The Soil Map of Portuguese Timor - The Eastern End
Preliminary representation

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Summary

The area studied pertains to the easternmost part of the island of Timor, covering about 5000 km². In 1960 the main soil groups were identified and defined and their mapping was begun in 1961. Aerial photographs at an average scale of 1:40 000 were used as a field basis.

The present paper deals with the morphological study of the main soil units and their placing in a general soil classification scheme. The field work upon which it is based is a part of the framework leading to the General Soil Map of Portuguese Timor.
Mapa de solos de Timor Leste - A parte oriental
Uma representação preliminar

Apresenta – se um estudo da área situada na zona mais oriental da ilha de Timor Português, cobrindo uma extensão aproximada de 3000 km². Em 1960 identificaram-se e caracterizaram-se os principais agrupamentos de solos, tendo-se iniciado em 1961 a respectiva cartografia, para o que se utilizaram fotografias aéreas à escala aproximada de 1: 40 000. Referem-se as principais características morfológicas das unidades pedagógicas definidas e sua filiação num esquema geral de classificação dos solos. O trabalho de campo realizado faz parte dos estudos de base da Carta de Solos a efectuar em toda a província.

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THE SOIL MAP OF PORTUGUESE TIMOR  THE EASTERN END
PRELIMINARY REPRESENTATION

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1. INTRODUCTION
Soil mapping was carried out during 1961 using aerial photographs at an average scale of 1:40 000. The area studied covers about 3000 km³. The present paper describes the main morphological characteristics of soil units and sets up their provisional placing in a general scheme of classification. The survey was undertaken within the framework of Soil Map of Portuguese Timor which is being prepared.

2. LOCATION
The portuguese Province of Timor, placed between Australia and Indonesia, is located between 8° 17' and 10° 22' of latitude South, and 123° 25' and 127° 19' of longitude East of Greenwich. Its elongated shapes is oriented in the SW- NW direction and it is one of the Southernmost of the Lesser Sunda Island. The mapped area covers the Eastern End of the Island.

3. RELIEF
The Island of Timor has excessive relief. Across its length runs a central chain of mountains whose highest peak reaches 2980 m (Ramelau Peak). The Eastern End comprises a tableland that becomes more rugged towards the West.

4. CLIMATE
The climate is rather variable. Variations between the average temperatures of the warmest and the coldest months of the year amount to
less than 5°C. Clear decrease in temperature is felt with increase in altitude.  
Average annual rainfall varies between 1250 mm and 3000 mm. Rainfall is the most important climatic factor exercising marked influence upon the genesis of soils. The climate is clearly isothermal.

5. GEOLOGY AND LITHOLOGY
The area under study presents a great geological complexity. The largest representation belongs to rocks of igneous (mainly basic) and sedimentary origin. Among the sedimentary ones predominate calcareous formations (from the Triassic, of the «fato» and coral reef type) and clay formations (from the Jurassic, clay complex and alluvium).

The parent material can be considered as one of the most important factors of soil formation.

6. VEGETATION
Vast areas covered by forest, savannah and pastures are found in the region under study. In agricultured areas rice and maize cultivation covers the largest portions. There are extensive tracts under coconut in the coastal belt.

7. SOILS
The main characteristics of the soil groupings that were defined are given below:

7.1. Lithosols and Lithosolic Soils (L)
Incipient soils derived from consolidated rocks of various types. Less than 10 cm deep. Do not show genetic horizons. Profile of the CR or (A) C type.

7.2. Calcareous Psammitic Regosols (RC)
Incipient soils derived from unconsolidated materials. Generally rather deep. Made up of more or less coarse sandy debris. Sandy; high carbonate content. Found along the coast. (A) C type profile.

7.3. Medium Textured Calcareous Modern Alluvial Soils (Amc)
Medium and light texture (clay loam and sandy loam); grayish; high carbonate content. Found along water streams. From time to time new alluvial sediments are added.

7.4. Heavy Textured Non Calcareous Modern Alluvial Soils (Ap)
Incipient soil from stratified alluvium deposits, often receiving sedimentary additions. Deep water table, subject to
fluctuations. Flooding is common. Dark; clay.

7.5. Non Differentiated Calcareous Old Alluvial Soils (Ali)
Alluvial soils covering the vast area of the Mehara plateau. Somewhat heterogeneous though normally silty. Very high carbonate content. Lower layers whitish and increasingly calcareous. Better developed than the Recent Alluvial Soils. Little developed. Variable carbonate content along the profile. Grayish

7.6. Non Diferencial Calcareaus Old Alluvial Soil (A2i)
Clay; lower horizons marked by hidromorphism and poor drainage. Lying upon greenish yellow clay. Normally do not receive more alluvial deposits. They cover areas of higher altitude than the Ali soils.

7.7. Coastal Lowland Soils (Plc)
Incipient soil, found in lowlying coastal areas. Dark coloured. Water table comparatively high; normally not subjected to flooding. Do not show clearly developed genetic horizons. These soils are deep and have a high level of natural fertility. Better developed than the Recent Alluvial Soils.

7.8. Brown Calcareous Soils (from «fato» limestone) (PF)
Little developed. Variable carbonate content along the profile. Grayish brown; clay. When shallow contain a great deal of limestone fragments lying at the surface. Present surface cracking when thicker. Profile of the AC type, sometimes ABC type. These soils have a shallow phase (PFD) characterized by a greater amount of stones at the surface, the C horizon being less than 50 cm deep.

7.9. Brown Calcareous Soils (from compact gray limestone) (PC)
Brown; clay; subangular and angular blocky structure; many limestone fragments in the profile. Developed from light and grayish coloured limestone mixed up with a small quantity of igneous rocks.

7.10. Gray Calcareous Soils (from pseudo-ooliticlimestone) (CZ)
Whitish gray; thin; high carbonate content. They cover areas of excessive relief with marked slopes where erosion has been severe. Easily distinguished from other soil groupings due to their clearly whitish colour and little thickness. When found on more level
lands they are darker and thicker. AC or A (B) C type profile.

7.11. Red Calcareous Soils (from coral reef limestone) (VR)
Reddish brown; large amount of coral limestone fragments at the surface; variable carbonate content in the lower horizons. Limestone shows up often at the top in large areas but soil is still found among the stone and in the hollows. Sometimes show considerable thickness. Have a shallow phase (VRd) when the C horizon is found less than 50 cm deep.

7.12. Brown Calcareous Soils (from coral reef limestone)
Dark brown; little thickness. They spread over more or less level lands. They show less agricultural suitability than the VR Soils.

Black; little thickness; normally contain small limestone fragments in the profile. Developed from limestone spared over more or less level areas following the VR Soils at lower height. When waterlogged, they present hydromorphic characteristics which become more marked with depth. Profile of the AC or ABC type.

Morphologically these soils are very similar to the Black « Barros», almost the exclusive difference being a higher organic matter content in the upper layers. Generally covered by forest growth. AC type profile.

7.15. Gray Calcareous Soils (from sandstone and coral reef limestone) (CR)
Gray or brown; loam to clay; some quartz gravel; subangular blocky structure; high carbonate content. Normally found at lower altitudes.

7.16. Brown Calcareous Soils (from limestone from the Triassic associated to shales) (PCX)
Brownish; high carbonate content. Developed from limestone with alternate thin layers of grayish shales (from Naunilli). ABC type profile. They have a shallow phase (PCXd) where the C horizon is less than 50 cm deep. Generally covered by large and small limestone fragments, bare rock showing up in places.

7.17. Red Calcareous Soils (from pinkish limestone associated to igneous rocks) (Vce)
Reddish brown; clay; blocky structure. Often found alternating with soils derived from igneous rocks and shales. Profile of the ABR type.

7.18. Grayish Calcareous Soils (from the clay complex) (CN)
Marked heterogeneity associated to the nature of the parent material. Dark brown, reddish brown or grayish; clay; subangular and angular blocky structure. Variable carbonate content along the profile.

7.19. Brown Soils from clay emplaced upon coral reef limestone) (PA)
First horizon dark brown; clay; structure. Second horizon yellower; cracking deeply; poor drainage; prismatic structure; some iron concretions. Mottled C horizon; bad drainage; prismatic structure. ABC type profile.

7.20. Brown Soils from Non Calcareous Materials (from igneous rocks) (PE)
Brownish loam or clay loam; abundant coarse material (gravel and coarse sand). Shallow soils occupying very slopy areas.

7.21. Brown Soils from Non Calcareous Materials (from mica sandstone) (PG)
Grayish brown; rather shallow; poor drainage; signs of hydromorphism in the lower horizons. Clear susceptibility to erosion; very often the yellowish-red C horizon shows up at the surface. Suitable for pasture. AC or Acg type profile blocky structure. Variable carbonate content along the profile.

7.22. Gray Soils from Non Calcareous Materials (from quartzite) (CQ)
Clearly gray; shallow; very much eroded. Found in very slopy places where weathered rock shows up often at the surface. AC type profile.

7.23. Gray Soils from Non Calcareous Materials (from rhyolite) (CE)
Gray; shallow; clay loam to loam; some gravel; subangular blocky made up of granular structure; hard. AC type profile.

7.24. Grayish Brown Soils from Non Calcareous materials (from diorite) (CD)
Dark grayish brown; loam to clay loam; some gravel; granular and subangular blocky structure; friable; moderately well drained.
7.25. Brown Soils from Non Calcareous Materials (from clay shales associated to mica sandstone) (PXG)
Grayish brown; clay; clear motting in the lower horizons. Temporary flooding which cause reducing phenomena to take place in the lower layers. Profile of the ABC or AC type.
Have a thin phase (PXGd) when the C horizon is less than 50 cm deep.

7.26. Grayish Marly Soils (from Viqueque Formation) (CMC)
Shallow soils; olive gray with mottles in lower horizons; high carbonate content; somewhat poorly drained; clay; hard.

7.27. Soils Complexes
The main features of the complexes that were mapped are given below:

Complex A1. Made up as follows:
Red Calcareous Soils VR – 30 %; Red Calcareous Soils (Shallow Phase) VRD – 70 % . They have the characteristics of the VR Soils but are generally very thin and stony.

Complex A2. Made up as follows:
Brown Soils from Non Calcareous Materials PXG – 55 %; Red Calcareous Soils (Shallow Phase)VRD 30 %; Red Calcareous Soils VR- 15 %. Occupying very slopy areas that accompany the ridge of the coral reefs. Very much eroded.

Complex A3. Made up as follows:
Brown Soils from Non Calcareous Materials PXG – 70 %; Red Calcareous Soils PCX – 30 %. The soils from this complex spread over lowlands and areas of gentle relief, accompanying the depression and bordering the PCX Soils.

Complex CPL. Made up as follows:
Brown Soils PA – 60 % ; Red Calcareous Soils (Shallow Phase) VRd – 10 % ; Gray Calcareous Soils CZ – 10 %. Soils making up this complex occupy more or less level areas and are of a variable thickness turning shallower hill tops and thicker in level areas and depression.

Complex CEU. Made up as follows:
Brown Calcareous Soils PC 30 %; Grayish Calcareous Soils CN – 30 %; Red Calcareous Soils Vce – 20 % ; Brown Soils from Non Calcareous Soils PCX – 10 %. The soils of this complex have the C horizon less thans 50 cm deep (Shallow Phase).
Complex CNEM: Made up as follows:
Grayish Calcareous Soils CN – 75%;
Brown Soils from Non Calcareous Materials PE – 25%. Soils making up this complex have characteristics common to CN and PE Soils.

Complex CTE:
Made up of soils derived from coarse materials resulting from weathering of conglomerates. Very heterogenous. Normally reddish or grayish soils; sandy with much quartz gravel.