

A Case Study :

Simulation model for evaluation of irrigation project

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Irrigation water is released in canal network as per demands of the farmers in the command area. However, the effect of water release policies on crop yield and subsequent net benefits can not be ascertained as the irrigation water releases are often decided without considering the heterogeneity of the command area in terms of soils and crop stages. Hence evaluation of irrigation project is necessary as it helps to rectify water release policies and proposes corrective measures for efficient water management. In this study, mathematical simulation model was developed for the evaluation of irrigation project in terms of net benefits and applied to Punegaon project in Upper Godavari basin in Maharashtra. The developed model considers water distribution to the crops according to water release policy to be evaluated and estimates the crop yield by considering the response of crop to water applied at its different growth stages. The yield values are further converted into the net benefits. The model considers all the parameters that influence the yield. These include climate, soil, crop, losses in the irrigation network etc. The results of case study indicate that the distribution of water with respect to time is more important apart from total quantity of water applied to the crops. The crop yield is adversely affected if the crop experiences water stress during its yield sensitive stages.

The planning for irrigation water management consists of preparation of preliminary irrigation programme for allocation and distribution of water resources to different crops in the command area. The crop yield is mainly dependent on amount of water delivered at particular crop growth stage. It is therefore necessary to know the response of the command area as a whole and its units *i.e.* outlet or minor, to different water release policy in terms of crop yield and net benefits prior to finalizing the

particular water release policy. Due to climatic variability and unforeseen circumstances it is often required to modify the water release policy while the irrigation system is in operation. Under such circumstances it is necessary to have appropriate tool that aids in evaluation of several water release policies for comparison and to select appropriate one.

A number of evaluation studies have been carried out by various researchers for evaluating various water release policies for improving the performance of irrigation project. Loucks (1981) stated that behavior of the irrigation system is very well reflected by its evaluation studies. He further highlighted the importance of evaluation in better understanding the system. Biswas (1990) emphasized the importance of monitoring and evaluation of irrigation projects for future water management improvement. He further asserted that monitoring and evaluation should be given equal importance as planning and design of the project. Smout (1996) carried out evaluation of Takeo Irrigation Project in Cambodia and highlighted positive impacts of the projects through evaluation studies. Isidoro et al. (2004) carried out water balance and irrigation performance analysis of La Violada irrigation district in Spain and concluded that system can be better managed for the future by way of evaluation studies. Labadie (2004) highlighted the importance of understanding the behaviour of reservoir system for maximizing the beneficial uses of the projects. Evaluation studies reported by Gorantiwar and Smout (2005) emphasized the importance of application of required quantity of water at required time depending on crops and the type of soil.

Considering the importance of evaluation; the present study was undertaken to assess the response of command area in

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