SURFACE WATER LEAKAGE, SEDIMENTATION AND EVAPORATION IN ARID REGIONS: A CASE STUDY OF THE GARGAR DAM, ALGERIA

Abstract

This study was carried out in order to assess the total capacity loss in Gargar dam, third-largest in Algeria, due to the mudding of the reservoir, intense evaporation and water leaks. We analysed the variation in leakage as a function of the reservoir level, and quantify losses due to leaks, sedimentation and evaporation. We relied on site visits and data obtained from the Algerian Agency for Dams and Transfers to assess the leakage volume; reservoir level; sedimentation and evaporation levels for the period 1988–2015. We present an updated report of this problem through the dam. We estimated total average losses of 23 million m$^3$ year$^{-1}$ for the period 1988–2015, made up of leakage (0.3 million m$^3$ year$^{-1}$), evaporation (18 million m$^3$ year$^{-1}$) and dead storage for 4.6 million m$^3$ year$^{-1}$. However, total losses for 2004 were estimated at 113.9 million m$^3$, which increased to the alarming value of 166.8 million m$^3$ in 2015. We suggest improving the waterproofness by a concrete screen, and reducing mudding and evaporation by reforestation, to increase the storage capacity of the dam.

Key words: arid zones, evaporation, Gargar dam, leakage, sedimentation