

Adaptive Delta Management

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The challenge for delta development

We have problems:

- too much, too little, too dirty
- now and even more in the future

We have many ideas on how to solve those (measures, projects)

And we know what we ultimately want to achieve:

a safe, prosperous and sustainable delta

The challenge

- to select the best measures and projects
- to combine them in (alternative) consistent strategies
- to schedule the implementation of these strategies
- and that, while the future is uncertain



Adaptive (Delta) Management - What's new?

What is not new?

- for centuries we adapted our delta to change
- but often in response to (near) disasters
- or with static scenario analysis

What is new:

- anticipate the change (SLR-CC) or consider transitions
- but these changes are uncertain
- this requires new approaches and methods

Dealing with uncertainties is the key issue of adaptive (delta) management:

- "what to do and when to do it?"
- "not too much, not too little"
- "not too early, nor too late"



The future is uncertain.

Decisions are made over time in dynamic interaction with the system and cannot be considered independently.

Adaptive Delta Management

- A Decision Making under Deep Uncertainty approach that explicitly includes decision making over time and sequences of decisions (pathways).
- Supports planners to design a dynamic **adaptive plans**: short-term actions, long-term options, adaptation signals.



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Principles of ADM

"Adaptive"

"Delta Management"



The approach is a combination of existing approaches such as Integrated Water Resources Management, Scenarios and Adaptation Pathways → developed for the Dutch Delta Programme, but also applicable elsewhere?

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Slide from Pieter Bloemen (Delta Programme)

Principles of ADM

1. Connect short term decisions with long term objectives and tasks

2. Staged decision making: multiple pathways

3. Identify and value flexibility

4. Mix and Match with other investments (shipping, nature, infrastructure)











An adaptation pathways map shows **different possible sequences of decisions** to achieve objectives. A **scorecard** helps to evaluate the pathways and decisions. Monitoring plan helps to get **adaptation signals**.



Haasnoot et al 2013



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Transfer station to new policy action Adaptation Tipping Point of a policy action (Terminal) Policy action effective Adaptive plan could be Action C. Monitor and switch to action D, if high-end scenario becomes reality. Identify actions to mitigate adverse impacts.



Adaptation Tipping Point of a policy action (Terminal)

Policy action effective



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Exploring pathways with models and stakeholders



Adaptation signal: signpost+trigger



Looking for adaptation signal with transient scenarios: Haasnoot et al. (2015) Env. Res. Let.

Looking for an adaptation signal



Haasnoot et al. (2015) Env. Res. Let.

Summary

- ADM started in NL. ADM through pathways also in UK (TE2100), Bangladesh, New Zealand, ...
- Supports decision making under (deep) *uncertainty*. Scenarios have been updated and the plan reassessed
- Pathways provide insights into options and pathdependencies, to identify short term actions to prepare and keep long term options open to adapt
- Tipping points help to identify when to take actions
- Monitoring to stay on track needs further work. First signals: accelerated sea level rise

Barriers and enablers for Adaptive Delta Management a first assessment

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- Cases
- Bangladesh (Giasuddin Choudhury)
 - Flood risk reduction, salinity, droughts, erosion
 - ADM applied to Bangladesh Delta development
- Vietnam (Marcel Marchand)
 - Floods, salinity
 - Economic development perspectives
- Mississippi (Denise Reed)
 - Land restoration, Flood risk reduction
 - Mainstreaming bottom up initiatives
- Great Lakes (Eugene Stakhiv)
 - Navigation, floods
 - Adapting existing decision rules
- Netherlands (Jos van Alphen)
 - Flood risk reduction, Water supply
 - Preparing for climate change and sea level rises

Structured interviews

	Step in DAPP	Methods	Stake-holder involvement / institutions
1	Decision context	How were performance metrics derived?	Hierarchy objectives? Time horizon
2	Vulnerability analysis	How? Tipping points?	
3	Identify actions/ pathways	Multiple / preferred / level of detail	
4	Evaluation pathways	How? CBA,MCA	Decision criteria?
5	Adaptive plan	adaptivity	
6	Implementation		Barriers and enablers
7	Monitor		Trigger for change

Challenges

- Common:
 - Uncertainty in impacts of climate change, sea level rise and socio-economic changes.
 - Diverse stakeholder preferences
 - aim for a feasible and flexible plan
- Specific:
 - Institutional and basin boundaries do not align (Vietnam)
 - From community initiative to coordinated action (Mississippi)
 - Inclusion of other development priorities (Bangladesh)
 - Understanding system behaviour (Great Lakes)
 - Building on and breaking with tradition (Netherlands)

Different context developed and developing countries



Barriers

- Planning culture:
 - long-term,
 - uncertainty
 - scenarios (external vision)
- · Non-explicit decision criteria aimed at short term gains
- Now or wait? preference to use budget/social support now
- · Investments are aimed at projects not at plans
- Lack of models and data
- How to include autonomous development / adaptation?
 - Uncontrolled development in floodplains
 - Farmers adapt

Enablers

- Awareness raising on adaptive thinking
- Integration of varied stakeholder preferences in clear metrics
- Political support triggered by: major hazards, proactive thinking, development need and support
- Guidance for investments
- Buy time for more transitional measures by monitoring, implementing small and low regret measures.

Delta Programme, The Netherlands Prepare for uncertain climate change



"Adaptation pathways offer a strong approach to show which options are needed and when they should be implemented and how longterm objectives influence short-term decisions." (DeltaProgramme 2015)





- Iterative participatory process
 - Opens decision space
- Reduced number of pathways in the final plan
- Pathways based on short, medium, long term actions
- Continuous monitoring

Opens decision space



Bangladesh Deltaplan Enable socio-economic development



Delta Vision: Ensure long term water and food security, economic growth and environmental sustainability while effectively coping with natural disasters, climate change and other delta issues through robust, adaptive and integrated strategies, and equitable water governance.



- Vision and backcasting
- Iterative participatory process
- Several different pathways
- Investment plan
- Delta governance
- Update every 10 years
- Opportunity tipping points
- Fix the delta or live with water

Bangladesh Deltaplan:

- Actions focus on **enabling** socioeconomic development and food security. Other criteria include poverty, health, and gender.
- Mainly 5 year planning cycle.
- Dynamic delta: difficult hydrologies, co-evolution of multi-stakeholder pathways, used to adapt
- Less data, models available.

Dutch Deltaplan:

- Actions are oriented at protecting our socio-economic system and increasing ecological value of our water system.
- Dutch are used to long term planning.
- Static delta, not used to adapt
- A lot of **data and models** available for the whole delta.
- Strong governance

Conclusions

Adaptive (Delta) Management/Planning is well suited for:

- Long term impacts plus uncertainty in socioeconomics, climate and policy
- Organizing solution space, paths, short term long term.
- Integration of development and water risk reducing investments
- Umbrella for investment projects



- Society for Decision Making Under Deep Uncertainty www.deepuncertainty.org
- Future Deltas Summer Course Utrecht University 28 August

 1 September 2017 Deadline for registration: June 25. For more information visit website at: <u>https://www.utrechtsummerschool.nl/courses/science/fut</u> <u>ure-deltas</u>

Questions/feedback

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