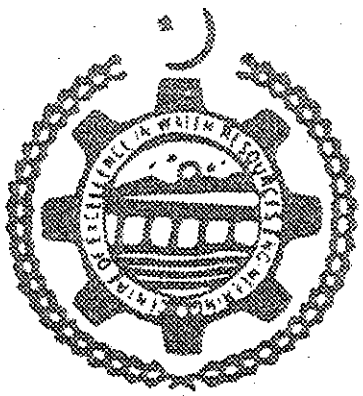
THESIS

ANALYSIS OF SPATIAL VARIABILITY OF WETTING PATTERNS OF EMITTERS USING WETUP SOFTWARE



SUBMITTED BY

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2009-PG-WRM-20

FOR THE DEGREE OF

MASTER OF SCIENCE

IN

WATER RESOURCES MANAGMENT

CENTRE OF EXCELLENCE IN WATER RESOURCES ENGINEERING
University of Engineering and Technology, Lahore

2011

ABSTRACT

This study was conducted to analyze spatial variability of wetting patterns of emitters using WETUP software. Field data were collected from three different locations having three different soil types where trickle irrigation systems were installed. At each study site four laterals were installed in the fields and four different types of dripper having flow rates of 0.5, 1, 1.5 and 2 lph were used on each lateral. Irrigations were applied for 1, 2, 3 and 4 hrs with all the four types of emitters for estimation of horizontal and vertical distances. Soil samples at horizontal distance of zero, 15, and 30 cm from the emitters and at depths of zero, 20, 40, and 60 cm from the soil surface were taken to measure the soil moisture. The software WETUP was used to analyze the variability of wetting patterns of different discharging emitters in three different soil types. The measured and simulated results were compared. The results showed that "wetting patterns" of the emitters increased with increase in time.

Results of the study further revealed that for loam soil, the wetting pattern along the horizontal direction for the simulated results is generally greater by 5 % as compared to the field results. For the sandy loam and clay loam soils, the software results were always greater than the field results ranging from 3% to 5 %. For vertical movement of water, the software results were always greater as compared to the field results for all the three types of soils. However, difference between the simulated results and field measurements was very small. For the maximum flow rate (2 lph) of the emitter, the measured horizontal distances were 0.64, 0.58 and 0.72 m for the loam, sandy loam and clay loam soils respectively. Similarly the measured vertical distances were 0.30, 0.32 and 0.36 m for the loam, sandy loam and clay loam soils respectively. The wetting pattern increased relatively more in clay loam soil along both horizontal and vertical directions as compared to the other two soil types.