

SANEM Annual Economists' Conference 2017:

Managing Growth for Social Inclusion



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CLIMATE CHANGE, MIGRATION AND ADAPTATION: CHALLENGES AND WAY FORWARD FOR BANGLADESH

DEltas, vulnerability and Climate Change: Migration
and Adaptation (DECCMA)

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DECCMA

SANEM Annual Economists' Conference 2017: "Managing Growth for Social Inclusion",
February 18-19, 2017, BRAC Centre Inn, Mohakhali, Dhaka



Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA):

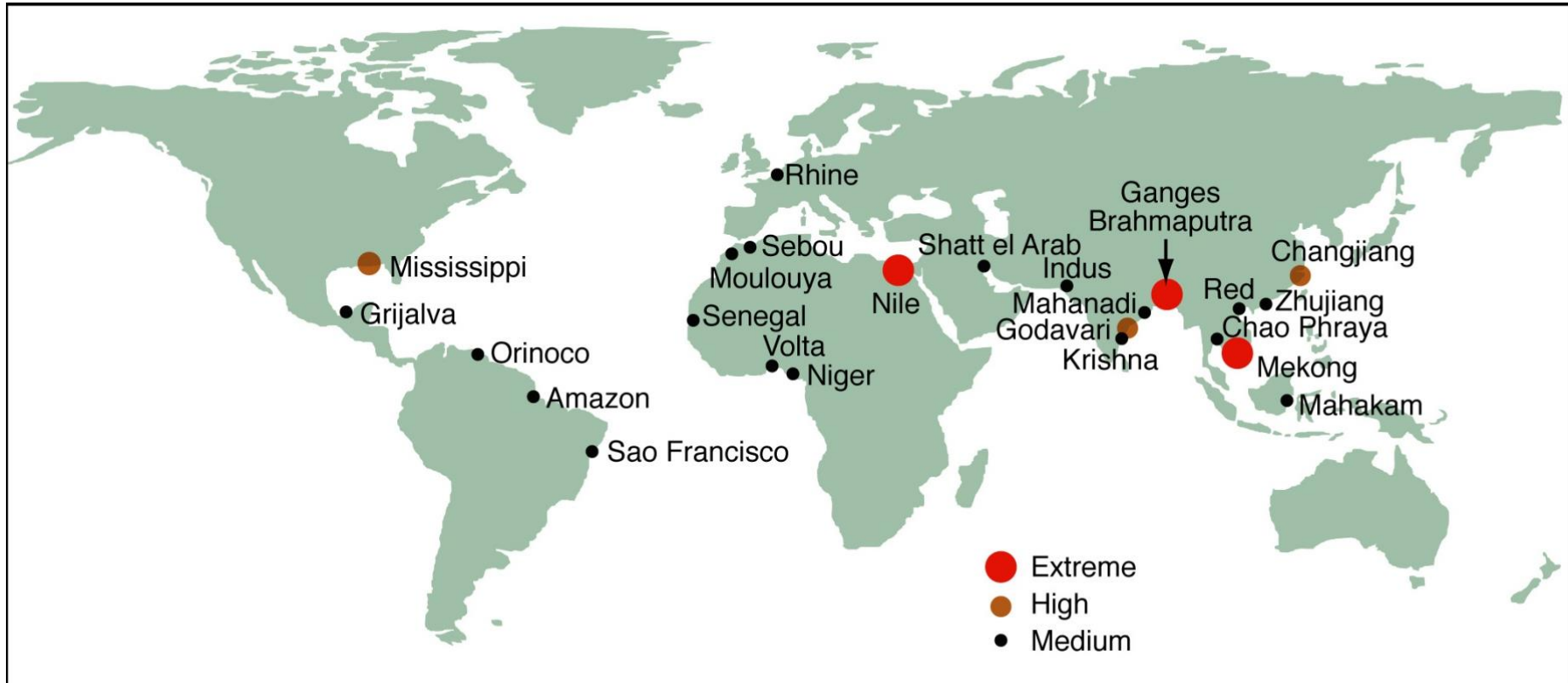
4 Consortium with 1000+ researchers at 3 CC hotspots (Snow pack (temp, snow melt), Semi-arid (Temp, rainfall) and delta (SLR, erosion, salinity, storm surge) which are home of 4 billion global population]

- ✓ Jointly funded by DFID and IDRC -- administered by IDRC, Ottawa, Canada
- ✓ Goal -- to develop robust evidence to inform how to increase the resilience of the poorest and most vulnerable populations in **climate change hot spots** in Africa and (south) Asia.
- ✓ *Objectives:*
 - (a) Generate and share new knowledge on vulnerability and adaptation in hot spots,
 - (b) Build new capacities by strengthening expertise among researchers, policymakers, and practitioners, and
 - (c) Inform better policy and practice through engagement.



Threatened Deltas: (Ericson et al.; IPCC AR4, 2007)

Population potentially would be displaced by current sea level trends to 2050



Densely Populated: Diverse livelihood opportunities (Agriculture/Fisheries/Forestry)

- ✓ Upstream exploration: Depleted water and sediment flow
- ✓ Local exploration: subsidence, loss of wetlands, and accelerated erosion
- ✓ Sea level rise: increases salinity and accelerates land loss
- ✓ Storms and cyclones: cause devastating flooding

DECCMA

(DEltas, Vulnerability and Climate Change: Migration and Adaptation)

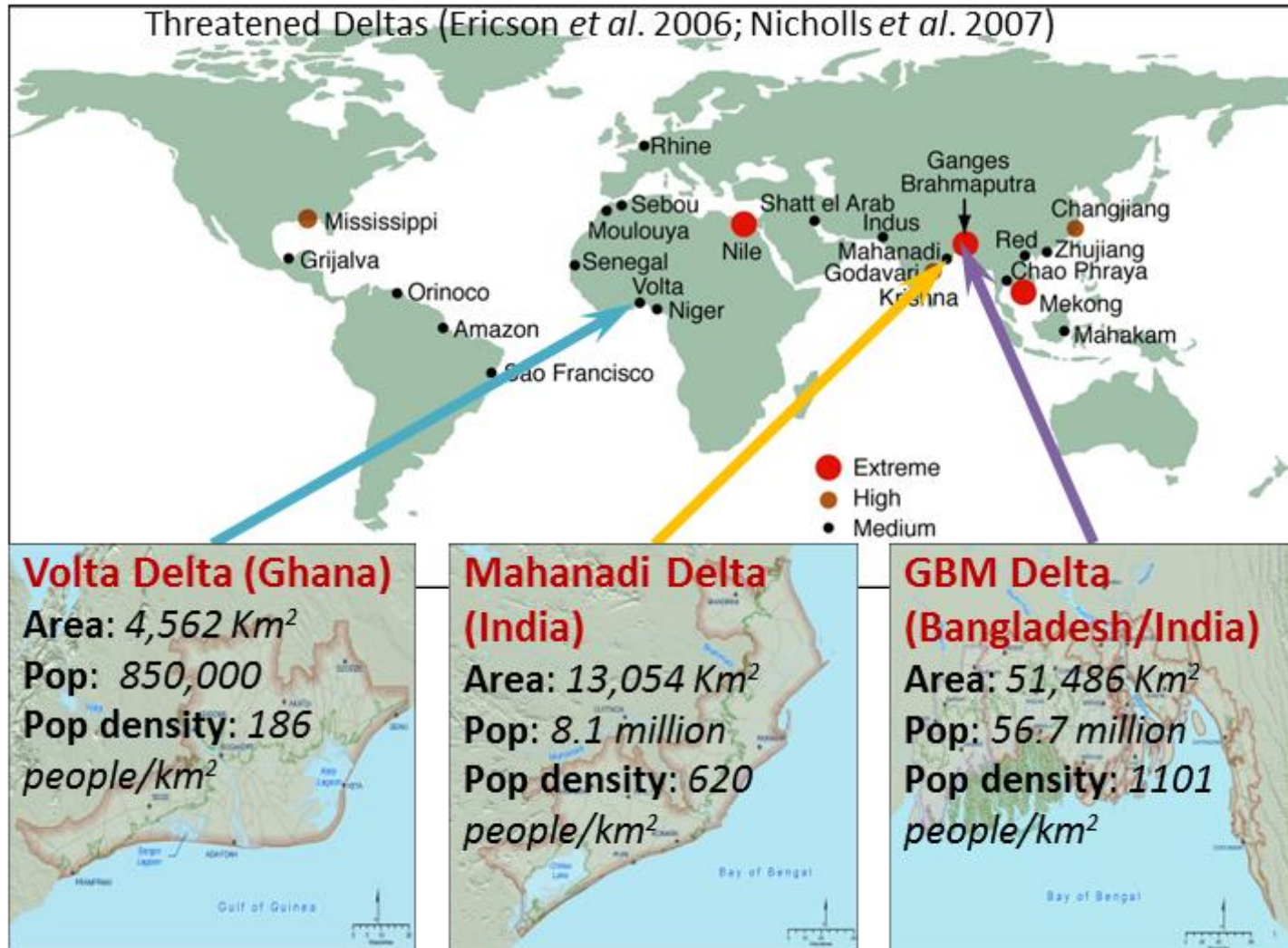
Aims

- ✓ To evaluate the effectiveness of adaptation options in deltas
- ✓ To assess migration as an adaptation in deltaic environments under a changing climate
- ✓ To deliver policy support to create the conditions for sustainable gender-sensitive adaptation

DECCMA Objectives

- ✓ To understand the governance mechanisms that promote or hinder migration of men and women in deltas
- ✓ To identify climate change impact hotspots in deltas where vulnerability will grow and adaptation will be needed
- ✓ To understand the conditions that promote migration and its outcomes, as well as gender-specific adaptation options for trapped populations, via surveys
- ✓ To understand how climate-change-driven global and national macro-economic processes impact on migration of men and women in deltas
- ✓ To produce an integrated systems-based bio-physical and socio-economic model to investigate potential future gendered migration under climate change
- ✓ To conceptualise and evaluate migration within a wide suite of potential adaptation options at both the household and delta level
- ✓ To identify feasible and desirable adaptation options and support implementation of stakeholder led gender-sensitive adaptation policy choices

DECCMA Study Sites



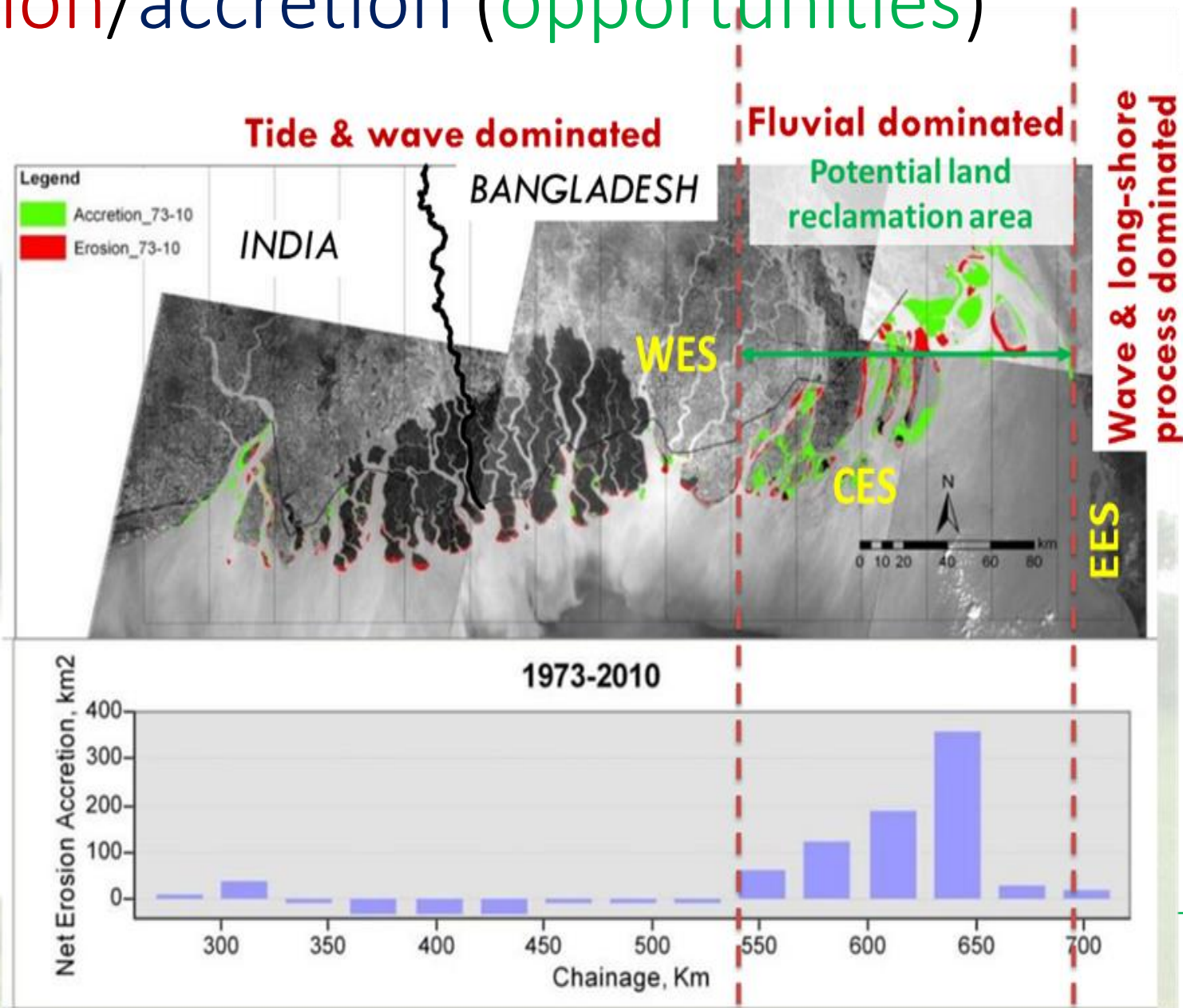
Livelihood Opportunities in GBM delta



Key Provisioning and Regulating Ecosystem Services:

- ✓ Riverine (Fisheries/Navigation)
- ✓ Forestry (livelihood/soil conservation)
- ✓ Agriculture/Aquaculture (livelihood)
- ✓ Wetlands/Floodplains (Fisheries/flood protection)
- ✓ Marine Fisheries (Livelihood)
- ✓ Mangrove (protection from flooding /sediment trap/fisheries)

Erosion/accretion (opportunities)



Challenges at Multiple Scales in the GBM Delta

HUMAN 'PROCESSES'

River Floods/ Sediment Supply
Changing Land Use/Catchment Management

People displaced by 2100 in Bangladesh
42 to 54 million (23% to 30% of total)

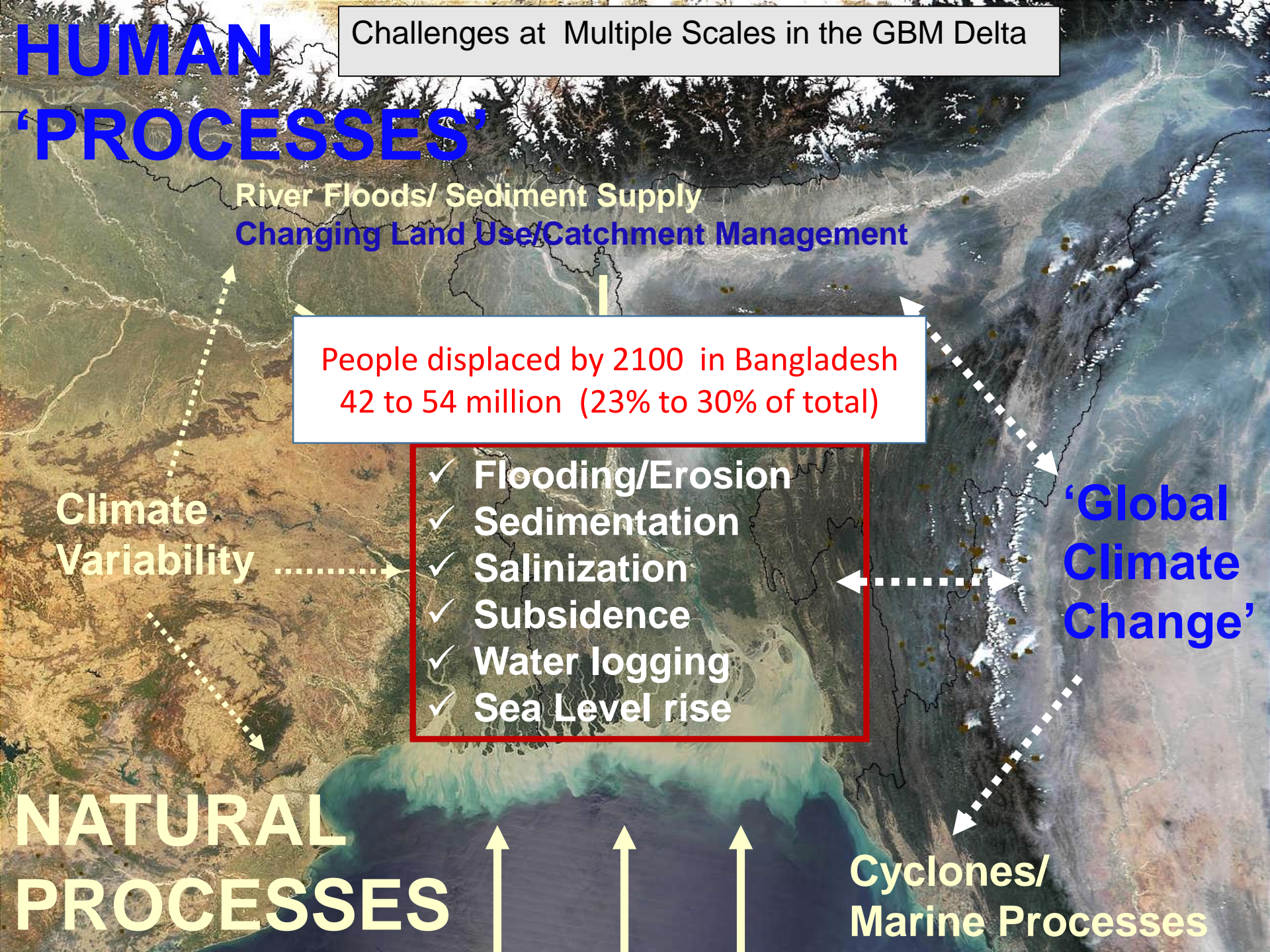
- ✓ Flooding/Erosion
- ✓ Sedimentation
- ✓ Salinization
- ✓ Subsidence
- ✓ Water logging
- ✓ Sea Level rise

Climate
Variability

'Global
Climate
Change'

NATURAL PROCESSES

Cyclones/
Marine Processes



Stakeholder Mapping

Key stakeholders

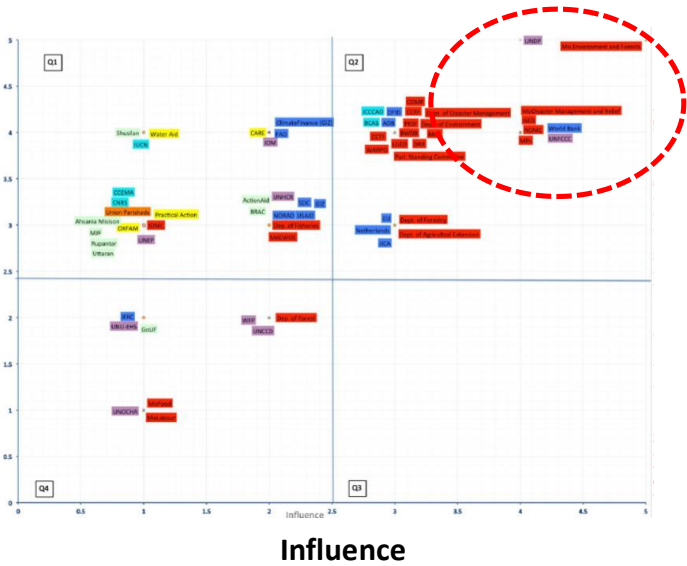
Planning Commission, MoEF, BCCT,
MoDMR/DDM, Upazila, Union
Parisad, Local stakeholder

Stakeholder engagement

National level
District level
Local level



In Khulna



At BUET



At MoDMR



Governance Analysis

Identification and review of policies and laws (more than 30) in Bangladesh based on around 70 questions over 4 broad categories (Strength and weakness):

- ✓ Human rights related to Adaptation and Safe Migration
- ✓ Natural Resources Management and Ecosystem Protection
- ✓ Disaster Risk Management / Response
- ✓ Climate Change Adaptation

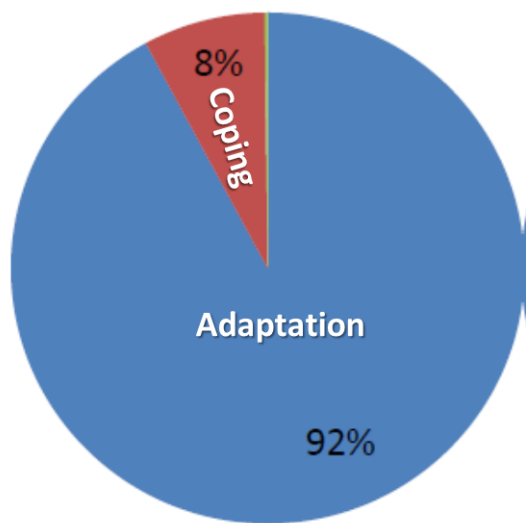
Barriers to policy implementation:

Questionnaire survey: 19 in national level; 28 at the district or local level

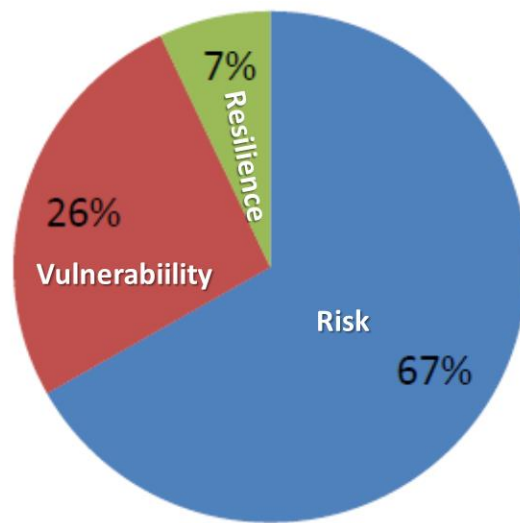
Inventory of Planned Adaptations

Objective: To Identifying and Evaluating Adaptation

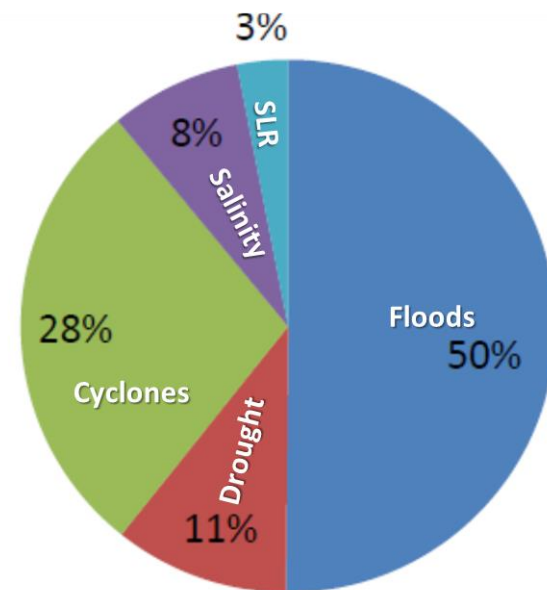
Adaptation in Government Policies



Adaptation Vs Coping



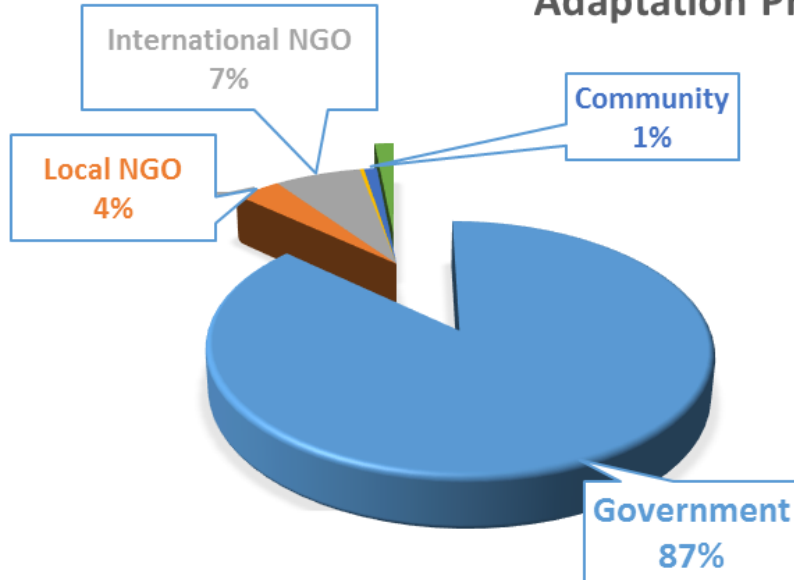
Aim of Adaptation



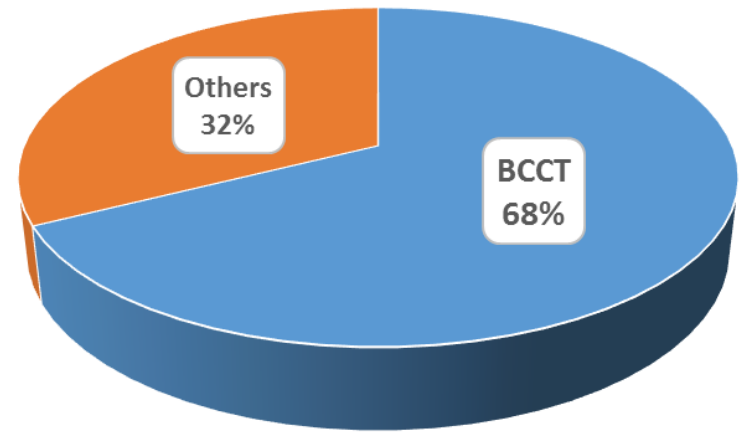
Primary Hazards targeted in Adaptation

Adaptation Inventory: Provider and Initiatives

Adaptation Provider

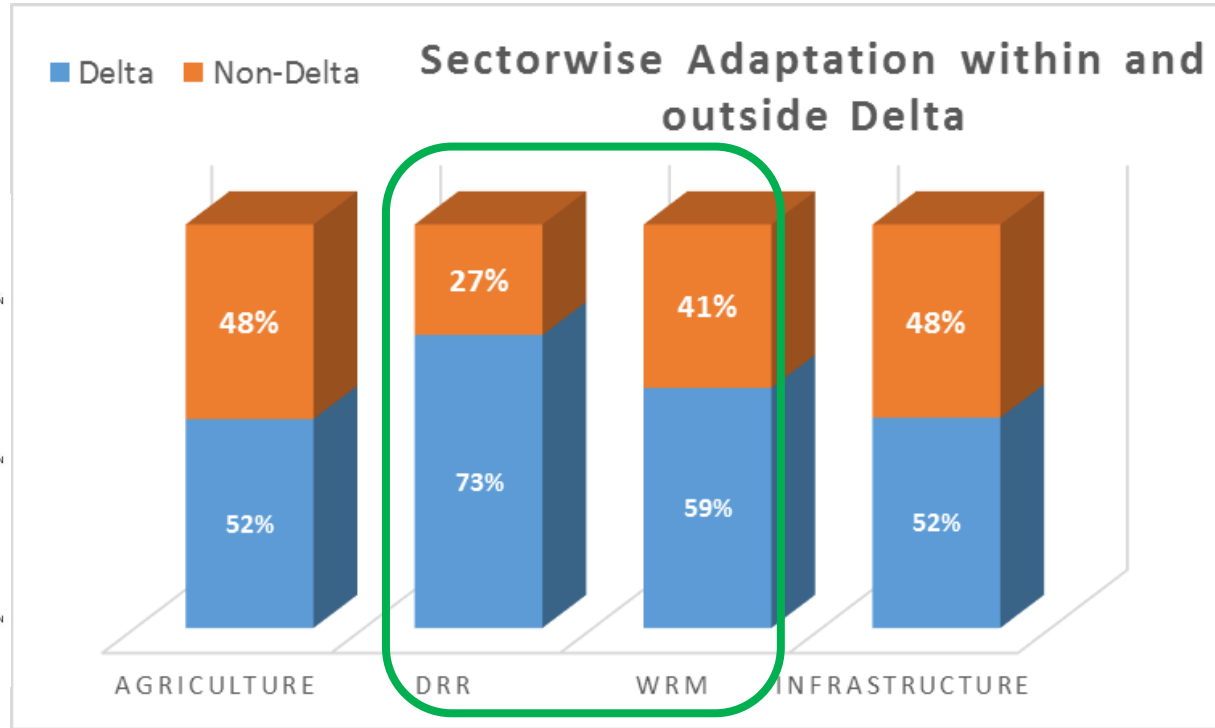
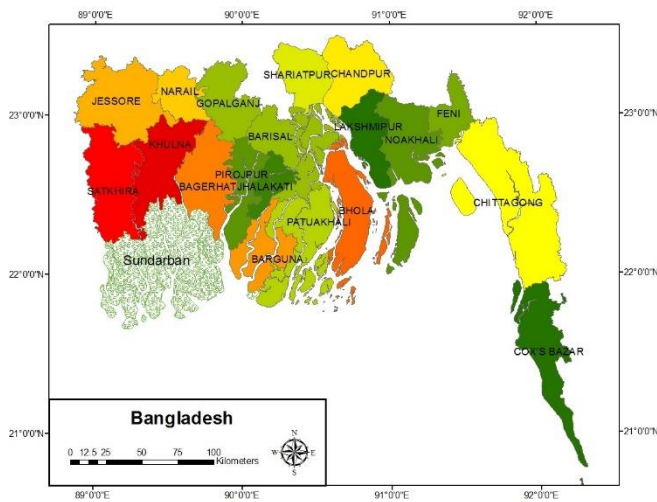


Adaptation with BCCT and other Initiatives

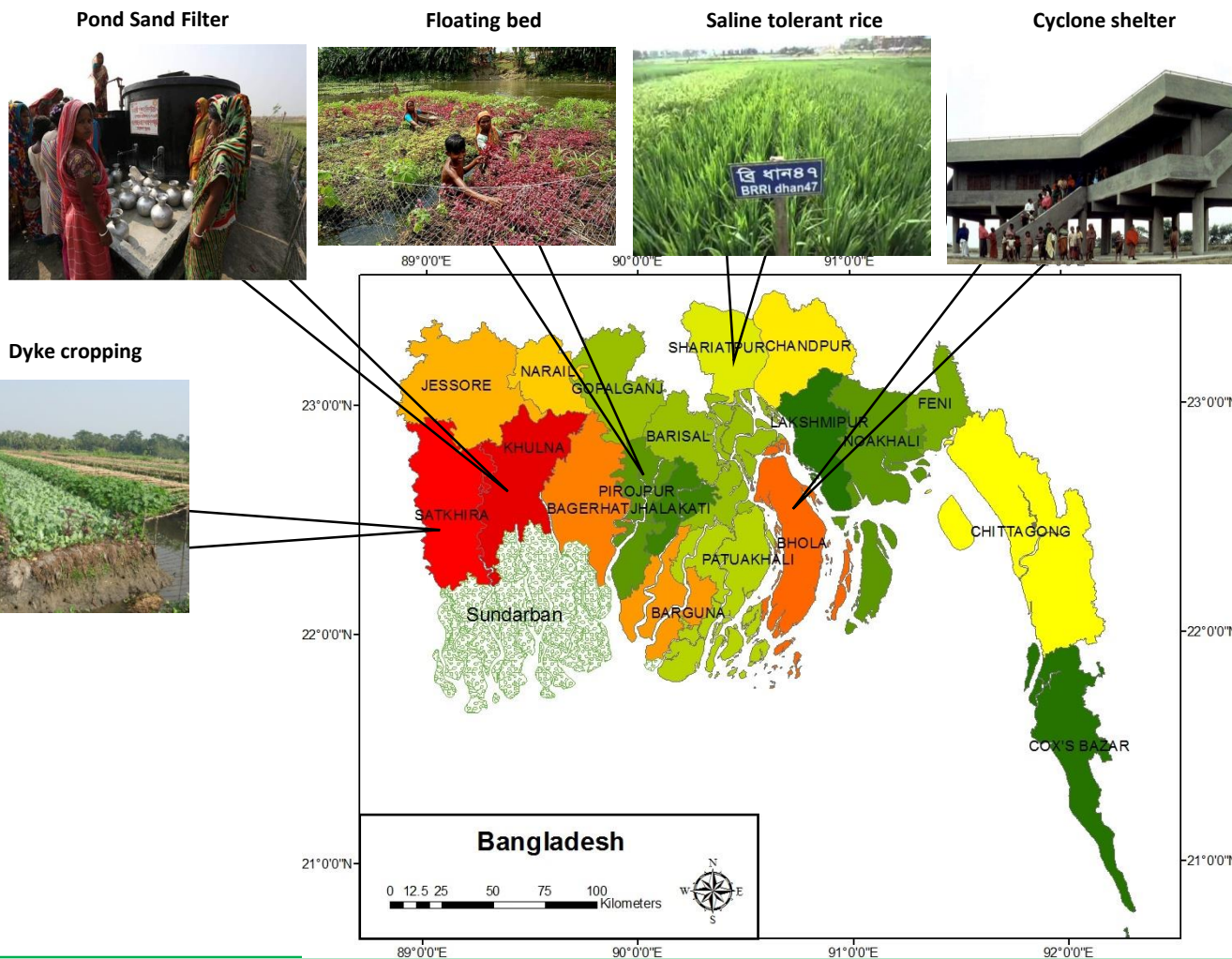


Differences in Delta and Non-Delta Initiatives

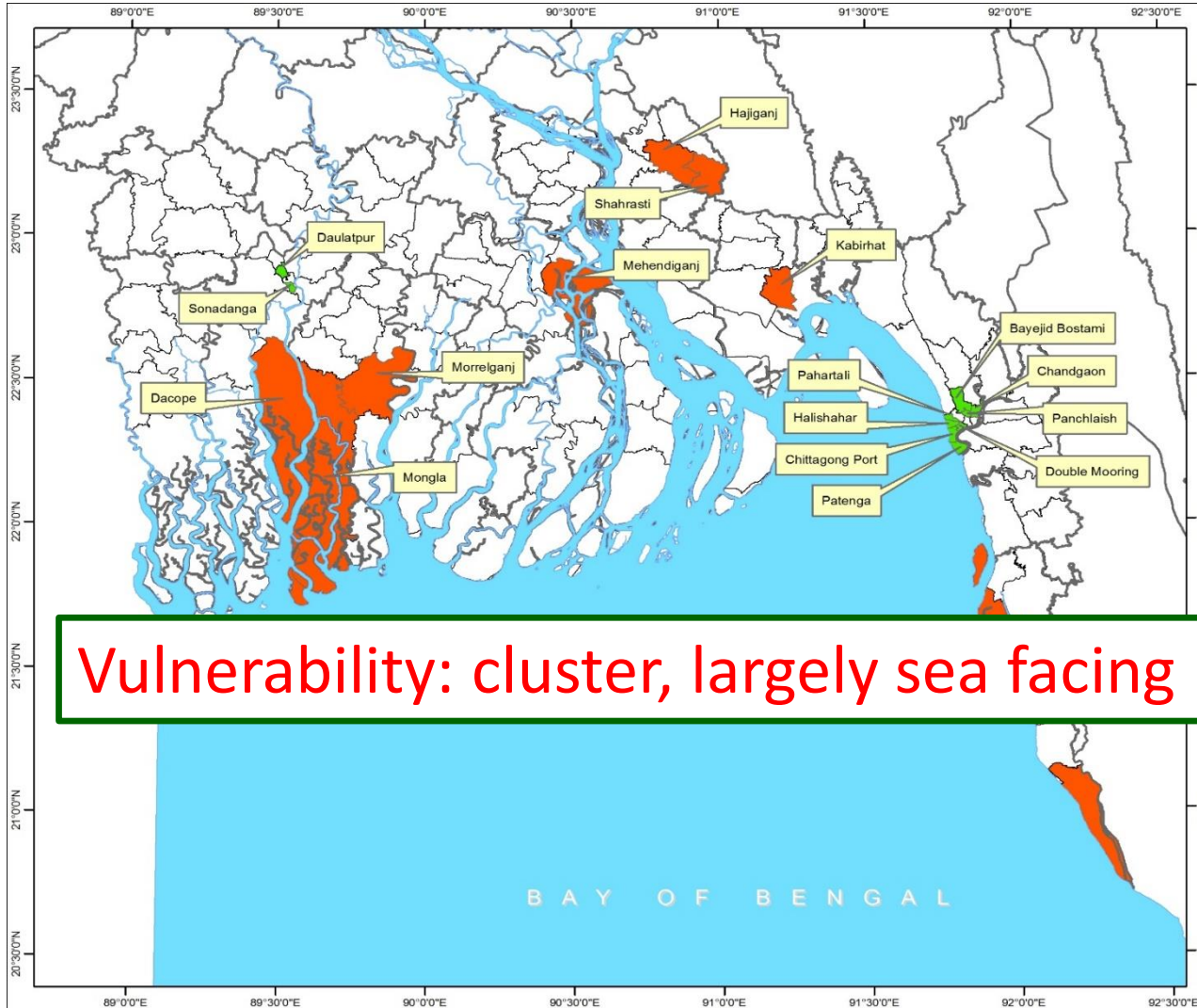
Delta Region Considered in DECCMA



Spatial Distribution of Adaptation Options in GBM Delta



Social vulnerability Assessment of the Delta (19 coastal districts)

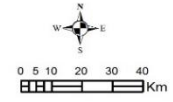


Map Showing the Most and Least Vulnerable Upazilas in Coastal Area

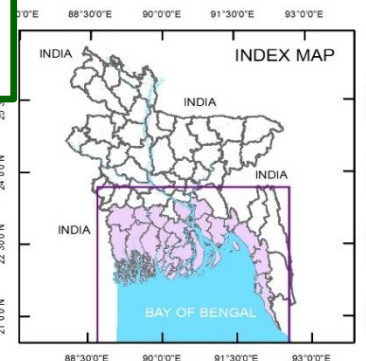
LEGEND

- River
- District Boundary
- Most Vulnerable
- Moderate Vulnerable
- Least Vulnerable

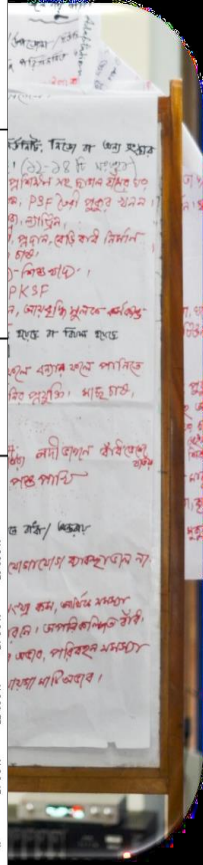
Projection:
Bangladesh Transverse Mercator (BTM)
Datum: Everest 1830



Vulnerability: cluster, largely sea facing



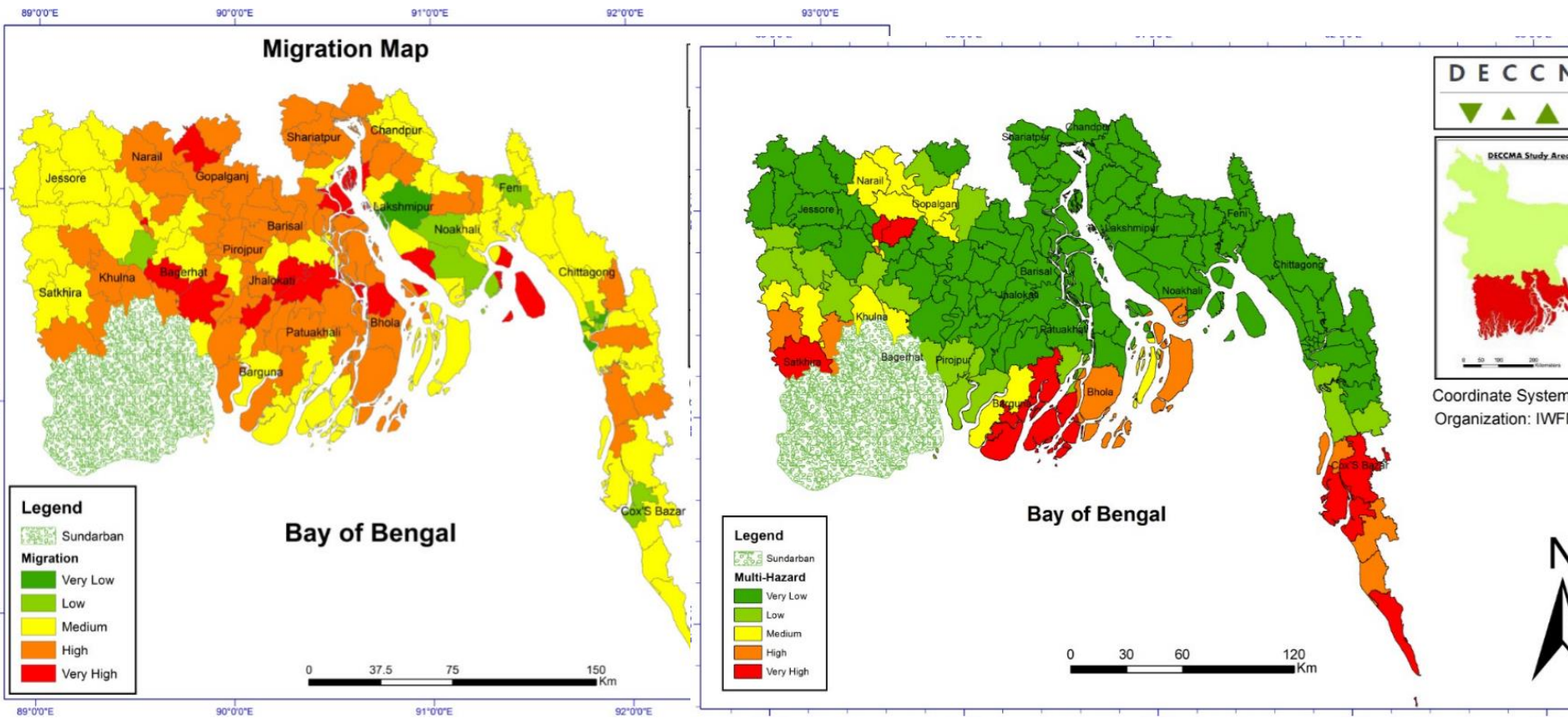
Prepared by: **CGIS** Center for Environmental and Geographic Information Services



DECCMA



Linking Multi Hazards and Migration (Census)



To understand condition for migration and autonomous adaptation: Social survey from Sending area

Study Area for GBM Delta

- 19 Coastal districts
- 153 Upazilas
- 14771 Mauzas

50 Mauzas selected based on:

- Multi-hazard category
- Settlement
- Household
- Population
- Sex ratio etc

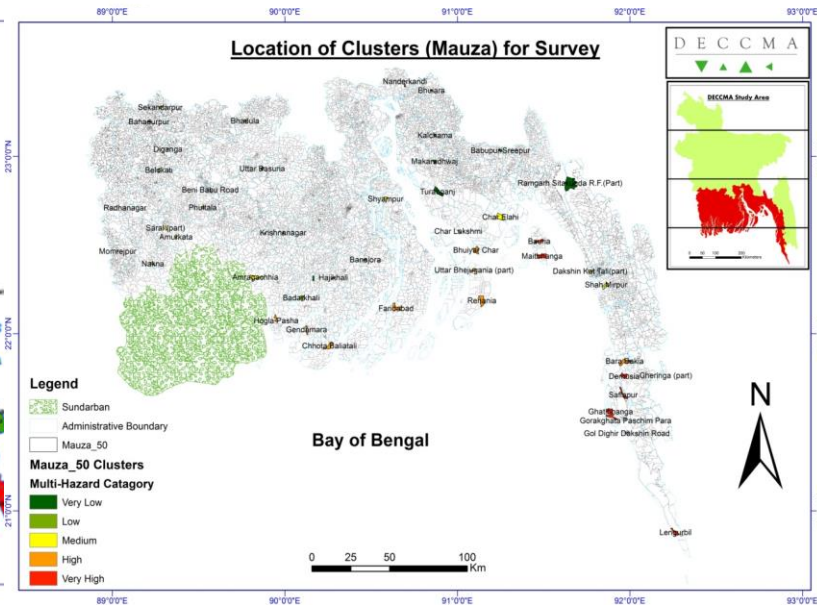
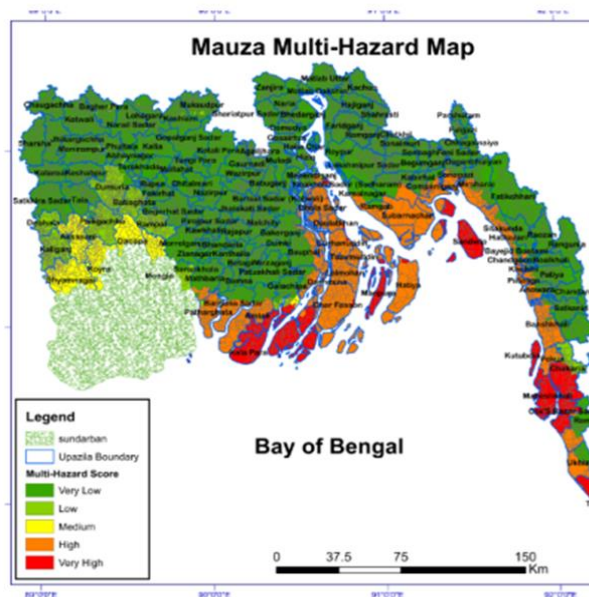
- 8 mouzas-- very high hazard
- 9 mouzas-- high hazard
- 10 mouzas-- medium hazard
- 11 mouzas-- low hazard
- 12 mouzas-- very low hazard

Selection for Survey

- ▶ 14 Coastal districts
- ▶ 41 Upazilas
- ▶ **50 Mauzas**

Each Mauza → 200 HH listed
[more than 10,000 HH in total]

Each Mauza → 30 HH selected
[1500 HH in total for survey]



Fact from Sending Area Survey

Findings

- ✓ Over the last five years altogether 663 HHs (of 1500) have sent at least one of their family members to work outside their village.
- ✓ Out of 663 HHs:
 - **More than one third of these families** assigned climate change related issues as one of the reasons for migration of their family members.
 - 48 percent assigned economic reason
 - While another 12 percent identified marriage or education as reasons behind migration.



Where do they migrate?
Around 45% to Dhaka
25% to Chittagong
7% to Khulna area

“ In the last decade number of migration has tremendously increased at the household level of Bangladesh”

“ 1/3rd of the migrants are Climate related Migrants”

Fact from Sending Area Survey

Autonomous Adaptation Practices: I

- ✓ Migration (More internal, less international)
- ✓ Tree plantation (almost in all)
- ✓ Rain water harvesting
- ✓ Solar Energy Use
- ✓ Change of Profession/Job (Less in number)
- ✓ Innovation of New Techniques
- ✓ (Resilient house making/ homestead vegetation/fish culture/backyard livestock production/cultivation of crops on dikes)

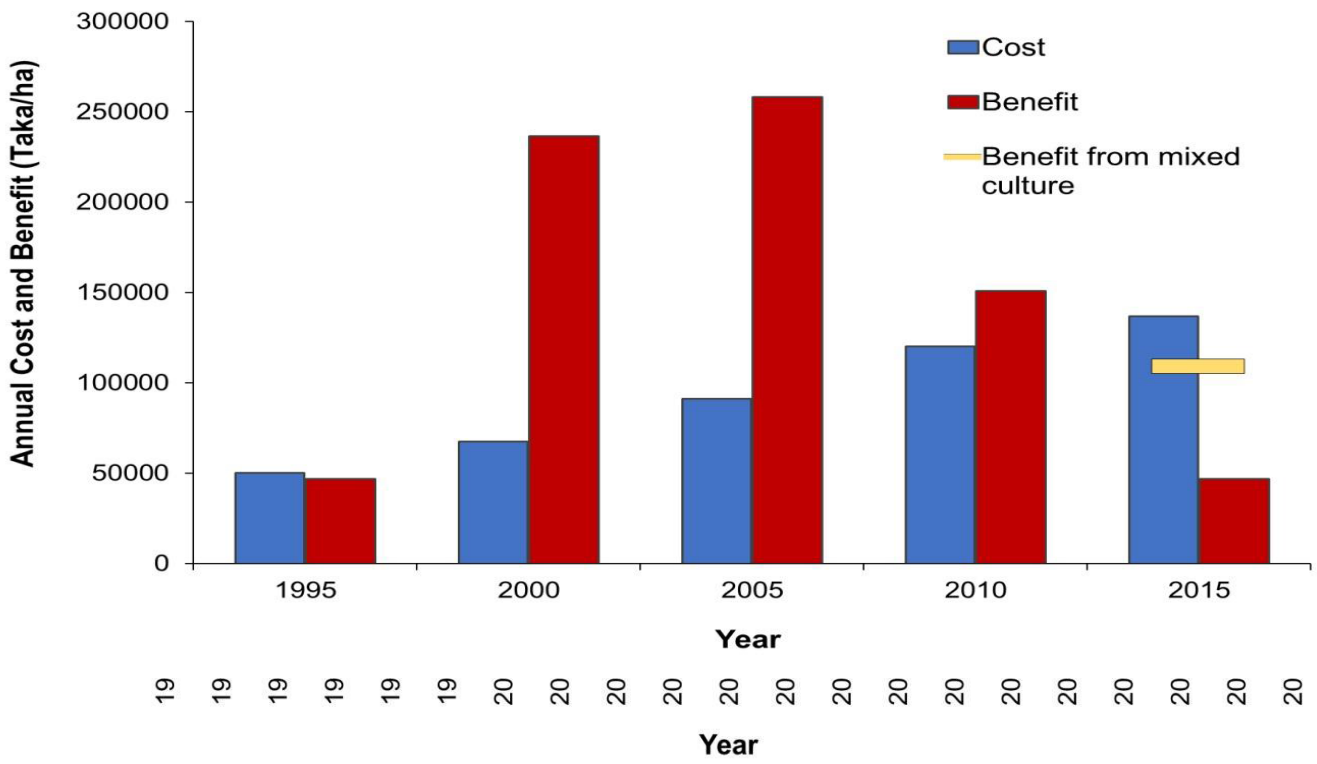
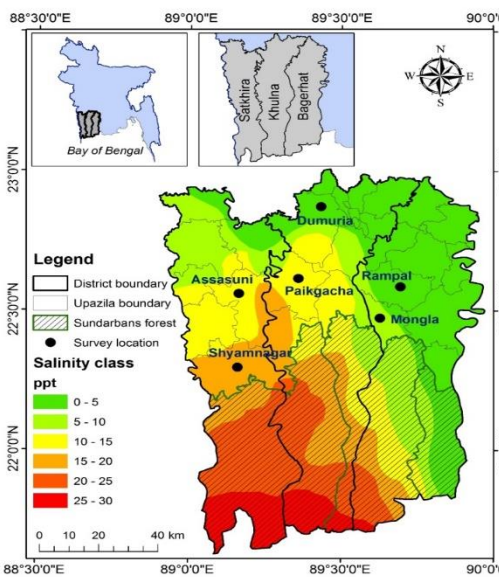
Autonomous Adaptation Practices: II

- ✓ Dependence on Micro-credit and NGO supports in other forms
- ✓ Investment in Livestock
- ✓ Investment in Education
- ✓ Community participation in embankment rebuilding
- ✓ Collective Action in Post-disaster Period

Preliminary Ranking of Autonomous Practices

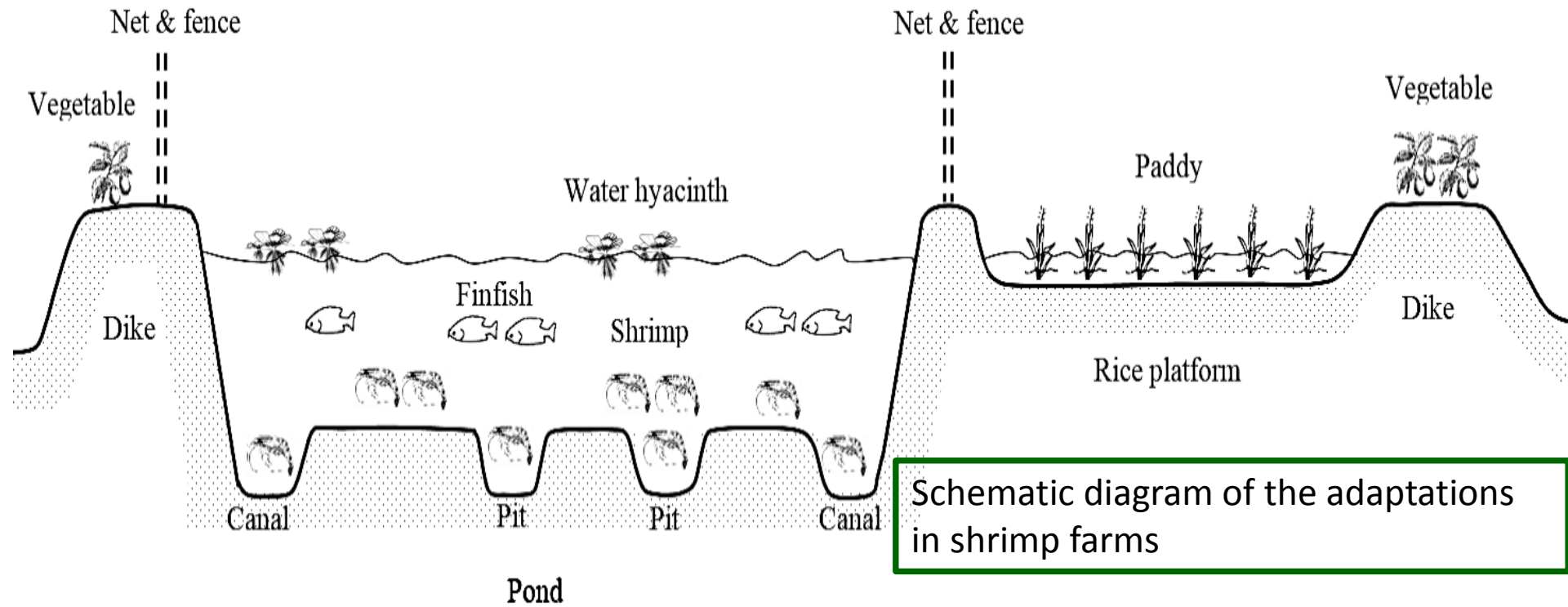
1. **Tree plantation** (Uncertain weather, *income generation*, less income, beautification purposes, fruit consumption)
2. **Borrowing money/Loans from different sources** (sending family members to abroad for *income generation*, new house building, house and agricultural land buying)
3. **Internal migration** (*income generation*, loan repayment, financing family expenses, investment in human capital)
4. **More male migration, less female migration** (Females are eager to but not permitted mainly because of social stigma and joint family values)

Climate change adaptations of shrimp farmers in southwest coastal Bangladesh : Mixed adaptation (autonomous+Planned)



Adaption strategies in shrimp mixed cultivation

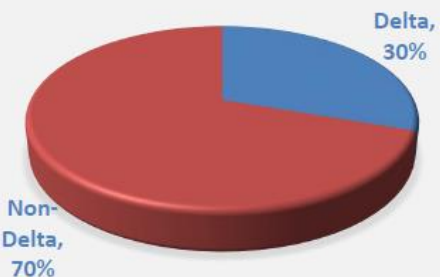
- ✓ Changes of shrimp farming in southwest coastal Bangladesh
- ✓ Future of Shrimp aquaculture in the context of climate change



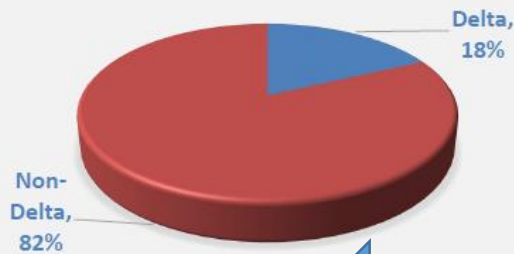
Schematic diagram of the adaptations in shrimp farms

Macro economic drivers in Delta and non delta area

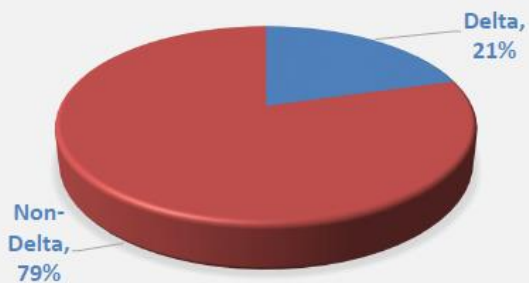
Share in Total Area in 2011



Share in GDP in 2012

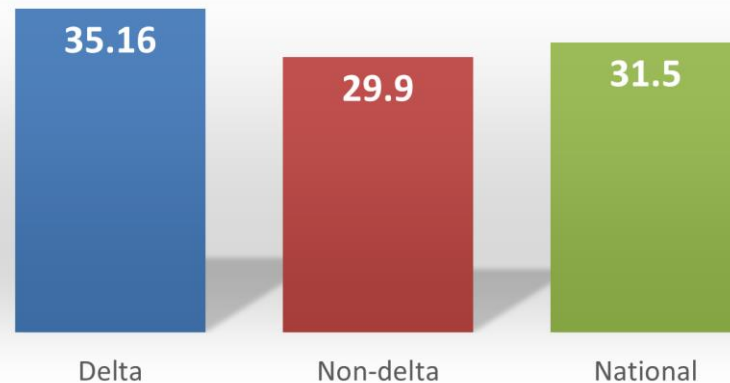


Share in Total Population in 2010



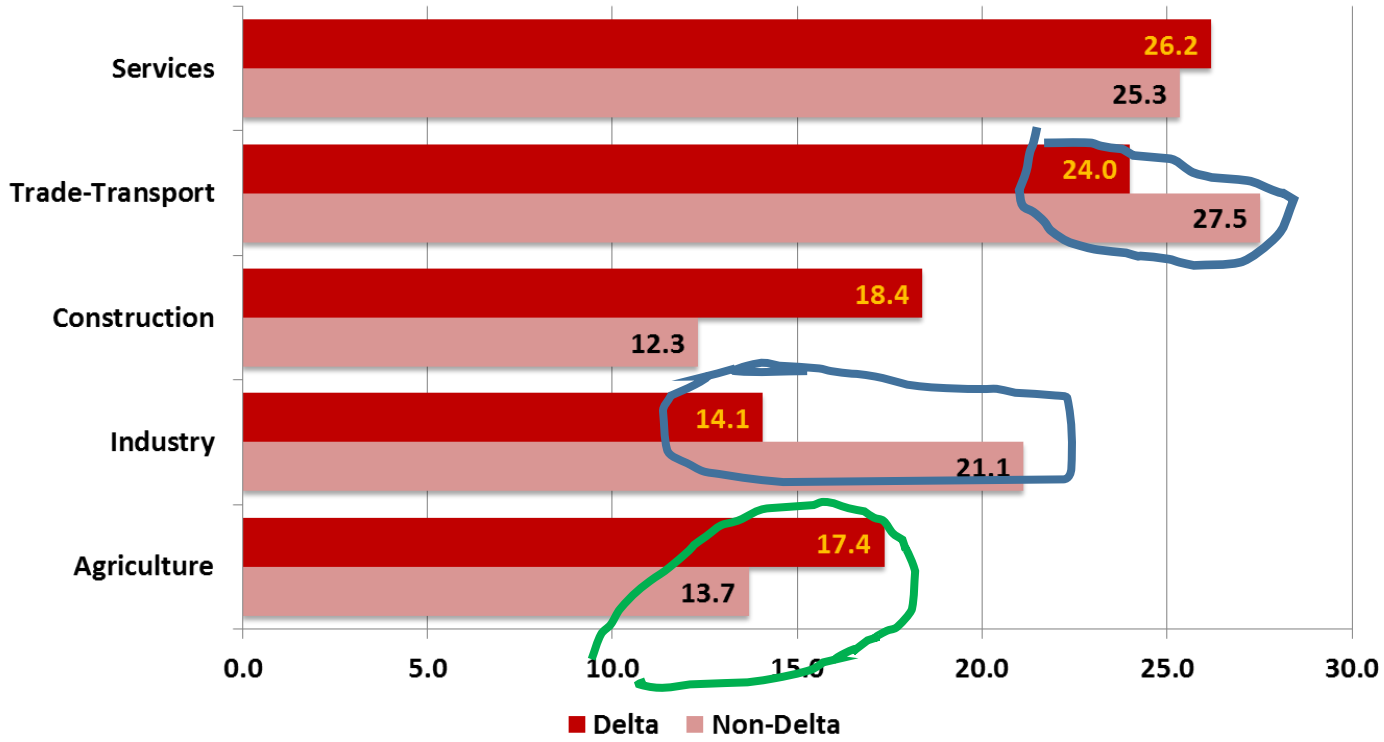
Though in terms of share in area, Delta has around 30% share, in terms of share in GDP and population, Delta has around 20% share.

The head-count poverty rate in Delta is much higher than that in Non-Delta



Economic Structure of Delta and Non Delta in GBM

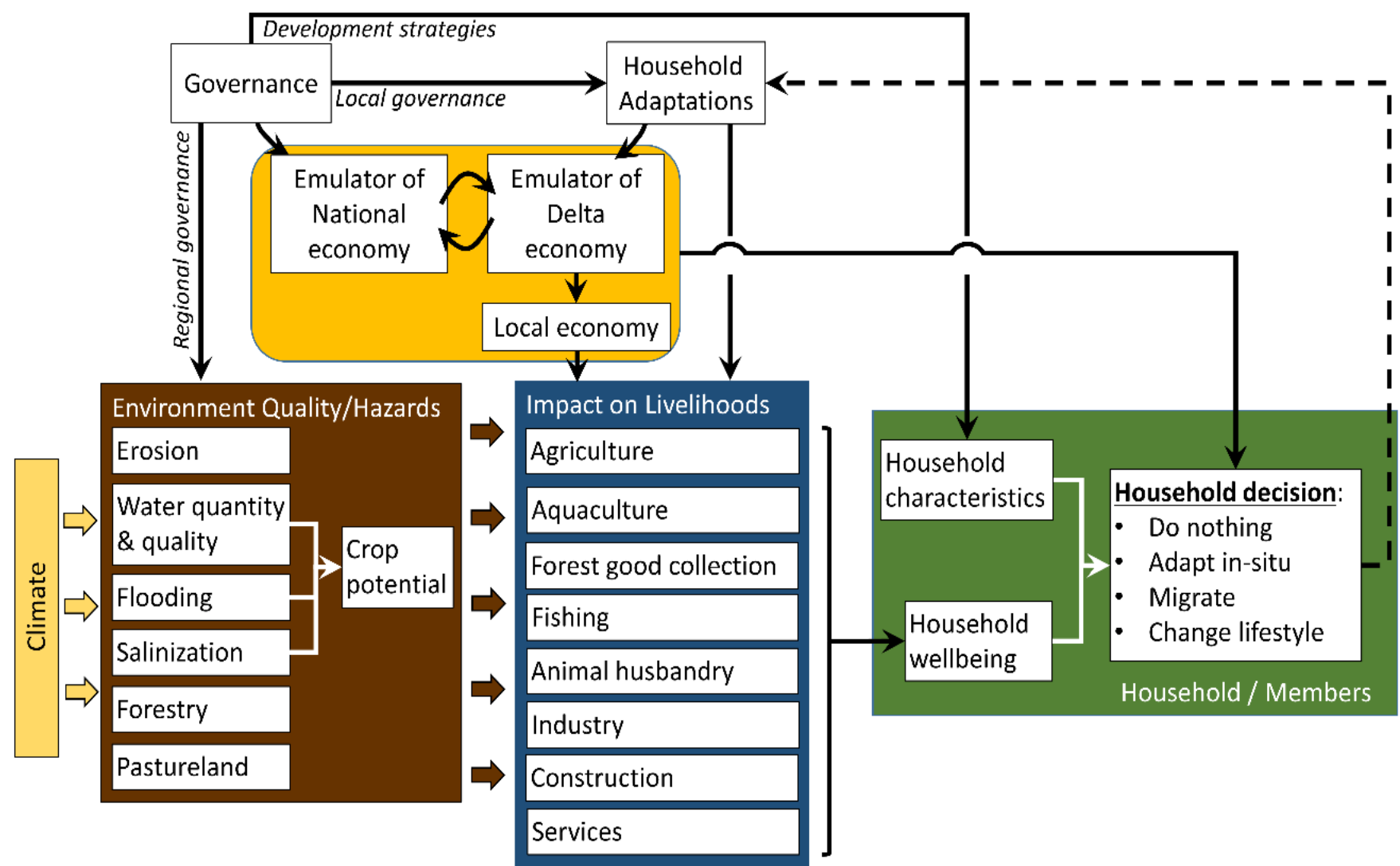
Distribution of value added (%)



Economic structures of Delta and Non-Delta are different: In terms of share in respective **GDPs**, Delta has **much lesser shares of industry and trade-transport** and **higher share of agriculture** than non-delta.



Conceptual outline of the integrative assessment tool



D E C C M A



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6th Team Meeting in Southampton January 2017



D E C C M A



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Meeting with Policy Makers: Science-Policy interaction in Climate Change Adaptation (RiU)



Workshop at MoDMR

- ✓ Understanding the Scientific outcomes of DECCMA activities and identify its usefulness in National Purpose (RiU)
- ✓ Further share the key results using developed tools (sectoral and Integrated: for SDGs) and its linkage with the centralized planning **at Identified different climate driven Hotspots**

D E C C M A



Objectives of the Panel Discussion

- ✓ Adaptation options in deltas in long term planning
- ✓ Migration as an adaptation in deltaic environments under a changing climate
- ✓ Macro economics of the deltaic environments
- ✓ Sustainable gender-sensitive adaptation

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