Assessing Health, Livelihoods, Ecosystem Services and Poverty Alleviation in Populous Deltas: the ESPA Delta Project

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ESPA Deltas Presentations/Posters

1. Nicholls et al, Assessing health, livelihoods, ecosystem services and poverty alleviation in populous deltas
2. Lazar et al, Integration of bio-physical and livelihood dynamics for analysis of poverty in coastal Bangladesh
3. Lim et al, The disaster management governance framework of Bangladesh, a model of good practice?
4. Fernandes et al, Projecting fish production in Bangladesh under climate change
5. Whitehead et al, Modelling Impacts of Climate Change and Societal Change on flows and nutrients in the GBM Delta of Bangladesh
6. Hutton et al, Spatial Modelling of the Association between Agricultural Land Use and Poverty in the Ganges-Brahmaputra Delta
7. Bricheno et al, River salinity on a mega-delta, an unstructured grid model approach
8. Huq et al, Contested Governance of Ecosystem Services for Poverty Alleviation in Southwest Bangladesh
9. Huq et al, Livelihoods in transformed floodplain: A case of flood polder in southwest Bangladesh
10. Salehin et al, Spatial variation in soil salinity in relation to hydro-climatic factors in southwest coastal Bangladesh
11. Caesar et al, High-resolution climate change projections for Bangladesh
12. Adams et al, Drivers, constraints dynamics of wellbeing from ecosystem services in the deltaic environments of Bangladesh
13. Mukhopadhyay et al, Dynamics of the tidal creeks of Bangladesh Sundarban: An indicator of Sea Level Rise?
14. Hazra et al, Erosion and submergence of New Moore Island from Sundarban delta
16. Sarker et al, Assessing the rate of subsidence in the Bengal Delta
17. Lim et al, Multi-scale governance of ecosystem services and poverty in the GBM Delta - the Resilience Challenge
Presentation overview

• Introduction
• The ESPA Deltas concept
• Current activities
• Conclusions

Nile delta
 Threatened Deltas

Population potentially displaced by current sea-level trends to 2050

Source: IPCC AR4 using data in Ericson et al. (2006)

Potential impact of sea-level rise on Bangladesh

Today
Total population: 112 Million
Total land area: 134,000 km²

1.5 m - Impact
Total population affected: 17 Million (15%)
Total land area affected: 22,000 km² (16%)

Source: UNEP/GRID-Davos; University of Oxford; JRD Marsitch; The World Bank; World Resources Institute. Washington D.C.
Lecture 4. Climate change and the integrated coastal system. Wednesday 25 July 2007

River Floods/ Sediment Supply

Climate Variability

Sedimentation, Tectonics, Subsidence,

NATURAL PROCESSES

Cyclones/ Marine Processes

HUMAN 'PROCESSES'

River Floods/ Sediment Supply
Changing Land Use/Catchment Management

Climate Variability

Sedimentation, Tectonics, Subsidence,
Growing Population and Economy

NATURAL PROCESSES

Cyclones/ Marine Processes

Multiple Scales in the GB Delta

'Global Climate Change'
Key Trends in the delta plain

- Growing populations;
- Rising wealth and improving health, but questions of inequality;
- Changing livelihoods and migration;
- Urbanisation and infrastructure expansion;
- Intensification of agriculture;
- Increasing demand for flood management;
- Increased water demand.

ESPA Deltas: Overall Aim

To provide policy makers with the knowledge and tools to enable them to evaluate the effects of policy decisions on ecosystem services and people's livelihoods in coastal Bangladesh.
The Delta
ESPA Delta: Project Aims

- To understand the present relationship between ecosystem services and human well-being and health.
- To predict how these ecosystem services might evolve over the coming years and decades (up to 100 years) [Timeframe of the Bangladesh Delta Plan]
- To analyse how policy can influence these outcomes and promote ecosystem services and human well-being and health.
- To select robust policies that are effective across the range of uncertainty.
- Using participatory approaches.

Project Structure
Scales and project elements

Endogenous governance
(BD policies, laws, subsidies, flood protection, education system, ...)

Exogenous drivers
(upstream flow diversion, climate change, macro-economics, ...)

Bay of Bengal

Sundarbans

GBM River Basin

Land use / Land Cover

char land

agriculture

settlements

inland fisheries

off-shore fisheries

Morphodynamics

Bay of Bengal

Livelihood & land use

demography
incl. migration
markets
security
(financial, environmental)
livelihood & poverty

Project elements

Climate

HadRM3/PRECIS

Sea level, SLP, SST, winds

Bay Bengal:

GCOMS

Supporting Services

Upstream Basin:

GWAVA / INCA

MODEFLOW

HydroTrend

Temp, rainfall, PE, etc.

Delta Plain

FVCOM, Delft3D

MODEFLOW

Water, sediment, nutrients

Regulating Services

Morphology

Land Cover

Land Use

Primary productivity,
T, S, O₂, currents

Provisioning Services

Agriculture

CROPWAT

Aquaculture

Mangrove

Coastal Fisheries

Size- & Species-based models

Inland Fisheries

Quantitative Physical/Ecological Models

Laws, policies:
Gaps, Conflicts,
Implementation efficiencies

Stakeholder engagement:
Key Issues, Scenarios

Governance research

Knowledge integration
Scenario development & quantification

Qualitative household survey (ES vs. livelihoods)

Quantitative household survey (consumption, assets, employment, migration, health, poverty, ...)

Statistical Associative model

(land use, environment, socio-economy, census)

Population projections

Economic analysis & modelling

Demographics, economics & poverty
Key Activities 1

• Top 10 issues (from stakeholders)
• Conceptualisation of the human-ecosystem service relationships
• Analysis of existing data – e.g. census and land use
• Social survey based on social-ecological zones
• Biophysical analysis across scales (Catchments, Bay of Bengal, delta plain)

Key Activities 2

• Scenario development
  – Exogeneous (experts, models) and endogeneous (stakeholder led)
• Integrated model development
  – Delta Dynamic Integrated Emulator Model – ΔDIEM
• Active stakeholder engagement with a range of national stakeholders, especially the General Economics Division, Planning Commission of the Bangladesh government
Summary

• ESPA Deltas is developing a multi-faceted assessment approach for deltas
• Brings together diverse engineering, natural and social science perspectives within an integrated framework
• Taking a strongly participatory approach (with the policy community)
• This is designed to leave a legacy of effective planning and analyses tools and methods in Bangladesh
• Project concludes in 2016
• Many other talks will give more details at the Rotterdam meeting
ESPA Deltas Presentations

Lazar et al, Integration of bio-physical and livelihood dynamics for analysis of poverty in coastal Bangladesh (DD 11.3)

Lim et al, The disaster management governance framework of Bangladesh, a model of good practice? (DD 8.1)

Fernandes et al, Projecting fish production in Bangladesh under climate change (DD 4.2)

Whitehead et al, Modelling Impacts of Climate Change and Societal Change on flows and nutrients in the GBM Delta of Bangladesh (DD 3.1)

Salehin et al, Spatial variation in soil salinity in relation to hydro-climatic factors in southwest coastal Bangladesh (DD 4.6)

Caesar et al, High-resolution climate change projections for Bangladesh

Adams et al, Drivers, constraints dynamics of wellbeing from ecosystem services in the deltaic environments of Bangladesh (DD 6.1)

Sarker et al, Assessing the rate of subsidence in the Bengal Delta (DD 1.9)

Lim et al, Multi-scale governance of ecosystem services and poverty in the GBM Delta - the Resilience Challenge (DD 9.5)