FACTORING IN SOIL WATER REPELLENCY IN A HILL SLOPE SOIL WATER BALANCE MODEL

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The incidence of soil water repellency (SWR) in New Zealand hill country (particularly on the North Island East Coast) increases the potential for runoff during the late spring through to late autumn seasons, thereby reducing the effective rainfall depth for pasture growth.

A modified soil water balance model for sloping land incorporating the infiltration restrictions imposed by SWR is presented. Detailed rainfall and runoff data collected at Alfredton in northern Wairarapa were used to develop a 2-tier daily soil water balance model - the first tier incorporating the top 50 mm soil layer, and the second tier incorporating the whole root zone. The reference crop evaporation was estimated using the FAO56 version of the Penman-Monteith equation after incoming solar radiation had been adjusted for slope and aspect. Repellency-induced runoff is only simulated to occur if two conditions are satisfied:

1) The top 50 mm soil layer is drier than a certain trigger water content value, and
2) The rainfall intensity is greater than a certain threshold value.

The model's input variables and shortcomings associated with SWR are discussed and the outputs matched against stream flow data gathered from a catchment near Waipawa in southern Hawkes Bay.

Some suggested uses of the model in terms of the management of SWR are presented.

Editor's Note: A manuscript has not yet been submitted for this presentation.