

A New Laboratory Equipment for Assessing Soil Erosion by Water

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Abstract

The design, construction and testing of a laboratory research facility to quantify wash erosion by overland flow is described. The design allowed slope length, slope gradient, and flow rates of water to be controlled. The apparatus was used to test the wash erosion from two Trinidadian soils (sandy loam, and clay), with four levels of peat content (0, 4%, 8%, and 12% by mass) exposed to two lengths of slope (1.54 m and 2.62 m), and two slope gradients (9% and 30%). Wash erosion was greater in soils with the higher slope gradient of 30% and slope length of 2.62 m than in the ones with the lower slope parameters. Increasing levels of peat was found to decrease wash erosion at all combinations of parameters. Wash erosion was higher in the sandy loam than the clay soil at the higher slope gradient. The opposite trend occurred at the lower slope (9%), where soil loss was greater in the clay. A multiple linear regression equation was developed for predicting wash erosion from the experimental factors. The major advantages of the constructed research facility are that unlike most previously devised equipment, it allows for small incremental changes to be made in the slope length as well as the slope gradient; it allows for the efficient separation of the eroded sediment from the runoff water during testing and it allows for the efficient removal of infiltrated water during testing.

Keywords: Soil, wash erosion, slope gradient, slope length, laboratory equipment