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HANDBOOK

OF

THE SOILS OF SRI LANKA (CEYLON)

COMPILED FROM PAPERS PRESENTED AT A SEMINAR HELD AT THE THIRD ANNUAL SESSIONS OF THE SOIL SCIENCE SOCIETY OF CEYLON PERADENIYA, 3rd JULY, 1972.

To Mr. Burnham

Veerasinha
11/July 77

SOIL SCIENCE SOCIETY OF CEYLON

HANDBOOK

of

THE SOILS OF SRI LANKA (Ceylon)

COMPILED FROM PAPERS PRESENTED

by

K. A. De ALWIS & C. R. PANABOKKE

At a Seminar held during the Third Annual Sessions of the Soil Science Socity of Ceylon, 3rd July, 1972.

EDITOR:

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The Soil Science Society of Ceylon was formed in June, 1969 to promote the advancement of Soil Science in Sri Lanka, to foster contact between workers in all branches of Soil Science and to disseminate knowledge pertaining to Soil Science. The Journal will be published annually. Articles and communications should be sent to:

THE EDITOR

Soil Science Society of Ceylon

Land Use Division

Irrigation Department

Buller's Road,

Colombo 7.

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EDITORIAL

The second volume of the Journal has been long in coming. The unfortunate disturbances in the country during 1971 prevented publication in that year. In 1972, publication was held up in the hope of obtaining some foreign exchange for the inclusion of colour plates of the soil profiles from slides presented at the annual sessions. This hope was not realized and it was decided to publish without them in early 1973.

The contents of this volume have been compiled into a handbook from the soil map and explanatory tables presented by K. A. de Alwis and C. R. Panabokke at a seminar held during the third annual sessions of the Soil Science Society of Sri Lanka in July, 1972. This handbook is "primarily intended for the general user i.e for farmers, plantation managers, extension workers, administrators, planners, teachers, engineers foresters, conservationists and others in any way concerned with the utilization of our soil resources", to quote the authors. However, a separate section catering to those requiring more specialized information on the characteristics of the great soil groups is also included.

The information presented in this handbook is of two kinds. There is **factual** informatian about the soils, their extents, distribution and characteristics derived from field observations and laboratory analyses, And there is also **interpreted** information based on interpretations of these facts and on the experiences of research workers, managers, farmers engineers, et al. in the actual use of the soils for various purposes. These interpretations will change with improvements in technology in agriculture, engineering and other fields involving the use of the soil, but are the best interpretations possible **within the limits of our present knowledge**.

The value of information of this nature to the development efforts of this country can hardly be overestimated. The current emphasis on programs like the food drive, land reform, agricultural diversification, conservation and the prevention of pollution renders this handbook timely and topical. Let us hope that the information contained in it will be used intelligently by the people who have responsibility for these programs.

Unfortunately, such use is not always made of available technical information due to its presentation in jargon not comprehensible to the user. Scientists, especially soil scientists, should in our opinion bear the responsibility of interpreting their findings so as to be intelligible to the potential user. This handbook makes a special effort in this direction and presents tha data in as simple and straightforward a manner as is possible within the limits imposed by subject matter of this nature.

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FOREWORD

by

Dr. A. W. R. Joachim

President, Soil Science Society of Ceylon

If there is one thing in my life that I look back to with pride, pleasure and satisfaction, it is the previlege I have had, along with my associates, of laying the firm foundations of a systematic study of the soils of Sri Lanka based on the soil profile which had just then come nto vogue.

Our soils are our greatest asset and the mainstay of our economy, and the basis on which our civilization was built. It was only proper, therefore, that their study should receive top priority among the items of the research programme which was started with the establishment of a Chemical Division of the Department of Agriculture in 1925. This period coincided with the grant of some measure of independence to the Island, and the then Minister of Agriculture and Lands with far seeing wisdom decided on the restoration of the ancient irrigation works in the Dry Zone of Sri Lanka as one of the main items of his land development programme.

The newly created Chemical Division had, in consequence, to play an important role in this scheme of development, its main function being the study of the soils of likely irrigable areas with a view to their utilization for paddy cultivation mainly. In the absence of such amenities as geological and aerial survey maps and mechanised transport that are now available, the work involved many miles of traverse on foot to identify the soil types of the area, their rough distribution and correlation with vegetative features. It is a matter for much gratification to those concerned that these soil reconnaissances have led to the establishment of several large schemes such as the Minneriya, Parakrama Samudra, Minipe, Elahera, Kalawewa, Walawe, Unichchai, Kirindi Oya and others which are now populous centres of intensive agricultural development, contributing an appreciable share to the country's supply of rice and other foodstuffs. This phase of soil study culminated with the preparation of the first provisional soil map of the Island based on the genetic classification of our soils as then identified.

The next phase of soil study which may be designated the Canada-Ceylon Aerial Resources survey phase, set the pace for considerable advances in soil and land use survey work based on aerial surveys accompanied by ground investigation. Some very valuable contributions to our knowledge of the characteristics and distribution of our soil and land resources emerged from this co-operative Canada/Ceylon effort, chief among these being a forest inventory of the Island as well as general resource surveys of no less than 18 river basins.

The modern era of soil survey and classification dates back to 1960 with the creation of the Land Use Division in the Department of Agriculture (later transferred to the Irrigation Department) with Dr. C. R. Panabokke as Head. One of the first contributions of this Division was the new classification of the soils of Sri Lanka by F. R. Moormann of the F. A. O. and Panabokke in 1961. Following on this publication Panabokke and his team of workers have carried out numerous soil surveys at different levels of intensity and studies, not only of the characteristics and distribution of our major soil groups but also of their productivity and agricultural quality. The Handbook of the Soils of Sri Lanka by K. A. de Alwis and C. R. Panabokke is the fruitful outcome of these studies. It presents a deep and precise knowledge of our soils, their nature, present and potential land use, and management, in a form which will enable its readers to readily assimilate the wealth of information it contains and to use it to best advantage. The publication represents an important stage in soil study for practical development locally, and will be invaluable to all those who are in any way connected with the study and development of the soils of our Island, whether they be students, research workers planters, farmers, administrators or legislators.

I cannot but pay my highest tribute to the authors and their colleagues who, with dedication and in a spirit of service, have devoted themselves to the exploration of the capabilities of our share of this great natural resource – Mother Earth, which "sustains and guides our life and yields us diverse fruits with tinted flowers and grass" (St. Francis of Assissi). May their efforts in the cause of the study of this precious asset of Mother Lanka continue unabated and give them joy and satisfaction that the writer of this Foreword has derived from similar efforts in the past!

ACKNOWLEDGEMENTS

The information presented in this volume is the cumulative esult of years of patient investigation by a very large number of vorkers. It will be difficult to give individual credit to all of them ut special mention must be made of

1) Dr. A. W. R. Joachim and his associates, who were the pioneer workers in this field.

2) Hunting Survey Corporation of Canada, who carried out the soil surveys of the north western part of Sri Lanka in collaboration with the Land Use Division of the Irrigation Department.

3) Dr. F. S. C. P. Kalpage, whose work furnished the information concerning the mineralogical composition of some great soil groups.

4) Dr. F. R. Moormann, F. A. O. Soil Specialist, with whom one of us collaborated in evolving the present classification of the soils of Sri Lanka and

5) the staff of the Land Use Division of the Irrigation Department whose efforts are primarily responsible for this publication.

Grateful acknowledgement is also made of the generous grant of Rs. 2,500/- by the Science Council of Sri Lanka which made this ublication possible.

INTRODUCTION

Soil is the most valuable natural resource that Sri Lanka possesses. reater and greater demands are being made on this resource as evelopment proceeds and as population pressures increase. With the creasing use of land and soil, more demands are being made for formation concerning the best possible use of each piece of land. cisions have to be made in respect of the suitability of land for ricultural crops, forestry, buildings, road construction, recreation d as a source of gravel and sand for construction purposes and clay r tiles, bricks and ceramics. All these decisions, as well as the bsequent management of the soil for maximum benefits, depend on e state of our knowledge of the soils of this country.

The soils of Sri Lanka have been studied systematically since 1935, hen Joachim and his co-workers started their profile studies and il reconnaissances. These studies went on for nearly a decade and minated, in 1945, in the presentation of the first genetic classification the soils and the first (provisional) soil map of Sri Lanka. Subsequent il surveys by the Hunting Survey Corporation (1959 to 1962) and e Land Use Division of the Irrigation Department (1959 onwards to te) have resulted in a rapid increase in information concerning the ture and characteristics of our soils. In 1961, Moormann and nabokke presented a new classification of the soils Sri Lanka into eat soil groups and sub-groups. This classification, with some odifications made in the light of subsequent surveys, is the one used day. The soil map of Sri Lanka presented with this text is based on is classification.

The soil map of Sri Lanka (see appendix) shows the areal stribution of the more important great soil groups and sub-groups of e country and the types of terrain on which they occur. Part I of is explanatory text attempts to describe the extent, composition and lation to the landscape of the different map units. It also deals with e present land use, the potential land use and the management of ch unit. In Part II, the morphological and laboratory analytical aracteristics of the different great soil groups and their classification cording to the comprehensive American (7th Approximation) system 967) are given.

The soil map of Sri Lanka is based on soil surveys carried out by the Land Use Division of the Irrigation Department under the National Soil Survey program. Soil survey data from earlier surveys in the north western part of the island conducted by the Hunting Survey Corporation in collaboration with the Land Use Division are also incorporated. Additionally, the soil map includes information generalized from detailed reconnaissance soil surveys in the north eastern region of Sri Lanka in connection with the Mahaweli Development Project and in the south eastern region in connection with the Uda-Walawe and Heda Oya schemes. Mapping in the rest of the Dry and Intermediate Zones (see inset) was carried out at a reconnaissance level on 1:40,000 aerial photographs using one inch to the mile topographical sheets as base maps. The Wet Zone has been studied and surveyed at a more generalized level and the soil boundaries in this region have a lower degree of reliability than those in the rest of the country. The final map was compiled by reduction and generalization of the base maps and is published at a scale of eight miles to one inch.

This explanatory text and soil map provide an inventory of the major soil resources of Sri Lanka and can be used for large scale planning purposes. The text also provides useful information for regional programs concerned with development, management, conservation and reclamation of land resources. Thus, the soil map and explanatory text can aid in planning out agricultural, irrigation and forestry development projects and assist in the formulation of land alienation policies. Urban development, highway construction, watershed planning, recreational planning and water and power transportation could all benefit from information contained in this publication. This handbook and soil map could be used in teaching and extension and will form the basis of future regional work in soil fertility.

The small scale of the map has necessitated the inclusion of soils other than those mentioned in the legend in each map unit. More detailed maps on a large scale will be required to delineate these inclusions and report on their potentialities for specific projects or purposes. The nature and amounts of these inclusions are, however, described in the text.

The sections of the text dealing with potential land use and management are based on (1) interpretations of morphological, physical and chemical characteristics of the soils, (2) published information on crop performance from research stations, (3) interviews with farmers, plantation managers and extension workers and (4) observations made in the course of soil surveys. These interpretive conclusions will, however, undoubtedly change with improvements in agricultural technology and new information from research.

Note on the Use of the Soil Map and Text

To use the soil map and text, first locate the area about which you require soil information on the map in the back pocket. Then note the numbers of the map units that occur within this area. Refer the description of these map units in Part I and observe the distribution of the individual soils in the landscape. Note that these discriptions apply to the main soils of the area but that inclusions could also be present. If you require further technical information about the characteristics of the individual soils, refer under the appropriate headings in Part II.

PART - I

SOIL MAP OF SRI LANKA: THE MAP UNITS, THEIR COMPOSITION, USE AND MANAGEMENT

1.1 MAP UNITS OF THE DRY ZONE, AND SEMI-DRY INTERMEDIATE ZONE

1. THE MAP UNITS OF THE DRY ZONE AND SEMI-DRY INTERMEDIATE ZONE

AP UNIT No. 1 – REDDISH BROWN EARTHS AND LOW HUMIC GLEY SOILS – Undulating terrain.

ent (1000 Acres) – 4,233

in Districts where present – Anuradhapura, Moneragala, Vavuniya, Polonnaruwa, Trincomalee, Hambantota, and adjacent Districts.

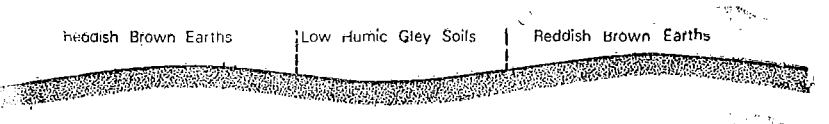
mposition of unit

Great Soil Groups – Reddish Brown Earths (50–80 Percent)
Low Humic Gley Soils (15–40 percent)

Inclusions – Lithosols, Alluvial Soils, Solodized Solonetz (0–15 Percent)

dform(s) – Undulating plain

ure of the great soil groups and their distribution in the landscape –The Reddish Brown Earths are well to imperfectly drained, moderately fine textured, reddish to brownish soils that occupy the crests, upper and mid slopes of the undulating landscape. The Low Humic Gley Soils are poorly drained, moderately fine textured, greyish soils that occur on the lower parts of the slopes and valley bottoms.



sent land use – **Reddish Brown Earths:** Forest, shifting cultivation, rainfed cereals and pulses in the wet (Maha) season; subsidiary foodcrops and rice under irrigation.

Low Humic Gley Soils – mainly used for rice cultivation with or without irrigation.

ential land use – **Reddish Brown Earths (upper and mid slopes):** In the wet (Maha) season, with or without supplemental irrigation: maize, sorghum, rainfed rice, turdhal, cowpea, soyabeans, green gram, manioc, sugar cane, tobacco, kenaf, castor. In the dry

(Yala) season with irrigation: chillies, onions, groundnuts, cotton, soyabeans, vegetables. On deep gravel free Reddish Brown Earths: orchard crops like citrus, mango, papaw, bananas. On the imperfectly drained Reddish Brown Earths: irrigated rice and pasture. Reddish Brown Earths are suitable for building and road construction.

Low Humic Gley Soils (lower slopes and slope bottoms): Well suited to irrigated rice cultivation provided adequate drainage is maintained. Also suitable for intensive pasture development with supplemental irrigation. Unsuitable for building and road construction. Limited quantities of groundwater available for domestic use where the basement rock is highly weathered and fissured.

Management – In the Reddish Brown Earths: Supplemental irrigation in the wet season and full irrigation in the dry season are required. Frequent applications of small amounts of water are recommended. Proper timing of tillage operations, erosion control and weed control are essential. Puddling should be avoided except in permanent rice fields. Responses to N and P should be high. In the Low Humic Gley Soils: Proper drainage is absolutely essential. Chemical amendments may be required to combat alkalinity in some places. Fertilizer responses will be similar to the Reddish Brown Earths.

MAP UNIT No. 2 - REDDISH BROWN EARTHS with moderate amount of gravel in subsoil and LOW HUMIC GLEY SOILS - Undulating terrain.

Extent (1000 Acres) - 124

Main Districts where present - Puttalam District and adjacent parts of the Kurunegala District.

Composition of unit

Great Soil Groups - Reddish Brown Earths (with moderate gravel) (60-80 Percent)
Low Humic Gley Soils (15-35 Percent)

Inclusions - Lithosols, Alluvial Soils, Solodized Solonetz (0-10 Percent)

Landform(s) - Undulating plain.

Nature of the great soil groups and their distribution in the landscape - The Reddish Brown Earths of this unit differ from those in Unit 1 only in having moderate amounts of quartz or ironstone gravel and pebbles present in the subsoil. They are associated with the Low Humic Gley Soils in the landscape in the same way as above. The Low Humic Gley Soils have characteristics that do not differ much from those described under Unit 1.

Present land use - **Reddish Brown Earths** (with moderate gravel) Forest; shifting cultivation; wild life sanctuaries.

Low Humic Gley Soils: Forest; rainfed paddy; wildlife reserves.

Potential land use - **Reddish Brown Earths** (with moderate gravel) (upper and mid slopes): A similar range of crops as in Unit 1 may be grown but yields will be lower. Suitable for shallow rooting subsidiary foodcrops like chillies and onions where irrigation facilities are available. Pasture. Commercial and plantation forestry. Wildlife sanctuaries where water supply is satisfactory. Suitable for building and road construction.

Low Humic Gley Soils (lower slopes and bottomland positions): Suitable for wet season rainfed rice. Not suited for building construction. Limited quantities of groundwater for domestic use.

Management – **Reddish Brown Earths** (moderate gravel): The gravel layer will interfere with most deep rooting crops. The erosion hazard is moderately high. Otherwise, management does not differ too much from that of the Reddish Brown Earths in Unit 1.

Low Humic Gley Soils: Artificial drainage with chemical amendments will be required on most of these soils for rice cultivation.

MAP UNIT No. 3 – REDDISH BROWN EARTHS with high amount of gravel in subsoil and LOW HUMIC GLEY SOILS – Undulating terrain.

Extent (1000 Acres) – 207

Main Districts where present – Anuradhapura, Hambantota and Mannar Districts.

Composition of unit

Great Soil Groups – Reddish Brown Earths (with high amount of gravel) (60–80 Percent)
Low Humic Gley Soils (15–35 Percent)

Inclusions – Lithosols, Alluvial Soils, Solodized Solonetz (0–10 Percent)

Landform(s) Undulating plain

Nature of the great soil groups and their distribution in the landscape – High amounts of ironstone or quartz gravel are found in the subsoil of the Reddish Brown Earths of this unit. As before, the Reddish Brown Earths occupy the higher topographical positions in the landscape with the Low Humic Gley Soils occupying the lowest positions. The Low Humic Gley Soils are similar to those described in Unit 1.

Present land use – **Reddish Brown Earths** (high amount of gravel): Wild life reserve; forest, shifting cultivation.

Low Humic Gley Soils: Wildlife reserve; forest, rainfed rice.

Potential land use – **Reddish Brown Earths** (with high amount of gravel) (upper and mid slopes): Conservation forestry. Wildlife reserves where water supply is favourable; building and road construction; as a source of gravel.

Low Humic Gley Soils: Pasture, irrigated rice, wildlife reserves. Unsuitable for buildings and roads. Limited amount of groundwater available for domestic use.

Management – **Reddish Brown Earths** (high amount of gravel): Artificial measures will be required to ensure a water supply for wildlife in most areas of this unit.

Low Humic Gley Soils: Irrigation, drainage and chemical amendments are required for rice cultivation.

MAP UNIT No. 4 - REDDISH BROWN EARTHS and SOLODIZED SOLONETZ - Undulating terrain

Extent (1000 Acres) - 445

Main Districts where present - Hambantota, Trincomalee and Moneragala Districts.

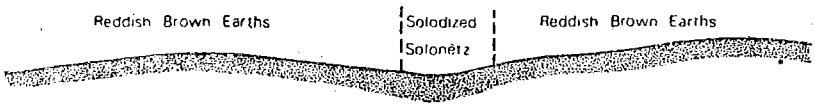
Composition of unit

Great Soil Groups - Reddish Brown Earths (70-85 Percent)
Solodized Solonetz (10-25 Percent)

Inclusions - Lithosols, Alluvial Soils, Low Humic Gley Soils and Solonchaks (0-10 Percent)

Landform (s) - Undulating plain.

Nature of the great soil groups and their distribution in the landscape - The Reddish Brown Earths have characteristics similar to those of Unit 1 and occupy the crests, upper, upper-mid and lower-mid slopes of the undulating landscape. The Solodized Solonetz consists of moderately coarse textured, brown to dark brown, slightly acid topsoils overlying moderately fine to fine textured, mottled and gleyed, grey alkaline subsoils. The poorly drained Solodized Solonetz occur in the nearly flat bottomlands.



Present land use - **Reddish Brown Earths:** Forest; shifting cultivation, rainfed cotton, cereals and pulses in the wet (Maha) season **Solodized Solonetz:** Parkland; rainfed rice cultivation.

Potential land use - **Reddish Brown Earths** (crests, upper mid and lower mid slopes): Under irrigation: cotton, subsidiary food crops, highland grain crops and pulses. Where irrigation is not possible wildlife; conservation and plantation forestry; buildings and roads.

Solodized Solonetz (bottomlands): Drainage and reclamation will make these soils suitable for rice cultivation or pasture. Wildlife. Positively unfit for buildings or roads. Very poor quality groundwater even for domestic use.

Management – **Reddish Brown Earths:** Management requirements are similar to the Reddish Brown Earths of Unit 1 but if irrigated, the maintenance of proper drainage is even more essential.

Solodized Solonetz: Drainage and application of chemical amendments will be definitely required to overcome alkalinity. Responses to N and P will be high.

MAP UNIT No. 5 - REDDISH BROWN EARTHS, NON-CALCIC BROWN SOILS & LOW HUMIC GLEY SOILS
Undulating terrain.

Extent (1000 Acres) - 434

Main Districts where present - Kurunegala, Puttalam, Amparai, Batticoloa and Monaragala Districts.

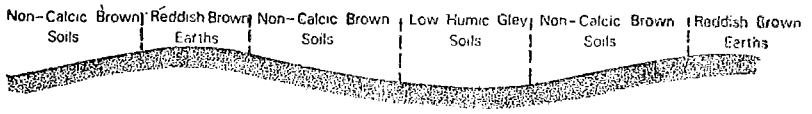
Composition of unit

Great Soil Groups - Reddish Brown Earths (20-40 Percent)
Non-Calcic Brown Soils (20-40 Percent)
Low Humic Gley Soils (15-40 Percent)

Inclusions - Lithosols, Soils on old alluvium, Alluvial Soils, Solodized Solonetz (5-15 Percent)

Landform (s) - Undulating plain

Nature of the great soil groups and their distribution in the landscape - The characteristics of the Reddish Brown Earths are as described in Unit 1. The Non-Calcic Brown Soils are well to imperfectly drained, medium textured, brownish to yellowish soils that occur in association with the Reddish Brown Earths on the crests and upper and midslopes of the undulating landscape. The Low Humic Gley Soils that occur on the lower slopes and valley bottoms are poorly drained and have characteristics as described under Unit 1 except that they are generally, somewhat coarser textured.



Present land use - Forest; shifting cultivation, irrigated rice and sugar cane, subsidiary foodcrops.

Potential land use - **Reddish Brown Earths:** As in Reddish Brown Earths of Unit 1.

Non-Calcic Brown Soils: In the Maha with or without supplemental irrigation: sugar cane, rice, maize, sorghum, kurakkan, groundnut, cowpea, green gram, turdhal, kenaf, castor. In the Yala with irrigation: Sugar cane, chillies, onions, groundnuts,

vegetables. The deeper soils are suitable for citrus and other orchard crops, the shallower soils for extensive pasture or aralu-bulu-nelli reserves for ayurvedic drugs, kudumberiya reserves for beedi manufacture. Suitable for buildings and roads.

Low Humic Gley Soils – As in the Low Humic Gley Soils of Unit 1.

Management – **Reddish Brown Earths:** As in Unit 1.

Non-Calcic Brown Soils: The main requirement is a satisfactory supply of irrigation water on account of the drouthiness of these soils. The sandier textures necessitate more frequent (split) applications of fertilizer in smaller doses. Response to K is likely to be better than on the Reddish Brown Earths. Erosion hazard.

Low Humic Gley Soils – As in Unit 1.

MAP UNIT No. 6 – REDDISH BROWN EARTHS and IMMATURE BROWN LOAMS–Rolling, hilly and steep terrain.

Extent (1000 Acres) – 740

Main Districts where present – Monaragala, Matale, Badulla, Kandy Ratnapura and Hambantota Districts.

Composition of unit

Great Soil Groups – Reddish Brown Earths (20–40 Percent)
Immature Brown Loams (50–70 Percent)

Inclusions – Lithosols, Low Humic Gley Soils, Alluvial Soils (5–25 Percent)

Landform (s) – Rolling and hilly landscapes, escarpments

Nature of the great soil groups and their distribution in the land cape – The characteristics of the Reddish Brown Earths are as described under Unit 1. The Immature Brown Loams are rather shallow, well drained, dark brown to yellowish brown, moderately fine texured, slightly acid soils. Immature Brown Loams generally occur on the steeper eroded slopes with Reddish Brown Earths occupying the gentler slopes of the rolling and hilly landscapes.

Present land use – Forest; shifting cultivation

Potential land use – **On the Reddish Brown Earths:** Economic forestry and, where the rainfall is adequate, tobacco, maize, vegetables etc. in the Maha season. Buildings and roads.

On the Immature Brown Loams: Forestry for conservation purposes; where adequate water is available from streams, vegetables may be grown. Aralu–bulu–nelli and kudumberiya in the Bibile and Monaragala Districts. Very suitable for building and roads.

Management – **Reddish Brown Earths:** Erosion control is essential on this unit.

Immature Brown Loams: Erodibility, drouthiness and shallowness of the solum are the main limitations encountered in utilizing this soil for agricultural purposes. Responses to N and P should be good.

MAP UNIT No. 7 - NON-CALCIC BROWN SOILS and LOW HUMIC GLEY SOILS-Undulating terrain.

Extent (1000 Acres) - 167

Main Districts where present - Amparai and Batticoloa Districts

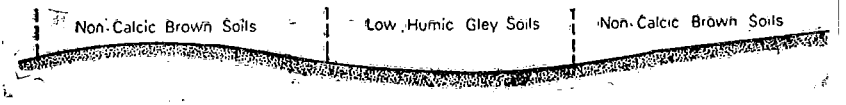
Composition of unit

Great Soil Groups - Non-Calcic Brown Soils (60-80 Percent)
Low Humic Gley Soils (35-40 Percent)

Inclusions - Soils on old alluvium, Alluvial Soils, Reddish Brown Earths, Solodized Solonetz (10-25 Percent)

Landform (s) - Undulating plain

Nature of the great soil groups and their distribution in the landscape - The Non-Calcic Brown Soils and Low Humic Gley Soils have characteristics described for these great soil groups under Unit 5. The Non-Calcic Brown Soils occupy the crests, upper and mid slopes while the Low Humic Gley Soils occur in the lower topographical positions.



Present land use - Forest, shifting cultivation; irrigated rice and sugar cane on the Non-Calcic Brown Soils. Forest, irrigated and rainfed rice on the Low Humic Gley Soils.

Potential land use - **Non-Calcic Brown Soils:** As described under Unit 5 for these soils

Low Humic Gley Soils: As in the Low Humic Gley Soils of Unit 1.

Management - **Non-Calcic Brown Soils:** As described under Unit 5. **Low Humic Gley Soils:** As in Unit 1. However, the coarser textures of these Low Humic Gley Soils associated with the Non-Calcic Brown Soils (as compared to those of Unit 1) result in greater irrigation losses and make more frequent irrigations necessary.

MAP UNIT No. 8 – NON-CALCIC BROWN SOILS, SOILS ON OLD ALLUVIUM and SOLODIZED SOLONETZ– Undulating terrain.

Extent (1000 Acres) – 269

Main Districts where present – Batticoloa, Polonnaruwa, Trincomalee and Amparai Districts.

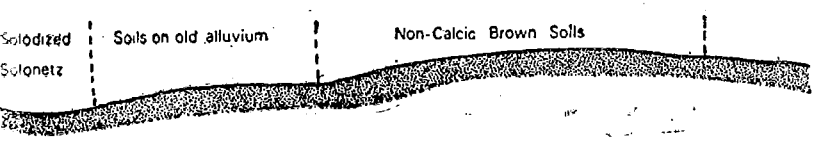
Composition of unit

Great Soil Groups – Non–Calcic Brown Soils (30–50 Percent)
Soils on old alluvium (30–50 Percent)
Solodized Solonetz (0–20 Percent)

Inclusions – Reddish Brown Earths, Lithosols, Low Humic Gley Soils, Alluvial Soils (5–20 Percent)

Landform (s) – Undulating plain The soils on old alluvium are largely developed on old river terrace deposits.

Nature of the great soil groups and their distribution in the landscape – The Non–Calcic Brown Soils are as described under Unit 5 Soils on old alluvium are well to imperfectly drained, brownish to yellowish, coarse textured soils. The characteristics of the Solodized Solonetz are as described under Unit 4. The Non–Calcic Brown Soils and soils on old alluvium occupy the crests and slopes while the Solodized Solonetz occur in the lowest topographical positions.



Present land use – Forest and parkland or shifting cultivation on the Non–Calcic Brown Soils and soils on old alluvium. Damana parkland and rice cultivation on the Solodized Solonetz.

Potential land use – **Non–Calcic Brown Soils:** As described under Unit 5.

Soils on old alluvium: In the Maha with supplemental irrigation: rice, sugarcane, high yielding pasture. In the Yala with irrigation: rice, sugar cane, groundnuts, subsidiary foodcrops. Wildlife reserves. Suitable for roads, marginal for buildings.

Solodized Solonetz : As described under Unit 4.

Management – **Non-Calcic Brown Soils:** As described under Unit 5.

Soils on old alluvium: The main problems with these soils are their sandy texture and a clay pan that frequently occurs at some depth in the profile. Frequent small irrigations, fertilizer in split applications and proper maintainance of drainage are suggested management practices. If used for wildlife purposes, artificial measures to provide adequate water will be required.

Solodized Solonetz: As in Unit 4.

AP UNIT No. 9 – RED-YELLOW LATOSOLS – Flat to slightly undulating terrain.

ent (1000 Acres) – 681

in Districts where present – Jaffna, Mannar, Puttalam and Vavuniya Districts

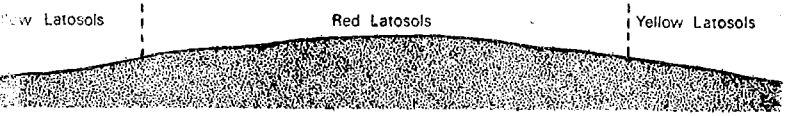
mposition of unit

Great Soil Groups – Red-Yellow Latosols (90–100 Percent)

Inclusions – Alluvial Soils, Eroded land (0–10 Percent)

d form (s) – Flat to gently undulating plain

ure of the great soil groups and their distribution in the landscape – The Red Latosols are very deep, excessively drained, moderately fine textured, reddish soils that occupy the crests, upper mid and lower mid slopes of the gently undulating landscape. The Yellow Latosols are imperfectly to poorly drained, very deep, moderately fine textured yellowish soils that occur in the lower topographical positions.



ent land use – Forest, shifting cultivation, wildlife sanctuaries, small extents of irrigated chillies, onions and groundnuts; also some cashew and coconut.

ntial land use – These soils are excellent for the intensive cultivation of irrigated chillies, onions, groundnut and tobacco. They are also very good for rainfed cashew plantations and, where supplemental irrigation can be provided, for citrus. Coconut and mango will perform adequately where the rainfall distribution is more favourable eg: in the Puttalam area. In all cases the Red Latosols give superior yields to the Yellow Latosols. Where the annual rainfall is somewhat higher, as in the Mullaittivu area, economic forestry may be practised. Adequate for road construction and small buildings, marginal for multistorey buildings. Moderate quantities of deep groundwater at depths in excess of 100ft, both for domestic use and very limited irrigation, are available.

Management – Frequent irrigations by sprinkler or lined channels are required. Split applications of fertilizer will give superior results. For deeper rooting crops, calcium and magnesium may have to be supplied to the subsurface layers. Responses to N, P and K and possibly Ca are likely to be high especially after one or two years of cropping. Owing to the great depth of soil, the total shrinkage and cracking is sufficient to cause problems in building construction.

MAP UNIT No. 10 – CALCIC RED-YELLOW LATOSOLS– Flat terrain.

Extent (1000 Acres) – 78

Main Districts where present – Jaffna District

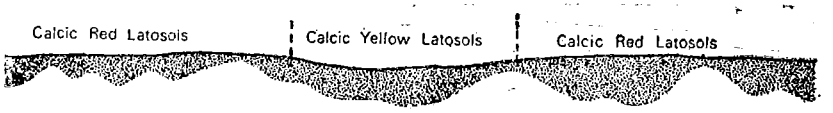
Composition of unit

Great Soil Groups – Calcic Red-Yellow Latosols (90–100 Percent)

Inclusions – Rock exposures, Lithosols (0–10 Percent)

Landform (s) – Flat karst plain

Nature of the great soil groups and their distribution in the landscape – The Calcic Red Latosols are excessively drained, fine-textured reddish soils of variable depth, overlying limestone. They are found in all but the lowest depressional areas. The Calcic Yellow Latosols, which are imperfectly to poorly drained, fine textured yellowish soils occur on the slope bottoms and depressional areas of this unit.



Present land use – Intensive cultivation of chillies, onions, tobacco and vegetables under lift irrigation. Small scale palmyrah and mango plantations. Urban development. Limestone quarrying.

Potential land use – Present land use is generally satisfactory. Replacement of some palmyrah with tobacco or subsidiary foodcrops may bring more satisfactory returns. Urban development is likely to make greater demands on the available land. The shallower soils of this unit are excellent for buildings and roads. The deep Calcic Red Latosols are adequate for buildings as are the Calcic Yellow Latosols. Source of limestone as building material, industrial raw material or fertilizer–operations could be mechanized. Satisfactory quantities of groundwater, exploited at present, could be used more efficiently.

Management – Frequent sprinkler irrigation is recommended. Soil dep may be limiting in some areas of this unit. Since irrigation with underground water, the quality of the water should carefully monitored especially for tobacco cultivation. Respons to N, P should be good. A wind erosion hazard is present in t dry season. Mulching with bulky organic manures appears to beneficial.

MAP UNIT No. 11 - SOLODIZED SOLONETZ and SOLONCHAKS - Flat terrain.

Extent (1000 Acres) - 391

Main Districts where present - Mannar, Jaffna Trincomalee and Puttalam Districts.

Composition of unit

Great Soil Groups - Solodized Solonetz (0-90 Percent)
Solonchaks (0-100 Percent)

Inclusions - Alluvial Soils, Low Humic Gley Soils, Grumusols (0-10 Percent)

Landform (s) - Flat coastal plain and tidal flats

Nature of the great soil groups and their distribution in the landscape - Solodized Solonetz consists of moderately coarse textured, brownish, slightly acid topsoils overlying moderately fine textured mottled and gleyed, grey, alkaline subsoils. Solonchaks are yellowish, granular salty (saline) soils. The Solodized Solonetz of this unit occur in tidal flats, estuaries and as deltaic deposits. Solonchaks occur in similar localities but are more recent deposits or occur in lower topographical positions or both.

Present land use - Some of these soils are cultivated with rice in the Maha season and also under irrigation but this unit consists mostly of barren areas with a patchy grass cover.

Potential land use - If suitable reclamation measures are adopted (see below) these soils can be very successfully utilized for irrigated rice cultivation or pasture. Unsuitable for building and road construction. Extensive use for range goat farming.

Management - Long term drainage and reclamation measures are necessary. The latter may include chemical amendments to overcome alkalinity. Salt tolerant varieties may have to be grown in some areas of this unit.

MAP UNIT No. 12 – GRUMUSOLS – Flat terrain

Extent (1000 Acres) – 38

Main Districts where present – Mannar and Jaffna Districts.

Composition of unit

Great Soil Groups – Grumusols (100 Percent)

Inclusions – ....

Landform (s) – Flat plain with gilgai microrelief.

Nature of the great soil groups and their distribution in the landscape – Grumusols are imperfectly to poorly drained, dark grey brown to black, moderately shallow, clayey soils. They are very sticky when wet and very hard when dry. Wide cracks appear on drying. These soils occur in localized flat areas in or adjacent to the Red Latosol region.

Present land use – Scrub – parkland. Limited rice cultivation in the Maha

Potential land use – Irrigated rice. Vegetables and pulses may be tried out on artificial ridges in Maha or with irrigation in Yala. Unsuitable for building and road construction.

Management – The desirable chemical properties of this soil are offset by the unsuitable physical properties. Its extreme stickiness when wet and hardness when dry make it difficult to work. Also, water logging tends to be a problem. The use of machinery is difficult or impossible. Artificial ridges will have to be used for upland crops. Responses to N and P should be good.

MAP UNIT No. 13 – SOILS ON RECENT MARINE CALCAREOUS SEDIMENTS – Flat terrain.

Extent (1000 Acres) – 70

Main Districts where present – Jaffna District.

Composition of unit

Great Soil Groups – Soils on Recent Marine Calcareous Sediments. (90–100 Percent)

Inclusions – Solodized Solonetz, Solonchaks, Regosols (0–10 Percent)

Landform (s) – Beach, near shore deposits

Nature of the great soil groups and their distribution in the landscape–These are comprised of a wide variety of brownish, yellowish, whitish, greyish or blackish soils with or without mottling and gleying and ranging from coral gravel to muds and clays in texture. They are a complex of sediments recently emerged from the sea (coral rubble, sands, lagoon muds etc) and are consequently confined to coastal areas of the north.

Present land use – Bare land

Potential land use – Unsuitable for agriculture or building. May be developed for recreation purposes (play grounds etc) but conditions will be marginal.

Management – For recreation: Grading for efficient water disposal and drainage of surrounding areas are essential. May be planted with salt tolerant grasses.

MAP UNIT No. 14 – ALLUVIAL SOILS OF VARIABL DRAINAGE and TEXTURE – Flat terrain.

Extent (1000 Acres) – 1,041

Main Districts where Present – All Districts of the Low and Mid-count Dry and Intermediate Zones

Composition of unit

Great Soil Groups – Alluvial Soils (90–100 Percent)

Inclusions – Solodized Solonetz (0–10 Percent)

Landform (s) – Flood plain

Nature of the great soil groups and their distribution in the landscape – The are soils of widely varying drainage (well to very poorly drained texture (sand to clay) and colour (whitish, reddish, brown, gre black). They occur adjacent to rivers and streams on levees, bac swamps, flood plains etc. and are frequently stratified.

Present land use – Forest, natural grasslands (villus) used for grazing irrigated and rainfed rice, tobacco, subsidiary foodcrops, vege tables. Shifting cultivation.

Potential land use – The heavier textured soils that are irrigable are bes cultivated with rice. The villu grasslands can continue to b used for grazing. The lighter textured levee soils are suitable fo for subsidiary foodcrops or tobacco. "Clay" deposits for bric and tile factories can frequently be found on this unit. Unsuitabl for buildings and roads. Forestry for conservation and economi purposes.

Management – One of the main hazards with these soils is, of course flooding. However, in the villu grasslands, flooding supplie valuable nutrients and maintains the quality of the pasture (mainl *Brachiaria mutica*). If flood control measures are adopted different grasses and regular fertilization may have to be used Responses to N and K will be high and to P moderate.

MAP UNIT No. 15 – REGOSOLS ON RECENT BEACH and DUNE SANDS – Flat terrain.

Extent (1000 Acres) – 335

Main Districts where present – Batticoloa, Amparai, Trincomalee, Puttalam, Mannar and Jaffna Districts.

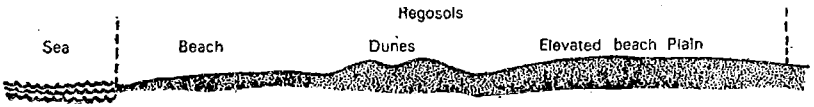
Composition of unit

Great Soil Groups – Regosols (90–100 Percent)

Inclusions – Solonchaks (0–10 Percent)

Landform (s) – Elevated beach, dune and beach

Nature of the great soil groups and their distribution in the landscape – The Regosols are very deep, whitish, excessively drained sands that occur along the coastline as beaches, elevated beaches and dunes.



Present land use – Coconut; cashew; scrub forest and parkland

Potential land use – Where the Regosols are not too deep (i.e. in flat to gently undulating areas as opposed to dune formations) they can be used for coconut or cashew cultivation or for potato cultivation in the cool Maha season with supplemental irrigation. Elsewhere, the main use of this unit would be for recreation purposes (beach resorts etc). Adequate for small buildings. Special techniques are required for multistorey buildings. Suitable for road construction. As source of ilmenite in some areas. Limited amounts of ground water.

Management – The main problem is to ensure an adequate moisture supply. This requirement is looked after by the fresh water lenses that build up in these sands. Frequent applications of small doses of fertilizer are recommended rather than heavy applications. Responses to all nutrient elements should be high.

2 THE MAP UNITS OF THE WET ZONE AND SEMI-WET INTERMEDIATE ZONE

2. THE MAP UNITS OF THE WET ZONE AND SEMI-WET INTERMEDIATE ZONE

P UNIT No. 16 – RED – YELLOW PODZOLIC SOILS and MOUNTAIN REGOSOLS – Mountainous terrain.

nt (1000 Acres) – 637

Districts where present – Kandy, Nuwara Eliya, Badulla, Kegalle, Matale, Ratnapura and Moneragala Districts

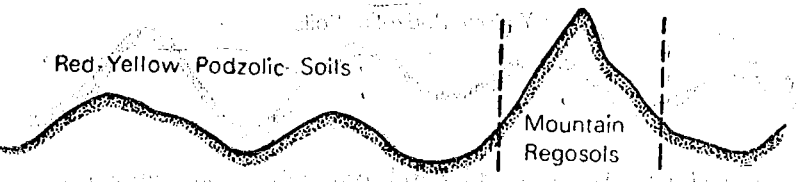
position of unit

Great Soil Groups – Red–Yellow Podzolic Soils (60–75 Percent)
Mountain Regosols (20–30 Percent)

Inclusions – Steep rockland and Lithosols, Alluvial Soils, Meadow Podzolic Soils, Bog and Half Bog Soils (0–10 Percent)

form (s) – High massive hills, steep slopes

re of the great soil groups and their distribution in the landscape – The Red–Yellow Podzolic Soils are well drained, reddish to yellowish, moderately fine textured, strongly acid soils occurring on the less steep slopes. Mountain Regosols have similar characteristics but are well mixed by colluviation and occur on the steeper slopes.



nt land use – Tea, forest

ntial land use – Areas of this unit not already under tea should be set aside for commercial and plantation forestry development as the steep slopes make adequate erosion control uneconomic for most crops. Cardamom at suitable elevations. Generally unsuitable for building and road construction owing to steepness of terrain.

nagement – Erosion control is the major problem on these soils and is absolutely, essential to maintain productivity. Responses of tea to N & K should be good. Slumping and sliding are a hazard on these soils.

MAP UNIT No. 17 – RED-YELLOW PODZOLIC SOILS
teeply dissected hilly and rolling terrain.

Extent (1000 Acres) – 2004

Main Districts where present – Ratnapura, Kalutara, Kegalle, Matara, Galle, Nuwara Eliya, Badulla, Kandy, Matale, Colombo and Kurunegala Districts.

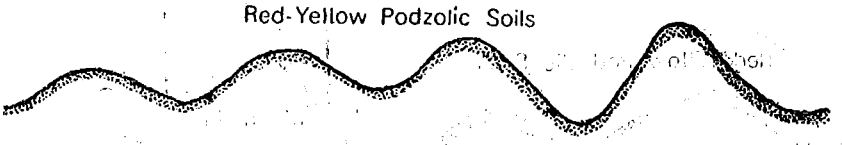
Composition of unit

Great Soil Groups – Red–Yellow Podzolic Soils (70–100 Percent)

Inclusions – Rock knob plains, steep rockland and Lithosols, Low Humic Gley Soils, Bog and Half Bog Soils (0–30 Percent)

Landform (s) – Hills with moderately steep slopes, ridge and valley formations and dissected rolling plains.

Nature of the great soil groups and their distribution in the landscape – The characteristics of the Red–Yellow Podzolic Soils of this unit are similar to those described under Unit 16, but the slopes are generally not as steep and the soils tends to be deeper. The Red–Podzolic and Yellow–Podzolic Soils differ primarily in colour and are intimately intermixed in the landscape



Present land use – Tea, vegetables and some tobacco are grown in the upland (> 3000ft) areas. Tea, rubber, coconut, vegetables, coffee cocoa, fruit crops etc. are grown in the midland and lowland, areas.

Potential land use – **In the upland areas** (3,000–7,000ft) Tea, economic forestry, coffee, temperate horticultural crops, pasture, vegetables. **In the midland areas** (1,000–3,000ft) Tea, rubber (in restricted areas) cocoa, coffee, fruitcrops, pepper, coconuts (< 2,000ft), capok, tobacco, economic forestry, vegetables, pasture, banana, avocado, mulberry for sericulture. **In the lowland areas** (0–1,000ft) Tea and rubber (in restricted areas), economic forestry, coconut,

cocoa, coffee *(Robusta)* vegetables, pineapple, cinnamon, fruit crops (banana, mangosteen, rambuttan, avocado, papaw) yams and tubers, oil palm, sugar cane. These soils are adequate for building and road construction but slumping and sliding are hazards on the slopes.

anagement – The management requirements of these soils are very dependent on the crops. Thus, for tea, erosion control is the only major problem, Responses to N are good. Nematode infestations may require special measures. Many of the other crops that are grown on these soils (except rubber) are fairly sensitive to high acidity and will benefit from liming. Use of urea in place of ammonium sulphate as a source of N will also prevent aggravation of this problem. Frequent applications of small doses of fertilizer are better than widely spaced applications of heavy doses. Minor element deficiencies and manganese or aluminium toxicity are possible hazards in some areas.

MAP UNIT No. 18 - RED - YELLOW PODZOLIC SOIL WITH STRONGLY MOTTLED SUB-SOIL and LOW HUMIC GLEY SOILS - Rolling and undulating terrain.

Extent (1000 Acres) - 374

Main Districts where present - Kurunegala, and Kegalle Districts

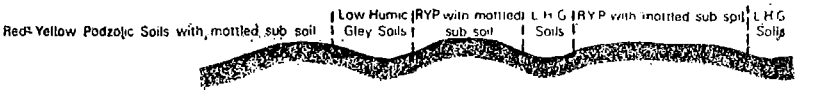
Composition of unit

Great Soil Group - Red-Yellow Podzolic Soils with mottled sub-soil (70-90 Percent)
Low Humic Gley Soils (20-30 Percent)

Inclusions - Alluvial Soils, Lithosols. (0-10 Percent)

Landform (s) - Rolling and undulating plain.

Nature of the great soil groups and their distribution in the landscape - The Red-Yellow Podzolic Soils of this unit are well to imperfectly drained yellowish to reddish brown soils with moderately fine textures and strongly mottled sub-soils and occur in the higher topographical positions. Low Humic Gley Soils are similar to those described under Unit 1 but are slightly more acid in reaction. They occur in the slope bottoms.



Present land use - Coconut, rubber, forest, shifting cultivation, garden crops on the Red Yellow Podzolic Soil and rice on the Low Humic Gley Soils.

Potential land use - **On the Red-Yellow Podzolic Soils with mottled subsoil:** Coconut, pasture, irrigated rice cultivation. Soil moisture conditions are normally satisfactory for pasture and other crops to be grown in association with coconut. Fair to good for buildings and road construction. **On the Low Humic Gley Soils:** Rice. Unsuitable for buildings and roads.

Management - The lower-lying areas of the landscape will require artificial drainage for coconut cultivation. Responses to N, K Ca and Mg are likely to be high.

MAP UNIT No. 19 - RED - YELLOW PODZOLIC SOILS WITH SOFT OR HARD LATERITE - Rolling and undulating terrain.

Extent (1000 Acres) - 577.

Main Districts where present - Colombo, Kalutara. Galle, Matara and Kurunegala Districts.

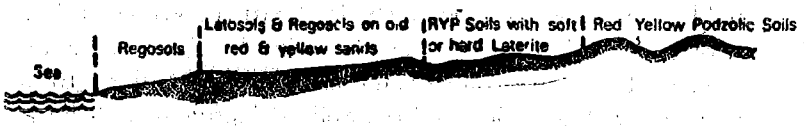
Composition of unit

Great Soil Groups - Red-Yellow Podzolic Soils with soft or hard laterite (70-90 Percent)

Inclusions - Low Humic Gley Soils, Humic Gley Soils, Bog and Half Bog Soils, Alluvial Soils, (10-30 Percent)

Landform (s) - Rolling and undulating plain.

Nature of the great soil groups and their distribution in the landscape - The Red-Yellow Podzolic Soils of this unit are similar to those described in Unit 18 but the sub-soil is more strongly mottled and consists of soft laterite (cabook) that hardens on exposure or has already hardened either massively or as gravel. This great soil group occurs in coastal regions of low elevation.



Present land use - Homestead gardens; rubber; coconut; rice; pineapple etc. Quarrying for laterite (cabook) bricks.

Potential land use - Rubber and coconut where soil depth and drainage are not limiting. Pineapple, orchard crops, vegetables. Cinnamon and cashew in areas with laterite which are marginal for coconut and other orchard crops. Good for building and road construction. Quarrying of cabook as a building material.

Management - The main limitations on these soils are depth and infiltration. In some instances, infiltration may be improved by artificially breaking through existing hard pans. Responses to the major nutrients as well as Ca and Mg should be good. Frequent fertilization essential. Some erosion hazard on steeper lands.

MAP UNIT No. 20 – RED-YELLOW PODZOLIC SOILS WITH DARK B HORIZON and RED-YELLOW PODZOLIC SOILS WITH PROMINENT A_1 HORIZON

Rolling terrain.

Extent (1000 Acres) – 30

Main Districts where present – Nuwara Eliya District.

Composition of unit

Great Soil Groups – Red-Yellow Podzolic Soils with dark B horizon (30–60 Percent)

Red-Yellow Podzolic Soils with prominent A_1 horizon. (30–60 Percent).

Inclusions – Bog and Half Bog Soils, Meadow Podzolic Soils (5–20 Percent)

Landform (s) – Rolling high altitude plateau-broad marshy valley floors

Nature of the great soil groups and their distribution in the landscape – The Red-Yellow Podzolic Soils with dark B horizons are well-drained, reddish to yellowish, moderately fine textured, strongly acid soils with a dark coloured layer in the subsoil. They occur under montane forest on the upper and mid slopes of rolling to hilly topography. Red-Yellow Podzolic Soils with prominent A_1 horizons are well-drained, strongly acid soils with thick dark grey-black surface horizons over reddish to yellowish subsoils. They occur under wet grassland (wet patana) vegetation on rolling to hilly topography.

Present land use – Tea, vegetables, potatoes, pasture, orchard crops.

Potential land use – Existing forests and natural grassland should be retained as such on lands over 5000ft in elevation for conservation purposes as most of the Island's perennial rivers have their sources in this region. The wet-patana grasslands which occupy the Red-Yellow Podzolic Soils with a prominent A_1 horizon can be utilized for pasture development or potato cultivation with strict soil conservation measures. The lands of this unit are

also well-suited to recreation or tourist purposes. The soils with the dark B horizon and better drained soils with prominent A_1 are suitable for buildings and roads.

Management – Soil and water conservation on these lands are of utmost importance. Liming may be required for pasture, potato and vegetables. Responses to N, P, K, Mg, Ca and possibly S are likely to be high for most crops. However, it has been found for potato, that the responses to inorganic fertilizers are higher when they are used in conjunction with cattle manure. For buildings and road construction, the surface organic matter layer should be scraped off.

MAP UNIT No. 21 - RED - YELLOW PODZOLIC SOILS WITH SEMI - PROMINENT A_1 HORIZON - Hilly and rolling terrain.

Extent (1000) Acres - 60

Main Districts where present - Galle, Ratnapura, Kalutara and Matara Districts

Composition of unit

Great Soil Groups - Red-Yellow Podzolic Soils with semi-prominent A_1 horizon. (70-90 Percent)

Inclusions - Steep rockland and Lithosols, Alluvial Soils, Bog and Half Bog Soils (10-30 Percent)

Landform (s) - Hilly and rolling dissected plateau.

Nature of the great soil groups and their distribution in the landscape - The Red-Yellow Podzolic Soils with semi-prominent A_1 horizon has characteristics similar to the Red-Yellow Podzolic Soils of Unit 16 except that the surface horizon is more distinctly stained with organic matter (not so strongly as the Red-Yellow Podzolics with prominent A_1 horizons). They occur under intermediate (1,000-4,000ft) fernland (kekilla) and grassland vegetation on rolling hilly and steeply sloping land.

Present land use - Forest, tea and cardamom at higher elevations and rubber and coconut at lower elevations.

Potential land use - Tea, economic forestry, coffee, cardamom, pasture at higher elevations. Rubber, coffee, coconut, pasture, forestry, and possibly oil palm at lower elevations. Suitable for building and construction in better drained sites.

Management - Erosion control is very important. Liming may be required for crops other than tea and rubber. Responses to all major nutrients (N, P, K) and to Mg and Ca should be good. Some danger of earthslips on these soils.

AP UNIT No. 22 – REDDISH BROWN LATOSOLIC SOILS
Steeply dissected, hilly and rolling terrain.

ent (1000 Acres) – 154

ain Districts where present – Kandy, Kegalle Kurunegala, Matale and Nuwara Eliya Districts.

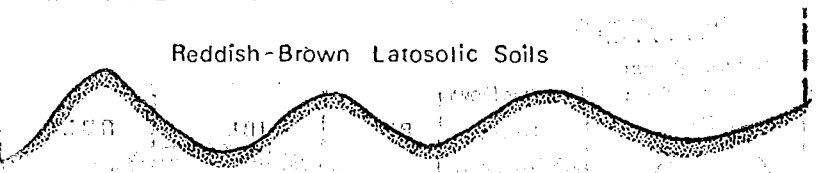
mposition of unit

Great Soil Groups – Reddish Brown Latosolic Soils. (70–90 Percent)

Inclusions – Immature Brown Loams, Alluvial Soils, Low Humic Gley Soils (10–30 Percent)

ndform (s) – Rolling, hilly and steeply dissected landscape

ature of the great soil groups and their distribution in the landscape– Reddish Brown Latosolic Soils are well to moderately well drained, reddish brown, moderately fine textured medium acid soils. They are present in all but the valley bottom positions of the rolling to hilly landscape.



resent land use – Tea, coconut, rubber, mixed home gardens, kitul, arecanut, cocoa, coffee, forest, pepper, kapok, fruit crops, vegetables rice, tobacco, banana.

otential land use – A wide variety of crops can be successfully grown. In addition to those listed above, cloves, cinnamon, nutmegs, mulberry for sericulture, vanilla and pasture may be grown. Compared to other soils, this is the best for cocoa and coffee. The elevation limitations of some of these crops (eg–rubber < 1,000ft) should be borne in mind when selecting any of them for cultivation on the Reddish Brown Latosolic Soils. Suitable for building and road construction.

Management – The Reddish Brown Latosolic Soils have very good physical and moderately good chemical properties. Responses to N, P and K should be moderately high but the soil is fairly well supplied with Ca and Mg. Erosion control is important.

MAP UNIT No. 23 – IMMATURE BROWN LOAMS – Steeply dissected, hilly and rolling terrain.

Extent (1000 Acres) – 133

Main Districts where present – Kandy, Kegalle and Kurunegala Districts.

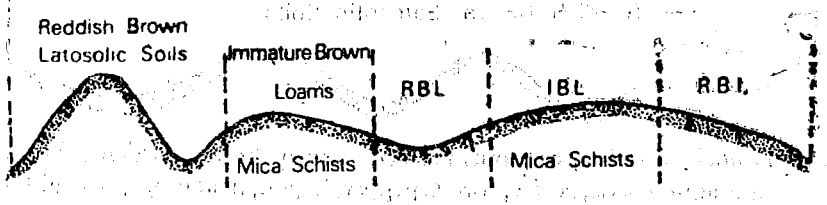
Composition of unit

Great Soils Groups – Immature Brown Loams (60–90 Percent)

Inclusions – Reddish Brown Latosolic Soils, Low Humic Gley Soils, Alluvial Soils (10–40 Percent)

Landform (s) – Rolling, hilly and dissected landscape.

Nature of the great soil groups and their distribution in the landscape– Immature Brown Loams are well drained, brownish, loamy, slightly acid soils with a high proportion of unweathered or partially weathered primary minerals–particularly mica. They occur over micaceous schists of the Khondalite Series and are found in all but the valley bottom positions of the rolling to hilly landscape.



Present land use – Tea, rubber, coconut, forest, home gardens, orchard crops, pepper, arecanut, vegetables, tobacco, banana.

Potential land use – Generally, the deeper Immature Brown Loams can and do support the same crops as the Reddish Brown Latosolic Soils. Often, however, depth is limiting on the Immature Brown Loams and only shallow rooted crops (vegetables, yams, etc) or pasture can be grown. Well suited for building and road construction purposes.

Management – On steep slopes erosion is a major hazard. The Immature Brown Loams tend to dry out rather rapidly so that supplemental irrigation may be required for some crops. Responses to N and P should be high but these soils are well supplied with K, Mg and Ca.

MAP UNIT No. 24 – BOG AND HALF BOG SOILS – Flat terrain.

Extent (1000 Acres) – 125.

Main Districts where present – Colombo, Kalutara, Galle and Matara Districts

Composition of unit

Great Soil Groups – Bog Soils (30–80 Percent)
Half Bog Soils (30–50 Percent)

Inclusions – Alluvial Soils (15–25 Percent)

Landform (s) – Flood plain, tidal marsh, filled-up lagoons.

Nature of the great soil groups and their distribution in the landscape – Bog Soils are very poorly drained soils with a dark brown to black organic matter rich (> 30%) layer overlying strongly gleyed and mottled sub soils. They occur in the lowest, most poorly drained positions of the coastal landscape. Half Bog Soils are similar but have less organic matter (15–30%) in the surface horizon and occur in very poorly drained positions that are slightly higher than those of the Bog Soils.

Present land use – Waste land, rice, pan (Cyperus spp).

Potential land use – Rice, pan, as a material for local handicraft ware. As source of peat. Intensive vegetable cultivation may be tried out in artificially-drained areas. Unsuitable for building and road construction.

Management – Sufficient drainage to prevent inundation but to ensure that the soils remain moist. Responses to N will depend on amount and C/N ratio of organic matter. Responses to other nutrient elements should be good. Some possibility of H_2S or organic acid toxicity and minor element deficiencies. Salinity control may be required in some areas.

MAP UNIT No. 25 - LATOSOLS and REGOSOLS ON OLD RED and YELLOW SANDS-Flat terrain.

Extent (1000 Acres) - 98

Main Districts where present - Puttalam and Colombo Districts.

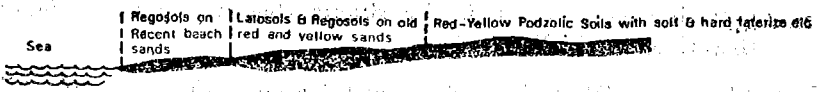
Composition of unit

Great Soil Groups - Red-Yellow Latosol (10-50 Percent)
Regosol (50-90 Percent)

Inclusions - Bog and Half Bog Soils, Alluvial Soils, (5-10 Percent)

Landform (s) - Elevated beach, barrier bar, beach plain

Nature of the great soil groups and their distribution in the landscape- These are reddish to yellowish, coarse textured, excessively drained soils which are slightly acid to neutral in reaction. They occur along parts of the west coast adjoining Regosols on Recent beach sands. There is no specific pattern in the occurrence of the latosols with respect to the Regosols in this unit.



Present land use - Coconut, cinnamon, urban development

Potential land use - Coconut, cashew, fruit crops, papaw, breadfruits, bananas, urban development. Soil moisture conditions may not be satisfactory for pasture and other crops to be grown in association with coconut in the semi-wet regions. Suitable for roads and buildings but large multistorey buildings will require special techniques (piles etc.) for the foundations.

Management - For coconut (and other deep rooting fruit crops) where impervious layers maintain perched water tables, artificial drainage is required. Responses to all major nutrients should be good but frequent application of small doses is the recommended practice. Some of the drier parts of this unit may require supplemental irrigation during drought periods.

AP UNIT No. 26 - ALLUVIAL SOILS OF VARIABLE DRAINAGE AND TEXTURE-Flat terrain.

tent (1000 Acres) - 120

ain Districts where present - All districts of the Wet and Intermediate Zones.

omposition of unit

Great Soil Groups - Alluvial Soils of variable texture. (85-95 Percent)

Inclusions - Bog and Half Bog Soils (5-15 Percent)

ndform (s) - Flood plain, back swamps, levees

ature of the great soil groups and their distribution in the landscape- These are brownish, greyish, black or even reddish soils of highly variable texture (from sands to clays) and drainage (from well to very poorly drained). They occur adjacent to rivers and streams.

esent land use - Rice, vegetables, coconut (on better drained sites) Sources of clay and sand for construction. Gemming.

otential land use - Rice, sources of clay and sand. Unsuitable for building construction except in better drained locations. Gemming in certain localities.

anagement - The only management problems on these soils for the cultivation of rice are the maintenance of soil fertility and proper drainage. Responses to fertilizers will vary widely over this soil unit but P and K should produce good responses.

MAP UNIT No. 27 – REGOSOLS ON RECENT BEACH SANDS – Flat terrain.

Extent (1000 Acres) – 15

Main Districts where present – Colombo, Kalutara, Galle and Matara Districts

Composition of unit

Great Soil Groups – Regosols (90–100 Percent)

Inclusions – Alluvial Soils (0–10 Percent)

Landform (s) – Elevated beach, barrier bar

Nature of the great soil groups and their distribution in the landscape– Regosols on Recent beach sands are excessively-drained, light brownish coloured sands occurring along the present coasts.

Present land use – Coconut

Potential land use – Coconut, cashew, recreation (beach resorts etc). Unsuitable for large buildings unless special techniques are adopted for foundations. Adequate for road construction.

Management – Frequent applications of small doses of fertilizer are preferable to less frequent applications of larger doses.

1. 3. MISCELLANEOUS LAND UNITS

1. 3. MISCELLANEOUS LAND UNITS

MAP UNIT No. 28 – ROCK KNOB PLAIN.

Main Districts where present – All districts of the lowland Dry and Intermediate Zones

Composition of unit – Rock exposures cover a significant part of the landscape (10–80%). Lithosols and other great soil groups of the Dry and Intermediate Zones occupy the remaining area.

Landform (s) – Rock knob plain

Present land use – Quarries for rock

Potential land use – Extensive pasture on Rock Knob Plains with lower percentages of rock exposures. Source of rock as material for construction. Suitable for buildings and roads. Nature and wild life reserves. Forest reserves.

Management – Exploitation as a source of building material is dependent on the location, extent and nature of the rock exposure.

MAP UNIT No. 29 - ERODED LANDS.

Main Districts where present - Vavuniya, Jaffna, Mannar, Anuradhapura and Puttalam Districts

Composition of unit - These are mostly exposures of the underlying Basal Ferruginous Gravel exposed by erosion of the Red-Yellow Latosols

Landform (s) - Undulating plain

Present land use - --

Potential land use - Wildlife, source of gravel for road construction. Suitable for buildings and roads.

Management -

IAP UNIT No. 30 - EROSIONAL REMNANTS (INSEL-BERGS)

lain Districts where present – All districts of the lowland Dry and Intermediate Zones.

'omposition of unit – Isolated hills and ridges of resistant bedrock standing well over the level of the lowland plain.

.ndform (s) – Rock knob plain

'esent land use – Quarry, religious or historical buildings. Recreation.

)tential land use – As source of rock, for construction, recreation, tourism, strict natural reserves for ecological and aesthetic purposes.

lanagement – --

MAP UNIT No. 31 – STEEP ROCKLAND AND LITHOSOLS

Main Districts where present – Kandy, Nuwara Eliya, Badulla, Ratnapura and Moneragala Districts

Composition of unit – These are largely steep scarps and cliffs which are bare or have a thin layer of Lithosols.

Landform (s) – Scarps, cliffs.

Present land use – ---

Potential land use – Source of rock, recreation

Management – ---

PART - II

SOME SELECTED CHARACTERISTICS AND CLASSIFICATION ACCORDING TO THE 7th APPROXIMATION

2. 1 SOILS OF THE DRY ZONE AND SEMI-DRY INTERMEDIATE ZONE

1 SOILS OF THE DRY ZONE AND SEMI-DRY INTERMEDIATE ZONE

REAT SOIL GROUP - REDDISH BROWN EARTHS

ap units where present : 1, 2, 3, 4, 5 and 6

rent materials : Residuum or colluvium from mixed intermediate and basic metamorphic crystalline rocks of the Vijayan and Khondalite Series.

ainage : Well, moderately well and imperfectly drained

eneral depth (ft) : 3–5

olour – **Surface soil:** Dark brown to dark reddish brown.
Sub soil: Red, reddish brown, dark red or dark brown.

exture – **Surface Soil:** Sandy loam to sandy clay loam.
Sub soil: Sandy clay loam to sandy clay with gravel.

ructure – **Surface soil:** Weak crumb or weak subangular blocky.
Subsoil: Moderate sub-angular blocky

nsistence (Moist) – **Surface soil:** Friable.
Subsoil: Friable to firm.

action – **Surface soil:** Slightly acid to neutral.
Subsoil: Medium acid to slightly acid

arbon (%) (Surface soil) : 0.5–2.0

arbon–Nitrogen ratio (Surface soil) : 8–12

ation Exchange Capacity (m.e/100g Soil) : 10–20

ase Saturation (%) (In sub soil) : 60–90

ominant Basic Cation (s) : Ca.

alts and Carbonates :–

Vater Physical properties : Moderately slow infiltration.
Low available water.

Mineralogy – **Sand:** Quartz (dominant), feldspar, mica, hornblende, rutile, zircon, ilmenite, magnetite.
Clay: Kaolinite (dominant), mica, iron oxides, smectite (minor)

7th Approximation (1967) equivalent (Great group) : Rhodustalfs, Haplustalfs, Plinthustalfs.

GREAT SOIL GROUP - LOW HUMIC GLEY SOILS

Map units where present : 1, 2, 3, 5 and 7

Parent materials : Local alluvium, colluvium and residuum derived from crystalline rocks of the Vijayan and Khondalite Series.

Drainage : Poorly and very poorly drained.

General depth (ft) : 4–6

Colour – **Surface soil:** Dark or very dark greyish brown or very dark brown.

Subsoil: Greyish brown, yellowish brown or dark grey with mottles and gleying

Texture – **Surface soil:** Sandy loam to sandy clay loam.
Subsoil: Sandy clay loam to sandy clay or clay.

Structure – **Surface soil:** Weak subangular blocky.
Sub soil: Weak subangular blocky to massive.

Consistence (Moist) – **Surface soil:** Friable to firm.
Sub soil: Firm to very firm.

Reaction – **Surface soil:** Slightly acid.
Sub soil: Moderately alkaline.

Carbon (%) (Surface soil) : 1–3

Carbon–Nitrogen ratio (Surface soil) : 8–12

Cation Exchange Capacity (m.e/100g Soil) : 15–30

Base Saturation (%) (in sub soil) : 90–100

Dominant Basic Cation (s) : Ca, Na

Salts and Carbonates : Carbonates often present in lower horizons.

Water Physical properties : Slow infiltration.
Moderate available water.

Mineralogy – **Sand:** Quartz (dominant), feldspar, mica, hornblende, zircon, magnetite, rutile.

Clay: Kaolinite and smectite (dominant), mica, chlorite and vermiculite (minor).

7th Approximation (1967) equivalent (Great group) : Tropaqualfs

GREAT SOIL GROUP – SOLODIZED SOLONETZ

Map units where present : 4, 8 and 11

Parent materials : Local alluvium, colluvium and residuum derived from metamorphic crystalline rocks or deltaic marine sediments.

Drainage : Poorly and very poorly drained.

General depth (ft) : 4–6

Colour – **Surface soil:** Dark brown
Sub soil: Grey with mottling and gleying.

Texture – **Surface Soil:** Loamy sand to sandy loam.
Sub soil: Sandy clay loam to sandy clay.

Structure – **Surface Soil:** Structureless to weak sub-angular blocky
Sub soil: Strong columnar with angular blocky compound structure.

Consistence (Moist) – **Surface Soil:** Loose or very friable.
Sub soil: Very firm.

Reaction – **Surface Soil:** Strongly acid.
Sub Soil: Strongly alkaline.

Carbon (%) (Surface soil) : 0–2

Carbon–Nitrogen ratio (Surface soil) : 10–15

Cation Exchange Capacity (m.e/100g Soil) : 15–30

Base Saturation (%) (In sub soil) : 100

Dominant Basic Cation (s) : Na, Ca.

Salts and Carbonates : Carbonates and soluble Namay be present in lower horizons.

Water Physical properties : Very slow infiltration. Available water low in surface soil, moderately low in subsoil.

Mineralogy : **Sand:** Quartz (dominant), feldspar, mica hornblende, resistant heavy minerals.
Clay: Probably kaolinite, smectite, mica.

7th Approximation (1967) equivalent (Great group) : Natraqualfs.

GREAT SOIL GROUP - SOLONCHAKS

Map units where present : 11

Parent materials : Recent marine clayey sediments.

Drainage : Poorly or very poorly drained

General depth (ft) : 2–4

Colour – **Surface soil and subsoil:** Dark brown to grey with mottling and gleying.

Texture – **Surface soil and subsoil:** Sandy loam, sandy clay loam or sandy clay

Structure : Massive (structureless)

Consistence (Moist) : Firm.

Reaction : Moderately to strongly alkaline.

Carbon (%) (Surface soil) : 0–0.5

Carbon-Nitrogen ratio (Surface soil) : 10–15

Cation Exchange Capacity (m.e/100g Soil) : 10–25

Base Saturation (%) (In sub soil) : 100

Dominant Basic Cation (s) : Na, Ca.

Salts and Carbonates : Soluble salts and carbonates present.

Water Physical properties : Very slow infiltration. Moderately low available water.

Mineralogy : **Sand:** Quartz (dominant) ilmenite, etc.
Clay: Probably kaolinite, smectite, mica.

7th Approximation (1967) equivalent (Great group) : Salorthids.

GREAT SOIL GROUP - NON - CALCIC BROWN SOILS

Map units where present : 5, 7 and 8.

Parent materials : Acid rocks of the Vijayan Series or colluvium and alluvium derived from these rocks.

Drainage : Well, moderately well, or imperfectly drained.

General depth (ft) : 3–5

Colour – **Surface soil:** Dark brown to dark greyish brown.
Sub soil: Yellowish red, yellowish brown or brown.

Texture – **Surface soil:** Sandy loam.
Sub soil: Sandy loam to sandy clay loam.

Structure – **Surface soil:** Weak subangular blocky.
Sub soil: Weak to moderate sub angular blocky.

Consistence (Moist) – **Surface soil:** Loose to very friable.
Sub soil: Very friable to friable.

Reaction – **Surface soil:** Slightly acid or neutral.
Sub soil: Medium acid.

Carbon (%) (Surface soil) : 0–2

Carbon–Nitrogen ratio (Surface soil) : 8–12

Cation Exchange Capacity (m.e/100g Soil) : 5–15

Base Saturation (%) (In sub soil) : 50–70

Dominant Basic Cation (s) : Ca.

Salts and Carbonates :–

Water Physical properties : Moderate infiltration.
Low available water

Mineralogy – **Sand:** Quartz (dominant), feldspar, mica, heavy minerals.
Clay: Probably kandite, mica.

7th Approximation (1967) equivalent (Great group) : Haplustalfs.

GREAT SOIL GROUP - IMMATURE BROWN LOAMS

Map units where present : 6

Parent materials : Residuum from micaceous gneiss (Bintenne Series).

Drainage : Well, and moderately well drained

General depth (ft) : 2-4

Colour - **Surface soil:** Dark brown to dark greyish brown.
Sub soil: Dark brown to yellowish brown.

Texture - **Surface soil:** Sandy loam to sandy clay loam.
Sub soil: Sandy loam to sandy clay loam

Structure - **Surface soil:** Weak moderate crumb
Sub soil: Structureless to weak subangular blocky

Consistence (Moist) - **Surface soil:** Loose
Sub soil: Friable.

Reaction - **Surface soil:** Neutral.
Sub soil: Slightly acid.

Carbon (%) (Surface soil) : 0-2

Carbon-Nitrogen ratio (Surface soil) : 8-12

Cation Exchange Capacity (m e/100g Soil) : 10-20

Base Saturation (%) (In sub soil) : 40-60

Dominant Basic Cation (s) : Ca.

Salts and Carbonates : --

Water Physical properties : Moderately rapid infiltration.
Low available water.

Mineralogy - **Sand:** Mica (major), quartz, feldspar, heavy minerals.
Clay: Probably mica, kandite, smectite.

7th Approximation (1967) equivalent (Great group) : Ustropepts.

GREAT SOIL GROUP – RED LATOSOLS

Map units where present : 9

Parent materials : Red Earth Formation–unconsolidated sedimentary beach or near-shore Quaternary deposits.

Drainage : Excessively or somewhat excessively drained.

General depth (ft) : 20–80

Colour – **Surface soil:** Dark reddish brown.
Sub soil: Dark red.

Texture – **Surface soil:** Loamy sand, sandy loam or sandy clay loam.
Sub soil: Sandy clay loam to sandy clay.

Structure – **Surface soil:** Weak subangular blocky.
Sub soil: Weak subangular blocky to massive structureless.

Consistence (Moist) – **Surface soil:** Loose to very friable.
Sub soil: Very friable to friable.

Reaction – **Surface soil:** Slightly acid.
Sub soil: Medium acid.

Carbon (%) (Surface soil) : 0–1

Carbon–Nitrogen ratio (Surface soil) : 6–10

Cation Exchange Capacity (m.e/100g Soil) : 2–6

Base Saturation (%) (In subsoil) : 20–60

Dominant Basic Cation (s) : Ca.

Salts and Carbonates : --

Water Physical properties : Very rapid infiltration. Very low available water.

Mineralogy – **Sand:** Quartz (dominant), ilmenite, rutile, zircon, sillimanite, mica.

Clay: Kaolinite (dominant), mica, hematite.

7th Approximation (1967) equivalent (Great group) : Eutrustox and Haplustox.

GREAT SOIL GROUP – YELLOW LATOSOLS

Map units where present : 9

Parent materials : Lowerlying parts of the Red Earth Formation.

Drainage : Moderately well to imperfectly drained.

General depth (ft) : 20–80

Colour – **Surface soil:** Dark brown to brown.
Sub soil: Yellowish brown to strong brown.

Texture – **Surface soil:** Sand to fine sandy loam.
Sub soil: Sandy clay loam to sandy clay.

Structure – **Surface soil:** Structureless to weak subangular blocky
Sub soil: Massive structureless.

Consistence (Moist) – **Surface soil:** Loose to very friable.
Sub soil: Friable.

Reaction – **Surface soil:** Neutral or slightly acid
Sub soil: Slightly acid to neutral

Carbon (%) (Surface soil) : 0–2

Carbon–Nitrogen ratio (Surface soil) : 6–10

Cation Exchange Capacity (m.e/100g Soil) : 2–6

Base Saturation (%) (In sub soil) : 40–60

Dominant Basic Cation (s) : Ca.

Salts and Carbonates :–

Water Physical properties : Very rapid infiltration. Very low available water.

Mineralogy – **Sand:** Quartz (dominant), ilmenite, magnetite, rutile, zircon, sillimanite, mica.
Clay: Probably kandite, mica, iron oxides.

7th Approximation (1967) equivalent (Great group) : Eutrustox and Haplustox.

GREAT SOIL GROUP – CALCIC RED LATOSOLS

Map units where present : 10

Parent materials : Shallow Red Earth Formation overlying Miocene limestone.

Drainage : Excessively or somewhat excessively drained.

General depth (ft) : 2–5

Colour – **Surface soil:** Red to yellowish red.
Sub soil: Red or dark red.

Texture – **Surface soil:** Sandy clay loam.
Sub soil: Sandy clay loam.

Structure – **Surface soil:** Weak subangular blocky.
Sub soil: Weak subangular blocky to massive structureless.

Consistence (Moist) – **Surface soil:** Loose to very friable.
Sub soil: Very friable to friable.

Reaction – **Surface soil:** Neutral or slightly acid.
Sub soil: Slightly acid or medium acid.

Carbon (%) (Surface soil) : 0–2

Carbon–Nitrogen ratio (Surface soil) : 8–12

Cation Exchange Capacity (m.e/100g Soil) : 15–20

Base Saturation (%) (In sub soil) : 40–60

Dominant Basic Cation (s) : Ca.

Salts and Carbonates :–

Water Physical properties : Very rapid infiltration. Moderately low available water.

Mineralogy – **Sand:** Quartz (dominant), ilmenite, magnetite, rutile, zircon, iron oxides.
Clay: Probably kandite, mica.

7th Approximation (1967) equivalent (Great group) : Eutrustox

GREAT SOIL GROUP – GRUMUSOLS

Map units where present : 12

Parent materials : Clayey, Quaternary lacustrine deposits.

Drainage : Poor.

General depth (ft) : 2–4

Colour – **Surface soil:** Black.
Sub soil: Black

Texture – **Surface soil:** Clay loam to clay.
Sub soil: Clay.

Structure – **Surface soil:** Moderate granular.
Sub soil: Moderate to strong subangular blocky.

Consistence (Moist) – **Surface soil:** Very firm.
Subsoil: Very firm.

Reaction – **Surface soil:** Medium to slightly acid.
Subsoil: Medium to slightly acid.

Carbon (%) (Surface soil) : 2–3

Carbon–Nitrogen ratio (Surface soil) : 10–15

Cation Exchange Capacity (m.e/100g Soil) : 55–65

Base Saturation (%) (In sub soil) : 65–90

Dominant Basic Cation (s) : Ca.

Salts and Carbonates : Some secondary carbonates in lower part of subsoil.

Water Physical properties : Very slow infiltration. High available water

Mineralogy – **Sand:** Quartz (dominant), feldspar.
Clay: Dominantly smectite.

7th Approximation (1967) equivalent (Great grop) : Pellusterts.

GREAT SOIL GROUP – SOILS ON RECENT MARINE CALCAREOUS SEDIMENTS

Map units where present : 13

Parent materials : Recent marine sediments–reefoid, nearshore and lagoonal sediments.

Drainage : Imperfectly to poorly drained

General depth (ft) : 1–4

Colour – **Surface soil and subsoil:** Olive brown, light yellowish brown, very dark grey or black with mottles and gleying.

Texture – **Surface soil and subsoil:** Gravel, sands and clays.

Structure – **Surface soil and subsoil:** Structureless.

Consistence (Moist) – **Surface soil and subsoil:** Sandy soils–loose, clayey soils–very firm.

Reaction – **Surface soil and subsoil:** Mildly to moderately alkaline.

Carbon (%) (Surface soil) : 0–1

Carbon–Nitrogen ratio (Surface soil) : 6–10

Cation Exchange Capacity (m.e/100g Soil) : 1–25

Base Saturation (%) (In sub soil) : 90–100

Dominant Basic Cation (s) : Na, Ca.

Salts and Carbonates : Carbonates and soluble salts often present.

Water Physical properties : Variable–sands have very rapid infiltration and low available water. Clays have very slow infiltration and low available water.

Mineralogy – **Sand:** Quartz, calcium carbonate.
Clays: Probably mica, smectite, kandite.

7th Approximation (1967) equivalent (Great group) : Ustorthents.

GREAT SOIL GROUP – SOILS ON OLD ALLUVIUM

Map units where present : 8

Parent materials : Old alluvium

Drainage : Well, moderately well and imperfectly drained.

General depth (ft) : 2–5

Colour – **Surface soil:** Very dark greyish brown or dark brown.
Subsoil: Brown, light yellowish brown or pale brown.

Texture – **Surface soil:** Loamy sand to sandy loam.
Subsoil: Sandy loam.

Structure – **Surface soil and subsoil:** Very weak subangular blocky to massive structureless.

Consistence (Moist) – **Surface soil and subsoil:** Loose to very friable

Reaction – **Surface and subsoil:** Medium acid, slightly acid or neutra

Carbon(%) (Surface soil) : 0–2

Carbon–Nitrogen ratio (Surface soil) : 6–12

Cation Exchange Capacity (me./100g Soil) : 2–4

Base Saturation (%) (In sub soil) : 40–60

Dominant Basic Cation (s) : Ca.

Salts and Carbonates : Carbonates occasionally present in lower subsoil.

Water Physical properties : Very rapid infiltration. Very low available water.

Mineralogy – **Sand:** Quartz (dominant), resistant heavy minerals
Clay: Probably kandite, mica.

7th Approximation (1967) equivalent (Great group) : Quartzipsamments

GREAT SOIL GROUP – ALLUVIAL SOILS OF VARIABLE DRAINAGE AND TEXTURE

Map units where present : 14

Parent materials : River alluvium.

Drainage : Moderately well, imperfectly and poorly drained.

General depth (ft) : 5–8

Colour – **Surface soil and subsoil:** Dark greyish brown, very dark greyish brown and dark brown with mottles and gleying in lower part

Texture – **Surface soil and sub soil:** Variable–sandy, loamy and clayey textures.

Structure – **Surface soil and subsoil:** Massive structureless

Consistence (Moist) – **Surface soil and sub soil:** Variable from loose to very firm.

Reaction – **Surface soil and sub soil:** Slightly acid, neutral or slightly alkaline.

Carbon (%) (Surface soil) : 2–10

Carbon–Nitrogen ratio (Surface soil) : 8–15

Cation Exchange Capacity (m e/100g Soil) : 5–50

Base Saturation (%) (In sub soil) : 60–90

Dominant Basic Cation (s) : Ca, Mg.

Salts and Carbonates : Soluble salts and carbonates sometimes present.

Water Physical properties – Highly variable – dependent on texture, organic matter etc.

Mineralogy – **Sand:** Quartz (dominant), resistant heavy minerals.
Clay: Probably kandite, smectite, mica.

7th Approximation (1967) equivalent (Great group) : Tropaquents Ustifluvents and Tropofluvents.

GREAT SOIL GROUP – REGOSOLS ON RECENT BEACH SANDS

Map units where present : 15

Parent materials : Barrier bar, beach and beach plain sands.

Drainage : Excessively drained.

General depth (ft) : 10–30

Colour – Surface soil and subsoil: Variable–generally bleached whitish appearance.

Texture – Surface soil and subsoil: Sand.

Structure – Surface soil and subsoil: Single grain structureless.

Consistence (Moist) – Surface soil and subsoil: Loose.

Reaction – Surface soil and sub soil: Neutral.

Carbon (%) (Surface soil) : 0–1

Carbon–Nitrogen ratio (Surface soil) : 8–12

Cation Exchange Capacity (m.e/100g Soil) : < 2

Base Saturation (%) (In sub soil) : 75–90

Dominant Basic Cation (s) : Ca.

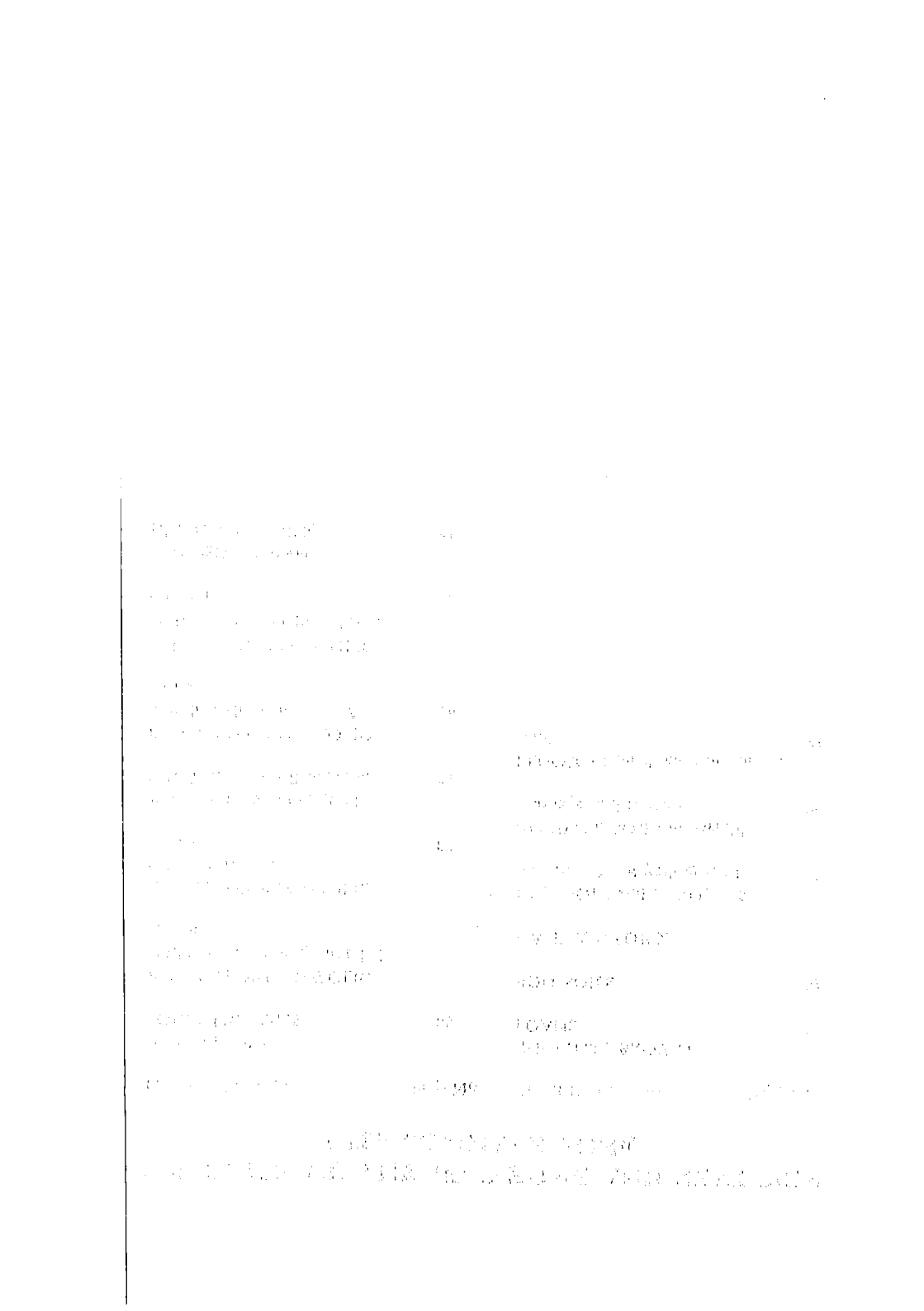
Salts and Carbonates : –

Water Physical properties : Very rapid infiltration. Very low available water.

Mineralogy – Sand: Quartz, ilmenite, magnetite, rutile, zircon, sillimanite
Clay: ?

7th Approximation (1967) equivalent (Great group) : Quartzipsamments and Ustipsamments.

2. 2 SOILS OF THE WET ZONE AND SEMI-WET INTERMEDIATE ZONE



. 2 SOILS OF THE WET ZONE AND SEMI-WET INTERMEDIATE ZONE

REAT SOIL GROUP-RED-YELLOW PODZOLIC SOILS

Map units where present : 16 and 17

arent materials : Residuum, colluvium or local alluvium derived from a wide variety of crystalline metamorphic rocks of the Pre-Cambrian.

Drainage : Well and moderately well drained.

General depth (ft) : 6–8

Colour – **Surface soil:** Dark grey brown to dark brown.
Sub soil: Brown to yellowish brown or yellowish red with reddish mottles.

Texture – **Surface soil.** Sandy loam to sandy clay loam.

Structure – **Surface soil:** Weak to moderate crumb or granular.
Sub soil: Weak to moderate subangular blocky.

Consistence (Moist) – **Surface soil:** Friable.
Sub soil: Friable to firm.

Reaction – **Surface soil:** Very strongly acid.
Sub soil: Strongly acid or medium acid.

Carbon (%) (Surface Soil) : 0–2

Carbon–Nitrogen ratio (Surface soil) : 8–12

Cation Exchange Capacity (m.e/100g Soil) : 8–15

Base Saturation (%) (In sub soil) : 4–6

Dominant Basic Cation (s) : Mg, Ca.

Salts and Carbonates :–

Water Physical properties : Moderate infiltration. Moderately low available water.

Mineralogy – **Sand:** Quartz (dominant), magnetite, sillimanite, ilmenite, rutile, zircon.
Clay: Kaolinite (dominant), gibbsite, iron oxides.

7th Approximation (1967) equivalent (Great group) : Rhodudults, Tropudults, Rhodustults, Tropustults.

GREAT SOIL GROUP – RED-YELLOW PODZOLIC SOILS WITH STRONGLY MOTTLED SUB SOILS

Map units where present : 18

Parent materials : Weathered quartzo-feldspathic gneiss and biotite gneiss.

Drainage : Well drained to moderately well drained.

General Depth (ft.) : 5–7

Colour – **Surface soil:** Brown to dark brown or reddish brown.
Sub soil: Mottled yellowish brown to brownish yellow, reddish brown, yellowish red etc.

Texture – **Surface soil:** Loamy sand to sandy loam.
Sub soil: Sandy clay loam to sandy clay.

Structure – **Surface soil:** Weak subangular blocky to massive
Sub soil: Weak to moderate subangular blocky.

Consistence (Moist) – **Surface soil:** Friable.
Sub soil: Firm.

Reaction – **Surface soil:** Slightly to medium acid
Sub soil: Strongly to medium acid.

Carbon (%) (Surface soil) : 0–2

Carbon–Nitrogen ratio (Surface soil) : 8–12

Cation Exchange Capacity (me. 100g Soil) : 5–15

Base Saturation (%) : (In sub soil) : 30–40

Dominant Basic Cation (s) : Ca, Mg .

Salts and Carbonates : –

Water Physical properties : Moderate infiltration. Moderately low available water.

Mineralogy – **Sand:** Quartz (dominant), magnetite, ilmenite, rutile.
Clay: Kaolinite (dominant), iron oxides, gibbsite.

7th Approximation (1967) equivalent (Great group): Tropudults.

GREAT SOIL GROUP – RED-YELLOW PODZOLIC SOILS WITH SOFT OR HARD LATERITE

Map units where present : 19

Parent materials : Residuum, colluvium or local alluvium derived from a wide variety of crystalline metamorphic rocks of the Pre-Cambrian.

Drainage : Well drained or moderately well drained.

General depth (ft) : 5–7

Colour – **Surface soil:** Dark grey brown to dark brown.
Sub soil: Strongly mottled, yellowish brown to brownish yellow.

Texture – **Surface soil:** Sandy loam to sandy clay.
Sub soil: Sandy clay loam to sandy clay often with iron-stone gravel.

Structure – **Surface soil:** Weak crumb or granular.
Sub soil: Massive.

Consistence (Moist) – **Surface soil:** Friable.
Sub soil: Firm to very firm.

Reaction – **Surface soil:** Strongly acid.
Sub soil: Strongly acid.

Carbon (%) (Surface Soil) : 0–2

Carbon–Nitrogen ratio (Surface soil) : 8–12

Cation Exchange Capacity (m.e/100g Soil) : 5–15

Base Saturation (%) (In sub soil) : 15–30

Dominant Basic Cation (s) : Mg, Ca.

Salts and Carbonates : --

Water Physical properties : Moderate infiltration. Low available water holding capacity

Mineralogy – **Sand:** Quartz, magnetite, ilmenite, rutile, zircon, iron oxides,
Clay: Kaolinite, gibbsite, iron oxides.

7th Approximation (1967) equivalent (Great group) : Plinthudults,

GREAT SOIL GROUP – RED – YELLOW PODZOLIC SOILS WITH DARK B HORIZON

Map units where present : 20

Parent materials : Residuum, colluvium or local alluvium derived from metamorphic crystalline rocks of the Khondalite Series.

Drainage : Well drained or moderately well drained.

General depth (ft) : 5–8

Colour – **Surface soil:** Dark brown.
Sub soil: Yellowish brown with dark brown layer in the B horizon.

Texture – **Surface soil:** Sandy loam to loam.
Sub soil: Sandy clay loam to sandy clay.

Structure – **Surface soil:** Weak crumb or weak subangular blocky.
Sub soil: Moderate subangular blocky.

Consistence (Moist) – **Surface soil:** Loose to very friable.
Sub soil: Friable to firm.

Reaction – **Surface soil:** Very strongly acid.
Sub soil: Strongly acid.

Carbon (%) (Surface soil) : 8–10

Carbon–Nitrogen ratio (Surface soil) : 15–20

Cation Exchange Capacity (m.e/100g Soil) : 10–30

Base Saturation (%) (In sub soil) : 5–15

Dominant Basic Cation (s) : Ca, Mg.

Salts and Carbonates :–

Water Physical properties : Moderate infiltration. Moderate available water.

Mineralogy – **Sand:** Quartz, magnetite, rutile, zircon, sillimanite.
Clay: Kaolinite, iron oxides, gibbsite.

7th Approximation (1967) equivalent (Great group) : Tropohumults, Tropudults.

GREAT SOIL GROUP – RED-YELLOW PODZOLIC SOILS WITH PROMINENT A_1 HORIZON

Map units where present : 20

Parent materials : Residuum, colluvium or local alluvium derived from metamorphic crystalline rocks of the Khondalite Series.

Drainage : Well drained, moderately well drained and imperfectly drained.

General depth (ft) : 5–6

Colour – **Surface soil:** Very dark brown to very dark grey brown.
Sub soil: Yellowish brown or strong brown; some mottling in lower part.

Texture – **Surface soil:** Loam or sandy loam.
Sub soil: Sandy clay loam to sandy clay.

Structure – **Surface soil:** Weak crumb
Sub soil: Moderate subangular blocky.

Consistence (Moist) – **Surface soil:** Loose to very friable.
Sub soil: Friable to firm.

Reaction – **Surface soil:** Strongly acid.
Sub soil: Medium acid.

Carbon(%) (Surface soil) : 5–15

Carbon–Nitrogen ratio (Surface soil) : 15–40

Cation Exchange Capacity (m.e/100g soil) : 10–30

Base Saturation (%) (In sub soil) : 5–10

Dominant Basic Cation (s) : Ca, Mg.

Salts and Carbonates : --

Water Physical properties : Moderate infiltration. High available water.

Mineralogy – **Sand:** Quartz (dominant), sillimanite, magnetite, ilmenite, zircon, rutile.
Clay: Kaolinite, gibbsite, iron oxides.

7th Approximation (1967) equivalent (Great group) : Tropohumults.

GREAT SOIL GROUP – RED-YELLOW PODZOLIC SOILS WITH SEMI-PROMINENT A_1 HORIZON

Map units where present : 21

Parent materials : Residuum, colluvium or local alluvium derived from metamorphic crystalline rocks of the Vijayan and Khondalite Series.

Drainage : Well drained, moderately well drained and imperfectly drained.

General depth (ft) : 5–6

Colour – **Surface soil:** Very dark grey brown.
Sub soil: Brown to yellowish red.

Texture – **Surface soil:** Gravelly clay loam.
Sub soil: Gravelly clay loam to gravelly clay.

Structure – **Surface soil:** Moderate granular.
Sub soil: Moderate to strong subangular blocky.

Consistence (Moist) – **Surface soil:** Very friable.
Sub soil: Friable to firm.

Reaction – **Surface soil:** Strongly acid.
Sub soil: Medium acid.

Carbon (%) (Surface soil) : 2–5

Carbon–Nitrogen ratio (Surface soil) : 15–20

Cation Exchange Capacity (m.e/100g soil) : 10–15

Base Saturation (%) (In sub soil) : 5

Dominant Basic Cation (s) : Ca.

Salts and Carbonates :–

Water Physical properties : Moderate infiltration. Moderate available water.

Mineralogy – **Sand:** Quartz (dominant), mica, sillimanite, garnet, zircon, etc.
Clay: Kaolinite (dominant), gibbsite, iron oxides.

7th Approximation (1967) equivalent (Great group) : Tropudults.

GREAT SOIL GROUP – REDDISH BROWN LATOSOLIC SOILS

Map units where present : 22

Parent materials : Slope colluvium and residuum from basic and intermediate rocks of the Khondalite Series.

Drainage : Well drained and moderately well drained.

General depth (ft) : 4–5

Colour – **Surface soil:** Dark reddish brown or reddish brown.
Sub soil: Reddish brown.

Texture – **Surface soil:** Sandy loam to sandy clay loam.
Sub soil: Sandy clay loam to clay loam with gravel.

Structure – **Surface soil:** Strong crumb to granular.
Sub soil: Moderate subangular blocky.

Consistence (Moist) – **Surface soil:** Friable.
Sub soil: Friable to firm.

Reaction – **Surface soil:** Slightly acid.
Sub soil: Medium acid.

Carbon (%) (Surface soil) : 3–5

Carbon–Nitrogen ratio (Surface soil) : 10

Cation Exchange Capacity (m.e/100g Soil) : 12–20

Base Saturation (%) (In sub soil) : 20–30

Dominant Basic Cation (s) : Ca, Mg.

Salts and Carbonates : –

Water Physical properties : Moderate infiltration. Moderate available water.

Mineralogy – **Sand:** Quartz (dominant), mica, feldspar, garnet, zircon, rutile, etc.
Clay: Kaolinite (dominant), iron and aluminium oxides.

7th Approximation (1967) equivalent (Great group) : Rhodudults, Tropudults.

GREAT SOIL GROUP - IMMATURE BROWN LOAMS

Map units where present : 23

Parent materials : Residuum from micaceous schists of the Khondalite Series.

Drainage : Somewhat excessively to well drained.

General depth (ft) : 1–3

Colour – **Surface soil:** Dark brown to dark grey brown.
Sub soil: Yellowish brown to brown.

Texture – **Surface soil:** Loam to sandy clay loam.
Sub soil: Sandy loam.

Structure – **Surface soil:** Moderate crumb or weak subangular blocky
Sub soil: Weak subangular blocky to massive structureles

Consistence (Moist) – **Surface soil:** Friable.
Sub soil: Loose.

Reaction – **Surface soil:** Slightly acid to neutral.
Subsoil: Slightly acid.

Carbon(%) (Surface soil) : 1–2

Carbon–Nitrogen ratio (Surface soil) : 10

Cation Exchange Capacity (m.e/100g Soil) : 10–20

Base Saturation (%) (In subsoil) : 50–70

Dominant Basic Cation (s) : Ca, Mg.

Salts and Carbonates :–

Water Physical properties ; Moderately rapid infiltration. Low available water.

Mineralogy – **Sand:** Mica, quartz, feldspar, garnet, sillimanite, magnetite, etc.
Clay: Probably smectite, mica, kaolinite.

7th Approximation (1967) equivalent (Great group) : Dystropepts.

GREAT SOIL GROUP – BOG SOILS

Map units where present : 24

Parent materials : Cumulose organic deposits overlying alluvium.

Drainage : Very poorly drained.

General depth (ft) : > 2

Colour : Dark brown to black organic layer (> 30% organic matter, > 20 inches thick) overlying strongly mottled and gleyed mineral alluvial soil.

Texture : Textures of mineral part of these soils are quite variable.

Structure : --

Consistence (Moist) : Loose.

Reaction : Strongly acid when wet.

Carbon(%) (Surface soil) : > 30

Carbon–Nitrogen ratio (Surface soil) : –

Cation Exchange Capacity (m.e/100g Soil) : –

Base Saturation (%) (In sub soil) : –

Dominant Basic Cation (s) : –

Salts and Carbonates : Some periodic salinity in low lying coastal areas with salt water intrusion.

Water Physical properties : –

Mineralogy : –

7th Approximation (1967) equivalent (Great group) : Tropofibrists, Tropohemists, Troposaprists.

GREAT SOIL GROUP – HALF BOG SOILS

Map units where present : 24

Parent materials : Cumulose organic deposits overlying alluvium.

Drainage : Very poorly drained

General depth (ft) : > 2

Colour : Dark brown to black organic layer (15–30% organic matter) overlying mottled and gleyed mineral alluvial soil or peat.

Texture : Textures of mineral part of these soils are variable (generally clayey.)

Structure : —

Consistence (Moist) : Loose.

Reaction : Strongly acid when wet.

Carbon (%) (Surface soil) : 15–30

Carbon–Nitrogen ratio (Surface soil) :–

Cation Exchange Capacity (m.e/100g Soil) :–

Base Saturation (%) (In sub soil) :–

Dominant Basic Cation (s) :–

Salts and Carbonates : Some periodic salinity in low-lying coastal areas with salt water intrusion.

Water Physical properties :–

Mineralogy :–

7ht Approximation (1967) equivalent (Great group) : Tropaquepts.

GREAT SOIL GROUP – LATOSOLS AND REGOSOLS ON OLD RED AND YELLOW SANDS

Map units where present : 25

Parent materials : Beach plain, barrier bar and elevated beach deposits.

Drainage : Excessively drained on red sands, moderately well-drained on yellow sands.

General depth (ft) : > 20

Colour – **Surface soil:** – Dark brown.
Sub soil: Reddish brown to red.

Texture – **Surface soil:** Sand to loamy sand.
Sub soil: Sand to sandy loam.

Structure – **Surface soil:** Single grain or massive structureless
Subsoil: Single grain or massive structureless.

Consistence (Moist) – **Surface soil:** Loose to very friable.
Sub soil: Loose to very friable.

Reaction – **Surface and Sub soil:** Slightly acid to neutral.

Carbon (%) (Surface soil) : 0–2

Carbon–Nitrogen ratio (Surface soil) : 8–12

Cation Exchange Capacity (m.e/100g Soil) : 1–5

Base Saturation (%) (In sub soil) : 30–75

Dominant Basic Cation (s) : Ca, Mg.

Salts and Carbonates – :–

Water Physical properties : Very rapid infiltration. Very low available water.

Mineralogy – **Sand:** Quartz (dominant), ilmenite, magnetite, zircon,
Clay: Kaolinite (dominant), iron oxides, mica.

7th Approximation (1967) equivalent (Great group) – Quartzipsamments

GREAT SOIL GROUP – ALLUVIAL SOILS OF VARIABLE DRAINAGE AND TEXTURE

Map units where present : 26

Parent materials : Alluvium.

Drainage : Well, moderately well, imperfectly, poorly or very poorly drained.

General depth (ft) : 6–10

Colour : Dark brown, dark greyish brown, very dark greyish brown etc. with mottles and gleying often present.

Texture : Variable-sandy, loamy and clayey textures.

Structure : Very weak subangular blocky or, more generally, massive structureless.

Consistence (Moist) : Variable-loose to very firm.

Reaction – **Surface and sub soil:** Strongly acid, medium acid or slightly acid.

Carbon (%) (Surface Soil) : 2–10

Carbon-Nitrogen ratio (Surface soil) : 10–15

Cation Exchange Capacity (m.e/100g soil) : 5–20

Base Saturation (%) (In sub soil) : 10–50

Dominant Basic Cation (s) : Ca, Mg.

Salts and Carbonates : Some salinity in coastal areas with salt water intrusion.

Water Physical properties : Infiltration and water holding properties are highly variable depending largely on texture and % organic matter.

Mineralogy – **Sand:** Quartz (dominant), resistant heavy minerals.
Clay: Probably variable amounts of kandite, mica, smectite, iron oxides, gibbsite.

7th Approximation (1967) equivalent (Great group) : Tropaquents, Tropofluvents, Tropaquepts.

GREAT SOIL GROUP - REGOSOLS ON RECENT BEACH SANDS

Map units where present : 27

Parent materials : Beach plain, barrier bar, elevated beach and dune deposits.

Drainage : Excessively drained.

General depth (ft) : > 10

Colour : Variable–generally bleached, whitish appearance.

Texture : Sand.

Structure : Structureless (single grain)

Consistence (Moist) : Loose.

Reaction – **Surface and Sub soil:** Slightly acid to neutral.

Carbon (%) (Surface soil) : 0–1

Carbon–Nitrogen ratio (Surface soil) : 8–12

Cation Exchange Capacity (m.e/100g Soil) : 0–2

Base Saturation (%) (In subsoil) : 30–50

Dominant Basic Cation (s) : Ca.

Salts and Carbonates – –

Water Physical properties : Very rapid infiltration. Very low available water holding capacity.

Mineralogy – **Sand:** Quartz (dominant), magnetite, ilmenite, garnet, rutile, zircon, feldspar, mica etc.
Clay: Probably mica, kandite, smectite.

7th Approximation (1967) equivalent (Great group) : Quartzipsamments.

[illegible] SOIL GROUP [illegible] SERIES [illegible]

[illegible] : 27

Parent material : [illegible] plain, [illegible] elevated [illegible]

Drainage : [illegible]

[illegible] (ft) : [illegible]

[illegible] : [illegible] whitish [illegible]

[illegible]

[illegible]

[illegible]

Soil reaction : Neutral and Slightly acid [illegible]

[illegible] (%) (Surface soil) : 0.1

[illegible] (%) (Surface soil) : [illegible]

Cation Exchange Capacity [illegible] : [illegible]

Base saturation (%) (Subsoil) : 30-50

[illegible] (s) : [illegible]

[illegible]

[illegible] properties : Very rapid infiltration. Very low [illegible] water holding capacity.

[illegible] : [illegible] magnetite, [illegible] feldspar, [illegible]
[illegible] mica, [illegible]

[illegible]