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Understanding adaptation practice in African and Asian deltas

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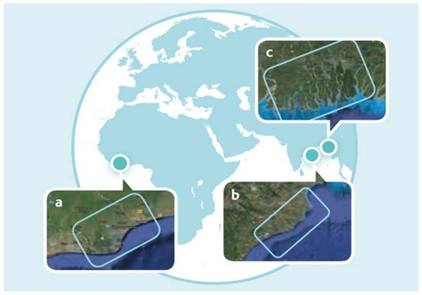
Introduction

With their large and often poor populations in low-lying areas, deltas are highly vulnerable to climate change and variability including sea-level rise, salinity, erosion and cyclones. Whilst large scale population movement away from hazardous areas may be one response to threat, there is little empirical evidence to suggest migration will be a widespread strategy.

Another way to deal with hazards is to adapt in-situ. In this work, we examine adaptation across scales (from policy to local deltaic communities) in three deltas: (a) the Volta (Ghana); (b) the Mahanadi (India); and (c) the Ganges-Brahmaputra-Meghna (in both Bangladesh and India)



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What is adaptation?

Adaptation refers to adjustments that reduce vulnerability to climate variability and change. These adjustments may be in response to, or in anticipation of, real or perceived climate stressors. These stressors may be exposure to sudden onset shocks, such as floods; and/or to slow-onset incremental stresses, for example in temperature and rainfall patterns, or sea level rise.

Importantly, our definition of adaptation recognises the following :

- There has been a recent change in practice and/or behaviour.
- This change is in response to, or, in anticipation of climate stresses and/or shocks.
- The climate change and variability that people respond to can be real or perceived.
- Adaptation will have a positive effect in reducing vulnerability. If the response has a negative effect, it is not adaptation.

Method

We conducted a large scale systematic review of the peer-reviewed and grey literature on adaptation in our three deltas.

(1) We searched online databases using key words, including Adapt*; Resilien*; vulnerab*; climat*. We also searched paper resources.

(2) To be included in the review, documents must provide empirical evidence of observable adaptation

(3) Relevant documents were collated in a universal format (in spreadsheet form) to document the adaptation.

Common adaptation strategies

We found evidence of seven common adaptation strategies across the three deltas.

Adaptation	Description
Agricultural innovation	New farming techniques, including mulching/early planting; mixed crops and integrated rice and fish systems; new crop/species types, including saline tolerant rice; use of traditional knowledge .
Water management	Communal irrigation; control of waterlogging; improvements to drainage; rainwater harvesting.
Afforestation	Mangrove / coastal forest regeneration to act as protective barrier; preventing bushfires and deforestation.
Livelihood diversification	Move away from solely on-farm income generation.
Capacity building	Training centre teaching skills to cope with change; training community volunteers to assist in emergency.
Preparedness	Household construction with new material; multipurpose cyclone shelters; early warning dissemination plans; sand bags around homes.
Developing infrastructure	Hard infrastructure, including groynes; raising of embankments; raised pond dykes (for fishermen); polder rehabilitation.

Multi-purpose cyclone shelter, Bangladesh
Photo: International Federation of Red Cross and Red Crescent Societies

Communal rainwater harvesting in the Mahanadi
Photo: UNDP India

Keta sea defence, Ghana
Photo: Research Planning, Inc.

Mangrove rehabilitation in the GBM, India
Photo: Jayanta Pal\WFS

Barriers to successful adaptation

The literature also highlighted a number of barriers to successful adaptation faced by deltaic communities. Using a framework by Pinkse and Kolk (2012) we categorise barriers into four groups; resource, regulatory, learning/cultural and governance:

Barriers to adaptation	
Resource	Regulatory
• Financial cost of new equipment/inputs • Lack of irrigation facilities / water • Lack of climate forecast • Lack of new land • Lack of new tree seedlings	• No policy or plans controlling natural resource • Corruption • Lack of political presence in the area
Learning /cultural	Governance
• Not knowing what measures to take/lack of suitable traditional knowledge • Lack of info about climate change • Fatalism	• Local conflict over resources • Insecure property rights • Low female participation in community discussions

The literature shows that adaptation barriers led to a number of erosive **coping strategies** that are likely to increase vulnerability to climate risk in the future. These include:

- Working harder and for longer
- Accessing distant resources
- Taking out loans
- Waiting for government help

Next steps

This work is part of the four year **DEltas, vulnerability and Climate Change: Migration and Adaptation (DECCMA)** project. In early 2016, researchers will begin to collect data from 12,000 households across the three deltas. Data will examine how households respond to different climate stressors as well the success of those responses. We will also explore when migration may be used as an adaptation.

References: Pinkse, J and Kolk, A (2012), Addressing the climate change—sustainable development nexus the role of multistakeholder partnerships, *Business & Society*, 51, pp. 176–210; Full details of all the documented adaptations are available on request

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For more information please email n.r.suckall@soton.ac.uk or see www.geodata.soton.ac.uk/deccma