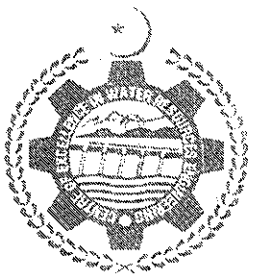
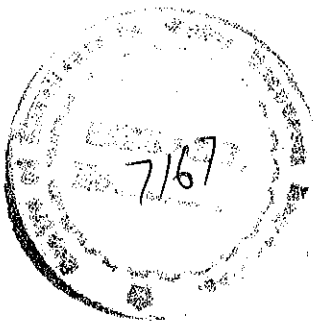
THESIS

SEDIMENT TRANSPORT MODELLING FOR UPPER REACHES (RD 0+000 TO RD 109+000) OF LOWER BARI DOAB CANAL AND ITS IMPACT ON BED PROFILE





Submitted By:

Nasir Hameed
(2006-PG-WRE-40)

For the Degree of

MASTER OF SCIENCE

IN

WATER RESOURCES ENGINEERING

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

2012

ABSTRACT

The most effective sources of water in Pakistan are the rivers, especially the River Indus and its tributaries while river water is distributed through canal networks. Canal irrigation in the country is supply driven with inadequate storage from dams and barrages to prevent fluctuations. The need for flow regulation has increased over the years. Canal waters available to meet consumptive use requirements are reduced by conveyance and application efficiencies.

Lower Bari Doab Canal was originally designed for a cropping intensity of just 67% and gradually increased to about 170%. Additional supplies had adverse effect on the bed profile, which is intended to be studied in present research work. Existing parameters of Lower Bari Doab Canal were evaluated, the specific objectives of this study includes; Predict geomorphologic changes in canal based on possible increase in canal capacity and to predict the changes in canal based on possible increase in sediment discharge

The mean monthly flows were generated from twenty four years data from 1984 to 2008 and incorporated in the study. This study applies HEC-RAS model for the prediction of delta (deposition or degradation) profile for the LBDC main reach section up to RD 112+000. The result of study indicates that existing LBDC canal prism has scoured from 0.5 to 2.0 ft. below the designed canal bed level whereas, delta profile modeling for average mean monthly flows and sediments scenario, high flows and average mean monthly sediments scenario showed canal bed erosion upto5 feet. Delta profile modeling for high sediment conditions and average mean monthly flows indicated maximum canal bed erosion upto 10 feet.

The scope of this study was limited to the modeling of the canal from RD 0+000 to RD 109+000 and did not cover the whole stretch of channel so channel must be modeled form its head to tail (RD0+000 to RD 665+000) for different flow and sediment conditions. Fall velocity can also be optimized by appropriate canal design to control degradation phenomenon.

Previously, none of modeling study was conducted since canal operation whereas present HEC-RAS sediment and flow model is also limited to one dimensional flow hence, three dimension modeling study is required to compute the sediment impact on the canal prism.