An Experimental Investigation to Develop Horton's Infiltration Capacity Curve for Gadigi's Empire Layout, Ballari

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Abstract: *Infiltration occurs when water enters the ground strata. Infiltrated water further moves in lateral direction to reach nearby streams or in vertical directions to reach groundwater. The rate of infiltration depends on the depth of surface detention and thickness of the saturated layer of ground surface soil. As soil on the ground surface gets saturated, the rate of infiltration slows down. In this study, the rate of infiltration is determined at five locations in Gadigi's Empire Layout, near Satyam International school and P.U college, Ballari, using double ring infiltrometer method. Red soil and black cotton soil is identified in the study area. The surface of the soil is loose, uncompacted, dry and free from the growth of weeds. By using two concentric cylindrical rings, with the inner ring 30cm and outer ring 50 cm being made of mild steel. During the experiment, it is observed that initial infiltration rate is high in location - 1 (40.6621 cm/hr.) and location - 2 (36.7312 cm/hr.) compared to location - 3 (10.2461 cm/hr.), location - 4 (8.755 cm/hr.) and location - 5 (8.983 cm/hr.). Horton's Infiltration Capacity Curve parameters are determined to develop a relationship between rate of infiltration and time at five locations in the considered study area, location – 1: $f_t = 19.23+(27.54) e^{-1.50451t}$, location – 2: $f_t = 14.423+(26.151) e^{-0.9336t}$, location – 3: $f_t = 3.790+(6.72) e^{-0.2404t}$, location – 4: $f_t =1.690+(7.276) e^{-0.176t}$ and location - 5: $f_t =1.566+(7.65) e^{-0.1852t}$, where f_t is rate of infiltration in cm / hr for t hour duration*

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