

Evaluation 'Multiple Environment Monitoring System for Regional Control (3MG)' (WP-021)

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Introduction

The current Dutch manure policies and regulations put a strong emphasis on individual farms and are input and not output oriented. It is felt by farmers that these regulations are too restrictive

1. with negative side effects on nature conservation,
2. with too little room for alternative strategies to reach environmental goals,
3. providing no insight into environmental impacts of activities, and
4. leading sometimes to negative side effects for other environmental compartments. This policy has a negative impact on the Dutch National landscape "Northern Friesian Woodlands" (NFW). The question arose in the Innovative Project Northern Friesian Woodlands whether some form of self governance at NFW regional level could be established with respect of environmental monitoring. Self governance at regional level could lead to a decrease in regulations, a more effective realization of environmental goals and improve social cohesion among the different stakeholders. Self governance has to be based on objectives and indicators by monitoring.

Research

The objective of the 3MG Scientific project was to develop a monitoring methodology supporting self-governance at regional level with special attention to NFW. The environmental goals, the current regional environmental status as well as elements of the monitoring set up had to be investigated. The project aims were to:

1. Determine regional environmental goals for air quality (ammonia emission and nitrogen deposition), surface water quality (nitrogen and phosphate concentrations) and groundwater quality (nitrate in the upper groundwater).
2. Make an inventory of the current environmental status of the region using existing measurement results and calculation models.
3. Provide elements for a concept of environmental monitoring that could support self-governance at regional level. This involves additional monitoring of ammonia concentrations and measurements of surface quality.

This project was executed by Wageningen UR and Dutch Energy Research Centre in close contact with the ministries of Agriculture Nature and Food Quality and of Housing, Spatial Planning and the Environment (VROM), the province of Fryslân, the Wetterskip Fryslân and the Association NFW. For a number of farmers derogation from the present input oriented manure regulation was approved in order to monitor the desired way of manure treatment.

Main results

Based on the results obtained a number of conclusions could be drawn: to derive the environmental regional goals:

- a. There is no formal procedure to translate the national ceiling values for ammonia emission, determined by the EU nitrate directive, to regional ceiling values. For that a transparent down scaling procedure has been used to come to a regional specific ceiling value of 2.6 kton NH₃.
- b. It seemed to be possible to develop critical nitrogen deposition values for various sub-regions in the NFW, including their maximum annual N loads.

- c. For groundwater quality the widely used standard of maximal 50 mg/l nitrate in the upper-groundwater could be used.
- d. For surface water quality the so-called national MTR standards of N 2.2 mg/l and for P 0.15 mg/l could be applied.

With respect of the inventarisation of the current environmental quality status:

- a. Based on calculation models it could be determined that in 2004 the ammonia emission was 2.4 kton, not exceeding the downscaled EU ceiling. The ammonia concentrations were comparable with the national monitoring stations.
- b. For nitrogen deposition fluxes mostly exceeded, as in other parts of the Netherlands, the standard values. In 53% of the natural landscape the value was across the standard. However, it has to be said that only 28% of nitrogen deposition can be attributed to agriculture within the region. So sources outside the region contributed significantly more.
- c. The upper groundwater quality for NFW was with 15 mg/l amply below the EU threshold of 50 mg/l. Values higher than the standard were only found at 6 places of the NFW slightly exceeding the nitrogen standard but not that of phosphate.

With respect of developing a monitoring system:

- a. For air quality, the monitoring system has to use measurement results as well as calculation models.
- b. For determination of upper groundwater quality a robust statistical design for the measurement system itself and step by step implementation of it is recommended.
- c. Specific monitoring for groundwater quality should focus on the more sensitive drier sandy soils where some degree of exceeding the EU standard can be expected.
- d. Monitoring should also aim at certain effect-indicators that are linked to ecological conditions.

The most important recommendation is that this research must lead to the development of an integrated measurement system in this region in order to monitor quality of environment in the mid and long run. The part of the results of this study has been published in reviewed scientific journals. The recommendations have been accepted by the different stakeholders of this region to continue with self-governance development on reaching the ecological and environmental goals by the stakeholders following implementation in a region specific approach.

Meaning for TransForum

This scientific project in Theme 2 on Inventions for Sustainability stimulated the invention on monitoring the environment to overcome barriers towards sustainable development in NFW. This question was the direct outcome of the first innovative project "Northern Friesian Woodlands" of TransForum whether self-governance at regional level could lead to a decrease in regulations, a more effective realization of environmental goals and improved relations between citizens and the (regional) government. For the environmental goals a frame work was needed for monitoring important indicators to improve environmental and ecological quality and the associated impacts. For this reason this technical project was started to determine the present situation and to develop the integrative environmental monitor tool. This is the first step to think about a policy transition to change more often from input to output approaches both in the Netherlands and EU. It is clear from the results that NFW is appropriate to change from farm level into regional level monitoring. The outcomes of the project have resulted in a commitment between various regional partners to work on a follow up in close collaboration with the new second TransForum Innovative project called "Self-Governance and Profit in the NFW". This scientific project is an example that sometimes technical hardware projects are needed for answering important orgware and software questions for changing regulations based on reconstructed knowledge. Based on the presented results a Letter of Attend was send to the minister of Agriculture Nature and Food Quality resulting in the approval of an additional application experment for 2 years on 2500 ha.

Implications for Metropolitan Agriculture

Metropolitan agriculture in our country needs to be much more sustainable. This means in our case that typical national landscape areas have to be protected in a proper way at one hand and economically stimulated at the other hand. We have seen that the input oriented application of the Dutch manure policy is not protecting the typical local situation sufficiently. The specific local conditions have to be taken into account not only at NFW but also in the other typical landscapes. This more output oriented approach can be combined with saving nature in the presence of, for example, outdoor oriented diary farms without breaking the locally adapted rules. We believe that NFW is the first example where problems connected to local circumstances can be solved by developing alternatives like output oriented monitoring systems. Sustainable metropolitan agriculture is in a much more optimal way possible when we acknowledge the importance of local circumstances which can serve ecology by keeping locally adapted instead of general rules.

Implications for Connecting Values and Agro-Innovations System

The monitoring system proposed here is an important example of the need of differentiation of general rules. This new approach of reconstructed logic has also to be extrapolated to other examples of national landscapes with low input agriculture. It would also be wise to follow a more differentiated environmental monitoring approach in high input and high tech agricultural areas. This could help to specify in more detail sustainability and ecology under high input circumstances.