

Sustainable use and management of the subsurface: governance issues

Frank Boons

Erasmus University Rotterdam

Department of Public
Administration



agenda

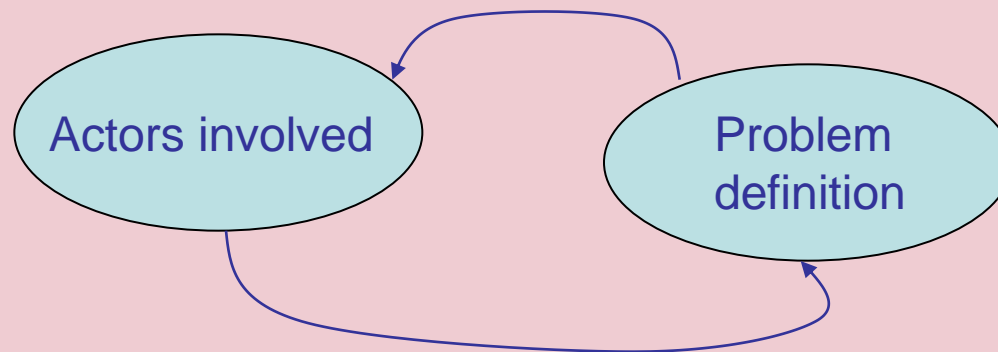
1. Governance of the subsurface as a research focus: what system boundaries?
2. Some illustrative 'situations'
3. Complexity as a perspective
4. Knowledge gaps and research opportunities



Governance of the subsurface

Governance = the coordination of activities of societal actors around collective problems

system boundary is determined by:



Illustrative situations

Expanding metro network

Amsterdam

- Overrunning budgets
- Building activities lead to sagging houses



Soil remediation combined with energy storage: faster cleaning of soil

applied in Eindhoven, Utrecht



Wieringermeer:

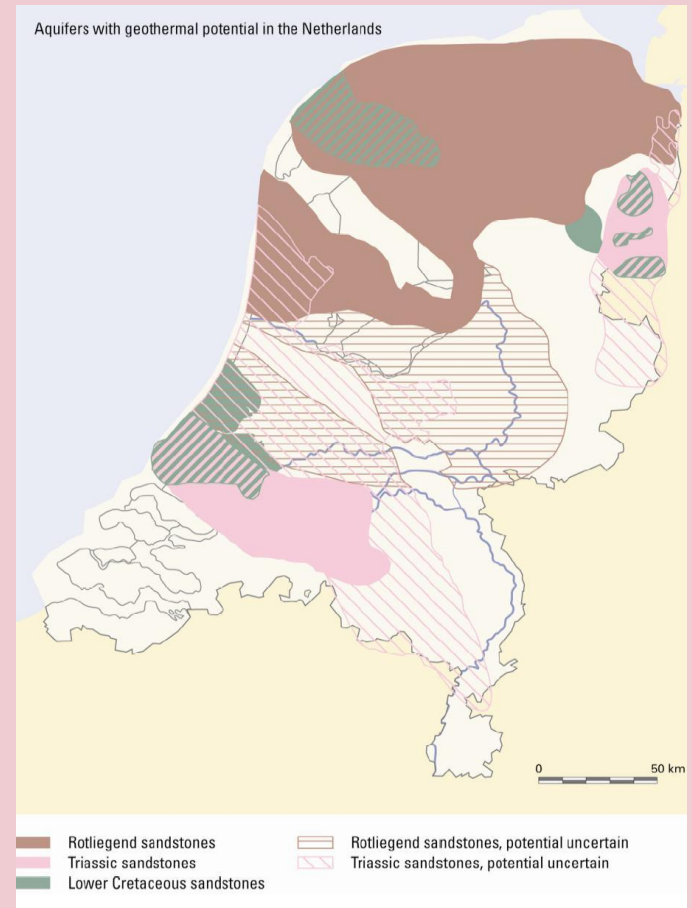
- Increased windpower generation
- Access to grid is limited

→ Attract energy intensive activities (Data Hotel)



Geothermic energy:

- 'proven technology'
- Advantages for users (but high investment)
- Planning is collective issue



Observations

- Subsurface is – part of – a physical/ecological system that is increasingly part of collective problems (and solutions)
- Many of the processes in this system have different scale and timeframe than decisionmaking systems
- Actors involved have different problem perceptions, system boundaries, and opportunities for solutions
- Polycentric decision system: networks of dependent, but partially autonomous actors



Complexity as a perspective

- Complex systems are inherently ***unknowable***; how to deal with this in governance?
- ***Self-organisation*** is a basis; government can provide boundary conditions
- Sub-systems co-evolve: ***synchronisation*** is a viable strategy
- Synchronizing physical and decisionmaking system:
 - Trying to match long scale & time frame leads to rigidity
 - Solution is ***adaptive arrangements***



Knowledge agenda from a social science perspective

1. How do actors deal with the dynamics of technology development: first incomplete information, later entrenched interests?
2. What institutional arrangements ensure effective and just use of the subsurface?
3. How can sustainable co-evolution of social and ecological systems be achieved?

