

Koyna Dam Breach Analysis

Dam Breach Induced Flood Affected Villages

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ArcGIS Pro



HEC-HMS



RAS
HEC-RAS

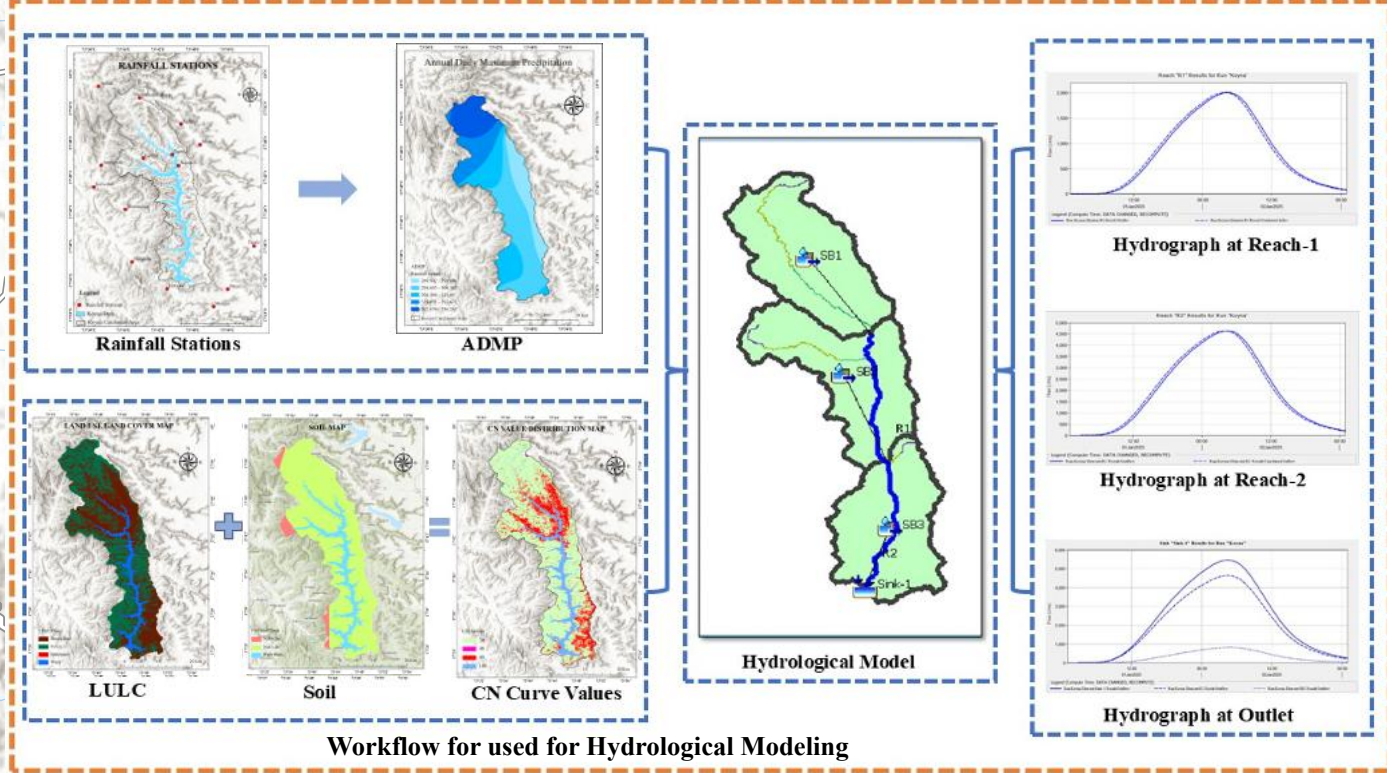
Estimating CN curve value, Integration of geospatial data, Visualization and Layouts preparation.

Developing hydrological models.

Developing and simulating hydraulic model.



For more details and digital maps, please scan these QR codes.



Koyna Reservoir Specification	
River	Koyna
Lat/Long	17° 23' 00" 73° 44' 28"
Reservoir Capacity	105 TMC
Reservoir Spread Area	119.69 sq km
Hydro Power Generation	1960 MW
Catchment Area	891.78 sq km
Main Dam Length	807.72 m
Top Elevation	664.45 m
Height of Dam	85.35 m
Full Reservoir Level	659.430 m

This study presents a flood inundation analysis for a hypothetical failure of the Koyna Dam in Maharashtra, India. The dam is located in the Western Ghats at a high elevation, and the large reservoir has been associated with reservoir-triggered seismicity (RTS). These conditions make dam failure a serious risk for people living downstream. The analysis shows that more than 300 villages could be affected by a dam breach. The study provides important flood-related information, including flood extent, water depth, flood arrival time, and flow velocity. These results help to understand how the flood could spread and how severe its impacts could be.

The study used a combination of GIS and hydraulic modelling techniques. Open-source data, including a 30 m Digital Elevation Model (DEM) and LISS-4 satellite imagery from the ISRO Bhuvan portal, were used. Dam information was collected from official sources such as the Central Water Commission (CWC) and Water Resources Information System (WRIS). All spatial data were processed using ArcGIS Pro. HEC-HMS was used to model watershed hydrology and generate the inflow hydrograph, while HEC-RAS was used to simulate the dam breach and downstream flood propagation. ArcGIS Pro was then used to visualize and analyses the model results.

The final outputs included flood inundation maps, water depth maps, flood arrival time, and flow velocity maps. These outputs provide a clear understanding of the possible flood behavior and its severity. The findings can support early warning systems, evacuation planning, disaster preparedness, and flood risk reduction.

Overall, the study demonstrates how GIS, open-source data, and hydraulic modelling can be effectively combined to assess dam breach flood risks. The results can help decision-makers and disaster management authorities develop better preparedness and mitigation strategies for vulnerable areas downstream of large dams.

