DETAILED SOIL SURVEY AND EVALUATION FOR LAND USE INTERPRETATIVE GROUPS IN TAMIL NADU AGRICULTURAL UNIVERSITY COTTON RESEARCH STATION FARM OF SRIVALLIPUTTUR

K. MAYALAGU and P. PARAMASIVAM[1]

ABSTRACT

Detailed soil survey and characterization of morphology of cotton research station farm Srivilliputtur were made. Subramaniapuram and Peelamedu series were identified and mapped. Both were very deep vertisols with slight alkalinity and darkness of colour in the latter. The rating of these soils for land capability, storie Index and Productivity were of Grade Fair to Good.

KEY WORDS : Detailed Soil, Survey, Land evaluation, SIR, Land Capability, Productivity ratings.

Soil differences modify crop responses to management inputs. Improper use of soils may aggravate degradation. It is therefore, essential to understand the soils for proper conservation and sustained agricultural production. So, this study has been undertaken for detailed soil survey of Cotton Research Station farm - Srivilliputtur to investigate the morphological characteristics of the soil series and finally to arrive at interpretative groupings and taxonomy for the different soil phases of each farm and to suggest management practices.

The farm is geographically situated at 9°5'N latitude and 77°6'E longitude with an altitude of 138 m above MSL. It has a total extent of 8.86 ha. The tract is experiencing a long and hot summer and a brief cold and rainy winter with unpredictable monsoonic rains.

MATERIALS AND METHODS

A detailed soil survey of the farm was carried out using the cadastral map as the base material as per the procedure given by Soil Survey Staff (1951). In each soil series, three pedons were examined, described as per the procedure of (Soil Survey Staff 1951) and sampled horizonwise for Laboratory analysis.

RESULTS AND DISCUSSION

The detailed soil survey map of the farm reveals that there are two mapping unit namely Sbm - C1 - d5/A - e1 and Plm - C1 - d5/A - e1 (Sbm - Subramaniapuram soil series and Plm - Peelamedu soil series) occupying 6.63 and 2.23 ha respectively. The sbm series in the new farm has very deep solum (d5), clay loam textured surface (c1), 0.1 per cent slope (A) and slight erosion

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1. Department of Soil Science and Agricultural Chemistry, Tamil Nadu Agricultural University, Coimbatore.
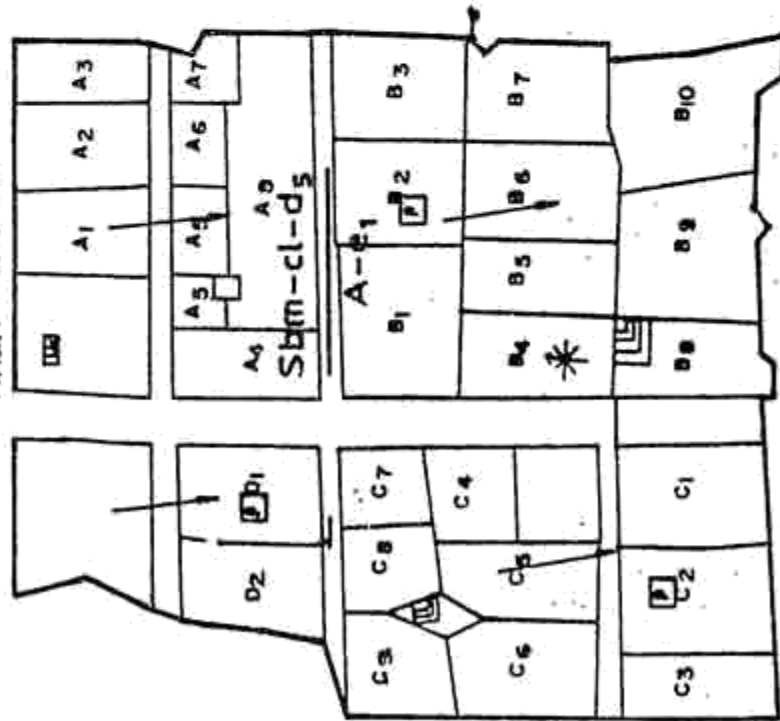
SOIL MAP

COTTON RESEARCH STATION, SRIVILLIPUTHUR

OLD FARM
AREA : 2.23 Ha

NEW FARM
AREA : 6.63 Ha

REFERENCE

P   Profile pit
    Slope direction

Motor shed
Meterological observatory

hazard (e1). The Plm series in the old Farm has also very deep solum (d5), clay loam textured surface (c1), 0.1 per cent slope (A) and slight erosion hazard (e1).

The Subramaniapuram series is very deep, calcareous, dark grayish brown, clay loam textured in surface grading silty clay loam to silty clay in sub-surface and poorly drained soils developed from weathered quartz and feldspathic gneiss inter laid by lime Kankar and distributed in low land topography. The Plm series mapped is a very deep, calcareous, dark grey coloured, clay loam textured in surface grading to silty clay in sub surface poorly drained soils derived from weathered gneiss inter laid by lime Kankar and distributed in mid upland physiography.

Based on the morphology and physical and chemical properties reported by Balasubramanian (1987), the interpretative groupings on Storie Index Rating (Storie 1964), Land use capability classification (Soil Survey Staff, 1951), soil and land irrigability classifications (Anon, 1970) and productivity and potential productivity classification (Riquier et.al.,1970) along with coefficient of improvements were accurately worked out (Table - 1).

It is revealed that the Sbm series and Plm series are placed under Storie Index ratings of 58.48 and 48.48 per cent respectively both falling under grade 3 (Fair) and pointing out the near marginal suitability for sustained use under agriculture in the light of the report by Mayalagu and Sree Ramulu (1981). The overall tract rating for this farm works out to 56 per cent falling under grade 3 (Fair).

The land capability of these soils are of III W C-2,5 and III W, C-2,5 6 for Sbm Plm series respectively revealing that both the soils are moderately good cultivable lands with the sub class level limitations being poor drainage and drought (Sub class W,C) and their unit level hazards are drainage and fine texture. The additional hazard in Plm series is alkalinity. Regarding management aspects, provision of drainage (by digging deep trenches of 30 x 40 cm at periodical intervals) and reclamation of alkalinity (by gypsum application) are essential for both the series.

The soil irrigability class 'A' of Sbm series indicates that it has slight limitations for sustained use under irrigation (less permeability, more Kankar and alkalinity). The class 'B' of Plm series expresses the moderate soil limitations or sustained use under irrigation. Similarly, the land irrigability class '2d' of Sbm and Plm series reveal that Cotton Research Station has moderate topographic and drainage limitations respectively for sustained use under irrigation. These evaluations are similar to the report of Syed Ahamed Miranji et. al., (1983) and Chellamuthu (1987).

The productivity ratings are 25.32 and 21.71 per cent for Sbm and Plm series respectively, both falling under grade 3 (Average). After investigating enough resources to make scientific improvement both the soils would better the potential productivity class to II (good) as per the guidelines pointed out by Naidu et.al., (1986). These interpretations fall in line with those of Chellamuthu (1987). The coefficients of improvements are 2.2 and 2.5 for Sbm and Plm series respectively indicating the fact the magnituds of 220 and 250

TABLE - 1 : INTERPRETATIVE GROUPING OF SOILS OF COTTON RESEARCH STATION, SRIVILLIPUTHUR

	Interpretative grouping	Subramaniapuram series (Sbm)	Pedamedu Series (Pim)
I	Storie Index Rating-Rating (Per Cent)	58.48	48.48
	Grade	3 (Fair)	3 (Fair)
II	Land Use Capability Classification-Class/Sub-Class/Unit	III W, C-2 5	III W, C-2 5 6
III	Soil Irrigability Classification-Class	A	B
IV	Land Irrigability Classification-Class/Sub-class	2d	2d
V	Productivity Classification-Rating (Per cent)	25.32	21.71
	Grade	3 (Average)	3 (Average)
VI	Potential Productivity Classification-Rating (Per cent)	55.23	55.23
	Grade	II (Good)	II (Good)
	Co-efficient of improvement	2.2	2.5
VII	Crop Suitability Classification		
	Wet Land Crops		
	Paddy	HS	HS
	Sugarcane	MS	MS
	Banana	MS	MS
	Gardenland crops		
	Millets	MS	MS
	Groundnut	PS	PS
	Cotton	HS	HS
	Chillies	MS	MS
	Coconut	MS	MS
	Vegetables	HS	HS
	Tapioca	US	US
	Fruit Crops	HS	HS
	Dry land crops		
	Millets	HS	HS
	Cotton	HS	HS
	Pulses	HS	HS
	Groundnut	MS	MS
	Chillies	HS	HS

N.B: HS - Highly suited : PS - Poorly suited :
MS - Moderately suited : US - Unsuited.

per cent of improvement are possible in those soils productivity through scientific management.

Considering the morphological, physical and chemical properties of the series (Balasubramanian 1987), the taxonomy of the soils is as follows. The Peelamedu series is a member of fine, montmorillonitic, isohytperthermic family of typic chromustert. (Soil Survey, Staff 1975).

Thus, both Subramaniapuram and Peelamedu soil series are not much different in characters and management, having only some alkalinity and darker colour in Peelamedu series than the former. Therefore there is a need to weigh the soil characteristics and potentialities for accomplishing scientific land use and soil based agrotechnology.

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