdrawn tracing of the manuscript on dimensionally stable film. This is the final record from which printed maps or dyeline copies can be made; these may then be hand-coloured by the user according to a recognised colour system suggested by the Commission on World Land Use. The anticipated market for this scale of land use mapping is likely to be limited and therefore a coloured series at this scale is not being produced.

A printed coloured land use map series at a scale of 2 miles to an inch is, however, being published for all States. The uncoloured version, enclosed in the back cover pocket, is presented with the report.

Land use mapping at this scale is useful as it gives an overall picture of the present conditions as well as facilitating regional and state planning. The 2 miles to one inch Land Use Map of Perak was compiled by condensing 135 of the 1:25,000 map sheets into 3 sheets.

Drainage

There are three main rivers in Perak: Sungai Kerian which forms the northern boundary with Kedah; Sungai Bernam which forms the southern boundary with Selangor; and Sungai Perak. All three rivers drain into the Straits of Malacca. While in their upper reaches, the rivers are generally swift and strong; their middle and lower courses, in contrast, are slow and sluggish. In the hilly country where they have their headwaters, waterfalls and rapids are common features.

Sungai Perak, the largest river is about 170 miles long and drains a large part of north-western Malaya. It has its headwaters in the mountainous region near the Thai border and follows a longitudinal course approximately along the centre of the State until reaching Telok Anson town where it makes a right-angled turn and debouches into the Straits of Malacca at Bagan Datuk. The upper course has been dammed for the generation of hydro-electric power and resulted in the creation of Chenderoh Lake. This river is fed by a number of tributaries, the largest being the Sungai Kinta.

PHYSICAL ENVIRONMENT

Location and Extent

Situated in north-west Malaya, Perak lies between latitudes $3^{\circ} 40'N$ and $5^{\circ} 55'N$ and longitudes $100^{\circ} 20'E$ and $101^{\circ} 45'E$. It is bounded on the north by Thailand, Kedah and Province Wellesley, on the west by the Straits of Malacca, on the south by Selangor and on the east by Pahang and Kelantan. (Figure 1). The second largest State in West Malaysia, Perak's total area is about 8,102 square miles. The measurements for its length and breadth are approximately 156 miles and 94 miles respectively. Forming part of the State are a number of off-shore islands, the largest being Pulau Pangkor, opposite to Lumut.

The State is divided into nine administrative districts: Kerian, Larut and Matang, Dinding, Selama, Perak Hulu, Kuala Kangsar, Kinta, Perak Hilir and Batang Padang. (Figure 2). The seat of government is Ipoh while the Royal town is Kuala Kangsar. The other principal towns are Taiping, Telok Anson, Bidor, Batu Gajah, Tanjong Malim, Kampar, Sungai Siput and Parit Buntar.

The State's population is about 1,593,800 people.

Physiography and Geology

Highlands, confined to the northern and eastern parts of Perak, cover over half the area of the State. They are dominated by three mountain ranges: the Main Range which forms the eastern border of Perak has a regional tectonic axis trending north-south. The Bintang Range located on the extreme west is an outlier of the Main Range and follows a tectonic axis trending north-northwest - south-southeast. The Kledang Range, situated between these two ranges, is a smaller range aligned roughly parallel to the Bintang Range (Figure 3). These mountain ranges are composed wholly or predominantly of granites and other igneous rocks which have been exposed by sub-aerial denudation. The terrain of the land occupied by these ranges is very mountainous and rugged.

The foothills region adjacent to these ranges generally consists of low undulating to rolling hills which seldom exceed 750 feet above sea level. These hills are formed by the folding of sedimentary rocks of arenaceous and argillaceous origin during the Post-Triassic orogeny. Close to the mountain ranges (particularly the Main Range) where the granites are in contact with the sedimentary rocks, metamorphism of arenaceous and argillaceous sediments to quartzites and phyllites/schists respectively occurs. The degree of metamorphism decreases with distance from the contact zones. In the Kinta Valley calcareous rocks form the underlying bedrock, and limestone outcrops occur as isolated steep-sided hills rising abruptly from flat lands to form distinctive features of the landscape.

Western Perak is primarily an extensive coastal alluvial plain. Formed by the deposition of recent unconsolidated alluvium under both marine and fluvial conditions, this plain is narrower in the north and reaches a maximum width in the lower courses of Sungai Perak and Sungai Bernam where the alluvium extends inland for some 40 miles. This is also the widest of the west coast plain of West Malaysia. Low-lying terraces of riverine deposits consisting of Subrecent and Older Alluvium extend from the landward margin of the coastal flat and gradually merge with the low hills of the foothills region.

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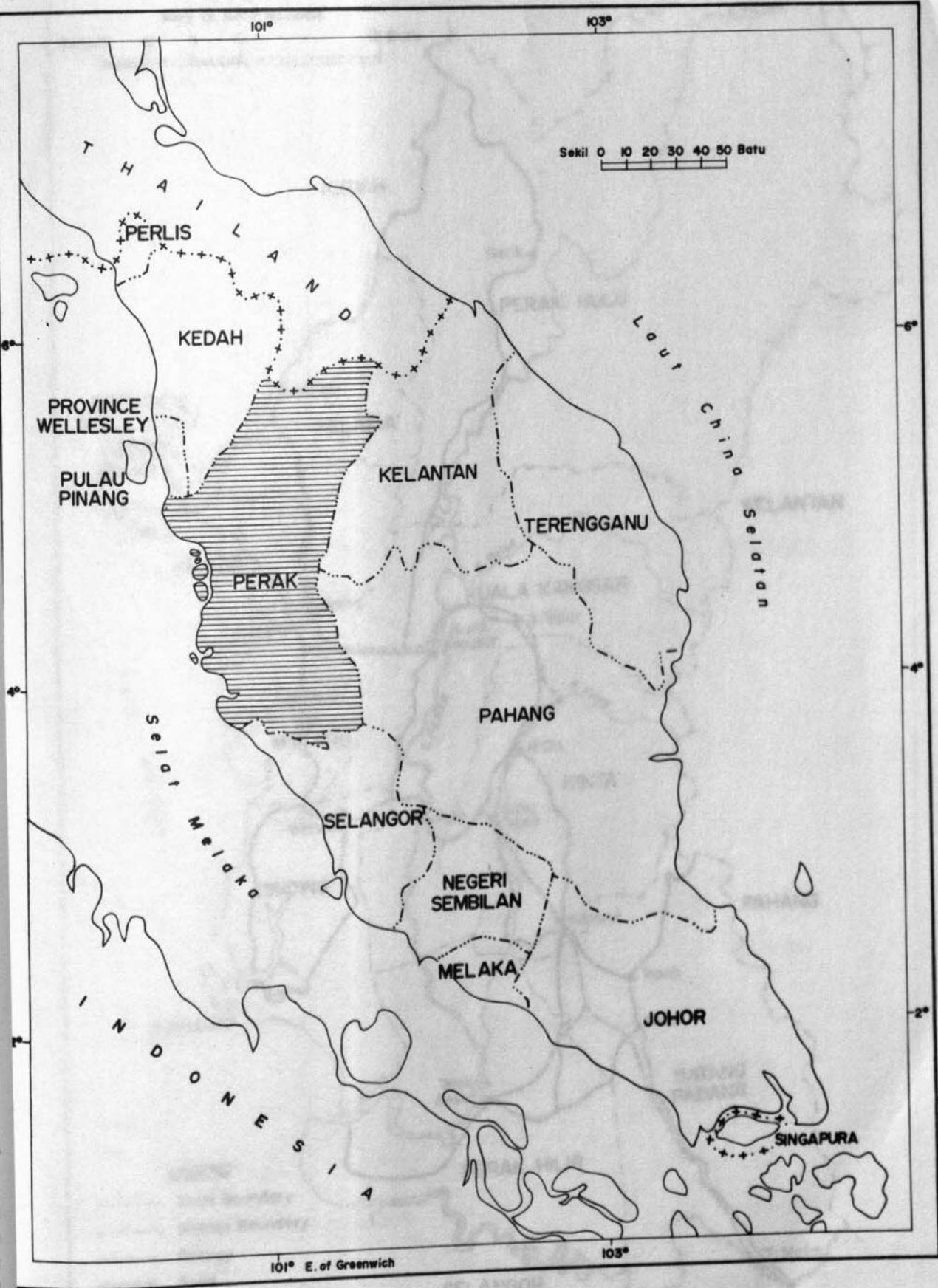


Figure 1. Location of the State of PERAK within West Malaysia.

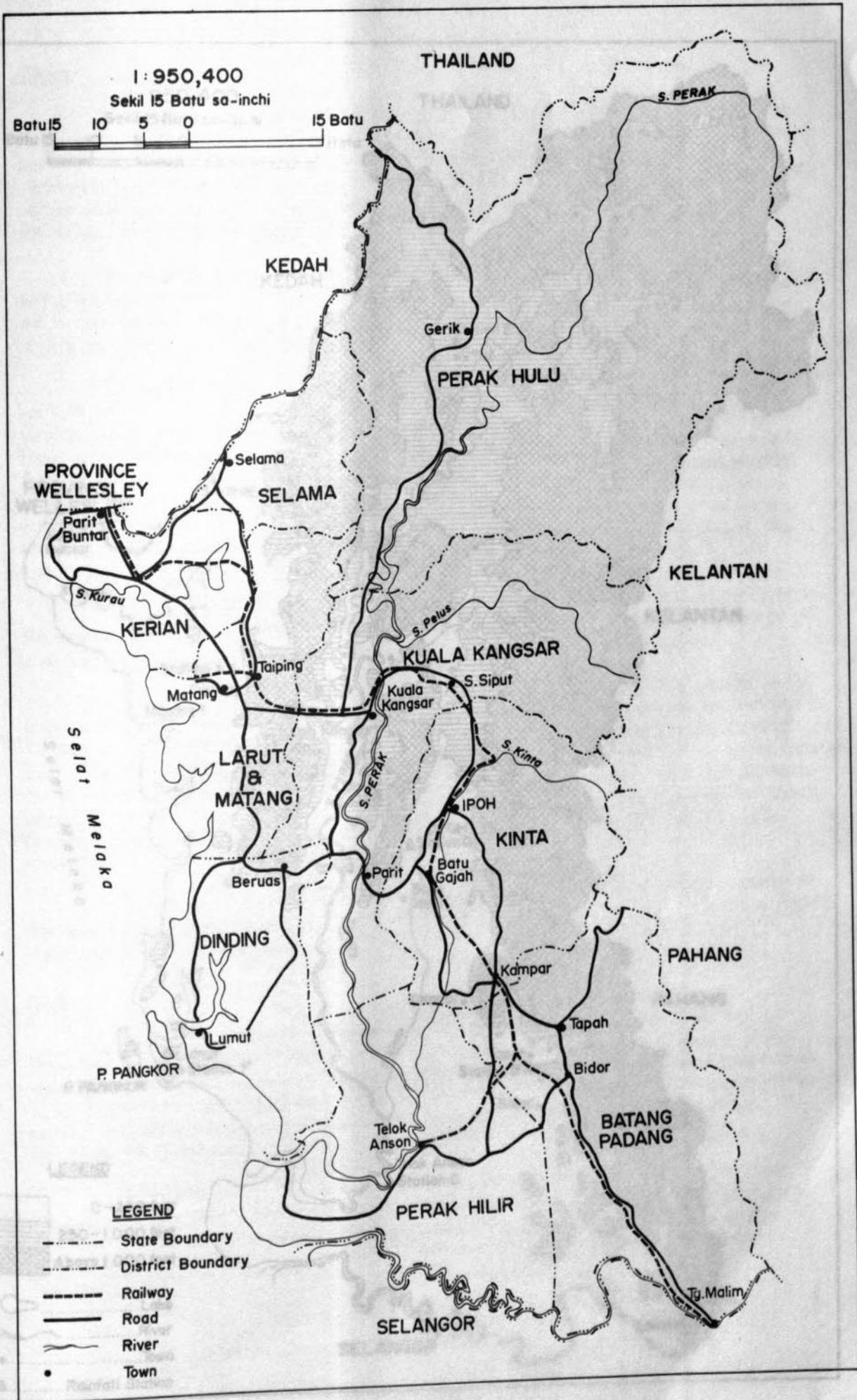


Figure 2. Map of Perak showing districts and major towns.

Climate

As elsewhere in West Malaysia the climate of Perak can be divided into seasons according to the prevailing winds. They are the north-east monsoon when air streams from the north-east blow over the State from November until October and the south-west monsoon during the prevalence of the south-westerlies from May to September. Between these monsoons are two intermonsoonal or transitional periods which coincide with April and October. During these transitional periods the winds are weak and variable in direction and sometimes calm conditions may prevail.

The rainfall regime in the State consists of two maxima and two minima. The maxima occur during the transitional periods with the October/November one being the higher maximum. Precipitation during these periods is mainly convectional and often in the form of heavy showers. The minima occur in July and February during the monsoons with July being the driest month.

The pattern of annual rainfall distribution in Perak is depicted in figure 4. A discontinuous wet belt, aligned in a north-west and south-east direction extends from north-western Perak to the vicinity of Tanjong Malim. Within the wet belt the rainfall totals are generally between 110 and 140 inches a year, while certain areas have rainfall totals in excess of 140 inches a year. For example, Maxwell's Hill located on the windward slope of the Bintang Range has an annual precipitation of 201 inches, whilst the annual total for Taiping at the foot of the Hill was 166 inches. (Ooi, 1964). A dry belt which receives less than 80 inches of rain a year covers the coastal region of the Dinding and Perak Hilir Districts and extends inland along the Sungai Perak valley to the Thai border. The rest of the State receives annual rainfall of between 80 and 110 inches.

Figure 5 shows the average monthly and annual rainfall of 6 representative rainfall stations. The rainfall pattern of two distinct intermonsoonal maxima and two monsoonal minima is depicted by all 6 stations which also show the difference in rainfall received by the different regions.

Temperatures in the State remain uniformly high throughout the year. Gerik located in the interior of northern Perak some 50 miles inland from the coast has a mean annual temperature of 80.5°F. The mean annual temperature for the highlands is comparatively lower, e.g. Maxwell's Hill (3,400 ft. a.s.l.) has mean temperature of 69.9°F (Dale, W.L., 1962). The mean monthly temperatures in the lowlands for most part of the year range between 78° and 82°F. The mean annual range in temperature is small, being 2°F-4°F only. On the other hand, the diurnal range, as is typical of the equatorial latitudes, is more pronounced as indicated by the mean daily maxima and minima of 89°F- 93°F and 69°F- 72°F respectively, for Gerik. (Ooi, J.B., 1964).

Relative humidity is constantly high in the State. The mean relative humidity recorded for the lowland region ranges between 82 and 86 per cent whereas in the highland areas the value is slightly higher, being about 90 per cent. (Ooi, J.B., 1964).

Soils

Reference to the Schematic Reconnaissance Soil Map of Perak shows that the soils in the 'Steepland' and 'Disturbed Land' areas have not been mapped. Virtually all the 'Steepland' areas which constitute over 50 per cent of the State's area are located in the hilly or mountainous regions of eastern, northern and north-central Perak. The areas under 'Disturbed Land' occupy a much smaller extent. They are confined mainly to the built-up areas and land disturbed by mining activity. The bulk of the 'Disturbed Land' is located in the Kinta Valley where tin-mining is very intense.

The soils mapped in the remaining area of the State can be grouped into sedentary and alluvial soils according to the mode of origin of the parent materials. The sedentary soils are developed on parent materials derived from in situ weathering of the underlying rocks whilst the alluvial soils are developed on parent materials that have been transported and deposited in new localities.

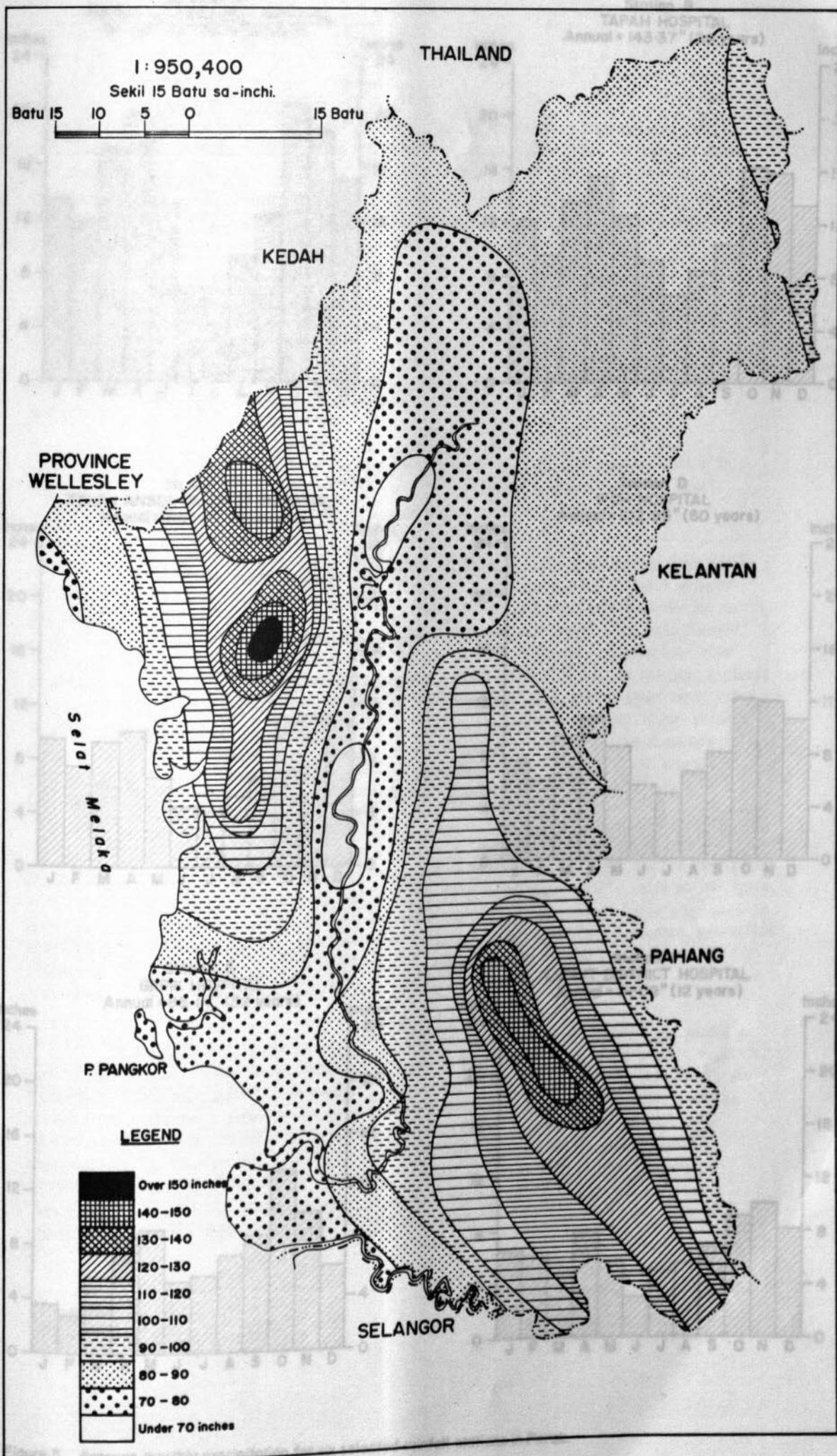


Figure 4. Mean annual rainfall distribution of Perak. (1950-1965, compiled by D.I.D.)

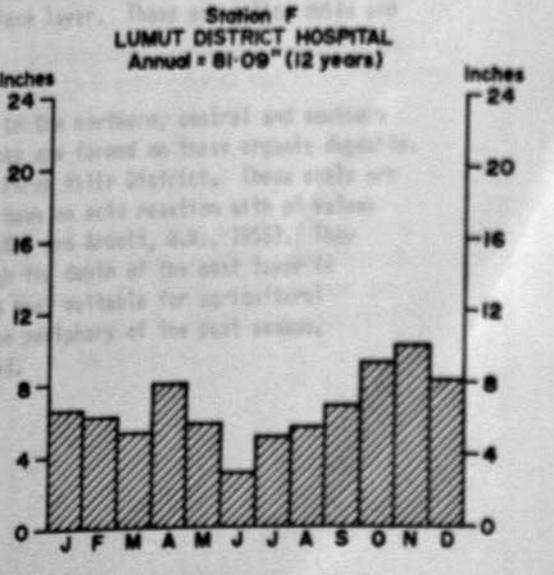
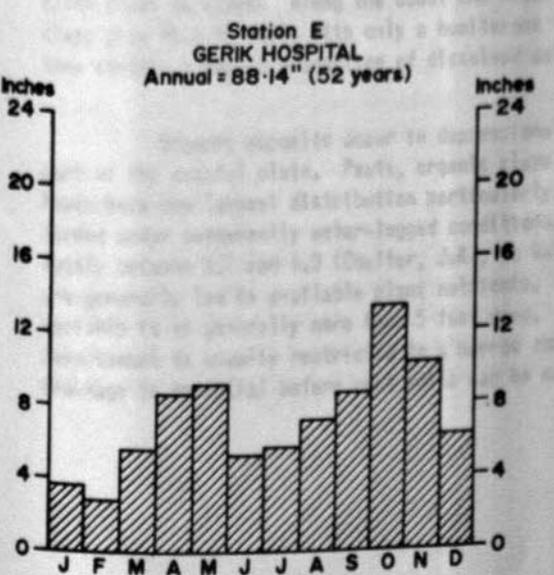
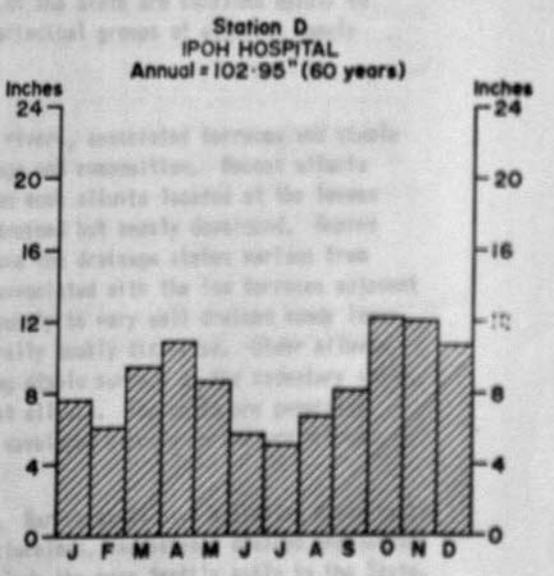
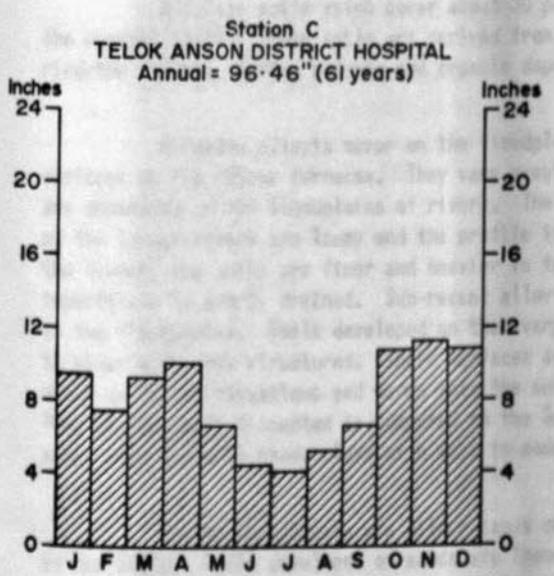
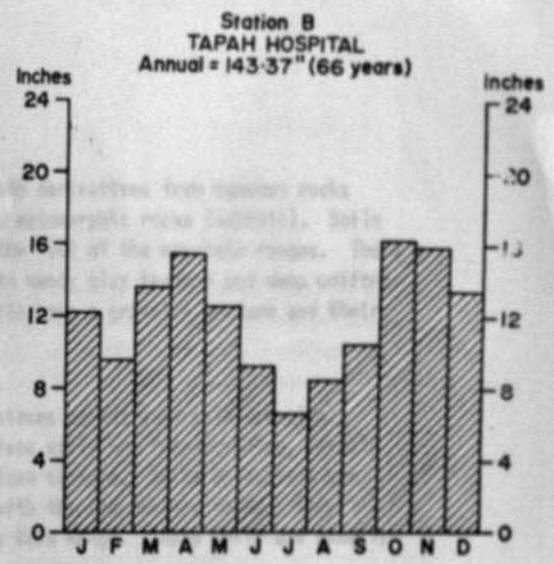
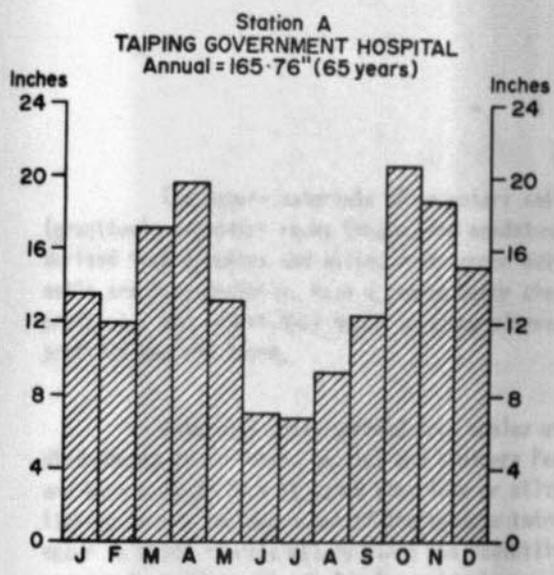


Figure 5. Average monthly precipitation for six selected rainfall stations in Perak.

The parent materials of sedentary soils include derivatives from igneous rocks (granites), sedentary rocks (shales and sandstones), and metamorphic rocks (schists). Soils derived from granites and allied rocks occur mainly at the foot of the mountain ranges. These soils are free-draining, have a coarse sandy clay loam to sandy clay texture and deep uniform profiles. But, where they occur on steep slopes the soils have a gravelly texture and their profiles are shallower.

Sedentary soils derived from shales and sandstones parent materials are widely distributed in northern, central and southern Perak. These soils are free-draining, friable and have a sandy loam to sandy clay loam or silty clay loam texture. Soils on schists are limited to the contact zones of the igneous intrusions with the sedimentary rocks. They occur on hilly terrain mainly along the foothills of the Main Range. These soils are usually moderately well developed clay loams to clays.

Alluvial soils which cover about 30 per cent of the State are confined mainly to the coastal plain. These soils are derived from three principal groups of alluvia, namely riverine alluvia, marine alluvia and organic deposits.

Riverine alluvia occur on the floodplains of rivers, associated terraces and stable surfaces of the higher terraces. They vary greatly in age and composition. Recent alluvia are deposited on the floodplains of rivers. The soils on such alluvia located at the levees of the larger rivers are loamy and the profile is well-drained but weakly developed. Behind the levees, the soils are finer and heavier in texture and the drainage status varies from imperfectly to poorly drained. Sub-recent alluvia are associated with the low terraces adjacent to the floodplains. Soils developed on them vary from poorly to very well drained sandy loams to clays with weak structures. Their surfaces are generally weakly dissected. Older alluvia occur on higher elevations and merge into the surrounding stable surface of the sedentary soils. They are markedly dissected as compared to the Sub-recent alluvia. The soils are generally sandy clay loams to sandy clays with weak to moderately developed structures and are friable.

The marine alluvia are either sands or clays. Marine sands have a limited distribution in the State. Soils developed on sands are loose, structureless, excessively drained and lacking in plant nutrients. Soils developed on marine clays include the more fertile soils in the State. They have a variable drainage status, but are usually poorly drained. These soils are generally silty clays to clays. Along the coast and river estuaries subject to tidal influence, the marine clays give rise to soils with only a humiferous top surface layer. These are saline soils and they contain a higher proportion of dissolved salts.

Organic deposits occur in depressional areas in the northern, central and southern part of the coastal plain. Peats, organic clays and mucks are formed on these organic deposits. Peats have the largest distribution particularly in the Perak Hilir District. These soils are formed under permanently water-logged conditions. They have an acid reaction with pH values mostly between 3.7 and 4.9 (Coulter, J.K., Mc Walter, A.R., and Arnott, G.W., 1956). They are generally low in available plant nutrients. Although the depth of the peat layer is variable it is generally more than 5 feet deep. Shallow peat suitable for agricultural development is usually restricted to a narrow zone at the periphery of the peat swamps. Drainage is essential before peat soils can be cultivated.

THE PRESENT LAND USE

The following is a summary of the present land use in Perak in 1966.

1. The physical area of the State was 5,185,294 acres or 8,102.0 square miles.

2. The total land use area, however, was 5,187,101 acres - a difference of 1,807 acres more than the physical area. (See note below)

General

Tin-mining was responsible for giving the initial impetus to the development of Perak. With the discovery and economic exploitation of the rich tin deposits in Larut and later the Kinta Valley, towns which were previously sited on river banks sprang up in the foothill regions as exemplified by Taiping and Ipoh. In 1966 the mining economy in Perak was still based on tin mined mainly in the districts of Kinta and Batang Padang.

Later, when the economic interest of the people extended to include commercial agriculture, large tracts of land were cleared and developed for cultivation. At first sugar cane was planted. It was replaced by coffee which in turn was replaced by rubber. Thus, the land use pattern gradually evolved over the years to that as presented on the 1966 Land Use Map of Perak.

About 50 per cent of the agricultural land use acreage in the State was mapped on the coastal plain; the agricultural development being concentrated in the districts of Krian, Dinding and Perak Hilir. With the exception of rubber, the bulk of the other major crops, namely, padi, coconut and oil palm were located primarily on the alluvial plain. Padi was cultivated extensively in areas which have been reclaimed and irrigated while coconut and oil palm covered large areas which have been drained. About 30 per cent of the State's rubber was also located on the plain, the main area being the Dinding District where extensive estates were established. Despite the fact that about half the agricultural land in Perak was located on the coastal plain, there were still large tracts of waterlogged land occupied by swamp vegetations and hence considered as undeveloped.

In the Sungai Perak Valley, padi fields occupied the flat narrow valley bottom on either side of a river, with houses and mixed fruit trees (Mixed Horticulture) strung out along the base of the hills and the crops mainly rubber occupying the slopes.

In the foothill regions, the land use pattern was more varied and intense, resulting in a juxtaposition of mining areas, grassland, rubber, tapioca, ground nut and market gardening. Where rich tin deposits had been discovered, tin-mining was the chief economic activity; hence vast areas were utilized for this purpose as found in the Kinta Valley, the Taiping area and the Batang Padang District. On the periphery of the mining areas were waste land or abandoned mining areas colonized by grasses. Arable land was mainly planted to rubber under smallholding as well as estate management. Extensive areas were also cultivated with tapioca and ground nut while market gardening was concentrated in the Kinta District.

Forests and scrub forests occupied the mountainous regions of central, northern and eastern Perak. The only area of extensive agricultural usage in northern Perak was in the vicinity of Gerik where rubber was cultivated.

Salient Statistics

The State Land Use Summary, presented as Appendix B, gives the summarised statistics of all the land use categories for the year 1966. This summary has been compiled from District Abstracts containing land use acreage counts for all the Mukims in the State. If any land use information at the mukim level is required for a more detailed study of a particular area, it can be obtained from the Land Use Section of the Department of Agriculture.

southern half of Perak, thus indicating the concentration of plantation agriculture in this part of the State.

Notes- The difference is due to the introduction of the 'crop equivalent factor' as explained in the section on the methodology of the Present Land Use Survey under Area Measurement in Tabulation.

The following is a summary of the salient features of land use in Perak in 1966.

1. The physical area of the State was 5,185,294 acres or 8,102.0 square miles.
2. The total land use area, however, was 5,187,103 acres - a difference of 1,809 acres more than the physical area. (See note below)
3. Only 19.8 per cent of the State was under agricultural use.
4. Rubber was mapped on 624,101 acres which accounted for 12.0 per cent of the State land use acreage or 60.8 per cent of the agricultural land use acreage.
5. Padi was identified on 128,746 acres, representing 2.5 per cent of the State land use acreage or 12.5 per cent of the total agricultural acreage.
6. Coconut, planted on 104,632 acres, accounted for 2.0 per cent of the State land use acreage or 10.2 per cent of total acreage under agricultural use.
7. "Mixed Horticulture" was mapped on 61,828 acres, equivalent to 1.2 per cent of the State land use acreage.
8. "Diversified Crops" occupied a total of 51,809 acres, which amounted to 1.0 per cent of the State land use acreage.
9. Oil Palm cultivation totalled 39,337 acres or 0.8 per cent of the State land use acreage.
10. There was a total of 3,266,777 acres, representing 63.0 per cent of the State land use acreage, under forest, scrub forest and scrub grassland.
11. Land totalling 613,468 acres and amounting to 11.8 per cent of the State land use acreage, was mapped as swamps.
12. Tin mining was identified on 73,401 acres of land.
13. The total area classified as urban land use was 31,311 acres.

Figure 6 illustrates the distribution of the major land use categories within Perak.

Urbanization

Urbanized land use in the State was confined to the better-developed regions where they function as administrative, trading, collecting and distributing centres. Some of the older towns originated as mining camps. Except for Ipoh, Taiping, Kuala Kangsar and Telok Anson, most of the towns are generally small. Other urbanized land include fishing villages located at intervals along the coast and kampong as well as new village settlements; these were generally of limited size and widely scattered.

The total 'Urban' land use area mapped from the 1966 aerial photographs was 31,311 acres, equivalent to 0.6 per cent of the State land use acreage. The majority of this total was distributed in eastern, central and southern Perak where virtually all the principal towns have sprung up as a result of different economic activities. The greatest degree of urban development occurred in the Kinta District where 14,890 acres representing 47.6 per cent of the total urban area was mapped. Ipoh, the State Capital is located in this district.

Estate urbanisation is the settling of workers in compact residential areas within large estates. In this survey a total of 4,420 acres of 'Estate Buildings' was mapped mainly in the southern half of Perak, thus indicating the concentration of plantation agriculture in this part of the State.

Note:- The difference is due to the introduction of the 'crop equivalent factor' as explained in the section on the methodology of the Present Land Use Survey under Area Measurement and Tabulation.

The largest acreage was located in the Parak Hill District where 1,133 acres amounting to 27 per cent of the total area under estate's administration were occupied.

The total estate acreage could be further increased if the total area occupied by hillside and related compounds within the "Mixed Horticulture" sub-category was taken into consideration, or if it shows only this sub-category that as much as 33,500 acres of land would be left vacant consisting of houses and related compounds.

Malay

There are several districts in the State which are the biggest and most productive in 1956. The largest acreage was located in the Parak Hill District where 1,133 acres amounting to 27 per cent of the total area under estate's administration were occupied. Other districts which had large acreage were ... were ...

... of this reported that in 1956 Perak's tin production, the highest in the State, amounted to 55.0 per cent of total tin output recorded in the State. ... reported that there were ... mining operations in the State which together accounted for ... of the State's output. ...

... of a total of 195,001 acres ... for estate ...

... through the mining economy ... under the sub-category "Other ... of which there were 788 acres.

Reports published by the Department of Mines (1958) stated that there were ... producing a total of 457,757 long tons of iron-ore (the fourth-highest in West ... 1,250 long tons of gold ... The land allocated for ... of the ... was 1,325 acres ...

... long tons of China Clay ... in the State in 1956.

Rubber was introduced into Perak towards the late 19th century and had since increased steadily to become the State's main ... widely distributed, being cultivated on the coastal plains, the foothill regions as well as the interior. In 1958, the land utilized by rubber was 1,053,200 acres, representing 12.0 per cent of the total area under agricultural use. The main areas were sited in the districts of Kuala Kangsar (127,308 acres); ... (101,630 acres); and Baling (81,437 acres).

The Rubber Statistics Handbook 1958 reported that estate rubber occupied 234,113 acres of land in Perak which means that the remaining 819,087 acres were smallholding rubber including those ... Thus, 37.5 per cent of the State's rubber acreage belonged to the estate sector while the remaining 62.5 per cent belonged to the smallholding sector. Of the estate sector, 51,527 acres, representing 22.5 per cent of the estate total, were occupied by immature rubber.

Available records showed that for the 1950s years from 1954 to 1955, the total acreage of estate rubber had decreased from year to year while there was a relative increase in the oil palm acreage in the State; thus, indicating a decision to interest in the replanting or new planting of rubber to the estate sector. This shift in interest is substantiated by the fact that during the same period, numerous requests were made by estate holders to the Department of Agriculture for soil suitability certificates for the conversion from rubber to oil palm in their estates. And it is further confirmed from field observation that extensive areas of estate rubber had been cleared and replanted with oil palm. Contrary-wise, the acreage in the rubber smallholding sector kept on increasing during the same period.

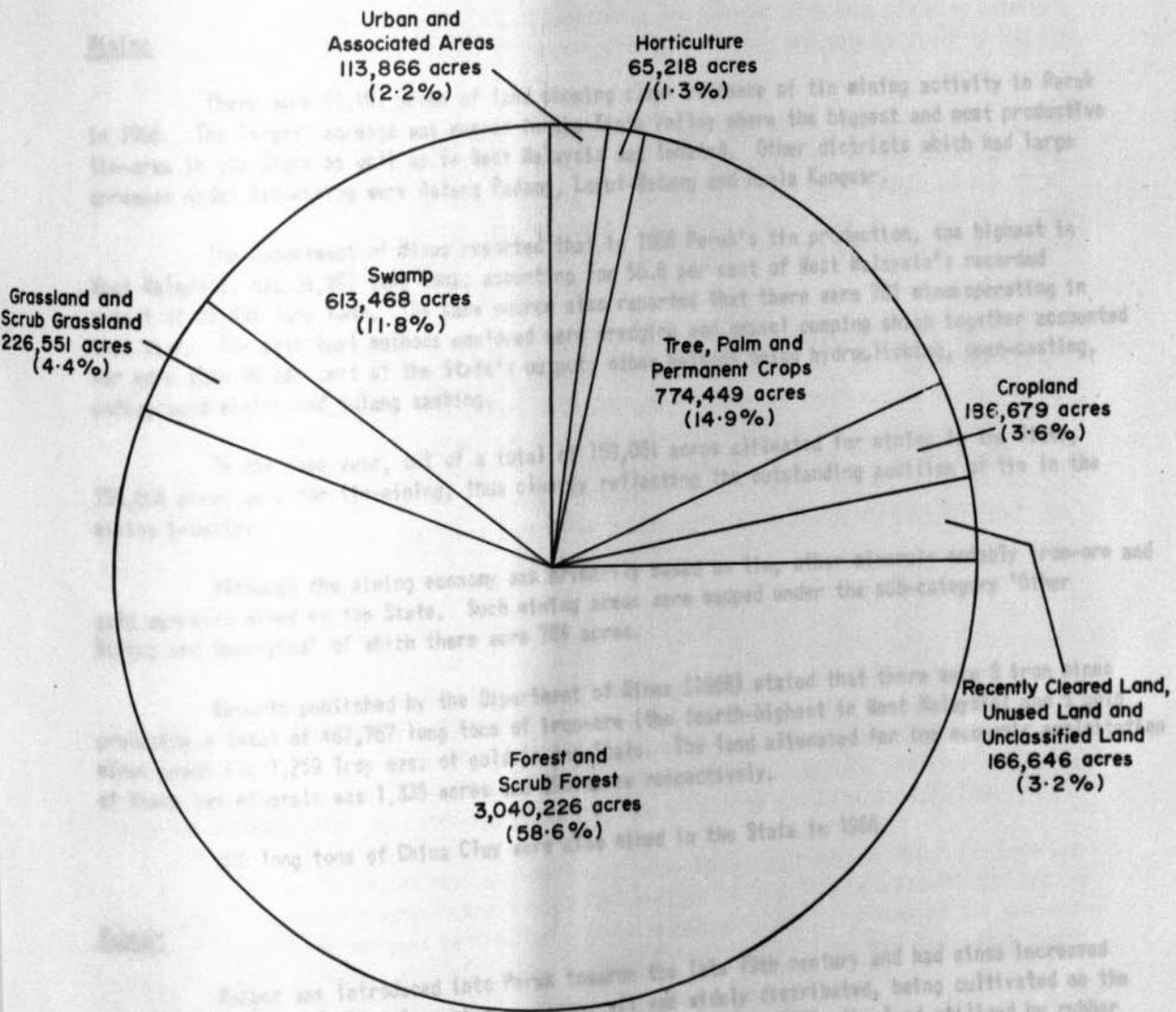


Figure 6. The proportions of major land use categories within Perak.

The largest acreage was located in the Perak Hilir District where 1,193 acres amounting to 27 per cent of the total area under estate urbanization were mapped.

The total urban acreage could be further increased if the total area occupied by buildings and related compounds within the "Mixed Horticulture" sub-category was taken into consideration, as it is shown under this sub-category that as much as 33,000 acres of land mapped in this survey consisted of houses and related compounds.

Mining

There were 73,401 acres of land showing clear evidence of tin mining activity in Perak in 1966. The largest acreage was mapped in the Kinta Valley where the biggest and most productive tin-area in the State as well as in West Malaysia was located. Other districts which had large acreages under tin-mining were Batang Padang, Larut-Matang and Kuala Kangsar.

The Department of Mines reported that in 1966 Perak's tin production, the highest in West Malaysia, was 38,991 long tons; accounting for 56.6 per cent of West Malaysia's recorded output of 68,886 long tons. The same source also reported that there were 701 mines operating in that year. The principal methods employed were dredging and gravel pumping which together accounted for more than 99 per cent of the State's output; other methods being hydraulicking, open-casting, underground mining and dulang washing.

In the same year, out of a total of 159,061 acres alienated for mining in the State, 156,865 acres were for tin-mining; thus clearly reflecting the outstanding position of tin in the mining industry.

Although the mining economy was primarily based on tin, other minerals notably iron-ore and gold were also mined in the State. Such mining areas were mapped under the sub-category 'Other Mining and Quarrying' of which there were 784 acres.

Reports published by the Department of Mines (1968) stated that there were 9 iron mines producing a total of 487,767 long tons of iron-ore (the fourth-highest in West Malaysia) and 5 gold mines producing 1,259 Troy ozs. of gold in the State. The land alienated for the economic exploitation of these two minerals was 1,335 acres and 290 acres respectively.

306 long tons of China Clay were also mined in the State in 1966.

Rubber

Rubber was introduced into Perak towards the late 19th century and had since increased steadily to become the State's number one crop. It was widely distributed, being cultivated on the coastal plain, the foothill regions as well as the interior. In 1966, the land utilized by rubber was 624,101 acres, representing 12.0 per cent of the State or 60.8 per cent of the total area under agricultural use. The main areas were mapped in the districts of Kuala Kangsar (127,388 acres); Batang Padang (101,880 acres); and Dinding (81,457 acres).

The Rubber Statistics Handbook 1966 reported that estate rubber occupied 234,113 acres of land in Perak; which means that the remaining 389,988 acres were smallholding rubber including those plantings under the direction of the Federal Land Development Authority. Thus, 37.5 per cent of the State's rubber acreage belonged to the estate sector while the remaining 62.5 per cent belonged to the smallholding sector. Of the estate sector, 54,967 acres, representing 23.5 per cent of the estate total, were occupied by immature rubber.

Available records showed that for the three years from 1964 to 1966, the total acreage of estate rubber had decreased from year to year while there was a relative increase in the oil palm acreage in the State; thus, indicating a decline in interest in the replanting or new planting of rubber in the estate sector. This shift in interest is substantiated by the fact that during the same period, numerous requests were made by estate agencies to the Department of Agriculture for soil suitability certificates for the conversion from rubber to oil palm in their estates. And it is further confirmed from field observation that extensive areas of estate rubber had been cleared and replanted with oil palm. Contrary-wise, the acreage in the rubber smallholding sector kept on increasing during the same period.

In 1966, there were 371 estates, of which 87 were European-owned and 284 Asian-owned. Among the estates under European ownership 30 were under 1,000 acres in size as compared to 269 estates (of which 233 were actually less than 500 acres in size) under Asian ownership. There were 54 European-owned estates whose size ranged between 1,000 and 5,000 acres and only 15 Asian-owned estates were in the same size range. All the 3 estates over 5,000 acres in size were owned by Europeans.

As much as 79 per cent of the estate rubber was planted with high yielding material. The average estate yield was 897 lbs. per acre - one lb. less than the average yield of 898 lbs. per acre for West Malaysia.

The estate rubber production for 1966 was 68,851 tons while the smallholding rubber production was estimated at 69,095 tons, giving a total State production of 137,946 tons - the second highest, after Johore, in West Malaysia. Thus, estate rubber which accounted for 37.5 per cent of the total rubber acreage was responsible for about 50 per cent of the State's rubber production. Since the total rubber production in West Malaysia for the same period was 900,278 tons, Perak's production accounted for 15.3 per cent of it.

In the smallholding sector, the holdings were generally well-maintained and their appearance was comparable to that of the estate. But, in some holdings, the rubber was found to be growing in the midst of tall undergrowth and rubber seedlings which has taken root from fallen seeds, thus giving the appearance of rubber intermixed with scrub or scrub grassland. In the Survey, about 800 and 650 acres respectively were mapped as rubber intermixed with scrub forest and scrub grassland. In cases where dwellings were sited within the holdings, the rubber trees around the dwellings were often interplanted with fruit, coconut or other trees and bushes.

Padi

Padi cultivation in Perak, as elsewhere in West Malaysia, is mainly a Malay interest and is practised solely on a smallholding basis in close association with the sub-category 'Mixed Horticulture'. Two types of padi are being planted in the State: Wet-padi, the dominant form, requires flooding and is cultivated on coastal and riverine locations which can easily be flooded. Dry-padi which does not require flooding is cultivated on hillsides and slopes.

Padi was the second most important crop after rubber in Perak in 1966. The Land Use Survey identified 128,746 acres, amounting to 12.5 per cent of the State's agricultural land use acreage, as land under wet padi cultivation. If it is assumed that 5 per cent of the land was occupied by bunds, ditches, shelters, etc., it would be reasonable to say that there were about 122,300 acres of pure padi land in the State.

The bulk of the padi in Perak was mapped on the alluvial plain where extensive areas equipped with modern drainage and irrigation facilities were utilised for its cultivation e.g. Sungai Manik Area, Krian Irrigation Area, Changkat Jong Irrigation Area and the land occupied by the Trans-Perak Irrigation Project. In addition, padi was also cultivated in widely scattered fields in inland valleys, particularly, in upper Perak.

The Statistical Digest of 1968 reported that in the 1966-1967 cropping season there were 102,030, 11,280 and 10,120 acres of main season wet padi, off-season wet padi and dry padi respectively in Perak. Thus, as much as 92 per cent of the padi cultivation was that of the wet variety requiring flooded fields.

Padi production in Perak for the cropping season 1966-1967 amounted to 38,079,000 gantangs (See note below) yielding 61,920 tons of rice, which accounted for 10.9 per cent of West Malaysia's recorded rice production of 567,430 tons. The harvest from the main crop which gave an average yield of 325 gantangs per acre, was 33,160,000 gantangs of padi. Offseason padi from which an average yield of 336 gantangs per acre was obtained, accounted for 3,623,000 gantangs of the total padi production. The remaining 1,296,000 gantangs were harvested from the dry padi whose per-acre-yield was recorded at 200 gantangs. Average yields for the same cropping season in West Malaysia were 389 gantangs per acre from the main crop; 457 gantangs per acre from the offseason crop and 209 gantangs per acre from dryland padi. (Statistical Digest, 1968).

Note: 1 gantang = 1 gallon 1 gantang rice = 8 lbs. rice (approx.)
 1 gantang padi = 5.6 lbs. padi 615 gantang padi = 1 ton rice.

Coconut

Two types of coconuts are being cultivated in Perak: The tall type which is more hardy and tolerant of a wider range of soil conditions, is very common in the State; its planting density is 48 palms per acre. The dwarf type, which is more sensitive to unfavourable conditions, has been introduced from Indonesia; being a smaller plant, its planting density is 90 palms per acre. Although the cultivation of dwarf coconut has increased in recent time, the tall coconut still forms the basis of the coconut industry in the State.

Orchards Coconut, mapped on 104,632 acres of land, was the third most important crop in Perak, preceded only by rubber and padi. Its cultivation was primarily on the alluvial soils of the coastal plain; the principal areas of concentration being the Bagan Datoh Peninsular in Perak Hilir District, Dinding and Krian Districts. Some fairly large coconut holdings were also found interspersed between the rubber and 'Mixed Horticulture' areas on the banks of Sungai Perak. Whereas some of the coconuts in the estates sector were interplanted with cocoa, the coconuts in the smallholding sector were often intercropped with banana, coffee, pineapple or cocoa.

In addition, coconut was also found abundantly within the sub-category "Mixed Horticulture" where it was intermixed with other crops such as banana, pineapple, arecanuts, etc. It will be shown later that about 9,000 acres of coconuts were found within this sub-category, thus raising the coconut acreage in the State to about 113,000 acres.

Published figures by the Department of Statistics (West Malaysia Oil Palm, Coconut and Tea Statistics, 1966.) show that there were 9 European-owned and 14 Asian-owned coconut estates. The total area covered by these 23 estates was 41,272 acres --- the highest as compared to other States in West Malaysia. 1,274 acres of the acreage under estate coconuts consisted of immature palms. Most of the estates were located in the Bagan Datoh Peninsular.

Pineapple Records for the three years previous to 1966 showed that the acreage under estate coconut had decreased whereas the acreage under smallholding coconut had increased during the same period. This is because some of the estates had replanted their old coconut areas with oil palms.

In 1966, production in the estate sector was 114,459,287 nuts and 21,812 tons of copra, accounting for 76.2 per cent and 78.8 per cent of the West Malaysian estate output of 150,287,000 nuts and 27,684 tons of copra, respectively. The per-acre-yield of copra in the State for the same period was 0.788 tons.

There were no statistics available for coconut smallholdings. But in view of the fact that more than 63 per cent of the coconut areas in the State consisted of smallholdings, there must be a substantial production particularly of nuts from this sector.

Oil Palm

This crop, occupying a total area of 39,337 acres, was the fourth most important crop in terms of area in Perak. This total was also the third largest acreage under oil palm in the States of West Malaysia. The bulk of the oil palm in the State was located on the right bank of the middle and upper reaches of Sungai Bernam; the largest acreage being mapped in the Perak Hilir District.

All the oil palm areas were under estate management. Figures published by the Statistics Department (West Malaysia Oil Palm, Coconut and Tea Statistics, 1966.) reported that there were 32 estates in Perak at the end of 1966; 22 of them were under European ownership while the remaining 10 were Asian-owned. Only 16 of the estates were in production, indicating that the oil palm in the remaining estates were either newly planted or still immature.

The same source also reported that there were 55,260 acres of oil palm in the State. The discrepancy between this and the figure obtained from the Survey can be explained as follows: The part of 1966 (mainly in February); hence all the young seedlings planted in late 1965 would be too small to be identified and as such would be included in the category 'Newly Cleared Land' of which there were 53,644 acres in the State. So would all the areas newly planted with oil palm during 1966 because they were most probably only cleared land at the time of actual photography. This is further confirmed by the high incidence of newly planted oil palm in the State.

21,973 acres, representing 39.8 per cent of the total of 55,260 acres were under immature stands, and hence not in production. In 1966, production from the remaining 33,287 acres of mature oil palm was 38,839 tons of palm oil and 9,829 tons of palm kernel. These figures accounted for 21.2 per cent and 23.0 per cent respectively of the West Malaysian recorded production of 183,394 tons of palm oil and 42,699 tons of palm kernel. The per-acre yields were 1.13 tons of palm oil and 0.29 tons of palm kernel, while the average yields in West Malaysia for these products were 1.16 tons and 0.27 tons per acre respectively.

Orchards

Perak is quite famous for its fruits, particularly durian from Bukit Gantang in Larut-Matang District and Parit in Kuala Kangsar District, and pomelo from Tambun in the Kinta District. In addition, other fruits such as mangosteen, duku, langsat, mandarin orange and lime were also planted in the State.

A total of 2,706 acres were mapped as orchards in the Survey. The principal areas were located in the districts of Larut-Matang (938 acres) and Kinta (735 acres). It must be pointed out that the total acreage included only those orderly-planted and well-managed orchards of two acres or more in size. For convenience of cartography, orchard areas smaller than two acres in size were mapped under other related categories, especially under "Mixed Horticulture" where mixed stands of fruit trees were also planted in a haphazard and casual manner. As it will be shown later that there were some 6,000 acres of fruit trees in the sub-category 'Mixed Horticulture', it can be reasonably stated that there were about 8,200 acres of orchards in Perak in 1966.

It was observed in the field that the larger orchards were invariably planted with durian, rambutan or a mixture of these two, while the other fruit trees were generally found in smaller orchards.

Pineapple

Pineapple-growing areas totalling 1,456 acres were mapped only in the districts of Perak Hilir (1,032 acres) and Dinding (424 acres).

This does not mean that pineapple is only grown in the above two districts. In fact, pineapple is widely distributed in Perak; it is usually grown in very small units together with other crops. Since it is not possible to identify and map such small units, pineapple occurring under such circumstances has been mapped under other related categories, particularly "Mixed Horticulture".

Sago

The sago palm usually occurs in clumps in a semi-wild state in swampy land along river banks and low-lying riverine areas. It is also found on the wetter fringes of padi-growing areas.

In Perak, sago was mapped on 1,004 acres of land, with the bulk of it being mapped in the Kuala Kangsar District.

Fish and Hyacinth Ponds

Fish and hyacinth ponds are characteristic features of the Chinese market-gardening-cum-fish-rearing landscape. The ponds are normally artificially constructed but, some may have been converted from mining pools. These ponds are usually stocked with a wide variety of carps, namely Chinese carp, grass carp, big head, silver carp and mud carp. The hyacinths growing in some of these ponds are used as pig-feed.

The survey mapped a total of 604 acres as land utilized by "Fish and Hyacinth Ponds". Out of this total, 553 acres or 91.5 per cent were located in the Kinta District.

Tea

All the tea mapped in Perak belonged to the lowland variety and were established under estate management. In 1966, there were 493 acres, occurring only in Perak Hilir and Kinta districts. In the latter district, the tea bushes were very old and inter-cropped with rubber.

The Department of Statistics reported that in the same year there were 3 tea estates - 2 under European ownership and 1 under Asian ownership - in Perak. Production for 1966 was:- 'Green Leaf' - 1,914,000 pounds; 'Made Tea' - 434,000 lbs. The per acre yields for these two were 3,681 pounds and 835 pounds, respectively. (West Malaysia Oil Palm, Coconut and Tea Statistics, 1966.)

Coffee

Arabian Coffee (*Coffea arabica*) was planted as a plantation crop in the latter part of the nineteenth century in Perak. It was later replaced by the Liberica coffee (*Coffea liberica*) because the Arabian coffee was susceptible to a devastating fungus disease. Due to poor commodity prices coffee was gradually replaced by other more remunerative crops.

Thus, the importance of coffee as a crop declined until in 1966, only 108 acres were cultivated, solely with the 'Liberica' coffee. Its cultivation was mainly confined to the alluvial clay soils of Perak Hilir District where about 92 per cent of the coffee mapped in Perak was located. All the coffee was grown in peasant holdings sometimes as pure stands but more often as an intercrop in coconut areas.

Mixed Horticulture

This sub-category is a grouping of small farm units, each cultivating an assortment of both subsistence and cash crops in a haphazard and casual manner around the house. The types of crops grown may vary from place to place depending on the geographic location, soil condition and local tradition; but the emphasis is on subsistence. The farms are generally arranged in a linear pattern alongside roads, pathways, rivers and canals. In padi-growing areas, the farms which are sited on land of relatively higher elevation, appear as "islands" of tree cultivation standing above the general level of the plain. This sub-category is also frequently found around the periphery of towns and village settlements.

Although "Mixed Horticulture" was widely distributed in Perak, occurring wherever peasant farming was carried out, it was highly concentrated in the padi-growing areas, particularly, the Krian District and along the banks of Sungai Perak which were mainly inhabited by Malays who were generally peasant farmers. The Survey mapped a total of 61,828 acres, equivalent to 1.2 per cent of the State or 6.0 per cent of the total agricultural land use acreage, as utilized by 'Mixed Horticulture'. District-wise, the largest acreage of 15,324 acres was found in Kuala Kangsar - the district with the highest Malay population in the State.

The principal crops cultivated were coconut, banana, fruit trees and tapioca; the others being sweet potato, arecanut, pineapple, vegetable, groundnut, maize, sugar-cane, yam etc. Coconut was predominantly cultivated on the coastal locations whereas fruit trees were abundant in the foothill regions. It was also noted from field checks that in areas of Chinese-concentration, the common crops were sweet potato and groundnut, while coconut, banana, fruit trees and arecanut were usually associated with the Malay-dominated areas.

In the absence of proper sample studies, a very rough estimate of the breakdown of this sub-category would be:- coconuts 15 per cent; fruit trees (durian, rambutan, mangosteen, duku and langsat) 10 per cent; banana and arecanut 10 per cent; garden crops (vegetables, spices, pineapple, groundnut, maize, sugar-cane, yams etc.) 10 per cent; buildings, footpaths, courtyards, negative land 55 per cent. Thus, according to the above breakdown, the 'Mixed Horticulture' areas in the State would be composed of approximately 9,000 acres of coconut; 6,000 acres of fruit trees, 6,000 acres of banana and arecanut, 6,000 acres of garden crops and 33,000 acres of land occupied by buildings, courtyards, footpaths and negative land.

Diversified Crops

This sub-category refers to short-term crops such as tapioca, sweet potato, banana, groundnut, maize, tobacco, chillie, yam etc., which either in combination or individually, are cultivated over reasonably extensive areas. The individual crops are not mapped because most of the time the situation is that of a number of crops of varying stages of growth, being cultivated side by side in small units or fields; and thus, it has not been possible to identify and map them separately.

A total of 51,809 acres representing 5.1 per cent of the agricultural land use acreage in Perak was mapped. The more important crops cultivated were tapioca in central and southern Perak; sweet potato and groundnut in Kinta District; and banana in Dinding and Larut-Matang Districts.

The above crops were also found in very small units within 2H "Mixed Horticulture".

Tapioca: This was the most extensively cultivated short term crop after padi in Perak; its 1966 estimated total area of 35,000 acres was the largest in West Malaysia. The principal areas were located in the districts of Batang Padang, Perak Hilir, Dinding, Kinta and Kuala Kangsar. Quite a large portion of the State's tapioca was cultivated on a rotation or shifting basis by squatters on State land, mining reserves and forest reserves. In fact, about 25,000 acres, representing some 72 per cent of the total tapioca acreage in Perak, were illegally cultivated. (Aw Yong, K.K. et al 1967).

In 1966 there were 17 flour mills and 29 chip mills concentrated in Sungai Siput, Chenor and in Perak Hilir District. The estimated production of tapioca roots was 3,555,320 pikuls; flour products, 462,110 pikuls; chips, 499,380 pikuls and tapioca refuse, 1,017,686 pikuls - the monetary value of all these was about \$18 million. (Aw Yong K.K. et al 1967).

Banana: This crop is commonly cultivated in the State, particularly in the districts of Dinding and Larut-Matang where it occurs as pure stands in smallholdings or intercropped with young rubber. But its cultivation is seldom in large enough homogeneous blocks for it to be mapped on the 1:25,000 photography. It is thus not included in the legend and consequently unaccounted for in the acreage statistics.

Nevertheless, this crop has been observed to occur commonly under the following situations:-

1. As a cash crop in newly-cleared jungle areas.
2. As a catch crop in young rubber areas.
3. Within "Mixed Horticulture" areas.
4. Around dwellings in estate settlements and new villages.
5. Within "Diversified Crops" areas.
6. Within coconut smallholdings.

Market Gardening

'Market Gardening' refers to the growing of vegetables and other related short term crops for sale. It is a highly intense form of agriculture practised virtually by Chinese farmers only. Sometimes this practice is combined with pigs, fish or poultry rearing.

In the Survey, the total area mapped under 'Market Gardening' was 3,007 acres. The largest acreage of 'Market Gardening', not surprisingly, was located in the Kinta District which contained about 48 per cent of the State's urban land use acreage. In this district there were 1,809 acres, representing more than 60 per cent of the total 'Market Gardening' areas in Perak. It was observed during field checkings that market gardening was quite often practised on mined-over land. Other main areas were mapped in the Perak Hilir and Larut-Matang Districts where the large urban population gave rise to demands for the vegetable produces.

*1 Pikul = 100 katies or 133 1/3 lbs.

It should be noted that this total included only those areas of 'Market Gardening' that were two acres and larger. But areas of 'Market Gardening' smaller than two acres in size also occurred quite commonly in the State. Due to their small size, such areas were mapped under other related categories, especially under 'Mixed Horticulture' where vegetables and spices were also found to be cultivated on a subsistence basis.

Shifting Cultivation

This is a form of agriculture practiced by the aborigines whose natural habitat is the higher slopes of the mountain ranges. Known locally as 'ladang' cultivation, it involves the selection and clearing of forest sites, planting crops such as hill padi, tapioca, banana, maize, etc., on them, and subsequently abandoning the sites when the soil is depleted of its fertility after 2 or 3 harvests. The aborigines then move to new sites and the same process is repeated. On the air-photos, the stamp of shifting cultivation can be recognised by patches of cultivated clearing and regenerating vegetation, distributed disorderly in an otherwise forested area.

Shifting cultivation in the State was concentrated in its distribution to upper Perak, particularly in Perak Hulu District. A total of 6,124 acres accounting for 0.6 per cent of the total area under agricultural use was mapped as land utilized for shifting cultivation. This total included only those areas that were actually in use, while the abandoned areas were mapped as grassland, scrub grassland or scrub forest, according to the vegetative cover.

Forest, Scrub Forest, Scrub Grassland and Swamp

The above non-agricultural sub-categories together occupied a total of 3,880,245 acres, representing 74.8 per cent of the State area. The bulk of this total comprising mainly forests and scrub forests was located in the mountainous regions in eastern, northern and north-central Perak where extensive areas were mapped under these sub-categories.

Forest (dryland) alone accounted for 2,845,026 acres or 54.8 per cent of the State area. The largest acreages were mapped in the inland districts of Perak Hulu, Kuala Kangsar and Batang Padang in that order.

Land covering some 195,200 acres, representing 3.8 per cent of the State, was mapped under the sub-category 'Scrub Forest'; whose main areas were mapped in the above inland districts where 'Scrub Forest' generally occurred at the edge of pure forests. This sub-category, apart from comprising different stages of regenerating forest also included poorly-maintained or abandoned rubber areas (about 12,000 acres) and other crop areas colonised by shrubs and bushes.

A total of 226,551 acres, equivalent to 4.4 per cent of the State, was classified as 'Scrub Grassland'. This sub-category was widely distributed and some of the areas mapped were quite extensive. 'Scrub Grassland' had a varied occurrence: it occurred commonly and extensively on the periphery of mining areas; within or in close association with cropland areas as fallow land or land laid waste or abandoned because of mineral exhaustion, particularly in the tapioca growing areas; in the intermediate zone between the developed areas and forests/scrub forests.

The swamp category includes those low-lying areas subject to occasional inundation and those areas covered with water all the year round. Although large areas of swampland had been reclaimed for agriculture, swamps still covered vast stretches of the alluvial plain in western and south-western Perak. The total area mapped under swamp (both coastal and inland) was 613,468 acres or 11.8 per cent of the State. District-wise, the largest acreage was mapped in the Perak Hilir District. This sub-category also included swamp areas which had been unsuccessfully developed for agriculture, e.g. abandoned padi land covering some 3,468 acres were mapped as swamp.

Batu 15

10

5

0

10 Batu

INDEX OF AERIAL PHOTOGRAPHY AND 1:25,000 LAND USE MAPPING

Photography

Aerial photographs at the scale of 1:25,000 taken in 1966 form the basic tool of this Survey. Hence it is thought desirable that the reader be made aware of the photographic coverage of Perak. The original films of this coverage are lodged with the Directorate of National Mapping and prints can be made available to authorised bodies who may require them for carrying out a closer inspection of a particular area.

There are about 2,639 overlapping aerial photographs covering the State of Perak. This coverage is represented by an index (Figure 7) which depicts the position of every 5th photograph, the flight line position and the negative film roll number containing a particular line. For example, the photographs stereoscopically covering Ipoh Town in figure 8 would be referred to as, Roll C-4, Line 28S, Photos 47, 48, 49 and 50. The State is covered by 41 north-south lines approximately 2.5 miles apart. The lateral overlap of these lines is approximately 30 per cent with the strip width of a single line being about 3.5 miles. The photographs along the flight lines overlap by about 55 to 65 per cent which means that the principal points (centres) of the photographs are approximately 1.4 miles apart.

Each aerial photograph measures 9" x 9" and covers an area of approximately 12.6 square miles. Since the lateral and forward lap are necessary to achieve stereoscopic effect, it means that each photograph only "gains" approximately 2.8 square miles of the stereoscopic coverage.

It should be noted that the aerial photographs covering Ipoh were taken at different times during the year 1966. A record of the actual dates and times of exposures for all the photographs is kept in the Land Use Section, Department of Agriculture, Kuala Lumpur.

Mapping

Figure 8 is the index of the 1:25,000 land use mapping which conforms in layout to the National Topographical Series L8010 at the same scale. It is a breakdown of the 1 inch to one mile series with the general case being six 1:25,000 sheets to one of the 1 inch to one mile sheets. Perak is covered by 135 of these 1:25,000 sheets.

Flight line number

Film roll number

Photograph number

Scale of photography

1 : 950,400

Sekil 15 Batu sa - inchi

Batu 15 10 5 0 15 Batu

Sekil 15 Batu sa - inchi

PANGKOR

P PANGKOR

LEGEND

- Flight line number..... L - 8
- Film roll number..... C - 43
- Photograph number..... 195
- Scale of photography..... 1 : 25 000

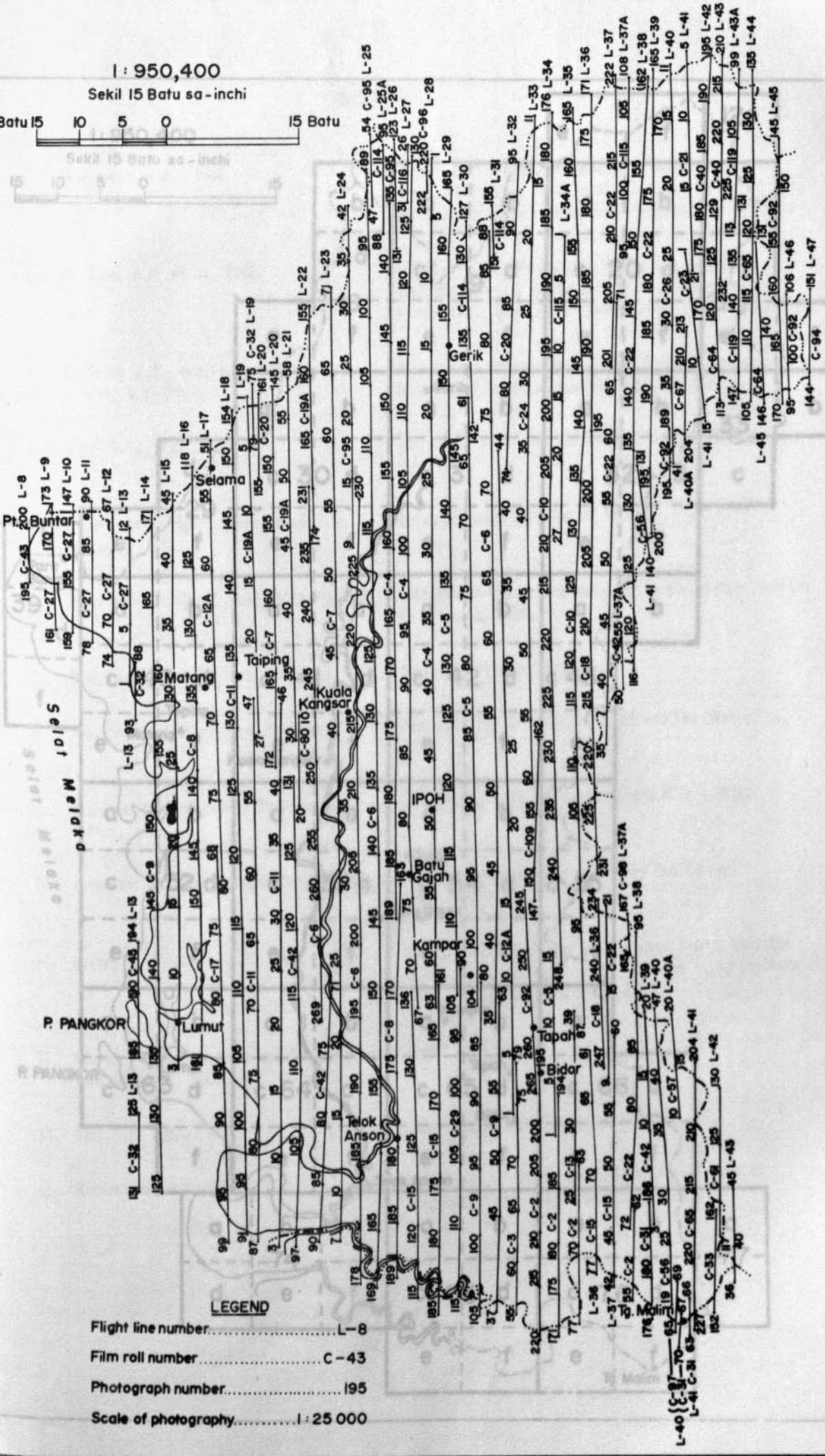


Figure 7. Index of 1966 aerial photography for Perak.

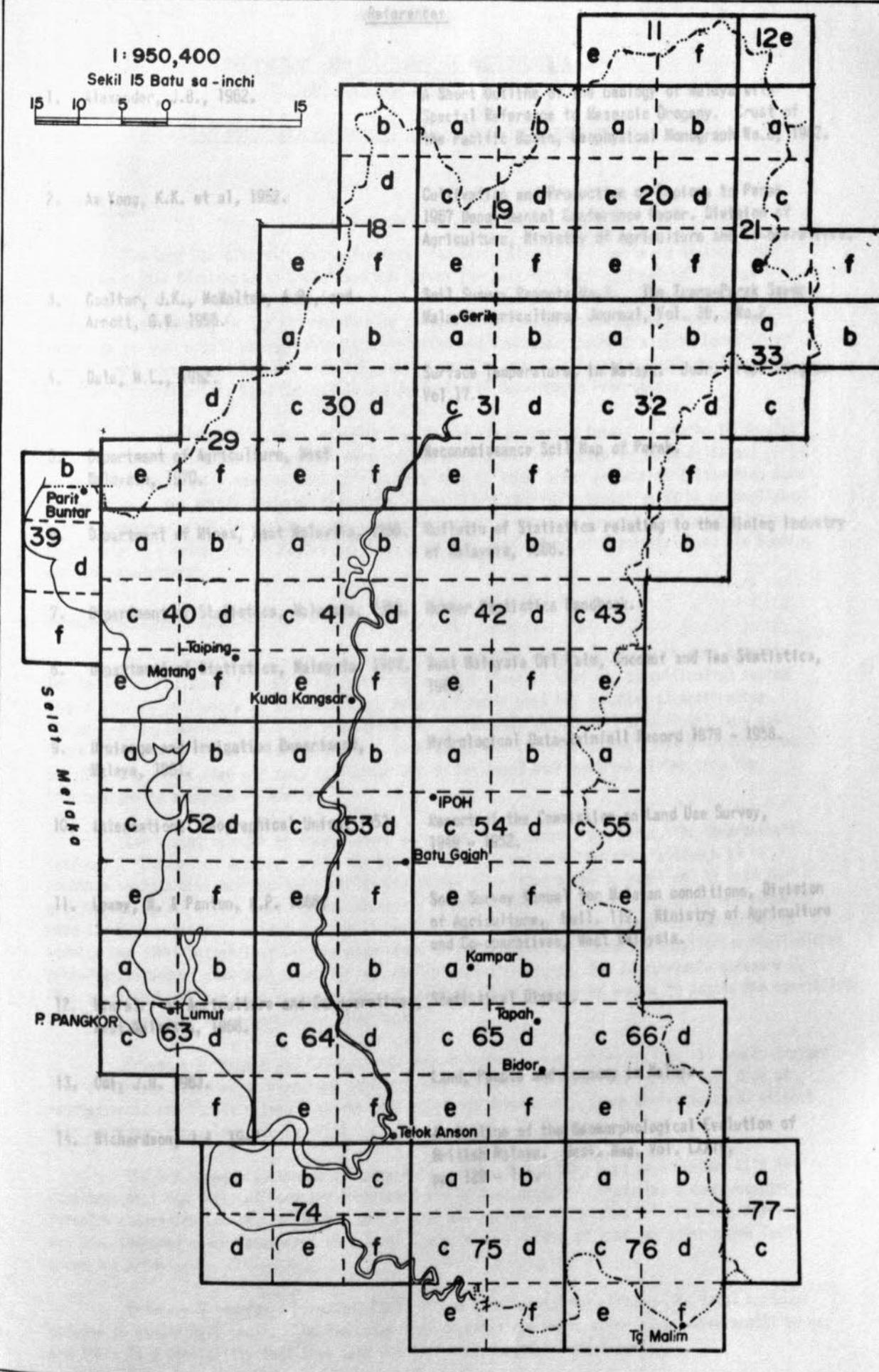


Figure 8. Index of 1:25,000 land use mapping for Perak.

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Category 5 "Improved Permanent Pasture" has been maintained although the total national acreage is exceedingly small. The few areas that do exist are being grown on an experimental basis, and there is a possibility that this land use type will expand in the future.

A detailed explanation of the Classification Legend follows.

APPENDIX A

THE PRESENT LAND USE SURVEY OF WEST MALAYSIA
THE LAND USE CLASSIFICATION LEGEND

1. Settlement and Associated Areas
For the Interpretation of 1:25,000 Aerial Photography

Introduction

The Land Use classification, developed for West Malaysia, is one based on the format presented by the Commission on World Land Use Survey for international application. It has been modified to more precisely meet the requirements of Land Use as found in West Malaysia, while still conforming to the internationally recognized and established system. The obvious advantage is that actual photographic interpretation and subsequent mapping will be immediately readable and understandable to a wide and growing group of specialists continually dealing with Land Use Classification, Land Capability and Agricultural Development Programmes.

The development of the classification legend now presented took five months to develop during which time preliminary legends were applied on a production basis to three different areas in West Malaysia, while reconnaissance trips were made to other areas possessing distinctive land use patterns. The writer believes that this legend allows photointerpretation to be accomplished with the minimum of deliberation, keeps field checking to a minimum, and yet enables the identification of all categories necessary for the subsequent compilation of meaningful Land Use Mapping and area measurement.

Classification Modifications

In developing the system of classification used for mapping land use in West Malaysia, two important requirements have been kept in mind. The first is that any classification system should conform as closely as possible to an internationally used and accepted classification. The second requirement is that any classification system must include all significant land use types found within the area for which it is to be used. It is believed that this classification embodies these qualities and only in a minor way do the local modifications differ from the internationally accepted framework.

Two slight changes in nomenclature were considered necessary. First, the Commission's category 6 "Unimproved Grazing Land", has been re-named "Grasslands" because, although it is possible to interpret and map areas of low vegetative cover that might or might not be used for grazing, it is not always possible to accurately determine whether or not these areas are actually used for this purpose. In fact most small herds of cattle graze within and on the boundaries of some of the other categories; e.g. on road right of ways, within settlement areas, inside smallholding rubber areas and on some padi areas during the "offseason". Second, the Commission's category 9, "Unproductive Land" has been re-named "Unused Land" as it is considered unwise to negate the possibility of future use under hitherto unknown practices.

Category 8 "Swamps and Marshes" has been enlarged in concept to include all poorly drained land exhibiting seasonal or permanent waterlogging. It seems illogical to include this type of vegetation in the forest category as its very existence depends on a swamp environment and without this condition it would cease to exist.

The sub-categorisation of category 7 "Forest Land" has been kept to a minimum with the knowledge that the National Forestry Department are in fact presently executing a comprehensive forestry classification interpretation on the same photography. "Shifting Cultivation", however, has been included under Category 4 (Cropland) since this is a form of land use under which food crops are produced.

Category 5 "Improved Permanent Pasture" has been maintained although the total national acreage is exceedingly small. The few areas that do exist are being grown on an experimental basis, and there is a possibility that this land use type will expand in the future.

A detailed explanation of the Classification Legend follows.

The complexion of this sub-category changes according to geographical location, soil condition and local conditions. THE LEGEND The essential feature is always diversification and the activity is intense and focused around the family unit.

1. Settlement and Associated Non-Agricultural Lands (Shades of Red)

1U: Urban and Associated Areas

The truly built-up areas of cities, towns, kampongs, including associated and surrounding parks and open spaces, detached industrial sites, settlement areas, reservoirs, etc. Areas obviously in the process of urban development showing evidence of a road pattern and house lots but presently without buildings are also included. Fringes of urban centres, strip development and most kampongs may be included in sub-category 2H "Mixed Horticulture" if more than 50% of the land is under horticultural use.

1E: Estate Buildings and Associated Areas

All areas of estate housing, schools, hospitals, administrative buildings and recreational land. When groups of these exceed two acres they are interpreted but individual and isolated buildings occupying less than this acreage are ignored.

1T: Tin Mining Areas

All areas previously laid waste and devoid of vegetation, areas being worked at present, and cleared land obviously designated for tin mining. Within these areas all water bodies greater than two acres are identified and given the code (W).

1X: Other Mining Areas

All other areas showing mining activity other than for tin.

1P: Power Lines

Power lines or transmission lines of a width greater than one hundred feet are interpreted where they interrupt the land use of the areas they traverse. If there is no disruption of the land use activity the presence of a power line is ignored; e.g. a wide power line crossing a block of padi may not prevent the homogeneous development of the padi area. When a transmission line traverses and interrupts the continuous activity of a sub-category then the actual land use of the line is indicated in parenthesis; e.g. 1P(6) would indicate a power line swath with a ground cover of grassland.

2. Horticultural Lands (Shades of Deep Purple)

2H: Mixed Horticulture

This is a very wide and extensive sub-category including all the typical diversified "garden cultivation" found in a haphazard fashion around a family unit. It may be better visualised if it is realised that the terms, "Dusun", "Minor Cultivation", "Domestic Cultivation" and "Domestic Horticulture" were all considered as possible descriptions.

The essential basis is the family settlement unit with emphasis on the production of diversified crops for family needs with the possibility of small surpluses being sold locally. Included are mixed vegetables, yams, tapioca, chillies, pine-apples, fruit trees, bananas, papayas, coconuts etc.

Sago Pala

Aresamit Pala

- 3X: Orchards The complexion of this sub-category changes according to geographical location, soil condition and local traditions but the essential feature is always diversification and the activity is intense and focused around the family unit.

Often this sub-category, although existing, is completely overshadowed by the importance of the activity within which it exists. For example, if it is present in small patches within an area of intense smallholding coconuts, then the area will merely be designated as coconuts. Also, where units of more than two acres of other sub-categories appear with a background of "Mixed Horticulture", they are then, of course, separately identified. It is not uncommon to find twenty-acre lots of smallholding coconuts, rubber and orchards within and on the periphery of "Mixed Horticulture".

- 4P: Padi The most common location is along roads, waterways and on the better drained sites of padi areas. Frequently this type forms buffer strips between estate and smallholding crops.

- 4C: Diversified The interpreter's decision to designate an area as 2H is taken when homogeneous units of other sub-categories are not discernible and the intense land use activity is focused around rural settlement. Mixed tree crops (often very dense) intermingled with small garden plots, footpaths and housing are the cumulative criteria necessary for designation as 2H.

- 2M: Market Gardening Areas where the obvious emphasis is on the commercial production of fresh vegetables. The pattern is that of intense neatness and use with individual units being small. These areas should not be confused with the larger areas of "Diversified Cropland" (4C) where the individual units are bigger and "high" crops such as tapioca, sugar and maize are obvious.
- Most market garden areas occur in or near large urban centres or in mountain areas favourable to temperate zone crops. In these latter areas, category 2M includes commercial flower gardens.

- 2E: Government Agricultural Stations

3. Tree, Palm and Other Permanent Crops (Shades of light purple)

- (The following sub-categories cover crops at all stages of growth and under various forms of management).
- 3G: Rubber
- 3O: Oil Palm
- 3C: Coconut
- 3N: Pineapple (Only commercially grown pineapple, sometimes by smallholders in conjunction with coconuts and principally for the canning industry).

NOTE:

- 3K: Coffee
- 3T: Tea
- 3A: Cocoa
- 3P: Pepper
- 3S: Sago Palm
- 3R: Arecanut Palm

3X: Orchards (Rambutan, Durian, Citrus, Clove, Nutmeg, etc.)

3H: Fish and Hyacinth Ponds - (Excluded are some old tin excavation ponds often stocked with fish).

When two of the crops mentioned above are found growing in a mixed fashion the area is designated by the number 3 followed by the letter of the tree or palm crop and then by the ground crop; e.g. 3CK describes an area of coconuts with intensive coffee cultivation beneath the coconuts.

4. Cropland (Shades of Brown)

4P: Padi

Double and single cropping padi areas.

4C: Diversified Crops

This sub-category covers a wide range of crops growing in reasonably large areas although the individual units (fields) may be quite small (3 to 20 acres). The size of the fields make it difficult to interpret the actual crop, especially when the same crop may be present at different stages of maturity within a mixed crop area which may also contain areas of fallow. Crops found in this sub-category are almost entirely annual with tapioca occupying the largest acreage. Other crops include maize, sugar, bananas, yams, sweet potatoes, tobacco etc.

NOTE:

Bananas appear in small units within this sub-category. It should however be realised that the bulk of the country's bananas grow within 2H "Mixed Horticulture" and in conjunction with young smallholding rubber. Within these areas they cannot be separately delineated at the present interpretation scale.

Within Malaysia bananas are not grown on a large scale commercial basis. If bananas did appear in large "plantation" areas, they would naturally be included under category 3.

4X: Shifting Cultivation

Shifting cultivation also referred to as "ladang" cultivation, describes an activity carried on by the Aborigines where primary forest areas are selected for cultivation, then cleared and planted with crops, and finally abandoned after a year or two as the soil loses its initial fertility. The most common crops planted are, upland rice (hill padi), tapioca, sweet potatoes, yams and maize. General areas of shifting cultivation are recognized by the cell-like appearance of small clearings in various stages of regenerating vegetation as well as newly cleared ladangs. Only the areas presently in use are identified and areas previously in use, but now abandoned, are identified according to the present vegetative cover. The sizes of these clearings vary between three and twenty acres.

NOTE:

It must be realised that many of the crops found in categories 3 and 4 are also found in small uninterpretable areas (less than 2 acres) within the collective sub-category 2H "Mixed Horticulture". Often the cumulative acreage of these crops within 2H "Mixed Horticulture" can be considerable.

5. Improved Permanent Pasture (Hatched Yellow)

The category at present covers an extremely small proportion of the country. But it is a category with possibilities of expansion. It includes land where selective grasses are being grown for grazing and for the production of marketable fodder.

NOTE:

6. Grasslands (Yellow)

Because of the difficulties created by detailed interpretation combined with the relative unimportance of this Category, it has been decided not to sub-categorize and so this Category includes areas of Lalang, Unimproved Coarse Pasture and Scrub-Grassland. The general appearance of the Category is grassland and areas are only included when shrubs and trees (generally below 15 feet) cover less than 50% of the area. When the scrub component covers more than 50% of an area it is designated as 7S "Scrub Forest".

Lalang, often occurring in "sheets" over extensive areas comprises an important part of this Category as do the grasses inhabiting the beach ridges ("permatang") of the east coast.

It is not always possible to accurately determine which areas within this Category are actually used for grazing and therefore it should be remembered that the title "grassland" does not imply an area of grazing. Only in a few local areas of the country are cattle intentionally grazed within this Category, which for the most part, is devoid of cattle.

Areas of grassland appearing in Urban (1U) and having no apparent recreational use are mapped in this Category.

Areas of grassland or scrub grassland appearing on erosion scars or on landslides are designated 6E.

7. Forest Land (Shades of Green)

7F: Forest

All dryland forests are present in this sub-category. It includes all primary forests and secondary forests or high "belukar", above about 15 feet in height. In a few areas the symbol 7F (R) denotes reforestation, afforestation and "treated" forests.

7S: Scrub Forest

This sub-category is used when more than 50% of an area is covered by shrubs, bushes, and young or dwarf trees, having a height of less than approximately 15 feet. It includes a) low "belukar", or secondary growth, which is in the first stage of regeneration of mature forest, and b) scrub vegetation whose occurrence is due to edaphic factors, such as the xerophytic scrub of the dry permatang.

Normally 7S would also include the dwarf Montane and Sub-Montane Forest growing on the thin soils of mountain summits and ridges of the interior. In these areas of primary forest this edaphically controlled dwarf scrub forest is not mapped. This is the only sub-category of land use that is mapped discontinuously, the reason being the unjustifiably high cost of mapping this relatively inconsequential type and also because a comprehensive forestry interpretation is being carried out by the Forestry Department.

1. Settlements and Associated Non-Agricultural Land (Shades of Red)

NOTE:

If no agricultural land use activity is present on a complete map sheet, the entire sheet is not interpreted and therefore not mapped. These areas are mostly in the interior of the country where natural montane dwarf vegetation is found. Hence considerable areas of this vegetation type are excluded by this survey.

2. 7C: Recently Cleared Land (Shades of Deep Purple)

These are recently cleared areas where there are no indications as to the future land use. For convenience these areas have been placed within the forest Category but it should be realised that they are not necessarily always areas cleared from forest; e.g. areas cleared from older rubber awaiting replanting into oil palm would come under this sub-category. These areas are recognized not only by a very "clean" appearance, but also by the presence of felled trees and traces of burning.

8. Swamp, Marshland and Wetland Forests (Blue-Green)

This category includes all poorly drained land exhibiting seasonal or permanent waterlogging. Wetland Grass and Forest Associations (including Mangrove, Nipah and Gelam) occur in this category, as well as Wetland Forest areas which have been recently cut-over.

9. Unused Land (Grey) (Rambutan, Durian, Citrus, Cloves, Soursop, etc.)

4. Cropland All areas, which by present practices, are unproductive; e.g. riverine and coastal beaches, mudflats, exposed rocks, cliffs, etc.

- 4P : Padi
- 4C : Diversified Crops
- 4X : Shifting Cultivation

5. Improved Permanent Pasture (Hatched Yellow)

6. Grassland (Yellow)

- 6 : Lalang, Unimproved Coarse Pasture and Scrub-Grassland.

7. Forest Land (Shades of Green)

- 7F : Forest
- 7S : Scrub Forest
- 7C : Recently Cleared Land (Black Hatching - No Colour)

8. Swamp, Marshland and Wetland Forests (Blue-Green)

- 8 : Wetland Grass and Forest Associations, including Mangrove, Nipah and Gelam.

9. Unused Land (Grey)

THE PRESENT LAND USE SURVEY OF WEST MALAYSIA
CONCISE FORM OF THE PRESENT LAND USE CLASSIFICATION LEGEND

For the Interpretation of 1:25,000 Aerial Photography

1. Settlements and Associated Non-Agricultural Lands (Shades of Red)

- 1U : Urban and Associated Areas
- 1E : Estate Buildings and Associated Areas
- 1T : Tin Mining Areas
- 1X : Other Mining Areas
- 1P : Power Line Right of Ways

2. Horticultural Lands (Shades of Deep Purple)

- 2H : Mixed Horticulture
- 2M : Market Gardening
- 2E : Agricultural Stations

3. Tree, Palm and Other Permanent Crops (Shades of Light Purple)

- 3G : Rubber
- 3O : Oil Palm
- 3C : Coconut
- 3N : Pineapple
- 3K : Coffee
- 3T : Tea
- 3A : Cocoa
- 3P : Pepper
- 3S : Sago Palm
- 3R : Arecanut Palm
- 3X : Orchards - (Rambutan, Durian, Citrus, Cloves, Nutmeg, etc.)
- 3H : Fish Ponds

4. Cropland (Shades of Brown)

- 4P : Padi
- 4C : Diversified Crops
- 4X : Shifting Cultivation

5. Improved Permanent Pasture (Hatched Yellow)

6. Grassland (Yellow)

- 6 : Lalang, Unimproved Coarse Pasture and Scrub-Grassland.

7. Forest Land (Shades of Green)

- 7F : Forest
- 7S : Scrub Forest
- 7C : Recently Cleared Land (Black Hatching - No Colour)

8. Swamp, Marshlands and Wetland Forests (Blue-Green)

- 8 : Wetland Grass and Forest Associations, including Mangrove, Nipah and Gelam.

9. Unused Land (Grey)

AREAS TAKEN FROM THE 1:25,000 AERIAL PHOTOGRAPHS	AREAS
STATE AREA	21,511,840
LAND UNDER AGRICULTURAL USE	10,200,000
PHYSICAL AREA	11,311,840

APPENDIX B

LAND USE SUMMARY OF PERAK

Land use acreage and percentage figures for each of the nine districts as well as the State of Perak have been summarised and tabulated in table B.1. The table also indicates the area and the percentage of the State under agricultural use. In addition, the categories under agricultural use and their sub-categories are presented as percentages of the total area under agricultural use.

Supplementary information viz. area of West Malaysia (national area) as per Directorate of National Mapping and the population figures for West Malaysia and Perak as per Statistics Department June 1966 estimates are also included in the table. With these extra information, the followings have been computed:- a) the percentage coverage of Perak to that of West Malaysia, b) the population of Perak as a percentage of the total West Malaysian population, c) population densities of the State and of the agriculturally used land.

The total land use acreage and the physical area of the State are based on the measurement of all land areas indicated on the 1:25,000 aerial photographs taken in 1966.

3A: Cocoa	
3B: Pepper	
3C: Sage	
3D: Areca nut palm	
3E: Pita & Hyacinth Ponds	
3F: Orchards	
4: Padi	
4C: Diversified Crops	
4X: Shifting Cultivation	
5: Improved Permanent Pasture	
6: Grassland	
7F: Forest	
7S: Swamp Forest	
7C: Swampy Closed Forest	
8: Swamp	
9: Unused Land	
UNCLASSIFIED	
TOTAL	

* This is a preliminary estimate by the State Survey Department.

† As indicated

PRESENT LAND USE SURVEY - 1966
TABLE B.1. STATE LAND USE SUMMARY - PERAK

AREAS TAKEN FROM 1:25,000 LAND USE MAPPING COMPILED FROM THE INTERPRETATION OF 1966 AERIAL PHOTOGRAPHY

STATE AREA:-		
LAND USE ACREAGE	5,187,103	(8,104.8 SQ. MILES) ^x
PHYSICAL ACREAGE	5,185,294	(8,102.0 SQ. MILES) ⁺

NATIONAL AREA	SQUARE MILES 50,806 [@]	ACRES 32,515,840
PERCENTAGE OF NATIONAL AREA 16.0%		
POPULATION* 1,593,806	% OF NATIONAL POPULATION: 19.2%	
POPULATION DENSITY	PER SQUARE MILE 196.6	PER ACRE 0.31
AGRICULTURALLY USED LAND	SQUARE MILES 1,600.8	ACRES 1,024,537
POPULATION DENSITY ON AGRICULTURALLY USED LAND	PER SQUARE MILE 996.1	PER ACRE 1.56

LAND USE CATEGORY	D I S T R I C T																		TOTAL	%	MAJOR LAND USE CATEGORIES IN ACRES	%	LAND UNDER AGRICULTURAL USE IN %			
	BATANG PADANG	%	PERAK HILIR	%	PERAK HULU	%	LARUT & MATANG	%	SELAMA	%	DINDING	%	KINTA	%	KUALA KANG-SAR	%	KRIAN	%					MAJOR CATEGORIES	SUB-CATEGORIES		
	1U: Urban	2,647	0.4	2,086	0.4	1,274	0.1	4,116	1.2	608	0.3	2,151	0.7	14,890	3.1	2,613	0.3	926					0.4	31,311		0.6
1E: Estate Buildings	673	0.1	1,193	0.2	41	-	296	-	159	0.1	511	0.2	523	0.1	556	0.1	468	0.2	4,420	0.1	1E					
1T: Tin Mining	15,052	2.2	940	0.2	650	-	2,793	0.8	118	-	-	-	52,268	10.8	1,580	0.2	-	-	73,401	1.4	1T					
1X: Other Mining, Quarrying	20	-	22	-	14	-	31	-	5	-	28	-	597	0.1	6	-	61	-	784	-	1X					
1P: Transmission Line	2,211	0.3	17	-	145	-	308	0.1	-	-	-	-	392	0.1	821	0.1	56	-	3,950	0.1	1P					
2H: Mixed Horticulture	4,251	0.6	8,632	1.5	4,196	0.3	8,832	2.6	4,209	2.2	2,715	0.9	5,615	1.2	15,324	2.0	8,054	3.5	61,828	1.2	HORTICULTURE	1.3	6.0	2H		
2M: Market Gardening	142	-	3	-	102	-	444	0.1	4	-	34	-	1,809	0.4	362	-	107	-	3,007	0.1			2M			
2E: Agricultural Stations	-	-	232	-	-	-	-	-	-	-	9	-	-	-	142	-	-	-	383	-	TREE, PALM AND PERMANENT CROPS	14.9	6.4	2E		
3G: Rubber	101,880	15.1	62,571	11.0	46,350	2.9	59,533	17.8	34,951	18.6	81,457	26.1	69,094	14.3	127,388	16.6	40,877	17.6	624,101	12.0			60.8	3G		
3O: Oil Palm	4,048	0.6	29,335	5.1	-	-	467	0.1	-	-	-	-	-	-	-	-	5,487	2.3	39,337	0.8			3.8	3O		
3C: Coconuts	69	-	75,636	13.2	40	-	1,959	0.6	50	-	14,538	4.6	767	0.1	379	-	11,194	4.8	104,632	2.0			10.2	3C		
3N: Pineapple	-	-	1,032	0.2	-	-	-	-	-	-	424	0.1	-	-	-	-	9	-	1,456	-			0.1	3N		
3K: Coffee	-	-	99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			-	-	-	3K
3T: Tea	-	-	346	0.1	-	-	-	-	-	-	-	-	147	-	-	-	-	-	493	-			-	-	-	3T
3A: Cocoa	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			-	-	-	3A
3P: Pepper	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			-	-	-	3P
3S: Sago	64	-	36	-	47	-	164	-	6	-	-	-	111	-	563	0.1	13	-	1,004	-			0.1	3S		
3R: Arecanut Palm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			-	-	-	3R
3H: Fish & Hyacinth Ponds	31	-	-	-	3	-	-	-	-	-	-	-	553	0.1	11	-	6	-	604	-			774,449	14.9	75.4	3H
3X: Orchards	30	-	335	-	34	-	938	0.3	39	-	182	-	735	0.2	262	-	151	0.1	2,706	-			0.3	3X		
4P: Padi	775	0.1	26,810	4.7	5,095	0.3	9,338	2.8	5,842	3.1	3,062	1.0	575	0.1	19,523	2.5	57,726	24.8	128,746	2.5	12.5	4P				
4C: Diversified Crops	6,722	1.0	8,075	1.4	1,523	0.1	1,221	0.4	61	-	12,282	3.9	10,122	2.1	11,442	1.5	361	0.1	51,809	1.0	5.1	4C				
4X: Shifting Cultivation	1,596	0.2	-	-	2,192	0.1	-	-	4	-	10	-	1,371	0.3	951	0.1	-	-	6,124	0.1	0.6	4X				
5: Improved Permanent Pasture	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5		
6: Grassland	31,525	4.7	36,265	6.4	26,740	1.6	11,845	3.6	3,931	2.1	20,999	6.7	56,856	11.7	35,663	4.6	2,727	1.2	226,551	4.4	226,551	4.4	100.0	99.8	6	
7F: Forest	411,174	60.8	40,687	7.1	1,474,807	90.9	100,488	30.1	119,521	63.6	35,774	11.4	201,487	41.5	449,235	58.5	11,853	5.1	2,845,026	54.8	FOREST AND SCRUBLAND 3,040,226	58.6	Total Acreage under Agricultural Use		7F	
7S: Scrub Forest	53,201	7.8	10,900	1.9	39,046	2.4	7,919	2.4	6,646	3.5	7,042	2.2	36,612	7.6	32,675	4.3	1,159	0.5	195,200	3.8			53,644	1.0	1,026,346 ^x	7S
7C: Recently Cleared Land	6,153	0.9	6,124	1.1	7,328	0.4	4,357	1.3	3,313	1.8	5,983	1.9	2,330	0.5	14,333	1.9	3,723	1.6	53,644	1.0	613,468	11.8	Percentage of State area under Agricultural Use	7C		
8: Swamp	30,226	4.5	230,616	40.4	782	-	100,979	30.3	7,711	4.1	114,996	36.8	14,297	3.0	42,448	5.5	71,413	30.7	613,468	11.8	29,410	0.6	8			
9: Unused Land	30	-	4,898	0.8	955	-	6,891	2.1	-	-	3,251	1.0	7,358	1.5	1,100	0.1	4,927	2.1	29,410	0.6	83,592	1.6	9			
UNCLASSIFIED	3,344	0.5	23,828	4.2	10,396	0.6	10,514	3.2	793	0.4	6,926	2.2	5,984	1.2	10,598	1.4	11,209	4.8	83,592	1.6	5,187,103	100.0	19.8%			
TOTAL	675,864	99.8	570,726	99.9	1,621,760	99.7	333,433	99.8	187,971	99.8	312,374	99.7	484,493	100.0	767,975	99.8	232,507	99.8	5,187,103	99.9	5,187,103	100.0				

* This is a State Population Estimate for June 1966 supplied by the Statistics Department and indicates an increase of 30% over the 1957 Census Total.

+ This acreage total is based on measurement of all land areas indicated on the 1:25,000 aerial photographs taken in 1966.

x The Land Use Acreage is 1,809 acres larger than the physical acreage as a crop equivalent factor has been adopted within mixed associations:- e.g. a 10 acre block of coconuts and coffee is taken as comprising an equivalent of 7.5 acres of each giving an equivalent total acreage of 15.

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