

Abstract of the Thesis titled “*Physically Based Numerical Simulation Model for Conjunctive Water Use in Basin Irrigated Canal Command Areas*”

**by
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Basin irrigation is a common practice in many parts of the world, and especially in some regions of India, where paddy is grown as a staple food. In many canal irrigated command areas where basin irrigation is practised with diverted water from a river, it is often seen that the supplied water is inadequate to meet the crop water requirement. As a result, cultivators at the lower ends of the command area resort to pumping groundwater, thus posing a threat of its over withdrawal. Water managers, therefore, advise “conjunctive use” of surface and groundwaters for a more equitable and sustainable solution to this issue. However, the decisions these managers have to take are based either from their experience acquired by a study of past scenarios or on some empirical tools. The work presented in this thesis attempts to fill in this gap by developing a physically based numerical model that simulates surface flow, groundwater flow and the interlinking process of moisture movement in the unsaturated zone for basin irrigation in a canal command area. Details of the individual models as well as the integrated framework combining all the models is discussed. Capability of the model is demonstrated considering an illustrative study area irrigated by canal (surface) and groundwater. Various scenarios possible for a basin irrigated system for conjunctive water use is also demonstrated using this sample domain.

Keywords: Numerical Simulation, Basin Irrigation, Conjunctive Use