

A STUDY ON THE FEASIBILITY OF REGULATING
WATER RETENTION CAPACITY OF SANDY REGOSOLS

BY

JEYARANEE PAUL

A Research Report

Submitted in Partial Fulfilment for
the Requirments of the Advanced Course

In

AGRICULTURAL ENGINEERING

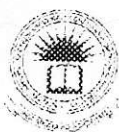
For the Degree of

BACHELOR OF SCIENCE IN AGRICULTURE

Eastern University, Sri Lanka

1987

Approved by



Sivapalan

Supervisor

Mr.S.Sivapalan

Dept.of Agronomy

Faculty of Agriculture

Eastern University, Sri Lanka

Chenkalady.

S.Raveendranath

Head/Dept.of Agronomy

Dr.S.Raveendranath

Dept.of Agronomy

Faculty of Agriculture

Eastern University, Sri Lanka

Chenkalady.

ABSTRACT

A field experiment on a bare soil was conducted in the Eastern Region at the Eastern University, Sri Lanka, Chenkalady to study the feasibility of regulating water retention capacity of sandy regosols during the dry season of 1987 (July-october).

Four different types of organic matter ammendments , namely, burned paddy husk, cowdung, tank silt and ipil-ipil leaves at 3 levels of application were tested in plots arranged in Randomized complete block design.

Results indicate that the addition of paddy husk and tank silt at higher level of application(at the rate of 1.5 and 30 tons/ac respectively) has significantly increased the water retention capacity of sandy regosols. Means of each treatment show that addition of paddy husk was superior to other treatments.

Soil temperature measured at a depth of 10 cm indicates that the temperature rise of treated plots was slightly lower than that of control plots.

The addition of different types of organic matters at higher levels has significantly increased the total organic matter content of regosols. However, among these treatments the highest organic matter content was recorded for cowdung. Treatment of sandy regosols with different kinds of organic matters at higher levels of application reduces the bulk density of the soil which inturn increases the porosity. Treatment means were compared and found that cowdung and Ipil-ipil leaves treatments were superior to other treatments.in increasing total porosity of the soil.

TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	Abstract	ii
	Acknowledgement	iii
	Table of contents	v
	List of Figures	viii
	List of Tables	ix
1.	INTRODUCTION	1
1.1	Objectives of the study	2
2.	LITERATURE REVIEW	3
2.1	Agricultural problems in sandy soils	3
2.2	Development of Agricultural potential in sandy soils	5
2.3	2.2.1 Placement of organic manure layers in soil	5
	2.2.2 Application of phosphatic colloidal clay	6
	2.2.3 Placement of water barriers in the soil	6
	2.2.4 Placement of mulches	7
2.3	Effect of adding organic manure to soils	9
	2.3.1 Effect of organic manure on water retention/release characteristics ;	10
	2.3.2 Effect of adding organic manure on soil structure	11
	2.3.3 Effect of adding organic manure on porosity	12
	2.3.4 Effect of adding organic manure on soil temperature	12
	2.3.5 Effect of adding organic manure on cation exchange capacity	13
	2.3.6 Effect of adding organic manure on apparent specific gravity	13

2.4	Factors influencing the decomposition of organic manures	14
2.5	Effect of decomposition on water retention/release characteristics	15
3.	METHODS AND MATERIALS	17
3.1	Site selection	17
3.2	Description of soil	
3.3	Experimental lay-out	19
3.4	Experimental procedure	21
3.4.1	Land preparation	21
3.4.2	Treatment of soil	21
3.4.3	Installation of soil thermometers	21
3.4.4	Irrigation	21
3.4.5	Removal of weeds	21
3.5	Soil analysis	21
3.5.1	Sampling	21
3.5.2	Physical properties of soil	23
3.6	Analysis of results	23
4.	RESULTS AND DISCUSSION	24
4.1	Effect of different types of organic matter on water retention capacity of sandy regosols	24
4.1.1	Effect of paddy husk	28
4.1.2	Effect of cow dung	28
4.1.3	Effect of tank silt	28
4.1.4	Effect of ipil ipil leaves	29
4.2	Effect of organic matters on water retention capacity of sandy regosol of different levels of application	29
4.2.1	Effect at level-1	29
4.2.2	Effect at level-2	29
4.2.3	Effect at level-3	31