CATCHMENT HYDROLOGY IN MAHAWELI SYSTEM C IN RELATION TO WATER LOGGING

By

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ABSTRACT

Land use planning for Mahaweli System C designates the well drained Reddish Brown Earths (RBE) for upland cropping, yet during maha localised, transient water logging is common on these soils. A small catchment (5.4 ha) at the Girandurukotte Regional Research farm in Mahaweli system C was monitored to assess the factors contributing to water logging. Dip wells and access tubes were installed to monitor ground water and soil moisture fluctuations. A flume was constructed to measure the daily outflow. Meteorological data were obtained from the Research Station. Measurements were taken from December 1986 to August 1987. The soil profile variation and depth to the Decomposing Parent Material (DPM) were recorded.

Topography of the upper catchment was more complex due to gullies and discontinuous depressions. The soil profile consists of two less permeable horizons, A2 (with more gravel) and B2; both have very low hydraulic conductivities, hence there are two distinct water tables. The shallow water table correlated strongly with rainfall (r=0.7 to 0.9). Water logging was more prevalent where depth to the less permeable layer and/or depth to the DPM was least, or where surface drainage was poor. Rainfall was the major input to the water balance. Evaporation was a relatively constant output. Rainfall contributes 51% to outflow, with which it was strongly correlated (r=0.85). The 1 m profile was depleted by up to 50% as of the first week of July and reached 75% depletion by August 1987.

Vertical flow was seriously restricted by aquifer characteristics. Soil profile saturation was restricted by the less permeable layers. Poor surface drainage also aggravated the problem during maha. The perched water table fluctuation depended on rainfall and created temporary water logging when the soil profile above the less permeable layer became fully saturated. A system of drainage is therefore necessary for upland cropping on RBEs during maha.