Title: UAV-based High-resolution DEM for 1D Hydrodynamic modeling - A case of Flood Assessment of Sabarmati River, Gujarat, India.

Methodology:

According to the methodology, the UAV survey for the research region is carried out in two courses: 1. Data Capturing and 2. Data Processing. The equipment records the topography during data processing- a device known as the 4RTK Phantom takes pictures. Phantom 4 RTK needs a few GCPs (Ground Control Points) to build a precise map. Data is continually georeferenced using the reference station method to produce GCP. The study region was separated into three patches for the survey's convenience. Each patch has at least one GCP thanks to the labelling of the GCPs, and the UAV survey's transverse flight in the Phantom 4 RTK enabled the camera's auto validation. The UAV then overflew the entire area while flying along the planned route to take aerial pictures. The percentage of overlap between the photos was set at 75%. Data processing is completed after data are collected in the form of an image. In order to conduct the study, Pix4D, which turns images into digital spatial models, was used following the image capture process. The three steps of analysis this graphic user completes in final processing are initial processing, point cloud, and mesh. A spatial resolution of about 3 cm was used to build the digital model.

DEM Generation: Different DEMs were generated for the research area with the use of a Global Mapper because DEMs are a crucial component of hydrodynamic modelling. 20 DEM generated from 0.5x0.5 m2 to 20x20 m2.

1D Hydrodynamic Model: Civil GeoHECRAS was employed for 1-D hydrodynamic modelling. GeoHECRAS significantly accelerates the creation and evaluation of HEC-RAS models, producing better and more precise results. Calculating water surface profiles for steady and unsteady flow models, bridge and culvert roadway crossings, encroachments into floodplains, stream restoration, inline reservoir structures, and off-channel storage sites are a few examples of uses. With the ability to operate directly on the map and interface with CAD and GIS, it is very simple to learn and use. The study here is on creating a 1-D river hydrodynamic model for the instance.

Benefits:

Improved understanding of urban food hazard analysis: The work may contribute to the field of urban food hazard analysis by providing insights into the impact of topography and land cover data resolutions on hydrodynamic model simulations. This could improve the accuracy and reliability of future simulations and enhance the understanding of the dynamics of urban food hazards.

Practical implications for decision-making: The findings of the work may have practical implications for decision-makers involved in urban planning, disaster risk reduction, and food hazard management. For example, the work may provide recommendations on optimal data resolutions for hydrodynamic modeling, which could guide decision-makers in selecting appropriate data inputs for urban food hazard analysis.