



## **The best plan for flood mitigation: A case study in the north-eastern part of IRAN**

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Frequency and magnitude of flood and debris flow have dramatically risen in north-eastern part of IRAN in the past decade. The evidence shows that the peak discharge of 2001 flood has exceeded the estimated PMF (Probable Maximum Flood) of Golestan dam. The extreme floods of the region which mostly occurred in the summer, have damaged hundreds of life and thousands of livestock and destroyed a lot of infrastructures in recent years. Structural in association with non structural measures have been identified essential elements of flood mitigation in the master plan. Consequently two-phased plan including urgent measures and a master plan have been prepared for the basin as mid-term and long-term solution respectively. Considering flash flood manner of the region, flood detention and attenuation in upstream areas has been assessed as an effective measure in order to mitigate flood magnitude in down stream areas. Therefore a detention dam has been designed in the upstream catchments where there is high contribution in flood generation of the basin. In the design stage of the detention dam, several alternatives of reservoir and spillway capacity have been assessed regarding to flood reduction in the whole catchments. However, detention dam characteristic has been finalized based on maximum justifiable flood attenuation due to high vulnerability of the areas. The designed detention dam can completely control floods up to 200 year and reduce 1000 year peak discharge to less than 100 year return period at the dam site. Nevertheless, the dam would mitigate floods of downstream damage center at least 40% comparing to without project situation. This paper introduces not only the proposed master plan but also evaluates efficiency of the detention dam in flood reduction of the whole basin.