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Dam breach analysis using HEC models: a case study for Samanalawawa and Udawalawe dams

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Flood catastrophes have become frequent events around the world and the economic losses and threat to human life are more significant for developing nations than for developed nations. The disaster mitigation has become a popular theme in recent times to control the adverse effects due to all type of disasters. Generally, flood disaster studies are done for extreme weather conditions. However, it is becoming important to perform scenario analysis for dam breach which could lead to flash floods. Moreover, the threat of dam breach is considered to be significant due to both natural and manmade disasters in the region. Also a breach of an upstream dam could be a huge threat to a downstream reservoirs or dams. In this study two such dams are selected which are constructed in the same main river, Walawe. The two reservoirs are Samanala-wewa and Udawalawe where the dams are located about 30 km apart from each other along the river. Since the two reservoirs are closely located, it is very important to ensure that, in case of a dam break of upstream reservoir, the water can be discharged safely through the downstream dam. One dimensional river dynamic model HEC-RAS and GIS software Arc-GIS were used to simulate the flood and taking cross sections respectively. Due to the high amount of inflow, tributaries were ignored and only the main river flood plain was considered. The results showed that the damage due to flood is minimum in upstream and also the maximum flow can be safely conveyed through the downstream dam.

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