THESIS

HYDRAULIC ANALYSIS OF REMODELED CANAL FOR EFFICIENT WATER DISTRIBUTION

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ABSTRACT

Efficiency of irrigation system depends upon providing specific quantity of water from canal through irrigation outlets to the stake holders. The purpose of efficient irrigation system is to provide due share of water to the farmers depending on temporal and spatial scale. Efficient planning and careful management is essential to achieve the required efficiency of an irrigation system. The study was conducted on Pervaiz distributary of Lower Chenab Canal (East) area in district Faisalabad, Pakistan. Spatial equity of the distributary was disturbed after lining of the canal. Objective of the research was to quantify the spatial and temporal variation in water distribution and to find out the design efficiencies of the outlets. SIC hydrodynamic model was employed to evaluate the operational performance of the distributary.

The model performance was tested by calculating the statistical parameters such as coefficient of efficiency (COE) and percent bias (PBIAS). The COE for simulation was 0.98 which illustrates a good relationship between simulated and measured water levels and discharges of outlets. The percent bias for simulation was -2.1. The Delivery Performance Ratios (DPR) in operation of irrigation system allows for checking of weather discharges are more or less than design discharge. The DPR of outlets of pervaiz distributary varied from 0.30- 1.69.

Proportionality is a serious issue and ultimately it leads to inequity. All the open flume outlets along the Pervaiz distributary behaved as hyper- proportional except outlet No.1 at RD 71L which is behaving as sub proportional. Adjustable proportionate module outlets behaved as sub proportional irrespective of their position while half APM outlets as proportional. The major causes are construction inaccuracies in setting of the outlets, due to which they draw more or less discharge than their design discharge. At low canal supplies of 70% and 80% half of APM acted as broad crested weir. After possible modifications in the geometry of outlets, they draw 100% of their sanctioned discharges. Based on the results it is suggested that the outlets setting should be changed so they can draw their fair share and efficient distribution of water might be achieved.