

## **EROSIVITY, SOIL AND WATER LOSSES ON “ARENIZED” HILLSLOPES IN THE SOUTHWEST OF GOIAS STATE, BRAZIL**

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### **ABSTRACT**

The southwest of the State of Goiás, lies in the Central Highlands of Brazil, it is characterized by a sub-humid tropical climate, with a summer rainy season, whereas the structure of the Paraná Sedimentary Basin supports the regional high tabular erosive plateaus, locally named *Chapada*. These landforms rise to more than 800m of altitude, and are limited by erosive escarpments of a maximum average local height of 150m, contoured by lowered dissected surfaces with gentle slopes at 600m of altitude. Within the last three decades, the original vegetation cover – the Brazilian Savannah, named *Cerrado Biome* – was submitted to intensive deforestation and strong substitution to grains and cotton motto-mechanized cultures, as well as extensive pastures. The area is dominated by acidic and homogeneous Red and red Yellow Oxisols (*Latosols*), the high plateaus do not demand as much intensive conservational practices as the lowered surfaces, dominated by sandy (Quartzipsamic Entisols) highly susceptible to hydric erosion which leads to processes of hydrogeological disequilibrium. At the onset of the process, the area displays small isolated superficial deposits of washed sand in the hillslopes that later develop into big ones accompanied by big gully features. This phenomenon is related to *human induced desertification* processes, locally named “arenization” because it doesn’t display any evidence of aeolian activity, either changes in annual precipitation. The sandy covers affect an area of about 7.700 ha, concentrating in the municipality of Serranópolis. At that location, the Panela Brook watershed, one of the most affected tributaries within the Verde River watershed, currently covered by pastures, was selected to implement an arboreal savannah cover monitoring experiment in order to test the bio-pedological rehabilitation capacity of the sandy covers as a tool to control the geomorphologic process of “arenization”. Erosion estimate, soil and water losses as well as particle carrying potential were measured in collecting gutters under natural rain. The experiments were conducted from October, 2003 to August, 2005 aiming at testing parameter variations under six soil recovery treatments. The annual erosivity was  $8,220.83 \text{ MJ.mm.ha}^{-1}\text{h}^{-1}\text{year}^{-1}$ ,  $\approx 82\%$  concentrated from November to March. Annual mean soil and water loss in the control area were  $4.2315 \text{ Mg.ha}^{-1}$  and  $\approx 1.2\%$ , 79% occurring from January to April. The rainy season is the most important period considering the energy of the process. Water losses were less affected by vegetation cover than soil losses. Lower losses occurred in the plots treated with *C.Cajan*, *C. mucomoides* and *S. guianensis*, successively. Soil and water losses differences between the 1<sup>st</sup> and the 2<sup>nd</sup> rainy seasons were greater in treatments under sugar cane residues, NPK + Ca and limestone. The particle carrying potential experiments followed the same trend. Biomass provided by tree species within the period and spacing tested was not sufficient to provide an adequate soil and water re-equilibrium.

Keywords: Arenization, Quartzipsamic Entisols, erosivity, soil and water losses, vegetational rehabilitation experiment.