Workshop Report, Version of 9th December 2018

2nd TOPSOIL Bilateral Exchange Drenthe- Oldenburg: Summary

Date 13-14th September 2018

Place Fletcher Hotel Zeegse, Schipborgerweg 8 9483TL Zeegse

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INTRODUCTION & AIM OF THE DOCUMENT

Hosted by Hunze en Aas, WMD Water Company and Province Drenthe, about 20 Dutch and German experts from authorities, water provision, agriculture and land / nutrient management explored the differences and similarities in maize growing and nutrient management. During intense discussions details regarding the cultivation of maize in relation to nitrate leaching, crop protection and fertilization were exchanged and compared. The participants addressed the details of the differences and similarities in the two regions, aiming to explain (apparent) contradictions. A central objective was to identify which measure (both with regard to measuring nitrate and to adapted land management) can be transferred to the other region / country for reducing nitrate losses. The measure should not only benefit groundwater management but also benefit farmers, so that it would be accepted by the farmers as one which they can integrate in their management while at the same time being supported by farmers. This should contribute to improve maize growing so that it provides less impact on groundwater and soil, and that it is still of economic interest to farmers (= sustainable maize growing). To enhance the discussion, the organizers provided a programme with presentations and field trips (see Agenda at the end of the document).

This document summarizes the discussions of the workshop. More technical details on maize growing and nutrient management can be found in the presentations of the meeting which have been sent to the participants.

An earlier version of this summary was sent to the organizers for comments which are integrated in the present version. A German translation of the summary is also available.

CORE ISSUES DURING THE MEETING

At the start of the meeting, the participants' questions were collected to provide a "red thread" during the discussions. The following main issues were addressed:

- **Measuring and controlling nutrient losses in maize growing**: How exactly is nitrate measured? What are the relevant parameters? Who is responsible for measuring / monitoring? How are the results communicated and how are they responded to?

- **Land management measures for more sustainable maize growing**: What measures are applied for reducing nutrient and pesticides' losses? What measures can be transferred between the countries?

- **Cooperation for Groundwater Protection:** Why do the farmers cooperate? What are drivers for implementing / monitoring / improving nutrient management at farm level?

- **Cycling nutrients on dairy farms- The ANCA Tool.** How can farmers identify their farms' potential for improvement? How much optimization is possible in management?

During the presentations and discussions the issues above were addressed in parallel. Often very detailed information was requested by the Dutch colleagues from their German counterparts, and vice versa.

For the summary, not all details can be displayed but only main discussion lines along the issues above, illustrated with selected examples are presented.

MEASURING AND CONTROLING NUTRIENT LOSSES IN MAIZE CULTIVATION: HOW CAN WE COMPARE OUR DATA?

The nitrate concentration in groundwater has a legally defined target of 50 mg/L. In both countries, different indicators / parameters (Nutrient balance, profiles of sampling depths, Nmin, N surplus) are applied to represent this target. For example, the concentration of N_{min} is a well understood indicator for the actual nitrate-concentration in groundwater or the nutrients availability for plants in soil. In both countries it is measured regularly. There are differences with regard to the depth, in which the samples are taking, the threshold to call for action, or the timing of the measure.

That Lower Saxony measures N_{min} after harvest, to get an indication of the maximum impact on groundwater, surprised some of the Dutch colleagues: Their experience was that there is not always a good correlation between N_{min} after harvest and the total leaching of nitrate. In The Netherlands, N_{min} is measured in spring time to estimate the need for fertilization. From German perspective this seems not to support groundwater protection sufficiently.

Many more details were explored with regard to measuring nitrates. A (only rough) attempt to capture can be found in the table on p.8. The table will be complemented by the experts in NL and D, under the coordination of Province of Drenthe.

In both countries, measuring networks have been established at regional levels (Province / NLWKN), and are complemented by the water provider which measure in their production areas. Further for specific contexts (e.g. the application of the derogation rule in NL), external consultants take extra samples at plot and farm level.

In the Netherlands, in the project “Grondig Boeren voor Water” (see presentation of Hein Korevaar), better nutrient efficiency points towards better economic efficiency, even though some measure such as catch crop don’t pay off too soon. In Lower Saxony, better nutrient efficiency can only be linked to better economic efficiency in grass management but not for areas with specialization in husbandry.

LAND MANAGEMENT MEASURES FOR GETTING SUSTAINABLE MAIZE GROWING: WHICH MEASURES CAN WE TRANSFER?

In general the most common practices are similar in Germany and the Netherlands for reducing nutrient losses in maize cultivation. They include e.g. crop rotation, no rotation (maize after maize), or under sowing. There are still differences since for example in Lower Saxony depending on the sort of maize (with more or less shadowy leaves) under sowing can be controlled differently so that it does not compete with the maize for the nutrients. In the Netherlands experiments with different types of maize are done in under sowing experiments. It depends on the type of maize (earliness of harvest, type of leaf, type of soil and region (in the south region under sowing is less successful because of fast growing of maize) whether under sowing is successful or not. So under sowing is not the overall solution to prevent leaching of nitrate in autumn.

Due to the impact of extreme weather periods (e.g. the drought/ heat in summer 2018), German farmers have negotiated successfully some compensation while Dutch farmers did not get state aid or compensation. In the Netherlands there was an adaption in terms of time limits for harvesting and application of manure.

During the field trip to De Kooyenburg, the participants learnt from Bouke Meijer why he changed his farm to comply with the derogation rule. The derogation rule allows the application of much more manure per field (up to 250 kg/ha instead of 170 kg/ha) if the overall maize: grassland ratio does not exceed 20:80 at farm level. For some German participants this was a very interesting approach. With the decrease of maize protein, for Bouke Meijer this approach became attractive. During the 7 years as being partner in GBMM (sustainable maize growing), his awareness was raised on the impact of grassland ploughing on the nitrate leaching. In the Netherlands there is a system in which the farmer must sign up how many cows, how much manure and how much acres of land are available for the manure. It is called Manure bookkeeping. The Dutch Government does check the Manure bookkeeping by sample with very high sanctions if the standards are exceeded. Samples on monitoring the nitrate concentration are taken by a company that does all the analysis for all farmers in the Netherlands (about one per field), and analysed in a mixed sample. They give advices on these soil sample results on how much manure the farmer must use, how much phosphorus, nitrate etc..

The above mentioned difference in measuring nitrates may be linked to the fact that as the example in De Kooyenburg showed, in the Netherlands, there is no control on the actual application of manure. With the farm level nutrients balance, and the GPS tracked transport of slurry transport, there might be less risk of over-application of manure. However, experience shows that the GPS – track can be and is outwitted. In Germany, there is currently no control and not implemented consequences of an over-exposure of manure, although it has been reported for several years in the annual nutrients report published by the Chamber of Agriculture. Due to a new regulation in Germany, all farms are required to submit data on their nutrient management at farm level from 2020 on. Still, one challenge in Lower Saxony remains: you can only control nutrient management at farm level, not at field level. For plot-adapted manure management, the OOWV is currently testing land-management approaches in an outcome-based bonus system.

COOPERATION FOR GROUNDWATER PROTECTION: HOW TO APPROACH THE INDVIDUAL FARMER?

The way the land is managed is a central factor with regard to reducing the nutrients and pesticides loss in maize growing. For a successful land management approach and water protection, a close cooperation between agriculture, water authorities, and water providers is needed, as well as a close interaction with knowledge institutes such as universities. Such cooperation enables the structures and the finances to develop and test, and throughout monitor innovative solutions, including the practical applicability and relevance to the farmers as implementers.

Experience shows, that successful uptake of measures and engagement in projects only happens if the individual farmer identifies an individual benefit. At the workshop, the discussed examples included:

- Farmers identified in the most vulnerable abstraction areas are often more motivated since they are aware of a (potentially) increasing legal pressure on their work.
- Real, local measuring data needs to be provided to actually proof the impact of land management on the groundwater. Farmers in the Netherlands would often like to get samples of their groundwater, and are interested in samples on their farm. In Germany this is a very sensitive issue: generating farm or plot specific data seems to be watched more carefully by farmers in Germany as they do not want to become too transparent, and are concerned if the data may impact e.g. the land value.

- Farmers engaging in a project show a particular strong interest to learn, and are more open to new information.
- In The Netherlands, the water authorities expect the farmers' union to take care of the nutrients problem. From the perspective of the Province of Drenthe, the union is / should be somehow aware that solving nutrient management is linked to the farmers' "licence to produce". In Germany, farmers' organization expects the water authorities to balance the pressure for water protection with the interest of economically viable agriculture.
- The study groups which were established in the Netherlands in the context of water protection projects were considered very interesting and useful. In the Netherlands, there is no institutionalized technical support for farmers, such as the Chamber of Agriculture in Lower Saxony providing expert advice on fertilizing, groundwater protection or other agriculture related aspects. Instead, farmers often have to pay their consultants. Thus, a project structure such as in Grondig Boeren voor Water which encourages farmers to learn from each other, and to get individual advice at farm level is often well received. In the project farmers even pay a fee (€250) to engage in the project.
- With the established Wasserschutzberatung in Lower Saxony German farmers would most likely be less interested to invest in such groups. In Lower Saxony, the water abstraction fee (for pumping out groundwater) is (partly) re-invested into a consultation infrastructure by the Chamber of Agriculture in Lower Saxony and the OOWV as water provider. Only very selected farmers show stronger interest in additional advice and in the data on their nitrate concentration. This will probably change with the new obligation for nutrient balances.
- In the Netherlands, arable farmers are not always interested in cooperating with dairy farmers to make use of their manure. But in some areas arable and dairy farmers cooperate in exchanging land for growing potatoes or grassland and vice versa. In some areas however, the utilization / disposal of manure from other farmers has been established as a reliable additional income (the "fifth crop").
- Dutch farmers who are not participating in projects often own very large farms, and are simply too busy too engage. From the perspective of the water authority, only a threat of new and stronger regulation might act as a driver for water protection.

CYCLING NUTRIENTS ON DAIRY FARMS- THE ANCA TOOL

How can we make tools for farmers which raise awareness on the impact of their management activities on their ground? In two presentations, by Albert-Jan Bos and Hein Korevaar, the design of and experience with the KringloopWijzer, (in English the ANCA-Tool **A**nnual **N**utrient **C**ycle **A**ssessment – Tool) were addressed. The tool was developed and tested as part of the project Koeien & Kansen (Cows and Opportunities) to raise awareness among farmers on the potential of their individual farm for reducing nutrient losses at farm levels. In the project Grondig Boeren voor Water the ANCA-Tools is the key point in the guidance on nutrient efficiency on the participating dairy farms.

The ANCA tool raises awareness on nutrient management, to assess the nutrient surplus and to identify potential measures for reducing them. It aims to help the farmers to decrease the loss of nutrients. For this, the farmers include specific data from their farm, such as data on soil and feed samplings, estimation of plot yield, energy input to cattle from farm based fodder (estimated by "backwards" calculation on energy demand by cattle minus purchased

fodder). Not much additional effort is required to generate the necessary input data. For example, the yield is not weighed, but estimated (based on silo size, compaction rate). Consultants are often entering the data for the tool, but the results are intensively discussed with the farmer. Sometimes simple measures (e.g. the timing for high protein food, or increasing the age of the milk producing cows) can help to reduce the nutrient surplus.

ANCA does not extrapolate but it provides an insight in the results of the recent years. With the experience from the past you can make a strategy for the future So you can test the measures in terms of their effectiveness. The ANCA tool was discussed as a very promising tool. It has been applied in very convincing pilots in NL; the German colleagues showed strong interest to explore this tool for their country, as a tool to support water providers or water authorities.

The comprehensive approach of the ANCA tool underlined well the interdepence of the different nutrient sources.

The importance of such an integrated approach is underlined if you take a look at the example of bio-energy plants in Lower Saxony showed that if you are not careful, you can create new problems by solving old ones. The energy out of biomass production was considered to tackle climate change but created new problems regarding nutrient management.

CONCLUSIONS & NEXT STEPS

The problems regarding maize cultivation and groundwater protection in both countries are similar as the basic approaches towards them. However, different legal systems, and political differences bring diversity to the details. Better learning from each other requires a better comparability of results. It is a central challenge between the Netherlands and Germany to fully understand the discrepancies in the strategies in maize growing. Sometimes the strategy looks the same, but the outcome is different. It starts already at understanding the difference in the nitrate values, and progresses in different motivations of the farmers to engage in groundwater protection. This meeting provided a further step to better compare the approaches in the different countries and towards better identifying what can be learnt from each other. The participants appreciated the strong emphasis on practical examples (“show, don’t tell”) and the space for exchange and discussion.

Result 1) During the discussion many specific questions could be answered; still the participants felt that they needed to specifically test, if they now know enough to really compare the data from different countries.

For this, Andrea Knigge-Sievers (Chamber of Agriculture) and John Verhoeven (WUR – Wageningen University & Research) will exchange and compare data on the results on reducing nutrient losses in the German and Dutch experiments.

Result 2) Participants were interested in setting up an overview of the different approaches to measuring nutrients, and the impact and communication of the results. Rinke van Veen (Province of Drenthe) will take on this and approaches the other participants for contributions.

Result 3) stakeholder involvement: The discussion showed that results in nutrients losses depend also on the legal and organizational context which frames the farmers’ motivation. In both countries, farmers need to have strong motivations to bother about nutrient losses as in

most cases a nutrient surplus provides the farmer with additional yield security or reduces costs for manure management, with no immediate negative impact on the agricultural system. Often, individual farmers still show a strong interest to learn more about the impact of their activities. European legal pressure can generate more of this motivation.

Conclusion/ statement:

- In the Netherlands authorities expect farmers' union to take responsibility for managing nutrients according to the European legal requirements. In Lower Saxony, the farmers unions expect the authorities to provide a financial frame that agriculture remains economically profitable.
- In total, this 2nd bilateral meeting provided intensive discussion and exchange. More need for exchange and for a cross-border perspective was emphasized. The participants agreed to meet a 3rd time in about a year in Oldenburg. OOWV and Chamber of Agriculture are going to host it.

The following topics were suggested:

- Visit of the experimental fields on nutrient losses in Oldenburg –Wehnen which are managed by the Chamber of Agriculture (Andrea Knigge Sievers)
- Visit / Results of TOPSOIL land management results in Thuelsfelde (reducing nutrient leaching by specific land management practice & outcome driven bonus system)
- Examples for voluntary agreements between farmers and water providers
- Under sowing: how can you manage this without using glyphosate? For example which plants can you under sow without glyphosate being needed to destroy the catch crop before ploughing the next year?

Version of 9th December 2018

ANNEX: AGENDA OF THE MEETING

Thursday 13 September

Location: Fletcher Hotel Zeegse, Schipborgerweg 8 9483TL Zeegse

12.00 Welcome & lunch

Part 1: Nutrient losses in Maize growing –

13.00 Introduction to meeting

Marian van Dongen and Christina Aue: what are the questions of last year; where did we end.*

Discussion: What are our open questions from last year? What would be important to answer at this meeting?

14.30 Bus trip to De Kooyenburg, Marwijksoord 4 9448 XB Marwijksoord (pilot area)

15.00 Bouke Meijer (farmer) 7 years partner in GBMM (sustainable maize growing): How and why he grows maize.

15.30 Guided tour by John Verhoeven (WUR – Wageningen University & Research). How do we fertilize maize in the Netherlands; Results of the demosystems on Marwijksoord; successes and failures; greatest challenges on maize growing

17.00 Bus to Fletcher Hotel Zeegse, Schipborgerweg 8 9483TL Zeegse

Break

18.00 **Buffet dinner**

19.15 Introduction opening evening discussion. Have we found answers to the open questions at the start of the meeting? Reflection on the afternoon visits and focus on the coming presentations

Presentation: Hein Korevaar: general perspective 'Grondig Boeren voor Water' , what do you want to achieve, what is your goal, nitrate measurements.

Panel discussion with John, Hein and Albert-Jan: what have we learned from each other, what is still left to be worked out?

21.30 End of session, drinks.

Vrijdag 14 september

Locatie: Fletcher Hotel Zeegse, Schipborgerweg 8 9483TL Zeegse

Part 2: Sharing the method of cycling nutrients on dairy farms

9.00 Albert-Jan Bos, introduction to 'KringloopWijzer' (Recycling/ Circular approach))

10.30 Bus trip to De Hullen Noord-Sleen, farmer Bert Wilting who participates in 'Grondig boeren voor water' will guide us through his way of growing maize related to groundwater quality

11.00 Introduction and guided tour

12.30 Lunch and discussion, Wielens Dorpsstraat 19, 7846 AS Noord-Sleen

13.30 Return to Fletcher Hotel and departure.

ANNEX: LIST OF PARTICIPANTS

Marian van Dongen, Waterschap Hunze en Aas
Rinke van Veen, Provincie Drenthe
Deidre Burst, Provincie Drenthe,
Leo de Vree, Provincie Drenthe
Marie Wessellink, University of Wageningen
Hein Koorevaar, University of Wageningen
John Verhoeven, University of Wageningen
Matthias Krebeck, Landkreis Vechta
Alina Harms, LWK
Andrea Knigge-Sievers, LWK
Cassandra Meyer, LWK
Christina Aue, OOWV,
Johannes große Beilage, OOWV
Andrea Rode, OOWV
Sascha Kochendörfer OOWV
Nico van de Moot, WMD
Geertje Enting, WMD
Albert Jan Bos, DLV advies
Ilke Borowski-Maaser, Interessen Im Fluss