AERATION AND MOISTURE STUDIES IN TRINIDAD SOILS:

(I) A SIMPLE METHOD FOR THE DETERMINATION OF SOIL MOISTURE IN THE FIELD.

(A) INTRODUCTION

The usual method for determining soil moisture in the field is by means of auger samples taken in a random manner throughout the area to be sampled. Moisture content of the composite sample is then determined by oven-drying a weighed portion, and reweighing when dry. The auger method is open to several serious objections, which become accentuated as the size of the area to be sampled is reduced and the number of observations made is increased. Among these may be listed the following:-

(1) The continual removal of soil from the area may eventually reach appreciable proportions and actual damage to the plot may result.

(2) The time required in sampling and in the actual determination of moisture content is considerable.

(3) Trampling of the soil in the sampling process may be serious, especially during wet weather.

(4) Conditions are changed in the soil itself, notably where gaseous exchange is concerned.

(5) The boring holes may offer a means of escape for excess water which might otherwise have been more generally absorbed by the surface soil.

From these considerations, it is readily seen that the number of moisture estimations allowable in a given area is greatly restricted by the use of the auger method. The method now to be described represents an attempt to eliminate to some extent these objections, and to provide a means whereby detailed information concerning soil moisture fluctuations may readily be obtained. The basis of the method is the periodic weighing of a block of soil which can be removed from its surroundings without disturbing its structure. Calculation of moisture content is then based on data obtained at the time the block was cut out of the soil. If the variations in weight of the soil-block correspond to increases or decreases in moisture

content of its surroundings, the method should serve as a ready means of estimating soil moisture.

That it might be possible to use the weight of a movable block of soil as an indicator of soil moisture, arose from various considerations, among these are:-

(1) Except where a definite water-table exists near to the surface of the soil, the importance of upward capillary movement of water is negligible.

(2) The chief loss of water from a soil (with moisture content below its field moisture capacity), is by diffusion from the soil and by transpiration from plant leaves.

(3) Soil is wetted, to approximately its field capacity, to a depth corresponding to the amount of rain or water added.

(4) The drying out of the soil is largely independent of capillary movement.

The importance of diffusion compared to capillary makes it possible for a soil to dry out naturally, even though the continuance of close contact downwards may be interrupted.