

Delta's in Times of Climate Change



Conference preliminary findings future challenges

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Goal of the conference:

**Bring together for learning and for building an
international community of:**

- **Scientists**
- **Practitioners and firms**
- **policy makers, urban and land developers and
financing organisations;**



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Scientific findings/issues

Sea level rise:

- Particular attention should be given to the regional expression of SLR and storm surges in response to climate change. SLR rise likely to vary widely by geographic region;
- Coping with multiple threats is a challenge: changing river regimes, storms, waves and sea level...
- Challenge is to integrate these elements in a comprehensive adaptation strategy;

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Fresh water availability

- In Delta areas fresh water availability, river management and coastal zone planning are strongly intertwined;
- In climate change adaptation one should not address them separately, but in combination; experience in his field is available;
- The presentations showed striking similarities between the technical situations and options in developing countries and developed countries;

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Estuarine ecosystems:

- The difficulty of teasing apart effects of climate change and other anthropogenic stress on estuaries;
- The reinforcement of possible climate effects by other stresses e.g. destruction of protective vegetation;
- The diversity of responses of systems around the globe;
- Full consideration to be given to water, nutrients and sediment dynamics.
- Scales are important!

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Climate Proofing urban areas

- Mega cities in Delta areas with subsidence are increasingly vulnerable, climate change adds to this;
- The presentations show that we are only at the beginning, starting to unravel the complexity;
- The main challenge is how to keep up with urban dynamics. Research and especially applied research tends to get the character of **historic analysis**.
- Inspired design driven by awareness, meaning and sustainability thinking is as important as number crunching and uncertainty management;

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Competing claims in land use

- Delta's have historically been areas of competing land use with a long term trend away from agriculture towards urbanization.
- Delta's remain areas of intensive competition for land use and development and will have to take climate change into account.
- This offers opportunity for delta's to lead the way globally in tackling climate change, adaptation and mitigation.

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Governance and economics of adaptation

- We were struck by the amount and variety of research in governance and adaptive capacity amongst many countries;
- Reconciling flexibility and certainty remains a major challenge, given the different time scales;
- The change globally, from public to private sector and pps will require a new understanding of governance and autonomous adaptation;

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Decision support instruments

- There are many large research projects that offer an integrated approach to climate adaptation; not much methodological innovation;
- Reconciling socio-economic uncertainty with climate uncertainty is a major challenge; This should be done at local level;
- Imaging of impacts and adaptive solutions is an effective tool to gain interest and participation;

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Health issues

- Health issues in relation to climate change do get less attention than they deserve in climate science and in climate policies;
- Health issues, water, air and urban quality are related in many ways, climate change illustrates such interdependencies;

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Managing the risk of extremes

- Insurers see a clear increasing trend in measured disaster losses. This can be mainly attributed to an increase in wealth and exposure, but we expect the climate signal will pick up in the decades to come;
- Low perceptions of extreme events by communities and policy makers has led to a major underinvestment in prevention and damage reducing measures, world wide;
- Innovative schemes in insurance can help to guide development and reduce vulnerability.

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Many Delta's present:

- Mekong/ Vietnam
- Jakarta, low lands, Indonesia
- GBM Bangladesh
- Nile Egypt
- Yangtze /China
- Po Italy
- Elbe/Germany
- Rhine Netherlands/Germany
- Thames United kingdom
- Sacramento river California/USA
- Mississippi
- Danube

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Mekong

- Gov. of Vietnam is working on adaptation
- Awareness goals: 65 % population, 100 % civil servants
- Adaptation investments only if part of city revitalisation
- Salt intrusion
- Inundation
- urban development
- Industrial development
- Demographic issues
- Food supply

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Rural deltas in Indonesia



Ca 33 - 36 Million ha, mostly tidal swamps



Euroconsult
Mott MacDonald

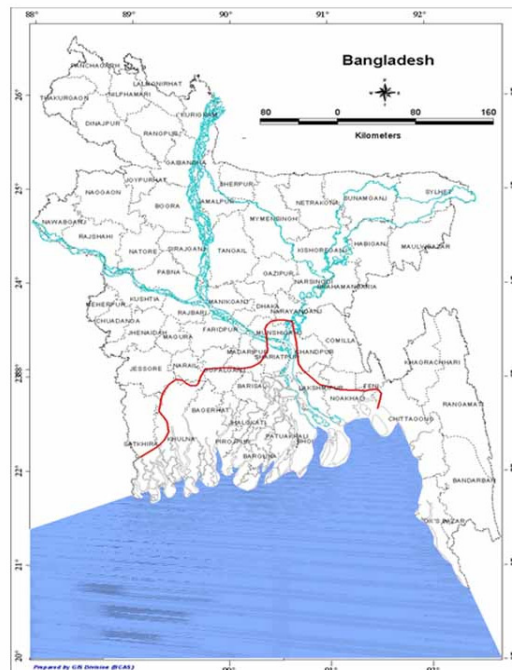
Low lands Indonesia

- "Rural delta"
- Ongoing development driven by private sector licensed by gov.
- Vulnerable peatland;
- Opportunities in RED financial compensation for not cutting trees;
- Understanding the bio-physical system is a bottleneck in development;
- Make the issue of livelihoods explicit, beyond lip service

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One Meter



Sea Level Rise



Knowledge for Climate



CLIMATE CHANGE CASE STUDY: BANGLADESH VULNERABILITY



1. Sea Level Rise
2. Cyclone (Intensity & Frequency)
3. Deeper Penetration of Saline Water
4. Erratic Rainfall
5. Flood (Intensity & Frequency)
6. Drought
7. River Bank Erosion
8. Health
9. Food Security

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Bangladesh



- People **are** adapting to floods and increasing salt already;
- Salination has a negative influence on prenatal child development;
- Bangladesh has a comprehensive climate adaptation plan and initial national funds to start implementation;

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Nile Delta

- Creating awareness among population and politics is the major challenge;
- Fresh water scarcity and coastal inundation are the most important issues;
- Demographic development, urban development and food production are difficult to accommodate and manage;
- Major rehabilitation of drainage system is getting started, opportunities to include climate change;

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The Po delta and the Venice Lagoon in the North-East coast of Italy



r Climate

Po Delta

- Wetlands in the Po Delta are most vulnerable;
- Venice is technically well protected up to at least up to 50 cm of sea level rise;
- Institutional arrangements is the major issue: of the lagoon, the storm surge barrier and zoning of industrial activities, urban development, recreational/tourist activities, ecosystems and wetlands.





Rhine Delta

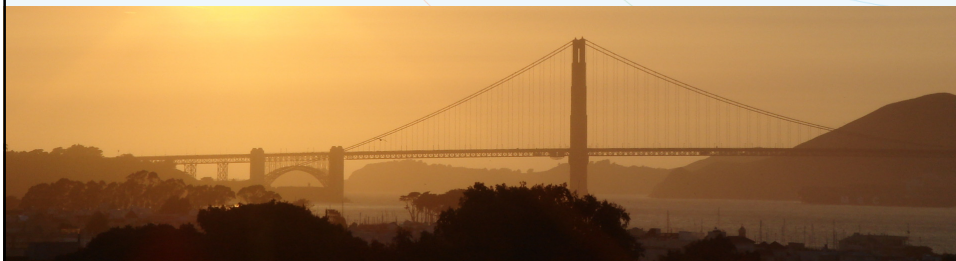
- Dealing with uncertainty in climate scenario's in relation to investment decisions in land use and flood protection is a major issue;
- Adaptive management does not necessarily agree with investors asking for clarity for now and for the future;

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California

**Bay Delta
Bay Area
Urban water use by South California
Los Angeles**





California: Messages

- Water use and distribution: ecology vs agriculture vs urban use (North is supplier, South is user)
- Mitigation & adaptation (19% of the electric energy is used to pump water). Business with a sustainability objective.
- We will not move, so we will adapt to the challenges, which may result in a new landscape possibly with different species;
- Concentrate on how fast and where population grows;
- Governance: stay out of the courtrooms!

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Elbe Estuary Germany

- Large man made changes in the past;
- Human influence (dredging) of major importance for north sea storm driven flood levels in Hamburg;
- Adaptation through city planning and climate proof ing of harbour area;
- Governance is a major issue;
- Beliefs and preferences of population are an uncertain and simultaneously a most relevant factor.

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Financing Adaptation

- Round table identified the difficulty in defining the net cost of climate adaptation measures (issue of additionally), Try to get beyond this,.... aim at solving problems!
- There is a major debate going on regarding the global annual cost of adaptation ranging form 100 tot 1000 billion euro;
- Adaptation Fund financed through mitigation arrangements (CDM) and other gov.sources is interesting, but still heavily underfunded;
- Private sector funds and compensation frameworks would be necessary to meet the needs;.

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The Role of Cities



- Cities need to act now. They cannot and do not want to wait for national policies and measures regarding adaptation;
- Cities ask for a formalised position in the international allocation of funds for adaptation;
- Challenge the private sector and other stakeholders in integrating climate in their activities and plans;
- Cities have major opportunities by using climate change as a source of inspiration to redesign hardware and software of city development;
- Developing countries perspective: adaptation closely linked to poverty alleviation and env. Improvement;

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Building community and Project developers



- Building sector and project developers can be and should be at the forefront of climate change adaptation.
- Is the market the bottleneck, the skills or the capacity to deliver..? In retrofitting houses and buildings;
- Experimental areas and pilot projects free of existing rules and regulations would certainly help to engage the building sector and project developers.

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Delta Alliance

- The Delta Alliance is a timely vehicle to further develop and reinforce our international community toward climate proofing of delta's.
- A major product of Delta Alliance in the making is an international, comparative assessment of the vulnerability and resilience of Delta's (scorecard/index); other tasks may follow;
- Future meetings and products are being planned, e.g. the Delta Summit in Jakarta, next year October and more...