



Connecting climate research to societal challenges

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main research interest: adaptive water management

Message today: guide climate research by asking:
What change do actors care about? When to do what?






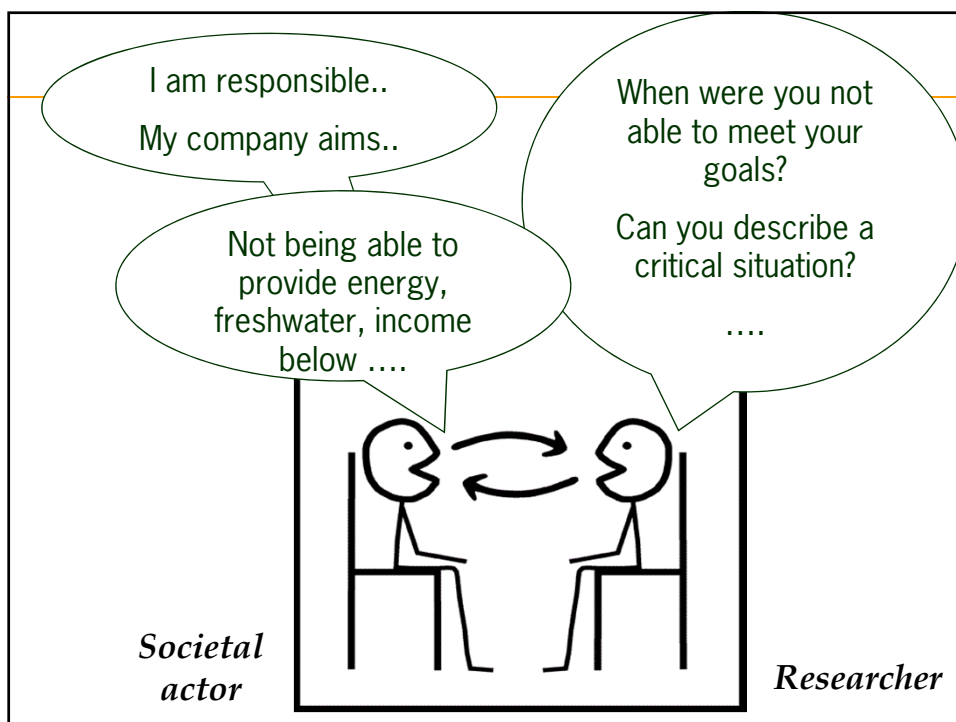
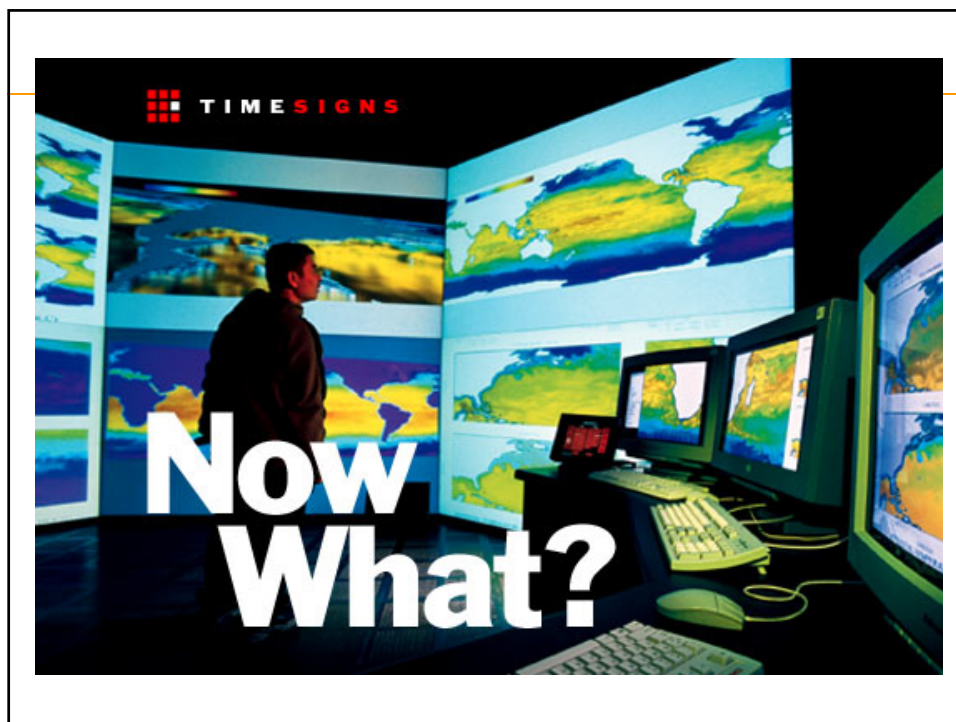


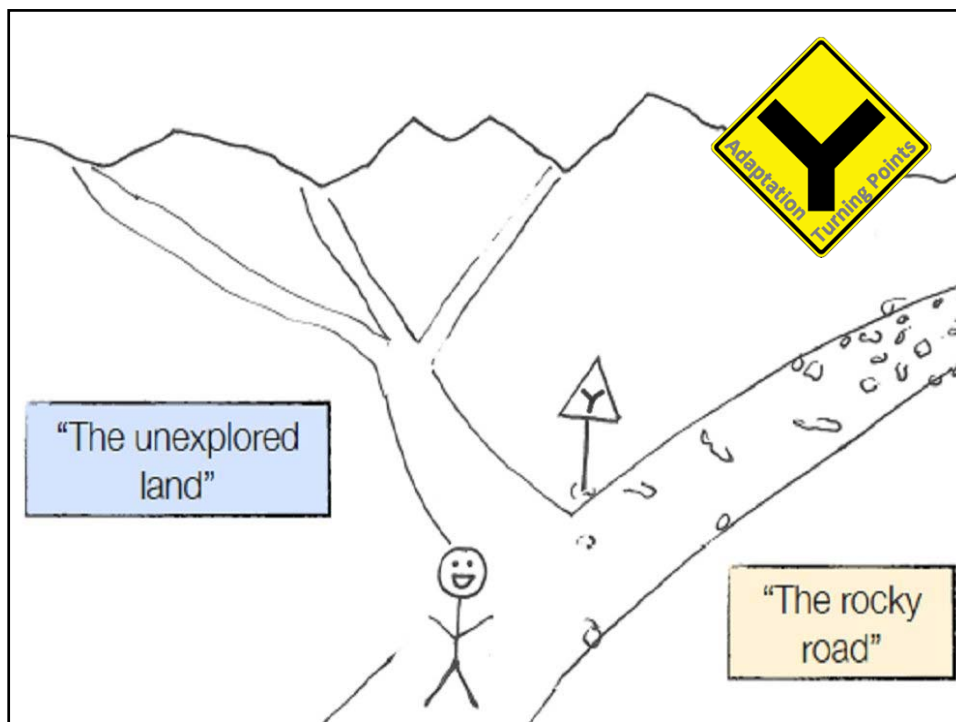
Today

- ∞ Illustrate challenge for communicating implications of climate research
- ∞ Introduce assessment of 'adaptation turning points' as a bridge between climate research and society
- ∞ Discuss value for your collaborative program



Amsterdam
Januari 2008





Assessment of 'adaptation turning points'

Why: Climate change becomes relevant to policy makers if (and only if) it threatens management objectives or results in conditions that society perceives as undesirable.

Question: how much longer current policies and management activities are expected to suffice and when adjustments will be required.

In other words: **when** are societal thresholds reached?

Adaptation turning points (formal definition):

a situation where a **socio-political threshold** is reached, due to climate change induced changes.

Socio-political thresholds:

- formal policy objectives (norms)
- informal societal preferences (required water depth, income, willingness to invest, protect cultural heritage)

Rijnmond Area, the Netherlands

Starting point: safety, economy, nature, residence

Vertrekpunt
veilige delta

economische motor

unieke natuur

aantrekkelijk wonen

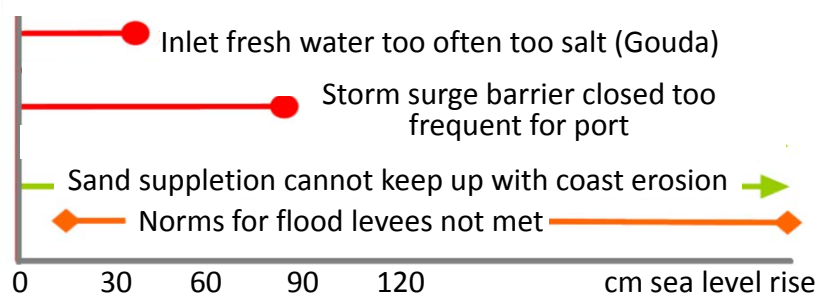
Flood safety

Fresh water

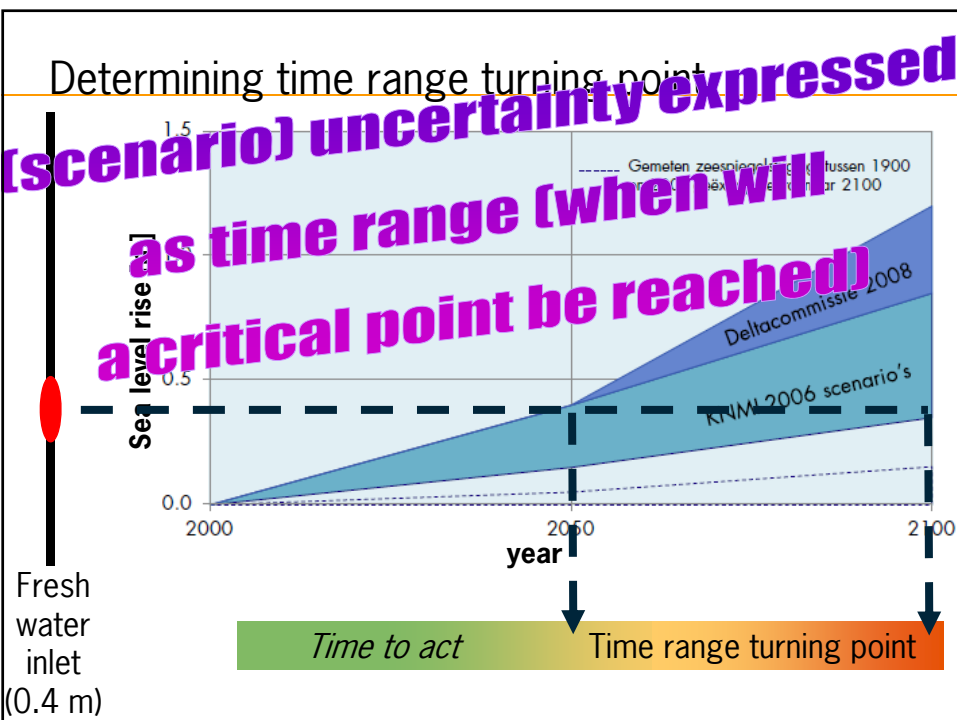
Assessment of adaptation turning points

Step 1: Ask: What are **socio-political objectives**? **Target?**

Step 2: What climate conditions are critical for reaching objectives (beyond which current management fails)



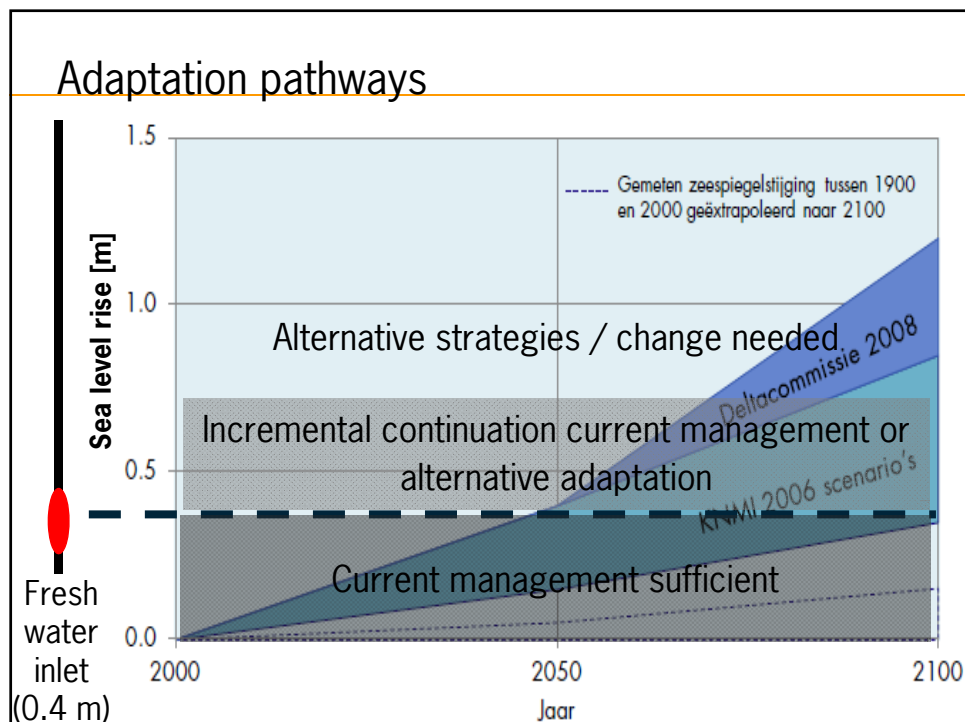
Turning points for Rijnmond region (red dots). Green line: no turning point (Jeuken et al., 2010).



Next: the analysis allows you to

plan adaptation **over time**:

Adaptation pathways



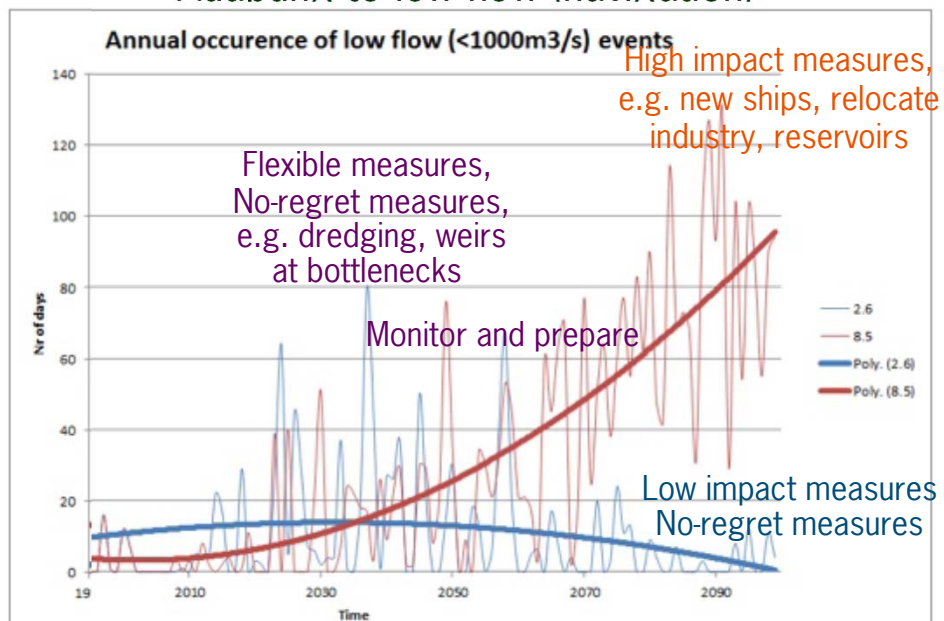
Beyond sea level rise?



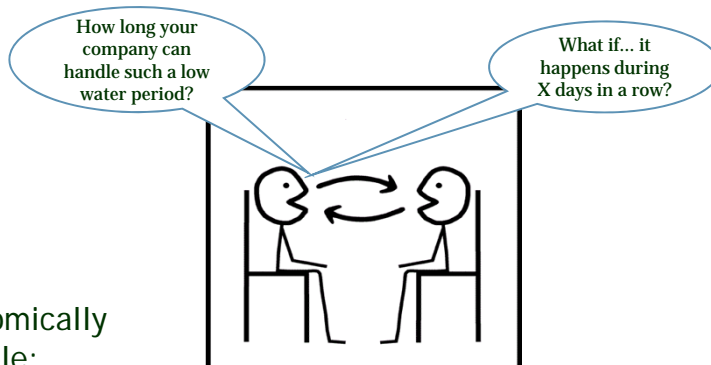
Cargo shipping on the Rhine River

Solar, M R, E v. Slobbe, S E Werners (2014) Adaptation Turning Points on Inland Waterway Transport in the Rhine River. *J. Water and Climate Change* **in press**.

Adapting to low flow (navigation)



Is it that simple? Composite indicators(navigation)

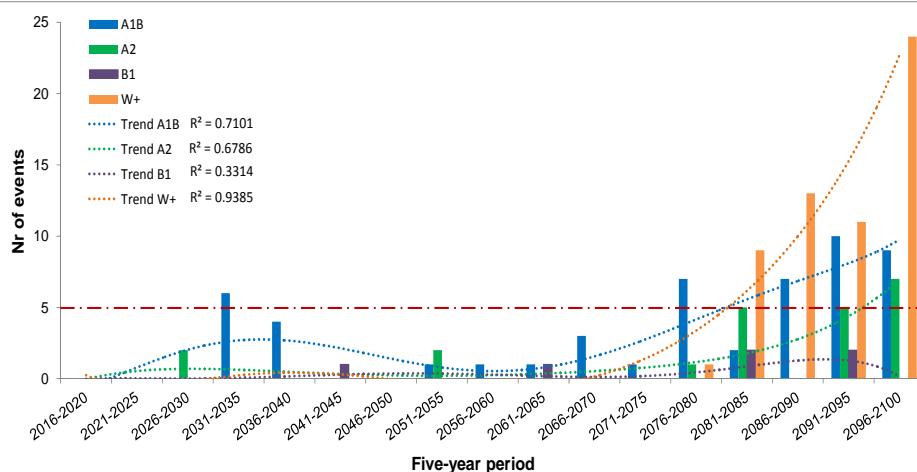


Situation
socio-economically
unacceptable:

"the moment in time when the minimum water depth required for normal vessels' propeller performance is not reached during -at least- 7 days in a row, every year"

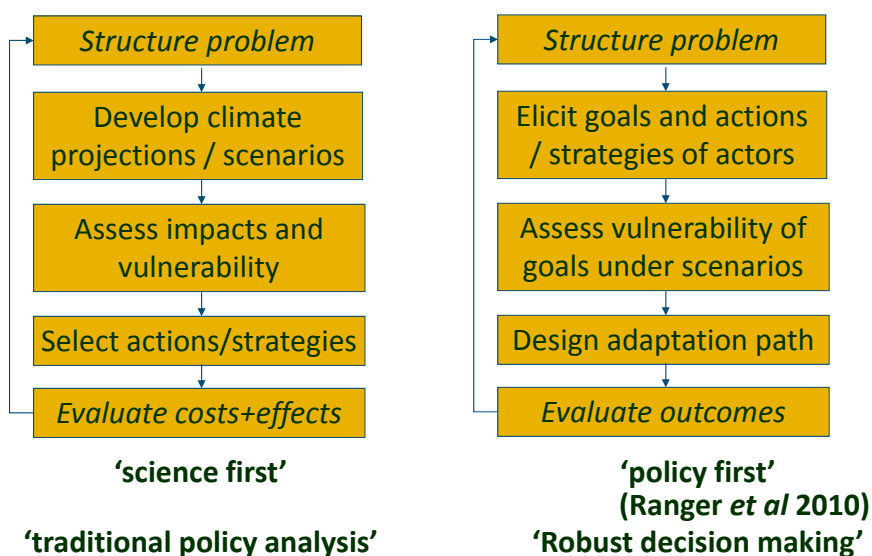
Solar, M R, E v. Slobbe, S E Werners (2014) Adaptation Turning Points on Inland Waterway Transport in the Rhine River. *J. Water and Climate Change in press.*

Navigation / low flow



Solar, M. R., E. v. Slobbe and S. E. Werners (2014) Adaptation Turning Points on Inland Waterway Transport in the Rhine River. *Journal of Water and Climate Change in press.*

Summary - For consideration



Conclusions / Experience

Method: Adaptation turning points and adaptation pathways as a concept for assessing and communicating the implication of climate change & plan adaptation

- **Risk perception & uncertainty:** Expressing uncertainty in time (when will a critical point be reached) is easier to understand than % change in a certain projection year.
- **Communication:** Close to question of actors.
Allows for dialogue between science & policy community / client (if no answers exist this can inspire research programming)

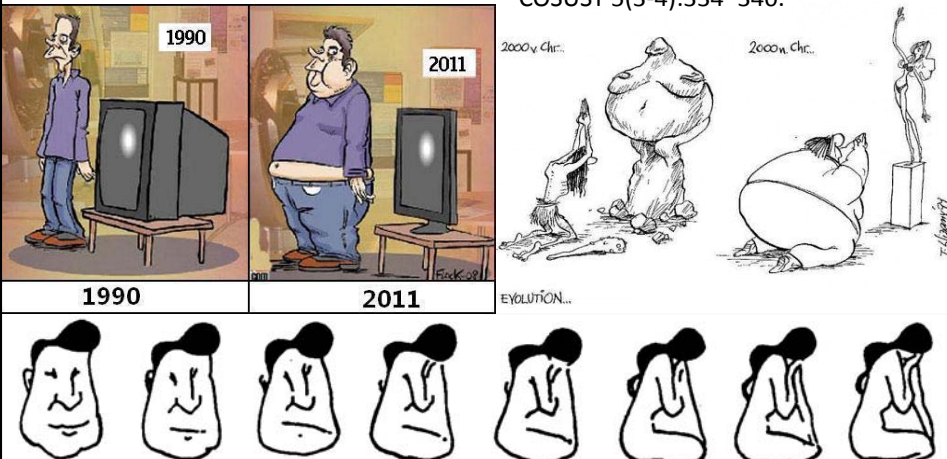


Thank you **Contact:** Saskia.werners@wur.nl

☞ **Discussion / questions?**

☞ **Relevance for your collaborative program?**

☞ **Other feed-back?** Werners, S. E., et al. 2013. Thresholds, tipping and turning points for sustainability under climate change. *COSUST* 5(3-4):334–340.



Thank you

Further reading:

- ☞ Werners, S. E., *et al.* (2013) Adaptation turning points: Decision Support Methods for Adaptation. Briefing Note 9. MEDIATION Project, Wageningen, NL.
- ☞ Werners, S. E., S. Pfenninger, E. van Slobbe, M. Haasnoot, J. Kwakkel, and R. Swart. 2013. Thresholds, tipping and turning points for sustainability under climate change. *Current Opinion in Environmental Sustainability* 5(3-4):334–340.
- ☞ Werners, S. E., Swart, R., Oost, A., van Slobbe, E., Bölscher, T., Pfenninger, S., Trombi, G. and Moriando, M. (2014) Turning points in climate change adaptation. *Ecology and Society* (Special Feature 'The Governance of Adaptation'), in press.
- ☞ Haasnoot, M., H. Middelkoop, A. Offermans, E. Beek, and W. Deursen. 2012. Exploring pathways for sustainable water management in river deltas in a changing environment. *Climatic Change* 115(3-4):795-819.
- ☞ Reeder, T., and N. Ranger. 2011. How do you adapt in an uncertain world? Lessons from the Thames Estuary 2100 project. Washington DC, US.
- ☞ Hamarat C, Kwakkel JH, Pruyt E. 2013. Adaptive Robust Design under deep uncertainty. *Technological Forecasting and Social Change* 80:408-418.
- ☞ Hallegatte S, Shah A, Lempert R, Brown C, Gill S (2012) Investment Decision Making Under Deep Uncertainty Application to Climate Change. Working Paper. World Bank, US