Consultancy Services for Dam Break Analysis and Emergency Action Planning

With the increasing frequency and intensity of rainfall, can our dams withstand the excess rainwater? Do you think our dams are safe? Given the socio-economic and environmental risks behind a dam breach, it is crucial to improve the design of hydraulic structures, and devise flood mitigation mechanisms to avoid catastrophe.

Irrespective of the advancement in design parameters, dam failures continue to occur. Simulation of dam breach events and the resulting floods are crucial to characterizing and reducing threats due to potential dam failures. Hence, an advanced information dissemination system and emergency action plan (EAP) are required to reduce the impact of catastrophic flash floods and minimize loss of life and property.

RMSI has extensive experience supporting national development agencies to assess the dam break risk and propose the best possible mitigation solutions. Our experts adopt an integrated approach using simulation techniques backed by GIS and IT to develop cost-effective solutions.

We have expertise in modeling different types of floods such as riverine flood, flash flood, urban flood, coastal flood, and glacial lake outburst flood (GLOF). Our team has vast experience in hydro-meteorological hazard modeling (hydrology and hydraulics), dam break analysis, water resources management, and climate change impact assessment.

Our Approach

- Dam break modeling and analysis include predicting the reservoir outflow hydrograph based on the volume of water stored, water level, and geometry of breach. The outflow hydrograph is routed through the downstream valley, and vulnerability of areas are identified.
- Flood risk assessment is conducted based on the extent of the inundated area, water depth, and exposure type.
- Emergency action plans are proposed based on the community, livestock, assets, and infrastructure to be affected.

Output

The output of Dam Break Analysis is presented in the form of GIS based flood hazard risk maps for different dam break scenarios. Flood inundation maps citing population at risk and structures under potential threat are produced and emergency action plan for mitigating the impact of flood in the downstream area is prepared.

Flood Hazard Assessment

- Inundation map
- Flood water depth
- Flood water velocity

Flood Risk Assessment

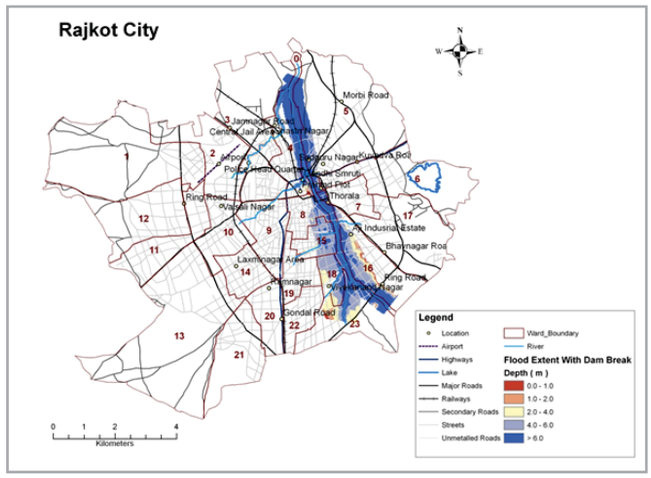
- Impact-based flood forecasting
- Climate-induced flood hazard risk assessment
- Loss estimation

Flood Mitigation Planning

- Flood mitigation measure (engineering/nature-based)
- Adaptation planning and risk transfer measures

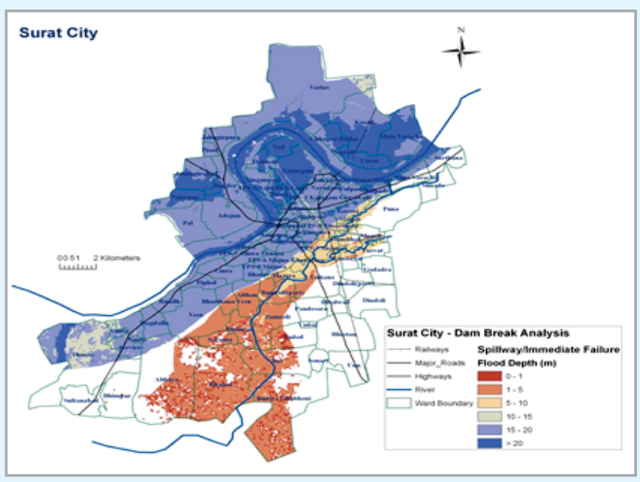
Emergency Action Plans (EAPs)

- Early warning/alert for dam-break condition
- Site-specific micro-level assessment of the damage potential
- Emergency procedures for flash flood impact, mitigation, and control
- Roles and responsibilities of different stakeholders
- Information and maps of evacuation routes and shelters



Flood water depth and inundated area simulated using dam break analysis

SUCCESS STORY



Simulated flood extent and water depth due to spillway failure of Ukai Dam

Dam Break Modeling and Hazard Assessment for Ukai, Aji and Dharoi Dam, Gujarat

Considering the dam break scenarios of Ukai Dam (Surat), Aji Dam (Rajkot), and Dharoi Dam (Ahmedabad), flood vulnerability assessment for four major cities of Gujarat was conducted by RMSI. The dam break analysis considered various scenarios such as overtopping, erosion, piping failure, and spillway structure failure in the earth embankment dam. Flood water depth and inundated area were simulated for the cities located downstream of dams.

Emergency Action Plan

RMSI has extensive experience supporting national/international development agencies to assess the risk from flooding and propose the best possible mitigation options to reduce the risk. We have devised the Emergency Action Plan for the following key projects:

- Emergency Action Plan for a River Basin, Nigeria – The World Bank
- Development and Commissioning of a Decision Support System for Emergency Operation Centre in Jammu and Kashmir, and Ladakh –The World Bank
- Preparation of Disaster Management Plan for UT of Puducherry – Department of Revenue and Disaster Management, Puducherry

Key Differentiators

- National and International experience of simulation of floods and real-time flood forecasting
- Impact-based flood risk assessment due to dam break, riverine floods, urban floods, and coastal floods
- Executed first-of-its-kind flood risk assessment study due to Glacial Lake Outburst Flood (GLOF)

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For further information, please contact info@rmsi.com or visit www.rmsi.com