

WOSSAC: 42417

631.473  
(911.14)

**Report No. 127**

**Report on a Semi-Detailed Soil Survey  
of the  
SUNGEI KELULIT AREA  
( BEKENU )**

**4th Division**

**by  
Ahmad Haji Ebon  
(A.A.O. Soil Survey)**

**Soil Survey Division  
Research Branch**

**October, 1968.**

**Dept of Agriculture  
Sarawak**

631.473(911.14)

# HUNTING TECHNICAL SERVICES

The study area is located approximately 10 miles down the Sungsang River from Bokan Town (see location in Map 1). The area is bounded by foothills in the north, Sg. Sibuti, Sg. Kelalit and an embankment running westward from the northern boundary while the southern line is the canal and the west form the other borders. The total area surveyed is approximately 2,015 acres.

This survey was requested for a proposed 1,500 acre coconut estate and 500 acre wet padi. The diagrammatic map of the area is shown on Map 1. This area was included in soil reconnaissance survey (1962) which shows that the area is under peat soils belonging to the Bijat Family (Anderson 7 & 1) with Rajang Soil found along Sg. Sibuti.

## Contents

	page
Introduction	1
Vegetation and Land Use	1
Population	1
Method of Survey	2
<b>SOILS:</b>	
Bijat Family	2
Sebandi Family	3
Mukah Family	3
Anderson Family	3
Limbang Family	3
Soil suitability for coconut and rice	4
References	5

Seedling rubber is found on the Bijat soil near the upper part of Sg. Kelalit.

## Population

The people of Kampong Kelalit are Kelapas or Muslim folk. They do not live together in one area but scattered along the foothills that form the northern boundary, where their padi fields are located. A local school up to Primary Four education was set up at this Kampong to serve the children in the area.

# HUNTING TECHNICAL SERVICES

The Kuluik area is located approximately 10 miles down the Kuluik River from Kuluik Town (see location in Map 1). The area is bounded by Terbilie to the south, Kg. Sibuti, Kg. Kuluik and an arbitrary line running westward form the northern boundary while the arbitrary lines on the east and the west form the other borders. The total area surveyed is approximately 1,815 acres.

This survey was requested for a proposed 1,500 acre coconut scheme and 500 acre wet paddy. The diagnostic map of the two schemes on Map 11. This area was included in the reconnaissance survey (1962) which shows that the area is under post soils belonging to the Anderson Family (Anderson & K. J.) with Rajang Soil found along Kg. Sibuti.

## Contents

	page
Introduction	1
Vegetation and Land Use	1
Population	1
Method of Survey	2
<b>SOILS:</b>	
Bijat Family	2
Sebandi Family	3
Mukah Family	3
Anderson Family	3
Limbang Family	3
Soil suitability for coconut and rice	4
References	5

Soil number is found on the Bijat soil near the upper part of Kg. Kuluik.

## Population

The people of Kuluik Sibuti are Kuluik of Hindu faith. They do not live together in one area but scattered along the Terbilie that form the northern boundary, where their main houses are located. A local school up to Primary Four education was set up at this Kuluik to serve the children in the area.

## Introduction

The Kelulit area is located approximately 10 miles down the Sibuti River from Bekenu Town (see location in Map 1). The area is bounded by foothills in the south, Sg. Sibuti, Sg. Kelulit and an arbitrary line running westward form the northern boundary while two arbitrary lines on the east and the west form the other borders. The total area surveyed is approximately 2,815 acres.

This survey was requested for a proposed 1,500 acre coconut scheme and 500 acre wet padi scheme (see the diagramatic map of the two schemes on Map 1). This area was included in Wall reconnaissance survey (1962) which shows that the area is under peat soils belonging to the Anderson Family (Anderson 2 & 3) with Rejang Soil found along Sg. Sibuti.

The semi-detailed soil survey described by this report was carried out in June, 1968. The fieldwork was largely undertaken by two Agricultural Assistants, Basmawi bin Mahli and Zamiran bin Ujang. The writer was with the survey party towards the latter part of the survey.

Three maps of scale 1:20,000 were produced. Map 1 shows the soils distribution, Map 2 Vegetation and Land Use and Map 3 the drainage requirement.

## Vegetation and Land Use

As indicated on Map 2 which was compiled from aerial photographs (sortie 17/68 Photo No. 0650-52) the bulk of the area is covered by peat swamp forest. The area along the foothills has been cleared for the cultivation of wet padi while those along Sg. Kelulit and Sg. Sibuti are partly planted with coconut. The coconut trees along Sg. Sibuti and Sg. Kelulit are grown under deep peat which has been drained. The trees though looking healthy show a general inclination instead of an upright position. This defect is to be expected of coconuts grown on drained peat because the tree roots cannot get a good anchorage. The taller the trees grow the more they would incline. The nuts on these trees are rather small and few in number. The trees are approximately 8 years old.

Seedling rubber is found on the Bijat soil near the upper part of Sg. Kelulit.

## Population

The people of Kampong Kelulit are Kadayan of Muslim faith. They do not live together in one area but scattered along the foothills that form the southern boundary, where their padi fields are located. A local school up to Primary Four education was set up at this Kampong to serve the children in the area.

### Method of Survey

There being no relief feature, the soil mapping depends on the vegetation pattern on the photographs. Rentises were cut at an average intervals of 500 meters or approximately 1,700 feet. There was no accurate scale map available and the field map was compiled from a mosaic made from enlarged aerial photographs (Sortie 17/68 Photo No.0650-51). The acreage given on the soil map are therefore not 100% accurate.

### Soils

The soils in this area are mainly peat soils derived from the accumulation of organic materials. Sg. Kelulit was originally a small winding stream flowing through peat swamp. Before the Second World War this stream was straightened into a channel by the local inhabitants. There has been practically no silt deposition along this channel during the short period except the upper part of Sungei Kelulit. It is assumed that the present Sg. Sibuti is flowing through the peat swamp from the evidence that deep peat found right to the banks of Sg. Sibuti.

The presence of gleyed minerals soils found along the foothills in the south could possibly be the colluvial materials washed down from the hills. These colluvial materials find their way in between the peat layer which was mapped as the soil variants of Sebandi and Mukah family.

The soils of the area are classified at a group and family level as shown in the table below:-

Great Soil Group	Soil Family
Gley soils	Bijat
	Sebandi
Peat soils	Mukah
	Anderson
	Limbang

#### Bijat Family (100 acres)

It is a poorly drained alluvial clay which in this area is found at the upper part of Sg. Kelulit.

Bijat profile is normally light grey or greyish brown clay with scattered yellowish brown mottles which are more prominent in the upper part of the profile than lower down. The profile is always moist to wet.

The area under this soil is presently under seedling rubber and coconut, the growth of which looks very healthy.

Sebandi Family (185 acres) and variant (80 acres)

This soil is found along the foothills. It is closely related to the Bijat soil but occupies areas where the drainage condition is very poor. Watertables are at or near the surface throughout the year.

The common feature of Sebandi soil is the peat surface layer of less than 10 inches overlying the gleyed clayey materials. In many sites the peat is found again immediately below the clay layer at an average depth of 25 inches from the surface. Such profiles are presently mapped as Sebandi variant. It occupies the area between the true Sebandi and the true Mukah. A total of 80 acres of this soil is mapped in this area.

Almost all the Sebandi soil is used for wet padi cultivation.

Mukah Family (70 acres) and variant (40 acres)

Where peat exceeds 10 inches in thickness, the soil is considered as peat soil and the depth of peat determines the classification of the different family level of the peat soils.

Mukah comprises of peat which is 10 to 40 inches in thickness and is underlain by strongly gleyed sticky clays. This soil family occupies the area behind the Sebandi soil. Like the Sebandi variant, the peat in the Mukah variant is found immediately below the clay layer at an average depth of 35 inches from the surface. This soil occupies 40 acres of the flat.

Some of the soil under Mukah are constantly used for the wet padi cultivation.

Anderson Family (2,225 acres)

All peat deeper than 40 inches is classified in Anderson Family. Within this family depth phases are distinguished, Anderson 1 being 40 to 80 inches of peat (410 acres), Anderson 2 comprising 80 to 120 inches of peat (1,390 acres) and Anderson 3 comprising all peat deeper than 120 inches (425 acres).

The peat consists of raw woody materials, underlain by clay mineral at depths as stated in the various Anderson phases. It is a water-logged soil. The bulk of the area under survey is under Anderson 1 to 3 and it is still covered with primary swamp forest. The shallow peat along the river and the foothill has been cleared for coconut and padi.

Limbang Family (115 acres)

This soil is found along Sg. Sibuti and at the estuary of Sg. Kelulit.

Limbang soil is peat soil of varying depth and is influenced by the incursion of saltwater. The boundary between this soil and the Anderson on the map is largely based on the limit of the Mangrove in the vegetation pattern.

Some of the area under this soil has been cleared for coconut.

Soil suitability for coconut and rice

The present soil survey was carried out in connection with the proposed drainage scheme involving some 1500 acres of land for coconut and some 500 acres for padi, the location of which is shown diagrammatically on Map 1.

Coconut will grow on a variety of soil ranging from some residual soil on the hills to the riverine alluvial clays and the coastal sand. The most important characteristic necessary for coconut is good drainage. Coconuts growing in waterlogged conditions generally have a short bearing life but it is essential that the roots of the coconut reach the constant water supply. The optimum depth of the permanent watertable varies with the age of the palms and the development of the root system, but it is in the order of 2-3 feet for the young palm and 5-8 feet for the mature palm. Of the soils present in this area, only Sebandi and Mukah soils are suitable for coconut but the acreages of these two soils are too small, moreover they are not included in the area earmarked. The area proposed for the scheme has soils belonging to the Anderson Family class 1-3. To reclaim this vast area for coconut through major drainage scheme may involved a considerable investment of funds and even when such scheme is considered justifiable, it would take some years before permanent crops could be planted in the area. Again the danger of these permanent crops of great height such as coconut, felling over is great because of poor anchorage.

Up to the present time the Department has not recommended the use of peat soils of over three feet deep for any agricultural purpose, other than sago. Further experience has now enabled a slight modification to be made in this matter. The Anderson 1 (i.e. peat of 40 to 80 inches deep overlying clay) can now be accepted for wet padi or coconuts in areas where drainage of the peat is possible and more suitable land is not available.

It must always be borne in mind that there will be a marked lowering of the level of the land following the clearing and draining of areas of peat, this can be as much as several feet when primary jungle is felled. This is to be remembered when an inspection of the drainage possibilities is made.

When the areas are **planned** for coconut it is essential that the land be cleared and drained (and planted to short term crops) for at least one year, before coconuts are planted in order to give the soil time to settle. It must be remembered that it will be necessary to drain the land to a depth of 3-5 feet after settling of the soil if the coconut are to be grown successfully.

Where wet padi is to be planted, good drainage is essential; it will take 2 to 3 years, at least, before it is possible to construct bunds from peat but wherever it proves feasible bunds should be constructed from the underlying clay. The yields of padi on peat will be rather less than yields from mineral soils. In this area there is only a small strip of Sebandi and Mukah soils mainly along the foothill. The greater part of these mineral soils is under the annual padi cultivation.

In view of the above factors it would be economical to concentrate the development efforts to areas of better soils where crops with proper development and management would be certain to give good returns.

Since the area under Bijat, Sebandi and Mukah soils are very limited, where possible the aids through the A.P.P.S. should be extended to the farmers whose lands are located under the above soil families.

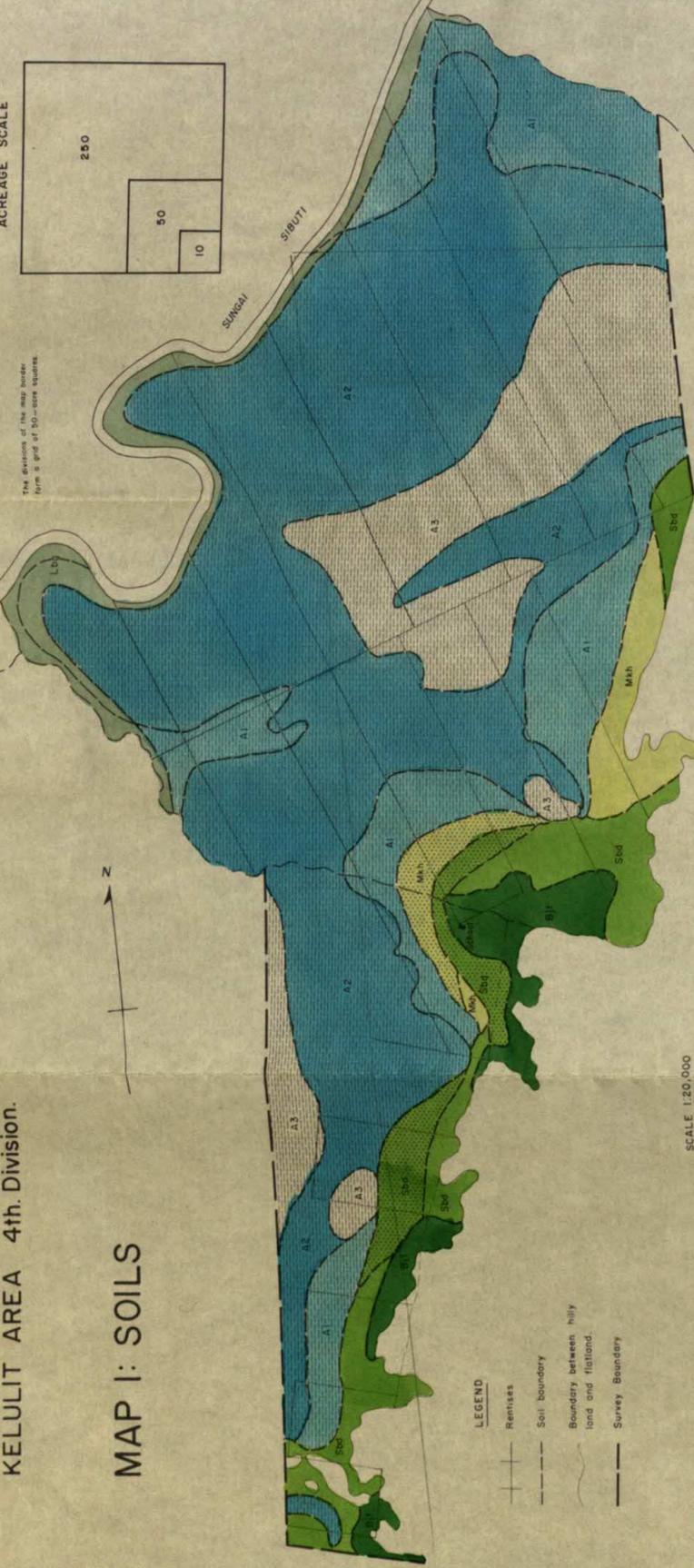
For further information on the drainage recommendation, please refer to the Appendix of Soil Survey Report No.119.

References

1. Scott, I. M. ... Report on a semi-detailed Soil Survey of Tanjong Jol, 3rd Division, 1967.
2. Departmental Circular ... Use of Anderson 1 (Peat 3 - 6 feet).

KELULIT AREA 4th. Division.

MAP 1: SOILS



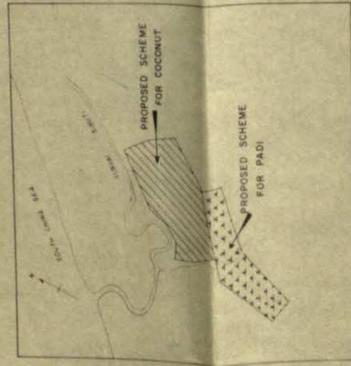
SCALE 1:20,000

SCALE 1:20,000

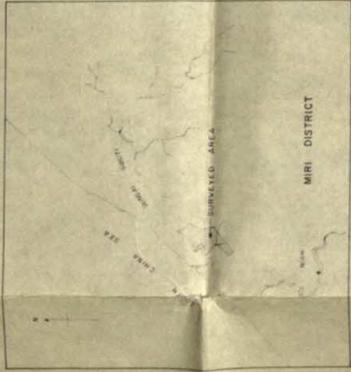
KEY

ORIGIN	MAPPING UNIT	SOIL FAMILY	MAIN CHARACTERISTICS	APPROX. ACREAGE	SOIL SUITABILITY
ALLUVIAL DEPOSIT	Buat	BUAT	poorly drained light grey clay.	100	Suitable for coconut and rice.
	Sebandi	SEBANDI	Poorly drained light grey clay with feet fossil up to 10 inches thick.	185	
	Mah	MURAH	Spand variant with clay layer of 20"-30" thick at an average depth of 6"-12" below the surface.	80	Suitable for rice. Unsuitable for coconut
ORGANIC DEPOSIT	Mah	MURAH	Very poorly drained light grey clay with peat fossil 10-40" thick	70	
	Mah 2		Mud variant with clay layer of 20"-30" thick at an average depth of 2'-3' below the surface.	40	
	Mah 3		Peat ranging from 40-80' on light grey clay.	410	Suitable for rice & coconut with qualifications
	Anderson	ANDERSON	Peat 80-120" deep	1,390	
	Limbang	LIMBANG	Peat 120" +	425	Unsuitable for coconut and rice
			Some peat ranging from 40-120" +	115	

DIAGRAMATIC LOCALITIES OF THE PROPOSED SCHEMES



LOCATION



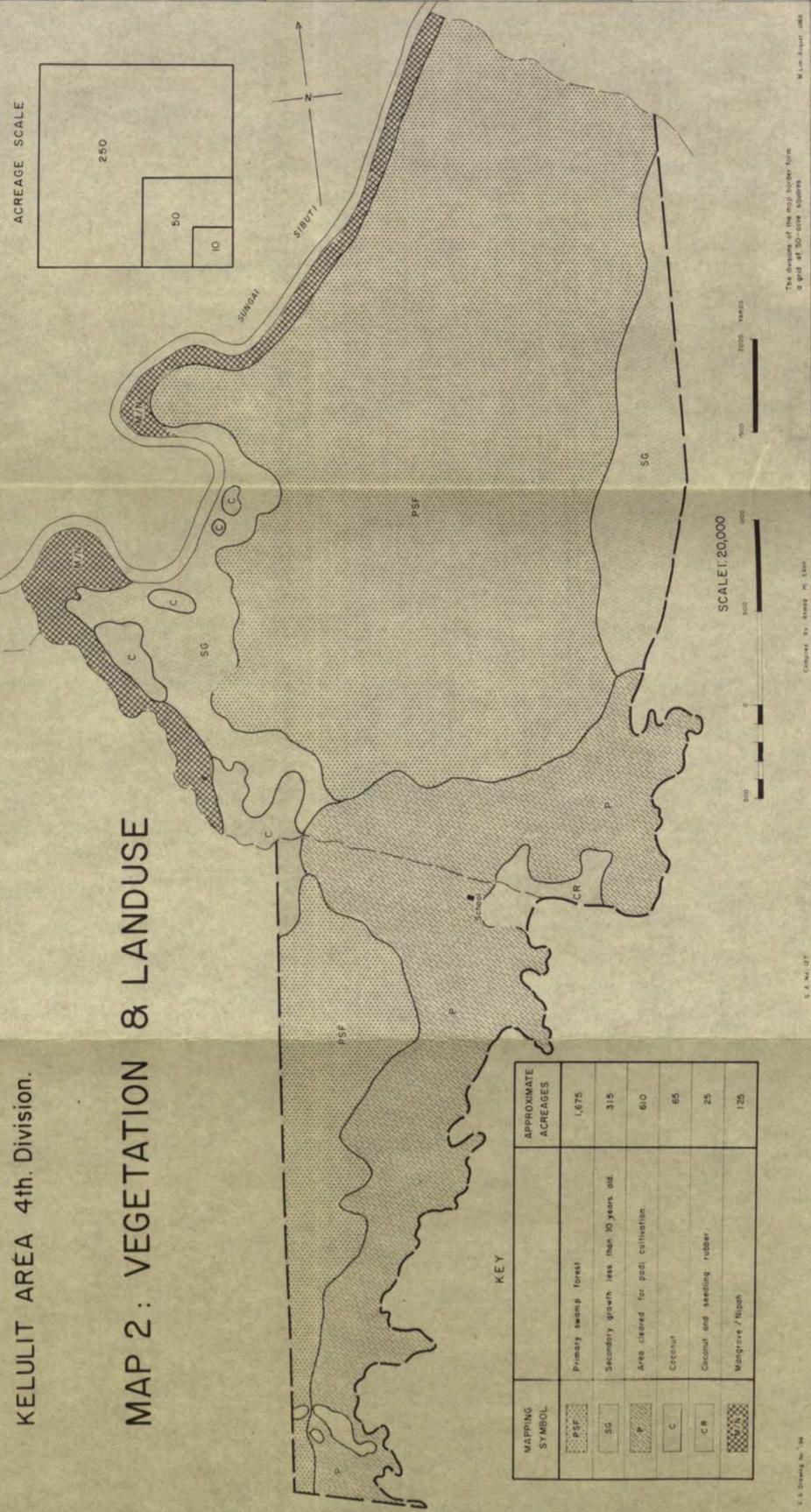
U.S. District No. 148

Compiled by James W. Dixon

Survey No. 148

KELULIT AREA 4th. Division.

MAP 2: VEGETATION & LANDUSE



KELULIT AREA 4th. Division.

MAP 3: DRAINAGE REQUIREMENT

