

Operational analysis of a reservoir in GIS environment using remote sensing inputs

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ABSTRACT

Reservoir management involves allocating available water among multiple uses and users, minimizing the risks of water shortages and flooding and optimizing the beneficial use of water. Irrigation demands from a reservoir, which are generally computed by using the design cropping pattern and average rainfall conditions, may vary over the years depending on the actual cropping pattern and meteorological conditions. This study demonstrates the utility of remote sensing inputs and geographic information system (GIS) environment for determining realistic irrigation demands from a reservoir. Remote sensing data are used to map the actual cropping pattern in the command area while the GIS is used for integrating the field-level irrigation demands up to the canal system head. Ten daily irrigation demands in the command area of Samrat Ashok Sagar Reservoir in Madhya Pradesh, India have been estimated and the reservoir operation policy has been derived. Through the simulation analysis with 29 years of inflow data, rule curves have been derived for the operation of reservoir so that water deficit (if any) can be distributed in time much in advance and severe crop failure can be avoided. Inferences drawn from the analysis can guide the system operator in using the available water in a scientific and judicious manner.