International Interdisciplinary Conference on

Land Use and Water Quality

Agriculture and the Environment

Maastricht, the Netherlands, 12-15 September 2022

LU WQ 2022

Volume of Abstracts

Compiled by Dico Fraters and Karel Kovar

POST-CONFERENCE PUBLICATION, as UPDATE based on comments from participants

RIVM, main organiser

National Institute for Public Health and the Environment
Ministry of Health, Welfare and Sport

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DEPARTMENT OF BIOSCIENCE

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of attention, … of the above mentioned events are communicated to the entire agricultural sector. This communication is sensitizing and practically minded. Various communication channels and formats are used for this, tailored to the target audience.
- The ultimate goal is to establish a change in practical behavior of farmers and the techniques used on their farms. A questionnaire after each event evaluates whether farmers consider to change or innovate their practices and the reasons behind it.

Every year specific working themes are defined, together with the Flemish Land Agency. That allows to shift the focus to sectors with the highest environmental issues and/or to new promising techniques.

Löw P., Osterburg B., Klages S.
P. Löw, B. Osterburg, S. Klages

Abstract number–103 Assessing the reliability and uncertainty of agri-environmental indicators in German nitrogen policy

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Crop need targeted and efficient nitrogen (N) fertilization is necessary for optimal nutritional plant supply and at the same time to reduce impacts on the environment, as loss of reactive N compounds threaten biodiversity, climate, and human health (Sutton & Bleeker 2013). The European Union (EU) Nitrates Directive (91/676/EEC), on which the nutrient policies of many EU-Member States (MS) are based, including Germany, aimed to reduce nitrate emissions from agricultural activities (European Commission, 1991). With the Farm to Fork Strategy, the Commission has proposed targets for 2030: the reduction of fertilizer use by at least 20 % and a reduction of nutrient losses by at least 50 % (European Commission, 2020). This would require immediate action.

The present study investigates the suitability of three different nitrogen (N) indicators as entry points for agricultural regulation for limiting N fertilizer inputs in Germany. The net soil surface balance (SoilB), gross farm-gate balance (FarmB) and an evened fertilization planning (FertP), indicators currently and recently applied in Germany and other EU-MS, were examined regarding design, data reliability and data uncertainty, and N reduction requirements.

Using Farm Accountancy Data Network (FADN) data of about 6,000 farms representing the agricultural sector with its different farm structures and regions in Germany, farm types were grouped according to the EU farm typology for a comparative study (Löw et al., 2021). Reliability and uncertainty were subject to the level of documentation and to the accuracy of determination of nutrient amounts. Results show (1) that design and purpose of the regulatory approaches differ whereby the required data basis is very similar, and (2) parameters used differ regarding reliability and uncertainty, both from FarmB (higher) to

FertP (lower). While FarmB is mainly based on verifiable documents such as receipts, FertP relies more on farm-internal data which are hardly verifiable. The limits for maximum input of N fertilizer at farm level vary with regard to approach and farm type, so that at the current state of implementation FertP is probably most limiting focusing on the agricultural sector (3). Further, the level of restriction differs depending on the farm type.

FarmB is acknowledged as an integer approach by scientific, consulting, and official institutions, albeit improvements are possible and necessary to make the indicator values more robust and justiciable. However, a discussion is ongoing in Germany on whether FertP as a mandatory performance indicator is sufficient and what FarmB will provide, apart from an additional bureaucratic burden. We argue that digital and receipt-based systematic documentation of nutrient flows along the value chain within FarmB can considerably improve data acquisition and reliability, and reduce data uncertainties.

Jordan P., Gaffney G.J., Johnston C.
P. Jordan, G.J. Gaffney, C. Johnston

Abstract number–104 Using short-rotation willow coppice to mitigate water quality impacts from point sources

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Waste-water treatment technologies sized between single house domestic septic tank systems and large-scale urban waste-water treatment works (WWTW) are small scale works that treat waste-water from small population equivalents (10s-100s PE). This has been a standard and regularly adopted solution in Irish rural landscapes where there is a dispersed population. However, small WWTW technologies range from modern package plants to basic solid separation systems—but where the final effluent is discharged to local water courses. Quantifying the water quality impacts of this point source discharge and providing further treatment prior to final discharge is a research priority to understand and prevent chronic pollution, particularly when rivers are vulnerable at low flows.
Nature based solutions to environmental pressures are increasingly used as they also offer multi-functional benefits. Here, short rotation willow coppice (SRC) was employed to treat the irrigated final effluent from two small rural WWTWs (PE 70 and 38) in Co. Donegal (Republic of Ireland) and Co. Tyrone (Northern Ireland) from European Union funding under INTERREG Va. The work was conducted in three stages. First, a baseline survey was undertaken in the streams receiving treated effluent at upstream and downstream points. Soluble reactive phosphorus (SRP) was measured as the pressure, and benthic algae were measured as the impact. SRP was measured during 24 hour campaigns over a low flow season, as single daily samples were found to be ineffective. Benthic algae were measured on the build-up of films on natural and artificial substrates over periods of several weeks. Second, mixed varieties of willow were planted and established in fields adjacent to the