

## STUDY ON THE WETTING FRONT ADVANCE OF REDDISH BROWN EARTH SOIL AND NON-CALCIC BROWN SOIL UNDER SOLAR DRIP IRRIGATION SYSTEM

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The solar power drip irrigation system is becoming popular in Sri Lanka as an alternative to conventional water management and water scarcity problems. The advancement of wetting front under solar power drip irrigation system is required to establish relationship between wetted front of various soils and application time. The horizontal and vertical water movement within 4 hour (Rate of application 3.3 mm/hr) was studied in three sites each for Reddish Brown Earth (RBE) and Non-Calcic Brown (NCB) soils having different textures of clay loam and sandy loam. Three experimental sites for each soil group were selected. The wetting pattern was observed, on the vertical wall of a pit dug about 30-45 cm deep to observe the wetted diameter, after 1, 2, 3 and 4 hours. The experiment design used was Randomized Complete Block Design. The results were analyzed using SAS 12.0 version computer software.

Average wetted diameter of the RBE soils and NCB soils were expanded from 28.21 cm to 38.88 cm and 20.99 cm to 29.55 cm respectively within the 4 hour duration. Wetted depth of RBE soil and in NCB soils were expanded from 15.10 cm to 24.77 cm, and from 18.66 cm to 35.55 cm. Results indicated that the water application rate of drippers and soil type had a significant effect on wetting front under the solar power drip irrigation systems. Crop establishment of RBE soil should be at the centre of the wetted radius, approximately 10 cm away from the drip laterals, whereas for NCB soils, appropriately 7.5 cm away from the drip lateral to the both sides. Water application at 3.3 mm/hr for

4 hours wetted depth of RBE soil and NCB soil provided the adequate moisture for the effective root zone of selected vegetable crops.

*Key words:* Wetting front, Rate of application, RBE soil, NCB soil, Solar power drip irrigation system