THE GRAND ETHIOPIAN RENAISSANCE DAM BREACH MODELING AND CONSEQUENCES ASSESSMENT

The Grand Ethiopian Renaissance dam (GERD) is being constructed on the Blue Nile close to Ethiopian-Sudanese boarder. The dam is designed to retain a 150 m water head with total height 150 meters. This paper aims to study a predicted scenario of the dam damage under operating condition. The investigation has done via simulations from as a 1-D streamflow model; HEC-RAC model. The model is used to simulate the impact of the GERD failure, with low and high releases on the Sudanese lands downstream of dam. A failure impact assessment must be prepared to evaluate the population at risk if failure of a water dam was to occur. A dam is considered to have failed, if there is a physical collapse of all or part of the dam or an uncontrolled release of any of its contents. The study focused on the steady state simulation. Therefore, all the simulations considered the filling during the average flow years between the flood and drought seasons to address the total effect of the proposed dam on the downstream countries. Results showed the possibility of impacts due to the dam breach including flood inundation from the dam to the Khartoum, Sudan which impact vast area of land. Further, this study highlights a severe flood will result in inundation of the Senner dam with 15 km width and 200 km long and the areas in between until it reaches Khartoum. Also, excessive water level rise with 3 m is expected from the dam until it reaches Nasser Lake. Finally, the study is very important for helping the decision makers in case of emergency management situations that could occur due to the GERD breach.