THESIS

SECONDARY SOIL SALINITY DEVELOPMENT AND ITS IMPACT ON IRRIGATED ENVIRONMENT IN A SELECTED CANAL COMMAND AREA

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(2004-PG-WRM-02)

For the Degree of

MASTER OF PHILOSOPHY

IN

WATER RESOURCES MANAGEMENT

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

2006

ABSTRACT

This study was undertaken to investigate groundwater quality and its impact on soil salinity, crop production and income of the farmers. The command area of Main Branch Lower Canal (MBL) located in Qasur district was selected as the study area. Groundwater and soil samples were collected from one hundred sixty two (162) fields and in all, three hundred twenty four (324) composite soil samples were collected from fifty four (54) selected fields each upto 90 cm depth with 15 cm interval. The farmers of the selected fields were also interviewed to investigate the impact of salinity on crop yields and their income. The analysis of the groundwater samples showed that out of 162 samples, 59 percent had EC_{gw} below 1.5 dS m^{-1} whereas 29 percent had EC_{gw} ranging from 1.5 to 3.0 dS m^{-1}, and 12 percent had EC_{gw} greater than 3.0 dS m^{-1} during the 1st year (2004-05). During the 2nd year (2005-06) the same values were 48, 38 and 14 percent, respectively. There was the worst condition along the tail-end of all the secondary channels especially the last two channels located at tail of the main canal. The analysis of the soil profile showed that soil was deteriorating from head to tail along tertiary channels almost on each secondary channel. The worst condition prevailed at the tails of last two secondary channels where the soil became saline due to continuous use of saline groundwater and less availability of canal water.

Decreasing trend of crop yields and income of the farmers were observed along all the irrigation channels i.e. the main canal, the secondary and tertiary channels. Average yield of wheat was 23 and 16 percent less at the tails during the 1st and the 2nd years respectively. Similarly, average net income of the tail-end farmers was 57 and 41 percent less than that of the head-enders during the 1st and 2nd years respectively.