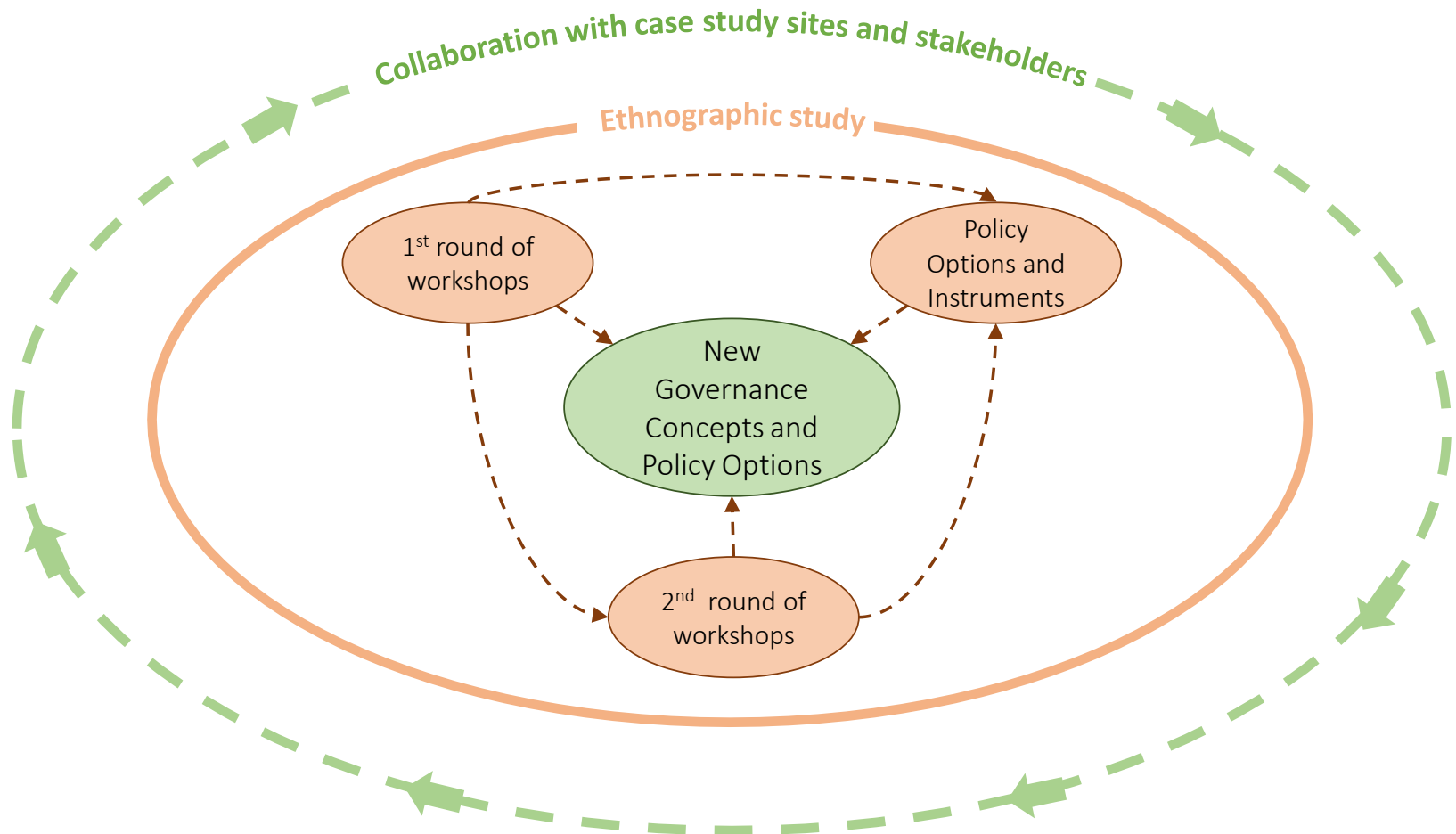


New Governance concepts and Monitoring aspects

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Two rounds of workshop



Spatially differentiated measures

Reduction of N varies with factors like soil-type, soil depth, slope and how much tile drainage there is.

If the retention is high, lower amounts of N reach the stream.

Spatially differentiated measures (like different amount of N used, placement of wetlands, land-use) can help nitrate reduction

Spatially differentiated measures II

In the Norsminde and Odense catchment area (BONUS SOILS2SEA Case Study area in Denmark), 10-20% extra nitrate reduction can be obtained in the subsurface through optimal spatial location of crops.

Retention maps

Retention maps estimate the N-transport and N-retention based on models and observation data

Retention maps can be one tool to exploit potential of spatially targeted measures.

To achieve the best results, retention maps with a fine spatial resolution (1- 25 ha) are necessary.

The level on uncertainty rises with the resolution (= is the map showing real conditions)

In Denmark currently retention maps at around 1500 km² resolution are used – they cancel out almost all economic and environmental gains of a spatially differentiated approach.

Governance Scenarios

1: centralized context

2: flexible management

3: co-governance

How to design a governance system for spatially differentiated regulation?

‘Centralised’ context

In the ‘**Centralised**’ context, the **State makes all decisions** on the use of measures, including **fertilisation norms**, at farm or field level. The government uses retention maps at a **low resolution** (e.g. 15km²) to produce spatially differentiated regulations for land-use. This differentiation can increase the effectiveness of catch-crops, constructed wetlands, and help to define fertilisation norms. Government **monitors at large catchment** level to evaluate if N reduction targets to coastal waters are met. To monitor and control implementation, farmers are required to **report detailed** plans for cropping systems and fertilisation. Farmers fulfilling the government requirements receive **subsidies** from the EU CAP.

'flexible management'

Under the '**flexible management**' scenario, authorities and farmers **work together** to reduce N emissions through a market-based '**cap and trade**' system. All farmers are obliged to **participate**. Based on retention maps with relatively high resolution (e.g. 25 ha), permits for N loading are distributed on a field basis. The community of farmers can **trade N load allowances amongst themselves**. To document compliance each farmer reports with detailed plans for cropping systems and fertilization. Non-compliance with individual allowances is **sanctioned**. Government authorities can **intervene** in the market by buying up or selling permits. The government performs **control monitoring at catchment level** to evaluate if the reduction targets to the coastal waters are achieved.

„co-governance“

The ‘**co-governance**’ approach describes a **low level** of State involvement. Farmers in the catchment **co-organize**, (e.g. forming a water council) to decide on measures to reach government-set targets. Detailed retention maps - at 1 ha resolution - can be used by farmers as a tool for spatially differentiated management. A system of **self-monitoring** is established. Authorities provide **financial and technical support** and information (e.g. establishing a water council with a technical support, detailed retention maps, monitoring process support). The authorities will **monitor only the entire catchment** at the outlet. **Subsidies** are based on reaching the target loads for the entire catchment and their **distribution is negotiated** between the farmers. If farmers/water council cannot agree , a central regulation based on Scenario A is imposed.

**What are the conditions
for successful a
transboundary
co-governance?**

Discussion

Discussion 1: monitoring & governance

- *How could monitoring ensured over borders?*
- *Who are most important stakeholders?*
- *Is there already a transboundary cooperation?*

Discussion

Discussion 2: problem identification & solutions

- What are the most pressing transboundary problems
- Informal bilateral treaties (between regional/national level?)
- Technical solutions? (e.g. water treatment plants)
- What kind of scientific evidence is needed?
- What would be incentives to cooperate?

Thank you!

For more visit:
www.soils2sea.eu

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Common-pool resources (CPR)

- Good water quality of the Baltic Sea is a common good (difficult to exclude others from enjoying its benefit - non-excludability characteristic)
- There is a rivalry in its consumption (pollution, fishing, transport, etc.)
- Non-excludability and rivalry in consumption = common-pool resources (CPR)

Elinor Ostrom

- Elinor Ostrom developed theories on socio-ecological systems, collective action and institutional diversity.
- Her ‘school of thought’ has identified institutional design principles and frameworks describing the conditions under which co-governance by users works sustainably over a longer period of time.

Research on variables and principles

- research on CPR management provides variables and principles relevant for self-organisation processes and institutions (Ostrom 2015, 2005; Poteete et al. 2010)

Variables

- **Number of participants**
- **Type of resource**
- **Heterogeneity of participants**
- **High marginal per capita return**
- **Transparent, up-to-date information about average contributions**
- **Freedom to enter and exit**
- **A linkage structure**
- **Effective, transparent and accurate monitoring and sanctioning**
- **Reputation**
- **Security**
- **A long time horizon**

Discussion

- 1) What does the governance setting look like in this scenario (which policies, support from which ministries, legal framework, financing, technical support)?
- 2) What role do different institutions play? How are they likely to behave/react/participate in this scenario?
- 3) How could self-organised monitoring work?

Design principles

- **Clearly defined boundaries**
- **Collective-choice arrangements**
- **Congruence between appropriation and provision rules.**
- **Graduated sanctioning and conflict-resolution mechanisms.**
- **Natural resource users' right to organize is not challenged by external governments**
- **Nested enterprises**
- **Monitoring**

What is the up-scaling potential of this approach working in Sweden?

- Could this work for other catchments?
- Would it be possible to apply this for whole regions or even nationally?