BONUS SOILS2SEA:
Future governance approaches for reducing excess nutrients at local farm scale – Upscaling

17 May 2017 | Ecologic Institut, Pfalzburger Str. 43/44, 10717 Berlin, Germany

Wednesday, 17 May 2017	
9:00 – 9:15	**Arrival - welcome coffee**
9:15 – 9:45	**Opening and Welcome to the Workshop + Introduction to Soils2Sea** *Jens Christian Refsgaard (Geological Survey of Denmark and Greenland - GEUS) and Grit Martinez (Ecologic Institute)*
9: 45– 10:15	**Soils2Sea Scenarios** *Jørgen E. Olesen (Aarhus University)*
10:15 – 11:00	**New governance concepts and monitoring** *Nico Stelljes & Katriona McGlade (Ecologic Institute)*
11:00 – 11:15	**Coffee Break**
11:15 – 12:30	**How can co-governance be applied in practice?** **World Café** *Table 1: Governance. Moderation: Katriona McGlade (Ecologic Institute)* *Table 2: Stakeholders. Moderation: Grit Martinez (Ecologic Institute)* *Table 3: Monitoring. Moderation: Nico Stelljes (Ecologic Institute)*
12:30 – 13:30	**Lunch**
13:30 – 14:35	**What are the conditions for successful co-governance?** *Presentation and discussion in small groups. Moderation: as above*
	Coffee
14:45 – 15:15	**Examining co-governance at different scales** *Plenary discussion. Moderation: Grit Martinez (Ecologic Institute)*
15:15 – 15:45	**Project results for the Baltic Sea Scale** *Alena Bartosova (Swedish Meteorological and Hydrological Institute - SMHI)*
15:45 – 16:00	**Wrap-up and closing of the workshop** *Jens Christian Refsgaard and Nico Stelljes*
16:00 – 19:00	**Excursion 'Tour of Berlin' (guided Bus-Tour through Berlin, starting from Workshop location and ending at the Oxymoron Restaurant)**
19:00 – 21:00	**Networking Dinner, Presentation of Soils2Sea Film,** **Restaurant Oxymoron (Hackesche Höfe, Rosenthaler Straße 40/41, 10178 Berlin)**

Summary of the workshop

1. Introduction

The upscaling BONUS SOILS2SEA workshop in Berlin was held on 17 May 2017 at the Ecologic Institute. Altogether, 26 persons from riparian Baltic Sea States participated in the workshop (details in Appendix). The workshop had two main interactive sessions. In the **first world-café session**, a co-governance' scenario was discussed that describes a low level of State involvement in the management, monitoring and control of N loading. In the **second world café session**, variables for successful implementation of co-governance were discussed. This document presents a summary of the two world café sessions.

Additionally, three accompanying presentation were given, presenting preliminary results from the project. Jens Christian Refsgaard (Geological Survey of Denmark and Greenland - GEUS) gave an introduction to the project, highlighting the projects case studies and the idea of **spatially differentiated regulation**. This idea is based on the natural removal of nutrients, which varies spatially depending on natural conditions (geology, topography, climate, etc.). In the Danish Case Study area (Norsminde and Odense catchment), 10-20% extra nitrate reduction could be obtained in the subsurface through optimal spatial location of crops. Further gains could be made through optimal location of constructed mini-wetlands, but also of in-stream mitigation measures prolonging the transport times, increasing the uptake in vegetated zones or enhancing filtering in streambed sediments. This idea forms the basis for the governance aspects within the project.

Jørgen E. Olesen, from the Aarhus University, presented the projects approach on **scenarios**. Scenarios are images of the future and not predictions. The project uses multiple scenarios to provide pictures encompassing a range of plausible futures. The project scenarios are based on three different components: socioeconomic change, climate change, and spatially targeted measures. And three different **Shared Socioeconomic Pathways (SSP)** were chosen to analyze changes in three case study sites.

Alena Bartosova (Swedish Meteorological and Hydrological Institute - SMHI) finally presented preliminary project results from a pan-European hydrological model: **E-Hype**. Based on the SSPs and the scenarios, the model displays the different possible changes for the whole Baltic Sea. With this tool, different effects of climate change, land-use change or reduction measures can be modelled for the Baltic Sea. The results give a good idea about the changes in total nitrogen loads, concentrations, and discharge for the whole Baltic Sea catchment area. Also, annual changes for the outlets from several major tributaries for the Baltic Sea were analyzed. More detailed results are excpeted as outcome of the project, but as a prelimary result it can be stated that the different SSPs have an effect on the Baltic Sea with the climate being a strong driver.

2. World Café, Session I

In the **first world-café session**, a co-governance' scenario was discussed (see box below). This scenario describes a low level of State involvement in the management, monitoring and control of N

loading. Farmers in a given catchment self-organize, (e.g. forming a water council) to decide on measures to reach government-set targets.

Scenario C

The '**co-governance'** approach describes a low level of State involvement in the management, monitoring and control of N loading. This scenario places a focus on the co-governance of farmers within one catchment. 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 - have higher uncertainty, but can be used by farmers as a tool for spatially differentiated management of the catchment. A system of self-monitoring is established to check and modify the retention maps and ensure that the target goals are reached (e.g. monitoring at a field or sub-catchment level). Authorities support the process of self-monitoring by providing 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. The allocation of EU CAP subsidies is based on reaching the target loads for the entire catchment and their distribution is negotiated between the farmers. If farmers/water council cannot agree on a plan for implementation, the State will impose a central regulation based on Scenario A.

The scenarios A and B can be found in the Appendix. All three scenarios were discussed in previous workshops undertaken in the project Case Study areas. A summary of the results of the workshops can be found in the project Deliverable 6.2 "Proposals for new governance concepts and policy options". At the workshops in Sweden and especially in Denmark, the co-governance approach was seen as the most promising way to introduce the idea of spatially differentiated regulation. Therefore, the discussion at this up-scaling Workshop focused at this workshop solely Scenario C with the main question of how can co-governance be applied in practise. For answering this question, three world-café tables were introduced, where three topics were discussed: (co-)governance, stakeholders, and monitoring.

2.1.1 (Co-)Governance

The discussion about co-governance addressed several topics. One important issue is that the **problems and goals** have to be well defined beforehand. While reducing N loads to the Baltic Sea is one important goal, there are many other goals which sit in parallel to this. The EU Birds and Habitats Directives, the Water Framework Directive and the Common Agricultural Policy are just some examples where conflict between goals could arise as it comes down to the finer details of implementation. On the positive side, there are also co-benefits that can arise when taking into account other objectives e.g. nature protection.

The need for a co-governance approach is determined by the **ambition of the reduction target**. With rather low reduction targets, a complex co-governance regime might not be needed. However, if the targets are more ambitious, there is a need for a greater flexibility and variety in terms of the management options and governance structures employed. The further reaching the targets, the greater the need for co-governance. It was also discussed if a co-governance regime would need the implementation of **additional governance structures and institutions**. It was suggested to use existing institutions and structures where possible to reduce the transaction costs for farmers to get involved. However, some participants felt that these institutions for farmers to participate in co-governance with the authorities are lacking in their countries for the national level.

The **framing** of the problem and goals were also discussed. When framing the issue of N loads negatively with a narrative of presenting farmers as polluter and responsible for reductions, it can reduce motivation for farmers to act. By framing the issue more positively and by providing training, there may be possibilities for achieving greater buy-in. It was also suggested to not only involve famer in the discussion. 'Outsiders' with other interests and expertise from different disciplines should also be part of the co-governance regime. For the **structure** of such a system, it was deemed essential to have a method for coordinating farmers and the subsidies to be disbursed e.g. through management by catchment officers and/or catchment councils. Also, for a positive outcome of such a regime, a sufficient investment of **time** was indicated. This is important to users to establish trust and also to build up a shared knowledge and understanding of the systems (i.e. environment, industry, society).

2.1.2 Stakeholders

It was felt that **everybody** who has a stake and knowledge should be able to participate in a self-organized group. If goals (such as reduction in demand) are set out clearly from the beginning and issues which are of interest and concern related to the goal are brought to the table, it is rather likely that more, rather than less people will take a stake in the process. Local farmers and landowner organizations should be involved (as they typically hold a lot of valuable knowledge) alongside local water users and NGOs. Participants were unanimous about the need of a chairperson/ moderator in any given self-organized group in order to steer communication, build confidence and strive for results. This person should have confidence and credibility from farmers, water users, and authorities alike and a be able to act as a bridge builder between top-down (directives) and bottom-up (local) initiatives. It proved to be helpful if the chairperson can act on an employed basis, modest membership fees are demanded and financial means can be made available to support reduction activities (e.g. compensation for land etc.)

Participants felt that self-governed **local water councils** are a conceivable solution. Such a council can be made up in different ways depending on the importance of the topic to the stakeholder, legal obligations and regulations in the catchment. They can operate at catchment or/ and trans-boundary levels.

However, as there are fundamental different historical and cultural variables in the way that farmers, water-users, authorities and scientists interact with, and react to, their environments (including the institutional environment) the interviewees expressed different opinions on the execution and performance of such self-organized local groups.

In Denmark for example it was reported that national authorities usually empower the building of local water councils and that this is well perceived by local stakeholders. While in Russia a top-down approach seems to be a preferred solution and any self-organized group would most likely look for centralized management from higher levels. In Poland, where farms can be very fragmented (in the south) or rather large (in the north), the practicability of a manageable size of self-organized group would be influenced by scale issues.

2.1.3 Monitoring

Monitoring is an important aspect of the co-governance scenario. The setup in this scenario is that the authorities would only monitor the N-leaching at the outlet of the catchment. If additional monitor-

ing has to be carried out for sub-catchment, this has to be organized by the farmers in the catchment.

The discussions revealed, that a clear goal setting has to be implemented beforehand to clearly define, **what** and **how** to measure. These standards still have to be set from the authorities and for example can be based on HELCOME suggestions. The authorities have to clearly explain how the goals are set and must be very transparent in their decision making. The farmers should take part of the decision making to ensure their agreement and understanding of the goals. To design monitoring activities**, conceptual models** are needed. They should show sources of water and pollution and also groundwater flowpath and the groundwater/surface water connection. Especially the groundwater is very difficult to monitor, because the groundwater aquifer do not necessarily overlap the catchment. Therefore the difference between the ground- and surface water within a catchment has to be carefully considered and can be a big obstacle to measure the nutrients runoff from the catchment. This obstacle makes it very unlikely, so that only one measurement point can monitor the whole catchment.

Different measures (like created wetlands or two-stage water courses) to reduce nutrient loads were also discussed. Especially the expected **effectiveness** was discussed and that it might be a problem, if the reduction-targets of the measures are not reached. It has to be agreed beforehand, who takes over the responsibility if the assumed reduction targets are not reached. It has also to be considered, that certain measures have **a time-lag** before measurable results become visible.

For the monitoring-activities undertaken by farmers, it was suggested that farmers hire a **3rd party** to ensure quality of the sample and methods, reliability of results and therefore ensure the trust in the results. Additionally, farmers should also report about measures that they have implemented and the N-input and balance/surplus on field level.

Also new approaches were discussed: with new technologies emerging, **citizen science** can be used for monitoring aspects. New apps can be developed or schools could carry monitoring approaches on a voluntary basis.

3. World Café Session II

In the **second world café session**, variables for successful implementation of co-governance were discussed. This list is based on the project deliverable 6.2 ‘Towards co-governance in monitoring of spatially differentiated regulation for good water quality – Common pool resources and EU law’. It derived from a literature review (based on: Ostrom 2015, 2005; Poteete et al. 2010) and included seven aggregated variables (see list below).

1. Trust is a core variable highly influenced by repetition of the situation, the reputation of others’ past actions and a reciprocal or uni-directional linkage structure of the community network.

2. Group make-up: large enough to mobilize resources (e.g. finances, knowledge), small enough to keep the transaction costs low. Homogenous groups can work together more easily but heterogeneous groups can bring wider set of resources to the table.

3. Group membership: Freedom to enter and exit the group is balanced so that no lock-in situation but also no high fluctuation occurs.

4. Communication: key variable (preferably face-to-face) to faciliate transparency, trust and helped through repetition meetings, reputation.

5. Users' rights: natural resources users' rights to organize are not challenged by external **government** and those who are affected by operational rules can also modify them.

6. Sanctioning, monitoring and conflict resolution: Effective, transparent and accurate monitoring and sanctioning capabilities support collective action. Participants have easy access to low cost systems for conflict resolution.

7. Long time horizon: motivates participants to build a good reputation and cooperate early on.

Workshop participants felt that the establishment of **trust** highly depends on an open and transparent set-up of the self-organized group. Clear goals, roles, responsibility and contact partner were seen as main ingredients. In an echo of the first round of discussions (2.1.1), participants commented in particular on the need for predictability of the conditions of the legislation. Furthermore, some participants remarked on the need to trust the goals themselves (that a problem exists and that it can be solved through these aims). The chairperson of the group should naturally be a good communicator with a strong reputation for solid and transparent work in farming and grounded local knowledge alongside its reputation of integrity. In relation to the issue of gaining trust among the participants in co-governance, different aspects were discussed. One important aspect is continuity. There should be an agreement that the participants should stay together during the project phase. Especially a high fluctuation from the authority side can slow down trust building. A second aspect is transparency: an open exchange of arguments and information will help in the process. Also, all agreements should be well documented. Predictability is another aspect, meaning that consequences of actions should be well predictable. This can imply sanctions but also reward mechanisms must be very predictable. Reputation was also mentioned as aspect that can enhance trust. An ownership from all parties in the plans will enhance trust as well. Overall good cooperation will result in trust.

For the **group make-up**, participants felt that everyone with a stake and knowledge in a given catchment should be invited to join the group. As example, in the Tullstorp project in Sweden, 165 potential stakeholders were approached while 75 people joined the group. The group is led by seven board members, Tullstorp project in Sweden, 165 potential stakeholders were approached while 75 people joined the group. Concerning the **group membership**, the Tullstorp project served as another example. Here, all farmers have the freedom to enter or exit the group. Participants felt that this should be the normal procedure of any self-organized group.

The findings in the literature about **communication** were clearly mirrored by the discussions, with emphasis placed on reputation, trust, and face-to-face communication. Time emerged as a critical factor for effective communication, i.e. the need for long time frames of engagement to build up trust for open discussion. Also, despite the advances of modern communications technology, face-to-face communication was considered indispensable, particularly in the early stages. Participants agreed that in order to get stakeholders to engage, this could be encouraged by an initial meeting with someone whose reputation is known and who is trusted by the farmer. In Sweden, so called 'kitchen table meetings' are an effective way of communicating with farmers – the advisor comes to the farm where they engage in a relaxed one-to-one meeting. Above all, participants noted, the purpose of the co-governance arrangements and meetings must be clear in order to be effective. In terms of information sharing and reporting, it was deemed important to be able to be technical in discussions and to have the relevant information at hand to be able to go into sufficient detail.

According to the literature on common pool resources, natural resources **users' rights** to organize should not be challenged by external government and those who are affected by operational rules should also be able to modify them. Echoing some of the conversations at the governance table in the first round of discussions, participants raised the question of who are the users that have rights to the resource. In the European context, it is usual that someone owns the land, but not the re-

sources inherent to that land (i.e. soil, water), which are common goods. How is it possible to weight different rights to these common goods against one another, in particular where some of these are supported by a strong lobby group? Furthermore, one participant highlighted the need for people to be compensated for providing public goods, both now and in the future. In some cases, farmers are averse to providing public goods such as areas for nature conservation or recreation as they do not want people walking on their land. One interesting issue raised related to inter-generational equity – how is it possible to take into account the rights of users from future generations?

Concerning the issues of **sanctions and rewards,** participants felt that sanction mechanisms could only be based on legal agreements. In such a co-governance system, boundaries are needed and sanction mechanism can help to keep the boundaries. However, if the sanctions are too strict, the co-governance system can collapse. The sanction mechanism should be transparent. It was stated that farmers/participants in the co-governance system should not have the power to sanction other participants. It should rather be an authority that imposes sanctions. It was also suggested rather to focus on rewards instead of sanctions. While the main reason to join such a co-governance approach would be economically driven, other aspects should not be neglected. For example the possibility to improve the environment or to get access to information can be a driving factor. 'Social sanctions & rewards' were also discussed. For example, acknowledgement of 'best farmers' was suggested or peer pressure was identified (for example if most of the farmers join the approach, they can convince other farmers to join as well).

The last topic addressed the issue of **time** and how long should a time frame be for a co-governance approach to work. In general the timeframe depends on the overall framework that is driven by the problems and the defined goals. From the problem perspective, the timeframe should be long enough to solve the problem. For the goals, it was suggested to include time steps with definitions when the goals should be reached. The goals should also be linked to actions plans from authorities (like timeframes of the WFD or HELCOM). In theory, such an approach would be a continuous approach with not a defined end point but it was stated that a setting-up of such a co-governance approach should at least be 10 – 25 years.

4. Literature

Ostrom, E. (2015): Governing the commons. Cambridge university press.

Ostrom, E. (2005): Understanding institutional diversity. Princeton Univ Pr, New Jersey.

Poteete, A.R.; Janssen, M.A.; Ostrom, E. (2010): Working together: collective action, the commons, and multiple methods in practice. Princeton University Press.

5. Appendix

World Café Part I: Scenarios

Background

In Europe, targets for load reductions for total allowable organic fertiliser to surface waters and total loads to the Baltic Sea basins have been set via the WFD and HELCOM. Yet imagine that we as stakeholders have the possibility to influence the *way* in which nitrate loads are managed under the third WFD implementation cycle (2021-2027). We would like to have a discussion of the three alternative governance scenarios outlined below. Rather than regulating what farmers may put on crops, we suggest a form of governance where farmers are regulated by the loads from their fields (or in the nearest waterway). These scenarios differ in the degree and approach to centralised/decentralised decision making and the data used to plan and monitor the regulation.

Spatially differentiated measures

Spatial targeting of mitigation measures has the potential to produce economic and environmental benefits. Between the root zone of crops and outflow to streams, nitrogen is reduced in the groundwater. This is called groundwater retention. How much reduction occurs in the groundwater varies with factors including the soil-type, soil depth, slope and how much tile drainage there is. If the retention is high, lower amounts of N reach the stream. We could therefore exploit this fact by relocating crops with larger nitrogen leaching losses to fields with higher retention.

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. Further gains can be made through optimal location of constructed mini-wetlands, but also of in-stream mitigation measures prolonging the transport times, increasing the uptake in vegetated zones or enhancing filtering in streambed sediments. Altogether there can be substantial economic and environmental gains, because it will be possible to produce the same crop yield with reduced nutrient load or increased crop yield with unchanged nutrient load.

To exploit the full potential of spatially targeted measures, retention maps with a fine spatial resolution (1- 25 ha) are necessary. However, in Denmark for example, the level of uncertainty associated with maps at this resolution is seen to be too high for use in government regulation. For this reason, the Danish government currently uses retention maps at around 1500 km^2 resolution, while expecting to improve this towards 15 km^2 resolution in the future. Although 1500 km^2 resolution maps have a lower level of uncertainty they also cancel out almost all economic and environmental gains of a spatially differentiated approach.

Scenario A

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.15km^2) 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.

- Approach: top-down (clear N-reduction targets uniformly for the whole catchment)
- Monitoring: Authorities are responsible for detailed monitoring
- Retention maps: only low resolution maps are used to structure the land use
- Subsidies: Are connected with the requirements set by the authorities

Scenario B

Under the '**flexible management**' scenario, authorities and farmers work together to reduce N emissions through a market-based 'cap and trade' system. This would be initiated by government authorities per catchment, with all farmers 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 (as in Scenario A). Non-compliance with individual allowances is sanctioned by forfeit of a deposit that is then passed onto other farmers for carrying out mitigation measures. Government authorities can intervene in the market by buying up or selling permits from the system to reduce or allow increases to N loads. The government performs control monitoring at catchment level to evaluate if the reduction targets to the coastal waters are achieved.

- Approach: market based.
- Monitoring: Authorities only monitor the N load at catchment level. More detailed monitoring could be arranged by farmers.
- Retention maps: Are used by authorities to calculate the exact amount of allowances and their distribution among the catchment.
- Subsidies: Are connected with the precise usage of allowances.

Scenario C

The '**co-governance'** approach describes a low level of State involvement in the management, monitoring and control of N loading. This scenario places a focus on the co-governance of farmers within one catchment. 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 - have higher uncertainty, but can be used by farmers as a tool for spatially differentiated management of the catchment. A system of co-monitoring is established to check and modify the retention maps and ensure that the target goals are reached (e.g. monitoring at a field or sub-catchment level). Authorities support the process of co-monitoring by providing 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. The allocation of EU CAP subsidies is based on reaching the target loads for the entire catchment and their distribution is negotiated between the farmers. If farmers/water council cannot agree on a plan for implementation, the State will impose a central regulation based on Scenario A.

- Approach: co-governance
- Monitoring: Authorities only monitor the N load at catchment level. More detailed monitoring could be arranged by farmers.
- Retention maps: Could be one tool used by farmers to optimize their fertilizer usage.
- Subsidies: Are only given if the reduction target for the whole catchment is reached.

Participants list

Participant list			
First Name	**Last Name**	**Country**	**INSTITUTION**
Katrine	**Soerensen**	Sweden	**The Tullstorp Stream Project**
Tapio	**Salo**	Finland	**Natural Resources Institute Finland**
Kirsten Flemming	**Hansen**	Denmark	**National Agency of Environmental Protection**
Susanna	**Kaasinen**	Finland	**HELCOM**
Lisbet	**Ogstrup**	Denmark	**The Danish Society for Nature Conservation**
Mateusz	**Sekowski**	Poland	**Agricultural Advisory Center**
Airi	**Vetemaa**	Estonia	**Estonian Organic Farming Foundation**
Helge Kjaer	**Soerensen**	Denmark	**Landboforeningen Odder-Skanderborg (Lokal Farmers Union)**
Maria	**Staniszewska**	Poland	**Coalition Clean Baltic**
Andis	**Zilans**	Latvia	**University Of Latvia**
Sergey	**Aleksandrov**	Russia	**Atlantic Research Institute of Marine Fisheries and Oceanography (AtlantNIRO)**
Bo	**Gustafsson**	Sweden	**Baltic Nest Institute, Stockholm University**
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