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A Preliminary Study for Determination of Plot-Scale Storm Runoff and Sedimentation Yield at Yagirala Forest Reserves: A Secondary Lowland Rain Forest

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Abstract

Surface runoff is an important element in the hydrological processes. Storm runoff is produced when the rainfall intensity exceeds the infiltration capacity. When runoff water contains with sufficient flow energy, it transports loosened soil sediment and initiate soil erosion process. Occurrence and quantity of storm runoff and sedimentation depend on the climatic and catchment characteristic of a particular watershed such as rainfall intensity, vegetation type, physical properties of soil layer and catchment slope. However, these two processes may cause certain impacts on human health, eco system services, crop productivity and flood frequency. Understanding the storm runoff mechanism and the measuring procedures will be essential to design and develop the storm runoff and soil erosion control techniques in different land uses. This experiment was conducted to elucidate the surface runoff generation and soil erosion process in forested landscape. Six surface runoff plots (10 m×3 m) were installed in hill-slopes of Natural Forest (NF) and *Pinus caribaea* enriched Forest (PF) in the Yagirala Forest Reserve (YFR); a secondary lowland rain forest located in the south-west low-country wet zone of Sri Lanka (6° 21' to 6° 26' N and 80° 08' to 80° 11' E). Surface runoff generations and sediment yield were measured for 10 individual storm events from April to December 2018. Results confirmed that there were no significant inter plot variation of surface runoff generation. At the same time there were no significant difference in surface runoff generation in between two forest type indicating the similar runoff generation in the two forest types. Moreover, there were no significant inter plot variation of sediment yield in both forest type. However, results showed that significantly higher sediment yield in NF compared to the PF, emphasising that NF is more suitable soil conservation. The results of the study is important for implementing the sustainable watershed management practices.

Keywords: Surface runoff, Sediment, Yagirala forest reserve, Watershed management