







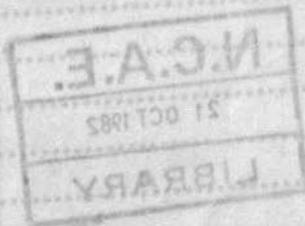
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LAND USE REPORT OF PAHANG

by

SIEW KAM YEW  
Agricultural Officer

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LAND USE SECTION  
SOIL SCIENCE DIVISION  
RESEARCH BRANCH  
DIVISION OF AGRICULTURE  
MINISTRY OF AGRICULTURE AND CO-OPERATIVES  
MALAYSIA  
KUALA LUMPUR



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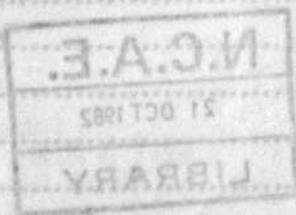
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**SIEW KAM YEW**  
**Agricultural Officer**



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

ACKNOWLEDGEMENTS

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

A Present Land Use Survey, in some form or other, is a picture of existing land utilization. The method of execution and the form of presentation depend on the scope of the survey, the source of funds, and the nature of the information required. It is a scientific procedure.

The Author is indebted to the following Sections whose efforts have made this report possible.

The word "present" qualifies this type of survey and places emphasis on the current status of the information. It also indicates that the information decreases in value with time so that speed is essential in the data-gathering programs.

Until now in West Malaysia the best cartographical display of land use has been contained in the various Departmental Reports and in State maps. The land use information obtainable from these sources is insufficiently detailed, often out-of-date, and in many places misleading (land alienation statistics, acreage statistics of major crops and some land use statistics 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. Also, it is very difficult to relate such results to specific geographical locations.

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, quick and accurate assessment of land use in West Malaysia. It is a scientific procedure, as that an accurate picture of land utilization is essential for any State and District. The Planning Department has a complete statistical inventory of land use, geographically distributed, and the State has a complete understanding of the situation. Large and small scale mapping combined with scientific methods for all statistical work ensures the comprehensive supply of "bench mark" data for both State and District Planning.

The Cartography Section ..... under the direction of Mr. G.W. Millington-Hogg, Canadian Colombo Plan Cartographer and Mr. Cheah Phi Teik, Cadet Cartographer.

The tangible end-products of the Survey are:-

- 1. Acreage statistics of all land use sub-categories.

The Area Measurement Section (1966) at a scale of 1:25,000 ..... under the direction of Miss Chong Sew Ying.

- 2. Present Land Use Mapping (1966), by States, at a scale of 1:25,000 in six sheets.

- 3. Present Land Use Map of West Malaysia (1966) at 1:500,000.

Malaysian Agriculturists and Planners have realized 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 given impetus and action.

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.

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.

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.

## 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.

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 of the information. It also indicates that the information decreases in value with time so that speed is 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. Also, it is often difficult to relate such results to specific geographical locations.

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.

The tangible end-products of the Survey are:-

1. Acreage statistics of all land use sub-categories.

2. Present Land Use Mapping (1966) at a scale of 1:25,000.

3. Present Land Use Mapping (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.

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 Pahang. 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 4,844 cover the State of Pahang (Figure 6).

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 Pahang 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.

Thus, a complete picture of land use is presented. The "whole" has been obtained by inspection, delineation and classification of the entirety. Regardless of the limitations imposed by the aerial photographic method, it can confidently be stated that an accurate universal picture is obtained and that, as far as the major crops are concerned, the results can be considered as those of an accurate crop survey.

## Fairdrawing

The final 1:25,000 map sheet is compiled by a fairdrawn tracing of the manuscript on dimensionally stable film (Durafilm). 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.

Depending on the demand, a printed coloured land use map series at a scale of 2 miles to an inch can be 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 Pahang was compiled by condensing 223 of the 1:25,000 map sheets (Figure 7).

## PHYSICAL ENVIRONMENT

### Location and Extent

Pahang State extends from latitude  $2^{\circ} 25'N$  to  $4^{\circ} 50'N$  and from longitude  $101^{\circ} 20'E$  to  $103^{\circ} 40'E$ . Located in the east coast of West Malaysia, Pahang is bordered on the north by Terengganu and Kelantan, on the west by Perak, on the southwest by Selangor and Negri Sembilan and on the south by Johore. On the east it has a coastline of 130 miles on the China Sea. (Figure 1). The State includes Pulau Tioman (Tioman Island) and a number of smaller islands off the coast. The largest state in West Malaysia, Pahang covers an area of 13,890.9 square miles.

The State has eight administrative districts: Bentong, Kuantan, Kuala Lipis, Cameron Highlands, Pekan, Raub, Temerloh and Jerantut. The seat of Government is Kuantan town while Pekan town, situated near the mouth of Sungai Pahang, is the Royal town. Other main towns are Temerloh, Mentakab, Bentong, Raub and Jerantut.

### Physiography and Geology

The highlands of Pahang are dominated by four mountain ranges which are oriented more or less parallel to one another in a northwest-southeast alignment. The peaks of these mountain ranges rise to heights above 7,000 feet above sea level though the majority are within the 3,000 to 5,000 feet range. Although the cores of these four ranges are thought to be composed of igneous material of granitic composition, in three of them, the Main Range, the Benom Range and the East Coast Range, the granitic core material has been exposed while in the Tahan Range the overlying mantle of sedimentary formations is still present.

The general physiographical pattern of Pahang is one of ruggedness in the highlands with pockets of broad mountain valleys such as at Cameron Highlands. In the foothills region where sedimentary and metamorphic formations predominate, the ruggedness of the terrain decreases away from the mountain ranges since the folding of the sedimentary formations has been less intense in those parts. Close to the mountain ranges where folding has been more intense, metamorphism of the original sandstones and shales to quartzites, phyllites and schists has taken place. In areas where calcareous shales occur limestone formations have been found, which outcrop as steep-sided hills.

The lithological composition of the foothills includes volcanic materials such as rhyolites, trachy-andesites, andesites, tuffs and agglomerates. These volcanic materials are distributed in a complex pattern over large areas and are often intercalated with sedimentary beds.

Of less extensive occurrence are amphibolites and serpentine which occur east of the Main Range.

Large fluvial plains are absent in the interior of the state as most of the land below the 250 feet contour in such areas consists of low hills of igneous, sedimentary and metamorphic formations of much older age than the Pleistocene. Coastal plains, on the other hand, are extensive with the eastern plains in Pekan District being the widest in the whole east coast of West Malaysia; this plain is about twenty miles at its greatest width. (Figure 2).

### Drainage

The Sungai Pahang (Pahang River) with a length of slightly over 270 miles is the longest in the State as well as in West Malaysia. It is formed by the coalescence of the Telom - Jelai system and the Sungai Tembeling River. The course of the whole river forms a large zigzag pattern. The main trunk of the Telom - Jelai flows approximately east-south-east as far as Kuala Tembeling, thence the combined rivers (now named the Sungai Pahang) sweep abruptly southwards as far as Kuala Triang. Thereafter the course again becomes approximately eastwards to the China Sea near Pekan.

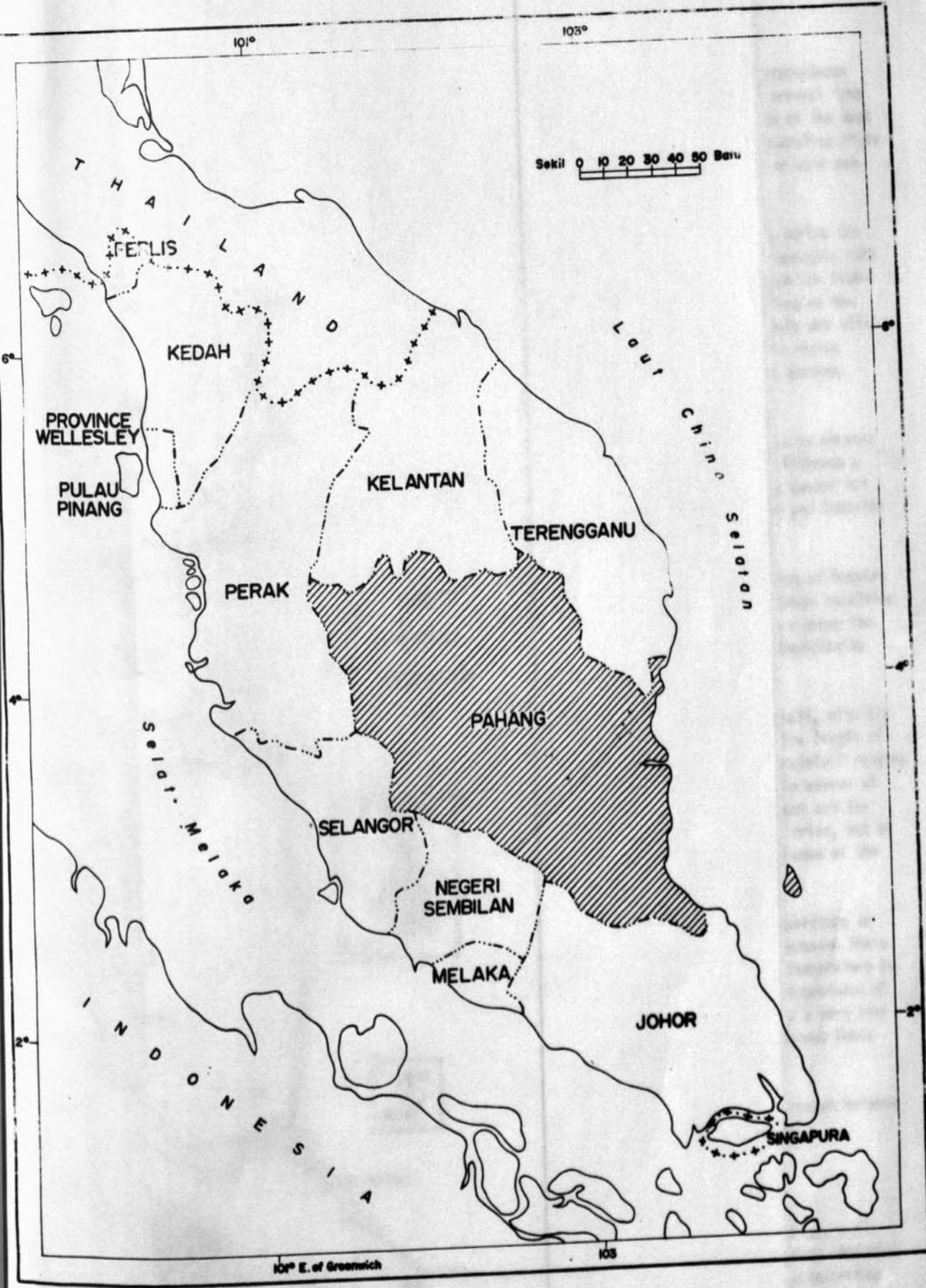


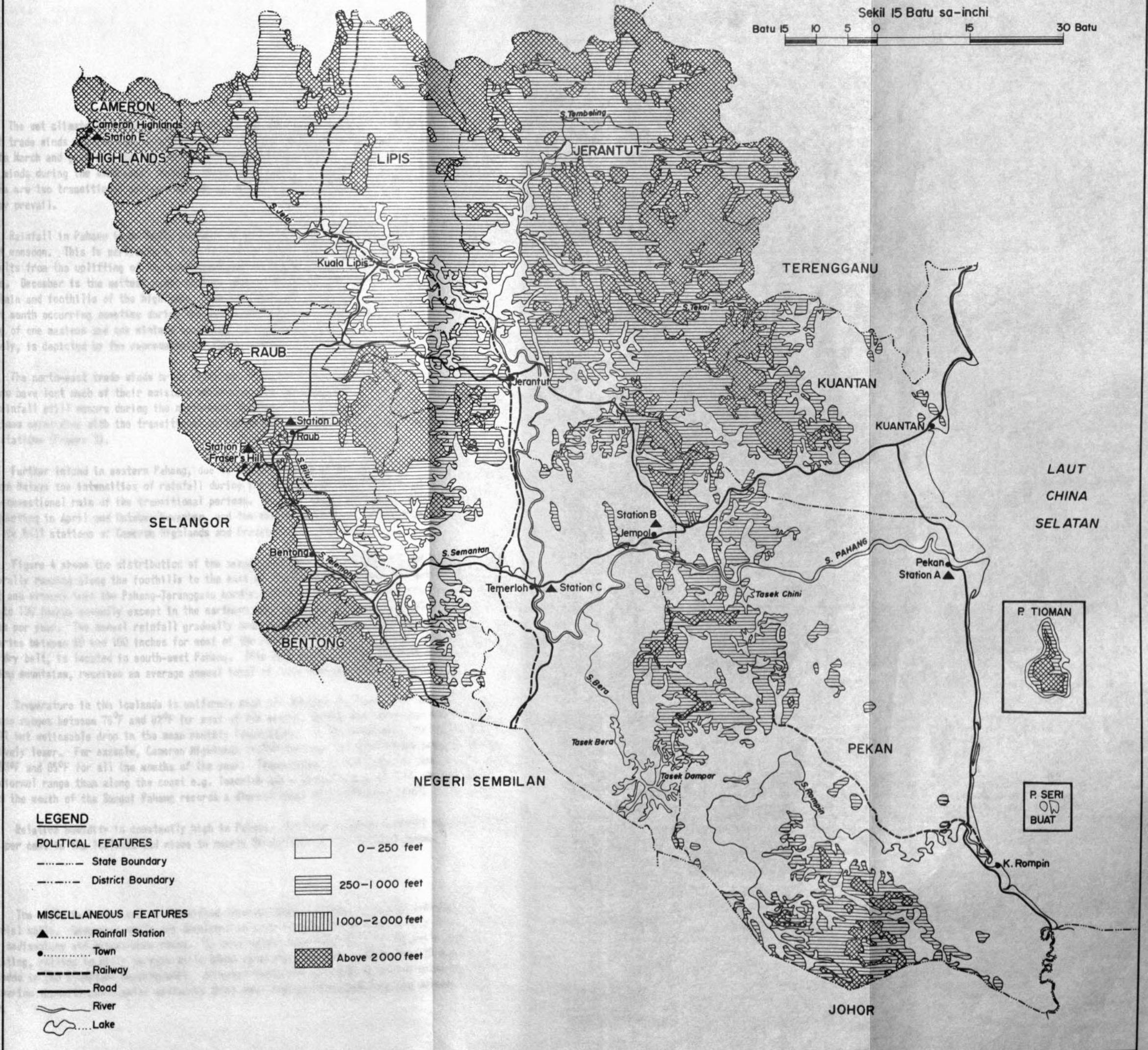
Figure 1. Location of the State of PAHANG within West Malaysia.

KELANTAN

1 : 950,400

Sekil 15 Batu sa-inchi

Batu 15 10 5 0 15 30 Batu



**LEGEND**

**POLITICAL FEATURES**

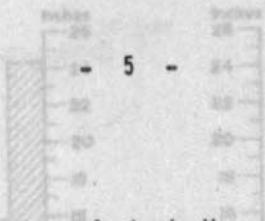
- State Boundary
- District Boundary

**MISCELLANEOUS FEATURES**

- ▲..... Rainfall Station
- ..... Town
- Railway
- Road
- ~~~~~ River
- ~~~~~ Lake

- 0-250 feet
- ▨ 250-1 000 feet
- ▩ 1000-2 000 feet
- ▩ Above 2 000 feet

Figure 2. The main physical and political features of Pahang and the six rainfall stations.



Climate

The wet climate of Pahang is mainly due to the combined influence of the moisture-laden north-east trade winds and the land configuration in the State. These north-easterlies prevail from November to March and give rise to the north-east monsoon. Pahang is under the influence of the weak southerly winds during the south-west monsoon which lasts from June until September. Separating these two seasons are two transitional periods when winds are light and variable in direction or calm conditions may prevail.

Rainfall in Pahang is markedly seasonal with most of the annual total falling during the north-east monsoon. This is particularly true in eastern Pahang which receives heavy orographic rain which results from the uplifting of the moisture-laden north-easterlies when they approach the highland areas. December is the wettest month in this area with the maximum rainfall occurring on the coastal plain and foothills of the highlands. The remaining part of the year is relatively dry with the driest month occurring sometime during the south-west monsoon. This type of rainfall regime consisting of one maximum and one minimum occurring during the north-east and south-west monsoon respectively, is depicted by the representative Pekan rainfall station (Figure 3).

The north-east trade winds bring relatively less rain to central Pahang. This is because these winds have lost much of their moisture while crossing the highlands to the east. Although a maximum rainfall still occurs during the north-east monsoon, its rainfall regime shows a second but lower maximum coinciding with the transitional period in April as depicted by the Jempol and Temerloh rainfall stations (Figure 3).

Further inland in western Pahang, due to the sheltering effect of the mountains of Sumatra and eastern Malaya the intensities of rainfall during the monsoons are not so great as those resulting from the convectional rain of the transitional periods. As such the distribution pattern shows two maxima occurring in April and October/November, and the minima in February and July as depicted by Raub and the hill stations of Cameron Highlands and Fraser's Hill (Figure 3).

Figure 4 shows the distribution of the annual rainfall in the State. A wet belt, with its axis generally running along the foothills to the east of the mountains, covers the entire length of the coast and extends into the Pahang-Terengganu border. This belt generally receives rainfall ranging from 100 to 130 inches annually except in the northern part where it receives rainfall in excess of 140 inches per year. The annual rainfall gradually decreases with distance from the coast and the amount varies between 80 and 100 inches for most of the remaining part of the State. A drier, but by no means dry belt, is located in south-west Pahang. This belt which lies in the rain shadow of the surrounding mountains, receives an average annual total of less than 80 inches of rain.

Temperature in the lowlands is uniformly high all through the year. The temperature in most places ranges between 78°F and 82°F for most of the months. During the north-east monsoon there is a small but noticeable drop in the mean monthly temperature. In the highlands, the temperature is comparatively lower. For example, Cameron Highlands (4,750 feet a.s.l.) experiences temperatures of between 63°F and 65°F for all the months of the year. Temperatures in the interior show a more pronounced diurnal range than along the coast e.g. Temerloh has a diurnal range of 17°F whereas Kuala Pahang at the mouth of the Sungai Pahang records a diurnal range of 11.5°F (Ooi, 1964).

Relative humidity is constantly high in Pahang. The mean relative humidity ranges between 82 to 86 per cent in the lowlands and rises to nearly 90 per cent in the highland areas.

Soils

The soils in Pahang can be classified into two broad categories, namely sedentary soils and alluvial soils. Sedentary soils are developed on parent materials derived in situ from weathered igneous, sedimentary and metamorphic rocks. In this report they refer only to the soils occurring on undulating, rolling to hilly terrain while those occurring on slopes greater than 20 degrees are all included in the steepland mapping unit. Alluvial soils are developed on parent materials which include marine deposits and fluvial sediments which have been carried down from the uplands of the interior.

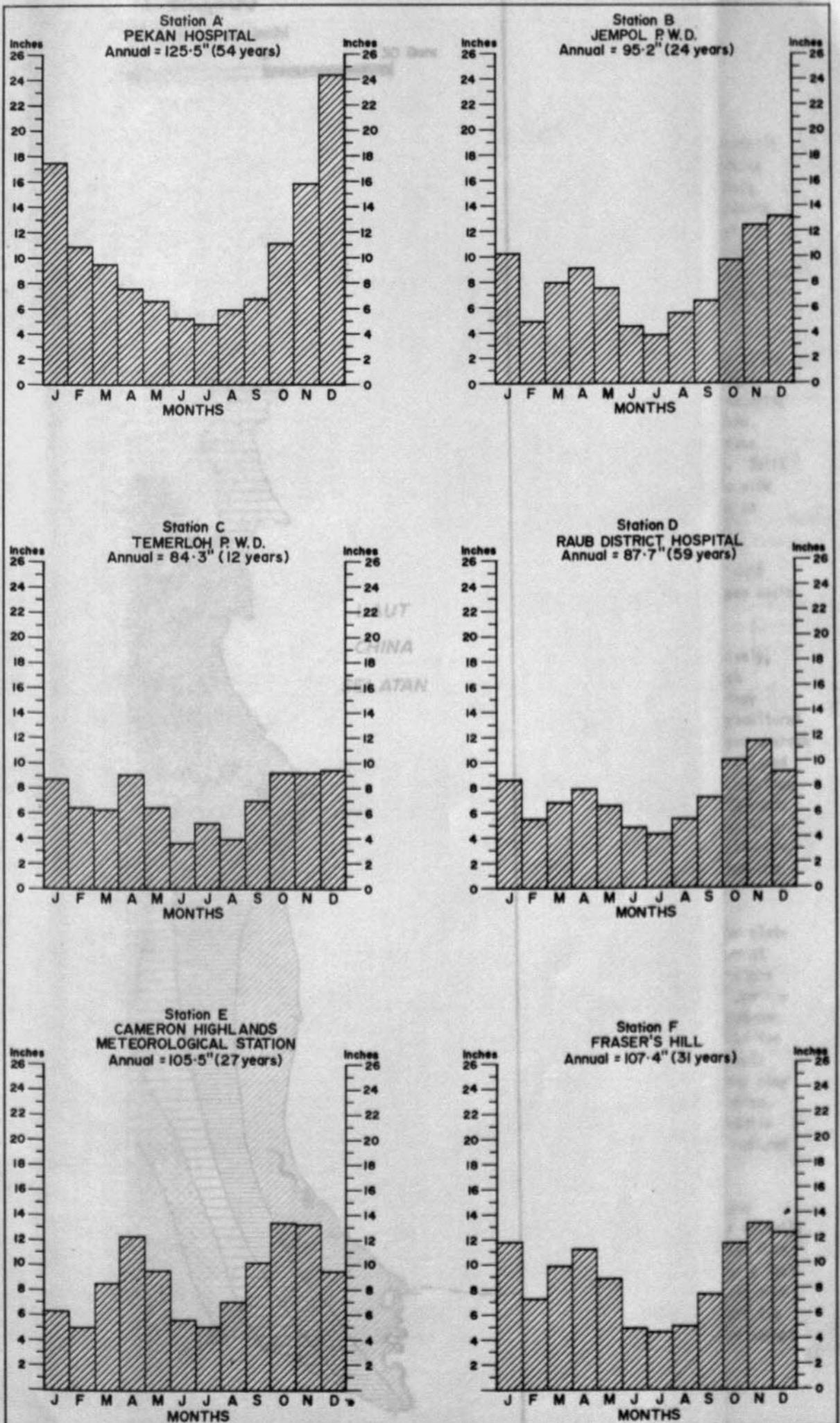
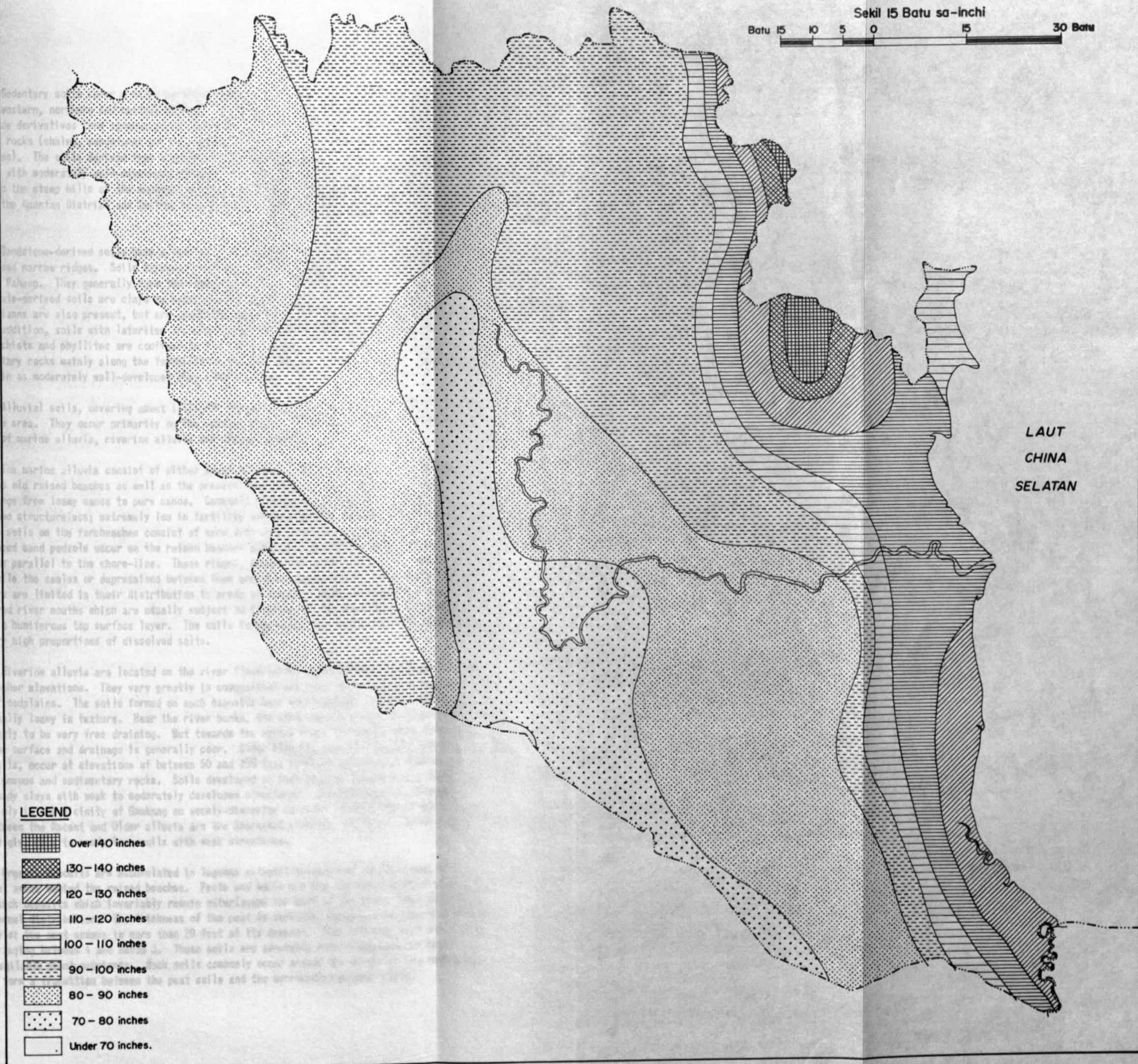


Figure 3. Average monthly precipitation for six selected rainfall stations in Pahang.



1 : 950,400  
Sekil 15 Batu sa-inchi

Batu 15 10 5 0 15 30 Batu

LAUT  
CHINA  
SELATAN

**LEGEND**

-  Over 140 inches
-  130 - 140 inches
-  120 - 130 inches
-  110 - 120 inches
-  100 - 110 inches
-  90 - 100 inches
-  80 - 90 inches
-  70 - 80 inches
-  Under 70 inches.

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

Sedentary soils cover a major portion of the State. They occur mainly in the foothill regions of western, northern and central Pahang. These soils are developed on parent materials which include derivatives from igneous rocks (granites, granodiorites, basalts and andesites); sedimentary rocks (shales, sandstones and interbedding of these); and metamorphic rocks (schists and phyllites). The soils derived from granites and granodiorites are deep sandy clay loams to sandy clays with moderately well-developed structures. They are widely distributed, generally merging into the steep hills of the mountain ranges. The soils developed on basalts and andesites, limited to the Kuantan District and Central Pahang respectively, are very deep and well-structured clays.

Sandstone-derived soils have a limited distribution, being confined to the lower slopes of steep-sided narrow ridges. Soils derived from shales occur extensively in western, northern and central Pahang. They generally form the lower foothills to the mountain ranges. The majority of these shale-derived soils are clays to heavy clays with firm subsoil horizons. Clays with friable horizons are also present, but are generally associated with the mixed shale/sandstone areas. In addition, soils with laterites are also associated with the shale-derived soils. Soils formed on schists and phyllites are confined to the contact zones of the igneous intrusions with the sedimentary rocks mainly along the foothills to the Main Range. They are usually found on hilly terrain as moderately well-developed clay loams to clays.

Alluvial soils, covering about 1,414,000 acres, constitute approximately 16 per cent of the State area. They occur primarily on the coastal plain. The parent materials of these soils are mainly of marine alluvia, riverine alluvia and organic deposits.

The marine alluvia consist of either sands or clays. Marine sands occur extensively, covering the old raised beaches as well as the present forebeaches. Soils developed on such deposits range from loamy sands to pure sands. Commonly referred to as the 'Bris Soils', they are loose and structureless; extremely low in fertility and consequently of very little agricultural value. The soils on the forebeaches consist of sand with only a humiferous top surface layer whereas well-developed sand podzols occur on the raised beaches especially on the elongated ridges aligned more or less parallel to the shore-line. These ridges, known locally as 'permatang', are very free draining while the swales or depressions between them are often seasonally or permanently flooded. Marine clays are limited in their distribution to areas of mangrove swamps fringing the coastline and sheltered river mouths which are usually subject to flooding by the sea. These are bluish grey clays with a humiferous top surface layer. The soils formed under such conditions are saline and contain very high proportions of dissolved salts.

Riverine alluvia are located on the river floodplains, associated low terraces or platforms at higher elevations. They vary greatly in composition and age. Recent alluvia occur at the river floodplains. The soils formed on such deposits have very variable drainage characters and are usually loamy in texture. Near the river banks, the soils have a weakly developed profile and are likely to be very free draining. But towards the valley sides the water-table approaches close to the surface and drainage is generally poor. Older alluvia, sometimes in the form of low isolated hills, occur at elevations of between 50 and 250 feet in close association with deeply weathered igneous and sedimentary rocks. Soils developed on such alluvia are generally sandy clay loams to sandy clays with weak to moderately developed structures. They are markedly dissected. Located mainly in the vicinity of Gambang on weakly-dissected terraces intermediate in elevation and age between the Recent and Older alluvia are the Subrecent alluvia. These are coarse textured alluvia and give rise to sandy loam soils with weak structures.

Organic deposits are accumulated in lagoons situated between the narrow ridges and depressional areas behind the raised beaches. Peats and mucks are the two major categories of soils formed on such deposits which invariably remain waterlogged for most of the year. Peat soils have a greater areal distribution. The thickness of the peat is variable, ranging from less than 2 feet at the edge of the peat swamps to more than 20 feet at its deepest. They are very acid soils with pH values ranging between 4 and below 3. These soils are generally infertile because of their low levels of available plant nutrients. Muck soils commonly occur around the margin of the peat swamps where they form a transition between the peat soils and the surrounding mineral soils.

## THE PRESENT LAND USE

### General

In 1966, forests and swamps covered more than 90 per cent of the land in Pahang, reflecting the low level of development within the State. This can be attributed to a number of factors, the main ones being poor and difficult accessibility; absence of good roads; distances from the ports and trading centres; and the unfavourable weather experienced by the State during the north-east monsoon.

On the contrary only 7 per cent of Pahang, the largest State in West Malaysia, was utilized for agricultural purposes and less than 0.1 per cent was under urban and associated usage. These two categories of land use which constituted the developed part in the State were confined primarily to the northern part of the coastal plain; the banks and levees of rivers, particularly the Sungai Pahang; the interior valleys and the more accessible regions along the roads and railway lines located mainly in western and south-western Pahang.

The bulk of the developed areas was utilized for agriculture. The land use pattern was that coconut smallholdings occupied the surrounding areas of fishing villages sited on the more favourable locations along the coast, while padi was sometimes cultivated in the depressional areas between the ridges. Land under rubber on the coast was limited mainly to the Kuantan region. On the riverbanks and levees as well as the interior valleys, the pattern took on a more variegated pattern. Padi fields still occupied the inundated areas, but land on the higher and better drained areas were occupied by kampong horticulture (Mixed Horticulture) and rubber holdings with some coconut holdings interspersed among them. Inland, located in the more accessible regions along roads and railway lines mainly in western and south-western Pahang, rubber dominated the landscape of the developed areas. Plantation agriculture was limited in distribution and areal extent. The crops planted under estate management were oil palm, tea, Manila hemp, gutta percha (wild rubber) and some of the rubber. Apart from these, other crops such as food crops, fruits and vegetables were cultivated in smallholdings.

Urbanised areas in the form of towns were confined to the better-developed regions of the State. They were generally limited in size and functioned as administrative, trading, collecting and distribution centres. Except for Kuantan, the State Capital and the Royal Town at Pekan (both situated on the coast in north-eastern Pahang), the other major areas of urbanisation were concentrated in the western and south-western Pahang. Other urbanised areas were generally small and existed as fishing villages scattered along the coast, estate settlements, kampong settlements occurring in association with 'Mixed Horticulture' and resettlement villages usually sited near the main towns.

The land under mining activity was generally scattered and inextensive with the exception of the tin mine at Sungai Lambing in Kuantan District and Iron mine at Rompin in Pekan District.

The land use pattern in the undeveloped areas of the State consisted of forests in the uplands and swamps in the low-lying areas. Forests covered about 80 per cent of the State. Extensive areas of the forests were protected under forest reserves. Two very expansive areas were utilized as wild game reserves. The larger one, located in northern Pahang and covering some 958 square miles, formed part of the Taman Negara (National Park); while the second area occupying about 251 square miles mostly in Temerloh was called the Klau Game Reserve. Swamps occurred primarily in the coastal plain although extensive areas of swampland were also mapped in the Tasek Bera region in south-western Pahang.

### 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.

The following are the salient features of the land use in Pahang in 1966:-

1. The total area of the State was 8,890,210 acres or 13,890.9 square miles.
2. Only 624,934 acres amounting to 7.0 per cent of the State were under agricultural use.
3. Rubber was planted on 466,645 acres, equivalent to 5.2 per cent of the State.
4. Padi was cultivated on a total of 71,068 acres, accounting for 0.8 per cent of the State.
5. "Mixed Horticulture" was mapped on 49,787 acres, that is 0.6 per cent of the State.
6. Oil Palm was identified on 12,157 acres, equivalent to 0.1 per cent of the State.
7. Shifting Cultivation occupied a total of 8,650 acres or 0.1 per cent of the State.
8. Coconut was grown on 6,821 acres, amounting to 0.1 per cent of the State.
9. Tea, cultivated only in the highlands, occupied 5,314 acres which approximated to 0.1 per cent of the State.
10. Land totalling 7,285,243 acres and representing 82 per cent of the State was mapped as forest, scrub forest and scrub grassland.
11. A total of 831,168 acres amounting to 9.3 per cent of the State was identified as land occupied by swamps.

Figure 5 illustrates the distribution of the major land use categories within Pahang.

### Urbanisation

In 1966, there were 9,229 acres representing 0.1 per cent of the State under 'Urban' land use. The areas of urbanised land were concentrated mainly in the coastal districts of Kuantan and Pekan which housed the State Capital and the Royal Town respectively; and the districts/Temerloh, Raub and Bentong /of in south-west Pahang where the other main towns were located. Urban development in the rest of Pahang was in the form of small towns and village settlements.

Estate urbanisation is the settling of workers in compact residential areas within large plantations. In this Survey, a total of 1,744 acres of "Estate Building" was mapped, mainly in the districts of Temerloh, Bentong and Kuantan. In Temerloh District alone there were 735 acres under this form of land use, thus indicating the degree of estate development in the district. In Cameron Highlands district, estate urbanisation of which there were 141 acres, were mapped entirely on tea plantations.

Since urban and estate development were not extensive in the State; it would be reasonable to expect an appreciable amount of the population to reside within the sub-category "Mixed Horticulture". This was substantiated by the fact that more than 50 per cent of the population was composed of the rural orientated Malays. Hence the total urban acreage could be further increased if the total area occupied by buildings and related compounds in the sub-category "Mixed Horticulture" was also taken into consideration, as it would be shown later that as much as 22,400 acres of land mapped under this sub-category consisted of houses and related compounds.

### Mining

Using aerial photographs taken in 1966, a total of 2,896 acres of land showing clear evidence of tin mining was mapped in Pahang. The distribution of the tin mining areas was confined mainly to the Kuantan District where about 73 per cent of the total area mapped was located and to parts of south-western Pahang.

The Department of Mines reported that in 1966 Pahang's tin production, the third highest in West Malaysia, was 2,771 long tons; accounting for 4.0 per cent of West Malaysia's recorded output of 68,886 long tons. The same source also reported that 40 mines were in operation in that year. The method employed by all but one of the mines was gravel pumping. The remaining mine, located at Sungai Lambing in Kuantan District was an underground lode mine. This mine, active since 1887, was responsible for 59.9 per cent of the State production in 1966. In the same year 15,543 acres out of 33,085 acres of land alienated for mining were for tin, thus reflecting the importance of tin in the mining industry.

Other minerals notably iron-ore and gold were also mined in the State. In 1966, the land allocated for the economic exploitation of these two minerals were 2,709 and 8,843 acres respectively. There were 5 iron mines and 3 gold mines in the State whose productions of these two minerals at 2,729,930 long tons and 1,466 Troy ounces respectively, were the highest in East Malaysia (Department of Mines, 1966).

The areas which showed clear evidence of being other than far tin were mapped under the sub-category 'Other Miscellaneous' and there were 1,236 acres. The majority of these acreages were measured 'Other Miscellaneous'.

**Rubber**

Rubber was by far the most important crop in 1966, it was mapped on a total area of land amounting to 3.2 per cent of the State's area of 23,700,000 acres. Except for the Kuala Lumpur District, rubber was confined to the coastal and riverine areas. It was cultivated on the estates such as Kuala Lela, Kuala Lumpur, and other areas along the coast and railway lines (State of Malaya, 1966).

The Rubber Statistics Handbook-1966 reports that there were 120,000 acres of estate rubber in Pahang which means that the remaining 34,000 acres were smallholding rubber. Thus 25.6 per cent of the total rubber area belonged to the estate sector and 74.2 per cent belonged to the smallholding sector. Of the estate sector 31,270 acres representing 25.9 per cent was occupied by mature rubber.

There were 178 estates in 1966, which 20 were European-owned and 158 Asian-owned. Only 4 European estates were under 1,000 acres while 139 Asian estates were under 1,000 acres with 124 being less than 500 acres in size. Among these estates whose size was between 1,000 and 4,000 acres, 18 were under European ownership and 19 were under Asian ownership.

About 72.5 per cent of the estate rubber was planted with high yielding materials. The average estate yield was 702 lbs. per acre, the second lowest yield (the lowest being Terengganu State) in East Malaysia. The average yield for East Malaysia was 890 lbs. per acre in 1966.

In the same year, estate rubber production was 28,443 tons and smallholding rubber production was estimated at 29,547 tons; giving a total State production of 58,000 tons. Thus estate rubber which accounts for only 25.8 per cent of the total rubber acreage contributed 47.2 per cent of the total production. Since the total rubber production in East Malaysia for the same period was 600,278 tons, the production in the largest State in East Malaysia only accounted for 9.2 per cent of it.

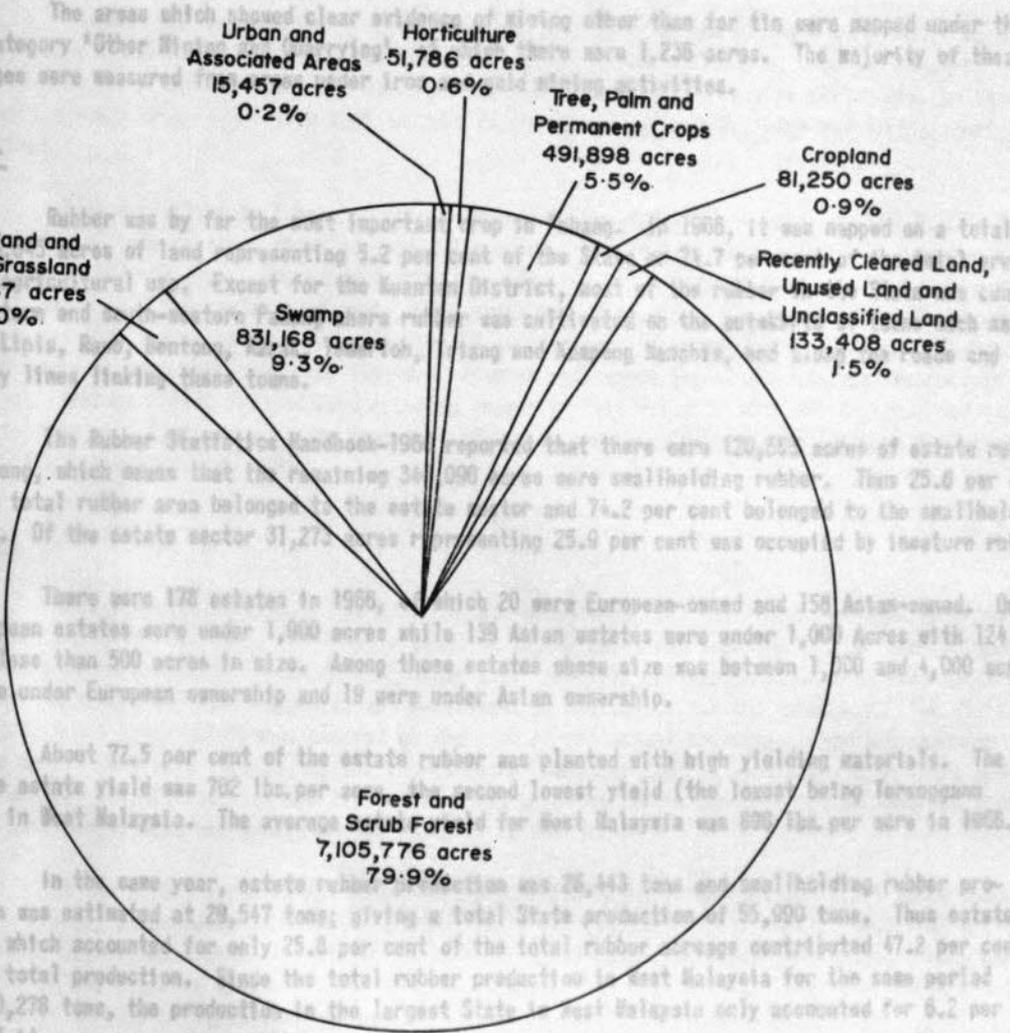
In the smallholding sector, some of the holdings were well-maintained and their appearance was comparable to that of the estate. But, quite often the rubber was found to be growing in the midst of tall undergrowth and rubber seedlings which had taken root from fallen seeds, thus giving

**Figure 5. The proportions of major land use categories within Pahang**

In the Survey, rubber intermixed with scrub forest and scrub grasslands were mapped on some 1,200 and 3,000 acres respectively. In cases where seedlings were sited within the holdings, the rubber trees around them were often inter-planted with fruit, coconut or other trees and bushes.

**Padi**

This crop occupied the second largest area of agricultural land after rubber in the State. The padi cultivated in the State was mainly that of the wet variety and its cultivation was mainly confined to the deltaic, coastal and riverine locations which could be easily flooded. It was cultivated solely as a peasant crop in close association with the sub-category 'Mixed Horticulture' which occupied the areas of relatively higher elevations. Dryland padi which did not require flooding was also cultivated in the State usually as a catch crop on hilltops and slopes.



Other minerals notably iron-ore and gold were also mined in the State. In 1966, the land alienated for the economic exploitation of these two minerals were 8,709 and 8,833 acres respectively. There were 8 iron mines and 3 gold mines in the State whose productions of these two minerals at 2,729,930 long tons and 1,466 Troy ounces respectively, were the highest in West Malaysia (Department of Mines, 1966).

The areas which showed clear evidence of mining other than for tin were mapped under the sub-category 'Other Mining and Quarrying', of which there were 1,236 acres. The majority of these acreages were measured from areas under iron and gold mining activities.

### Rubber

Rubber was by far the most important crop in Pahang. In 1966, it was mapped on a total of 466,645 acres of land representing 5.2 per cent of the State or 74.7 per cent of the total area under agricultural use. Except for the Kuantan District, most of the rubber in the State was confined to western and south-western Pahang where rubber was cultivated on the outskirts of towns such as Kuala Lipis, Raub, Bentong, Karak, Temerloh, Triang and Kampong Manchis, and along the roads and railway lines linking these towns.

The Rubber Statistics Handbook-1966 reported that there were 120,555 acres of estate rubber in Pahang, which means that the remaining 346,090 acres were smallholding rubber. Thus 25.8 per cent of the total rubber area belonged to the estate sector and 74.2 per cent belonged to the smallholding sector. Of the estate sector 31,273 acres representing 25.9 per cent was occupied by immature rubber.

There were 178 estates in 1966, of which 20 were European-owned and 158 Asian-owned. Only 4 European estates were under 1,000 acres while 139 Asian estates were under 1,000 Acres with 124 being less than 500 acres in size. Among those estates whose size was between 1,000 and 4,000 acres, 16 were under European ownership and 19 were under Asian ownership.

About 72.5 per cent of the estate rubber was planted with high yielding materials. The average estate yield was 702 lbs. per acre, the second lowest yield (the lowest being Terengganu State) in West Malaysia. The average estate yield for West Malaysia was 898 lbs. per acre in 1966.

In the same year, estate rubber production was 26,443 tons and smallholding rubber production was estimated at 29,547 tons; giving a total State production of 55,990 tons. Thus estate rubber which accounted for only 25.8 per cent of the total rubber acreage contributed 47.2 per cent of the total production. Since the total rubber production in West Malaysia for the same period was 900,278 tons, the production in the largest State in West Malaysia only accounted for 6.2 per cent of it.

In the smallholding sector, some of the holdings were well-maintained and their appearance was comparable to that of the estate. But, quite often the rubber was found to be growing in the midst of tall undergrowth and rubber seedlings which had taken root from fallen seeds, thus giving the appearance of rubber intermixed with scrub or scrub grassland. In the Survey, rubber intermixed with scrub forest and scrub grassland were mapped on some 1,500 and 3,000 acres respectively. In cases where dwellings were sited within the holdings, the rubber trees around them were often interplanted with fruit, coconut or other trees and bushes.

### Padi

This crop occupied the second largest area of agricultural land after rubber in the State. The padi cultivated in the State was mainly that of the wet variety and its cultivation was mainly confined to the deltaic, coastal and riverine locations which could be easily flooded. It was cultivated solely as a peasant crop in close association with the sub-category 'Mixed Horticulture' which occupied the areas of relatively higher elevations. Dryland padi which did not require flooding was also cultivated in the State usually as a catch crop on hillsides and slopes.

N.O.A.E.  
1966

The Survey identified 71,068 acres----amounting to 11.4 per cent of the cultivated land in Pahang---as land under the wet padi cultivation and if it was assumed that 5 per cent of the land was occupied by bunds, ditches, canals, shelters, etc., it would be reasonable to say that there were about 67,500 acres of pure padi land in the State.

However, it was reported that in the 1966/1967 cropping season there were 34,060 acres; 810 acres and 4,120 acres of main season wet padi, offseason wet padi and dryland padi respectively; thus, as much as 90 per cent of the padi cultivated was of the wet variety requiring flooded fields. The small acreage under off-season padi was due to the lack of proper drainage and irrigation facilities.

Padi production in Pahang for the cropping season 1966/1967 amounted to 13,808,000 gantangs yielding 22,460 tons of rice, which accounted for about 4 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 379 gantangs per acre was 12,909,000 gantangs of padi. Off-season padi from which an average yield of 337 gantangs per acre was obtained, accounted for only 182,000 gantangs of the total padi production. The remaining 717,000 gantangs were harvested from the 'dry' type of padi whose per-acre-yield was recorded at 181 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 off-season crop and 209 gantangs per acre from dryland padi. (Statistical Digest, 1968).

#### Oil Palm

This crop, cultivated solely under estate management, was the third important crop, after rubber and padi, in the State. In 1966, a total of 12,157 acres representing 1.9 per cent of the agriculturally used land in the State was mapped under oil palm cultivation. This is very close to the reported figure of 12,576 acres by the Department of Statistics for the same year. The difference is because those areas which were cleared at the time of the actual photography and subsequently planted to oil palm were included in the sub-category 'Recently Cleared Land', of which there were 41,521 acres. Its distribution was limited to a few areas mostly in the district of Temerloh where the largest single area was mapped in the vicinity of Chenor.

Of the 12,576 acres of oil palm in Pahang, 7,765 acres which included 2,315 acres under immature stands, belonged to commercial estates; while the remaining 4,811 acres, consisting wholly of immature stands, were under the direction of the Federal Land Development Authority. There were 5 estates in the State in 1966 - 3 were owned by Europeans and 2 by Asians. Only 4 of these estates with a total acreage of 4,285 were in production (Department of Statistics, 1967).

It was also reported by the Statistics Department that production for 1966 was 2,614 tons of palm oil and 691 tons of palm kernel. These figures accounted for only 1.4 and 1.6 per cent of the West Malaysian production of palm oil and palm kernel respectively. The yield per acre was 0.61 tons of palm oil and 0.16 tons of palm kernel while the corresponding yields in West Malaysia for these products were 1.16 tons and 0.27 tons respectively.

#### Coconuts

The Survey using aerial photographs taken in 1966 mapped a total of 6,821 acres as land occupied by coconut holdings. Virtually all the coconut areas were located in the coastal districts of Kuantan and Pekan where the coconut trees were planted extensively on the 'Bris Soils' occurring along the coast. Some fairly extensive coconut holdings were found along the banks of the Pahang River where they were planted on sandy loam soils.

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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.

With the exception of one estate, the coconuts in Pahang were planted in smallholdings. These coconut smallholdings were usually found around fishing villages or interspersed between areas occupied by the sub-category 'Mixed Horticulture'. Sometimes the smallholding coconuts were interplanted with other crops such as pineapple, arecanut palms and fruit trees.

Where the coconut trees were planted on 'Bris Soils' they were generally very poorly productive. In fact many of the palms had died through malnutrition while the survivors were moribund, completely barren and sometimes even devoid of spadices, or carrying only a few small nuts. Only those palms located in the vicinity of dwellings were healthy and well stocked with large round nuts. This is because the soils around the houses were constantly supplied with minerals, organic matter and water from household wastes. The coconut palms planted on river banks where the soils were relatively heavier and richer gave better yields.

Besides being cultivated as pure or intercropped coconut holdings, coconuts were also found abundantly within the sub-category "Mixed Horticulture" in close association with other crops especially banana and arecanut palms. It will be shown later that about 7,470 acres of coconuts were located within this sub-category. Thus it can be conservatively stated that there were about 14,300 acres of coconut in Pahang in 1966.

### Tea

The total acreage under tea (*Thea sinensis* or *Camellia sinensis*) was 5,314 acres, amounting to 0.1 per cent of the State or 0.8 per cent of the total area under agricultural use. All the tea areas were located in the district of Cameron Highlands. The type of tea planted belonged to the upland variety and its cultivation was exclusively under estate management.

In 1966 there were 21 tea estates in Cameron Highlands. Except for one which was under European ownership, the rest were all Asian-owned. Production for the same period was 18,740,000 pounds of Green Leaf and 4,047,000 pounds of "Made" Tea; the per-acre-yields for the corresponding items were 4,295 pounds and 928 pounds respectively (Department of Statistics, 1967).

### Orchards

Only a mere 461 acres - an insignificant total - were mapped as orchards in the survey. The principal areas were located in the districts of Jerantut, Bentong and Temerloh.

The fruits commonly cultivated in the orchard areas were rambutan (*Nephelium lappaceum*), durian (*Durio zibethenus*), mandarin orange (*Citrus nobilis*) and mangosteen (*Garcinia mangostana*).

It must be pointed out that the small total orchard acreage is because only orderly-planted and well-managed pure orchard areas which were two acres or more in size were mapped. For convenience of cartography, orchard areas smaller than two acres in size have been mapped under other related categories, especially under 2H "Mixed Horticulture" where mixed stands of fruit trees have also been planted in a haphazard and casual manner. As it will be estimated later that there were about 7,470 acres of fruit trees within the "Mixed Horticulture" sub-category, it can be reasonably stated that there were about 8,000 acres of orchards in Pahang in 1966.

### Fibre Crops

376 acres of Manila hemp (*Musa textilis*) were mapped under this sub-category. They formed the remaining part of this crop planted in an estate in Jerantut District. At the time of the photography part of area under Manila hemp was cleared and was found to be planted with oil palm during the field checking.

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, water-ways and as "islands of tree cultivation" on lands of relatively higher elevation in padi-growing areas. This sub-category is also frequently found around the periphery of towns and village settlements where they assume semi-urban characteristics. In Pahang, the Survey mapped a total of 49,787 acres equivalent to 0.6 per cent of the State or 8.0 per cent of the total acreage under agricultural use. The principal crops cultivated were coconut, banana, fruit trees and tapioca; the others being sweet potato, ground nut, arecanut, sugar-cane, maize, vegetables, spices, etc. Coconut was dominant in the coastal region, where 1,368 acres representing 81.3 per cent of the total area under 'Market Gardening' were mapped.

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 including bananas 15 per cent; tapioca, sweet potatoes, maize, groundnut 15 per cent; garden crops (vegetables, spices, yam etc.) 10 per cent; buildings, footpaths, courtyards, negative land 45 per cent.

Thus, according to the above breakdown, the 'Mixed Horticulture' area in the State would be composed of approximately 7,470 acres of coconuts; 7,470 acres of fruit trees including bananas; 7,470 acres of tapioca, sweet potatoes, maize, groundnut; 4,980 acres of garden crops (vegetable, spices, yam, etc.) and 22,400 acres of land occupied by buildings, courtyards, footpaths and negative land. Such areas were located on the outskirts of towns and villages where there were demands for vegetable produce.

Diversified Crops

Shifting Cultivation

This sub-category refers to such short term crops as tapioca, sweet potato, groundnut, maize, sugar-cane, water-melon, banana, 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 being cultivated side by side in small units or fields and thus, it has not been possible to identify and map them. The above crops have also been found in very small units within 2H "Mixed Horticulture". A total of 1,532 acres representing only 0.2 per cent of the agriculturally used land in Pahang was mapped, mainly in the districts of Bentong, Jerantut and Pekan. The crops commonly cultivated in these areas included tapioca, sweet potato and banana. Water-melon cultivation was confined mainly to the north-east in Kuantan and Pekan Districts. In one area, one being north-western Pahang mainly in Ulu district, while the other was in Pekan, in eastern Pahang. A total of 8,630 acres accounted for the above crops.

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

Banana:- This crop is widely distributed in the State. But its cultivation is seldom in large enough homogeneous blocks to facilitate its mapping on the 1:25,000 photography. It is thus not included in the legend and consequently unaccounted for in the acreage statistics.

However, 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 located in estate settlements and new villages.
5. Within "Diversified Crops" areas.
6. Within coconut smallholdings.

This sub-category was commonly mapped on the margin of forest areas. Included under this sub-category were some 33,000 acres of extremely poor or abandoned rubber.

### Market Gardening

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

In the Survey, the total area mapped under 'Market Gardening' in the State was 1,680 acres. 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 2 acres in size also occurred 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.

The main areas of 'Market Gardening' were located in Cameron Highlands District where 1,366 acres representing 81.3 per cent of the total area under 'Market Gardening' were mapped. Here, temperate vegetables, which could not be successfully cultivated in the lowlands were produced commercially in the cooler climate of the highlands. The vegetables cultivated were green peas, radish, celery, lettuce, capsicum, cabbage, cauliflower etc., in response to the great demand for these produces by the large urban populations in the lowlands.

Commercial flower gardens of which there were a number in Cameron Highlands were also mapped under this category.

Areas of 'Market Gardening' in the rest of the State were generally of small areal extent reflecting the lack of large towns. Such areas were located on the outskirts of towns and villages where there were demands for vegetable produces.

### Shifting Cultivation

This is a form of agriculture practised 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, and banana 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 clearings and regenerating vegetation distributed disorderly in an otherwise forested area.

Shifting cultivation in the State was concentrated in two areas, one being north-western Pahang mainly in Lipis district, while the other was in Pekan, in eastern Pahang. A total of 8,650 acres accounting for 1.4 per cent of the total acreage under agricultural use was mapped as land utilized by 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 8,116,411 acres, representing 91.3 per cent of the State area. The bulk of this total was located in western, northern and central Pahang where extensive areas were mapped under these sub-categories.

Forest (dryland) alone which accounted for 6,798,069 acres amounting to 76.5 per cent of the State, covered a major part of all the districts. The largest acreage was mapped in the inland district of Jerantut where 92.8 per cent of the area was occupied by forest.

307,707 acres, representing 3.5 per cent of the State were classified as 'Scrub Forest'. This sub-category was commonly mapped on the margin of forest areas. Included under this sub-category were some 33,000 acres of extremely poor or abandoned rubber.

The total area under the sub-category 'Scrub Grassland' was 179,467 acres. Some of the areas mapped were quite extensive and in fact, were land cleared for agricultural purposes but had reverted to scrub-grasslands. This sub-category also included those erosional areas which were mapped as '6E'. Such areas, whose distribution was limited to north-western Pahang, were the result of slumping and sheetwash.

Swamps occurred extensively in the low-lying coastal region and in some places extended for a few miles inland. Extensive areas of inland swamp were also mapped, particularly around the vicinity of Tasek Bera - the largest lake in West Malaysia. The total area in the State occupied by swamps (both coastal and inland) was 831,168 acres or 9.3 per cent. The largest acreages were located in the coastal districts of Pekan and Kuantan which had 677,056 and 100,742 acres respectively.

## 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 Pahang. 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 4,844 overlapping aerial photographs covering the State of Pahang. This coverage is represented by an index (Figure 6) 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 Kuantan Town in figure 6 would be referred to as, Roll C-34, Line 90N, Photos 96, 97 and 98. The State is covered by 65 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 12.2 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 Pahang were taken at different times during the year 1966. A record of the actual dates and times of exposure for all the photographs is kept in the Land Use Section, Department of Agriculture, Kuala Lumpur.

### Mapping

Figure 7 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. Pahang is covered by 223 of these 1:25,000 sheets.







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

For the Interpretation of 1:25,000 Aerial Photographs

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11. Leamy, M, & Panton, W.P., 1966. **Soil Survey Manual for Malayan conditions, Division of Agriculture Bult. 119, Ministry of Agriculture and Co-operatives, West Malaysia.**
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A detailed explanation of the Classification Legend follows.

APPENDIX A

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

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 measurements.

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 small-holding 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 LEGEND

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; eg. 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, pineapples, fruit trees, bananas, papayas, coconuts etc.

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".

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.

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).

3K: Coffee

3T: Tea

3A: Cocoa

3P: Pepper

3S: Sago Palm

3R: Arecanut Palm

3F: Fibre Crops

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

3H: Fish 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.

6. Grasslands ( Yellow )

NOTE:  
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 (IU) 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 forest are present in this sub-category. It includes all primary forests and secondary forest 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.

**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.

**7C: Recently Cleared Land**

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 )**

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

**5. Improved Permanent Pasture (Hatched Yellow)**

**6. Grassland (Yellow)**

5 : Lalang, Improved Coarse Pasture and Scrub-Grassland.

**7. Forest Land (Shades of Green)**

7F : Forest

7S : Scrub Forest

7C : Recently Cleared Land (Black Hatching - 8c Colour)

**8. Swamp, Marshlands 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
  - 3F : Fibre Crops
  - 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)

AREA	SQUARE MILES 50,806	ACRES 32,512,840
------	------------------------	---------------------

AREA 27.52 - 23 -

% OF NATIONAL POPULATION		
	PER SQUARE MILE 79.1	PER ACRE 0.23
STATE	SQUARE MILES 176.4	ACRES 112,944
STATE	PER SQUARE MILE 422.8	PER ACRE 0.65

MAJOR LAND USE CATEGORIES IN ACRES	LAND UNDER AGRICULTURE IN	
	MAJOR CATEGORIES	SUB-CATEGORIES

**APPENDIX B**

**LAND USE SUMMARY OF PAHANG**

Land use acreage and percentage figures for each of the eight districts as well as the State of Pahang 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 Pahang 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 Pahang to that of West Malaysia, b) the population of Pahang 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.

CREPLAND	61,270	85	100	100.0	100
FOREST AND SCRUBLAND	7,105,776	909	100	100.0	100
	41,521	6.1			
	531,152	8.1			
	17,423	0.3			
	74,484	1.1			
	8,290,210	100			

Source: Survey Dept. and Statistics Dept. of the State of Pahang. District and State boundaries as shown on the 1:25,000 aerial photographs taken in 1966. Population figures are based on the 1966 census.

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

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

STATE AREA:-			
LAND USE ACREAGE	8,890,210	(13,890.9 SQ. MILES) <sup>x</sup>	
PHYSICAL ACREAGE	8,890,202	(13,890.9 SQ. MILES) <sup>+</sup>	

NATIONAL AREA	SQUARE MILES 50,806 <sup>@</sup>	ACRES 32,515,840
PERCENTAGE OF NATIONAL AREA		27.3%
POPULATION* 412,690	% OF NATIONAL POPULATION: 5.0%	
POPULATION DENSITY	PER SQUARE MILE 29.7	PER ACRE 0.05
AGRICULTURALLY USED LAND	SQUARE MILES 976.4	ACRES 624,926
POPULATION DENSITY ON AGRICULTURALLY USED LAND	PER SQUARE MILE 422.6	PER ACRE 0.66

LAND USE CATEGORY	D I S T R I C T																TOTAL	%	MAJOR LAND USE CATEGORIES IN ACRES	%	LAND UNDER AGRICULTURAL USE IN %		
	KUANTAN		PEKAN		JERANTUT		TEMERLOH		LIPIS		RAUB		BEN-TONG		CAMERON HIGHLANDS						MAJOR CATEGORIES	SUB-CATEGORIES	
		%		%		%		%		%		%		%		%							
1U: Urban	1,431	0.2	1,358	0.1	487	-	1,668	0.1	912	0.1	1,541	0.3	1,091	0.2	741	0.4	9,229	0.1	URBAN AND ASSOCIATED AREAS	0.2	8.0	1U	
1E: Estate Buildings	272	-	48	-	43	-	735	-	72	-	123	-	310	0.1	141	0.1	1,744	-				1E	
1T: Tin Mining	2,116	0.3	25	-	-	-	27	-	286	-	42	-	400	0.1	-	-	2,896	-				1T	
1X: Other Mining, Quarrying	192	-	735	-	145	-	5	-	140	-	11	-	3	-	5	-	1,236	-				1X	
1P: Transmission Line	-	-	-	-	-	-	13	-	-	-	192	-	-	-	147	0.1	352	-				1P	
2H: Mixed Horticulture	4,012	0.5	6,137	0.3	6,417	0.4	19,765	1.3	7,097	0.5	4,447	0.8	1,908	0.4	4	-	49,787	0.6				HORTICULTURE	0.6
2M: Market Gardening	91	-	4	-	15	-	25	-	-	-	151	-	28	-	1,366	0.8	1,680	-	2M				
2E: Agricultural Stations	211	-	-	-	-	-	-	-	-	-	-	-	3	-	105	0.1	319	-	2E				
3G: Rubber	36,516	4.8	30,789	1.3	40,267	2.2	144,519	9.8	51,029	3.8	74,991	13.2	88,534	19.5	-	-	466,645	5.2	TREE, PALM AND PERMANENT CROPS	5.5	78.6	3G	
3O: Oil Palm	-	-	160	-	962	-	10,508	0.7	527	-	-	-	-	-	-	-	12,157	0.1				3O	
3C: Coconuts	2,308	0.3	4,252	0.2	8	-	210	-	14	-	29	-	-	-	-	-	6,821	0.1				3C	
3N: Pineapple	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	3	-				3N	
3K: Coffee	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				3K	
3T: Tea	-	-	-	-	-	-	-	-	-	-	-	-	-	5,314	3.1	5,314	0.1	3T					
3A: Cocoa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				3A	
3P: Pepper	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				3P	
3S: Sago	-	-	34	-	6	-	8	-	-	-	3	-	6	-	-	-	57	-				3S	
3F: Fibre Crops	-	-	-	-	376	-	-	-	-	-	-	-	-	-	-	-	376	-				3F	
3H: Fish Pond	-	-	6	-	-	-	-	-	-	-	41	-	17	-	-	-	64	-				3H	
3X: Orchards	37	-	27	-	161	-	72	-	9	-	21	-	96	-	38	-	461	-				3X	
4P: Padi	735	0.1	6,916	0.3	4,810	0.3	21,441	1.4	32,198	2.4	3,855	0.7	1,113	0.2	-	-	71,068	0.8				CROPLAND	0.9
4C: Diversified Crops	5	-	320	-	195	-	185	-	86	-	149	-	589	0.1	3	-	1,532	-	4C				
4X: Shifting Cultivation	38	-	2,865	0.1	80	-	791	-	3,301	0.2	871	0.2	79	-	625	0.4	8,650	0.1	4X				
5: Improved Permanent Pasture	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5				
6: Grassland	40,767	5.4	32,300	1.4	26,772	1.5	33,049	2.2	15,812	1.2	16,065	2.8	12,246	2.7	2,456	1.4	179,467	2.0	FOREST AND SCRUBLAND	79.9	100.0	6	
7F: Forest	531,343	70.4	1,475,667	63.4	1,678,781	92.8	1,091,461	73.9	1,130,649	85.0	426,025	74.8	327,452	72.0	136,691	81.0	6,798,069	76.5				7F	
7S: Scrub Forest	20,963	2.8	48,107	2.1	31,031	1.7	70,743	4.8	73,019	5.5	31,413	5.5	11,875	2.6	20,556	12.2	307,707	3.5	Total Acreage under Agricultural Use	624,934 <sup>x</sup>	Percentage of State area under Agricultural Use	7S	
7C: Recently Cleared Land	1,432	0.2	4,318	0.2	4,876	0.3	21,501	1.4	3,135	0.2	3,558	0.6	2,577	0.6	124	0.1	41,521	0.5				7C	
8: Swamp	100,742	13.4	677,056	29.1	2,200	0.1	41,831	2.8	2,390	0.2	3,435	0.6	3,514	0.8	-	-	831,168	9.3	7.0%	7.0%	8		
9: Unused Land	3,223	0.4	8,562	0.4	384	-	961	0.1	4,187	0.3	58	-	48	-	-	-	17,423	0.2			9		
UNCLASSIFIED	7,979	1.0	26,276	1.1	11,740	0.6	17,693	1.2	5,765	0.4	2,283	0.4	2,252	0.5	476	0.3	74,464	0.8	74,464	0.8			
TOTAL	754,413	100	2,325,962	100	1,809,756	100	1,477,214	100	1,330,628	100	569,304	100	454,141	100	168,792	100	8,890,210	100	8,890,210	100			

\* This is a State Population Estimate for June 1966 supplied by the Statistics Department and indicates an increase of 32% 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 8 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.

@ As indicated by the Directorate of National Mapping.

