

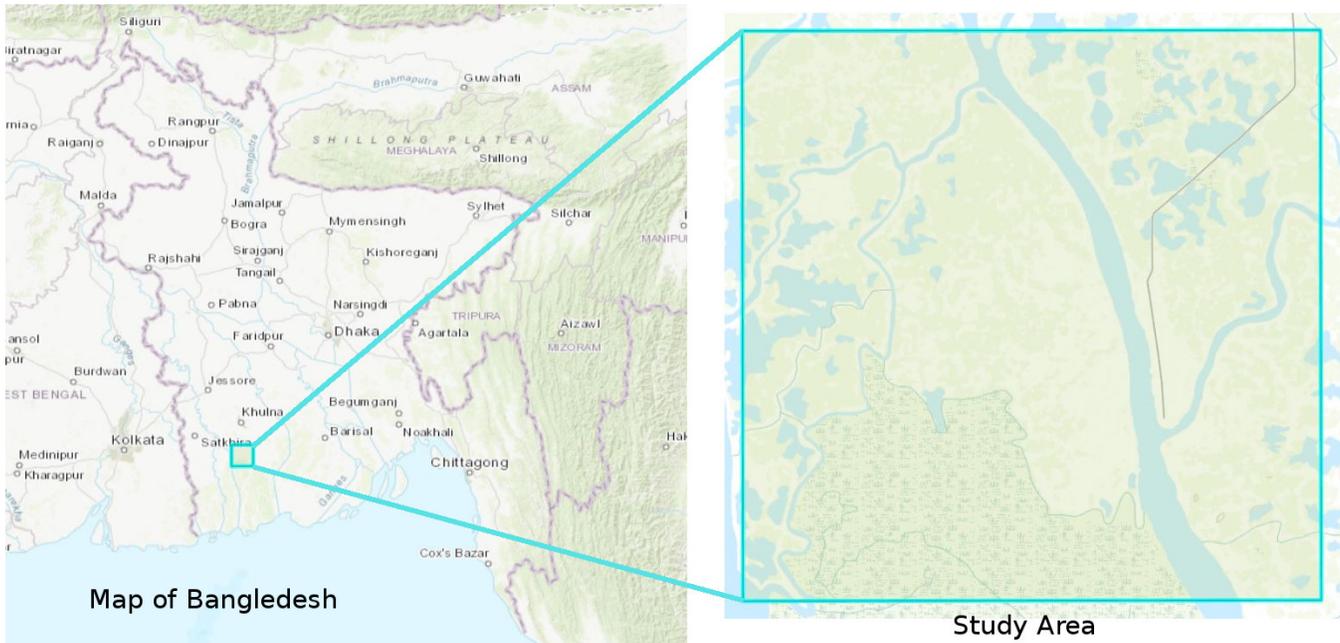
# GIS In Water Resources Project Update

Human Impacts to Delta Morphology - CE394K

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Jayaram Hariharan

## Project Site Map



## Summary of Project Goals

The objective of this project is to observe and compare developed and undeveloped areas of river deltas. By comparing these two scenarios, I hope to observe some difference in delta morphology. To study this, I elected to look specifically at Polder #32 in the Ganges-Brahmaputra-Meghna delta. As this is such a small area, it is not reasonable to extrapolate any conclusions to all deltas. But, this may help develop a way of comparing developed and undeveloped regions that can be applied to other deltas. Prior research in the field will be used to help make predictions about what results to expect, as well as explain the observations made.

## Current Progress

At this time, there has been an examination of imaging resources to identify data to be used in this project.

Government funded projects from across the world provide the majority of the open-access satellite data and imagery. So far, digital elevation models (DEM) of the area have been obtained from several different sources. Data was found from the

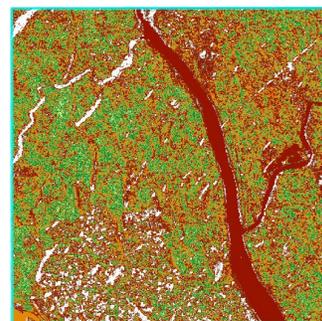


Figure 1: Sample of ASTER Data in Study Area

Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) which is on the NASA spacecraft Terra. ASTER data is distributed jointly by Japan and the United States. The data collected for this project (see Figure 1) is from ASTER version 2, which was released in October of 2011. The ASTER equipment has been operational since 2001. The information provided with the data package, has not made clear exactly when the data collection occurred. This timeline is something that will need to be resolved if this data is going to be used in any meaningful way for the purposes of this project.

In addition to the ASTER data, there is other DEM data that has been obtained. Shuttle Radar Topography (SRTM) data has been collected.

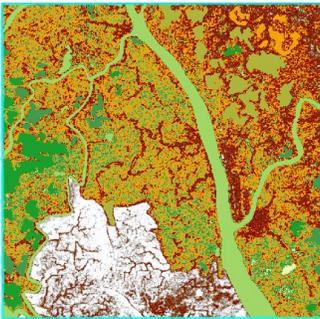


Figure 2: Sample of SRTM Data in Study Area

This data is well documented and it is clear when it time in was observed. The radar used to collected the data was deployed on the NASA shuttle Endeavour from February 11 - 22 in the year 2000. The data is provided at a resolution of 1 arc-second and will hopefully be useful in this project as it is well documented and provided at a high enough resolution to make observations even for a limited study area.

The United States Geologic Survey has also made available GTOPO30 elevation data which was obtained at a 30 arc-second resolution. This data was compiled in late 1996 using several raster and vector sources of information according to the documentation. This gives us an idea of when the data was obtained, presumably in the early 1990s.

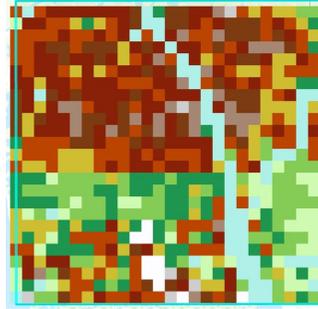


Figure 3: Sample of GTOPO Data in Study Area

To be more conclusive and precise, I need to continue looking at the literature about the GTOPO30 dataset to fully understand when and how it was collected. Unfortunately, this is the lowest resolution DEM data obtained so far. Initial map generations, such as the one shown in Figure 3, suggest that it may be difficult to observe fine changes in land elevations and the boundary between land and water.

## Remaining Tasks

1. Obtain additional elevation data and consider obtaining different types of data that has been collected over different time periods
2. Transform data as necessary so that it is all in a singular datum and can be analyzed and compared
3. Analyze changes to natural areas and compare to developed areas (Auerbach et al., 2015)
4. Classify the type of delta behavior (Wilson and Goodbred, 2014)
5. Assess whether the observations in developed areas would be expected

## Anticipated Challenges

The largest problems anticipated are finding additional data sources and being able to properly transform them into readable files for ArcGIS. Sometimes the data provided by various agencies comes in a compressed file format known as hdr or eos-hdr, and these files, while compact, cannot be imported into ArcGIS. So when downloading those data files, it appears there is

significant work to be done to understand what data is collected, and how it can be transformed such that it will be readable by ArcGIS and can be brought into the software for mapping and analysis.

In addition to challenges with obtaining the data, there will also be some hurdles to be passed in the analysis of data. As shown in

the figures provided earlier, the data collected thus far comes in a variety of resolutions. Since the cell sizes are all different, a determination must be made to set a minimum resolution for analysis. The site area being observed here is relatively small, and so it is important to ensure the data being analyzed is at a fine enough resolution to come to any conclusions.

## References

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