

PERMANENT REFERENCE

THE PHYSICAL AND CHEMICAL CHARACTERISTICS  
OF SOILS OF FOUR MAJOR SOIL GROUPS IN  
THE EASTERN PROVINCE

by

Pathmapriyadarshini Kularajasingam

A Research Report

Submitted in Partial Fulfilment of the  
Requirements of the advanced  
course in

SOIL CHEMISTRY (504e)

for the Degree of

BACHELOR OF SCIENCE IN AGRICULTURE

of

Batticaloa University College

Sri Lanka

1986

- approved by -

Dr. S. Sandama  
Head/Agronomy  
Department of Agronomy  
Faculty of Agriculture  
Batticaloa University College  
Vantharumoolai  
Sri Lanka



FAG24  
  
Project Report  
Library - EUSL

*S. Siva Suman*  
Dr. S. Sivasubramanian  
Supervisor  
Faculty of Agriculture  
Batticaloa University College  
Vantharumoolai  
Sri Lanka

07

L 2707

PROCESSED  
Main Library, EUSL

ABSTRACT

The main objective of the study was to determine the physical and chemical characteristics of the most abundant four major soil groups in the Eastern province. With the information obtained it was intended to compare their characteristics in relation to their capability for increased crop production.

Four major soil groups, regosol, alluvial, solidised solonets and non-calcic brown earth were described. Particle size distribution analysis was made according to the pipette method. pH was determined by using pH meter. Cation exchange capacity was determined by the Schollenberger and Simon method. Organic matter was determined by the Walkley and Black method. Total nitrogen was determined by <sup>the</sup> Kjeldhal method. Potassium and Calcium were determined by Flame photometry. Phosphorous was determined by a colorimetric method.

The pH values of the surface soils were near neutral in all soil types except in alluvial where it was slightly acidic. The organic matter contents in the surface soils were approximately 2%. The regosols had very low organic matter content of 1%. The cation exchange capacities were low and varied from 6 to 18 meq/100 g of soil, except in regosol, where it was only 2 meq/100g of soil respectively.

The total nitrogen content varied from 0.1 to 0.3 %.

Phosphorous status was found low in all the four types of soils and varied from 21 to 28 ppm. with the exception of non-calcic

brown soil where the value was only 9 ppm. Potassium status was medium in all soil types, and varied from 0.2 to 0.6 meq/100 g of soil. All four soil types were fairly well supplied with calcium, and varied from 22 to 23 meq/100g of soil, with the exception of non-calcic brown soil and solodised solonetz where the values varied from 3 to 4 meq/100g of soil.

Solodised solonetz soils were devoid of coarse sand. All the other three soils have been developed from fairly uniform parent materials, which were rich in sand. Clay and silt content in regosols were very low compared to the other three soil types.

All the four soil types were poorly developed and had higher infiltration rate. The soils in the Eastern province are suitable either for the cultivation of paddy or for plantation crops such as coconut and cashew. Soil amendments need<sup>to</sup> be done in all soils for better <sup>crop</sup> production.

\* \* \* \*

C O N T E N T S

	<u>Page No.</u>
Abstract .....	i
Acknowledgement .....	iii
Contents .....	iv
List of Figures and Tables .....	v
1. Introduction .....	1
2. Literature Review .....	3
2.1 Soils of Sri Lanka .....	3
2.2 Major Soil Groups in the Eastern province ...	5
2.3 Physical and Chemical Properties .....	8
2.4 Physical Properties of Soils .....	8
2.5 Chemical Properties of Soils .....	9
2.5 a (i) Cation exchange .....	9
(ii) Soil pH .....	10
2.5 b Soil Organic Matter .....	11
2.5 c Plant Nutrients in Soil .....	13
3. Materials and Methods .....	17
3.1 Preparation of Sample .....	17
3.2 Particle size distribution .....	17
3.3 Cation exchange capacity .....	18
3.4 Soil Organic matter .....	19
3.5 pH Value .....	19
3.6 Total nitrogen .....	20
3.7 Determination of phosphate .....	20
3.8 Determination of potassium .....	20
3.9 Determination of calcium .....	21
4. Results and Discussion .....	22
5. Reference .....	30

\* \* \* \* \*