Evaluating Effectiveness of Adaptive Measures against Storm Surge Hazard based on Field Experience from a Real Time Cyclone in Bangladesh Coast

CARIAA Collaborative Adaptation Research Initiative in Africa and Asia

DECCMA

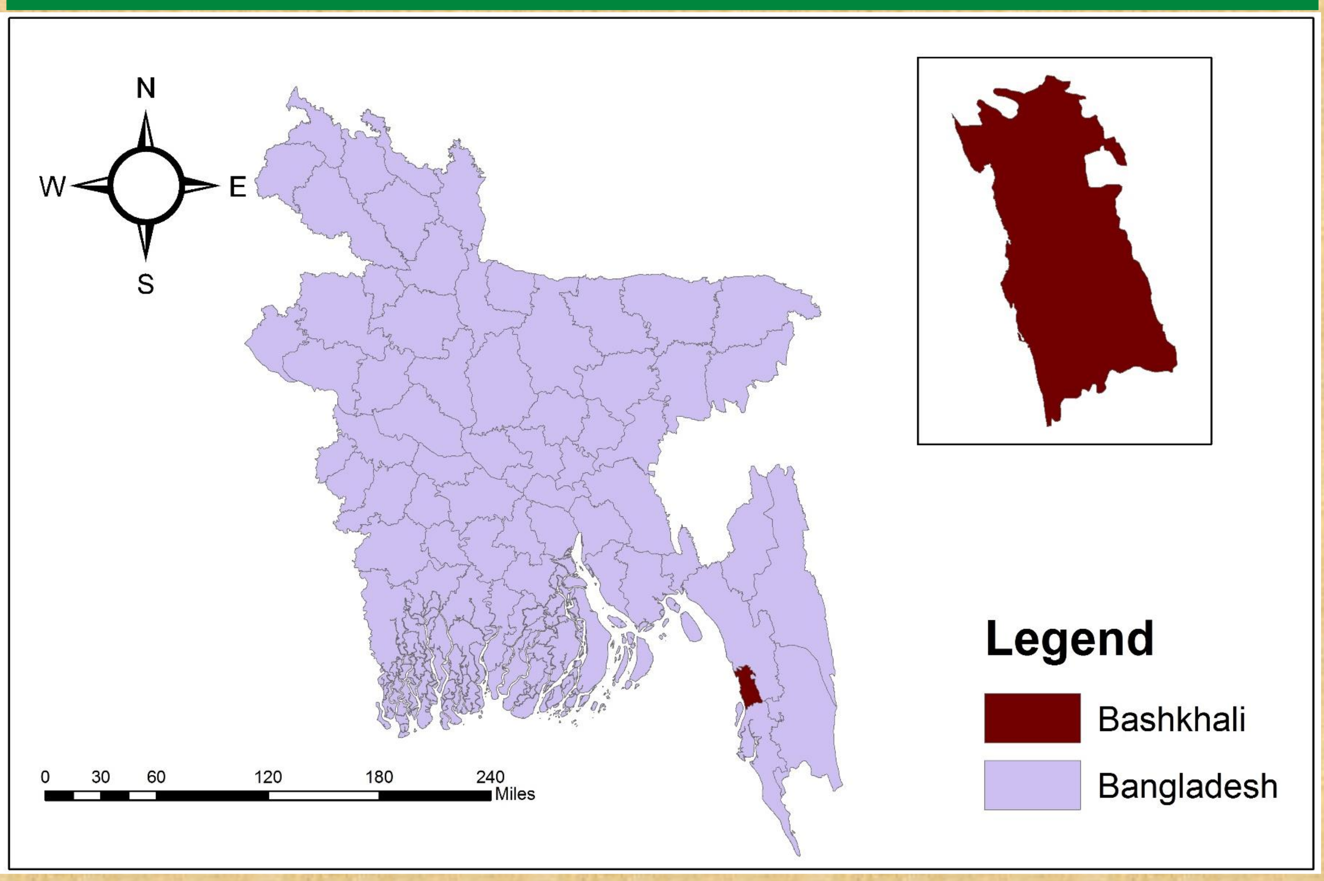
ABSTRACT

Bangladesh is the landing ground of cyclones because of the funnel shaped coast of the Bay of Bengal. The tropical cyclone ROANU struck the eastern coast of Bangladesh on **21 May, 2016**. The cyclone made landfall at around 12 pm during high tide resulting significant damage to the infrastructures, agricultural lands, fisheries and livestock. To assess the impact of the cyclone a team from BUET made a field visit to the affected regions. During the field visit, assessment of immediate shock of the cyclone and reactions from affected people are made. Polders (a structural adaptation) are washed away and large area are inundated. Available cyclone shelters (also a structural adaptation) are inadequate and useless in terms of location, accessibility and capacity. Cyclone warning (a non-structural adaptation) is found to be inadequate.

INTRODUCTION

- Cyclone Roanu made landfall in the East Coast of Bangladesh on May 21, 2016.
- Eighteen (18) coastal districts were affected and among them, seven (7) severely: Chittagong, Cox's Bazar, Bhola, Barguna, Laxmipur, Noakhali and Patukhali.
- In this study, field visit was made just one day after the cyclone landfall to have an immediate assessment of the effectiveness of polders, cyclone shelters and cyclone warning system – the three structural and non-structural adaptive measures against storm surge hazard.
- Sentinel 1A microwave images, Sentinel 2A satellite image and numerical model were used to have and idea on inundation extent.
- Saline water samples were collected to assess the salinity level of inundated area.

STUDY AREA



STUDY METHODS

Field Assessment

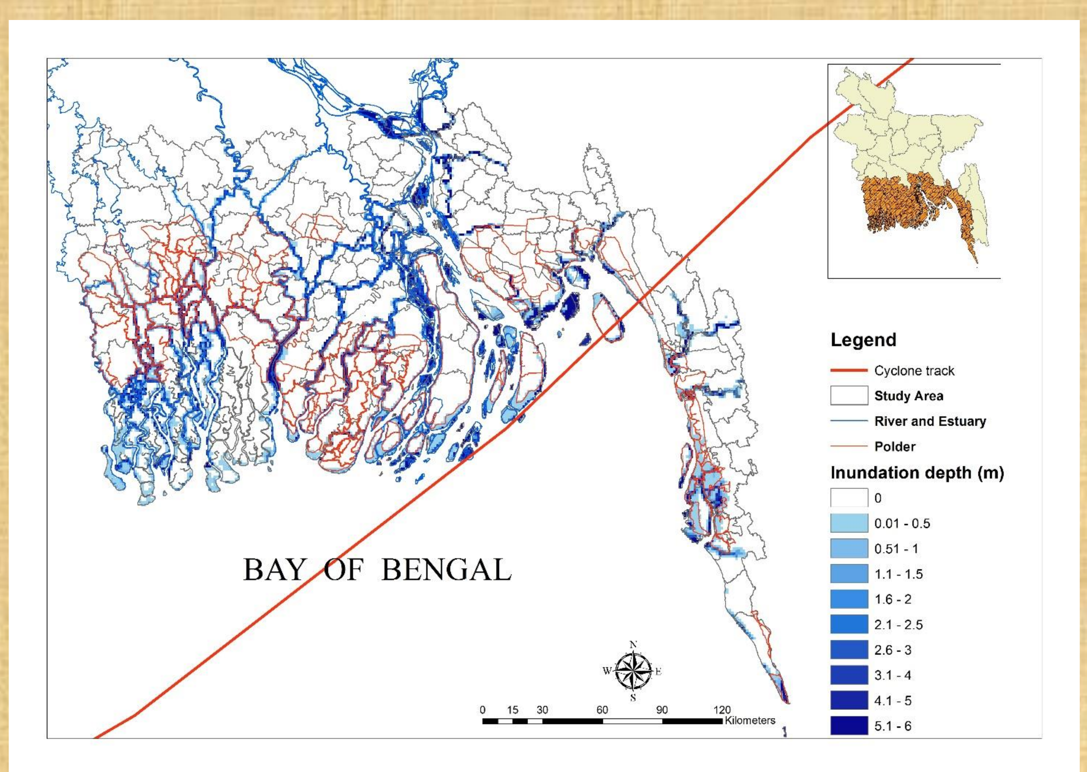
- Assessment of Immediate Shock
- Reaction from Affected People
- Saline Water Collection

Desk Analysis

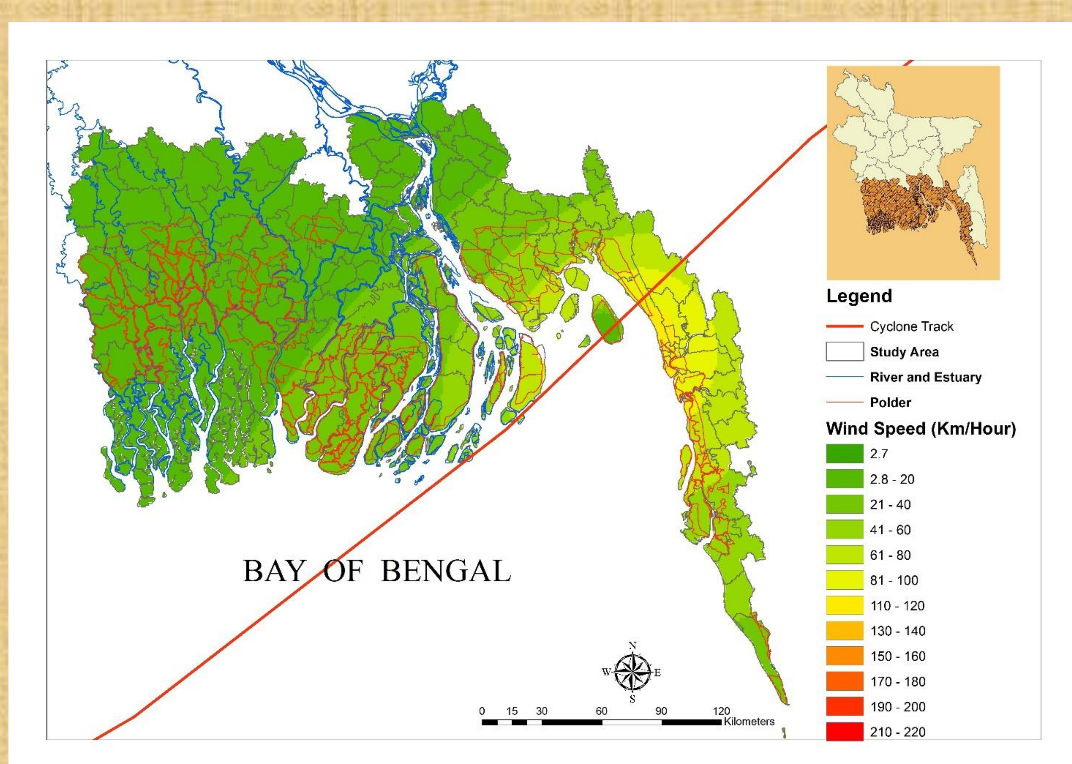
- Satellite Image Analysis
- Inundation and Wind Modelling
- Saline Water Mapping

ANALYSIS RESULTS

INUNDATION MAP

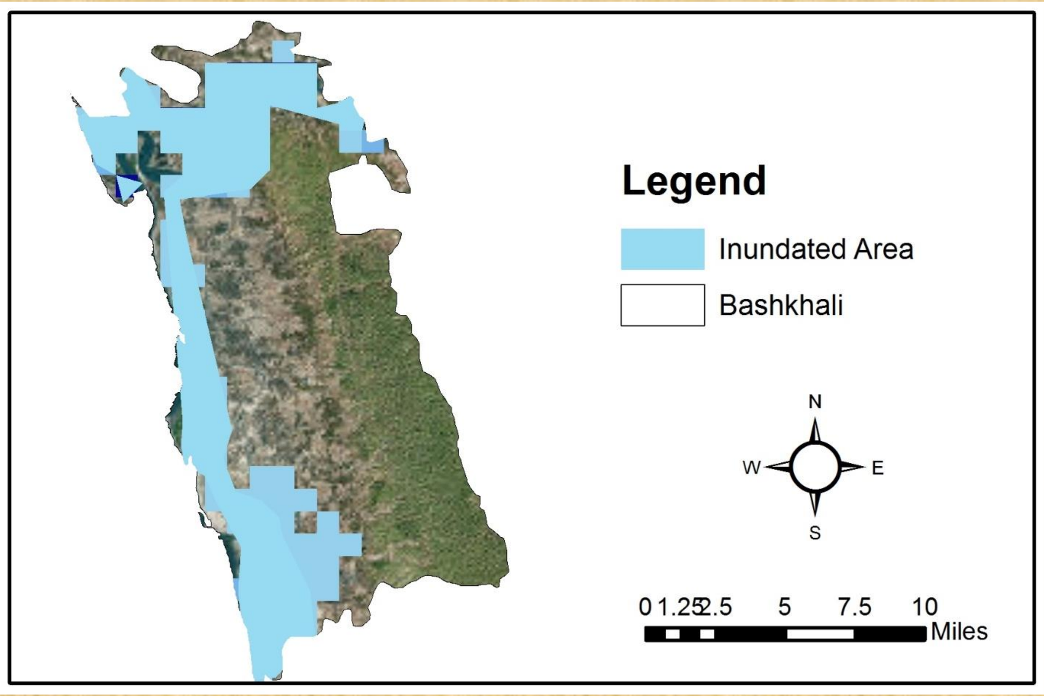


WIND SPEED MAP

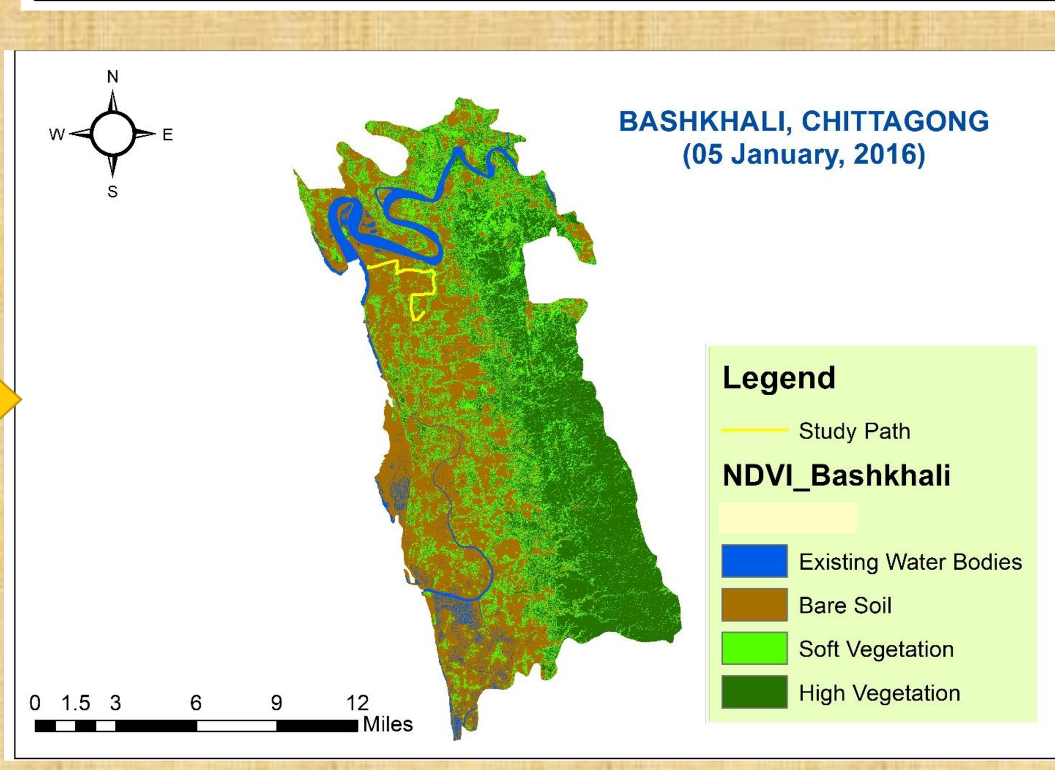


ANALYSIS RESULTS (CONTD…..)

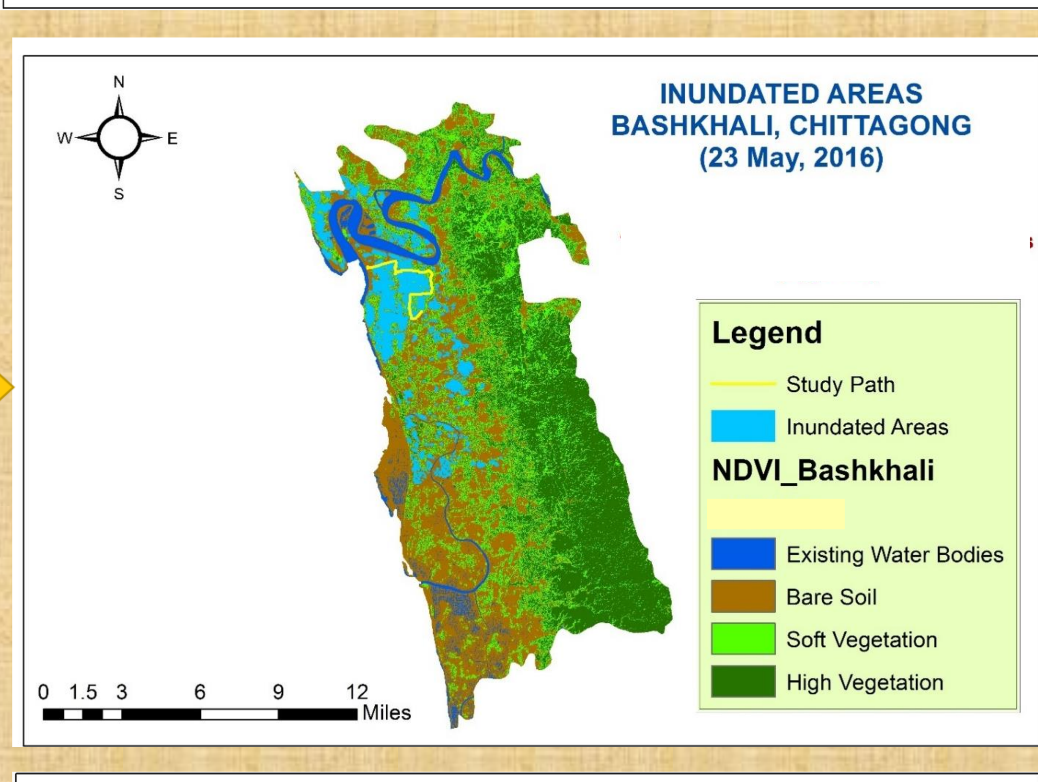
INUNDATION MAP (FROM MODELLING)



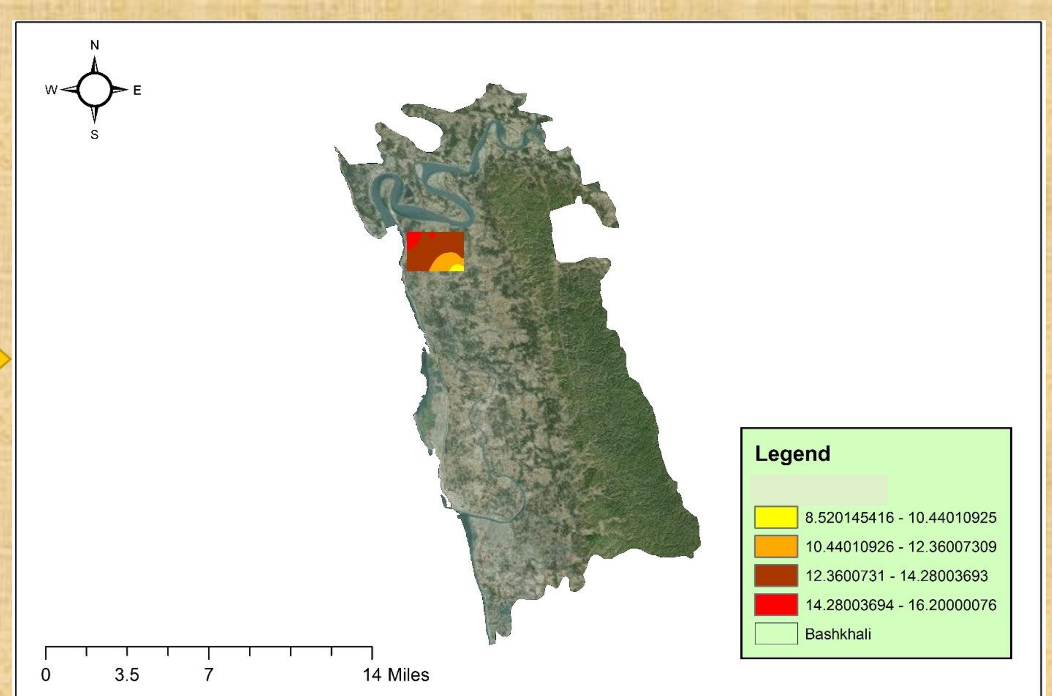
SATELLITE IMAGE (BEFORE ROANU)



SATELLITE IMAGE (AFTER ROANU)



SALINITY MAP (BASHKHALI)



PHOTOGRAPHS

FIELD VISIT









CONCLUSIONS

- Polders at Baskhali were washed away resulting inundation of large area.
- Around 15 km landward limit of Bashkhali area was inundated resulting widespread destruction.
- Microwave data (Sentinel-1A) along with Satellite Images (Sentinel-2A) and model result analyses showed that a large area of Bashkhali was inundated.
- Inundation was mainly due to polder overtopping and breaching.
- Cyclone warning system was found to be inaccurate and 'difficult to understand' to the local people and thus found to be useless.
- Available cyclone shelters in the affected area were inadequate and inaccessible in terms of location, accessibility and capacity.
- Salinity intrusion due to surge water inundation was found to be destructive and caused damage to agriculture crops, livestock and eco-system.
- People still believe an improved warning system, strong polder and effective cyclone shelter could ensure their safety against storm surge. In that case they opted to live in the same place and were not interested to migrate.

ACKNOWLEDGEMENTS

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