Introduction

Bihar is one of the most flood-prone states in India with approximately 75% of the population at flood risk. The capital city of Bihar, Patna, is the most vulnerable to floods as it is the most populated city in the state. Flood inundation mapping could be helpful in proper assessment and planning for minimising the effects of flood well before the hazard. In the current map, flood inundation map based on different water height (in metres) in Patna district has been presented.

Method flow

Cartosat-1 imagery → Projection Definition → DEM threshold images derivation (5 metres to 70 metres at interval of 5 metres) → Raster Volume Calculation → 3D visualization

Steps to follow in QGIS

1. Import 3 tiles of Cartosat-1 imagery downloaded from the Bhuvan portal
2. Merge the tiles into one single image (Merge in Raster tool) and clip the image using the Patna district shapefile (Clip Raster by Mask Layer tool in which Mask layer was the district shapefile)
3. Assign the projection to the clipped image (Wrap tool)
4. Derive 14 images corresponding to the DEM values from 5 metres to 70 metres at interval of 5 metres (Raster Calculator tool)
5. Make use of Qgis2threejs plugin to map the 14 images and visualize them in 3 dimensions

Complexities

1. 3D visualization and mapping could get difficult depending on the system configuration.

Map Application

The presented map can be potentially used in flood inundated area analysis of the current study area. It would help in analysing the zones at risk prior to flood after which the steps to mitigate the effects of flood could be taken.