



Delta Alliance - for the resilience of deltas worldwide

Comparative Assessment of the Vulnerability and Resilience of 10 Deltas

Cees van de Guchte The Netherlands UNFCCC, 18-20 July 2012, Mexico-City





More attention for deltas

River deltas are valuable:

urbanization

pollution River deltas are vulnerable:

provide food to the world underpin economies sustain biodiversity home to many people flooding and drought land subsidence and erosion

overall loss of environmental quality

And pressures are increasing:

economic growth population growth climate change

Vulnerable deltas



Figure C3.1. Relative vulnerability of coastal deltas as shown by the indicative population potentially displaced by current sea-level trends to 2050 Extreme = >1 million; High = 1 million to 50,000; Medium = 50,000 to 5,000; following Ericson et al., 2006).

IPCC 4th Assessment – Climate Change 2007 Synthesis Report

Delta Alliance Global Network



Delta Alliance Activities

- 1. Stimulate collaborative projects
 - Joint projects at national level
 - Joint projects at international level
 - Demonstration projects

2. Events

- International conferences
- Workshops, seminars
- Study tours, courses

3. Web based Information services

- Profile of deltas
- Overview of Delta projects
- Overview of research + gaps
- Network member info

Comparative assessment of the vulnerability and resilience of 10 deltas

Provide a first step towards a comprehensive overview of the current and future state of deltas

Integrate scientific, social and management knowledge

Provide framework for future data collection



Deltas studied



DPSIR + Spatial layers approach



Framework for assessment



Towards indicators of change

DRIVERS

Demographic trends

- population in delta
- migration

Economic developments

- status of economy
- sectoral developments
- upstream development

Technological developments

- food / agricultural
- civil engineering
- ICT
- energy generation

Climate change

- temp./evaporation
- sea level rise
- precipit./discharge

Subsidence

 natural and human induced subsidence

PRESSURES/IMPACTS

Land and water use (Occupation layer)

- pressure on space
- shift in land use/urbanization
- water demand
- flood vulnerability

Infrastructure (network laver)

- flood protection system
- irrigation and drainage
- water supply & sanitation
- roads, railways & ports

Natural resources (Base layer)

- freshwater shortage
- salinity intrusion
- water pollution
- flood hazard
- coastal/fluvial erosion
- loss of biodiversity and wetlands
- sediment supply
- mobility of delta distributaries

GOVERNANCE

RESPONSES

Development and adaptation of land and water use

- multifunctional land use
- land use zoning
- water saving
- flood preparedness

Extension/revitalization of infrastructure

- land reclamation
- multifunctional use of infrastructure
- building with nature

Management and restoration of ecosystems

- protected areas management
- habitat restoration
- ecological engineering
- environmental flows
- multiple use of wetlands
- ecosystem approach

Multi-level and

Public-private partnerships

Involvement of stakeholders and citizens

Approaches for dealing with risks and uncertainties

multi-sectoral cooperation

Scorecard and related indicators



Comparative overview of delta score cards

	Land and water use (occupation layer)	Infra– structure (network layer)	Natural Resources (base layer)	Governance	Resilience & Sustainability Indicator		
					Current	Moderate Scenario	Extreme scenario
Nile delta		0	-	0	-	-	
Incomati delta	0	-	-	-	-	-	
Ganges-Brahmaputra- Meghna delta				0		-	
Yangtze delta	-	+	-	0	0	0	
Ciliwung delta				-			-
Mekong delta	0	0	-	0	0	+	0
Rhine-Meuse delta	+	++	0	+	+	0	-
Danube delta	+	+	+	0	+	0	0
California Bay-Delta	0	-	-	0	-	0	-
Mississippi River Delta	0	0	-	0	-	0	-

Resilience / sustainability: ++ (very good), + (good), 0 (medium), - (low), -- (very low)

Comparative overview of delta score cards - Conclusions

For most of the deltas current resilience and sustainability is not satisfactory

Reasons differ per delta but some general mechanisms:

- Imbalance between demands and supply with regard to land and water use;
- Inadequate or ageing infrastructure in the delta;
- Disruption of the natural delta processes;
- Inadequate governance to address problems and implement solutions.

For a number of deltas the challenge is

to define a comprehensive (multi-sectoral) delta plan

The combined DPSIR-layer approach has proven to be useful

Potential for collaboration across deltas

	issues								
deltas	pressure on space	flood vulnerability	freshwater shortage	ageing or inadequate infrastructure	coastal erosion	loss of environmental quality and biodiversity			
Yellow River Delta (China)	••	•	••	•	•••				
Mekong River Delta (Vietnam)	••	••••	••••	••	•	•••			
Ganges- Brahmaputra Delta (Bangladesh)	••••	••••	••	••	••••	••••			
Ciliwung River Delta (Indonesia)	••••	••••	••	••	•	••••			
Nile River Delta (Egypt)	••••	•	••••	••••	••	••			
Rhine River Delta (The Netherlands)	•••	••	••	•••	••	•			
Mississippi River Delta (USA)	•	••••	•	••••	••••	••••			
California Bay (USA)	••	••••	••••	•••	•	•••			

Legend:

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relatively minor problem, now and in the near future currently a minor problem, but is likely to increase in the near future ...

currently already a big problem, future trend uncertain ...

•••• currently already a big problem, likely to increase in the near future

Vulnerability and Resilience of 10 Deltas

THANK YOU

www.delta-alliance.org

- Background information
- Research gaps identified per delta
- Adaptive measures identified

Documents to download:

- Synthesis report
- Working document (with full delta descriptions)

