

THESIS

**COMPARISON OF SUPPLY BASED AND CROP BASED
IRRIGATION SYSTEMS IN PHLC**



6916

BY

**SHAHAB KHAN
2004-PG-WRE-11**

For the Degree of

MASTER OF PHILOSOPHY

IN

WATER RESOURCES ENGINEERING

**CENTER OF EXCELLENCE IN WATER RESOURCES ENGINEERING
University of Engineering and Technology Lahore**

2007

ABSTRACT

The Upper Swat Canal offtakes from the left bank of River Swat. The canal serves about 2,79,100 acres in Malakand, Charsadda, Mardan, Swabi, Buner and Nowshera Districts. The canal was first remodeled under the Swabi Scarp Project in 1998 by increasing its allowance from 5 to 9 cusecs per thousand acres in order to achieve higher cropping intensity. The remaining part of the canal below RD 242 was remodeled under the Pehur High Level Canal (PHLC) Project in 2002 by increasing the water allowance to 10 cusecs per thousand acres.

The major issue addressed under this study was developing the methodology for devising appropriate CBIO schedule and the water saving obtained through this schedule. This model forms the basis for reducing the flow of water going waste into the drains and seeping into the groundwater. Water savings of 59 percent was observed if the irrigation system is operated on crop based as compared to the supply based.

Average increase in crop yield by 67 percent and consequently 330 percent increase in crop production has taken place, while the previous cropping intensity of 100 percent has gone up to 145 percent in 2005-06. The area irrigated after the commissioning of Pehur High Level Canal (PHLC) and operation on CBIO is 1,28,325 acres based on cropping intensity of 14 percent.

The groundwater level before the commissioning of PHLC was on average basis 3 m below ground surface and a rising trend of the water table was observed. The CBIO

operation causes less contribution to the rise of groundwater level as compared to supply base causing fall in water table depth. The present water table depth in the command area is 17 m, however in tail reaches of most distributaries the water table depth is less than 1m because the farmers in head and middle reaches prefer to irrigate their lands at day time and let the water flow un-utilized during the night to the lower reaches of the irrigation channel resulting in water table rise.

During the operation of system on supply based with higher water allowance, high quantum of discharge was going into the drains as a waste; also the same discharge was contributing to groundwater table rise. After the implementation of CBIO, sufficient amount of discharge that was going into the has been saved. Under supply based the total amount of water that was going into the drains was 23,694 cusecs while during CBIO the quantum of water has reduced to 12,953 cusecs.