Application of risk analysis in water resourses management

Emmanouil Varouchakis and Ioannis Palogos

Technical University of Crete, Environmental Engineering, Chania, Greece (varuhaki@mred.tuc.gr)

A common cost-benefit analysis approach, which is novel in the risk analysis of hydrologic/hydraulic applications, and a Bayesian decision analysis are applied to aid the decision making on whether or not to construct a water reservoir for irrigation purposes. The alternative option examined is a scaled parabolic fine variation in terms of over-pumping violations in contrast to common practices that usually consider short-term fines. Such an application, and in such detail, represents new feedback. The results indicate that the probability uncertainty is the driving issue that determines the optimal decision with each methodology, and depending on the unknown probability handling, each methodology may lead to a different optimal decision. Thus, the proposed tool can help decision makers (stakeholders) to examine and compare different scenarios using two different approaches before making a decision considering the cost of a hydrologic/hydraulic project and the varied economic charges that water table limit violations can cause inside an audit interval. In contrast to practices that assess the effect of each proposed action separately considering only current knowledge of the examined issue, this tool aids decision making by considering prior information and the sampling distribution of future successful audits. This tool is developed in a web service for the easier stakeholders' access.