

Interdisciplinary modelling for pro-poor policy-making: experience from Bangladesh

How natural and social science researchers are working with government and civil society partners to explore development scenarios on Bangladesh's coast, as they seek to adapt to the effects of climate and other changes.

Summary

The ESPA Deltas project (www.espadeltas.net) undertook an ambitious, interdisciplinary study to understand the ecosystems of coastal Bangladesh and the lives of the millions of people who benefit from them. A key aim was to make the findings available to decision-makers who are seeking to protect and improve the livelihoods and wellbeing of the people who live in this dynamic delta environment. The project's many findings have been integrated into a sophisticated model, the Delta Dynamic Integrated Emulator Model (Δ DIEM). The ESPA Deltas team is now working with the Planning Commission of the Government of Bangladesh to use the Δ DIEM to assess the diverse impacts of development options being considered as part of the Bangladesh Delta Plan 2100.¹ These options include a strengthened sea wall and a new mangrove 'buffer' zone. Such simulations can identify trade-offs, and so benefit decision-making processes. The Deltas project approach could be adapted for informing pro-poor policies elsewhere in Bangladesh and, indeed, in other delta regions in the world.

The research

The Ganges-Brahmaputra-Meghna delta covers most of Bangladesh and parts of West Bengal in India and has a population exceeding 100 million. The ESPA Deltas study area took place in the seaward part of the delta in Bangladesh, south of Khulna and west of the Meghna River to the Indian border. This is a densely populated region and, although it has fertile soil and productive fisheries, there is significant and widespread poverty. Rural livelihoods are inextricably linked with the natural ecosystems, which are endangered by long-term environmental change including rising salinity, subsidence, sea-level rise and storm surges. The ESPA Deltas project considered the broad range of pressures facing the people of the delta, for example from unreliable supplies of clean water, increasing salinisation of soils, land-use change, migration, food pricing and cyclones.

The researchers collected and analysed socioeconomic data, including an innovative household survey. This ran in parallel to a major effort to analyse and simulate a range of biophysical and socioeconomic processes including sedimentary and morphodynamic (landscape) and hydrological processes. The team studied specific

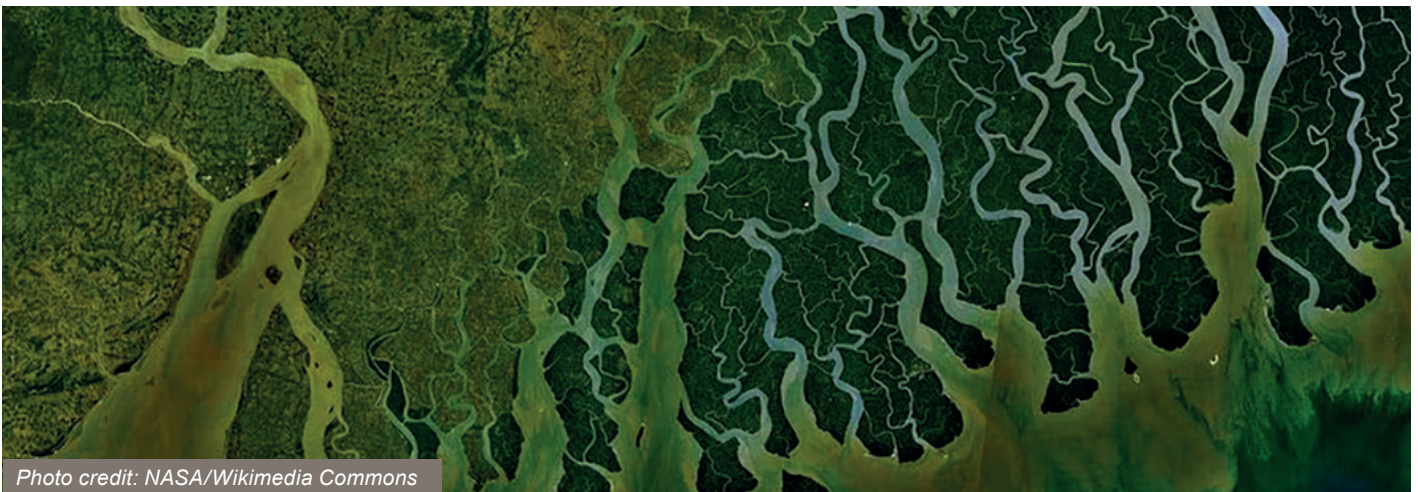


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¹ <http://www.bangladeshdeltaplan2100.org>

ecosystem services such as fisheries and agricultural crops, and developed scenarios for how these would be affected by different plausible climate and development trajectories, allowing different large-scale development choices to be considered.

Incorporating stakeholder views and understanding of how legal, institutional and policy frameworks connect ecosystem services and poverty alleviation was fundamental to the team's work. The researchers took account of stakeholder priorities and knowledge, and these issues informed the scenario development process.

The findings show that ecosystem services remain essential to the baseline wellbeing of the people of coastal Bangladesh. However, they rarely provide the impetus for substantive wealth creation.

As such, ecosystem services can be thought of as a welfare safety net that prevents destitution as opposed to a mechanism to alleviate poverty. Yet access to these services are diminishing for the poor.

The status of the rural poor is not simply coupled to national growth. For example, increased land prices as the result of enhancing coastal land with polders can mean the poorest people are barred from accessing what had been common resources. Neither does adaptation always benefit the poorest. For example, shrimp farming introduced in some areas as an adaptation to increasing salinity has had some negative environmental impacts, provides much lower levels of employment than traditional land uses such as paddy rice, and displaces poor farmers.



From this broad range of emerging knowledge, Deltas developed an integrated framework that describes the linkages and drivers between the Ganges-Brahmaputra-Meghna delta environment, the ecosystem services it supports, and the poverty, health and livelihoods of the delta's population. In particular, the team was interested in who would benefit from the different pathways offered by different interventions, as well as the integrity and future of the ecosystems themselves.



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ΔDIEM in action

The ΔDIEM is distinct in linking biophysical, socioeconomic and governance processes to consider a range of plausible futures. Given a particular development trajectory or intervention, it can assess the resulting range of impacts of change over time on the livelihoods and wellbeing of the people of the Ganges-Brahmaputra-Meghna delta, from a regional-level scale down to the lowest administrative tier (Union level, some 20,000 people), and for every year up to 2050 (2100 for biophysical change only). It can consider a wide range of environmental changes, natural hazards and climate change, and policy interventions, in varying permutations.

The ΔDIEM is currently being used to test the following potential interventions identified by the Planning Commission of the Government of Bangladesh and in line with the aims of the Bangladesh Delta Plan 2100:

- Creating mangrove forest strips along exposed coast.
- Erecting a new sea wall of some 3 metres-plus, by merging and strengthening existing coastal-facing dykes.
- Developing a new network of polders in Barisal and Jhalokati district. Polders are low-lying tracts of land enclosed by earthen embankments and are the traditional means to keep back annual river flooding and storm surges, but none currently exist in this area.

At the request of the Government of Bangladesh, worst-case scenarios are being considered, specifically a 148cm sea-level rise by the end of the century and higher levels of monsoon rainfall than at present. The results are expected to be available in early 2018.



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The livelihoods of people living in the Bangladesh delta are very vulnerable to natural hazards and climate change ... Adequate research and knowledge generation are important to take evidence-based decisions for development projects to improve the livelihoods of the people in the delta region.



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Next steps

The ESPA Deltas project identified three key challenges for coastal Bangladesh over the coming 30 years: the continued potential decline in ecosystem services; persistent poverty; and the impacts of and society's adaptive responses to climate change. These challenges and responses will shape the development trajectory of the region.

The ΔDIEM is offering decision-makers in Bangladesh a way of testing policy options against the available evidence, helping the country meet its own poverty alleviation goals as well as its international obligations under the Sustainable Development Goals (SDGs).

At a broader level, the ESPA Deltas project demonstrates the potential for applying participatory methods, interdisciplinary research and science-policy dialogue to benefit policy-making under conditions of uncertainty and in which there are many drivers of change. This approach is not only relevant to the study area, but could also be extended to other areas of Bangladesh and has the potential to be adapted for other delta regions of the world.

Further information

The ESPA Deltas project is a joint effort of:

Bangladesh partners

Bangladesh University of Engineering and Technology
Bangladesh Institute of Development Studies
Institute of Livelihood Studies
Ashroy Foundation
International Centre for Diarrhoeal Disease Research, Bangladesh
Center for Environmental and Geographic Information Services (CEGIS)
Bangladesh Agricultural University
Bangladesh Agricultural Research Institute (BARI)
Technological Assistance for Rural Advancement (TARA)
International Union for Conservation of Nature (IUCN)
Dhaka University
Water Resources Planning Organization (WARPO)

India partners

Jadavpur University

UK partners

University of Southampton
University of Dundee
University of Exeter
University of Oxford
National Oceanography Centre
Plymouth Marine Laboratory
Hadley Centre MET Office

For more information:

www.espadelta.net



Photo credit: DFID / Rafiqur Rahman Raqu



Policy-makers and researchers worked together in this project in an interactive way.



References

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