

Optimization of Agricultural Water Demand Using a Hybrid Model of Dynamic Programming and Neural Networks: A Case Study of Algeria

Authors : M. Boudjerda, B. Touaibia, M. K. Mihoubi

Abstract : In Algeria agricultural irrigation is the primary water consuming sector followed by the domestic and industrial sectors. Economic development in the last decade has weighed heavily on water resources which are relatively limited and gradually decreasing to the detriment of agriculture. The research presented in this paper focuses on the optimization of irrigation water demand. Dynamic Programming-Neural Network (DPNN) method is applied to investigate reservoir optimization. The optimal operation rule is formulated to minimize the gap between water release and water irrigation demand. As a case study, Fom El-Gherza dam's reservoir system in south of Algeria has been selected to examine our proposed optimization model. The application of DPNN method allowed increasing the satisfaction rate (SR) from 12.32% to 55%. In addition, the operation rule generated showed more reliable and resilience operation for the examined case study.

Keywords : water management, agricultural demand, dam and reservoir operation, Fom el-Gherza dam, dynamic programming, artificial neural network

Conference Title : ICEWRM 2020 : International Conference on Environment and Water Resource Management

Conference Location : Barcelona, Spain

Conference Dates : May 22-23, 2020