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RELATIONSHIP BETWEEN RAINFALL INTERCEPTION AND RAINSPLASH EROSION UNDER TEAK PLANTATION IN SOUTH WESTERN NIGERIA

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ABSTRACT

Rainfall interception and Rainsplash Erosion were measured utilizing a 405m² area of teak (*Tectona grandis* L. F.) Plantation located within the University of Ibadan Campus, over the period June-September 1991. Gross Rainfall, through fall and Stemflow were measured on a storm by storm basis. Soil splashed by raindrops falling through the canopy (through fall) was collected using round plastic pans. From these data, interception loss and splash erosion by throughfall were calculated. The result of the analyses show that teak plants intercepted 16% of the gross rainfall while throughfall accounted for 81% and the balance of 3% was stemflow. The Rainsplash detachment was 0.0385kg\m². This was found to be significantly related to the throughfall component (r=0.9). An equation relating throughfall and rainsplash erosion under teak was developed. The relationship was found to be significant at 0.01 level. Splash Erosion under the teak plantation was rather low when compared with splash from bare surfaces in the study area. This shows that teak plants protect the ground against soil erosion. Their use for erosion control is thus highly recommended.

KEY WORDS: Rainfall interception, Rainsplash erosion, throughfall, stemflow, Gross Rainfall.

INTRODUCTION

The quantity of rainfall reaching the surface of the earth depends upon the nature and density of vegetation wherever it exists. Grasses, shrubs, agricultural crops and standing trees, collect and retain parts of precipitation whether it is rain, dew, mist, fog or snow. In each of these cases, interception reduces the amount of precipitation reaching the ground surface.

Interception of rainfall by vegetation is recognised as a component of the hydrological cycle (Mohamoud and Ewing, 1990). However, the amount of water intercepted is not very important geomorphologically. It is the fact that interception reduces or slows down the rate of surface wash or erosion that makes interception significant. This is because interception apart from weakening the energy of raindrops equally reduces the quantity of water made available for erosion processes. Direct field measurement of interception loss are uncommon in our environment. Presently, the only Nigerian study on interception is that of Okali (1980).

With regards to rainsplash erosion, there has been very few studies in this direction. The most often studied erosion processes have been and still are, sheet and gully erosion. Yet the detachment of soil particles by splash is the forerunner of sheet and gully erosion. Indeed, the sequential nature of the process of erosion in the humid topics shows that the process usually begins with the detachment of soil particles (the splash phase) before transportation by runoff, rill and gullies. Hence to tackle the problem of soil erosion in this country, we must properly understand the splash phase. Moreso, the effects of vegetation, most especially tall trees on splash has been poorly researched (Morgan,1981). The usual assumption has been that under forest canopies, splash erosion becomes greatly reduced (Hudson, 1971; Bolline 1978). However, the effectiveness of vegetation in reducing the power of raindrops is a function of plant type, leaf area index and density. In most areas in Nigeria, the natural forest has been replaced by secondary vegetation, the most prominent of which has been the plantation system. It is against this background that this study attempts to investigate the phenomenon of interception and splash erosion under a specified vegetated surface, the teak plantation. The rationale for this study is derived mostly from the unsatisfactory state of information on interception and splash erosion in Nigeria. In addition, it is expected that information from studies like this will assist in capacity building for soil and water conservation.

METHODOLOGY

The study was carried out at the University of Ibadan teak plantation located at the North Gate during the 1991 wet season. The objective was to establish the relationship between rainfall interception and rainsplash erosion. The study took four months of intensive field work beginning from June to September, 1991. Two sets of data were collected

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