ABSTRACT

"Soil degradation and conservation based land suitability studies in plantains and banana production systems in volcanic areas'

Sama-Lang P and R Achard [CRBP Njombe-Cameroon] [1]

Volcanic soils exist all over the earth in many local occurrences. To evaluate such volcanic soils for their suitability for crop production, their intensive cultivation by farmers and their resultant enormous and rapid degradation must be considered. This will be for bananas and plantains abundantly produced here and simulating annual and perennial crop behavior. Soil conservation elements like phosphorus fixation and slopes will be included.

Materials and Methods: The volcanic soils around Mounts Cameroon and Kupe were regrouped using surveyed data based on banana and plantains' production and soil degradation factors. The results were placed in tables and charts and based on soil conservation parameters were interpreted for suitability to the banana and plantains crop production using soil conservation based crop requirements for banana and plantains.

Results and Discussions: Soils towards mount Cameroon are essentially grouped into young and old volcanic types on basalts. The Young materials are mainly from mudflows of ash and lavaflows while old volcanic materials are mainly plateau and columnar Basalt from 'relief inversion' following differential erosion. Mudflow soils are generally deeper and less stony than lavaflow soils with lower susceptibility to water erosion because of identified higher aggregate stability and permeability to water. The young volcanic or most recent soils are chemically richer while the old volcanic soils are chemically average or poorer and generally have a higher clay content. They are highly used for plantains and banana production because of high fertility especially on basic ash. They are easily leached and easily fix phosphate using Aluminium that impoverish them. Steep topography is identified as a major soil degradation factor limiting their use. On higher areas, topsoil is easily removed as crumbled hard 'high mountain granulations' by water from runoffs.

Plantains and banana production require 1000 - 1500 mm / year average rainfall as ideal. With wind damage being a hindrance because of root nematodes and stem borers, wind speeds should be less than 50 km/h. Soils should be freely drained, well aerated and deep. They should be fertile loams without water logging.

Soil conservation based land suitability assessment showed a total surface area of 35% as suitable for plantains and bananas. Because of slopes and other soil conservation related factors, 65% of the area showed three less suitable soil conservation units. Soil physical conditions (depth and slopes) were the most limiting factors along adverse climatic conditions which include very high and intensive rainfalls. For plantains and banana production during the dry season, soil conservation based irrigation is necessary. Improvement should include soil maintenance through the reduction of phosphate fixation arising from aluminium by applying phosphate fertilizers, raising the pH through liming and the use of organic manure and silica.