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LAND CAPABILITY CLASSIFICATION REPORT

JOHORE STATE

TECHNICAL SUB-COMMITTEE ON
LAND CAPABILITY CLASSIFICATION

ECONOMIC PLANNING UNIT
PRIME MINISTER'S DEPARTMENT
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Land Capability Classification Report
Johore State

INTRODUCTION:

As part of a programme of land capability classification for West Malaysia, undertaken by the Technical Sub-Committee for Land Capability Classification of the N.D.P.C., a land capability classification study of the State of Johore was carried out during part of 1967 and 1968. This report summarises the results of this study, and includes a statistical summary prepared from various maps. In addition, reduced and simplified copies of the land alienation, mineral potentiality, soil suitability and forest productivity maps are attached to this report. Copies of the original maps, in addition to the ones attached to this report, on a scale of 1 inch to a mile are available in the office of the Natural Resources Section of the Economic Planning Unit. Additional information pertinent to this report can be obtained from reports published by the contributing Government Departments.

The main objective of this report is to provide an appraisal of the present land use pattern and the more important natural resources, and to obtain a planimetric measure of the extent of these resources. A very broad appreciation is also made of the possibilities for future natural resource use and land development, and to provide some of the data necessary for sound policy formulation. This report is not a detailed study, on the contrary, it is very broad in approach, consequently, it does not present a plan of development.

The data and maps presented in this report reflect the land use and natural resource utilization at the time of compilation. The compilation period extended from July 1967 towards the end of the year.

PRESENT LAND USE UTILIZATION:

The present land use pattern in Johore is presented in table 1 and map A attached to this report. The map which is on a scale of 4 miles to one inch (1:253,440), has been compiled by reduction from larger scale maps for each of the eight districts, and shows the boundaries of the more important alienation and gazettelement groups within the State of Johore. The basic data was supplied by the State Survey Office and the respective district land offices. The map shows the location and extent of land alienated for agriculture, mining and urban development, and also of those areas which have been gazetted for forest, game, aborigine, malay, veterinary, or other official State or Federal use purposes. The remaining areas, indicated by blank spaces on the map, comprise the state land category.

This map, which reflects the legal situation and shows the boundaries of areas covered by deeds of title and gazettelement notices, has been prepared for comparison with the mineral potentiality map, (Map B), the soil suitability map (Map C), and forest productivity map (Map D). When making comparisons between these maps, by super imposing any of the resources maps (B.C. and D) on the land alienation map, it is important to note that map A does not necessarily reflect the present use to which the land is being put. For example, some of the land alienated for agriculture may never have been developed for this purpose and still lies idle, or it may have been developed and may since have been abandoned, while other areas, particularly state land, may be subject to illegal cultivation.

A more accurate picture of the present land use situation can be determined from a "Present Land Use Survey". Such a survey is presently being carried out with the aid of recent aerial photography for the States of West Malaysia. However, at the time of writing this report Johore State had not been covered.

The present summary presented on Map A and in tabular form in table 1 covers the mainland of Johore and Pulau Kupup, but not the islands off the east coast which form part of the Johore State territory. The total area of mainland Johore and the above named island, as determined by the summation method explained in Appendix 1, is approximately 4,692,690 acres, 7,332 square miles. Table 1 presents the estimated acreages of the land use categories shown on the alienation and gazette ment map.

It can be seen from table 1 that 43% of the total land area has been alienated for agriculture. The second largest category is that of forest reserves, which occupy 22% of the total, followed by state land, which occupies 20%. The above named 3 categories account for 85% of the total land area. The remaining 15% or 671,094 acres comprise game reserves, malay reserves and a few smaller categories as can be seen from the table. It is interesting to note that present mining leases do not occupy more than 36,225 acres or less than 1% of the total land area.

Mining:

The total area under mining lease is relatively small, at present 36,225 acres or .77% of the total land area is under mining lease. The districts of Kota Tinggi, Mersing and Segamat account for 92.57% of all land under mining leases.

Agriculture:

The land alienated for agriculture, comprising 2,027,565 acres, can be divided into two classes:

- a. Small-holders agriculture
- b. Estate agriculture

Small-holders agriculture has traditionally been associated with the coastal regions. Almost all of the agricultural alienated land on the West Coast, comprising the districts of Pontian, Batu Pahat and Muar have been alienated to small-holders. The most important commercial agricultural crops produced in this area are pineapple, rubber and coconuts.

Pineapples have been produced, processed and exported successfully during the past decade. Recently however, surplus crops produced by farmers and increased competition in the world market has decreased prices. This has not only resulted in lower returns to the individual producer but has retarded the rate of expansion of small-holders producing pineapple. Inter-cropping is practiced by coconut small-holders, with vegetables and various types of fruits being grown underneath the coconut trees, augmenting the farmer's income in cash and kind. In recent years, the Government has made available capital for coconut replanting schemes and drainage projects. In areas where this has caused a substantial increase in coconut yields, this programme is justified. However, in view of the changed competitive position of the coconut industry, this program should be reappraised.

Further inland, in the district of Muar and the adjacent districts of Segamat, Kluang and Johore Bahru, the estate type agriculture is the more important. Commercial firms and F.L.D.A. have planted large areas under rubber and oil palm. However, with declining rubber prices, suitable old rubber land as well as additional suitable land is being planted under oil palm.

The land alienated for agriculture, in the districts of Mersing and Kota Tinggi on the East Coast, is mainly small-holders agriculture with some locally owned estates. Rubber is here the most important crop. Table 1 indicates that in the Mersing district the land alienated for agriculture accounts for only 2.02% of the total agricultural alienated land in the State, in the Kota Tinggi District this is 8.84%.

Forestry:

Forest reserves occupy 1,039,140 acres or 22.14% of the total land area in the State of Johore. In addition almost all the State land, accounting for 20.35% of the total land area, is under forest. Most of the state land has been logged or is under timber extraction licenses. The forest reserves are being managed on a sustained yield basis, areas that have been logged are being regenerated by the Forest Department. It can be seen from table 1 that the districts of Mersing, Kluang and Segamat account for 71.48% of all land gazetted as forest reserves. Some areas gazetted as forest reserves, have also been gazetted as game reserves, this however is not a conflict of interest, since the two are complementary. A forest reserve provides the animals a natural and undisturbed habitat.

Further perusal of table 1 will indicate to the reader not only the estimated acreage breakdown for the major land use categories on a State basis, but also for the individual districts.

NATURAL RESOURCES:

Mineral Resources:

Table 2 estimates the various areas of mineral potentiality categories, the same information is also shown on map B, which is a reduced copy of the maps contributed by the Geological Survey.

The mineral potentiality classification is based on the potential of any one area for mining.

- | | |
|-----------|---|
| Class I | Current Mining Land - Land covered by current mining leases. |
| Class II | Potential Mining Land - Land shown by prospecting results or inferred from geological records to contain more than 0.2 kati of cassiterite per cubic yard, or workable surface deposits of other minerals, e.g. iron-ore. |
| Class III | Possible Mining Land - Land for which present evidence indicates a possible mineral potential but which needs to be thoroughly examined before commercial development can take place; or unprospected areas which on geological evidence might contain a mineral potential; or unknown areas. |

Class IV Non-Mining Land - Land which has been prospected and shown to have no mineral potential, or which on geological evidence is unlikely to have any mineral potential.

The above classification has been modified after the data had been processed, reprocessing of the data would have caused a lengthy delay in finalising this report. However, these modifications were incorporated in the production of the mineral potentiality map (map B). As a result the legend on map B differs from the mineral potentiality categories used in table 2.

The modified classification, corresponding with the legend of the mineral potentiality map (map B), is represented below, the brackets behind the individual classes refer to the original classification.

Class I Probable mining land as deduced from prospecting results and geological evidence (2).

Class II Area under mining lease/certificate or an area in which active mining is taking place (1).

Class III Possible mining land as deduced from geological evidence (3).

Class IV Areas which on geological evidence might contain mineral deposits (3).

Class V Areas for which no geological or other information is available (3).

Class VI Non-mining land (4).

In comparing the two classification one will notice that the only modifications are a reversing of the classes 1 and 2, class 1 of the old classification becomes class 2 of the new one, and vice versa, and a more detailed breakdown of class III of the old classification into 3 classes, class 3, 4 and 5 of the modified classification. In comparing class 3 of the old classification with the modified one, it is estimated that not more than 15% of the possible mining category, comprises the modified category 3. The above changes in the classification were made because it was felt that potential mining land deserves a higher priority than present mining land, as it represents an untapped future resource, while on present mining land the resources are already being exploited. In addition, class 3 was divided into 3 classes after it was found that it was possible to delineate the three classes on the map.

As a result of the slight modifications in the classification caution should be used in interpreting the table and map together. It can be seen from table 2 that 19,251 acres or 59.23% of the area under mining lease is in the district of Kota Tinggi and that this district also possesses 48.95% of the potential mining area. Mersing district has the second largest area for potential mining accounting for 36.36%. The district of Muar accounts for the third largest percentage of land under mining lease and area for potential mining. Class 3 represents 1,955,943 acres or 41.68% of the total land area, however it is estimated that only 15% or 293,391 acres is possible mining land as deduced from geological evidence.

At the present time mining is taking place in the Kota Tinggi district in two areas, a) the southern tip of the Pengerang peninsula and b) west and north west of the road from Kota Tinggi to Lombong.

The present mining operations in the southern part of the Pengerang peninsula concentrate almost exclusively on bauxite, which is almost all exported as ore. The present mining concerns have not exhausted all their reserves, in fact there are significant ore reserves left. The remainder of the area, classified on the map as class 4, has geological features that suggest that mineral occurrences might be found. In order to determine whether or not they represent an economic potential, it is suggested that a broad reconnaissance mineral exploration program be undertaken.

The current alluvial mining in the area west and north west of the Kota Tinggi - Lombong road is all tin, extracted almost entirely by gravel pump method. This area contributed the greater part of the total tin production for the State of Johore in 1965. Present information indicates that additional areas in this region have mineral potentials. These areas warrant not only further investigations for alluvial tin deposits but also for bed-rock tin and sulphite.

In the Mersing district, tin is being mined by gravel pump method in a belt along the Kota Tinggi-Mersing Road. Present information indicates that additional tin deposits are available when the present leases are worked out. The areas delineated as class 4 on the map warrant broad mineral investigations, especially the area around Jemaluang warrants bedrock exploration for tin, wolfram and base metals, in addition to prospecting for alluvial tin deposits.

An area between Batu Pahat, Labis and Muar contains almost all the iron deposits in the State. At present the area is being mined for iron in several localities, as indicated on map B. The total production for the area has decreased drastically since 1965, during that year the output was in excess of 1 million tons. This drop in production can be mainly attributed to marketing problems and to the effect of tribute. The total output is produced by a number of small mines, each having a low tonnage output with an inherent high cost of transportation.

At present little or no information is available on the additional mineral potential of the area, however further investigations for iron in the area is warranted, there are also known occurrences of manganese and bauxite. In the district of Muar near Dinding along the road from Muar to Yong Peng deposits of tin and niobium tantalum are being mined.

Under the present mining regulations, the maximum area granted for a prospecting permit is not nearly sufficient to encourage high cost bedrock exploration. In order to increase prospecting, especially that of bedrock exploration, it is strongly suggested that the existing regulations are revised to ensure more effective local participation by large mining concerns.

Soil Resource:

Table 3 estimates the various land areas of soil suitability categories, the same information is also shown on map C, which is a reduced copy of the maps contributed by the Department of Agriculture.

The soil suitability classification is based on features of the soil which limits the suitability of the soil for agriculture. Information was obtained from observations made by soil surveyors combined in some cases with information concerning the performance of main crops on different soils. The classification is broad in approach because it is based on data obtained from the schematic-reconnaissance survey of Malaya. Moreover, it is primarily aimed at assessing suitabilities for the main economic crops in the country, and does not contain enough detailed information to predict accurately the suitability for crops not grown on an economic basis in Malaysia.

The limitations to the suitability of soils for agricultural development are divided into three groups*:

- a) very serious limitations e.g. slopes steeper than 20°
 - b) serious limitations e.g. moderate steep slopes 12° - 20°
 - c) minor limitations e.g. susceptible to flooding.
- Based on this, five classes have been established.

- | | |
|-----------|--|
| Class I | Soils with no limitations to agricultural development. |
| Class II | Soils with few minor limitations to agricultural development. |
| Class III | Soils with at least one serious limitation to agricultural development. |
| Class IV | Soils with more than one serious limitation to agricultural development. |
| Class V | Soils with at least one very serious limitation to agricultural development. |

It can be noted from table 3, that the total acreage of class 1 and 2 is 1,493,505 acres or 31.82% of the total land area. Past experience has indicated that the classes 1 and 2 are eminently suitable for a wide variety of crops. In many cases those crops can also be produced on class 3 soils, especially those that have been downgraded due to terrain conditions. It may be concluded from the above that areas where crop diversification is most likely to succeed, are confined almost entirely to the areas covered by soil suitability classes 1 and 2. According to present information areas covered by classes 4 and 5 are not generally considered suitable for agricultural development.

It is interesting to note that no areas in the district of Pontian have been mapped as class 1 or 2, this can be attributed to the large areas of poorly drained organic soils in the form of peat and muck. These soils mapped as class 3 have been drained and are now being used for extensive pineapple cultivation. The districts of Batu Pahat and Muar have a total of 272,826 acres mapped as class 1 and 2 soils. The flat coastal areas, mapped as class 1 and 2, consist of marine clays on which coconuts are produced. The soils of the areas farther inland belong to the Rengam series and produce mainly rubber.

* Ministry of Agriculture and Co-operatives Malaysia, Division of Agriculture Bulletin No. 119, Soil Survey Manual for Malay Conditions PP 191-193.

The districts of Segamat and Kluang have a complex soils pattern, the soils derived from igneous rocks, including the Segamat and Rengam soil series, are predominantly mapped as class 1 and 2 and to some extent as class 3 which is due to topography. The greater part of the soils mapped as class 3 in the districts of Segamat and Kluang are derived from sedimentary materials mainly shales and sand-stones. The total area of class 1 and 2 mapped in the above two districts is 492,039 acres.

The soils in the district of Johore Bahru are mainly derived from igneous rocks. In addition, a substantial area has soils derived from older alluvium which have been mapped as class 3. However, from recent more detailed investigations these soils appear better than originally thought and suitable for diversification in agricultural crops.

The soils in the districts of Kota Tinggi and Mersing mapped as class 1 and 2 are mainly derived from igneous materials, however some of these soils with the same parent material were down-graded due to topography. The area mapped as class 3 in the districts of Mersing and Kota Tinggi are sub-recent alluvium or derived from sedimentary materials.

Knowing that class 1 and 2 are eminently suited for agricultural development with crop diversification, and class 3 suitable for agricultural development for more tolerant tree crops, 3,072,708 acres or 65.47% of the total land area of the State could be used for this purpose. However, at present, of the total area mapped as class 1, 2 and 3 1,491,849 acres have already been alienated for agricultural purposes. Further perusal of table 3 and map C will indicate to the reader the extent and location of the individual soil classes.

Forest Resources:

Table 4 estimates the various areas of forest productivity categories, the same information is also shown on map D, which is a reduced copy of the forest productivity maps contributed by the Forest Department. The forest productivity classification is based on the productivity of the commercial timber. Included as commercial species are those included in classes A to C of the Forest Department's Linear Sampling (L.S.) list of species. A system of 4 classes has been used to indicate the productivity of the commercial species in tons of round timber per acre. The legend on map D differs slightly from the 4 class system used in table 4. On this map an extra class has been introduced i.e. IV R or T, covering all areas that have been treated or regenerated by the Forest Department after a timber extraction license in an area had expired. As a result, the old class IV on map D has become class V. In table 4, however, this change was not possible since all data had already been processed, reprocessing the data would have caused a lengthy delay in publishing the report. As a result class IV in table 4 represents class V and class IV R or T on map D. However, it can be seen from map D that all treated or regenerated forests (class IV R or T) are located in forest reserves, which is a result of the Forest Department's policy to treat only the cut over areas in forest reserves. The five classes used are:

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| Class I | Highly productive forest with a basal area of commercial species of at least 50 square feet, or an approximate equivalence of at least 25 tons of round timber per acre. |
|---------|--|

Class II	Productive forest with a basal area of commercial species between 35 and 50 square feet, or an approximate equivalence of 15 to 25 tons of round timber per acre.
Class III	Marginal forest with a basal area of commercial species between 20 and 35 square feet, or an approximate equivalence of 10 to 15 tons of round timber per acre.
Class IV R or T	Regenerated or treated forest.
Class V	Unproductive forest with a basal area of commercial species below 20 square feet or an approximate equivalence of less than 10 tons of round timber per acre.

Table 1, estimating areas alienated for different purposes, indicated that 1,039,140 acres have been gazetted as forest reserves, accounting for 22.14% of the total land area in the State. In addition one may assume that almost all the state land accounting for 954,891 acres or 20.35% of the total land area is under forest. It can be seen from the above acreage figures that 42.49% of the total land area is still under forest, or has recently been cut and is being regenerated.

Timber is extracted on a commercial basis from forest reserves and state land, at the present time 241,548 acres are under timber extraction licenses. The latest available preliminary figures for the areas that were logged in any one year are for the year 1965. During that period 11,523 acres were logged over in forest reserves and 69,255 acres on state land. As mentioned above, silvicultural methods are used to restock the timber in forest reserves. On state lands however, no silvicultural methods are used.

The forested areas in the State of Johore, including both state land and forest reserves, can be divided into two categories.

- a. forests below the steep land boundary
- b. forests above the steep land boundary

The northern part of the State, adjacent to the Pahang and Negeri Sembilan border, is covered with forest reaching as far south as the Segamat-Kluang-Mersing Road. The greater part of this area, especially the most northern part, has a steep topography. Other forests above the steep land boundary can be found in the hilly parts of the districts of Kota Tinggi and Kluang and the small hill ranges in the Mersing district. Forests below the steep land boundary are found on the fringes of these areas. In addition, one can find small mangrove forest areas along the coasts, especially along the coasts in the southern part of the State. These mangrove forest areas are an important source of fuel wood and poles.

Table 4 indicates the estimated areas of forest productivity for the State, the location of these areas can be seen from map D. The total area of highly productive and productive timber accounts for 690,138 acres or 14.71% of the total land area in the State. Of these two categories two third is located

in the districts of Mersing, Kluang and Segamat. Class 4 accounts for 3,597,566 acres or 75.59% of the total land area. This high percentage is not surprising since it not only includes the treated or regenerated forests, as pointed out above, but also all areas alienated for other purposes than forestry.

Water Resource:

Other natural resource classification categories having an important bearing on land use are those concerned with water. Maps showing the boundaries of catchments presently being utilized for purposes of potable, industrial, hydro-electric, or irrigation purposes have been prepared by the responsible authorities. (Public Works Department, National Electricity Board and Department of Irrigation and Drainage). Table 5, indicates the areas presently utilised as water catchments by the above mentioned departments. Similarly, table 6 gives the estimated areas presently being utilized for irrigation and drainage schemes. It can be seen from this table that all drainage schemes are located in the districts of Pontian, Batu Pahat and Muar. Almost all these schemes are part of the rehabilitation scheme for coconut producers.

Also relevant to an understanding of the use of the water resources in the State is a picture of the annual rainfall distribution pattern and its relationship to the topography. Table 7 prepared from isohyets, estimates areas of land subject to different annual rainfall intensities. It can be seen from the table that no area receives less than 70" of rainfall, in fact not more than 1,274,499 acres or 27.16% of the total land area receives an annual rainfall of less than 90". Further perusal of table 7 will indicate to the reader the distribution on a district basis. Table 8 estimates the areas between the different contours, 4,388,400 acres or 93.52% of the total land area lies below the 500 foot contour level.

LAND CAPABILITY:

Table 9 presents the estimated areas of land Capability Categories in acres. The five categories in the table have been compiled from the mineral potentiality, soil suitability and forest productivity data.

Class I Land possessing a high potential for possible mineral development. (The estimated acreage figure for this class has been taken as the aggregate acreages for current and potential mining, classes 1 and 2 of the mineral potentiality classification).

Class II Land possessing a high potential for possible agricultural development with a wide range of crops. (The acreage figure for this class has been taken as the aggregate acreages of the soil suitability categories having no or a few minor limitations to agricultural development, class 1 and 2 of the soil suitability classification, less those areas over-lapped by class I above).

- Class III Land possessing a moderate potential for possible agricultural development, because of a restricted range of crops. (The acreage figure for this class is the same as class 3 of the soil suitability classification, less those areas over-lapped by class I above).
- Class IV Land possessing a high potential for possible productive forest development. (The acreage figure for this class has been taken as the aggregate acreages of class 1, 2 and 3 of the forest productivity classification, less those areas over-lapped by classes I, II and III above).
- Class V Land possessing little or no mineral, agricultural or productive forest potential, but suitable for possible alternative development such as: protective forest reserves, water catchment areas, game reserves, national parks, etc. (The acreage for this class has been taken as the acreage for the unproductive forest class, class 4 of the forest productivity classification, less those areas overlapped by classes I, II or III above).

The same information presented in table 9 can be obtained from the mineral potentiality map, the soil suitability map, and forest productivity map, maps B, C and D attached to this report by super imposing any one of the above maps on each other. Areas of conflicts, e.g. between mineral potential and agricultural potential land will be included in class I of the land capability classification etc.

It should be clearly understood that in producing the land capability classification, certain basic assumptions had to be made. At present not enough basic information is available to introduce a priority to any one resource development. In areas of conflict further studies should be undertaken to evaluate the alternative uses of the land. However, at this stage it was felt that it would be more useful to introduce a ranking of the resources that would provide the State with a preliminary guideline for land allocation, than nothing at all. Moreover, it can be said that the priority introduced in the land capability classification taken in a broad sense, will probably be proven right when more information becomes available at a later stage. It has further been assumed that there will be a continuing demand for additional mining land, which will be met largely from the potential mining class shown on map B and table 2. Also that there will be a continuing need to develop more land for agriculture, with this need being met largely from the unalienated areas shown to have either no, few, or only one serious limitation to agricultural development, shown on map B and table 3. Similarly, the eventual concentration of the forest industry in those areas containing productive forest and not suitable for mining or agriculture is assumed.

The broad application of the classification criteria to West Malaysia as a whole, has already indicated that the area of land subject to mining is likely to increase only by a relatively small amount. The extent of the increase will be one of probably less than 2% of the total area of West Malaysia. However, the land developed to agriculture might be increased to almost double the existing figure, and might eventually extend over at least 55% of the country. Even if this agricultural development is allowed for, it is believed that some 32% of the total area of the country will still consist of productive forest. This will constitute the permanent productive forest estates in the future. Another 10% of the country will most likely fall into the permanent productive category and is likely to be conserved in its natural condition for water-shed protection, nature conservation or similar purpose.

The estimated areas of land in the State of Johore falling within the five land capability classes is apparent from table 9. It can be seen that of the total land area of the State only 62,100 acres or 1.33% has a mining potential. Land suitable for agriculture accounts for 64.50% of the total land area. The remainder of the land area falls into classes 4 and 5.

RESOURCE DEVELOPMENT POTENTIAL:

A comparison of the land capability classification table with table 1 showing the land areas that have been alienated, suggests the extent of the opportunities for further land development in the State.

At present 2,027,565 acres have been alienated for agriculture, of this area, 1,491,849 acres or 73% possess soils which are suitable for agriculture, class 1, 2 and 3 of the soil suitability classification. The remainder of the agricultural alienated lands, amounting to 535,716 acres have soils which are not recommended for agriculture. These areas can be located by superimposing the soil suitability map (Map C) on the land alienation map (Map A). However, in addition to the areas already alienated for agriculture, 1,045,143 acres of the land area of the State possess an agricultural potential.

Table 10, indicates the estimated areas of alienated and state land having soils suitable for agricultural development. It can be seen that 607,959 acres of state land have an agricultural potential. Most of this land can be found in the district of Kota Tinggi, 310,914 acres or 51.14%. The Pengerang peninsula and the central area of the district offer this potential for agricultural development. The other two districts with the largest acreages of state land suitable for agricultural development are Mersing and Kluang. However, the largest part of the state land in the district of Kluang has been committed to F.L.D.A.

It can also be seen from table 10 that, besides the state land, the forest reserves offer the greatest potential for agricultural development. A total of 555,795 acres in the forest reserves out of total of 1,039,140 acres gazetted as forest reserves possess soils suitable for agricultural development. The forest reserves in the districts of Mersing, Kluang and Segamat alone possess a total of 455,814 acres of suitable soils for agricultural development. Further perusal of table 10, will indicate to the reader the extent and distribution of soils suitable for agricultural development on state land and areas already alienated.

In comparing table 10 and table 9, one will notice a difference in acreage between the total of the soil suitability classes 1, 2 and 3 and class 2 and 3 from table 9. This difference, being 45,747 acres is the area where there exists a conflict between mining and agricultural development. By superimposing the mineral potentiality map (Map B) on the soil suitability map (Map C) these areas can be located. The total acreage suitable for agricultural development and having a mining potential represents only 1.48% of the total land area having soils suitable for crop production.

Table 11, presents the estimated areas of soil suitability class 1, 2 and 3, subject to different annual rainfall intensities.

It may be concluded that the greatest potential for agricultural expansion is on state land and in forest reserves. Future mining development will not interfere, since the area where there exists a conflict is very small. In order to ensure that agricultural development will be carried out in an orderly fashion, active liaison should be established between the various government departments and land development authorities. It is of utmost importance that the Forest Department is well informed of future agricultural development schemes to ensure that all commercial timber has been cut, and if development takes place within the boundaries of a forest reserve no silvicultural methods are used to regenerate the timber. In order to minimize conflicts of this nature, it is recommended that the State government focus its attention in the first place on state land before degazetting forest reserves for land development.

Table 12 indicates the estimated areas of state land and alienated land covered by productive forest. The total estimated area covered by forest productivity classes 1, 2 and 3 is 1,144,917 acres. As expected, the greatest percentage of this acreage is located in forest reserves, game reserves and on state land. These three areas account for 1,082,610 acres.

In order to determine the areas that are suitable for agricultural development and are also covered by productive forest, one should compare tables 4 and 9. The same information can also be obtained by superimposing the forest productivity map (Map D) on the soil suitability map (Map C). One will find that 602,577 acres of the land area of the State covered by productive forest have soils which are suitable for agricultural development. As expected the greater part of this acreage is located in forest reserves.

In contrast to the conflict that exist between forestry and agriculture, mining development does not present a problem of the same magnitude. In fact, the conflict is very small, as has already been indicated above. Table 13, indicates the estimated areas of state land and alienated land covered by mineral potentiality categories.

Johore State has 364,734 acres of land gazetted as game reserves, most of these reserves are part of areas that have also been gazetted as forest reserves, except for the Segamat Sanctuary and 15% of the Endau-Kluang Reserve. As indicated, large areas of these reserves have soils suitable for agricultural development, as a result it is most likely that these areas will be developed for agricultural purposes.

However, this exercise has indicated that there are areas within the presently gazetted game reserves that not only have topography which makes it not suitable for agriculture but also soils which are of an inferior quality. Two of these areas can be located: a) the Mersing game reserve, which is part of the Mersing forest reserve and b) that part of the Endau-Kluang reserve that falls outside the forest reserve.

In preserving the above areas as game reserves, they may well function as areas where wild life will be attracted to as adjacent areas are being developed. Moreover, the coastal strip of the Mersing game reserve has a potential for recreation.

SUMMARY:

This report presents a description of the physical resources of the State, an evaluation of the manner in which these resources are being allocated and used, and through the land capability classification a provisional guideline concerning their future allocation and use.

The broad pattern of future development is dictated by terrain, climatic, and hydrological conditions and by the present alienated and gazettelement pattern. It is apparent that two main programs will be required. The first applies to the areas already alienated for agriculture. Development efforts in this areas should be directed towards raising crop yields and ensuring the stability of yield. The second type of program involves large-scale establishment of permanent cultivation in those areas that have suitable soils for agricultural production.

This study has indicated that large areas of land, which are presently not committed, have good potentials for agricultural development. Prospects for development of forestry in the State are good, but should be concentrated in areas not suitable for long range agricultural development. Mining prospects should be fully explored, in the form of bedrock exploration besides the search for alluvial tin, in areas delienated having a mineral potential.

APPENDIX 1

Area Summation Method:

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

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

Table 1

C.V. (%)	N			
	50,000 NK	10,000 NK	5,000 NK	1,000 NK
100	1	1	1	1
30	11	11	11	11
25	16	16	16	16
20	25	25	25	24
15	45	44	44	43
10	100	99	98	91
5	400	380	370	286
4	620	590	560	385
3	1090	1000	910	526
2	2380	2000	1670	714
1	8330	5000	3340	909
0.5	22220	8000	4440	976

N = Total no. of sampling points in the area. The exact plain acreage equivalent of a 1,000 yard square is 20,661,116 acres, but in order to facilitate the calculations necessary for preparing the acreage tables presented in this report, the area equivalent of each sampling point has been taken as 207 acres, thus introducing a bias of .2% into the quoted figures. Therefore, in order to determine the number of sampling points related to a given acreage, the acreage figure should be divided by 207.

NK = Total no. of sampling points with a particular quality "K".

The table gives, for four area classifications, the number of points with a particular quality, necessary to give the corresponding coefficient of variation, e.g. the total estimated land area of the State of Johore is 4,692,690 acres which is equivalent to 22,670 sampling points. The percentage standard error for area estimates within the boundary of the State can therefore be calculated by reference to column 3 in the table. As the total estimated area of the district of Kota Tinggi is 849,321 acres (table 1) equivalent to 4,103 sample points, and as this figure is most closely approximate to the figure of 5000 in the third column of the table, the standard error for the estimated acreage in this district is 1%.

$$\text{The standard error} = \frac{1}{100} \times 4103 \times 207 = \underline{\underline{8493}} \text{ acres.}$$

TABLE 1
STATE OF JOHORE
ESTIMATED AREAS OF ALIENATED AND GAZETTED LAND IN ACRES

DISTRICT	Class 0		Class 1		Class 2		Class 3		Class 4		Class 5		Class 6		Class 7		Class 8		TOTAL	% of State Total
	State Land	% of State Total	Alienated for Agriculture	% of State Total	Alienated for Mining	% of State Total	Malay Reserves (Unalienated)	% of State Total	Grazing Reserves	% of State Total	Aborigine Reserves	% of State Total	Forest Reserves	% of State Total	Game Reserves	% of State Total	Alienated/Reserved for Other Purposes	% of State Total		
Alor Gajah	174,294	18.25	40,986	2.02	9,936	27.43	21,321	10.90	621	6.12	3,312	38.10	266,823	25.68	182,781	50.11	621	1.12	700,695	14.93
Bandar Tenggara	404,892	42.40	179,262	8.84	17,181	47.43	57,546	29.39	414	4.08	2,691	30.95	113,022	10.87	72,036	19.75	2,277	4.10	849,321	18.10
Bayan Lepas	36,225	3.79	333,270	16.44	"	"	1,449	0.74	"	"	207	2.38	33,741	3.25	"	"	21,321	38.43	426,213	9.08
Bayan Lepas	36,225	3.79	333,270	16.44	"	"	1,449	0.74	"	"	207	2.38	33,741	3.25	"	"	1,449	2.61	227,079	4.84
Belaga	25,461	2.67	167,877	8.28	"	"	6,831	3.49	"	"	"	"	25,461	2.45	"	"	8,280	14.93	487,485	10.39
Belaga	25,461	2.67	167,877	8.28	"	"	6,831	3.49	"	"	"	"	25,461	2.45	"	"	8,280	14.93	487,485	10.39
Belaga	84,249	8.83	370,944	18.30	414	1.14	5,175	2.64	621	6.12	"	"	17,802	1.71	"	"	11,178	20.15	585,189	12.67
Belaga	84,249	8.83	370,944	18.30	414	1.14	5,175	2.64	621	6.12	"	"	17,802	1.71	"	"	11,178	20.15	585,189	12.67
Belaga	42,021	4.40	388,332	19.15	1,449	4.00	31,050	15.85	4,347	42.86	414	4.76	106,398	10.24	"	"	5,796	10.45	708,561	15.10
Belaga	42,021	4.40	388,332	19.15	1,449	4.00	31,050	15.85	4,347	42.86	414	4.76	106,398	10.24	"	"	5,796	10.45	708,561	15.10
Belaga	151,731	15.89	278,622	13.74	828	2.29	14,283	7.29	621	6.12	1,656	19.05	215,073	20.70	39,951	10.95	4,554	8.21	708,147	15.09
Belaga	151,731	15.89	278,622	13.74	828	2.29	14,283	7.29	621	6.12	1,656	19.05	215,073	20.70	39,951	10.95	4,554	8.21	708,147	15.09
Belaga	36,018	3.77	268,272	13.23	6,417	17.71	58,167	29.70	3,519	34.70	414	4.76	260,820	25.10	69,966	19.19	55,476	100.00	4,692,690	100.00
Belaga	36,018	3.77	268,272	13.23	6,417	17.71	58,167	29.70	3,519	34.70	414	4.76	260,820	25.10	69,966	19.19	55,476	100.00	4,692,690	100.00
TOTAL: 954,891	100.00	2,027,565	100.00	36,225	100.00	195,822	100.00	10,143	100.00	8,694	100.00	1,039,140	100.00	364,734	100.00	55,476	100.00	4,692,690	100.00	
TOTAL: 954,891 (20.35%)		2,027,565 (43.21%)		36,225 (0.77%)		195,822 (4.17%)		10,143 (0.22%)		8,694 (0.19%)		1,039,140 (22.14%)		364,734 (7.71%)		55,476 (1.18%)		4,692,690 (100.00%)		

TABLE 2
STATE OF JOHORE
ESTIMATED AREAS OF MINERAL POTENTIALITY CATEGORIES IN ACRES

DISTRICT	Class 1		Class 2		Class 3		Class 4		TOTAL	% Of State Total
	Current Mining	% Of State Total	Potential Mining	% Of State Total	Possible Mining	% Of State Total	Non Mining	% Of State Total		
Mersing	6,210	19.11	10,764	36.36	320,436	16.38	363,885	13.58	700,695	14.93
Kota Tinggi	19,251	59.23	14,490	48.95	377,982	19.32	437,598	16.36	849,321	18.10
Johore Bahru	"	"	207	0.70	39,123	2.00	386,883	14.46	426,213	9.08
Pontian	"	"	"	"	"	"	227,079	8.50	227,079	4.84
Batu Pahat	1,035	3.18	621	2.10	67,896	3.47	417,933	15.63	487,485	10.39
Muar	4,968	15.29	3,519	11.89	275,724	14.10	300,978	11.25	585,189	12.47
Kluang	828	2.55	"	"	368,046	18.82	339,687	12.70	708,561	15.10
Segamat	207	0.64	"	"	506,736	25.91	201,204	7.52	708,147	15.09
STATE TOTAL:	32,499	100.00	29,601	100.00	1,955,943	100.00	2,674,647	100.00	4,692,690	100.00
STATE TOTAL:	32,499 (0.69%)		29,601 (0.63%)		1,955,943 (41.68%)		2,674,647 (57.00%)		4,692,690 (100.00%)	

TABLE 3
STATE OF JOHORE
ESTIMATED AREAS OF SOIL SUITABILITY CATEGORIES IN ACRES

DISTRICT	Class 1		Class 2		Class 3		Class 4		Class 5		TOTAL	% Of State Total
	No Limitations	% Of State Total	Few Minor Limitations	% Of State Total	One serious Limitation	% Of State Total	More Than One Serious Limitation	% Of State Total	Very serious Limitation	% Of State Total		
Mersing	10,557	1.84	134,550	14.63	297,666	18.85	125,028	13.00	132,894	20.18	700,695	14.93
Kota Tinggi	102,051	17.78	310,500	33.77	188,370	11.93	149,040	15.50	99,360	15.09	849,321	18.10
Johore Bahru	129,582	22.57	41,400	4.50	180,711	11.44	55,062	5.73	19,458	2.96	426,213	9.08
Pontian	-	-	-	-	81,972	5.20	144,900	15.07	207	0.03	227,079	4.84
Batu Pahat	22,770	3.97	24,840	2.70	191,061	12.09	230,184	23.94	18,630	2.83	487,485	10.39
Muar	125,442	21.85	99,774	10.85	141,174	8.94	93,564	9.73	125,235	19.02	585,189	12.47
Kluang	62,100	10.82	258,543	28.12	207,414	13.13	85,698	8.91	94,806	14.39	708,561	15.10
Segamat	121,509	21.17	49,887	5.43	290,835	18.42	78,039	8.12	167,877	25.50	708,147	15.09
STATE TOTAL:	574,011	100.00	919,494	100.00	1,579,203	100.00	961,515	100.00	658,467	100.00	4,692,690	100.00
STATE TOTAL:	574,011 (12.23%)		919,494 (19.59%)		1,579,203 (33.65%)		961,515 (20.49%)		658,467 (14.04%)		4,692,690 (100.00%)	

TABLE 4
STATE OF JOHORE
ESTIMATED AREAS OF FOREST PRODUCTIVITY CATEGORIES IN ACRES

DISTRICT	Class 1		Class 2		Class 3		Class 4*		TOTAL	% Of State Total
	Highly Productive	% Of State Total	Productive	% of State Total	Marginally Productive	% Of State Total	Unproductive	% Of State Total		
Mersing	42,642	19.67	55,476	11.72	182,988	40.22	419,589	11.85	700,695	14.93
Kota Tinggi	10,764	4.97	40,365	8.53	150,489	33.07	647,703	18.26	849,321	18.10
Johore Bahru	621	0.29	28,773	6.07	3,312	0.73	393,507	11.09	426,213	9.08
Pontian	-	-	33,948	7.17	-	-	193,131	5.44	227,079	4.84
Batu Pahat	11,178	5.16	10,557	2.23	5,382	1.19	460,368	12.97	487,485	10.39
Muar	20,286	9.36	50,301	10.63	11,385	2.50	503,217	14.18	585,189	12.47
Kluang	40,986	18.91	121,302	25.62	61,479	13.51	484,794	13.66	708,561	15.10
Segamat	90,252	41.64	132,687	28.03	39,951	8.78	445,257	12.55	708,147	15.09
STATE TOTAL:	216,729	100.00	473,409	100.00	454,986	100.00	3,547,566	100.00	4,692,690	100.00
STATE TOTAL:	216,729 (4.62%)		473,409 (10.09%)		454,986 (9.70%)		3,547,566 (75.59%)		4,692,690 (100.00%)	

* Included in this class are forests which have been treated or regenerated; as can be seen from the Forest Productivity map these are all located in presently gazetted Forest Reserves.

TABLE 5
STATE OF JOHORE
ESTIMATED AREAS PRESENTLY BEING UTILISED AS WATER CATCHMENTS IN ACRES

DISTRICT	Class 0		Class 1		Class 2		Class 3		Class 4		Class 5		Class 6		Class 7	
	NIL	% Of State Total	DID, NEB, PWD	DID, NEB	DID, PWD	% Of State Total	NEB, PWD	DID	% Of State Total	NEB, PWD	DID	% Of State Total	NEB, PWD	% Of State Total	TOTAL	% Of State Total
rsing	693,243	20.33	--	--	2,484	3.21	--	--	--	--	--	--	4,968	0.42	700,695	14.93
ta Tinggi	845,802	24.81	--	--	--	--	--	1,449	7.00	--	--	2,070	0.17	849,321	18.10	
more Bahru	296,424	8.69	--	--	--	--	--	1,656	8.00	--	--	128,133	10.81	4,621,213	9.08	
ntlan	217,971	6.39	--	--	--	--	--	--	--	--	--	9,108	0.77	227,079	4.84	
tu Pahat	296,424	8.69	--	--	19,665	25.40	--	--	--	--	--	171,396	14.47	487,485	10.39	
ar	348,381	10.22	--	--	2,691	3.48	--	13,869	67.00	--	--	220,248	18.59	585,189	12.47	
uang	572,148	16.78	--	--	23,184	29.95	--	3,726	18.00	--	--	109,503	9.24	708,561	15.10	
amat	139,311	4.09	--	--	29,394	37.96	--	--	--	--	--	539,442	45.53	708,147	15.09	
STATE TOTAL:	3,409,704	100.00	--	--	77,418	100.00	--	20,700	100.00	--	--	1,184,868	100.00	4,692,690	100.00	
STATE TOTAL:	3,409,704 (72.66%)		--	--	77,418 (1.65%)		--	20,700 (0.44%)		--	--	1,184,868 (25.25%)		4,692,690 (100.00%)		

TABLE 6
STATE OF JOHORE
ESTIMATED AREAS PRESENTLY UTILISED AND PROPOSED FOR IRRIGATION
AND DRAINAGE SCHEMES IN ACRES

DISTRICT	Class 0		Class 3		Class 4		Class 5		Class 6		Total	% Of State Total
	ML	% Of State Total	Irrigation Schemes	% Of State Total	Proposed Irrigation Schemes	% Of State Total	Drainage Schemes	% Of State Total	Proposed Drainage Schemes	% Of State Total		
Mersing	672,336	17.68	4,347	14.00	24,012	75.32	-	-	-	-	700,695	14.93
Kota Tinggi	792,603	20.85	621	2.00	-	-	-	-	56,097	9.73	849,321	16.10
Johore Bahru	409,446	10.77	-	-	-	-	-	-	16,767	2.91	426,213	9.08
Pontian	49,266	1.30	621	2.00	-	-	43,884	17.46	133,308	23.12	227,079	4.84
Batu Pahat	99,774	2.62	5,382	17.55	4,347	13.64	114,264	45.47	263,718	45.75	487,485	10.39
Muar	436,977	11.50	6,417	20.67	3,312	10.39	93,150	37.07	45,333	7.87	585,189	12.47
Kluang	657,225	17.29	8,073	26.00	-	-	-	-	43,263	7.90	708,561	15.10
Segamat	684,342	17.99	5,589	18.00	207	0.65	-	-	18,009	3.12	708,147	15.09
STATE TOTAL:	3,801,969	100.00	31,050	100.00	31,878	100.00	251,298	100.00	576,495	100.00	4,692,690	100.00
STATE TOTAL:	3,801,969 (81.02%)		31,050 (0.66%)		31,878 (0.68%)		251,298 (5.36%)		576,495 (12.26%)		4,692,690 (100.00%)	

TABLE 7
STATE OF JOHORE
ESTIMATED AREAS OF LAND SUBJECT TO DIFFERENT ANNUAL RAINFALL INTENSITIES IN ACRES

DISTRICT	Class	Class	Class	Class	Class	Class	Class	Class	Class	Class	Class	Class	Class	Class	Class	Class	Class	Class	Class	Total	% Of State Total
	0 70"	70-80" 1 % Of State Total	80-90" 2 % Of State Total	90-100" 3 % Of State Total	100-110" 4 % Of State Total	110-120" 5 % Of State Total	120-130" 6 % Of State Total	130-140" 7 % Of State Total	140-150" 8 % Of State Total	> 150" 9 % Of State Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00		
Mersing	--	--	20,152	3.59	71,622	6.15	55,062	6.87	167,256	25.23	312,570	43.23	44,298	99.53	21,735	100.00	--	--	700,695	14.93	
Kota Tinggi	--	--	--	--	11,178	0.97	86,940	10.84	365,769	55.17	305,434	53.31	--	--	--	--	--	--	849,321	18.10	
Johore Bahru	--	--	--	--	133,308	11.45	184,230	22.97	83,620	12.61	25,047	3.46	--	--	--	--	--	--	426,213	9.08	
Pontian	--	--	--	--	25,047	2.15	170,568	21.27	31,464	4.75	--	--	--	--	--	--	--	--	227,079	4.84	
Batu Pahat	--	--	57,339	7.31	275,310	23.65	154,836	19.31	--	--	--	--	--	--	--	--	--	--	505,169	12.47	
Muar	--	76,797	15.67	221,697	28.26	196,236	16.86	90,459	11.28	--	--	--	--	--	--	--	--	--	700,561	15.10	
Kluang	--	--	202,446	25.80	431,388	37.06	99,823	7.46	14,904	2.24	--	--	--	47	--	--	--	--	700,147	15.09	
Segamat	--	413,172	84.33	274,896	35.04	19,872	1.71	--	--	--	--	--	207	100.00	21,735	100.00	--	--	4,692,690	100.00	
STATE TOTAL:	--	489,969	100.00	784,530	100.00	1,163,961	100.00	801,918	100.00	663,021	100.00	723,051	100.00	44,505	100.00	21,735	100.00	--	4,692,690	100.00	
STATE TOTAL:	--	489,969 (10.44%)		784,530 (16.72%)		1,163,961 (24.80%)		801,918 (17.09%)		663,021 (14.13%)		723,051 (15.41%)		44,505 (0.95%)		21,735 (0.46%)			4,692,690 (100.00%)		

TABLE B
STATE OF JOHORE
ESTIMATED AREAS OF LAND BETWEEN DIFFERENT CONTOUR LAYERS IN ACRES

DISTRICT	Class 0		Class 1		Class 2		Class 3		Class 4		Class 5		Class 6		Class 7		Class 8		TOTAL	% Of State Total
	0-499'	% Of State Total	500-999'	% Of State Total	1000-1999'	% Of State Total	2000-2999'	% Of State Total	3000-3999'	% Of State Total	4000-4999'	% Of State Total	5000-5999'	% Of State Total	6000-6999'	% Of State Total	7000-7999'	% Of State Total		
Belaga	641,206	14.61	34,983	22.50	22,563	17.70	1,863	9.57	-	-	-	-	-	-	-	-	-	-	700,695	14.93
Belaga	807,507	18.40	31,878	20.51	9,729	7.67	207	1.06	-	-	-	-	-	-	-	-	-	-	849,321	18.10
Bera	418,140	9.53	4,968	3.19	3,105	2.45	-	-	-	-	-	-	-	-	-	-	-	-	426,213	9.08
Belaga	227,079	5.17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	227,079	4.84
Belaga	482,103	10.99	4,554	2.93	828	0.65	-	-	-	-	-	-	-	-	-	-	-	-	487,485	10.39
Belaga	549,378	12.52	18,216	11.72	12,420	9.79	4,347	22.34	828	80.00	-	-	-	-	-	-	-	-	585,189	12.47
Belaga	678,753	15.47	19,044	12.25	10,143	7.99	621	3.20	-	-	-	-	-	-	-	-	-	-	708,561	15.10
Belaga	584,154	13.31	41,814	26.90	68,103	53.67	12,420	63.83	207	20.00	-	-	-	-	1,449	100.00	-	-	708,147	15.09
STATE TOTAL:	4,388,400	100.00	155,457	100.00	126,891	100.00	19,458	100.00	1,035	100.00	-	-	-	-	1,449	100.00	-	-	4,692,690	100.00
STATE TOTAL:	4,388,400 (93.52%)		155,457 (3.31%)		126,891 (2.70%)		19,458 (0.42%)		1,035 (0.02%)		-	-	-	-	1,449 (0.03%)		-	-	4,692,690 (100.00%)	

TABLE 9
STATE OF JOHORE
ESTIMATED AREAS OF LAND CAPABILITY CATEGORIES IN ACRES

DISTRICT	Class 1		Class 2		Class 3		Class 4		Class 5		Total	% Of State Total
	Potential Mining	% of State Total	Potential Agriculture*1	% of State Total	Potential Agriculture*2	% Of State Total	Potential Forestry	% Of State Total	Potential & Protectives Forestry	% Of State Total		
Mersing	16,974	27.34	141,795	9.61	267,730	18.54	89,153	18.27	155,043	14.61	700,695	14.93
Kota Tinggi	33,741	54.33	401,373	27.21	175,122	11.20	106,398	19.61	132,687	12.50	849,321	18.10
Johore Bahru	207	0.33	170,982	11.59	180,504	11.63	20,359	5.23	46,161	4.35	426,213	9.08
Pontian	--	--	--	--	81,972	5.29	33,741	6.22	111,366	10.50	227,079	4.84
Batu Pahat	1,656	2.67	47,610	3.23	169,819	12.23	14,697	2.71	233,703	22.02	487,405	10.39
Muar	8,487	13.67	221,283	15.00	139,311	8.98	59,202	10.91	156,906	14.79	585,189	12.47
Kluang	828	1.33	320,643	21.74	206,506	13.31	59,823	11.03	120,681	11.38	708,561	15.10
Segamat	207	0.33	171,396	11.62	290,835	18.74	141,174	26.02	104,535	9.85	708,147	15.09
STATE TOTAL:	62,100	100.00	1,475,082	100.00	1,551,879	100.00	542,547	100.00	1,061,082	100.00	4,692,690	100.00
STATE TOTAL:	62,100 (1.33%)		1,475,082 (31.43%)		1,551,879 (33.07%)		542,547 (11.56%)		1,061,082 (22.61%)		4,692,690 (100.00%)	

*1 Land possessing a high potential for possible agricultural development with a wide range of crops.

*2 Land possessing a moderate potential for possible agricultural development with a restricted range of crops.

TABLE 10
STATE OF JOHORE

ESTIMATED AREAS OF ALIENATED AND STATE LAND COVERED BY SOIL SUITABILITY CATEGORIES IN ACRES

DISTRICT	SOIL SUITABILITY	Class 0		Class 1		Class 2		Class 3		Class 4		Class 5		Class 6		Class 7		Class 8		Total	% Of State Total
		State Land	% Of State Total	Alienated Agriculture	% Of State Total	Mining Lease	% Of State Total	Malay Reserve	% Of State Total	Grazing Reserve	% Of State Total	Aberigine Reserve	% Of State Total	Forest Reserve	% Of State Total	Gene Reserve	% Of State Total	Town Land Govt. Reserve	% Of State Total		
Mesing	Class 1.	--	--	--	--	--	--	--	--	--	--	--	--	--	10,557	--	--	--	10,557		
	Class 2.	27,738		1,035		2,070		--		--		621		58,995	44,091		--		134,550		
	Class 3.	86,940		21,735		4,968		6,031		414		207		107,047	60,724		--		297,666		
	Total:	114,678	18.86	22,770	1.53%	7,038	28.10	6,031	6.04	414	6.45	828	18.18	166,042	123,372	51.69	--	--	442,773	14.41	
Kota Tinggi	Class 1.	31,257		49,680		2,898		828		--		--		11,178	6,003		207		102,051		
	Class 2.	103,609		51,129		3,519		19,251		--		2,070		18,630	32,292		--		310,500		
	Class 3.	96,048		54,855		5,175		15,525		--		207		11,178	4,554		828		188,370		
	Total:	310,914	51.14	155,664	10.43	11,592	46.28	35,604	31.50	--	--	2,277	50.00	40,986	42,849	17.95	1,035	3.52	600,921	19.56	
Johore Bahru	Class 1.	828		119,025		--		828		--		--		6,831	--		2,070		129,582		
	Class 2.	207		38,709		--		--		--		--		1,863	--		621		41,400		
	Class 3.	16,353		153,801		--		621		--		207		2,691	--		7,038		180,711		
	Total:	17,388	2.86	311,535	20.89	--	--	1,449	1.29	--	--	207	4.55	11,385	--	--	9,729	33.10	351,693	11.44	
Pontian	Class 1.	--		--		--		--		--		--		--	--		--		--		
	Class 2.	--		--		--		--		--		--		207	--		1,035		81,972		
	Class 3.	3,105		74,313		--		3,312		--		--		207	--		1,035	3.52	81,972	2.67	
	Total:	3,105	0.51	74,313	4.98	--	--	3,312	2.93	--	--	--	--	207	0.04	--	1,035		81,972		
Batu Pahat	Class 1.	2,691		18,009		--		--		--		--		1,656	--		414		22,770		
	Class 2.	3,105		20,493		--		1,242		--		--		--	--		--		24,840		
	Class 3.	35,397		144,900		414		828		414		--		4,347	--		4,761		191,051		
	Total:	41,193	6.78	183,402	12.29	414	1.65	2,070	1.83	414	6.45	--	--	6,003	1.08	--	5,175	17.61	238,671	7.77	
Muar	Class 1.	5,796		103,914		--		621		414		--		12,213	--		2,484		125,442		
	Class 2.	3,726		85,698		--		5,589		1,863		414		--	--		2,484		99,774		
	Class 3.	7,038		96,255		207		7,038		414		--		29,187	--		1,035		141,174		
	Total:	16,560	2.72	285,867	19.16	207	0.83	13,248	11.72	2,691	41.94	414	9.09	41,400	7.45	--	6,003	20.42	366,390	11.92	
Kluang	Class 1.	12,420		44,505		--		--		--		--		828	3,726		621		62,100		
	Class 2.	24,012		108,054		--		828		621		621		117,576	5,589		1,863		258,543		
	Class 3.	41,814		89,838		828		8,073		207		207		60,444	5,302		207		207,414		
	Total:	78,246	12.87	242,397	16.25	828	3.31	8,901	7.88	621	9.68	828	18.18	178,848	14,697	6.16	2,691	9.15	528,057	17.19	
Segamat	Class 1.	4,761		58,374		2,070		2,277		--		--		41,607	11,799		621		121,509		
	Class 2.	1,035		11,799		--		20,079		621		--		11,799	4,554		--		49,887		
	Class 3.	20,079		145,728		2,898		19,251		1,656		--		56,718	41,400		3,105		290,835		
	Total:	25,875	4.26	215,901	14.47	4,968	19.83	41,607	36.81	2,277	35.48	--	--	110,124	57,753	24.20	3,726	12.68	462,231	15.04	
STATE TOTAL:		607,959	100.00	1,491,849	100.00	25,047	100.00	113,022	100.00	6,417	100.00	4,554	100.00	555,795	100.00	238,671	100.00	29,394	100.00	3,072,708	100.00
STATE TOTAL:		607,959 (19.78%)		1,491,849 (48.54%)		25,047 (0.82%)		113,022 (3.68%)		6,417 (0.21%)		4,554 (0.15%)		555,795 (18.09%)		238,671 (7.77%)		29,394 (0.96%)		3,072,708 (100.00%)	

TABLE 11
STATE OF JOHORE
ESTIMATED AREAS OF SOIL SUITABILITY CATEGORIES SUBJECT TO DIFFERENT ANNUAL RAINFALL
INTENSITIES IN ACRES

DISTRICT	SOIL SUITABILITY	Class		Class		Class		Class		Class		Class		Class		Total	% of State Total		
		0	70 ¹ % of State Total	70-80 ¹	% of State Total	80-90 ²	% of State Total	90-100 ³	% of State Total	100-110 ⁴	% of State Total	110-120 ⁵	% of State Total	120-130 ⁶	% of State Total			130-140 ⁷	% of State Total
Muar	Class 1.	--	--	--	--	--	--	4,140	--	6,417	--	--	--	--	--	10,557	--		
	Class 2.	--	--	--	--	--	--	4,960	--	60,850	--	--	--	--	--	134,550	--		
	Class 3.	--	--	6,831	--	14,904	--	23,104	--	44,091	--	52,992	--	20,206	--	297,666	--		
	TOTAL:	--	--	6,831	1.39	25,254	5.36	32,292	6.95	111,366	23.25	213,210	43.31	21,714	99.03	442,773	14.41		
Tanjong	Class 1.	--	--	--	--	--	--	13,041	--	68,310	--	20,700	--	--	--	102,051	--		
	Class 2.	--	--	--	--	2,484	--	33,741	--	120,060	--	154,215	--	--	--	310,500	--		
	Class 3.	--	--	--	--	2,070	--	12,006	--	89,010	--	85,204	--	--	--	100,370	--		
	TOTAL:	--	--	--	--	4,554	0.61	58,708	12.55	277,300	57.91	260,199	52.86	--	--	600,921	19.56		
Muar Bharu	Class 1.	--	--	--	--	24,633	--	41,607	--	50,500	--	12,834	--	--	--	129,502	--		
	Class 2.	--	--	--	--	4,960	--	18,423	--	12,420	--	5,509	--	--	--	41,400	--		
	Class 3.	--	--	--	--	60,103	--	99,774	--	12,420	--	414	--	--	--	100,711	--		
	TOTAL:	--	--	--	--	97,704	13.08	159,804	34.39	75,340	15.73	18,757	3.83	--	--	351,693	11.44		
Muar	Class 1.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	Class 2.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	Class 3.	--	--	--	--	9,315	--	63,963	--	8,694	--	--	--	--	--	81,972	--		
	TOTAL:	--	--	--	--	9,315	1.25	63,963	13.76	8,694	1.82	--	--	--	--	81,972	2.67		
Muar	Class 1.	--	--	2,484	--	4,347	--	15,939	--	--	--	--	--	--	--	22,770	--		
	Class 2.	--	--	3,105	--	21,735	--	--	--	--	--	--	--	--	--	24,840	--		
	Class 3.	--	--	44,919	--	99,774	--	46,368	--	--	--	--	--	--	--	191,061	--		
	TOTAL:	--	--	50,500	10.23	125,856	16.85	62,307	13.41	--	--	--	--	--	--	230,671	7.77		
Muar	Class 1.	--	14,697	28,775	--	40,365	--	41,607	--	--	--	--	--	--	--	125,442	--		
	Class 2.	--	18,423	21,735	--	49,616	--	--	--	--	--	--	--	--	--	99,774	--		
	Class 3.	--	22,563	79,488	--	31,671	--	7,452	--	--	--	--	--	--	--	141,174	--		
	TOTAL:	--	55,683	129,996	26.34	131,652	17.62	49,099	10.56	--	--	--	--	--	--	366,390	11.92		
Muar	Class 1.	--	--	12,834	--	21,878	--	17,388	--	--	--	--	--	--	--	62,100	--		
	Class 2.	--	--	99,360	--	155,043	--	2,277	--	1,863	--	--	--	--	--	258,543	--		
	Class 3.	--	--	48,024	--	136,206	--	18,837	--	4,347	--	--	--	--	--	207,414	--		
	TOTAL:	--	--	160,218	32.47	323,127	43.25	38,502	8.28	6,210	1.29	--	--	--	--	528,057	17.19		
Muar	Class 1.	--	59,823	61,479	--	--	--	--	--	--	--	--	--	--	--	121,509	--		
	Class 2.	--	42,021	7,659	--	207	--	--	--	--	--	--	207	--	--	49,887	--		
	Class 3.	--	199,548	76,797	--	14,490	--	--	--	--	--	--	--	--	--	290,835	--		
	TOTAL:	--	301,392	145,935	29.57	14,697	1.96	--	--	--	--	--	207	0.97	--	462,231	15.04		
STATE TOTAL:		--	357,075	493,488	100.00	747,063	100.00	464,715	100.00	478,998	100.00	492,246	100.00	21,321	100.00	17,802	100.00	3,072,708	100.00
STATE TOTAL:		--	357,075 (11.62%)	493,488 (16.06%)		747,063 (24.31%)		464,715 (15.12%)		478,998 (15.58%)		492,246 (16.02%)		21,321 (0.69%)		17,802 (0.60%)		3,072,708 (100.00%)	

ESTIMATED AREAS OF ALIENATED AND STATE LAND COVERED BY MINERAL POTENTIALITY CATEGORIES IN ACRES

MINERAL POTENTIALITY	Class 0		Class 1		Class 2		Class 3		Class 4		Class 5		Class 6		Class 7		Class 8		TOTAL	% Of State Total	
	State Land	% Of State Total	Alienated Agriculture	% Of State Total	Mining Lease	% Of State Total	Malay Reserve	% Of State Total	Grazing Reserve	% Of State Total	Aborigine Reserve	% Of State Total	Forest Reserve	% Of State Total	Game Reserve	% Of State Total	Town Government Reserve	% of State Total			
Class 1.	2,277				3,726								207						6,210		
Class 2.	6,003				2,070								1,242						10,764		
Class 3.	78,453		1,449		3,519						207		128,133		104,535				320,436		
Class 4.	87,561		5,589		621				621		3,105		137,241		78,246		621		363,285		
TOTAL:	174,294	18.26	33,948	2.02	9,936	27.43		21,321	6.12	3,312	38.10		266,823	25.68	182,281	50.11	621	1.12	700,695	14.93	
Class 1.	3,933		1,449		13,041			414					414						19,251		
Class 2.	7,038		3,312		1,656			207					1,863		414				14,490		
Class 3.	186,714		21,321		1,242		28,359						69,759		70,173		414		377,982		
Class 4.	207,207		153,180		1,242		28,566		414		2,691		40,986		1,449		1,863		437,598		
TOTAL:	404,892	42.40	179,262	8.84	17,181	47.43	57,546	29.39	414	4.09	2,691	30.95	113,022	10.88	72,036	19.75	2,277	4.10	849,321	18.10	
Class 1.																					
Class 2.			207																207		
Class 3.	207		37,260								207		1,656						29,123		
Class 4.	36,018		295,803				1,449				207		32,085						386,883		
TOTAL:	36,225	3.79	333,270	16.44			1,449	0.74			207	2.38	33,741	3.25				21,321	38.43	426,213	9.08
Class 1.																					
Class 2.																					
Class 3.																					
Class 4.	25,461		167,877				6,831						25,461					1,449	227,079		
TOTAL:	25,461	2.67	167,877	8.28			6,831	3.49					25,461	2.45				1,649	227,079	4.84	
Class 1.																					
Class 2.																					
Class 3.																					
Class 4.	414		621		414								207						1,035		
TOTAL:	84,249	8.82	370,944	18.30	414	1.14	5,175	2.64	621	6.12			17,802	1.71				3,933	67,896		
Class 1.	828		828		1,242			414					1,656						4,968		
Class 2.	207		3,312																3,519		
Class 3.	26,703		126,891		207		19,665		2,070		414		95,013					4,761	275,724		
Class 4.	14,283		257,301				10,971		2,277				9,729					6,417	300,978		
TOTAL:	42,021	4.40	388,332	19.15	1,449	4.00	31,050	15.86	4,347	42.86	414	4.76	106,398	10.24				11,178	585,189	12.47	
Class 1.			414		414																
Class 2.																					
Class 3.	23,391		121,095										183,442		39,123				414	368,046	
Class 4.	128,340		157,113		414		14,283		621		1,035		31,671		820			5,382	339,667		
TOTAL:	151,731	15.89	278,622	13.74	828	2.29	14,283	7.29	621	6.12	1,656	19.05	215,073	20.70	39,951	10.95	5,796	10.45	706,561	15.10	
Class 1.					207																
Class 2.																					
Class 3.	17,181		115,920		6,210		42,435		1,449		414		252,540		69,966			621	506,736		
Class 4.	18,837		152,352				15,732		2,070				8,280					3,933	201,204		
TOTAL:	36,018	3.77	268,272	13.23	6,417	17.71	58,167	29.70	3,519	34.69	414	4.76	260,820	25.09	69,966	19.19	4,554	8.21	708,147	15.09	
STATE TOTAL:	954,891	100.00	2,027,565	100.00	36,225	100.00	195,822	100.00	10,143	100.00	8,694	100.00	1,039,140	100.00	364,734	100.00	55,476	100.00	4,692,690	100.00	
									10.143 (0.22%)		8.694 (0.19%)		1,039,140 (22.14%)		364,734 (7.77%)		55,476 (1.18%)		4,692,690 (100.00%)		

