عنوان مقاله:

Reservoir Operation During Droughts

محل انتشار:

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نویسنده:

Aalireza Dariane - *Civil Engineering, Khaje Nasir Toosi University of Technology*

خلاصه مقاله:

Drought is an inevitable part of the world's climate. It occurs in wet as well as in dry regions. Therefore, planning for drought and mitigating its impacts is essential. In this study, a hedging rule is developed using the zero/one mixed integer-programming approach. Furthermore, some procedures are introduced to ease the computational burden inherent in integer programming. Hedging rules are developed using three, two, and one-year historical droughts. Moreover, yield model (YM) along with the standard operating policy (SOP) are also formulated for comparison purposes. Simulations are carried out using ۴۰ years of monthly historical data along with ۲۰ series of synthetically generated inflows of the same length. The Karadj reservoir located in the northwest of Tehran is the major source of the capital's municipal water supply. It also provides a substantial portion of the irrigation demand of the Karadj Valley. Synthetic data are generated using single and multi-variate autoregressive modeling approaches. Models are compared using important reservoir operation criteria including reliability, resiliency, and vulnerability. As compared to the well-known SOP model, it is noticed that the application of the hedging rule and the yield model substantially reduces the system reliability as well as it's vulnerability, however it increases the resiliency. Moreover, hedging rules developed using longer drought periods tend to have lower vulnerability and reliability, and higher resiliency.

کلمات کلیدی:

Drought, Hedging Rule, Reservoir management, Reservoir operation, Karadj Reservoir, Yield Model, Zero/One Programming, Water Deficit Management