Report No.119

Report on a Semi-Detailed Soil Survey of the SUNGEI BOK AREA

4th Division

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Contents

Introduction

The Sungei Bok Area is located in the Batang Tinjar, Baram District, Fourth Division (see location map) and is formed by approximately 4,000 acres of flatland on both sides of Sg. Bok extending to the foothills which form the northern and the southern boundaries. A soil survey was requested to investigate the suitability of this area for wet padi cultivation.

The area was included in the reconnaissance soil survey of the Lower Baram-Bakong-Tinjar Area reported by Wall (Survey Report No. 88). This survey at semi-detailed level was carried out in March, 1968 by a team comprising the reporter and two Agricultural Assistants, Basmawi bin Mahli and Zamiran bin Ujang.

The area is flat and therefore does not show any relief or outstanding topographical features. A few small streams which have their source in the hills form the drainage pattern of the area and these streams could possibly supply sufficient fresh water for an irrigation scheme. The present APPS near Rh. Raden obtains its water supply from Sg. Alat. The approximate position of these two rivers is marked on the map.

Vegetation and Land Use

There is very little primary forest left in this area except for a few patches in the south and in the northwest corner of the area. The existing primary forest is mainly Peat Forest on deep peat. The bulk of the area except for the area at Nanga Bok which is under very poor old secondary forest, is used annually for padi cultivation. Between this permanently cultivated area and the primary forest, the land is used for shifting cultivation and is covered with secondary growth.

Method of Survey

There being no main topographic feature in the area, the soil boundaries are drawn mainly from the information obtained in the rentises and are supplemented by additional information on vegetation pattern as seen from aerial photographs.

Rentises were cut from the river bank to the foothill at intervals ranging from 1,000 to 2,000 feet. The survey team could not cut at closer intervals due to the existence of padi fields, the crossing of which according to the Ibans in the area, is a 'pemali'. As the result the location of the rentises had to be adjusted to conform to the land use. However, sufficient information was obtained to enable the compilation of a soil map and the survey report.

There being no base map with an accurate scale, a field map was prepared from enlarged aerial photographs (Sortie 6/66 Nos. 908 to 910 and Nos. 904 to 906) of which a mosaic was made.

Soils

The soils in this area are derived from alluvial material brought down by Sg. Bok and are mainly gley soils due to high water-tables. Towards the foothills these alluvial deposits are covered

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by peat of varying depth. In two small areas a clay layer of 10-15 inches thickness was formed to wedge in between peat layers. This type of soil is classified as an Anderson variant.

The soils found in this area are classified as follows:-

GREAT SOIL GROUP	SOIL FAMILY
Red-Yellow Podsolic	Malang
Recent Alluvial soils	Seduau
Gley soils	Bijat, Sebandi
Peat soils	Mukah, Anderson

Malang/Seduau Families (670 acres)

These two families though belonging to two different groups are mapped in association due to insufficient field data to separate them into individual units.

The Malang family is normally a brownish yellow to reddish yellow clay at depth with light grey to grey mottles found well below 20 inches depending on the height of the water table. Malang soil is found in location where no new alluvial materials are accumulating.

The common feature of the Seduau soil is generally a homogeneous brownish yellow clay loam to clay with some indication of stratification. Pale brown to light grey mottles occur at a depth of 20 inches plus, which is mainly due to imperfectly drained condition in soil profile. Seduau soils are actively accumulating alluvium.

Both soils can support a wide variety of crops.

Bijat Family (1,750 acres)

This soil family covers an extensive area of the bottomlands. It is usually found between the Malang family and the Sebandi family, with the latter grades merging into peat soils.

The common features of these soils are light grey and clay mottled, with reddish yellow to strong brown in the first 20 inches of the profile. In areas where the water table is close to the surface, very few mottles are seen. The drainage condition is generally poor.

The bulk of these soils is used for padi cultivation.

The Bijat family in its natural condition, is suitable for padi. However, with improved drainage condition, better padi production could be expected from this soil.

Sebandi Family (635 acres)

This is another family of gleyed soils. It is found mainly backing the Bijat soil, or at the edges of Mukah soil, and as a component of Bijat/Sebandi soils (70 acres).

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The characteristics for the Sebandi family are similar to those of the Bijat family, except that the former has a peaty topsoil of up to 10 inches thickness. This profile comprises light grey to white clay with few, if any, fine strong brown mottles mainly along old root channels. The mottles are totally absent where the water table comes up to the surface. The drainage condition is poor to very poor.

Like Bijat, Sebandi soil is ideal for padi cultivation but needs improved drainage.

Mukah Family (330 acres)

Where the peat on clay exceeds 10 inches in thickness, the soils are classified as Peat Soils. The Mukah family comprises soils of 10-40 inches of peat on light grey clay. In areas where the Mukah soils have been used for padi cultivation, the first 10 inches of the peat is usually well decomposed to give a mucky loam texture. The drainage condition is generally poor. The potentiality of this soil could only be realised with drainage improvement. Mukah soils are also mapped in association with Anderson family (75 acres).

Anderson Family (470 acres)

Peat deeper than 40 inches is classified as Anderson Family which is usually further divided into depth phases; such division was not possible in this area.

The peat consists of thick, raw, woody material in various stages of decomposition. In cleared areas the top layer is always well decomposed and crumbly.

A variant of the Anderson Family (25 acres) is formed by soils having a clay layer of 10-15" thickness at an average depth of 2' from the surface. This variant occurs as a small area in the western corner of the area as marked on the soil map.

Conclusions

Out of the total of 4,025 acres (measured on the soil map) 3,530 acres are regarded as suitable for the cultivation of padi, while 495 acres (Anderson family soils) are regarded as suitable after improvement of drainage.

Generally speaking the area of Sg. Bok is indeed ideal for a large Padi Scheme especially if a fresh water supply could be obtained from the streams found in the area for irrigation purposes during the dry season.

Specific drainage requirements for the soils found in flood-plains and coastal areas in Sarawak are found in the Appendix. Map 2 is based on the drainage requirements as explained in this appendix.

APPENDIX

DRAINAGE REQUIREMENT AND DEVELOPMENT POTENTIAL CLASSIFICATION FOR FLOODPLAIN AND COASTAL AREAS

At the present time considerable emphasis is being placed on the development of wet rice, coconut and oil palm on land where agricultural development is limited by poor drainage conditions. A drainage scheme is commonly proposed for such areas and it is becoming standard practice to request soil survey information at a semi-detailed level before investing in drainage works. A need has therefore arisen for a system of rating such land in terms appropriate to these development problems, so that different scheme proposals can be readily compared and the relative benefits of drainage works in different areas assessed.

A Drainage Requirement and Development Potential Classification has therefore been compiled, in which the soil families occurring in such areas are rated from the viewpoint of the ease with which they can be brought into productive cultivation. The Classification is employed for the first time in the Tanjong Jol area, the soil data being interpreted in terms of the Classification in Map 2.

This system has different aims from other soil and land classification systems which have been used in soil survey reports and in some respects is founded on different basic assumptions. In particular, to keep the system relevant to the type of problem for which it is designed, only a limited range of soil and land conditions are considered and the agricultural goals against which the land is rated are confined to those which conform to present development policies for such areas. To avoid confusion with other types of land rating some explanation of this system is required.

The Classification refers only to the alluvial and peat soils found along the coast or in association with major rivers, freshwater swamps or interior valleys. Soils on hill land are not considered. Well-drained alluvial soils are included (although drainage works are not required on them) because they are commonly found in association with poorly-drained soils and any scheme for agricultural improvement of the latter is likely to concern the former as well.

In defining the Classes and rating the soils within them it is assumed that a general development scheme is envisaged rather than an ad hoc improvement of smallholder units. If sufficient effort is applied, deep peat soils, for example, can be made quite productive in small areas with a little local drainage improvement. On large areas, however, such a form of development would be impracticable. Due to the expense of draining these soils and the length of time necessary before any large-scale development of them can be effected, they are given a low rating in this system.

At the Class level the extent of the drainage requirement is rated. Within the Classes, subclasses are distinguished on the development potential once appropriate improvements are carried out.

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The development potential can be defined as the potential for speedy and economic development, and is not the agricultural potential as such. Thus a droughty infertile sandy soil suitable for a limited range of crops is given a higher rating than a poorly-drained clay which, with the application of minor drainage works would be suitable for a wide range of crops. The more limited agricultural potential of the former is offset by the relative ease with which it can be brought into cultivation. From the viewpoint of the development planner both soils are of interest. Conversely, strongly saline clays exist which, on the basis of chemical analyses, appear to have a higher inherent fertility, and therefore agricultural potential, than most, if not all, other soils considered in this classification. The problems of bringing them into agricultural use are, however, so great that they are considered to have a very low potential for development except in particular conditions and their potential is not classified.

As stated above, in rating the soils their suitability has been estimated only for wet padi, coconut and oil palm. A large-scale development of these crops is encouraged by the Department, as their environmental requirements can be met in Sarawak and they are known to be economically feasible. Certain floodplain and coastal soils are known to be suitable for other crops (cocoa and coffee, for example) but the feasibility and economic benefits of large-scale plantings of these crops are, to a large extent, unknown. Such crops are therefore not considered in rating the families.

The Classification relies heavily on the amount of knowledge available on the requirements and benefits of large-scale crop planting in Sarawak and is strongly influenced by present development policies in connection with floodplain areas. Only within these limits can the classification be considered an objective one. A permanent absolute rating is not intended. It may be repeated that the classification is drawn up to help those who are involved in development planning for such areas to assess the problems confronting them and to apply the policies in force at the present time. It is not intended for use in other contexts.

Five Classes are used. Class D.I mainly covers dry land soils, D.II and D.III land is of interest to planners where improved drainage can be provided. Class D.IV land should generally be ignored in planning and Class D.V covers particular problem soils. (The prefix 'D' is used to avoid confusion with other classifications in circulation.)

CLASS D. I : NO DRAINAGE IMPROVEMENT REQUIRED

CLASS D.IA

Definition: Land on which a wide range of crops can be grown with little improvement. Minor fertility problems. Possible minor drainage problems. Possible intermittent flooding hazard.

Soil families: MALANG. SEDUAU.

Recommended use: Coconut or oil palm (but where other areas are available for these crops such land is best reserved for fruit trees, vegetables, etc.)

CLASS D.IB

Definition: Land on which a limited range of crops can be grown at present. No drainage problems. Moderate fertility problems. All problems easily rectified.

Soil families: KABONG. SEMATAN.

Recommended use: Coconut.

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CLASS D.II : MINOR DRAINAGE IMPROVEMENT REQUIRED

CLASS D.IIA

Definition: Land on which wet padi can be grown at present. If drainage is improved, a wider range of crops is possible. Minor fertility problems. Only minor drainage improvement necessary but for large-scale development government assistance required in most areas.

Soil families: BIJAT. SEBANDI. MUKAH (10-20 inches peat). PENDAM. JOL.

Recommended use following improvement: Coconut or oil palm.

CLASS D.IIB

Definition: As for Class D.IIB but fertility problems moderate to great.

Soil families: TATAU. MATU. NONOK. KAYAN. IGAN (10-20 inches peat.)

Recommended use after improvement: Coconut.

CLASS D.III : MODERATE DRAINAGE IMPROVEMENT REQUIRED

CLASS D.IIIA

Definition: Land not recommended for agriculture without prior improvement of drainage conditions. Where areas are large, drainage problems can only be rectified through a major drainage scheme (although where small areas of this Class occur in an area of dominantly Class D.II land, the entire area can appropriately be considered as the latter for the purpose of planning improvements.) Minor fertility problems. Suitable for a range of crops following improvement.

Soil families: MUKAH (20-40 inches peat). ANDERSON 1 (40-80 inches peat, where underlain by clay.)

Recommended use after improvement: Coconut or oil palm. (But where wet rice is required small areas of this land in an area dominantly of Class D.IIB can be treated as Class D.IIB land.)

CLASS D.IIIB

Definition: As for Class D.IIIA but fertility problems moderate to great.

Soil families: IGAN (20-40 inches peat). ANDERSON 1 (40-80 inches peat, where underlain by sand).

Recommended use after improvement: Coconut.

CLASS D.IV : MAJOR DRAINAGE IMPROVEMENT REQUIRED

Definition: Land in which drainage problems are so great that no agricultural use can be considered unless a regional drainage scheme can be undertaken (and in many areas such a scheme is known to be impracticable.) Where small areas of this Class occur in an area of dominantly Class III land, the entire area can be considered as the latter for the purpose of planning development. Only long-terms benefits can be expected from this portion of the area, however.

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Soil families: ANDERSON 1 (60-80 inches peat.) ANDERSON 2. ANDERSON 3.

Recommended use after improvement: Where peat is underlain by clay, as for Class D.IIIA. Where peat is underlain by sand as for Class D.IIIB.

CLASS D.V : DRAINAGE REQUIREMENT UNCLASSIFIED

Definition: Land in which drainage and salinity problems are so great that large-scale improvements would be extremely expensive. It is considered, however, that the agricultural returns from such land are likely to be sufficiently high to justify the cost of such improvements. Such land cannot at present be considered for development where the acreage is large unless a regional drainage improvement scheme can be provided. However, where the acreage is small and adjoins large areas of Class D.IIB land, it should be rated as Class D.II land and included in any drainage improvement scheme planned for the adjacent area.

Soil families: RAJANG.

Recommended use after improvement: There is insufficient data for recommendations to be made, but this land is likely to be appropriate for coconut, oil palm or wet rice after drainage and leaching of salts.

SUNGEI BOK AREA

Baram District

Fourth Division

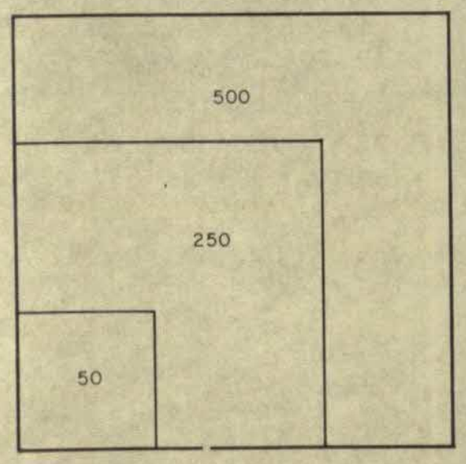
MAP I

Soils

Survey Drawing No. 188 — Compiled by Ahmad Hj Eban — S. A. No. 119 — Drawn by M. Lim April 68

LOCATION

ACREAGE SCALE



KEY

ORIGIN	MAPPING UNIT	SOIL FAMILY	MAIN SOIL CHARACTERISTICS	APPROXIMATE ACREAGE
ALLUVIAL DEPOSIT	Mlg/Sdu	MALANG/SEDILAU	Well drained to imperfectly yellow to reddish yellow clay	670
	Bjt	BIJAT	Poorly drained light grey alluvial clay	1,750
	Bjt/Sbd	BIJAT/SEBANDI		70
	Sbd	SEBANDI	Poorly drained light grey clay with peat top soil up to 10 inches thick	635
ORGANIC DEPOSIT	Mkh	MUKAH	Poorly drained light grey to grey clay with peat top soil ranging from 10-40" thick	330
	Mkh/And	MUKAH/ANDERSON		75
	And	ANDERSON	Peat ranging from 40-120" +	470
	And		Variant of Anderson soil with clay layer of 10"-15" at average depth of 2' from the surface	25

SCALE 1:20,000