THESIS

A RE-APPRAISAL OF LOSSES FROM CANALS IN PAKISTAN

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ABSTRACT

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This study is about the re-appraisal of seepage losses from canals in Pakistan using electric analogue and computer models in order to determine the suitability of different techniques to minimize the seepage losses. To achieve these objectives four electric analogue models were designed and their results were compared by using MODFLOW drain package. Representative canal section aquifer parameters and boundary conditions are selected according to Pakistan situations.

The following approaches of controlling canal seepage have been studied:

1. Seepage losses from an unlined canal.
2. Seepage losses from unlined canal with an interceptor drain laid at different distances from the centre line of canal of 0.2 m dia and variable depth below the bed of the canal.
3. Seepage from unlined canal having a low permeability barrier at 50m away from the center line of the canal and extended to a depth of 19m below the bed of the canal.
4. Seepage from lined canal sections.

The results shows that presence of interceptor drain near the canal causes increase of seepage. The low permeability wall fails to reduce losses significantly and it is not as effective as lining of the canal. Lining of canal was done with materials of low permeability. The decrease in permeability of bed material results in decrease of seepage losses. The effect of water level in the canal on seepage was also studied. The seepage losses decrease with decrease in canal water level but this approach cannot be applied practically in field because of water requirements of crops at the tail of the canal. It is concluded that lining can be very effective in reducing seepage losses as compared to the other techniques.

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