

# Geospatial Assessment of Water and Soil Salinisation Risk to Advance Climate Resilience in Coastal Bangladesh



## Research Motivation



Figure 1. Google Earth satellite image showing the location of Bangladesh and its surrounding areas (source: Google Earth Pro).

Due to global changes, the coastal region of Bangladesh (Fig. 1) faces increasing challenges related to the salinity of soil and water. My doctoral research focuses on understanding the dynamics of soil salinity and its relationship with surface and groundwater salinity in the coastal region of Bangladesh. The aim is to assess the risks posed by salinity and evaluate the effectiveness of adaptation measures, with a particular focus on the agriculture and health sectors. Research questions examine the changes in soil and water salinity, the factors driving these changes, variations in population exposure and vulnerability to salinisation across different regions, and current adaptation measures implemented. Additionally, the study investigates the effectiveness of these measures, the challenges faced in their implementation, and potential avenues for improvement. Furthermore, the research evaluates the institutional capacity and strategies to manage water and soil salinity risks and adapt to the changes. The findings of this research will contribute to policy development and implementation, enhancing coastal resilience against soil and water salinity risks in Bangladesh.

## Objectives

- To characterise spatiotemporal dynamics of salinity in soil, surface water and groundwater;
- To assess the multi-hazard risk of soil and water salinity combining physical and socioeconomic factors applying the hazard, exposure, and vulnerability framework;
- To map out the current adaptation measures to agriculture and health in relation to soil and water salinity; and
- To review institutional capacities and strategies currently in practice to adapt to the salinisation risk in the coastal region.

## Effectiveness of Adaptation Measures

- Below are some of the adaptation measures (Fig. 2) applied by farmers in coastal Bangladesh to address soil and water salinity in agriculture and drinking water.



Figure 2. Some Adaptation Measures in agriculture and drinking water to address water and Soil Salinity in the South-Western Bangladesh.

- Some of these look very promising. However, their effectivity in terms of scale, cost, seasonality and quality is not evaluated. One of the chapters of my thesis will look into this question and research gap.

## Data and Methodology

- Spatiotemporal data of soil salinity, surface water salinity, river discharge and weather have been collated from different government agencies.
- Data on salinity adaptation strategies and role of institutions are being collected in the field (Fig. 3) through various participatory research methods.

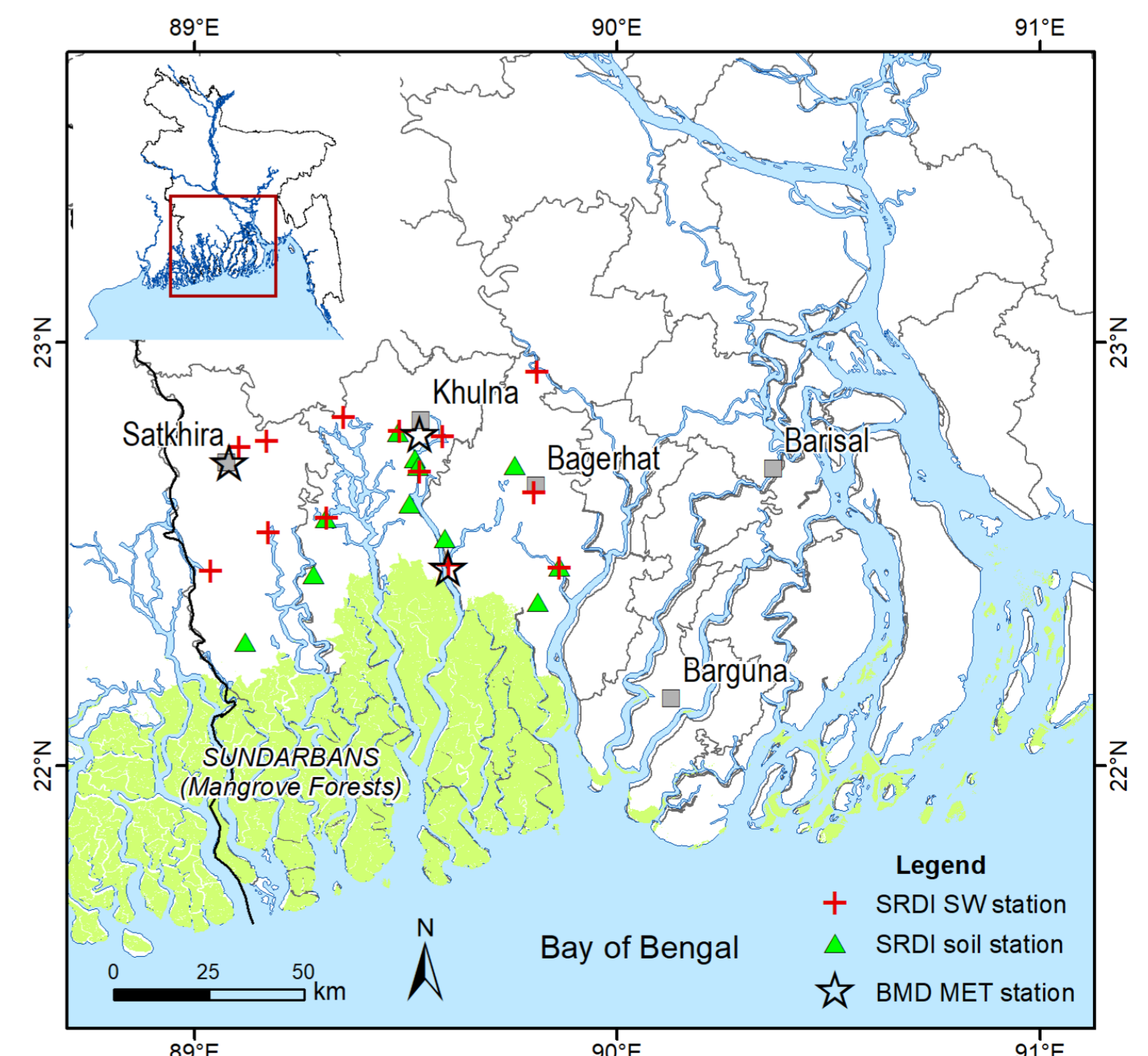


Figure 3. Map showing the location of SRDI soil salinity, surface water salinity and BMD meteorological station in southwest coastal Bangladesh. Data source: Global Mangrove Watch (1996 – 2020) Version 3.0 Dataset (<https://zenodo.org/record/6894273>)