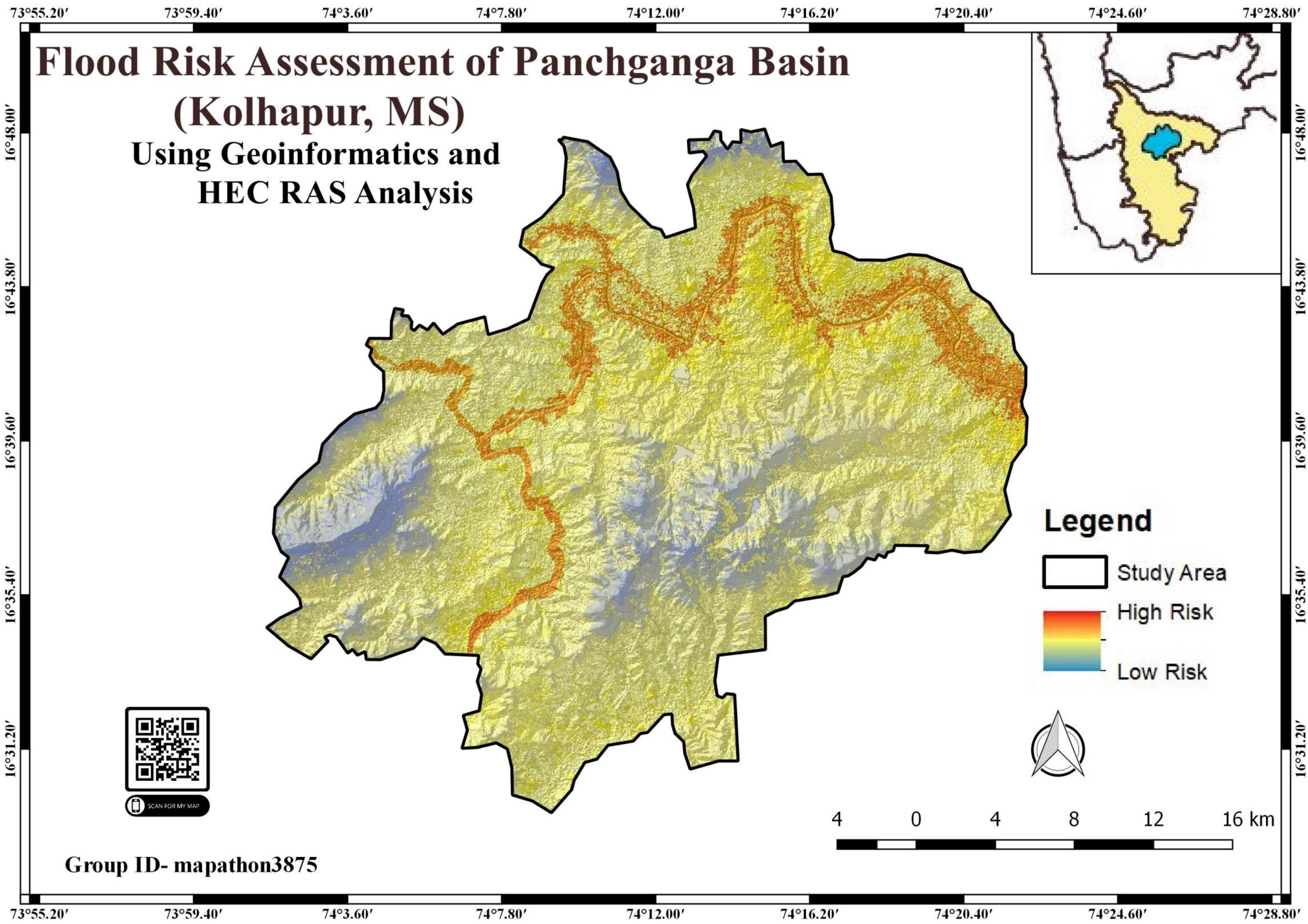


Title: Flood Risk Assessment of Panchganga Basin (Kolhapur, MS)

Map description and analysis



Introduction:
Flood risk analysis and assessment (FRA) is a scientific subdiscipline or a set of techniques regarding the quantitative analysis and evaluation of flood risk, its components, variables and parameters [1]. Here, Flood Risk of Panchganga basin (Kolhapur, Maharashtra) is defined as a result of probability and consequences [2]. Inundation map and elevation zones are considered from the probability point of view and land use/ land cover and infrastructure (road network) are considered as consequences.

Methodology:

- HEC-RAS (open source), developed by the United States Army Corps of Engineers Hydrologic Engineering Centre is used for channel routing and to perform steady flow analysis to prepare inundation map for the event 9th August 2019. Inundation information about part of the upper reach (from Nitawade, Balinga up to western Tehsil boundary of Karveer), which was not included in the HEC-RAS model due to non availability of observed data, has been digitised from the NRSC website.
- Digital representation of the terrain with high level of accuracy is a primary input for flood risk analysis. Hence, CartoDEM data (30 m) is used to extract topographic information to define elevation zones. (Source: Bhuvan website)
- IRS (LISS III-23.5 m) images are used to prepare land use/ land cover map by applying supervised classification techniques. (Source: Bhuvan website)
- Infrastructure (road network) data is generated through Bhuvan portal.
- The spatial multicriteria analysis with analytical hierarchy process (AHP) was used to compute the priority weights of each criterion. AHP uses pairwise comparison to allocate weights to the elements of each level, measuring their relative importance with Saaty's 1 ~ 9 scale, and finally calculates final weights for assessment. Higher importance was given to inundation map followed by elevation zones, LULC and Infrastructure through maintaining consistency ratio. Final weights are assigned by using raster calculator of QGIS software and flood risk assessment map has been prepared. QR code is generated to provide dynamic nature to the map, which can be easily used by stakeholders for various applications.

Applications and use of Map:
The Problems related to flooding have greatly increased in Panchganga basin along Kolhapur city and rural areas.

- Flood risk is prerequisite in order to promote a sustainable development and to decrease the flood effects in proper planning.
- Establishing a flood risk assessment system would enhances the effectiveness of all other mitigation measures by providing time for appropriate actions.
- Regional plan/ Development plan can be prepared or modified as per flood risk assessment.
- Flood zonation map can be updated with risk assessment studies.
- Damage assessment would be done within stipulated time period.

References:
[1] Saaty, T. (1990). How to make a decision: the Analytic Hierarchy Process. European Journal of Operational Research, 48:9–26.
[2] Jonkman, S. N., Gelder, P. and Vrijling, J. K., An overview of quantitative Risk measures for loss of life and economic damage. *J. Hazardous Mater.*, 2003, 99(1), 1–30.



Team Name: Geo-surveyor

Topic: Flood Risk Assessment

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