

APPLICATION OF GEOTECHNOLOGY TO WATERSHED SOIL CONSERVATION PLANNING AT THE FIELD SCALE

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ABSTRACT

Soil conservation planning in inaccessible mountainous watersheds is a very tedious and expensive job. Generally, in India most soil conservation programs are carried out with physical reconnaissance surveys. However, recent technological advancements have paved the way for planning soil conservation measures on a field scale in the watershed. This paper describes the suggested soil conservation planning methods on the basis of the quantified soil erosion rate in the Kuniquda watershed of Orissa and Andhra Pradesh. The soil erosion rate was determined as a function of land topography, soil texture, land use/land cover, rainfall erosivity, and crop management and practice in the watershed using the Universal Soil Loss Equation (for Indian conditions), remote sensing imagery, and GIS techniques. Results indicate that 81.6% of the watershed area was within a low soil loss zone ($< 4.43 \text{ T ha}^{-1} \text{ yr}^{-1}$), while only 7.1% of the area was above the high soil loss zone ($> 11.2 \text{ T ha}^{-1} \text{ yr}^{-1}$). A drainage density map of the watershed was created based on a 1 km x 1 km grid. Land use change analysis of the watershed was performed between 1989 and 1996 using IRS-1A and IRS-1B satellite images, respectively. A systematic soil conservation planning for the said watershed was developed using these information sources along with a spatial study of the watershed. The average soil loss amount was also estimated on a sub-watershed basis to prioritize the requirement of the soil conservation program implementation. Above all, the results obtained from this study were validated and compared with results from similar studies using a different methodology. This study provides a faster and more economical means for spatial soil conservation planning, which can eliminate rigorous physical surveys in inaccessible mountainous watersheds in India and elsewhere.

Reference: Panda, S.S., H. Andrianasolo, and D.D. Steele. 2005. Geotechnology Application in Watershed Basis Field Scale Soil Conservation Planning Strategy Development, *Journal of Environmental Hydrology*, Vol. 13, Paper 16.

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