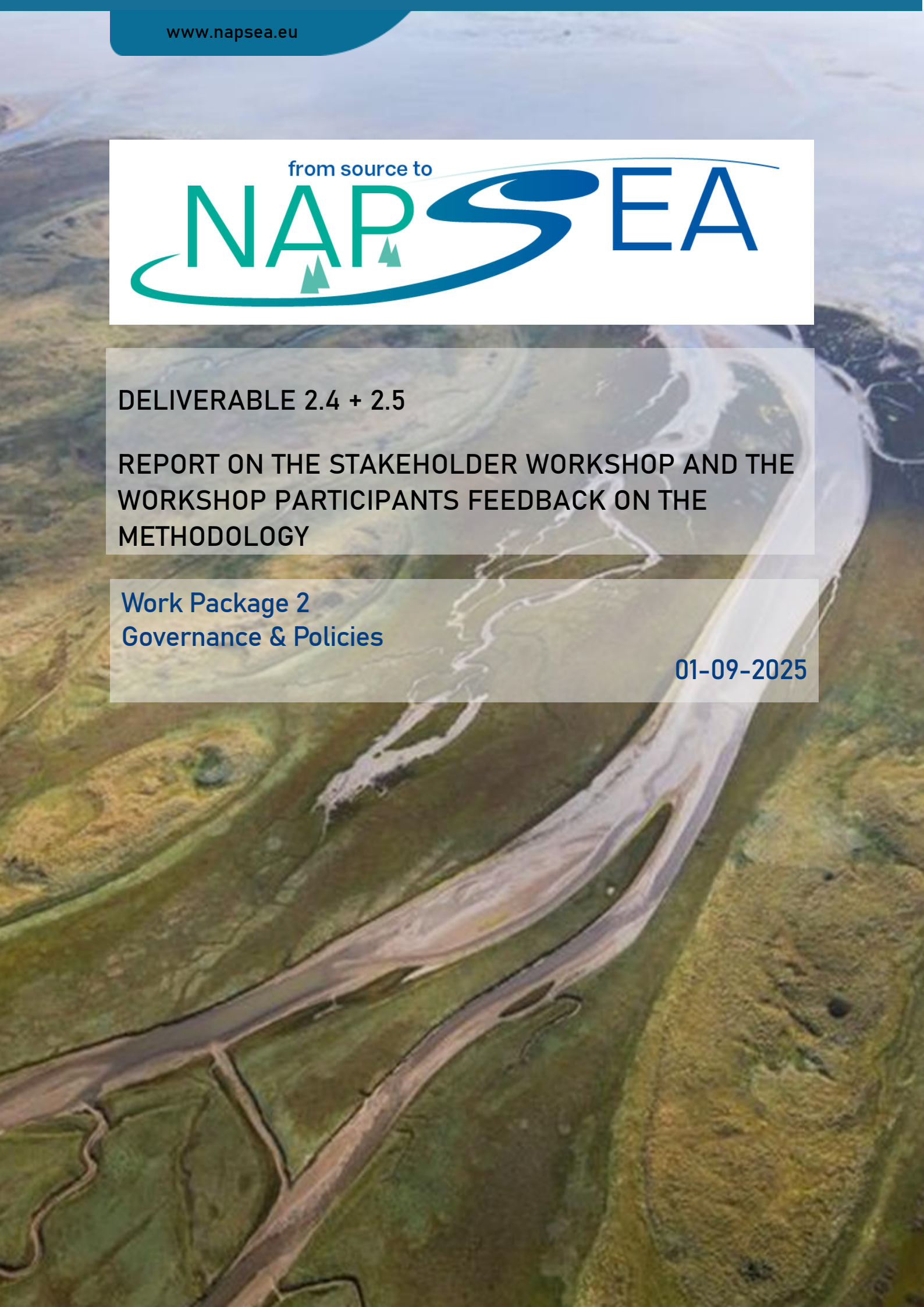

from source to NAPSEA

DELIVERABLE 2.4 + 2.5

REPORT ON THE STAKEHOLDER WORKSHOP AND THE WORKSHOP PARTICIPANTS FEEDBACK ON THE METHODOLOGY

Work Package 2
Governance & Policies

01-09-2025

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Abstract	Guidance and description of the process of forming a framework to assess the feasibility of policy instruments across governance levels and sectors aiming at reducing nutrient input
Keywords	Policy instrument analysis framework, Nutrient input reduction, nitrate, phosphorus, horizontal and vertical governance analysis, stakeholder workshop

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Executive Summary

During a so-called summer workshop held in Nijmegen, Netherlands, in June 2025, some project results of the NAPSEA project were presented and collectively discussed. This deliverable presents the feedback provided by participants on a methodology for analysing policy instruments to reduce nutrients from agricultural activities (see D2.1; Geidel et al., 2023), along with the recommendations based on the analysis (see D2.3; Dworak et al., 2025).

While there was very little feedback on the methodology, the discussion centred on the policy recommendations under D2.3. Participants raised concerns about the limited integration of marine targets into river basin management plans, noting that while some targets exist, they are often voluntary and lack binding measures. They suggested better coordinating WFD and MSFD thresholds. Inconsistencies across policies and thresholds were highlighted as confusing and counterproductive, particularly for farmers who face conflicting requirements and trade-offs in implementing measures. Farmers' perspectives were emphasised, with calls for more transparent communication, dedicated engagement sessions, and the sharing of peer-based best practices supported by science to build trust and support long-term planning. Broader governance challenges were identified, including fragmented policies, weak coordination between marine and freshwater management, and legal risks if inconsistencies persist; participants urged stronger collaboration, more coherent reporting, and critical input into the EU Zero Pollution Plan. Finally, participants emphasised the importance of effective communication and continuity, noting that eutrophication is challenging to visualise and that trust relies on clear guidance, consistent contact points, and improved integration of policies across levels.

1. Introduction

This deliverable is an integrated report on the Stakeholder Workshop, presenting the methodology for assessing the effectiveness of nutrient reduction strategies related to water management as developed under D2.1 (Geidel et al., 2023). It also includes a Stakeholder Workshop with policymakers relevant to the Wadden Sea, discussing the recommendations under D2.3 (Dworak et al., 2025). It was decided to merge the two deliverables, as the two stakeholder workshops foreseen were merged in order to limit the time of stakeholder to contribute. The new approach came necessary as during the duration of the project it became clear that public authorities and NGOs as main stakeholders have very limited time resources to contribute.

1.1. The NAPSEA project

This project addresses the effectiveness of 'Nitrogen and Phosphorus load reduction measures from Source to sEA, considering climate change's effects (NAPSEA). The primary objectives of NAPSEA are to support national and local authorities in selecting effective measures to reduce nutrient loads and create political support for their execution. The project employs an integrated approach from pollution sources to the sea, considering governance, nutrient pathways, measures, and ecosystem health. Geographically, the project focuses on the Wadden Sea catchment area, with specific case studies for the Rhine, Elbe, Hunze, and the Wadden Sea itself. NAPSEA serves as a platform to show practices in implementing socially acceptable, sustainable, and efficient measures.

The envisaged outcome of Work Package (WP) 2 is to provide improved support, along with a set of guidelines, for achieving the policy vision of clean European seas by 2030. Efforts to combat eutrophication have significantly advanced in Europe, but certain challenges remain, such as disjointed policies, adverse effects of high nutrient inputs, and limited public acceptance of measures. WP2 aims to analyse the policy and socio-economic aspects of nutrient management. This includes analysing barriers and highlighting good practices for implementing sustainable and effective strategies to reduce marine pollution – encompassing administrative, legal, financial, technical, and social dimensions.

1.2. Contributions and objectives of this deliverable

This deliverable focuses on reporting on the content shared and feedback provided of the so-called NAPSEA project summer workshop, From Source to Sea – towards the protection of the Wadden Sea'', which took place in Nijmegen, 24 June 2025[1]. It also compiles the feedback on two different topics that were discussed during the workshop: 1. the methodology of the policy instrument analysis (D2.1), and 2. the recommendations of the policy instrument analysis (D2.3).

2. Aim and background of the workshop

The workshop aimed to present some results of the NAPSEA Project and receive feedback from relevant stakeholders (see Annex 1) on the issues mentioned above, while also supporting decision-makers with the latest scientific information.

The following research results have been presented in the workshop:

- Analysis results of policy instruments to reduce nutrient pollution, investigating the consistency of the policy framework.
- Survey insights from 1,400 citizens in Germany and the Netherlands on which measures they support and find socially acceptable.
- Findings from in-depth interviews with 29 farmers in the Rhine basin on their perspectives and needs for reducing nutrient pollution.
- Scenario-based modelling results showing pathways to achieving safe ecological boundaries in the Wadden Sea.

Bringing all these findings into one workshop allowed the participants to understand the project results holistically and provide better feedback, based on their own experience and what they deem realistic. The results of the workshop will also be presented to the European Commission, to develop policy further and to provide input to the Zero Pollution strategy.

[1] https://from-source-to-sea.fresh-thoughts.eu/events/from-source-to-sea/

3. Workshop Mode

The workshop, held for registered attendees in person at a venue in Nijmegen, the Netherlands, took place on June 24, 2025. It lasted from 9:00 a.m. to 5:00 p.m. Twenty-three participants were present, with affiliations ranging from public water boards to agricultural representatives, representatives from the ministerial level, and researchers.
The workshop opened with registration, a welcome coffee, and an introduction to the project's background and objectives. The morning sessions addressed the nutrient problems of the Wadden Sea and the need for safe ecological boundaries, followed by a presentation of modelling results on nutrient reduction scenarios. After lunch, discussions shifted to the policy framework, with recommendations from earlier assessments serving as the basis for debate. During a coffee break, participants could pass by a small data exhibition (presenting the raw data statements from the interviews and survey data of the social acceptance study from another task. In the afternoon, results from the assessment of social acceptance from the citizen survey and the agricultural sector were presented, leading into a forward-looking session on future actions and how to improve coherence and effectiveness. The day concluded with a wrap-up at 5:00 in the afternoon.

Please check Annex 1 for the affiliations of the participants, and the agenda.

4. Outcomes of the workshop

After the content was presented to the participants (see Chapter 2 for the research results), plenary discussions took place to discuss the findings together. In this chapter, the two main topics presented (the methodology for D2.3 and the recommendations from D2.3) and the feedback from participants on these topics are discussed.

4.1. The methodology of the policy instrument analysis

The method presented in the workshop was designed for analysing policy instruments related to nutrient reduction and their consistency across different levels (EU, national, regional, and local) and across various sectors (see D2.1).

Under D2.1 a methodology was developed to assess relevant EU and national policies on how they reduce nutrient input into sea waters . In order to carry out the assessment two main assessment dimensions were considered (see Figure 1):

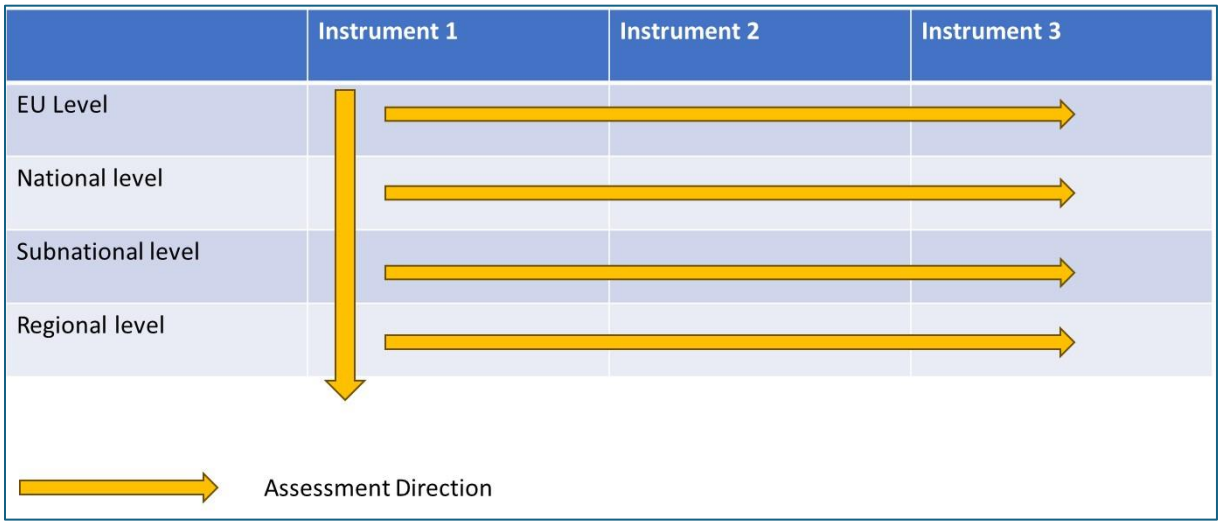

Figure 1: Methodological analysis of the policy instruments

The box below presents a summary of the methodology subject to discussion:

1. **Vertical consistency:** examining whether EU-level objectives are effectively translated into national and local targets, whether responsibilities are assigned, and whether sufficient resources, monitoring, and reporting mechanisms exist at all governance levels.
2. **Horizontal consistency:** checking alignment across different policies, whether they provide coherent and complementary approaches, how voluntary and mandatory measures interact, and how coordination works across sectors and institutions.

Box 1: Summary of the methodology for the policy assessment.

For the assessment a set of key questions has been developed along the following topics: legal obligations, governance coordination, implementation capacity and resources, as well as monitoring and reporting frameworks.

The assessment process consisted of three main stages. The first stage focused on data collection, aiming to gather detailed information on each selected policy instrument and its functioning across various governance categories. A structured template was completed using official documents and supporting literature. To fill remaining gaps and ensure practical insights, interviews were conducted with NAPSEA team members as well as external experts, thereby complementing the document review with experiential knowledge.

The second stage was dedicated to data analysis, examining the coherence of nutrient reduction strategies both vertically and horizontally. Special attention was given to transboundary coordination and the interlinkages between freshwater and marine water issues.

Finally, the third stage aimed to transform assessment results into concrete recommendations. This included further exploration of the enabling environment through additional expert input and literature review, ensuring that the proposals were both evidence-based and feasible. The recommendations were designed to improve coherence between strategies, strengthen coordination across sectors and governance levels, and enhance the overall effectiveness of nutrient reduction measures, particularly in transboundary contexts.

4.2. Feedback on the methodology of the assessment of policy instrument

The participants have not made significant comments on the methodology during the workshop. The topics covered by the assessment have been seen as feasible by the participants and the complexity of the assessment was recognized. However, the presenter reported that the initial approach with having a template for each policy instrument to fill in as a bass (stage 2) was not fully implemented. The reason for this was that some policy instruments have been too complex to fit into the template as they are designed to work in interplay with others. This interplay could not be captured with the template.

Further, it was reported that during the assessment the initial set of questions has been further refined and further developed in order to be more precise and to reflect comments from NAPSEA policy experts (in particular from UBA and Rijkswaterstaat)

4.3. Presentation of D2.3: Recommendation on improving coherence for current nutrient reduction strategies as applied to the Wadden Sea

The recommendations presented in the workshop were based on an assessment report D2.3 that examined how consistent and effective existing policy instruments are in addressing nutrient reduction, both across governance levels and among sectors.

The assessment shows that the EU level, objectives and targets display a high degree of coherence. Policies are cross-referenced with one another as a result of extensive interservice consultations during their development. However, significant incoherence persists when sectoral policies, particularly in agriculture, are considered.
At the national level, the water and marine sectors are well aligned. Still, the linkages to the Common Agricultural Policy (CAP) and biodiversity objectives remain weak and would benefit from strengthening.

The assessment of nutrient thresholds revealed that values generally decrease from source to sea, reflecting the dilution of land-based nutrient inputs. Despite this logic, inconsistencies emerge due to the use of different indicators and assessment methods for nitrogen and chlorophyll under the Water Framework Directive (WFD) and the OSPAR/Marine Strategy Framework Directive (MSFD). The use of water body–specific ecological conditions further complicates comparisons. A particular challenge is translating thresholds into nutrient load reduction targets, which remains both technically and politically complex.

From a governance perspective, EU-level instruments contain various coordination mechanisms between institutions and ministries relevant to nutrient reduction. The integrated approach they promote is designed to align conservation measures with efforts to reduce nutrients. Nonetheless, the governance system remains highly complex, with numerous actors operating at different levels. Shortcomings are obvious in the implementation of WFD objectives, which are often poorly integrated into other policy areas. At the Member State level, communication gaps were highlighted between governance levels, particularly between Dutch and German authorities at the sub-catchment level. The absence of a holistic coordination framework that brings together land, water, and air measures towards safe ecological boundaries makes effective implementation difficult. Moreover, fragmented geographical responsibilities across instruments complicate cooperation.

In terms of implementation gaps, several issues were identified. River Basin Management Plans (RBMPs) often lack a comprehensive source-to-sea perspective, thereby limiting their capacity to address nutrient pathways in an integrated way. CAP strategic plans must balance multiple objectives, which means that water quality is only one of several priorities, often receiving insufficient emphasis. While cross-references between different strategic documents exist, implementation tends to follow separate agendas and remains insufficiently coordinated, particularly at the local level. Additionally, enforcement of nutrient reduction measures is often weak.

Monitoring and reporting frameworks also present notable shortcomings. While excess nitrogen has long been a focus, phosphorus continues to contribute significantly to eutrophication; yet, the legislative framework for its monitoring and reporting remains comparatively weak. Current monitoring systems are often inadequate for detecting diffuse nutrient pollution, thereby undermining the effectiveness of measures. Although a broad range of indicators exists within the WFD and MSFD/OSPAR frameworks, only a limited subset is comparable across frameworks and borders. Chlorophyll-a is the only parameter that allows direct comparison, yet it is not applied in all water body types, such as Dutch R-type waters. These inconsistencies reduce the comparability and reliability of assessments.

4.4. Feedback on the recommendations on improving coherence for current nutrient reduction strategies as applied to the Wadden Sea.

After the presentation of the recommendations, participants could ask questions and/ or comment on the content of the presentation. The following topics were brought forward during the discussion:

Policy and Governance Challenges: The lack of integration between marine and freshwater management was seen as inefficient and potentially costly. Without coordination, measures risk duplication or contradiction. Participants warned of legal risks if citizens challenge inconsistent policies. Stronger collaboration with OSPAR, harmonisation of thresholds, and coordinated strategies were recommended. Additionally, concerns were raised that, without decisive action, similar discussions may recur in the future. Suggestions included stronger project cooperation to influence the EU Zero Pollution Plan and clearer reporting channels involving ECOSTAT and the MSFD working group.

Concerns about the broader policy environment were also voiced. One person described the current policy situation as a “mess,” warning that it carries the risk of citizens challenging measures in court. Another pointed to the infringement procedure of the EU against the Netherlands under the Nitrates Directive, which has discouraged change, while in Germany, as Thomas explained, fines were high enough to set things in motion.

Looking ahead, one participant asked what could be done to avoid arriving at the same conclusions again in ten years. Another added that they had been wondering the same, and suggested that sister projects should come together at the end of their cycles to critically influence the Zero Pollution Plan, since the strategy is not currently addressing the most urgent issues. The discussion also turned to the question of reporting. Participants inquired whether the results should be reported to the EU, ECOSTAT, or Water Directors, with one recommendation being ECOSTAT and the MSFD working group on Good Environmental Status, as the latter also explores linkages with the WFD. A follow-up question asked how results should be reported at the national level. The reply was that the outcomes would be communicated to Dutch ministries. Another participant suggested that the results should also be transmitted directly to farmers.

At the **EU level**, adopting the proposed Soil Health Law would strengthen the capacity to reduce nutrient flows into water bodies by fostering healthier soils. Additionally, more effort should be directed towards improving the knowledge base on the effectiveness of diffuse pollution reduction measures, particularly in the agricultural sector. Finally, it was recommended that the management cycles of the WFD and MSFD be strengthened by placing greater emphasis on the programmes of measures. This includes ensuring comparability across Member States and achieving a consistent level of ambition.

Integration of Marine Targets: Several participants challenged the statement that marine targets are not considered in river basin management plans. While targets exist in some German plans at the limnic-marine boundary, they often lack associated binding measures. In many cases, marine concerns are only mentioned in passing or treated as voluntary, leading to limited implementation. One participant mentions that sometimes the word 'marine' is mentioned, but not with any consequence. ,,The Dutch approach is that we will not adjust local thresholds to accommodate downstream reduction needs, but rather define additional measures.'' Another person referred to the earlier recommendation to strengthen collaboration between marine management and WFD. They suggested that this would be a good way to build upon the work already being done in OSPAR on harmonisation and the definition of maximum allowable inputs, and that these efforts could be integrated into river basin management plans. In practice, however, one participant remarked that catchments generally only consider WFD thresholds. Others added that marine interests cannot simply be ignored, as the measures involved are very costly; therefore, it is better to plan and coordinate them well in advance. It was also suggested that WFD and OSPAR thresholds should both be included in scenario plots with river loads and ecological boundaries.

Inconsistencies and Threshold Conflicts: Participants highlighted inconsistencies across policies and thresholds. Farmers, for example, are confronted with differing nitrate standards for groundwater and surface water. These contradictions create confusion and reduce trust. One person emphasised the need for a holistic view, highlighting the difficulty of keeping everything together when numerous actors—ranging from animal welfare authorities to water regulators—visit farms, often with conflicting findings or recommendations. Another participant noted that measures themselves sometimes involve trade-offs: for example, one manure-spreading technique might benefit water quality but be detrimental to the atmosphere. Overall, there was a desire to reduce inconsistencies, so that everyone involved in the implementation understands the logic behind the decisions. An example was brought up, that there is a target at the limnic marine border in the river basin management plans, but no associated measures. There is a map of the (LAWA recommendation on the limnic marine connection), and it should be reflected in RBMP, but in fact they are not doing it. Sometimes it is mentioned, but only as a voluntary measures. In many cases you don't know the translation- definitely often it is not translated into the measures level.

A further recommendation is the development of **integrated policies** that link nutrient management with climate action. This would help reduce greenhouse gas emissions from agriculture while simultaneously addressing nutrient runoff. It was emphasised that additional investments will be required to achieve this dual goal. Moreover, the future design of the CAP should ensure that farmers either select or are required to implement measures that support the objectives of the WFD, Nitrates Directive, Natura 2000, and the National Emission Ceilings Directive.

At the **regional level**, it was suggested that a cross-border nutrient management task force be established for the Wadden Sea. This body should work to harmonise monitoring and reporting standards across Germany, the Netherlands, and Denmark, where relevant. Additionally, specific targets and monitoring protocols should be introduced not only for nitrogen, but also for phosphorus and silicate, given their combined role in driving eutrophication in freshwater and marine systems.

Stronger **reporting obligations** are also recommended, with more detailed and frequent data collection at the field level. This would include fertiliser and manure application records, improved tracking of nutrient flows, and the publication of relevant datasets, particularly in areas that impact the Wadden Sea.

Farmers' Perspectives and Needs: Farmers face significant trade-offs, such as choosing practices that may be positive for water quality but negative for air quality. They also struggle with rapidly changing and fragmented policies, which make long-term planning difficult. Participants noted that farmers trust best practices from peers more than scientific studies, though ideally, both sources should be combined. Greater engagement is needed, including dedicated sessions to clarify expectations, share successful experiences, and gain a deeper understanding of farmers' perspectives. During the discussion, one participant recognised the conclusions about mismatches and highlighted how difficult it is to explain to farmers that the groundwater threshold is 50 mg/l. In contrast, the Water Framework Directive (WFD) threshold for surface waters is only 2.3 mg/l. Farmers, they said, are visited by different authorities representing different policies, often receiving conflicting messages. This participant also inquired whether it is truly necessary to begin monitoring silicate in fresh surface waters. The answer given was that monitoring would be required at least in the rivers.

Several people emphasised that farmers, in particular, face a lack of clarity. They often do not have a clear overview of what is expected of them, and some suggested organising dedicated sessions with farmers, not only to inform them but also to gather their perspectives. It was noted that farmers are reluctant to think long-term because political and policy frameworks change quickly, but they could benefit from sharing experiences with other farmers. Frank added that environmentalists and farmers still live in separate "bubbles."

Communication and Engagement: Participants noted the difficulty of communicating the problem of eutrophication, which is not easily visible. This reduces awareness and urgency among stakeholders. Successful engagement was linked to the presence of a consistent focal point within projects, providing continuity, trust, and opportunities for follow-up. More precise and more consistent communication with farmers and other stakeholders was emphasised as a key success factor. Another person pointed out the difficulty of visualising eutrophication, since it cannot be seen directly. Others stressed that for farmers, the main issue is not the inconsistency between marine and freshwater policies, but the different policies overall—such as nitrates, atmospheric requirements, and WFD—each requiring different actions. Thomas, drawing on his study, confirmed that it is highly complicated to understand what is meant by all these different policies and how they relate to one another.

There was also discussion about communication formats. One participant asked whether it would be more effective to share best practices from other farmers or rely on scientific evidence. The consensus was that farmers tend to trust experiences from fellow farmers more than studies, though the best approach would be to combine these experiences with scientific backing. Finally, it was emphasized that a key success factor in bottom-up projects is the presence of a fixed focal point for the entire project, someone whom participants can contact with follow-up questions. This continuity and accessibility were seen as essential for building and maintaining trust.

5. References

Dworak, T., Plette, S., van Beusekom, J.E.E., Geidel, T., Enserink, L., Glößl, T. (2025). Recommendation on improving coherence for current nutrient reduction strategies as applied to the Wadden Sea. EC report of grant 101060418 Deliverable 2.3.

Geidel, T., Glößl, T., Dworak, T. (2023). Framework for assessing the feasibility of nutrient reduction strategies related to water management. EC report of grant 101060418 Deliverable 2.1. https://napsea.eu/wp-content/uploads/2024/03/D2.1.-Report_NAPSEA_v1.pdf

6. Annexes

6.1. Annex 1

from source to NAP SEA

Summary report

Summer workshop

From Source to Sea – towards the protection of the Wadden Sea

Nijmegen, 24 June 2025

AGENDA

Time	Content
9.00 - 9.30	*Registration und Welcome Coffee*
9.30 - 10.00	Welcome and Background to the Project
10.00 - 10.45	Nutrient Problems of the Wadden Sea and the need for safe ecologic boundaries Q&A
10.45 - 11.00	*Coffee Break*
11.00 - 12.00	Scenarios of nutrient reduction measures (modelling results) Q&A
12.00 - 13.00	*Lunch Break*
13.00 - 14.30	Assessment of the Policy Framework (Recommendations from D2.3.) Q&A Discussion
14.30- 15.00	Wadden Sea Coffee Break + Study Data Exhibition
15.00 - 16.00	Findings from assessing social acceptance in the general public and the agricultural sector Q&A Discussion
16:00 - 17.00	Way forward: What can be done and how
17.00	*End of the workshop*

23 Participants. Representatives from: ZLTO, Waterboard Delfland, Waterboard Rijnland, Waterboard Aa and Maas, Monitoring programme in agricultural surface waters at RIVM, Rijkswaterstaat North-Netherlands, Dutch Ministry of Infrastructure and Water, NLWKN, OSPAR, IHE Delft, Center for Ocean and Society-University of Kiel, Hereon, Fresh Thoughts Consulting, Deltares, Nmi), UBA, UFZ, Rijkswaterstaat.

Legend: Q= Question, A= Answer, C= Comment, à= Reaction to previous comment

Discussion following presentation on ecological boundaries (Justus Beusekom):

1. **Q*: Can you say something more about other habitat conditions required for seagrass growth, factors such as wave movement?***

A: Yes, there are many more aspects that play a role for seagrass habitat recovery. Lisette: we had also the Afsluitdijk. We also have a concern that seagrass will not return, due to wave action etc., even though the concentrations chlorophyll are close to your threshold.

2. ***Q: Can you elaborate on N/P ratios?***

A: Fish larvae cannot live on phosphorus limited phytoplankton and copepods. And the N-P ratio is especially a problem in the higher trophic layers. If we improve the N-P ration in the Wadden Sea, the habitat will benefit.

3. ***Q: Is the nutrient reduction target compared to current conditions?***

A: Yes.

A: we are already struggling a lot to reach current WFD thresholds, so we are not ready for further restrictions. Current investments in WWTP-improvements are already keeping us busy for the coming decades.

A: Yes, but it is not just for the Wadden Sea. If we improve the nutrient situation inland the Wadden Sea will also improve.

C: The absence of seagrass in the Wadden Sea is not perceived as a problem. The oxygen depletion in local waters is perceived as a problem.

C: We have already reduced nitrogen outputs since the 2010s. It would be helpful for us to understand what the contribution by our waterboard to downstream ecosystems is. We have a discussion if we should discharge WTTP effluents towards the North Sea or keep the water in the water board for use in dry periods.

C: We need to know what the impact of our local water quality on downstream ecosystems is. We'd better know that asap, rather than get new targets after we're done with current WFD targets.

C: Sometimes current local thresholds for WFD are not consistent between nutrient targets and ecological targets.

C: Often this mismatch is not just with the link with nutrients. Also other environmental conditions such as current speed are often more lacking.

C: We are now drafting the WFD plans for the coming six years. So, if we should include more measures this will be an issue for the future.

C: WFD thresholds are missing for sediment variables and this is a problem in linking nutrients with ecology. WFD considers only summer nutrient concentrations, which does not represent the whole nutrient loads.

C: Thresholds for P are lacking for Wadden Sea. There is a mismatch in policy which hampers us to tell waterboards what is needed in terms of nutrient needs. Therefore, we asked Deltares to model all nutrient loads to the Wadden Sea to get a better insight into the contributions of different sources.

4. ***Phosphorus monitoring***

C: Downstream targets should be leading, but at present they are not. Also, there is no fixed threshold for phosphorus.

Q: Why not put P as a pressure in WFD? And could the solution also be to put phosphorus under the river basin specific pollutants?

A: The problem is that we don't know the impact of phosphorus.

A: In WFD the rule is: one in means all in, so if you reach your N target the P target does not matter anymore, unless you change this rule.

A: targets are very high, so should be communicated well. We should clarify the ecological importance of seagrass and for carbon sequestration. Seagrass conference showed that also the impact of fine sediment smothering seagrass can be large. And in the Elbe there is a large impact of dredging.

C: I agree, from RWS perspective, in policy we are used to multi-factorial issues. We should be careful to take all aspects into account.

C: But is should not be a reason not to take action.

5. ***Q: Is N/P ratio more important than the absolute values of N and P concentrations.***

A: No, they are both important and have different impacts in different environments. They are both important, otherwise one would just increase the phosphorus loads.

A: We cannot improve N/P ratios by increasing P-loads because P is a scarce resource so we have to be careful with that.

C: Our targets should not be based on optimal nutrient ratios, but policy targets are rather based on 'natural' N/P ratios.

6. ***Comments on the current policies***

C: The policy framework is not sufficient in the sense that if one (N) or (P) is okay, we are all off the hook. Also, we have no idea about the data in the winter, because it is not monitored. From a water policy perspective, it is already hard to meet the current goals.

C: It would be useful to monitor what role the sources play locally to understand what measures would be most useful. For example, do the ecological requirements of the Meuse equal the ecological requirements of the Wadden Sea?

C: Currently we already have a lot of objectives to follow and it would be unpopular if much later further reductions for the Wadden Sea would be added. If they are known now, they should be communicated now based on the calculations of the downstream needs.

C: Multiple pressures are really hard to communicate. If we call for a very high reduction, we need to be realistic and honest.

Discussion following presentation on the models and scenarios (Andreas Musolff):

1. ***Q: I see blue colours already in the reference situation, what does this mean?***

A: Our model is slightly underestimating chlorophyll and therefore it artificially looks like the conditions are already suitable for seagrass recovery. Andreas M. it always complicated to show uncertainty in a figure and still have

2. ***Q: What type of nitrogen to you use in your model?***

A: We use nitrate as proxy for total N, because we have most observations of nitrate for the model validation & calibration. This approximation is most problematic for historic data with more organic matter.

3. ***Q: In scenario 4 in the Hunze N-loss is strongly affected by change from grassland to arable land. Due to the loss of derogation many farmers in the Netherlands are changing from grassland to arable land. Is this representative also for the Elbe and Rhine?***

A: Need to look at Nitrogen (as it is carried in the water) – there are differences between Rhine and Elbe (see results much later because the nitrogen first enters the groundwater and then only the river) and Hunze in the residence times.

A: We did not run this, but residence time in groundwater is much longer than in Hunze.

A: STOWA study also showed similar effect of increased N loss due to change to arable land in other areas.

4. ***Q: What is the impact of legacy of historic loads?***

A: The model indeed shows a delayed and smeared effect of N-loss reduction from fields to river concentrations. The average residence time in the area is approximately 10 years, which is an approximation of the expected delay time to measures.

5. ***Q: On what area have the NBS for flood plain restoration and buffer strips been simulated in the NBS scenario.***

A: 20% of historic floodplain extent. Buffer strips: estimation of arable land next to water ways with less than 5% slope.

A: Locally buffer strips can be effective but overall for the whole catchment they are not very effective.

A: Particularly in the Netherlands most farmlands are drained by tile drainage which means that any buffer strips are by-passed by the drains.

A: The input from the deposition plays a bigger role, also for NL the effect is reduced due to the drained land

5. ***Q: Can you please elaborate on the drastic scenario, what does it imply?***

A: These are not optimized on lowering N/P ratios.

A: For WWTP we reduced the size of WWTP to comply with UWTTP effluent targets. UWWT plants from 2000pe (which is not addressed by urban waster water treatment plant directive) – assumption: all the treatment plants, need to meet retention and outflow concentration requirements. – most drastic effect if median of current retention and outflow concentrations are used as benchmark. For agriculture, different for NL and GE. For GE, limit manure application to 80% of plant uptake. For NL, 7A is all technical measures possible are applied. For drastic it is 50% livestock reduction (de Vries et al.). NBS: in Germany: 30% of former floodplains, in Netherlands there are areas along rivers that cannot be built up to leave room for the river to prevent/ reduce flooding. In the drastic scenarios we have assumed that these areas are deepened so they are all year wet, so denitrification will be significant. Atmospheric deposition: all technically feasible measures + livestock reduction (EMEP)

Discussion following presentation on the policy instrument analysis (Thomas Dworak):

1. ***Q: I'm surprised by your statement that marine targets are not taken into account in river basin management plans.***

A: This mostly applies to Germany. The thresholds do not align (because they are water body specific) but there are still measures that would make sense to implement that will definitely help with marine issues in the Netherlands).

A: Sometimes the word marine is mentioned but not with any consequence. The Dutch approach is that we will not adjust local thresholds to accommodate downstream reduction needs, but rather define additional measures.

2. ***Q: I don't recognize what you say with the German river basin management plans… There is a target at the limnic marine border in the river basin management plans.***

A: Yes, but there are no measures associated to those.

A: There is a map of the (LAWA recommendation on the limnic marine connection) and it should be reflected in RBMP, but in fact they are not doing it. Sometimes it is mentioned, but only as a voluntary measures. In many cases you don't know the translation- definitely often it is not translated into the measures level.

3. ***Q: I recognize your conclusions about mismatches. It is hard to explain to a farmer that there is a threshold in groundwater of 50 mg/l and then the WFD threshold for surface waters is 2.3 mg/l. There are different people for different policies coming to the same farm with conflicting messages. Do we really need to start monitoring silicate in fresh surface waters.***

A: Well, at least in the rivers.

C: there is the need for a holistic view but also hard to keep everything together. Everyone (animal welfare, etc.) goes to farms and measures and some of what they find or recommend is contradicting each other.

C: Some of the measures also have trade-offs and then the farmer has to decide, i.e. how to spread manure. There is one technique that is good for the water but bad for the atmosphere.

C: Regarding your recommendation to strengthen the collaboration between marine management and WFD. I think it would be a good way to build upon the work towards more harmonization and definition of maximum allowable inputs that is done in OSPAR. These could be taken into account in the river basin management plans.

➔ In practice the catchments only care about WFD thresholds.

C: We can try to ignore interests from marine areas, but the measures are very costly, so it's better to think and coordinate them well in advance.

C: we should add the current WFD and OSPAR thresholds in the plots with the river loads for scenarios and ecological boundaries.

C: The policy 'mess' is a risk that citizens can go to court if they don't like the measures.

➔ The infringement of the EU of the nitrates directive in NL is such that we don't want to change. Thomas: in Germany the fine was high enough to set things in motion.

C: What can we do to prevent that we sit here the come to the same conclusions again in 10 years time.

- ➔ I was wondering the same and I would suggest that the sister projects come together at the end of the projects and try to influence the Zero-pollution plan in a critical way. Because this strategy is not tackling any of the issues that we think are really urgent.
- ➔ Who are we reporting to RTD at EU? ECOSTAT? Water directors? I recommend ECOSTAT and working group GES of MSFD. The latter is also looking into the linkage with WFD.
- ➔ Reaction question: And how about the national level?

A: We will communicate the results to the Dutch ministries.

- ➔ I suggest to communicate this also to farmers.
- ➔ For farmers it is very unclear to have the overview of what is expected from them. I suggest to organize sessions with farmers to better inform them. And also to inform that about their perspectives. Farmers don't dare to think about the long term because of fast changes in politicians and policies. It would help to make them share experiences from other farmers. Frank: environmentalist and farmers live in separate bubbles.
- ➔ It is very complicated to visualize the problem of eutrophication because you cannot see it.
- ➔ The problem for the farmers is not the inconsistency between marine policies and freshwater policies but rather the different policies requiring different actions from them (nitrates, atmospheric, wfd etc.). Thomas also experienced this during his study. It is highly complicated to understand what is meant by all policies and how they are linked together.
- ➔ Would it be better to share best practices from colleague farmers or scientific evidence?
- ➔ The farmers will trust experiences from other farmers more than scientific studies. Best would be if experiences from other farmers are backed up by scientific evidence.
- ➔ A key success factor of the bottom-up project is that there is a fixed focal point for the whole project and that you can also contact with follow-up questions. This supported the required trust.

Discussion following presentation on the nutrient reduction measures (Teresa Geidel and Yuki Fujita)

1. ***Discussion about the gender effect (Women are already doing and are more willing to change more strongly than men when it comes to adapting to more sustainable diets).***

C: At ZLTO we are aware of this effect and therefore we try to involve the wives of the (male) farmers in discussions.

C: We found this also in other studies. It seemed to be linked to experiences that many times the man at the farm focused on conventional farming (maybe from stronger responsibility to creating income) and the wife experimenting with organic farming.

2. ***Q: There seems to be consensus on the need for improving water quality, reducing nutrient input and improving policies. So, why is there so little progress?***

A: It is logical that farmers do not see the connection between their farming practice and the health of the Wadden Sea, because their individual contribution is small.

A: here is no significant difference involvement with the Wadden Sea and distance from the sea. Wera: Can we filter out survey results of people who clearly don't have a clue, for example people that fill out often 'cannot judge'.

3. ***Q: Are there correlations between household income and willingness to pay?***

A: Interesting suggestion, we will look into that.

A: There is also a correlation between conviction of the need to nutrient reduction and willingness to pay.

C: It would be good to look more into correlations between answers from the same persons.

- ➔ We will for sure look into correlation with income and age and number of people in household.

4. ***Q: How stable would these results be: like if you would repeat these surveys, could it be very different?***

A: We will compare with other studies to get an impression of the representativeness of the results.

A: Agreed, it would be interesting but it is not realistic to repeat these kind of surveys regularly. The scope of projects like this one (incl. length) is limited, there is not enough finances.

C: This is an interesting novel approach that nicely complements existing surveys.

- ➔ If the results would be very striking we could do follow-up results.

C: Supermarkets make more profit on organic products than regular products. Therefore, the prices are higher than they need to be, which reduces the willingness to pay.

à supermarkets could take more responsibility in communication and getting acceptable prices.

5. ***Q: Are citizens aware that in NL there are many more waterways close to agriculture fields than in Germany. So, the same width of buffer strips would result in a much higher percentage of land lost because of buffer strips.***

A: It was a struggle to define the questions in a way that can be answered by regular citizens.

C: It would be nice to repeat the citizen survey under different political climates.

6. ***About the comment "We're doing our best but no one notices" on one slide. That sounds so childish, and what we hear all the time.***

A: but still it is felt very strongly by many farmers.

A: also by farmers who really invest a lot on sustainable methods.

A: It may be linked to the different requests from different policies and fast changing requests by politics.

A: Also, the attention to positive developments is overshadowed by attention for angry farmers blocking roads etc.

Final round of discussions

Statement 1: Rather than informing people about requirements for the Wadden Sea it may be more appealing to people to focus on local environmental problems.

C: But that is exactly what we are already doing.

- ➔ But yet, we, (at waterboards) are not aware of our influence on downstream areas, such as the Wadden Sea. We can only act upon this if we know and can explain these reduction needs.
- ➔ It takes a long time from a project result to policy implementation.
- ➔ But you can already inform the 'upstream' water managers about novel scientific insights, so they can at least anticipate on these potential future requirements.
- ➔ But policies should be well aligned between different regions and that takes years.
- ➔ We can already start with raising awareness of causal effect chains, so water managers are already prepared for what may be coming towards them.
- ➔ But the WFD plans with measures should be ready by December 2025 for the coming six years, so we are already too late to take NAPSEA results into account into those plans.

Question: Do you have any recommendations for us as a project to get our NAPSEA results included in the upcoming WFD river basin management plans?

A: The deadline for the plan is spring 2026. They can already consider a paragraph on potential future developments, even though they are not quantified in thresholds.

- ➔ It may be more important to get our outcomes taken up in the new CAP plans, because that provides the funding for agricultural measures. Within six weeks a new update of the CAP is expected.

C: I think we should try to reduce the 2.8 mg N/l threshold for the Rhine, because that is the reason why the Rhine commission is not paying any attention to nutrient reduction.

C: meeting local ecological thresholds does not always help because nutrient loads are often largest in winter and that WFD ecological thresholds are mostly defined in summer. Flushing out nutrients may help locally, but can aggregate problems downstream. Luuk: so answer to the statement would be partially true.

Statement 2: implementation of measures by farmers would be improved if they don't need to study all potential measures and expected benefits for different policy targets.

C: I think we should do the study of potential useful measures for them.

- ➔ I don't agree with statement about popular measures. It is the task of the government to come up with effective and feasible measures.

C: We should promote the dialogue between citizens and farmers, for example starting with school kids to better educate them.

C: The statement about planning in the long term may suggest that there is room for all farms in the long term, but that is not necessarily true.

- ➔ For farmers the long term planning would be approximately 15 years, which is shorter than long term planning in water management.
- ➔ but how to create long term stability if with every new election policies can change?
- ➔ how can we realistically plan long term if the world is changing so quickly?
- ➔ It should be beneficial for a farmer to invest. Now some people invest and other lean back and the ones running in front are punishment as much as the ones leaning back.
- ➔ Yes, the farmers should have 'maatwerk' so some can take 5 small measures rather than one big one.
- ➔ In adaptive management it is a problem that the response to measures is so slow.