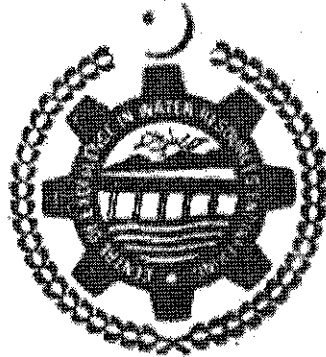


# THESIS

## COMAPRISON OF SURFACE AND SUB SURFACE DRIP IRRIGATION TECHNIQUES IN IRRIGATED ENVIRONMENT



7098

By

**Hafiz Muti ul Rehman**  
**2005-PG-WRM-03**

For the Degree of

**MASTER OF SCIENCE**

IN

**WATER RESOURCES MANAGEMENT**

**CENTRE OF EXCELLENCE IN WATER RESOURCES ENGINEERING**  
University of Engineering & Technology Lahore, Pakistan

2010

## ABSTRACT

Experimental studies were conducted for the design and installation of surface and sub surface drip irrigation systems to compare moisture distribution along the length of the field and in estimating the water saving on guava orchard at Research and Demonstrate Centre of PCRWR, Sargodha.

Drip irrigation system was divided into two sub-units, i.e. power unit and field unit. Power unit was designed and developed with the help of local industry. To design this drip irrigation system, the procedure was adopted as the guidelines provided by the Netafim Australia. Field unit was designed by calculating length, size, discharge and head losses of laterals, sub main and main pipe lines. Head losses were calculated with the help of Hazen William formula. Random soil sampling in the irrigated fields was done from 0-15, 16-30, 31-45, 46-60 and 61-90 cm depths. The sampling was performed at the left, center and right of the selected bed at start, middle and end of the field length. Gravimetric Method was used for moisture content determination.

Comparison of Surface Drip Irrigation with the Sub-surface Drip Irrigation for moisture content distribution in bed revealed that drip pipe buried in bed gave better distribution of moisture contents both by the depth and width wise in the soil profile. On overall basis the Sub-surface Drip Irrigation shows the potential of more moisture conservation and an increase in the moisture in the soil to the tune of 1.19% and 1.61% during first and second irrigation was noted in the present study. Results revealed that there was higher moisture content in bed at inlet field, which decreases

along the field length in the bed due to discharge variation at the inlet and end of the drip pipe i.e. average increase in moisture at start of field is 7.13%, at middle 6.90% and at the end of the field 6.40% which shows 0.73% more conservation of moisture in the bed at inlet of field than the end of the field. Thus distribution uniformity decreases along the length although that decrease is very less. Results also indicated a little variation in moisture content distribution at the tail end of the lateral than that of the start of the lateral. Moisture content saved in surface drip irrigation were found to be 5.63%, 5.58% and 5.37% at start, middle and end in the bed along the field where as in sub-surface drip irrigation these values were 6.90%, 6.69% and 6.50% at start, middle and tail of the field respectively. This shows water saving of 1.27%, 1.11% and 1.13% in subsurface drip irrigation during first irrigation. Similarly 1.54%, 1.38% and 0.99% water saving was observed during second irrigation. On overall basis, the subsurface drip irrigation has been suggested as a better water conservation technique.