‘Building with Nature’ for coastal erosion challenges

System knowledge and dealing with uncertainties in relation to BwN

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Thai coastline is prone to erosion
Affected by upstream dams, (illegal) sand mining, land use changes, coastal activities, etc.
Accelerated by SLR (/ climate change)
Existing man-made structures and developments along the coasts have disturbed the equilibrium of erosion and accretion

**Improved system understanding: data and advanced tools are available**
-> dealing with uncertainty
Operational forecasting system GoT

Coastal flood forecasting along the Gulf of Thailand together with the Hydro-Informatics Institute (HII)

Deltavers
Aqua-monitor – coastal erosion

Global tool (google earth engine: Landsat 5, 7 and 8 and Sentinel-2)

http://aqua-monitor.appspot.com/?datasets=shoreline
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Building with Nature opportunities
Why addressing uncertainties today?

Identifying uncertainties is important for the success of both Building with Nature and traditional Design and Implementation.
Introduction uncertainty

- Urban-Coastal environments are complex systems
- Climate Change comes in many forms, magnitudes and rates

Results in an **Unknown Future** and **Uncertainty**
Introduction uncertainty

Working with Uncertainties

- Levels: fairly certain, few alternatives, range of futures
- Types: ambiguity, unpredictability, incomplete knowledge
- Sources: natural, technical, social
- Unknown future: goal, population growth, natural dynamics
- Problem space, solution space, robustness, flexibility
Uncertainty of Building with Nature (BwN)

- The perceived uncertainty concerning BwN solutions, often hampers its implementation.
- Yet, uncertainty of BwN solutions is more manageable, than uncertainty of the problem.
How to deal with uncertainty?

- Desire to ignore uncertainties and to hold on to familiar **predict-and-design practices**
- With these conventional practices, the chances for ‘regret’ are high

Instead:
- Acknowledge uncertainty and complexity
- Act now with low-regret (flexible) measures
- Formulate robust plans that can be adapted over time
Planning and design principles

Three broad strategies for dealing with uncertainties in the solution space:

1. Over-dimensioning; assumes worst-case scenario
2. Diversification; a risk management strategy
3. Modularity; different components in a solution
Diversification is key

- Diverse solutions provide robustness; e.g. combining a seagrass habitat with mangrove restoration
- Hybrid solutions give flexibility; e.g. combining mangroves with levees in the hinterland
- Especially if space is limited hybrid is the way to go
- Not only along the coast, but also in the urban environment
Monitoring uncertainty and solutions

• The best way to reduce uncertainty on BwN solutions is by executing pilots / living labs

• It reduces the uncertainty caused by incomplete knowledge of the proposed solutions, through monitoring and research.

• Working with adaptive solution, also comes with a need for maintenance.

• This should be considered before a decision is made to implement such solutions.
Conclusion

- Diversification of proposed solutions is key in dealing with uncertainties and risks, especially in urbanized coastal areas.

- Building with Nature embraces natural dynamics and thus adapts to a changing environment.

- Identifying and managing uncertainties using Building with Nature is the most sustainable, resilient and future proof approach in the long run.
Thank you for your attention!

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