

A scenario framework to explore migration and adaptation in deltas: A multi-scale and participatory approach

A.S. Kebede^{1*}, R.J. Nicholls¹, A. Allan², I. Arto³, I. Cazcarro³, J.A. Fernandes⁴, C.T. Hill⁵, C.W. Hutton⁵, S. Kay³, J. Lawn¹, A.N. Lazar¹, I. Macadam⁶, M. Palmer⁶, P.W. Whitehead⁷

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

² Centre for Water Law, Policy, and Science, University of Dundee, Dundee DD1 1HN, UK

³ Basque Centre for Climate Change, Alameda Urquijo 4, 48008, Bilbao, Spain

⁴ Plymouth Marine Laboratory, Prospect Place, The Hoe, Plymouth PL1 3DH, UK

⁵ Geography and Environment, University of Southampton, Southampton SO17 1BJ, UK

⁶ School Met Office, FitzRoy Road, Exeter EX1 3PB, UK

⁷ School of Geography and the Environment, University of Oxford, South Parks Road, Oxford OX1 3QY, UK

* Corresponding author – Email: ask2g08@soton.ac.uk; Tel: +44 (0) 23 8059 4796

Abstract:

Coastal deltas are home for over 500 million people globally, and they have been identified as one of the most vulnerable coastal environments during the 21st century. They are susceptible to multiple climatic (e.g., sea-level rise, storm surges, change in temperature and precipitation) and socio-economic (e.g., human-induced subsidence, population and urbanisation changes, GDP growth) drivers of change. These drivers also operate at multiple scales, ranging from local to global and short- to long-term. This highlights the complex challenges deltas face in terms of both their long-term sustainability as well as the well-being of their residents and the health of ecosystems that support the livelihood of large (often very poor) population under uncertain changing conditions. A holistic understanding of these challenges and the potential impacts of future climate and socio-economic changes is central for devising robust adaptation policies. Scenario analysis has long been identified as a strategic management tool to explore future climate change and its impacts for supporting robust decision-making under uncertainty.

This research presents the overall scenario framework, methodology, and processes adopted for the development of scenarios in the DECCMA¹ project. DECCMA is analysing the future of three deltas in South Asia and West Africa: (i) the Ganges-Brahmaputra-Meghna (GBM) delta (Bangladesh/India), (ii) the Mahanadi delta (India), and (iii) the Volta delta (Ghana). This includes comparisons between these three deltas. Hence, the scenario framework comprises a multi-scale hybrid approach, with six levels of scenario considerations: (i) global (climate change, e.g., sea-level rise, temperature change; and socio-economic assumptions, e.g., population and urbanisation changes, GDP growth); (ii) regional catchments (e.g., change in river flow), (iii) regional seas (e.g., fisheries), (iv) regional politics (e.g., transboundary issues), (v) national (e.g., socio-economic factors), and (vi) delta-scale (e.g., future adaptation and migration policies) scenarios. The framework includes and combines expert-based and participatory approaches and provides improved specification of the role of scenarios to analyse the future state of adaptation and migration across the three deltas. It facilitates the development of appropriate and consistent endogenous and exogenous scenario futures: (i) at the delta-scale, (ii) across all deltas, and (iii) with wider climate change, environmental change, and adaptation & migration research.

Key words: *Coastal deltas, sea-level rise, migration and adaptation, multi-scale scenarios, participatory approach*

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