Climate Change in Bangladesh Delta Plan 2100

Seminar of Gobeshona Platform on Climate Change Research in Bangladesh, at ULAB, Dhaka

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Overview

1. Introduction

2. What is a Delta Plan

3. Netherlands Delta Plan

4. Bangladesh Delta Plan 2100

5. Climate Change in the Bangladesh Delta Plan

6. Questions/discussion
1. Introduction

Catharien Terwisscha van Scheltinga
Dewan Quadir

Climate change experts in BDP formulation team

Sharing information on Bangladesh Delta plan on Climate Change study in BDP
Asking your help
2. What is a Delta Plan (and why would Bangladesh need one)
Delta Plan

What is a Delta Plan?

- An indicative plan
- To improve safe living and sound economic development in the delta
- Longer term (50 to 100 years)
- Integrated and holistic plan
- Based on a vision about the future
- Need to cope with uncertainty and complexity – using vision and scenario development can help
- Different approach!
  - Not: knowing it all first, and then doing something
  - But: Parallel start between policy, research, implementation
  - Requires: Change in mindset (not business as usual)

Unusual business!
Working with a longer term vision

(fore-casting – back-casting)

Instead of:

Create a longer term vision for e.g. 100 years (fore-casting, 1), use back casting to ‘translate’ it back to the present (2); and subsequently integrate it in regular (short and medium term) planning (3).
Importance of a Delta Plan for Bangladesh

Need of a Long Term Delta Vision and Program

Bangladesh:
- Shows consistent average economic growth rate of 6%
- Is on its way to become middle-income country by 2021

However,
- Climate change is threatening these significant achievements, as it is related to delta issues as flooding and droughts, sea level rise, salt-water intrusion, access to fresh water, which influence water safety, food production and economic growth

Challenges:
- A long term integrated approach to water safety, food security and economic growth in relation to future water and land management
- An Institutional and governance setting to make such long term holistic Delta Plan 2100 approach possible and implementable
- Priorities for investments for the future to be set today

II. What is a Delta Plan
Key elements Bangladesh Delta Plan

II. What is a Delta Plan

Choudhury et al. 2012
(www.bangladeshdeltaplan.org)
3. The Delta Plan in the Netherlands

http://www.deltacommissaris.nl/english/
4. The Bangladesh Delta Plan 2100

Developing Strategies for Adaptive Delta Management in the Face of Climate Change

GoB General Economic Division (GED) Planning Commission and GoN Embassy of Kingdom of The Netherlands (EKN)

Launching Date: 27 Aug 2014
Partners to GoB/GoN: BanDuDeltAS

IV. Bangladesh Delta Plan 2100

Plus sub contractor: Climate Adaptation Services foundation
Overall Process

PMU

Thematic studies
Scenario building
Information portal

Common knowledge base

Implementation strategy
Project Service Cell
Implementation programmes

Delta plan document
Selecting scenarios
Delta vision
Delta goals
Measures
Outline Delta Framework

Propose institutions & terms of reference
Draft act for delta framework

Exemplary projects

BDP 2100 for working towards a sustainable Bangladesh delta
Interactive Strategic Planning process

Governance, Content, and Stakeholders will come together, via learning cycles

Concepts:
- Planning as Learning
- Adapative Management
- Strategy Process sense-making - sensegiving
BD Delta with Climate Change Challenges

BDP 2100 takes a different point of view

Considering uncertainties, risks, and impacts

Aims at addressing strategic questions and choices:
- Vision
- Scenarios
- Pathways & Tipping Points
- Institutional Framework
- Coordinated Action

IV. Bangladesh Delta Plan 2100
Overall expected outputs

- Inception Report – widely accepted
  - June 2014

- Background Reports on the delta themes creating a common Knowledge Base by sharing those studies and data with stakeholders involved
  - December 2014

- Input for the 7th Five Year Plan
  - March 2015

- An Institutional Delta Framework which contributes to BDP 2100 formulation and realization of new projects in line with the BDP 2100
  - 2015

- A Delta Plan Document with Vision, Scenarios, Strategies/Measures and Program
  - 2016

- Implementation Strategy and Guideline for the coming 5 to 10 years with geographical and sectoral priorities for BDP 2100 implementation, including 2 - 3 projects developed parallel to the BDP 2100 formulation
  - 2016
Integrated analysis

- Initial Delta Vision will be based on the baseline studies:
  - vision elements and goals generating a first Delta Vision
  - reflecting on and responding to physical development options
  - defining the sectoral, institutional, and financial environment where the physical developments need to be embedded

- Hotspot approach:
  - Areas with similar characteristics and challenges
  - Provides insight in inter-sectoral dependencies and relations
  - Hotspot serves as arena for multi stakeholder workshops (Delta Ateliers)
  - Provides a platform for defining no-regret interventions that may be incorporated into the 7th Five-Year-Plan

- Delta Ateliers
  - specific workshops in the stakeholder process leading to building blocks in our argumentation
Clustering of Themes and Baseline Studies

Water Resources
I. Morphological dynamics of Bangladesh Delta
II. Water resources
III. Coastal Polder issues

Water Supply and Sanitation
I. Public health, water supply and sanitation

Disaster Risk Reduction
I. Climate change issues
II. Disaster management

Spatial Planning
I. Land resources
II. Urbanization and settlement

Food Security
I. Agriculture and food security
II. Fisheries and livestock

Environmental Management
I. Ecological Settings
II. Forest and biodiversity
III. Environmental pollution

Economics and Finance
I. Growth of Population and Management in the context of resources setting
II. Socio-economic and demographic condition
III. Sustainable Transportation and Infrastructures

Governance
I. Information and creation of knowledge management Institution
II. Institutional framework/arrangement
III. Regional cooperation

Eight Clusters with 19 themes to be studied

The Baseline Studies include:
- Quick scans
- Start up Document with Study Plans
- Study of Baseline Conditions

IV. Bangladesh Delta Plan 2100
Contents of the Baseline Studies

- Baseline conditions on thematic areas: problem definitions, policies, plans, implementation problems / gaps, current measures and interventions, reviews, outputs, outcomes, trends and developments; opportunities

- Identification of relationships between themes; integrated analysis during Baseline Study process; setting priorities

- Input for tentative Delta Vision and first Scenario development (e.g. Climate Change combined with Economic Development or Population Growth)

- First recommendations on probable (alternative) strategies and interventions to address present / future challenges

- Exploration and first design of institutional Delta Framework adequate BDP 2100 governance and implementation and future renewal of the Plan, e.g. including draft Delta Act, Delta Program, Delta Funding
5. Climate Change in the Bangladesh Delta
Plan 2100
Baseline Study Climate Change

Objective: provide the state of the art knowledge, data, climate scenarios for Bangladesh, and visualization, supporting the formulation of the Bangladesh Delta Plan

Knowledge  What do we know?  Provide an overview on CC & impacts in BGD
Data  Which data do we need?  Make an inventory of key information
CC scenarios  What are possible futures?  Develop initial climate change scenarios for BGD
Visualize  Can we make it visible?  Develop key maps for stakeholder interaction

• Task 1: Description of key information
• Task 2: Development of daily downscaled climate scenarios
• Task 3: Meteorological indicator analysis
• Task 4: Development of climate change scenarios for BDP
• Task 5: Quantification of climate change impacts for indicators, sectors or issues relevant for the Bangladesh Delta Plan

Process: involving cc experts and policy makers in increasingly wider circles, creating consensus
Vulnerability and Risk

Global risk analysis (Maplecroft)
CC in BDP 2100

Temperature

- Temperature will go up

- Islam, 2009:
  - Daily max: 0.621 ± 0.491 °C per 100 year
  - Daily mean: 1.026 ± 0.403 °C per 100 year
  - Daily min: 1.536 ± 0.461 °C per 100 year

- IPCC, 2013: Figures show changes in temperature during summer (June_Aug) for 2016-2035; 2046-2065 and 2081-2100 relative to 1986-2005 period. Different percentiles (25, 50, 75th) are shown of CMIP5 ensemble (IPCC, 2013, Annex 1 of WG1 report).
CC in BDP 2100

Precipitation

- Rainfall variability in BGD extremely high
- Rainfall trend due to climate change unclear: seems total may increase

- Increase of frequency of extreme events (Kumar et al, 2013, IPCC, 2013 WG1, Ch14)
- Analysis using RCP4.5, show increase in average of 10 to 20% by the end of the century
- Figure (right) shows more change in winter towards the end of the century, though amount is less in those months. Uncertainty high
CC in BDP 2100

Cyclones

- More intense cyclones are expected in Bangladesh in future - difficult to quantify (as yet)
- Cyclones occur in pre-monsoon (April-May) and post- -monsoon (Oct-Dec)
- Trend: Western part gets most cyclones in post-monsoon – eastern part both before and after monsoon season (BDP, 2014)
- Global warming: more intense cyclones (Unnikrishnan et al, 2006)
- Number of weak cyclones decrease with simultaneous increase of the strong once [Singhvi et al., 2010]
- Fifth IPCC report (2013) emphasizes large uncertainties in future changes in cyclones.
- Figure: Tracks of cyclones across Bangladesh, source: IWM
CC in BDP 2100

Run-off

- Modelling shows high/low flow
- At the end of the century

- Highly uncertain
- Related to modelling uncertainty
- And development initiatives
- Recent news on 16 dams
- In Ganges river (Daily Star Oct)
CC in BDP 2100
Sea Level Rise

<table>
<thead>
<tr>
<th>Stations</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Relative Sea Level Rise (mm/year)</th>
<th>IPCC (AR5) observed (1981-2000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Sundarban Coast (Hazra, 2002) in India</td>
<td>-</td>
<td>-</td>
<td>3.24</td>
<td></td>
</tr>
<tr>
<td>Hiron Point</td>
<td>21°48’ N</td>
<td>89°28’E</td>
<td>4</td>
<td>2.0 mm/year</td>
</tr>
<tr>
<td>Char Changa</td>
<td>22°08’ N</td>
<td>91°06’E</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Cox’s Bazar</td>
<td>21°26’ N</td>
<td>91°59’E</td>
<td>7.8</td>
<td></td>
</tr>
</tbody>
</table>

- IPCC (AR5) and (Hazra, 2002; Khan et al., 1999; SMRC, 2003)
- Due to sedimentation and subsidence (subsidence range 1-5 mm/year). The subsidence is adjusted by sediment deposits for non-polder areas (Khan and Islam 2008).
- Complex issue, not resolved yet (as also measurement issue)
- Empirical evidence based validation: 1.5 mm/year (CEGIS in Daily Star, June 2014)
CC in BDP 2100

Salinity intrusion

- Dasgupta et al, 2014 (World Bank paper salinity)
- Soil Salinity (1973, 2000 and 2009) Source:
Approach CC

Using scenarios

RCP4.5

5 Global Climate Models

Interpolation to half degree grid

Bias Correction

Basis climatological data set, daily data at 0.5°Grid for 8 variables

Meteorological Indicator analyses

Impact analyses - with biophysical models
CC scenarios in BDP 2100

First steps

- Climate model runs from 1971-2100
- Two RCPs from 2005-2100
  - 4.5 – realistically low emissions
  - 8.5 – High emissions
- Output used from 5 different climate models is used
  - MPI-ESM-LR
  - IPSL-CM5A-LR
  - HADGEM2-ES
  - ECEARTH
  - CNRM-CM5

- Analyse meteorological indicators (12)
- Not only working with ‘worst case’ scenario, but with ‘high end’ and ‘low end’ options.

- Note: The climate change scenarios, together with the socio-economic scenarios, will form the Delta scenarios for the BDP
- The Delta scenarios will be discussed early 2015
How you can help
Baseline Study Climate Change

1. Provide information (knowledge, data, people)
   
   *Tell us / Fill in the form, send to Catharien.Terwisscha@wur.nl*
   
   *Or hand in immediately after the session*

2. Validate information
   
   *e.g. through Linked In Bangladesh Delta Plan group*

In general:
- Contact the General Economic Division, Planning Commission on the Bangladesh Delta Plan
- Use factual information and try to collect factual information on climate change for the implementation of your programmes
Information inventory form

Baseline Climate Change

- Research (topic) (contact person, organization, phone, email)
- Papers (topic) (contact person, organization, phone, email)
- People (inside Bangladesh)
  - (name, organization, phone, email)
  - working on climate change science
  - working on climate change impacts
  - working on climate change adaptation
- People (outside Bangladesh)
  - (name, organization, phone, email)
  - working on climate change science
  - working on climate change impacts
  - working on climate change adaptation