TOPSOIL Governance Case Studies:
How can farmers be better motivated to implement the precautionary principle (for groundwater protection), in the context of voluntary agreements and local regulations?

Background: TOPSOIL wants to improve groundwater management by taking a focused look at all aspects from sampling and modelling geological characteristics to understanding legal and organisational contexts, stakeholder involvement, financial barriers etc. Work package 6 deals with best governance practice emphasizing the relations and interactions of legislative and institutional frames but also relevant issues about stakeholders, funding etc. .

Purpose: For this purpose, partners are invited to document cases with a central issue they want to solve (Step 1). These case studies will be commented by TOPSOIL partners from other countries, providing insight on the situation from different perspectives: "How would the case look like, if I had this case study in my area?" (Step 2) The results will be discussed (e.g. at a transnational Challenge Workshop or a partner meeting), and synthesized into road-maps for tackling central challenges in groundwater management (Step3).

The present document introduces a case study of the OOWV.

For further information on the case study, please either contact **one of the** members of the Transnational Governance Team in your country:

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1. Facts on Case Study

GE-5 / Groundwater Bodies in South of Oldenburg, Lower Saxony, see also p.56 in the TOPSOIL pilots' catalogue: http://www.topsoil.eu/siteassets/documents/topsoil_pilot_catalogue_temp.pdf

Groundwater for drinking water provision in the area of the OOWV is pumped from deep groundwater layers[1], and is still of good quality. However, the shallow groundwater layers where future groundwater is stored are highly impacted by agriculture. Large parts of the provision area of OOWV are characterized by intensive agricultural land use combined with little buffering soil conditions, i.e. with vulnerable underlying groundwater bodies. OOWV as the largest water provider in this area works closely with local farmers in drinking water cooperation to support groundwater protection. However, the development of groundwater quality (e.g. re-increasing nitrate concentrations in shallow groundwater) shows that this is not sufficient.

On the basis of Lower Saxony Water Law, the so-called "Cooperation Model for Drinking Water Protection" has been developed. Since 1993, groundwater protection has been practiced successfully in the water protection areas in Lower Saxony via the "cooperative water protection": Farmers use the free advice on water protection and optimize their management methods through the implementation of "voluntary agreements". Accompanying investigations monitor the efficiency of the measures. Representatives of water management and agriculture regularly discuss the current issues of groundwater protection. Farmers receive compensation from drinking water companies for the implementation of groundwater protection measures. They receive subsidies from the water collection fee. This fee attracts Lower Saxony for the use of water. For example, the drinking water companies pay 7.5 cents per thousand liters of water to the land, the so-called "Wassergroschen".

The results of 2016 show at many measurement points in Lower Saxony more than 50mg/l of nitrogen. The question is what we can do and what needs to be done to improve the groundwater quality together with the farmers based on the precautionary principle.

2. Environmental context of case study

In the northern part of the OOWV provision area, clayey layers protect strongly the deeper groundwater layers. The drinking water production areas southern of Oldenburg (where the case study is located) are characterized by glacial sands (kaltzeitliche Sande) with a higher infiltration rate, and a resulting high vulnerability towards migrating pollution. As sandy areas provide naturally less fertile soil, animal husbandry often dominates the local agriculture activities. This generates high amounts of organic fertilizer which needs to be disposed of.

3. Management issue – simplified

- Major challenge?

  Groundwater protection, motivate all stakeholders but especially farmers to adapt their management practices towards the precautionary principle.

- General Approach / Solution?

  Main focus in the OOWV area has been to compensate farmers at an individual basis for implementing specific management activities. Since 2015, this approach is further developed so that the compensation is results' depending: if a specific concentration is not achieved, (part of) the compensation is not paid.

[1] Groundwater is pumped from up to 160 m, and needs up to 60 years from surface to the deep layer.

- Major Obstacles to implement solution?
  The partly instable context reduces the benefits for the farmers to stronger engage in precautionary groundwater protection but emphasizes short term benefits of less protective management. Thus, it is difficult to convince farmers to engage in groundwater protection.

4. Management issue – expanded

- *Main issue*

OOWV needs to ensure better protection of groundwater resources. For this, agricultural commitment needs to be improved by all stakeholders – farmers, regulatory authorities and legislative bodies. Groundwater protection has to be prioritized, and agricultural management activities need to better consider their impact on underlying groundwater bodies.

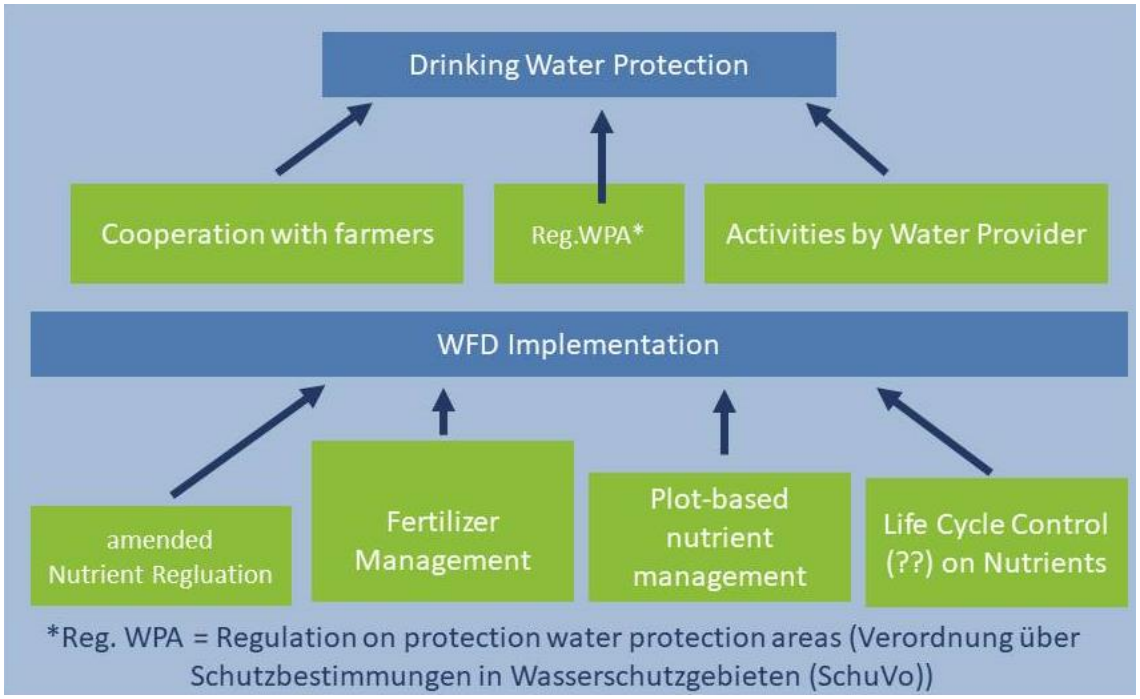
The current recommendations for fertilizing are not focused on sustainability but on maximizing the agricultural income. Regulations on protecting the environment and on subsidies for farmers and fertilization are sometimes incoherent. The national regulations in Germany are not sufficient to protect the groundwater from nitrogen. Some experts say that even the renewed laws on fertilization are no enough to protect the groundwater.

Still, there seem to be also some gaps with regard to comprehensive implementation of the existing groundwater protection regulations.

- *legal frame (local / regional / national / European law) and legal obstacles?*

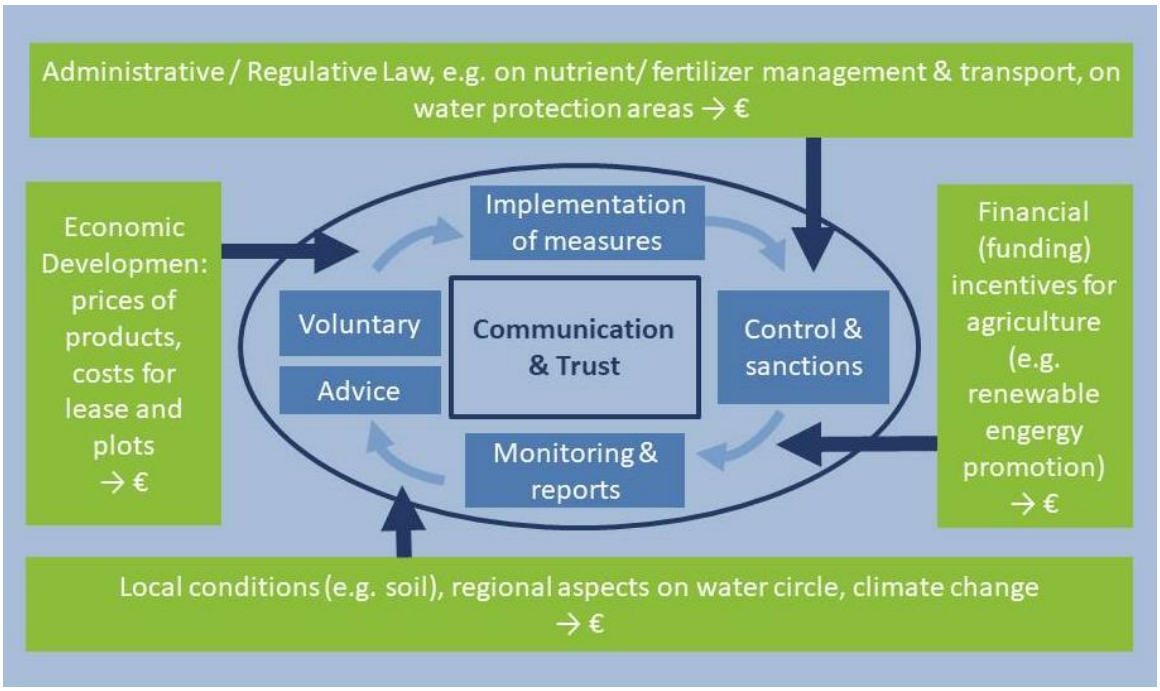
Groundwater management takes place within a system of voluntary and regulatory instruments (see graphic below):

Figure 1: Regulatory and voluntary measures for groundwater protection. Translated and adapted from Aue(2017): Grenzen und Möglichkeiten des Grundwasserschutzes. Der Kritische Agrarbericht. S. 35, Abbildung 2



While Germany has been sued by European Commission for the insufficient implementation of nitrate's regulation, in general support by the municipalities could be expanded. However, the context of voluntary measures is not only regulatory, but also the larger economic context as well as incentive based instruments embedded in EU regulation:

Figure 2: (Dynamic) boundary conditions for cooperation between agriculture and water provider. Translated from Aue(2017): Grenzen und Möglichkeiten des Grundwasserschutzes. Der Kritische Agrarbericht. S. 35, Abbildung 3



- *Is any approval procedure relevant (e.g. for groundwater abstraction permits)*

No.

- *Is the funding of measure(s) secured by the responsible person / organization or supported by other funds?*

The voluntary cooperation for groundwater protection were introduced with the water abstraction fee (so called "Wassergroschen") in 1972, which is paid to the Land by the water providers (and other water users) for abstracting groundwater. 40% of this income (about 17 Mio Euro) is fed back by the Land for cooperative groundwater protection in areas protected for water production.

- *Who is responsible for planning, initiating or implementation of (potential) measures? Who is the problem owner?*

As the OOWV relies on suitable groundwater, its statutes include the duty for groundwater protection. Thus, the water provider takes responsibility for ensuring this and takes problem ownership. However, municipalities are the regulatory authorities to control and implement regulatory instruments for groundwater protection.

5. Options and obstacles

What are the different options and obstacles currently possible within legislation, funding and stakeholder involvement should be mentioned here - please elaborate each bullet.

Options / Solutions:

Technical solutions (to be avoided due to additional costs):

- Dilution of raw water with less polluted groundwater or dismiss use of highly polluted groundwater for drinking water-

Financial Instruments – funded by water abstraction fee

- Compensation for adapted management practice,
- Compensation for reduced nitrate concentration

Legislation changes:

Strengthening of regulation on nutrient management:

- Controllable and plot-depended nutrient management and qualified resource management, including sanctions for non-compliance
- Consideration of all relevant nutrient loads for management of fertilizer application

Obstacles to implement the solutions:

Resources and preparedness / willingness to implement groundwater protection are limited. If a large number of farmers engages, how well do the remaining farmers manage? It is difficult to identify most effective measures, and how to prioritize.

6. Questions to TOPSOIL partners

The following questions are not only from OOWV, but include also the questions from the TOPSOIL case study UK 1, as they face a rather similar situation. As a responder, please respond to the first 3 questions if possible, and select all those below you can respond to.

- **How would you deal with the situation in your area?**
- **How do you interest commercial farmers in protecting and improving the environment?**
- **How would you identify the measures with the largest positive impact on groundwater protection?**
- Can you provide good example on improving nutrient efficiency in farms?
- Which practices would you want farmers to change and how would you achieve those changes?
- What barriers are in the way of making these changes and how should they be overcome?
- Do farmers engage in voluntary agreements for protecting groundwater? Why? What is their benefit?
- Is there any experience with participatory / co-governance management processes in vulnerable areas?
- How do you measure environmental improvements arising from the measures taken?
- Are there any established methodologies to monitor nitrate percolation to groundwater?
- What modelling softwares/methodologies would you recommend for; 1) nitrate percolation, 2) minewater/groundwater interactions, 3) Phosphate (sewerage) inputs.
- Who would be responsible in dealing with the challenges in your country? Who are good persons to contact on this issue?
- Any specific references (including page-numbers…) you would recommend?