



A framework for identifying and selecting long term adaptation policy directions for deltas



Natalie Suckall ^{a,*}, Emma L. Tompkins ^a, Robert J. Nicholls ^b, Abiy S. Kebede ^b, Attila N. Lázár ^b, Craig Hutton ^a, Katharine Vincent ^c, Andrew Allan ^d, Alex Chapman ^b, Rezaur Rahman ^e, Tuhin Ghosh ^f, Adelina Mensah ^g

^a Geography and Environment, University of Southampton, Southampton SO17 1BJ, UK

^b Faculty of Engineering and the Environment, University of Southampton, Southampton SO17 1BJ, UK

^c Kulima Integrated Development Solutions (Pty) Ltd, Postnet Suite H79, Private Bag x9118, Pietermaritzburg 3200, South Africa

^d Centre for Water Law, Policy and Science, School of Law, University of Dundee, Dundee DD1 4HN, UK

^e Institute of Water and Flood Management at Bangladesh University of Engineering and Technology, Dhaka, Bangladesh

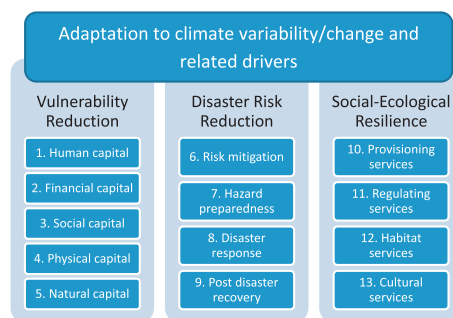
^f School of Oceanographic Studies, Jadavpur University, Kolkata, West Bengal, India

^g Institute for Environment and Sanitation Studies (IESS), University of Ghana, Accra, Ghana

HIGHLIGHTS

- We generate a set of observed adaptations that are occurring in three deltas.
- We offer a framework for categorising adaptations into 13 distinct classes.
- Four future directions for adaptation policy focus on different classes of adaptation.
- Future policy directions range from minimum intervention to radical transformation.
- Countries can select a policy direction that suits their normative goals.

GRAPHICAL ABSTRACT



The 13 classes of adaptation

ARTICLE INFO

Article history:

Received 18 January 2018

Received in revised form 13 March 2018

Accepted 20 March 2018

Available online xxxxx

Keywords:

Deltas
Climate change
Adaptation
Policy
Transformation
Framework

ABSTRACT

Deltas are precarious environments experiencing significant biophysical, and socio-economic changes with the ebb and flow of seasons (including with floods and drought), with infrastructural developments (such as dikes and polders), with the movement of people, and as a result of climate and environmental variability and change. Decisions are being taken about the future of deltas and about the provision of adaptation investment to enable people and the environment to respond to the changing climate and related changes. The paper presents a framework to identify options for, and trade-offs between, long term adaptation strategies in deltas. Using a three step process, we: (1) identify current policy-led adaptations actions in deltas by conducting literature searches on current observable adaptations, potential transformational adaptations and government policy; (2) develop narratives of future adaptation policy directions that take into account investment cost of adaptation and the extent to which significant policy change/political effort is required; and (3) explore trade-offs that occur within each policy direction using a subjective weighting process developed during a collaborative expert workshop. We conclude that the process of developing policy directions for adaptation can assist policy makers in scoping the spectrum of options that exist, while enabling them to consider their own willingness to make significant policy changes within the delta and to initiate transformative change.

© 2018 Published by Elsevier B.V.

* Corresponding author.

E-mail address: n.r.suckall@soton.ac.uk (N. Suckall).

1. Introduction

Deltas are dynamic, stressed and often densely populated environments. They are especially vulnerable to the impacts of climate change and variability, including sea-level rise, erosion, land loss, increased soil salinity, and changing storms (Church et al., 2013; Collins et al., 2013). These factors combined with subsidence and sediment starvation are rapidly changing the coastal landscape (Brown and Nicholls, 2015; Syvitski and Saito, 2007). This has implications for deltaic populations who rely on the economic activities and ecosystems services that deltas provide (Ericson et al., 2006). Without adaptation measures to address these multiple stresses, deltas could struggle to attain the Sustainable Development Goals (SDGs) and become unsafe locations. Human interventions have a long history in deltas through efforts to enhance livelihoods and reduce hazards. Engineered adaptation interventions, where they have occurred, have arguably had a major impact on delta evolution (Welch et al., 2017). However, these adaptations have not been systematically planned, assessed or documented to date. Consequently, there is a pressing need for information about what deltaic communities and their governments can do to adapt. Drawing on evidence of policy-led adaptations collected through a five year IDRC funded project ('Deltas, Vulnerability & Climate Change: Migration and Adaptation' - DECCMA) this paper aims to provide policy makers with insight into plausible adaptation policy directions in deltas. DECCMA's geographical focus is on three deltas in Africa and Asia: the Volta in Ghana, the Mahanadi in India, and the Ganges-Brahmaputra-Meghna (GBM) spanning India and Bangladesh (Fig. 1). However, this paper has a wider relevance, especially for large ecosystems, as we seek to generate a method for understanding adaptation in complex social and physical environments.

Adaptation policy is a newly emerging area for most countries where it is becoming an increasingly important challenge to meet. Adaptation is all the more pertinent in the context of the Paris Agreement 2015, the global agreement to address climate change, adopted under the United Nations Framework Convention on Climate Change (UNFCCC). The Paris Agreement introduces an "ambition mechanism" requiring countries to strengthen their commitments to adaptation and mitigation. Many countries are grappling with the possible contents of adaptation policy, and this is especially challenging in large interconnected and transboundary ecosystems, such as deltas, mountains or coasts, where adaptation policies do not exist. Using deltas as an example, we reflect

on the challenges affecting large ecosystems, that often have both upstream and downstream areas, and that may span national or regional borders. The aim of this paper is therefore to explore long term adaptation policy choices for deltas. To do this we ask: (1) what adaptations are occurring in deltas?; (2) what are possible future directions for adaptation policy?; and (3) what are the trade-offs associated with each policy direction?

This paper first reviews the theoretical literature on framing adaptation, and considers the key drivers underpinning adaptation policy development (Section 2). Drawing on data collected by DECCMA researchers during literature searches, inventory analysis and policy analysis, we then outline the planned, policy-led adaptations that are currently occurring in deltas, as well as presenting a method to create and populate four discrete directions for adaptation policy, which considers the trade-offs between different aspects of adaptation (Section 3). Section 4 describes specific adaptation actions in DECCMA's three deltas, in the context of the four directions for policy, which range from a minimum intervention approach to radical transformational adaptation.

2. Adaptation theory

Broadly defined, adaptation is "an adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities" (IPCC, 2007). However, debates surrounding more precise definitions as well as the content of adaptation continue unabated adding to the perceived complexity of understanding adaptation (Lesnikowski et al., 2016). Despite the lack of consensus in answering questions about the relationship between adaptation and other variables e.g. coping and adapting, or adaptation and development, progress has been made on agreeing its broad aims. It is generally agreed that adaptation aims to: (1) address drivers of vulnerability; (2) reduce disaster risk (DRR); and, (3) build landscape/ecosystem resilience (Eakin et al., 2009; Ensor and Berger, 2009; McGray et al., 2007). These three broad aims allow a simpler categorisation of adaptation options and an easier communication to stakeholders. We are thus developing and organising our policy adaptation scenarios around these categories.

Well-developed theoretical constructs already exist to allow us to explore the three aims of adaptation in more detail. To better understand the first aim, addressing the drivers of vulnerability, the

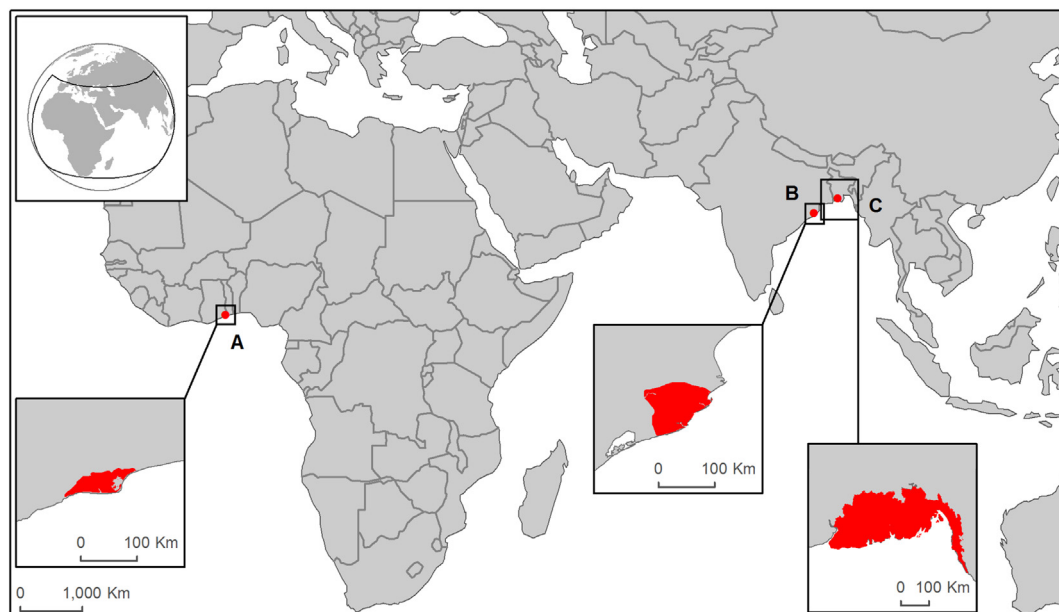


Fig. 1. Map of the DECCMA study deltas (A: Volta Delta, Ghana; B: Mahanadi Delta, India; C: Ganges-Brahmaputra-Meghna (GBM), India and Bangladesh).

Download English Version:

<https://daneshyari.com/en/article/8860238>

Download Persian Version:

<https://daneshyari.com/article/8860238>

[Daneshyari.com](https://daneshyari.com)