

THESIS

STUDY OF UPCONING OF FRESH AND SALINE GROUNDWATER
INTERFACE UNDER SCAVENGER WELLS

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ABSTRACT

STUDY OF UPCONING OF FRESH AND SALINE GROUNDWATER INTERFACE UNDER SCAVENGER WELLS

More than 350 scavenger wells are installed under Left Bank Outfall Drain Stage-1 (LBOD) project for the purposes of drainage and recovery of fresh water to supplement irrigation supplies. These wells are installed at the cost of 447 million rupees. However, these wells are not performing properly as per desired objectives, simply due to operation and maintenance and environmental constraints.

This study was planned to investigate the hydraulic performance of two scavenger wells representing different hydrogeological conditions using two numerical models (i.e., MODFLOW and MT3D for groundwater flow and salinity simulation respectively). These evaluations were aimed at modifying operational management strategies to ensure optimum recovery of relatively fresh water and to achieve the drainage requirements. The study was conducted on two scavenger wells i.e. PSW1A and PSW2. The original designed operational factor for both the scavenger wells was 0.6, whereas the recovery ratios (which is the ratio of fresh and saline water discharges) of PSW1A and PSW2 were 0.5:0.5 and 0.32:0.68 respectively.

The results of the study reveal that the recovery ratios could be changed upto 0.7:0.3 and 0.62:0.38, for PSW1A and PSW2, respectively, while keeping the same operational factor (i.e. 0.6). It means that hydraulic evaluation of scavenger wells enables to increase the recovery of fresh water and to decrease the quantity of saline water withdrawal without compromising the drainage objective.

As this study was conducted only for two scavenger wells, therefore the results of present study must carefully be utilized while dealing with field situations different than the evaluated ones. However, the guidelines deduced from this study will become increasingly more valuable for the managers and end users (farmers). Due to pollution problem and higher capital and operation and maintenance costs, further installation of these wells should be strictly prohibited and viable tubewell technology should be adopted.