ABSTRACT

The Influence of texture, mineralogy and humus on soil stability in four contrasting Trinidad soils

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Erosion is a problem in Trinidad like other parts of the world, but the indices proposed for predicting erodibility have been developed in temperate countries and are inappropriate for use in the tropics. There is a need to develop an index suitable for use in the Caribbean.

The erodibility of the soil is determined by a number of factors, one of which is soil stability. Soil stability on the other hand, is determined by physical, chemical and mineralogical properties which may be used as indicators of soil stability and in extension erodibility.

The aim of this study was to determine if there is a quantitative or qualitative relationship between aggregate stability to water droplet impact and texture, mineralogy and humus in four Trinidad soils. Mechanical analyses, X-ray diffraction, differential thermal analyses and stability tests, using the water droplet method, were all carried out to determine the correlation between these properties and aggregate stability.

There was no significant relationship between the percentage of sand, silt and clay and stability. The clay ratio, proposed by Bouyoucos (1935), was found to be suitable to some extent in predicting the stability of the four soils. Montmorillonite appeared to have a positive effect in maintaining aggregate stability. Therefore the quality of the clay rather than the quantity was more important in affecting aggregate stability.

There was no relationship between the percentage of FA ,HA or humic substances and aggregate stability. However, the relationship between aggregate stability and humic substances seemed to be qualitative, with carboxylic, phenolic, ketonic and amide groups, as well as, amino acids, aliphatic alcohols and benzene being important in maintaining aggregate stability.