

Report on a Semi - Detailed Soil Survey
of the

ULU BINATANG PROPOSED LAND DEVELOPMENT SCHEME

3 rd. Division

by

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REPORT ON A SEMI-DETAILED SOIL SURVEY OF THE
 ULU BINATANG PROPOSED LAND DEVELOPMENT SCHEME,
 THIRD DIVISION

I.M. Scott

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SUMMARY.

A total of 2,707 acres were surveyed at a semi-detailed level, the survey covering two blocks of land separated by half a mile. The area is underlain by shales and sandstones and the main upland soils are of the Kapit, Merit and Nyalau Families. Both blocks include alluvial flats mantled by Bijat, Malang and other more minor soils.

Roughly 900 acres of land is classed as marginal on the grounds of steep slopes and/or shallow soil. There are about 1,200 acres of land suitable for rubber and a further 600 acres of land suitable for wet land crops. A development scheme is therefore possible in this area but if a total of 1,600 acres of rubber land is required it will be necessary either to include much marginal land or to extend the scheme beyond the present proposed boundaries. The latter alternative is advised. Contour data for the land between the blocks suggest that land suitable for rubber is present there and this interblock area is thus worth investigating further. Including that land in the scheme would allow the scheme to form a compact block which would be advantageous from many viewpoints.

INTRODUCTION

A semi-detailed soil survey of two areas in the ulu Sg. Binatang was requested in 1965. These areas had been proposed for a Land Development Scheme under the terms of Rubber Planting Scheme 'B', (semi-detailed survey data being required by the State Development Planning Committee, under the 'Planning Criteria and Procedure' for such schemes). The Surveyor and one assistant, M. Malthus (V.S.A.), began work in the area on September 18th and were assisted by a surveyor and labourers supplied by Land and Survey Department who had previous knowledge of the area. The party worked from camps near Rh. Tegong and Rh. Entalai and completed the survey on October 4th. Soil sampling was carried out largely on new rentis lines but a number of existing lines cut by Land and Survey Department were also used. The field base map was on a scale of 1:10,000 with contours at 25 foot intervals.

GENERAL

LOCATION

The area lies in the upper reaches of the Sg. Binatang, east of the Pakan road and south of the Durin road. It comprises two blocks which are roughly half a mile apart. The western block, called Block A in this report, is calculated at 1,222 acres and has a narrow frontage on the Pakan road between mile 4 and mile $4\frac{1}{2}$, extending east and northeast from that point. The eastern block, called Block B in this report, is calculated at 1,485 acres. Its northern boundary lies more than one mile south of the Durin road but can be approached by a motorable road from mile 4, Durin road which leads to a school a short distance north of Block B.

The total area covered by the soil survey is thus calculated at 2,707 acres.

GEOLOGY

The geology of the area has been described by Wolfenden (1). The area is underlain by rocks of the Belaga II Formation which is considered to be Palaeocene to Eocene in age. The rocks are predominantly shales. They are somewhat metamorphosed, are generally very steeply dipping and commonly contain numerous quartz veins. Sandstones are less widespread but are found interbedded with the shales. They are generally fine- to medium-grained and are more extensive in Block A than Block B. Previous soil survey work at a reconnaissance level (Scott, 2) indicated that sandstones are only dominant to the north of this area although the country to the west is largely underlain by mixed sandstones and shales. To the south and east shales are dominant in almost all localities.

RELIEF AND DRAINAGE

The relief and drainage of the area is illustrated in Map 1.

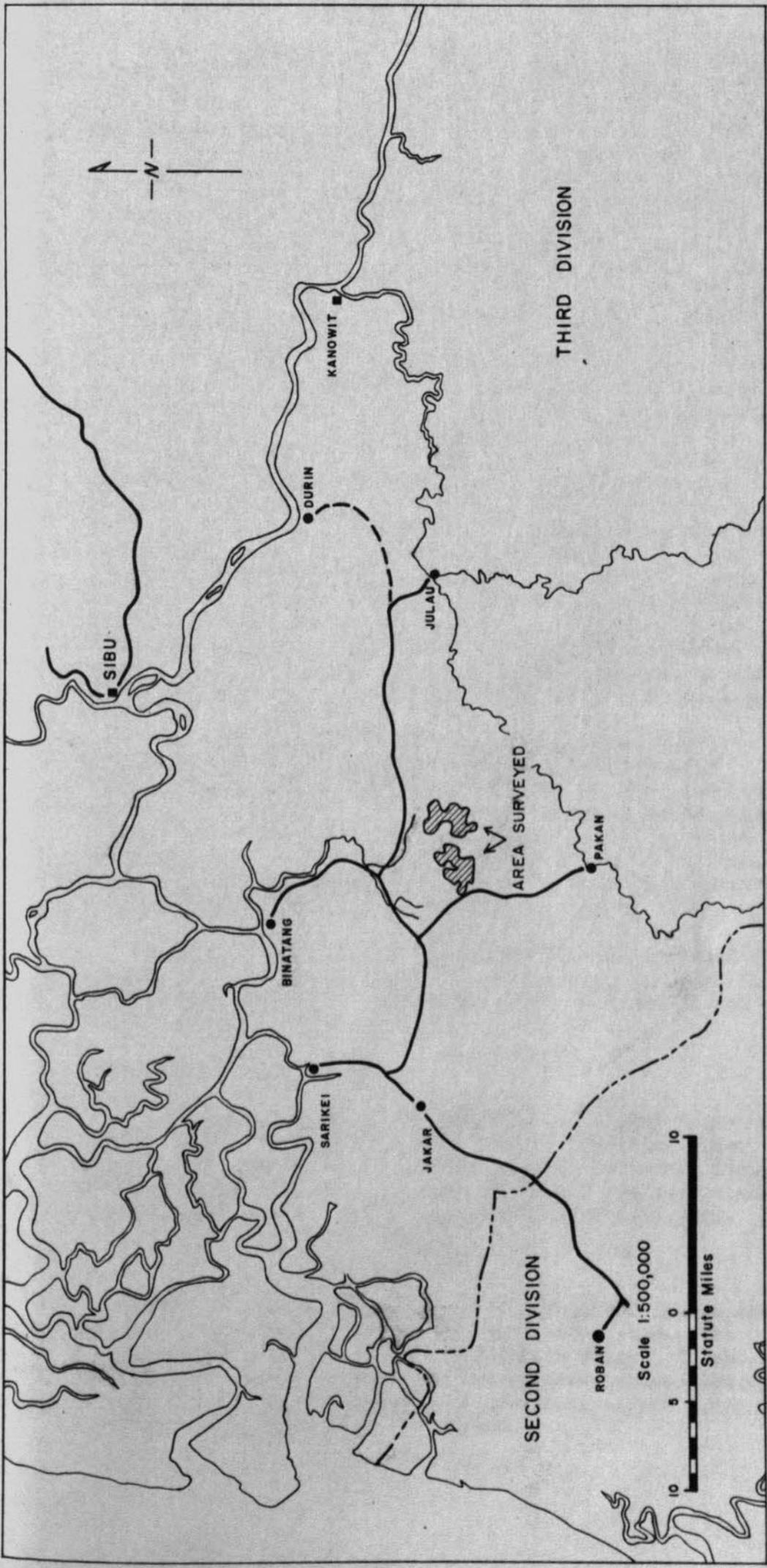


Fig. 1: LOCATION

Throughout much of this general region the topography reflects the northwest-southeast geological strike. Within the survey area, however, there is little pattern evident in the terrain. The shales give rise to a number of steeply sloping hills which are mainly present only on the borders of the surveyed area. Bukit Lalis, situated to the south of Block B, rises to over 600 feet and a north-trending ridge runs north from it and is partly included within this block, its summit line being at 300 - 450 feet above sea-level. In the northern part of Block B Bukit Bangun forms a northwest trending ridge which rises to over 325 feet. The remainder of Block B is largely comprised of moderately to steeply rolling terrain in which valley bottoms lie at 75 - 100 feet and hill summits at 150 - 300 feet above sea level. Hill flanks commonly slope at 10 - 25° but most hills have gullied sides and slope facets of less than 20° are thus interrupted by gully flanks which may approach 50°. In Block A the topography is somewhat more subdued and gully erosion is much less marked. Valley bottoms are at about 100 feet and hill summits at 150 - 250 feet above sea level. Higher hills with steep sides are, however, found in the southwest and north of the block and in the northeast the boundary follows the flanks of Bukit Berangan and Bukit Enkabang, which rise to over 350 feet. All these hills have somewhat gullied flanks and the gully sides commonly exceed 30°. As in Block B the high hills are composed of shale and the more rolling nature of the central part of the block is probably attributable to the sandstone bands locally dominant in that part of the area.

The area drains entirely to the north by streams tributary to the Sg. Binatang. Block A is drained by tributaries of the Sg. Stras, the course of which runs north and west of the block, and by the Sg. Chundong which runs through it. Block B is drained largely by the Sg. Bilat and Sg. Besai, both of which flow northeast into the Sg. Binatang. A small portion of the block is drained by the Sg. Lemayong, a Sg. Binatang tributary which flows between Blocks A and B.

Floodplains are generally narrow but wide alluvial flats are associated with the Sg. Stras in the west of Block A, the Sg. Chundong in the centre and north of Block A, and with the Sg. Bilat in Block B.

VEGETATION AND LAND USE

Old forest is present on parts of the higher hills and locally elsewhere but the survey area is otherwise under regrowth of various ages. At the time of the survey large areas in Block A and in the east of Block B had been cleared and, in part, burnt prior to the planting of hill padi.

SOILS

Soils of twenty families were recognised in the area and these have been mapped in twelve associations. The family classification is given in Table 1 below. In the following sections the families are defined, characteristics of each family in this particular area being given under the soil associations in which it occurs.

Great Soil Group	Family	Origin
Lithosol	KAPIT	Residual
	MELUAN	
	BINATANG	Shallow Alluvial
	KELUPU	
Red-Yellow Podsollic	MERIT	Residual
	BEKENU	
	NYALAU	
	NALANG	Alluvial
	SEMILAJAU	
Podsollic	SARATOK	Residual or Colluvial
	KERAIT	Residual
	TRIBOH	Alluvial
Podsol	BUSO	
Hydromorphic	SEMADOH	Residual
	BIJAT	Alluvial
	PLAN	
	SEBANDI	
	LUIS	
Bog	IGAN	
Alluvial	GAYA	Colluvial

Table 1: Soil Classification.

DEFINITION OF FAMILIES

Kapit

Kapit Family soils are shallow upland soils developed over sedimentary rocks. Weathered rock is dominant in the profile within 12 inches of the surface. The C horizon is, however, sufficiently weathered to be penetrated by an auger or by plant roots.

Meluan

Meluan Family soils are equivalent to Kapit soils except in the character of the weathered rock, which is hard and cannot be penetrated by an auger. The effective rooting depth in Meluan soils is thus 12 inches or less although some roots may penetrate farther.

Binatang

Binatang Family soils are similar in profile character of Kapit soils but are developed on old alluvial flats. A thin band of alluvial clay rests on weathered sedimentary rocks at depths of 12 inches or less. The profile is well- or moderately well-drained.

Kelupu

Kelupu Family soils are equivalent to Binatang soils but occupy more poorly-drained sites. The surface alluvial clay and the underlying C horizon are heavily gleyed.

Merit

Merit Family soils are residual Red-Yellow Podsollic soils in which the B horizon is fine-textured although the A2 horizon may be clay loam. The profile is typically porous but firm.

Bekenu

Bekenu Family soils are transitional between Merit and Nyalau Family soils. They have either clay loam textures throughout the surface 4 feet or have sandy loam upper subsoils abruptly overlying clay B horizons. The textural profile commonly suggests a partly colluvial origin.

Nyalau

Nyalau Family soils are similar to Merit soils but textures are coarser. The B horizon is not heavier than clay loam and the subsoil is commonly a sandy loam grading to a sandy clay loam at depth. Nyalau soils are normally porous and friable.

Malang

Malang Family soils are well-drained or moderately well-drained clays derived from riverine alluvium. A textural B horizon is weakly expressed. The family is found on present floodplains commonly in association with Bijat soils which occupy more poorly-drained sites.

Semilajau

Semilajau Family soils are similar to Malang soils but have sandy loam textures throughout the surface 4 feet. These soils are generally associated with levee sites or with stream valleys draining from areas of sandstone.

Saratok

Saratok Family soils are pale-coloured leached residual or colluvial soils commonly associated with lower slope sites. The B horizon is not heavier than clay loam and the profile is commonly a sandy loam throughout the surface 4 feet.

Kerait

Kerait Family soils are equivalent to Saratok soils except that clay textures are present in the B horizon. While found on lower slope sites Kerait soils are also present on summits and upper slopes.

Triboh

Triboh Family soils are equivalent to Saratok soils but are developed in alluvial material. Triboh soils are commonly present on terrace remnants.

Buso

Buso Family soils are weakly developed Podsolis. A Bh horizon is intermittently or continuously present within 4 feet of the surface but can be penetrated by an auger. Buso soils are developed in alluvial material and are commonly present on terrace remnants.

Semadoh

Semadoh Family soils are poorly-drained residual soils commonly associated with low, gently undulating hills or with long dip slopes. They are normally loams or clay loams in the upper subsoil grading to clay loams or clays at depth.

Bijat

Bijat Family soils are poorly drained alluvial clay loams or clays found on present floodplains. They are commonly associated with soils of the Malang and Sebandi families.

Plan

Plan Family soils are equivalent to Bijat soils except in texture, Plan subsoils being lighter than clay loam and commonly coarse sandy loams or loamy sands. Plan soils are most commonly found in small valley bottoms.

Sebandi

Sebandi Family soils are very poorly drained alluvial clay loams or clays found on present floodplains. They have a surface peat or muck layer which is up to 6 inches thick. They commonly occupy depression sites, the higher points being mantled by Malang and Bijat soils. Sebandi Family is a recent addition to the classification system, these soils previously being included in the Bijat Family.

Luis

Luis Family soils are, like soils of the Plan Family, coarse-textured and associated with minor valley bottoms. They have a surface accumulation of peat or muck which is less than 6 inches in thickness. Luis Family is a recent addition to the classification system, such soils previously being included in the Plan Family.

Gaya

The Gaya Family comprises immature soils with less than 20 per cent fine earth. The profile is largely stones or rock rubble. Gaya soils are commonly developed in gullies or on footslope sites as colluvial fill.

DESCRIPTION OF SOIL ASSOCIATIONS

The brief family definitions given above are relevant to the country as a whole. In the following sections the profile characteristics within the survey area are outlined and the distribution of the families is discussed.

Kapit and Kapit-Merit Associations

The Kapit Association largely comprises soils of the Kapit Family. Over much of the area it has not been possible to separate these soils from shallow phases of soils in the Merit Family, with which they are commonly associated. This mapping unit has therefore been confined to the steeper slopes of the main hills where Kapit soils are known to be dominant.

Kapit profiles are generally yellowish brown clays with little surface humus staining. Yellow and mauve weathered shale fragments are commonly dominant below 6 inches and always so below 12 inches. The weathered rock is soft and easy to penetrate with an auger. Patchy occurrences are present of weak red shales. Where these are present the colour of the parent rock is reflected in the overlying clay which is strong brown or reddish brown. These soils, where present, occur in complex association with paler Kapit profiles and could not be mapped separately at any point. They are normally inextensive but where present, on gully sides or the steepest hill flanks, they are associated with Meluan soils.

Where weathered rock is not encountered (or is not dominant) within 12 inches the soil is considered a shallow phase of a Merit Family soil. The Kapit-Merit Association, a compound unit dominantly of Kapit and shallow Merit Family soils, is widespread. Merit profiles in this mapping unit are rarely well-developed. Weathered shale is present within 18 inches of the surface at most sites examined and small pieces of rock are scattered throughout the profile at some points. Weathered rock is rarely dominant, however, within 24 inches of the surface. Above the C horizon there is little horizon differentiation, the B horizon being weakly expressed, or unrecognisable. Commonly a yellow brown clay or clay loam is exposed at the surface or is covered by a humus-stained surface horizon little more than 1 inch thick. On many slopes of 25 - 40° erosion following clearance for hill padi has left large areas where no A1 horizon remains.

Where quartz veins are present in the parent rock a stoneline of angular quartz gravel may be present in the profile, commonly close to the surface. In gully bottoms hard shale is generally exposed although some gullies were noted in which a colluvial fill of quartz and rock rubble had accumulated. The rubbly soils developed in this material are classified in the Gaya Family.

The Kapit Association covers an estimated 75 acres and the Kapit-Merit Association 742 acres.

Merit Association

The Merit Association largely comprises soils of the Merit Family, with minor occurrences of Bekenu and Nyalau soils. The association is mainly confined to moderately rolling terrain and only in Block A were Merit soils noted mantling steeply sloping hills (in one locality).

Merit soils in this mapping unit are commonly moderately deep and genetic horizons are well-expressed. Below a humus-stained surface horizon the profile is a yellowish brown clay or clay loam becoming somewhat heavier in texture and more reddish in colour with depth. At depths of 18 - 24 inches a stoneline of brown to red iron-enriched shale fragments is commonly present. This overlies paler-coloured weathered shale which is commonly present at a depth of 30 inches or more. In profiles examined the C horizon was rarely more than 4 feet below the surface.

Shallow phases of Merit soils, described above under the Kapit-Merit Association, are present in this association but are largely confined to the steeper slopes. On parts of the foothill area of Bukit Enkabang (in Block A) no Kapit profiles were recorded although slopes are very steep. The soil mantle in this locality appears to be dominantly one of shallow Merit soils. The degree of profile development is thus not entirely related to steepness of slope or to erosion following shifting cultivation. The nature of the parent shale and its resistance to weathering also appears to be important in this respect.

On lower hills within this mapping unit many Merit profiles are only imperfectly drained. The subsoil is yellow to brownish yellow and has many light grey and pale yellow mottles. Merit soils on these hills commonly grade into soils of the Semadoh or Kerait Families.

The Merit Association covers an estimated 504 acres.

Merit-Nyalau Association

Where sandstone is the dominant parent rock Merit Family soils are replaced by soils of the Nyalau Family. Isolated narrow sandstone bands are generally not reflected in the soil pattern and a Nyalau soil mantle generally indicates extensive occurrences of sandstone. Where this occurs the transition from Merit to Nyalau soils is generally fairly narrow and the boundary is not difficult to locate at this scale of mapping. In a few areas, however, alternating shales and sandstones give rise to a complex of Merit, Nyalau and transitional Bekenu profiles and no separation could be made.

These areas have therefore been mapped as a Merit-Nyalau compound association. Nyalau and Bekenu soils are described in the following section.

The Merit-Nyalau Association covers approximately 193 acres.

Nyalau Association

The Nyalau Association comprises soils of the Nyalau Family with minor occurrences of Bekenu and Merit soils. Small inclusions of Saratok and Gaya soils also occur. The association is typically found on moderately rolling hills and is most extensive in Block A, only isolated occurrences of the association being mapped in Block B. This pattern agrees with the findings of previous reconnaissance work in this general area, sandstone-derived soils becoming increasingly dominant towards the north and west.

Nyalau profiles are yellow or brownish yellow sandy clay loams or sandy loams, becoming sandy clay loams below a depth of about 2 feet. Profiles are typically deep, weathered rock being rarely encountered within 4 feet of the surface. The subsoil is porous and friable. A stoneline of quartz gravel is commonly present at depth and this locally includes iron-enriched shale fragments. On foothill sites profiles become increasingly paler in colour and Nyalau soils are locally replaced on lower slopes by pale yellow or light grey sandy or gravelly loams of the Saratok Family. Most hillsides within the mapping unit are not extensively gullied but in minor gullies and on some footslope sites a colluvial accumulation of vein quartz is present and soils with a very small proportion of fine earth have developed. These are placed in the Gaya Family.

The Nyalau Association covers approximately 465 acres.

Saratok and Nyalau-Saratok Associations

Saratok soils are present on lower slope sites in many parts of the area but in no case cover wide areas. These soils are a common minor inclusion within the Nyalau Association and in some localities within Block A form a complex with Nyalau soils on gently undulating terrain. These areas have been mapped as a Nyalau-Saratok Association. The remaining areas where Saratok soils were sufficiently widespread to map, either alone or in association with Semadoh and Gaya soils, have been mapped as a Saratok Association.

Saratok profiles in this area are generally light grey sandy loams or coarse sandy loams with increasing amounts of quartz gravel at depth. Near some stream courses in Block A they grade into soils with abundant coarse quartz gravel throughout the subsoil. These have been classified in the Gaya Family. In Block B and, to a lesser degree, in Block A Saratok soils are found on very gently undulating terrain in association with soils which have gley mottles throughout the subsoil; the matrix colour is generally pale yellow and becomes grey with depth. A stoneline of quartz gravel may also be present in these profiles which commonly are somewhat heavier in texture than Saratok soils and have sandy clay loam or sandy clay B horizons below a depth of 2 feet. These soils have been classified in the Semadoh Family. At one sampling point in Block A within this association a weak humus accumulation was recorded at depth in the profile. Such soils are classified in the Buso Family but appear to be of very minor extent in the

survey area.

The Nyalau-Saratok Association covers about 40 acres and the Saratok Association 20 acres.

Malang Association

In two localities in Block B it was possible to separate bottomlands in which Malang Family soils were dominant. The profile of Malang soils is a brownish yellow to yellowish brown clay (rarely clay loam) in which mottles, although possibly absent near the surface, become increasingly frequent with depth. The lower subsoil may be strongly gleyed but Malang profiles commonly have brownish yellow or yellowish brown matrix colours throughout the surface 4 feet. More poorly-drained Bijat soils are present in the association but are of minor importance.

The Malang Association covers approximately 30 acres.

Bijat-Sebandi Association

On the floodplains of some streams in the area Malang soils are dominant and can be mapped separately. In most valley bottoms however the dominant soils are classified in the Bijat and Sebandi families. Bijat Family comprises riverine alluvial clays which are dominantly pale yellow to grey in the subsoil and are generally mottled throughout. Heavily gleyed horizons are usually confined to the lower subsoil. Soils transitional to the Malang Family, in which the upper subsoil is brownish yellow, or yellow with abundant light grey mottles, are included in this family if the gleyed horizon is only present at more than 18 inches below the surface. Sebandi soils occupy rather more poorly drained sites and have high water tables through most of the year. The subsoil is grey or light grey in colour, mottles are generally few, and the surface soil is dark grey or dark brownish grey in colour.

Malang soils, discussed above, and Semilajau soils, described in the next section, are present in the association but are rarely extensive. Where they occur, Semilajau soils occupy the river banks, grading through a narrow band of Malang soils to the floodplain proper, which is mantled by Bijat and Sebandi soils.

Local occurrences of Plan and Igan soils were noted near the Sg. Mengeris in Block B and near the Sg. Luis in Block A. Plan Family soils are similar to Bijat soils but have coarse-textured subsoils and, in this area, a high proportion of subsoil quartz gravel. Luis and Igan soils have a similar profile but bear a surface accumulation of peat less than 6 inches thick in the Luis Family, 6 inches to 3 feet thick in the Igan Family. At one point a profile was recorded in which the surface 3 feet comprises lumps of coarse sandy clay loam in a matrix of peat. This is provisionally included in the Igan Family.

In a few narrow valleys soils of the Kelupu Family were recorded. In these soils a thin deposit of grey clay loam or clay overlies weathered shale at a depth of 12 inches or less. The shale can be penetrated by an auger but retains much of its structure and tends to splinter easily into small but hard fragments. The shale is grey and bluish grey in colour. The water table is close to the surface.

The Bijat-Sebandi Association covers some 580 acres.

Semilajau Association

Near the Sg. Stras in Block A and in the headwaters of the Sg. Bilat in Block B the river banks are mantled by yellowish brown loamy sands and sandy loams of the Semilajau Family, occurring in a moderately wide band. Where present near other streams they grade into heavier-textured soils within a few yards of the river bank and cannot be mapped separately.

The Semilajau Association has thus been mapped over only 6 acres.

Merit-Binatang Association

This mapping unit comprises a small area in Block B in which Merit soils on gently sloping footslopes grade into alluvial flats mantled by soils of the Binatang Family. The Merit soils in the unit are moderately well-drained to imperfectly drained. Binatang soils are yellowish brown clays which overlie weathered shale within 12 inches of the surface. The shales are yellow, mauve and grey in colour. It is believed that the thin clayey surface soil is of alluvial origin and that these soils are related to soils in the Malang Family.

The association covers approximately 7 acres.

Merit-Bijat Association

A small area in the north of Block B contains low undulating hills mantled by imperfectly drained Merit soils, grading to Bijat soils in the intervening bottomlands. These soils, which are described above, have been mapped as a compound unit and cover approximately 13 acres.

Merit-Saratok Association

Low hills mantled by Merit and Saratok soils, described above, with some Semadoh soils, occur near the Sg. Stras in Block A. These soils, have been mapped as a Merit-Saratok Association but cover only about 4 acres.

Nyalau-Saratok Association

This compound mapping unit has been described above together with the Saratok Association.

Bijat-Triboh Association

In a few localities in both Block A and Block B footslope colluvium grades into alluvial bottomlands containing low undulations covered by isolated stretches of older alluvial material. Where it has been impossible to separate these soils they have been mapped as a compound Bijat-Triboh Association. The association mainly comprises soils of the Bijat, Sebandi, Saratok and Triboh Families.

The Saratok, Bijat and Sebandi Families soils are described above. Triboh soils, noted near the Sg. Pematak in Block A and possibly present elsewhere, are fine sandy loams grading to fine sandy clay loams at depth and below the humus-stained surface horizon, are grey to light grey throughout the profile. They are developed in old riverine alluvium preserved in fragmented terrace remnants rising only a few feet above the present floodplain.

The Association is not extensive and covers only about 30 acres.

SUITABILITY FOR AGRICULTURE.

Judging by analyses available, there is little contrast in terms of chemical fertility between the main soils in the area. The Kapit and shallow Merit soils have medium levels of reserve potash and Group III elements and Merit soils generally have higher reserve magnesium levels than Nyalau and Saratok soils. All soils in the area, however, have low reserves of phosphorus and contrasts in these other respects are likely to be of little significance until this is rectified. A good response to phosphatic fertilizer is to be expected from all these soils.

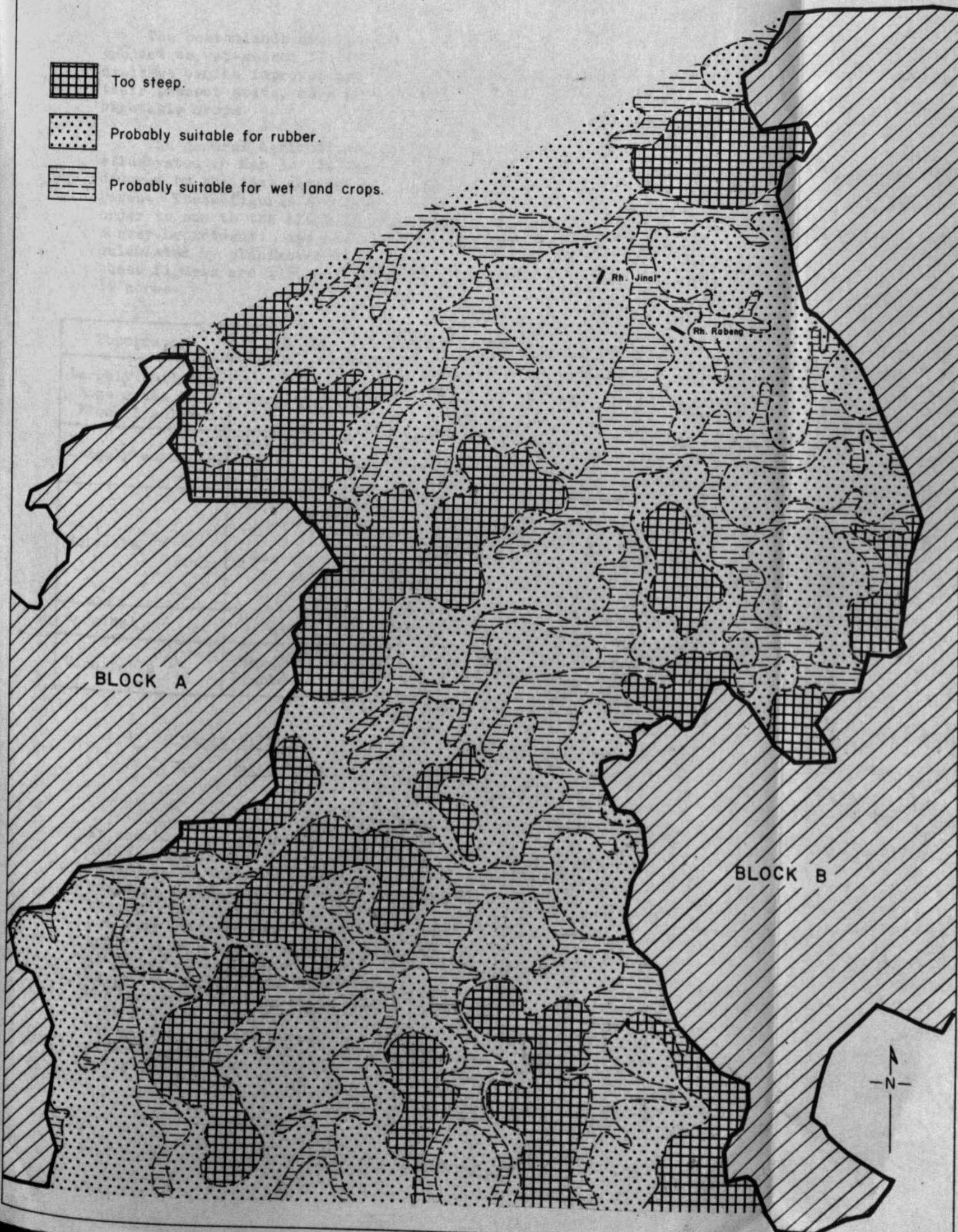
The proposed scheme is to be based on rubber cultivation. The main limitations for this crop are the shallow rooting depths and steep slopes of many areas. The weathered rock on the majority of upland areas is close to the surface but can be penetrated by plant roots. While not ideal, Kapit and shallow Merit soils can thus be used for this crop. It would be wise, however, to exclude them in favour of the deeper Merit soils where possible.

Topography is generally suitable for rubber except in the Kapit and Kapit-Merit Associations. The Kapit Association occupies very steep slopes and is unsuitable for cultivation for this reason. The Kapit-Merit Association mantles the higher hills and these are commonly gullied, the gully flanks being very steep. In Block B gullies are also commonly present on the somewhat lower hills mantled by the Merit Association. These gullies, while steep-sided and important in considering development, cover very small areas in plan and are not reflected in the contour data. It has not been possible to indicate many of them on the attached maps. The Merit Association in Block A is generally found on ungullied hills. While much of the land covered by these associations can be used for rubber many areas have, at best, marginal terrain and in many cases mechanical terracing will be difficult on the better slope facets as they are commonly interrupted by steep gullies.

The lower hills are mantled largely by Merit and Nyalau soils but in some localities these soils are replaced by, or occur in association with, Saratok soils. It has been found on the nearby Meradong Land Development Scheme that rubber benefits from increased fertilizer applications when planted on Saratok and similarly infertile, coarse-textured soils. Unless such preferential treatment can be given in this area, it is likely that rubber will show very varied growth where Saratok and more fertile soils occur in association. These lower hills have been considered suitable in Table 2 on the assumption that such treatment is possible.

Fig. 2: PROBABLE POTENTIAL FOR RUBBER IN THE AREA BETWEEN BLOCKS A AND B.

-  Too steep.
-  Probably suitable for rubber.
-  Probably suitable for wet land crops.



The bottomlands are generally poorly drained or are subject to wet-season flooding. While suitable for rubber if drainage can be improved and controlled these areas are, in their present state, more suitable for wet padi or seasonal vegetable crops.

The general agricultural potential of the area is illustrated in Map 3. In Table 2 the approximate acreages covered by the five classes of land separated on Map 3 are given. These figures are quoted to the nearest acre in order to sum to the block acreages supplied by Land and Survey Department. As, however, the individual acreages are calculated by planimeter from maps on a scale of 1:10,000 these figures are best considered accurate to the nearest 10 acres.

Topography	Soils	Acreage		
		Block A	Block B	Total
Largely suitable. Some areas in Block B gullied.	Largely suitable.	588	644	1,232
Largely suitable.	Low fertility. Suitable with adequate fertilizer.	71	25	96
Suitable	Poorly drained or seasonally flooded. At present suitable for wet land crops. Suitable for rubber if drainage improved.	325	276	601
Marginal	Marginal to suitable	238	452	490
Unsuitable	Marginal to unsuitable.	-	88	88

Table 2: Tentative agricultural suitability with reference to rubber.

It should be noted that Table 2 is based on the soil mapping units shown in Map 2, each mapping unit having been rated under one of the five headings given in the Table. It is, however, impossible to isolate mapping units in which soil and terrain characteristics are in all cases strictly uniform and many units on Map 3 therefore include some land which would be more appropriately considered under another class and given more detailed contour and soil data, could have been mapped separately. An independent assessment of the area was, however, made in which the percentage land falling within each class was roughly calculated for each mapping unit, reliance being placed on the survey records. The total acreages given by this method were substantially similar to those in Table 2.

The survey indicates, therefore, that there are about 1,800 acres of land which are suitable for development. Only 1,200 acres are, however, suitable for rubber, the remainder being suitable for wet land crops. If the minimum required acreage of rubber for this scheme is 1,600 acres it will therefore be necessary either to include much marginal land in which slopes are steep and soils shallow or to extend the scheme outwith the surveyed area.

The second alternative would seem preferable both with a view to good agricultural practise and to establishing a more easily managed scheme. As envisaged at present the scheme is divided into two isolated blocks. It would be far preferable if the intervening land were, at least in part, included in the scheme as the latter would then form one compact unit. With this in mind an interpretation of the area between the blocks has been made, using the contoured base maps. While it must be emphasised that this interpretation, given in Fig. 2, in no way replaces a semi-detailed survey, the general picture which it gives is likely to be broadly correct. The contour data indicates that there are many tracts of land suitable for rubber in this intervening area and it is probable that the soils within these tracts are largely suitable also. The area between the blocks appears, therefore, worthy of investigation with a view to including much of it in the scheme. There are a few pepper farms immediately south of Rh. Rabeng and old rubber along the Sg. Lemayong but recent air photographs indicate that the bulk of this area is not under permanent crops.

CONCLUSIONS

Within the survey area are about 1,200 acres of land suitable for rubber and a further 600 acres suitable for wet padi or for vegetable crops. If a larger acreage of rubber is required it is advised that, rather than planting on marginal land within the survey area, investigations should be extended into the land between the blocks where present information indicates the presence of land suitable for rubber. The inclusion of this land within the scheme would be advantageous in allowing a compact block rather than two isolated units.

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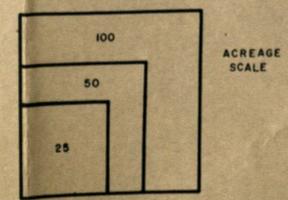
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ULU BINATANG PROPOSED LAND DEVELOPMENT SCHEME

MAP 3. TENTATIVE AGRICULTURAL SUITABILITY



MAPPING SYMBOL	TENTATIVE AGRICULTURAL SUITABILITY (with reference to block planting of rubber)	APPROXIMATE ACREAGE
	Topography and soils largely suitable for rubber planting. Hills somewhat gullied in Block B but not in Block A.	1232
	Topography suitable for rubber but soils largely have low natural fertility. Can be used for rubber if preferential fertilizer treatment possible.	96
	Areas largely subject to waterlogging or seasonal flooding. Largely suitable for wet padi or dry season vegetables. Can be used for rubber only where drainage improvements practicable.	601
	Soils shallow. Slopes generally steep and in places gullied. Best excluded from a block planting rubber scheme.	690
	Slopes very steep and soils very shallow. Unsuitable for any agricultural development.	66



ULU BINATANG PROPOSED LAND DEVELOPMENT SCHEME

MAP I: RELIEF AND DRAINAGE

