

Addressing Challenges of Coastal Communities through Ocean Research for Developing Economies (ACCORD)



Kevin Horsburgh, Stephen Widdicombe, Jeremy Blackford, Caroline Hattam, Ana de Moura Queiros, Jose Fernandes, Icarus Allen, Angus Best, **Lucy Bricheno**, Douglas Connelly, Jason Holt, Veerle Huvenne, Svetlana Jevrejeva, Bramley Murton, Jeff Polton, Ekaterina Popova, James Harle, Jennifer Brown, Francisco Mir Calafat, Joanne Williams, Simon Williams, Angela Hibbert



Case Study: Fisheries in the Western Indian Ocean



This case study focuses on the highest density of Lowest Developed Countries in the Indian Ocean — a region where 60 M people are directly dependent on the ocean for their food and livelihoods. The two main challenges are:

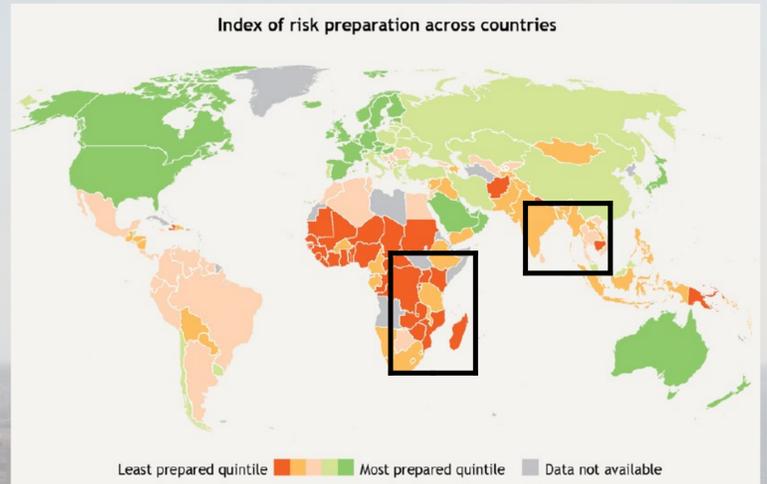
1. Over-exploitation, habitat destruction, and a changing ocean threaten ecosystem health & livelihoods.
2. Poor coastal communities have low adaptive capacity.



Untangling crisis!

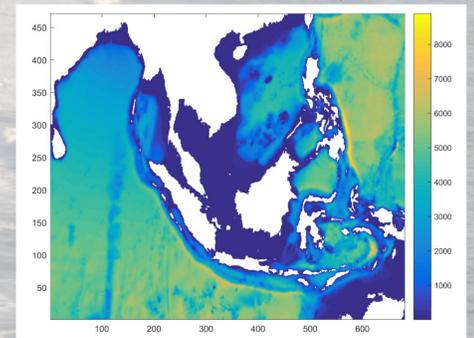
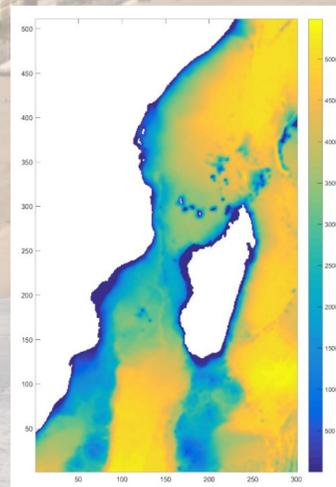


Figure: Adapted from the 2014 World Development Report (World Bank, 2013). Boxes indicate our two regional foci



Scientific Objectives

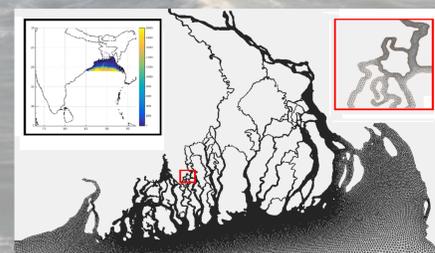
- Objective 1:** Develop and provide novel tools and approaches that improve the ability to quantify and predict the impacts of environmental stress (natural and man-made) on ecosystem function, identifying asset vulnerability and resilience. (Delivered by WP1, WP2, WP7 and WP8)
- Objective 2:** Increase the efficiency and cost-effectiveness of seabed mapping to quantify the potential for exploitation of both living and non-living seafloor resources and identify the processes that underlie the maintenance and sensitivity of those resources. (Delivered by WP2 and WP3)
- Objective 3:** Provide a consistent national and regional framework for holistic analysis of coastal flood hazard and understanding future flood risk (Delivered by WP1, WP2, WP4 and WP8)
- Objective 4:** Develop techniques by which the multiple impacts of climate change on the health, function and value of key Blue Carbon habitats can be quantified and managed alongside local sourced anthropogenic stressors. (Delivered by WP1, WP2 and WP5)
- Objective 5:** Understand and quantify the impact of climate change and local stress on the viability and value of commercial shellfish and fin fish resources. (Delivered by WP1, WP2, WP6 and WP8)
- Objective 6:** Understand the contrast between direct anthropogenic and climatic pressures across the two study regions and identify where adaptive management of local activities and impacts can ameliorate the impacts of climate change on key ecosystem services and maximise sustainable use of marine resources. (Delivered by WP1, WP2, WP5, WP6 and WP7)
- Objective 7:** To apply ACCORD outputs to promote the welfare and economic development of DAC list countries in SE Asia and the Western Indian Ocean (All WP, CfD).



Modelling Approach

- New ODA- National Capability Project with a big modelling focus
- Providing marine information and understanding to support Blue Economic growth and adaptation to sea level hazards
- Needs to deliver in 3-year project
- A small number of large scale domains
- ~1/36° NEMO-ERSEM, with tides and hybrid coordinates
- Boundary conditions and other analysis from ORCA025 and/or ORCA0083
- Still needs an efficient configuration approach

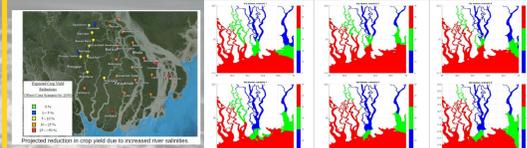
Case Study: Water Quality in Bangladesh



Environmental Science: Process & Impacts
 Modelling the increased frequency of extreme sea levels in the Ganges-Brahmaputra-Meghna delta and its impact on the delta and other effects of climate change

Tidal intrusion within a mega delta: an unstructured grid modelling approach.
 L. Bricheno, J. Wolf, A. K. M. Saiful Islam. ECS, 2016

FVCOM projections of future salinity



Winner of 2015 ARCHER IMPACT AWARD



Stakeholder Engagement

In March, NOC and the Bangladesh University of Engineering and Technology (BUET) ran a stakeholder workshop in Dhaka, Bangladesh for 50 participants from 21 institutions entitled "Identifying Challenges of Coastal Communities in Bangladesh"

We identified six main science themes which are key to the Ganges-Brahmaputra-Meghna delta, and Bangladesh more widely.

- Sediment and geomorphology
- Fishery and marine resource biodiversity
- Data collection
- Salinity and water quality
- Coastal flood risk and resilience
- River Basing Management and connection network

These themes were discussed in break-out groups, in order to identify routes from science into policy.