

Typical pitfalls leading to gaps between envisaged and realised impacts of manure and nutrient related projects

- a gap analysis

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Title Typical pitfalls leading to gaps between envisaged and realised impacts of manure and nutrient related projects - a gap analysis

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Preface

This report was produced in the Interreg Baltic Sea Region platform project SuMaNu (Sustainable Manure and Nutrient Management for reduction of nutrient loss in the Baltic Sea Region; www.balticsumanu.eu). The project aims to formulate and promote recommendations for more sustainable manure and nutrient management practices in agriculture and thus decrease agricultural nutrient loads to the Baltic Sea. The recommendations are targeted to a wide range of target groups from farmers to policy makers.

Work package 2 of the project (led by RISE) synthesized knowledge on sustainable manure nutrient management practices at farm and regional level from the projects that have built the SuMaNu platform. These projects include recent Baltic Slurry Acidification, Manure Standards, GreenAgri and BONUS PROMISE and also previous Interreg Baltic Sea Region funded projects (Baltic Manure, Baltic Deal, Baltic Compass, Baltic Compact). Additionally, the analysis covered manure processing as a pathway to enhance nutrient recycling in the Baltic Sea Region.

The platform projects have given recommendations for improved manure use and nutrient management, but have all recommendations been effective or taken into practice? This report, "Typical pitfalls leading to gaps between envisaged and realised impacts of manure and nutrient related projects - a gap analysis" describes potential pitfalls in project design and implementation that could cause gaps between envisaged and realised project impacts to promote sustainable manure management. The analysis of possible reasons for these gaps suggests improvements to enhance policy impact of projects in the future.

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Summary

SuMaNu is a thematic platform concerning nutrients and manure management, established “in order to strengthen the impact of projects’ outcomes in the selected thematic field”, especially via better integration of project results and conclusions into policies. The present gap analysis clarifies in this connection gaps between envisaged and realised impacts of seven projects to promote sustainable manure management, and specifies the impeding pitfalls, i.e. shortcomings and weaknesses that have caused the missing impact. The rationale behind the gap analysis is to help the design and implementation of future projects to achieve stronger impact. For this aim, it summarizes knowledge of selected projects' ability to produce results and recommendations and to communicate these to the end users for integration into policies.

To conduct the gap analysis, an approach of deductive and theory-testing research was used based on a set of described and classified potential pitfalls in project design and implementation that could potentially lead to gaps between envisaged and realised policy impact of projects. Links between pitfall categories and implementation gaps were tested by the use of empirical data collected during this study. Six typical pitfalls were defined, and ten recommendations selected for the gap analysis. The analysis was as far as possible based on referenced documentation. Key target stakeholders representing Germany, Poland and Denmark as well as the BSR region were interviewed in order to increase the quality of the analysis and secure impartiality of the results.

Generally, there were found gaps between envisaged and realised policy impacts. Out of the six classified pitfalls, not all projects had planned to create policy recommendations or impact among end users. The observed projects performed best with respect to producing planned results, whereas the most common pitfall was the ability to communicate these results. There were found considerable differences between the seven projects’ ability to support policy development and create impacts among end-users. It was among others concluded that projects are more likely to be integrated into policies and be implemented by end users if they adhere to some basic principles:

- 1) Objectives are SMART and in line with end-user needs;
- 2) Activities match the objectives and lead to the production of the foreseen results; and
- 3) Representatives of the administration and the end-users are directly involved in project partnerships and activities.

1: Introduction

The Baltic Sea is the world's largest inland brackish sea and is relatively shallow with an average depth of only 55 metres. The main countries found entirely or partly within the Baltic Sea Region (BSR) watershed area comprise eight EU Member States (Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland and Sweden) as well as Russia and Belarus. The Ukraine, Czech Republic, Slovakia and Norway also have minor areas that drain into the Baltic Sea (See Figure 1). The population in the BSR is ca. 85 million people, or 17% of EU's population. The life quality for much of this population is dependent on the ecological status of the Baltic Sea. The Baltic Sea provides a range of ecosystem services which are economically significant for the region including provision of fish for food and other raw materials, coastal recreation and tourism, maintaining biodiversity and providing transport for ship traffic (Hasler et al., 2016).

Realising that international cooperation was needed for remediation and prevention of pollution to the Baltic Sea, the first convention on the protection of the marine environment of the Baltic Sea Area was signed in 1974, the Helsinki Convention, which entered into force in 1980. The Helsinki Convention was updated in 1992. HELCOM (Baltic Marine Environment Protection Commission -

Helsinki Commission) is the governing body of the Convention. HELCOM establishes goals and monitors the environmental status of the Baltic Sea, and it issues recommendations to support reaching the targeted ecological status of the Baltic Sea and catchment area.



Figure 1: The Baltic Sea Region

The European Union Strategy for the Baltic Sea Region (EUSBSR) was established in 2009 as the first Macro-regional Strategy in Europe. EUSBSR has developed an Action Plan (European Commission, 2017) with Clear Waters as one of its aims, and in this way builds on EU legislative policies including e.g. the Nitrates Directive (91/676/EEC), the Water Framework Directive (2000/60/EC), the National Emissions Ceilings Directive (2016/2284/EU), as well as the Helsinki Convention, HELCOM Baltic Sea Action Plan (2007) and HELCOM recommendations, such as HELCOM Recommendations 24/3.

The EUSBSR Action Plan is implemented, among other means, through flagships projects. The Interreg Baltic Sea Region Programme (2018) is to a wide extent co-financing flagship projects, including SuMaNu and its related platform projects Baltic Slurry Acidification and Manure Standards and thereby supporting the implementation of the EUSBSR Action Plan through cooperation with neighbouring countries of the Baltic Sea macro region.

1.1: Nutrient reduction targets for the Baltic Sea

The ecological status of the Baltic Sea has improved over the years due to the abovementioned transnational measures. However, the level of eutrophication is still not good in more than 95% of the area of the Baltic Sea (HELCOM, 2018).

Aiming to have a Baltic Sea unaffected by eutrophication, the HELCOM Contracting Parties agreed in 2007 within the Baltic Sea Action Plan on applying a Nutrient Input Reduction Scheme. HELCOM Nutrient Input Reduction Scheme is a regional approach based on 1) maximum allowable nutrient inputs (MAI) for each Baltic Sea sub-basins to be unaffected by eutrophication and 2) needed reductions to meet the MAI based on average nutrient inputs during the reference period 1997-2003. The needed nutrient reductions for each basin were then divided up among countries according to their share of nutrient inputs. These country-allocated reduction targets (CART) helped share the burden of nutrient reductions to achieve good environmental status of the Baltic Sea while maintaining the polluter pays principle. The 2007 agreement was based on provisional reduction targets and then after more complete in-depth studies, revised targets were agreed upon in 2013 (See Table 1). The revised MAI included airborne and waterborne inputs which for the entire Baltic Sea was determined to be 792,209 t N/year and 21,716 t P/year. This meant that total CART annual reductions of 118,134 t N and 15,177 t P would be required to achieve the plan's crucial "clear water" objective. Each country can decide how to reduce their total load; either via air or via water.

The 2013 HELCOM Ministerial Meeting stressed that the achievement of good environmental status for the Baltic Sea also relies on additional reduction efforts by non-Contracting Parties.

Table 1: HELCOM maximum allowable input (MAI) of nutrients to Baltic Sea for "No eutrophication" (calculated per basin and not per country), average yearly nutrient input to the Baltic Sea basins for the reference period 1997-2003, country allocation reduction targets (CART) agreed upon in 2013, and the change in average yearly nutrient input to the Baltic Sea basins between the reference period and 2008-2010 average (HELCOM, 2015). Green indicates reductions higher than the targets and red has not met the reduction targets. All N and P values are in tonnes per year. Other sources (OS) include non-HELCOM countries and shipping.

	MAI		Reference period inputs 1997-2003		CART		Input change 2008-2010	
Country	N	P	N	P	N	P	N	P
DE			63,335	526	7,671	170	-13%	-1%
DK			70,490	1,928	2,890	38	-20%	-10%
EE			27,684	804	1,800	320	-7%	-19%
FI			82,652	3,560	3,030	356	-12%	-10%
LT			46,335	2,635	8,970	1,470	-10%	-30%
LV			77,959	2,227	1,670	220	3%	26%
PL			220,606	12,310	43,610	7,480	-7%	-13%
RU			93,598	7,178	10,380	3,790	2%	-12%
SE			130,279	3,639	9,240	530	-13%	-9%
OS			97,405	2,087			*-14%	0%
Baltic Sea	792,209	21,716	91,0343	36,893	118,134	15,177	-9	-10

*Airborne inputs from shipping has increased +15% while other sources have decreased -18%

1.2: Platforms for higher impact of project aims

The Interreg Baltic Sea Region Programme decided in 2017 to establish a number of thematic platforms "in order to strengthen the impact of projects' outcomes in the selected thematic field" (Interreg Baltic Sea Region, 2017). The aim was to capitalize on project results by synthesizing separate project results in cooperation with different target groups to be utilized in practice. In other words, expectations were to get greater impact for the provided funding. A strengthened impact is especially envisaged via better integration of project results and conclusions into policies. SuMaNu is such a thematic platform, covering the issues of sustainable manure use and nutrient management. SuMaNu platform includes recent Interreg BSR funded projects Manure Standards and Baltic Slurry Acidification, Interreg Central Baltic funded project GreenAgri and BONUS Programme funded project BONUS PROMISE. Also results from previous Interreg BSR funded projects Baltic COMPASS, Baltic DEAL and Baltic MANURE will be utilized when appropriate.

SuMaNu projects in general have aimed to promote more efficient nutrient management and manure use. Some projects had aims to influence farm practices but not all projects aimed directly to influence policymaking. Analysing and clarifying the reasons behind successful long-term accomplishment of goals might provide a useful background for better designing and implementing future projects through more effective communication of clear policy recommendations to target

groups. In this way, future projects could contribute better to closing nutrient cycles and reducing nutrient inputs to the Baltic Sea.

The idea behind the gap analysis presented in this report is that promotion of SuMaNu's recommendations concerning best nutrient and manure management practices could be better targeted and more effective if we clarify possible gaps between envisaged and realised impacts, and furthermore define the impeding pitfalls, i.e. shortcomings and weaknesses that have caused the missing impact leading to gaps in previous projects.

1.3: Choice of focus regions

According to project plans, the gap analysis shall "focus on regions with high livestock density and subsequent clear needs to improve manure nutrient management".

The spatial distribution of the focus regions must be adapted to the prioritised recommendations. For instance, it would not be relevant to choose a municipality as a focus region for a recommendation that must be implemented via amendments to a national support scheme or national legislation. Thus, the focus regions must be countries or NUTS1 regions according to the Eurostat definition (<https://ec.europa.eu/eurostat/web/nuts/background>).

For this reason, we choose EU Member States in the BSR as focus regions. According Eurostat¹, the focus regions should be DK, DE and PL, which are the countries with the highest livestock densities in the BSR.

1.4: Macro-regional policies

The projects considered in this report are transnational with project partners from all or most of the main BSR countries, except GreenAgri which involved only Estonia and Latvia. Their results and recommendations were generally targeted to the whole BSR, and they have all been presented in international events. Some of the projects took part in organizing the international conference "A Greener Agriculture for a Bluer Baltic Sea". It is thus also relevant to assess the effect of these projects on macro-regional policies, such as HELCOM Ministerial Declarations.

The HELCOM Ministerial Meeting 2013 was held in October 2013, which coincided with the end of Baltic COMPASS, Baltic DEAL and Baltic MANURE projects. This provides an opportunity to study, if the projects had an impact on the HELCOM 2013 Ministerial Declaration or later HELCOM policy documents.

¹ https://ec.europa.eu/eurostat/statistics-explained/index.php/Agri-environmental_indicator_-_livestock_patterns

2: Chosen approach

This report is aiming at

1. Identifying, analysing, classifying and describing the relevance of the gaps between project recommendations made for more sustainable manure management and their practical implementation.
2. Suggesting possible solutions so that the results of this platform and forthcoming projects will make a greater impact in practice.

2.1: Overall approach

To conduct the gap analysis, an approach of deductive and theory-testing research was used based on a set of described and classified potential pitfalls in project design and implementation that could potentially lead to gaps between envisaged and realised policy impact of projects. Links between pitfall categories and implementation gaps were tested by the use of empirical data collected during this study.

The decision was not to use an inductive research methodology, which typically would require performing wider explorative studies and data collection including interviewing of influencers and target groups, followed by analyses to structure the collected information. Such a study would likely identify a wider variety of pitfalls and produce results with greater detail and more nuances than the hypothesis-testing deductive research. However, the benefit of the deductive research is that the limited set of classified potential pitfalls are analysed in a focused way, and the results are easier to analyse and communicate.

2.2: Identifying gaps

Identifying gaps is a difficult and complicated task that attempts to determine the difference between the original goal and the realised result. The gaps cannot be objectively measured with exact tools or calculations but are evaluated on basis of methods that inevitably are based on qualitative inputs.

Most projects have formulated wider development objectives in a rather generic way, for instance saying that the project will “contribute” or “produce”, but without adding specific details, without concrete descriptions, and not using measurable goals.

We have anyway been determined to define, which impacts projects could be expected to have in practice and compare that with the realised effect in the selected focus regions.

2.3: Classified and described pitfalls

Project results and conclusions are included in the gap analysis along with the direct policy recommendations. The connection between policy recommendations, results and conclusions are visualised in Figure 1.

- Project results themselves cannot be expected to be turned into policies directly. They must first be interpreted and pooled with other results, information and impressions before experts (e.g. farm businesses, other businesses, or business advisors and researchers) could draw up conclusions from them. After conclusions are made, they must be turned into policy recommendations before they could have an effect.
- Project conclusions are typically mainly targeted to stakeholders that can combine these with other information such as other research conclusions and statistical information. Such stakeholders are typically research institutes, which often have an advisory function towards their governments, but can also be NGO's, including farmers' organisations, as well as any parties that are eligible hearing parts in case of new legislation being prepared or members of official work groups.
- Policy recommendations are logically delivered to policymakers in order to be turned into policies. Several methods can be used for delivering the policy recommendations, but the most effective is direct communication (person-to-person or via small meetings, such as roundtables). The effect of the communication depends typically on the personal relations between the project participant and the policymaker. The timing is extremely important, and policymakers, which are staff of ministerial bodies, are most open for proposals in situation that calls for introduction of new solutions or measures to comply with international commitments.

Thus, policy recommendations can be more easily implemented, whereas the likeliness that conclusions are turned into policies are less likely, more uncertain and would take longer time. Projects presenting only results cannot expect to see these as part of the policy framework but may impose influence on policy in the long run.

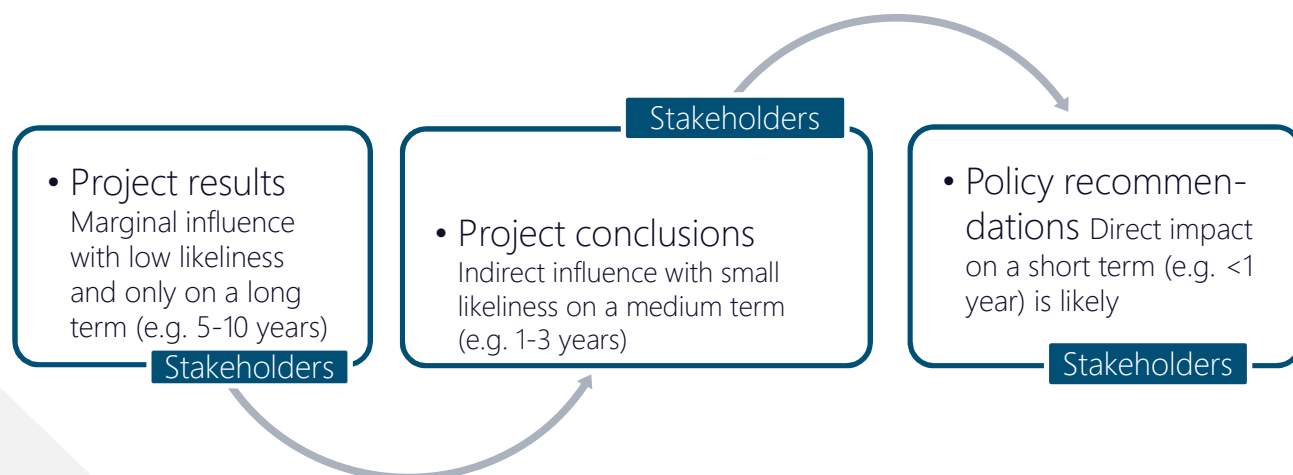


Figure 1: Relation between policy recommendations, project conclusions and project results, their probability to be turned into policies by the action of stakeholders, and the time it could take.

In order to effectively create an envisaged impact among end-users on a widespread scale, the project should be designed and implemented according to the following criteria:

- i. Project aim: The project is designed to produce policy recommendations² or recommendations in general that could create impact.
- ii. Project results: The project has in fact developed recommendations or policy recommendations. Documented by references to the information sources.
- iii. Clarity of recommendations: The recommendations or policy recommendations are formulated in a clear way, giving concrete instructions to policymakers or other target groups about the actions they should take. Judged by respondents.
- iv. Communication efficiency: The recommendations are communicated via relevant channels in an effective way to a sufficient number of persons in relevant target groups. Judged by respondents.
- v. Policy integration: The recommendations are adopted by policymakers. Preferably documented by reference to amended legal framework.
- vi. End-user acceptance: Policies are effectively implemented among end-users via enforced legislation and/or support schemes and/or via voluntary measures. Preferably documented via surveys of used farm practices and technologies.

These six issues are crucial for reaching envisaged impacts. They are also a guideline to common pitfalls, or shortcomings and weaknesses, in project design and implementation that increases likelihood of failing to reach the envisioned impacts.

In the gap analysis, project aims were evaluated in relation to their compliance with standard requirements to project objectives, namely how SMART they are formulated. SMART is an acronym for guidelines for setting project related objectives: Specific, Measurable, Attainable, Realistic and Time-bound. Project objectives were analysed according to these five dimensions, whereas they otherwise would be imprecise, not sufficiently detailed, and too generic formulated.

² Otherwise formulated as conclusions that could be converted into policies or policy recommendations, or alternatively presented as results, that could be turned into conclusions, which could be basis for policies or policy recommendations.

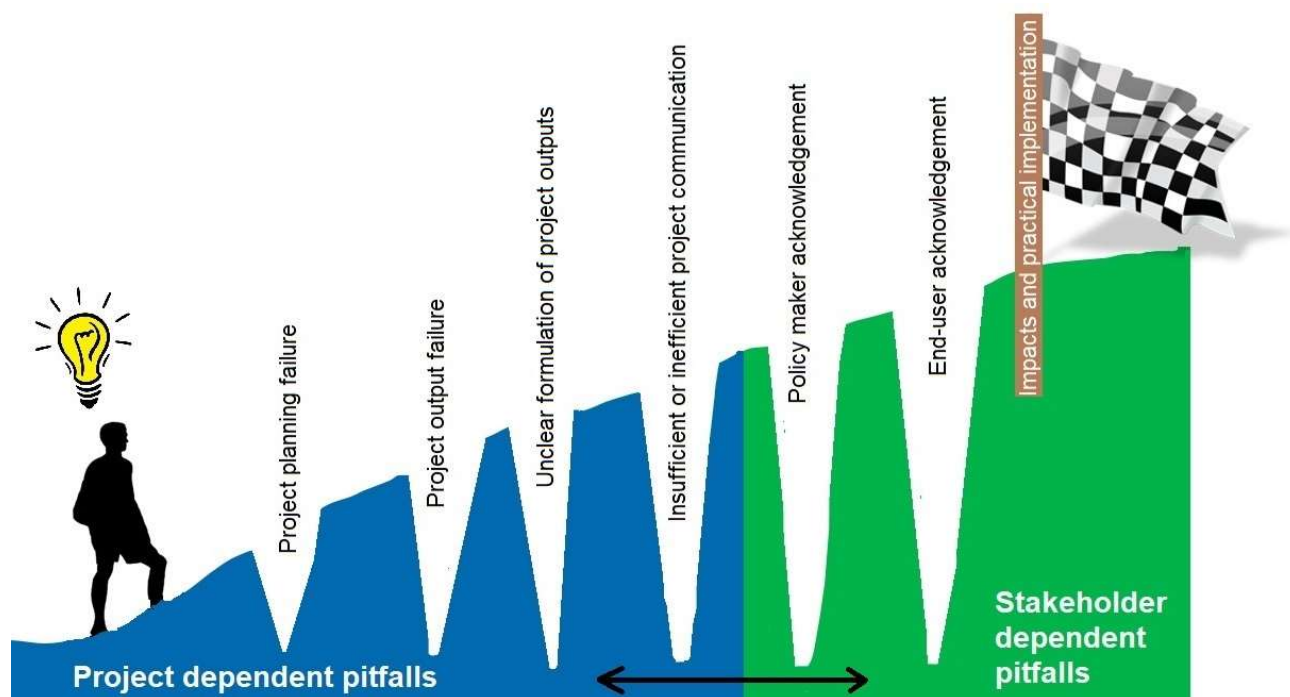


Figure 2: Typical pitfalls that causes gaps between envisaged project goals and realised impacts, evidenced as practical implementation among end-users.

Consequently, the described and theoretically assumed pitfalls also describe the most important criteria for ensuring projects to have an impact on farming practices related to manure use and nutrient management.

For instance, if the gap analysis identified projects that have not reached long-term impact due to the communication pitfall, then an obvious way to prevent coming projects to fail due to the same pitfall is to strengthen the project communication plan. Likewise, recommendations directed towards farms that anticipate a voluntary change of farm management policies, must also be formulated clearly and communicated effectively, since the end-user in this case is the farm manager, who shall consider possible ways to implement the recommendation into new practices at his farm.

Within each pitfall, there may be a variety of reasons for not avoiding it. For instance, in case of failure of policymaker acknowledgement, the reason could be unwillingness to follow the policy recommendations due to, e.g., budget constraints.

2.4: Selecting recommendations for gap analysis

The SuMaNu projects have made many recommendations, conclusions and results over the years. The goal was to make a gap analysis for 10 of these. The SuMaNu project team selected jointly the following 10 recommendations for that purpose:

Table 2: List of recommendations that were prioritised by the SuMaNu team to be subject for a gap analysis.

Baltic Slurry Acidification

1. All involved EU Member States were given the policy recommendation to establish an expert working group with representation from relevant authorities and knowledge institutions in order to clarify the potential impacts of slurry acidification for the livestock sector and the society, based on outputs, conclusions and recommendations of the Baltic Slurry Acidification project as well as other documentation; and possible ways of amending regulations, standards and subsidy programmes for ensuring an envisaged use of slurry acidification.

Manure Standards

2. A set of recommendations for ensuring a high nutrient use efficiency of manure nutrients.

Baltic DEAL

3. Each farmer can carry out soil and feed analyses and prepare nutrient balances to optimise usage on the farm. Each advisory can encourage soil analysis and nutrient balances on all farms.
4. Each country can support a network of demonstration farms. Each advisory can co-operate with demonstration farms and provide support in describing and analysing the economic and environmental effects of measures implemented.

Baltic COMPASS

5. Phosphorus management, including P-norms, P-indices, standard figures for livestock manure are behind laying driving incitements for deployment of other recommended technologies, as well as important pre-conditions for managing them.
6. Livestock manure-based biogas production deserves a wider disseminated use due to its ability to improve the nutrient cycling, for instance via increased bioavailability of nitrogen in the digestate compared to the feedstock material.

BONUS PROMISE

7. Manure is a valuable nutrient source. The phosphorus fertilization value of manure and digested manure is comparable to mineral fertilizers. Total P content and bioavailability of 100% are therefore to be taken as the basis for application, a smaller fraction leading to overfertilization.
8. Currently organic P-rich materials on the market need to inform their phosphorus fertilizer value based on chemical solubility tests. These tests do not always correlate with the actual bioavailability. Therefore, a common and reliable methodology needs to be verified and agreed.

Green AGRI

Not considered because the project covered only Estonia and Latvia.

Baltic MANURE

9. Ensure sufficient covered manure storage capacity.
10. Control water additions to slurry, and separate and re-use cleaning water when possible.

2.5: Interviews

Criteria iii (clear/concrete formulation of recommendations) and iv (quality and efficacy of communication) were judged by respondents that were selected among key stakeholders as staff of bodies that are involved in the formulation of related legal framework and/or subsidy schemes.

Judgements were collected by interviewing, either face-to-face or via telephone. In order to better understand the communication efficiency of the projects and the clarity of their messages, the respondent was initially given open questions, such as "Can you mention names of the current or finalised Baltic Sea Region projects dealing with nutrients, livestock manure and farming?". In case they were not mentioning all SuMaNu project, they were given help by asking, e.g., "Do you know Baltic MANURE?" If they knew Baltic MANURE, the next open question was "Can you mention a recommendation, conclusion or result of Baltic MANURE?" If not, the helping question was "Are you aware that Baltic MANURE was a project that recommended 'sufficient covered manure storage capacity'?" To understand how detailed the respondent have understood the recommendation, some questions could deal with the more concrete details of the recommendation, such as what did they mean with cover, or how to understand sufficient?

The respondents are according to the above supposed to be persons that should react on the recommendations by ensuring that standards, legislation, support schemes or own farm practices are changed. The interview is therefore continued with questioning how they followed the specific recommendation or used the conclusion or result of a given project.

Some guiding interview questions were formulated as follows:

Macro-regional level interview

- 1) Have you heard and how did you hear about the project [project name]?
 - a) In this step interviewer will ask project by project (Baltic MANURE, Deal, and Compass)
 - b) If yes, continue to the next points
- 2) Did you receive the results/recommendations from the projects when they were active?
 - a) Yes
 - i) Discussed with the project representative face-to-face/via email/phone
 - ii) Read the website
 - iii) Received newsletter
 - iv) Took part in an event
 - v) Other
 - b) No
- 3) Do you remember, what was recommended?
 - a) If yes, continue to question 6
 - b) If no, continue to question 5

- 4) Do you remember the recommendation about xxxx? Selected recommendations are found in the annexes.
 - a) If yes, go to question 6
- 5) Have the results/recommendations been relevant for your work/the work of your organization?
- 6) How did the project results/recommendations impact the HELCOM 2013 Ministerial Declaration or the other documents adopted in that HELCOM 2013 Ministerial Meeting?
- 7) Did the project recommendations have an impact on other macro-regional policy processes?
- 8) Did you encounter any special bottlenecks or barriers for implementing the recommendations?
- 9) How could the project recommendations and their communication be improved to be more relevant and have more impact?

National interviews

- 1) Can you mention names of current or finalised Baltic Sea Region projects dealing with nutrients, livestock manure and farming?
- 2) Have you heard about the projects called Baltic COMPASS? Repeated question for Baltic DEAL, Baltic MANURE, Manure Standards, Baltic Slurry Acidification, and BONUS PROMISE, whereas GreenAgri is not supposed to be known outside Latvia and Estonia.
- 3) Did you receive results/recommendations from the projects when they were active?
 - a) If "Yes"
 - i) What were they?
 - ii) Discussed with project representative face-to-face/via email/phone
 - iii) Read the website
 - iv) Received newsletter
 - v) Took part in an event
 - vi) Other
 - b) If "No"
 - i) Are you aware that [specific project] recommended [recommendation/conclusion or result of the specific project]? If no, continue with the next project.
- 4) Have the results/recommendations been relevant for your work/the work of your organization?
- 5) Did the project recommendations have an impact on the policy processes in your country?
- 6) Did you encounter any special bottlenecks or barriers for implementing the recommendations? (For example, economical (e.g. costs too much to be implemented) or technological (e.g. doesn't suit for the national conditions) barriers.)
- 7) How could the project recommendations and their communication be improved to be more relevant and have more impact?

Thus, the interview process chosen is semi-structured, meaning not so defined and structured as a questionnaire, but with possibility to use the prepared, guiding questions mentioned above.

The interviewed persons were supposed to provide immediate answers on basis of their memories and without analysing earlier email correspondence or other material, and it was emphasized that the provided answers should be given without any responsibility for their correctness.

The results of the interviewing are summarised in a few sentences in the annex tables for the pitfalls iii) and iv) for each of the selected recommendations.

2.6: Conducting the gap analysis

Section 3 is summarising the actual gap analysis, for which the details appear in Annex 1 – 7, structured according to the defined pitfalls.

In order to present the findings in a more digested and pedagogic way, the 10 selected recommendations were given a subjective score for their success with avoiding the various pitfalls in question.

Table 3: Structure for scoring the pitfalls of the selected recommendations, exemplified by typical situations.

Pitfall		Scoring				
		N/A	Zero / 0	Low / 1.7	Medium / 5	High / 8.3
			0	0.1 – 3.3	3.4 – 6.6	6.7 - 10
i	Project aim	No information available/ provided	The project has not specifically formulated aims to support policy development or creating impact among end-users.	The project is aiming at supporting policy development or creating impact among end-users, but this is not stated as a project objective.	The project is aiming at either supporting policy development or creating impact among end-users.	The project is aiming at both supporting policy development and creating impact among end-users.
ii	Project result		The project has not produced any policy recommendations or recommendations to end-users	Low quality of policy recommendation , compared to plans.	Medium quality of policy recommendations, compared to plans.	High quality of policy recommendations, compared to plans.
iii	Clarity of recommendations		The project and/or its recommendation	The recommendation was formulated in a generic way.	The recommendation could be followed after	The recommendation explained

Pitfall		Scoring				
		N/A	Zero / 0	Low / 1.7	Medium / 5	High / 8.3
			0	0.1 – 3.3	3.4 – 6.6	6.7 - 10
			was not known to respondents.		further research.	clearly what to do.
iv	Communication efficiency		The project and/or its recommendation was not known to respondents.	The respondents recalled the recommendation after reminding.	The recommendation was remembered.	The respondent took action to implement the recommendation.
v	Policy integration		There is no evidence of policy integration	The recommendation is considered in a non-binding policy paper.	The recommendation is integrated into the legal framework after more than 5 years.	The recommendation is integrated into the legal framework within 5 years.
vi	End-user acceptance		There is no evidence of end-user acceptance.	Few end-users follow the recommendation.	Some end-users follow the recommendation.	Most of the end-users follow the recommendation.

The table is both giving a qualitative and a quantitative scoring. The average is found by adding the quantitative scoring for non-N/A answers and divide this with the number of answers. For instance, in case no respondent has answered (N/A), but one has answered Low and one High, then the average scoring is calculated: 1.7 (Low) + 8.3 (High) divided with 2 valid answers = 10/2 = 5, meaning Medium.

It is in specific for pitfall v), Policy integration unclear to which extent the project activities and the mentioned policy recommendation have contributed to the actual amended policy frameworks, but the documented amendments are evidences of the recommendation being relevant in the concurrent context and supporting the related policy process.

3: Gap analysis results

For the projects related to the SuMaNu platform, we have identified wider objectives in Annex 1 - 7, largely based on the objectives described in the project documents and to a minor extent on the aims of the donor program. These objectives were examined for concrete plans to produce policy recommendations or alike, or for delivering other impacts. This is compared to the change of policy framework in the selected focus regions, as well as any change in end users' practice. The difference is a gap, and we have for each project described the pitfalls that hampered the reaching of the intentions of the project.

3.1: Scoring for the ability to handle defined pitfalls

Table 4 summarises in matrix form the subjective scoring for the quality of handling important pitfalls that leads to gaps between envisaged and realised impacts, whereas the details are summarised in the sections below, and the collected material presented in the annexes.

Table 4: Subjective scores according to the method mentioned in section 2.6. See table 3 for the details on the basis of scoring.

Project	Recommendation	i. Project aim	ii. Project results	iii. Clarity of recommendations	iv. Communication efficiency	v. Policy integration	vi. End-user acceptance
Baltic Slurry Acidification	Investigate possibilities for exploiting the potential benefits of slurry acidification	High	High	High	High	Medium ^a	Low ^b
Manure Standards	A set of recommendations to enable a high nutrient use efficiency of manure nutrients	Medium ^c	High	High	High	Low ^d	N/A ^e
Green Agri	The recommendations of Green Agri was not subject to a gap analysis because the project covered only Estonia and Latvia.						
BONUS PROMISE	A common and reliable method for measuring P bioavailability in organic P	Low ^f	Medium	N/A ^h	N/A ^h	0 ⁱ	N/A ^j

Project	Recommendation	i. Project aim	ii. Project results	iii. Clarity of recommendations	iv. Communication efficiency	v. Policy integration	vi. End-user acceptance
Baltic COMPASS	fertilizers needs to be verified and agreed.						
	In fertilisation with organic P-fertilisers, the total P content and bioavailability of 100% should be assumed.	Low ^f	Medium	N/A ^h	N/A ^h	0 ⁱ	N/A ^j
	Manure-based biogas production deserves a wider disseminated use	High	High	High	High	Medium ^k	Medium ^k
Baltic DEAL	P-management measures should be introduced	High	High	High	High	High ^l	High ^l
	Farms should analyse soils and feed and make nutrient balancing	Low ^m	Medium ⁿ	Low ⁿ	Low ⁿ	Low ^o	0 ^o
	Countries should support a network of demonstration farms	Low ^m	Medium ⁿ	Low ⁿ	N/A ⁿ	0 ^p	N/A ^p
Baltic MANURE	Ensure sufficient covered manure storage capacity	High	Medium ^q	0 ^r	0 ^r	0 ^r	N/A ^r
	Avoid water dilution of slurry	High	Medium ^q	0 ^r	0 ^r	0 ^r	N/A ^r

3.2: Rationale for the scoring

Table 4 summarizes in a single table the gap analysis, expressed as scores in a matrix combining the six defined pitfalls and the 10 prioritised recommendations. The following comments clarifies the rationale behind the scores:

- ^a Policy integration of slurry acidification has not happened, at least so far, in Poland, but in Denmark, Germany and on EU level.
- ^b Apart from the new use of slurry acidification by some investment partners in the Baltic Slurry Acidification project, we have no evidence for any end-user impact so far.
- ^c Plans to produce policy recommendations was not described clearly in the project objectives, but as part of work package 5 description.
- ^d The project has first submitted their recommendations in the beginning of 2020, and there are so far no BSR countries that have followed these, but a HELCOM Recommendation is already issued on basis of the recommendations.
- ^e In line with the above, there is no evidence for any farmers that have followed the policy recommendations.
- ^f The objective of the project was not to produce policy recommendations.
- ^g The quality of the project results are not questioned, but they were not of policy nature.
- ^h It was not possible to find any persons to interview about the project.
- ⁱ There was not found any evidence of policy integration.
- ^j There was not found any evidence of end-user impact.
- ^k Baltic COMPASS' recommendation concerning manure-based biogas production was so far not integrated into regional or Polish policy frameworks, and therefore also not accepted by end-users in Poland.
- ^l The high score concerning Baltic COMPASS' P-management recommendation is probably misleading. Both P-fertiliser norms, P-indices and standard values for manure were recommended, but only a fraction of this has so far been implemented: DK has only introduced flat-rate P-fertiliser norms and is not enforcing the use of a P-index. DE is using a balance method rather than defined P-fertiliser norms and P-indices. PL has so far alone mentioned P fertilisation in the legal framework, but not specified how this should be regulated via norms, standards or indices.
- ^m Baltic DEAL has the objective "To develop a common and transnational Baltic Sea region strategy" an ambitious plan for producing policies for the BSR. However, it is not clear what this policy could comprise.
- ⁿ The logic link between the formulated project objective and the resulting recommendations is unclear, and the resulting recommendations not unique and closely associated to the project, also not for the respondents.

° The recommendation that farms should make nutrient balancing has been used as a justification for the Manure Standards project. Germany had already with their Fertiliser Regulation of 2007 introduced the principle of nutrient balancing.

° There is no evidence of countries following the recommendation to support a network of demonstration farms, besides what they already had organised on beforehand. Following this, end-user acceptance is not applicable.

° The logic link between the formulated project objective and the resulting recommendations is unclear, and the recommendations appear accidental and not unique and closely associated to the project.

° Respondents did not associate the recommendations with the Baltic MANURE project, they didn't remember the project came with such recommendations, which they saw as general principles for good manure management. There is likewise no evidence of these Baltic MANURE recommendations having formed the basis for changed policy frameworks, wherefore also end-user acceptance is not applicable.

3.3: Overall comments

Pitfalls i) and ii) concerning aims and project results were described with reference to project documents by SuMaNu participants, who knew the projects via current or past participation in them:

- Three projects, representing four recommendations, namely Baltic Slurry Acidification, Baltic COMPASS and Baltic Manure scored high for their aims to produce policy recommendations and create impact among end-users. Manure Standards could have expressed their aims to produce policy recommendations more sufficiently as part of their objectives. Two projects behind four of the recommendations, namely BONUS PROMISE and Baltic DEAL scored low with respect to aiming at producing policy recommendations and create impact among end users.
- The overall highest evaluation was given to the projects for their ability to produce policy recommendations or results in line with own described objectives or project plans. All projects scored for this Medium or High. Projects that were evaluated at producing Medium results had typically failed to demonstrate a logic link between the described result and the original project objectives and plans.

Evaluation of the clarity of the recommendations and the communication efficiency were based on responses from interviewed persons, that were selected as representing the key target group of policymakers in the selected focus regions with high livestock density as well as in the BSR macro-region:

- The clarity of the recommendations was evaluated to be high for Baltic Slurry Acidification, Manure Standards and Baltic COMPASS. A high clarity means that you have understood the recommendation so well that you know exactly what to do to follow the recommendation.

For BONUS PROMISE, Baltic DEAL and Baltic MANURE, respondents either didn't know the project and their recommendations, no one was willing to be interviewed about the projects, or the recommendations seemed outside the respondent's context.

- As for clarity, the same evaluation was more or less given for communication efficiency.

Policy integration and end-user acceptance were described for the selected focus regions with high livestock density, DK, DE and PL, as well as for the BSR macro-region with reference to legislation or other policy framework documents and statistics by SuMaNu participants, who knew the projects via current or past participation in them:

- The policy integration is averagely low, and 0 (zero) for five out of ten recommendations.
- Without policy integration, the fundament for end-user acceptance is alone based on voluntary implementation. Being agro-environmental measures, the pre-conditions for that are very unfavourable as agro-environmental measures by rule of thumb seldomly would be cost effective for farmers.

Overall, the highest scoring projects were Baltic Slurry Acidification, Manure Standards and Baltic COMPASS. It seems some important success criteria comprise the following:

- Defining objectives in line with end-user needs;
- Organising activities in line with the objectives so that they lead to the production of the foreseen results;
- Involving both representatives of the administration and the end-users directly in project partnerships or activities.

3.4: Discussion

It is emphasized that the gap analysis was based on structured evaluations, subjectively answered, which were then deductively analysed. Efforts were made to make the gap analysis as detailed and precise as possible for all considered aspects. The gap analysis can be considered as a guiding overview.

There is a risk for impartiality in the gap analysis as the data was collected by SuMaNu participants who also participated in the study projects and therefore could be susceptible to unintentionally defend the value of their own projects. On the other hand, this was equal for all considered projects, and the benefit was that participants had good knowledge of the considered projects.

The interviewing of SuMaNu-external key stakeholders made a good contribution to the quality of the gap analysis, and especially to its objectivity. Unfortunately, it was not for all recommendations from the projects possible to find willing and suitable persons to interview in all cases.

The gap analysis as it is summarised in Table 4 gives an immediate impression of large gaps between all the good intentions with these projects and the results they have created, and that

some of them even can be considered as unsuccessful. However, more of the respondents have unsolicited underlined the importance of the projects, for instance with the following argumentation:

"The Danish respondent, Henriette Hossy from Danish Environmental Protection Agency pointed out, that she considers the projects to be instrumental in a needed dialogue among countries in the Baltic Sea Region to secure common approaches to joint environmental challenges, despite she evaluated the projects' direct impact on Danish policies to be rather limited.

4: Suggested solutions for effective future project implementation

An important purpose of this gap analysis is to find possibilities for improvements to change current practices about planning and implementation of projects with the intent of promoting change about manure and nutrient management in the Baltic Sea region.

With reference to Section 3, there were generally found gaps between envisaged and realised policy impacts, and in fact, not all the projects aimed at producing policy recommendations.

So, in conclusion, there is room for improvement, and this is more or less the case for all the described and classified pitfalls:

- i. *Project aims*: If the aim of a project is to promote fundamental, widespread change, it is relatively easy to ensure that future projects include objectives concerning support to policy development and creating impact among end-users. A higher focus could be given to this both in the preparation and design of projects, as well as, in the appraisal of project applications. It could be recommended to use the SMART dimensions that force the formulations to be clear and concrete.
- ii. *Project results*: Despite this was the best evaluated pitfall in average of all the projects, there is still room for improvement. The projects can be designed better, for instance by giving higher emphasis to preparation of detailed project plans once the projects have started, to ensure the planned activities corresponds to the promised results. Even stronger focus is given to the issue in case projects also prepare detailed plans for quality assurance and risk mitigation, and that the responsibility for this is delegated to specific persons.
- iii. *Clarity of recommendations*: For the considered projects, a huge effort was given to the financial reporting, which contrasts to an almost missing appraisal of the submitted technical reports. It is often very difficult to reach consensus about project recommendations or key messages in the project team if it, as is typically, consists of 10 - 20 diverse partners from 5 - 10 countries. It is therefore even more important that the projects and their work packages are led by good mediators that in the same time have a proven and strong technical profile. It is also important that sufficient resources have been allocated for the process of formulating recommendations or key messages, and that this is done before the project ends. It is important to ensure recommendations are relevant and clear, and it must not leave any doubts about the way it should be followed and by who.

The project should not be afraid to give recommendations. The recommendations should not be too general but not too detailed either. The recommendations are only to spark the interest of policymakers, and they need to be backed up by proper data and examples. It is important that the project has a functional website where the information easily is found.

A concise policy brief that puts the recommendations into a wider context and is written in plain language is a good way to bring the recommendation forward to policymakers since they often don't have time to read long reports. In the brief, there should not be too many details, the focus should be on meaning and not methods and there should be reference to where additional information can be found.

- iv. *Communication efficiency:* Communication is most efficient if it is targeted to those that should implement the recommendation, and it is important to use the correct communication media. Low communication efficiency is the major reason for gaps between aims and results of projects. The quality of communication is best ensured if the responsibility is clearly delegated to a communications officer, and a detailed communication plan prepared. A typical project claims that they can communicate results to all stakeholder groups, including for instance farmers. This should to a higher extent be supplemented with quantification to clarify the intended reach of the stakeholder group. For instance, there are according to Eurostat³ about 2 million farms in the eight EU Member States of the Baltic Sea Region Countries and it would not be realistic for a project running for a limited period could reach them all via communication activities.
- v. *Policy integration:* For future funding of projects from programmes with policy impact among their objectives, it is suggested to set up more concrete demands to the production of clear policy recommendations, and to the delivery of these to the target groups that should react on them. Furthermore, for better avoiding typical stakeholder dependent pitfalls, future projects could be faced with higher demands to involvement of key stakeholders, policymakers, such as administration bodies. The project should have contact with the policymakers, e.g., ministries, and know how decision-making process works and what is the right timing to give input to that process.
- vi. *End-user acceptance:* Having practitioners such as farmer and advisory organizations in the project consortium gives credibility to the recommendations of agriculture-related projects.

³ https://ec.europa.eu/eurostat/statistics-explained/index.php/Farms_and_farmland_in_the_European_Union_statistics#Farms_in_2016

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Annex 1: Selected recommendations from Baltic Slurry Acidification

Annex 1.1: Pitfall i – plans for producing recommendations and create impacts

Baltic Slurry Acidification was co-financed under Priority 2 'Efficient management of natural resources' of the Interreg Baltic Sea Region Programme. In this way, Baltic Slurry Acidification was expected to support the implementation of the EU Strategy for the Baltic Sea Region (EUSBSR), which has 'Save the Seas' as one of its main objectives, by working within their Policy Areas Nutri and Bioeconomy.

In line with this, the objectives for the project were formulated as follows in the project application document:

Section 1.6 (Summary): The objective of this project is to build upon Baltic MANURE results and promote the use of SATs throughout the BSR. Core activities focus on establishing pilot installations in all BSR countries around which field trials and demonstrations will help to build enduser confidence in these technologies. The project further aims to systematically enhance the capacity of both public and private actors in BSR countries by conducting technical feasibility studies and detailed environmental and economic analyses of SATs implementation. Using these results, together with market and national legislation analyses, the project will formulate policy recommendations for integration of the technology in existing legislation and agricultural support schemes. Expected impacts to the BSR include reduced airborne eutrophication and a more competitive and sustainable farming sector.

Section 3.8 (Objectives and results): Policy recommendations will be based on the mentioned analyses of legislation, support schemes and markets, as well as on the results of the tests and demonstrations of pilot installations and their environmental and economic effects in the different countries. Policy recommendations will also take into consideration the theoretical estimation of the effect of slurry acidification technologies at five case study farms that were described in the former Baltic MANURE project.

From this, it is clear that the project was planning to produce recommendations. Also, the project expected to create impact in the form of reduced airborne eutrophication and a more sustainable farming sector. The expected impacts are not formulated in a SMART way, they are for instance not quantified and therefore not measurable.

Annex 1.2: Other pitfalls (ii – vi)

Baltic Slurry Acidification

ii Project results	Policy recommendations were developed in work package 6, considering the national economies, the society and the environment. The recommendations were based on results of other work packages, such as work package 2, which researched potential impacts on e.g. corrosion of concrete, and work package 4, which organised field trials, whereas work packages 3 and 5 were more oriented towards individual farms concerning their investment economy and alike. The macroeconomic estimations of the impacts of using slurry acidification technologies (SATs) was for all involved EU Member States positive, not least due to the capitalised value of cleaner air, whereas the policy framework of Belarus and Russia did not give basis for a positive economic impact of using SATs. Consequently, all EU Member States were given the policy recommendation to establish an expert working group with representation from relevant authorities and knowledge institutions in order to clarify 1. the potential impacts of slurry acidification for the livestock sector and the society, based on outputs, conclusions and recommendations of the Baltic Slurry Acidification project as well as other documentation; and 2. possible ways of amending regulations, standards and subsidy programmes for ensuring an envisaged use of slurry acidification. The policy recommendation for the individual country is explaining the recommendation, among other via a SWOT analysis (See: Foged, Henning Lyngsø (Ed.). 2019. Policy recommendations for supporting SAT implementation. Technical Report. http://balticslurry.eu/reports-2/).
iii Clarity of recommendations	The policy recommendations aimed at being clear, concrete and without any complexity. Interviews among key stakeholders of the project concerning the clarity of the policy recommendation had the following result: Germany: • Respondent: A person from Ministry of Energy Transition, Agriculture, Environment, Nature and Digitization of the State of Schleswig-Holstein

Baltic Slurry Acidification

and a person from State Agency for the Environment, Nature Conservation and Geology of Mecklenburg-Western Pomerania

- Summary: The State Agency for Agriculture, Environment and Rural Areas of the German Federal State Schleswig-Holstein (LLUR) itself was a project partner and supports the recommendations of the project. A brochure was published (<http://www.wrrl-mv-landwirtschaft.de/sites/default/files/downloads/Fl%20Ans%C3%A4uerung%20G%C3%BClle%20170818.pdf>), which also recommends slurry acidification in Mecklenburg-Western Pomerania.

Poland:

- Respondent: Bogdan Pomianek - Director of the Common Agricultural Policy Department at the Ministry of Agriculture and Rural Development
- Summary: Recommendations resulting from the project, i.e., conducted trials clearly present procedures and restrictions resulting from the adaptation and implementation of the use of acidification techniques in Poland.

Denmark:

- A suitable and willing person for the interviewing was not identified. The Danish Environmental Protection Agency (DEPA) was in close contact with the project and arranged an international seminar for relevant persons from the administration in EU Member States while the project was active, i.e. in 2016, but the organiser left DEPA before the final recommendations were formulated.

iv Communication efficiency

The policy recommendations were communicated via the project website <http://balticsslurry.eu>, where the mentioned technical report is published.

The policy recommendations were also communicated and discussed at nationally organised roundtables (organised differently in each country and at different times, but generally during the last 6 months of the project) and presented at the final project meeting in Jyväskylä in Finland 12 - 13 February 2019.

Interviews among key stakeholders of the project concerning the communication efficiency concerning this policy recommendation had the following result:

Baltic Slurry Acidification

Germany:

Same as for pitfall iii).

Poland:

- Respondent: Bogdan Pomianek - Director of the Common Agricultural Policy Department at the Ministry of Agriculture and Rural Development
- Summary: The project as well as the slurry acidification technique itself has been widely promoted by Polish agricultural advisory service during numerous training sessions, thematic conferences, workshops, meetings with farmers, information stands during trade fairs, etc.
- Awareness of farmers / advisors / agricultural institutions regarding slurry acidification was significant, also at the national level.

Denmark:

- Same explanation as for pitfall iii.

v Policy integration

The policy framework has during or after the end of the project been amended to follow the policy recommendations:

Germany:

- According to the EU NERC directive of 2016, Germany must reduce ammonia emissions by 5 % until 2020 and by 29 % until 2030 compared to the reference year 2005.
- In the Fertiliser Regulation (DüV) of 2017, measures such as improved application methods for livestock manure and a short incorporation period were specified, which should achieve a potential reduction of ammonia emissions of around 100,000 t in the next few years (Thünen report 77). That would be enough to achieve the 5 % target of 70,000 tons until 2020.
- In May 2018, the Federal Cabinet adopted a new "Ordinance on National Obligations to Reduce Emissions of Certain Air Pollutants" (43. BImSchV). This is intended to implement the EU NERC directive into German law. By March 2019, the federal government had to draw up a national air pollution control program (nationales Luftreinhalteprogramm) and subsequently update the technical

Baltic Slurry Acidification

instructions for air pollution control (Technische Anleitung zur Reinhaltung der Luft - TA Luft).

- The Ministry for Environment, Nature Conservation and Nuclear Safety (BMU) has published a draft of the updated TA Luft (Draft version of July 16, 2018: https://www.bmu.de/fileadmin/Daten_BMU/Download_PDF/Glaeserne_Gesetze/19_Lp/ta_luft/entwurf/ta_luft_180716_refe_bf.pdf). This also includes slurry acidification as a measure to reduce ammonia emissions.
- The 2030 climate protection program of Federal Government to implement the 2050 climate protection plan (19/13900) states that the ammonia emission reduction primarily serves to keep the air clean, with positive synergies for water protection and biodiversity by reducing diffuse N-inputs. The measures offer also the potential to contribute to reducing nitrogen surpluses. However, for acidifying slurry further studies on other possible environmental consequences (e.g. soil fauna bacteria, aquatic communities) are necessary before a clear recommendation can be given.
- So far, in addition to the Slurry Acidification project with State Agency for Agriculture, Environment and Rural Areas of the German Federal State Schleswig-Holstein (LLUR) and Blunk GmbH as project partners, further research projects have been carried out in Germany or are still ongoing.
- In some federal states, e.g. Bavaria, Mecklenburg-Western Pomerania, Lower Saxony, there are now existing concrete recommendations for the use of slurry acidification to reduce ammonia emissions as a result of these projects.

Poland:

This technique was significantly noticed by the relevant implementation institutions but has so far not caused any concrete changes in the policy framework.

Denmark:

- A Cabinet Regulation (BEK nr 1004 af 01/10/2019 - <https://www.retsinformation.dk/Forms/R0710.aspx?id=210419>) earmarks DKK 50 million for investments at cattle farms in ammonia emission

Baltic Slurry Acidification

reducing technology, including in-house acidification, which can be supported with up to DKK 700,000 per farm. Last time slurry acidification was given public support was in 2016.

- The Danish Government has allocated DKK 160 million for reduction of ammonia emissions from farming – see <https://mfvm.dk/nyheder/nyhed/nyhed/160-millioner-kroner-til-at-reducere-udledningen-af-ammoniak-fra-landbruget/>. The budget shall cover activities over a four-year period. An official working group is established to advise the Minister of Environment and Agriculture on the most cost-efficient way of using the budget. It is expected that slurry acidification will be among prioritised areas.
- A subsidy scheme was launched in March 2020 (Bekendtgørelse om tilskud til modernisering af slagtesvinestalde, In English: Cabinet regulation on support for modernising fattener stables - <https://www.retsinformation.dk/eli/lta/2020/173>), offering support for modernising slaughter pig stables with the objective to reduce their environmental load and climate impact. Up to 35 million DKK is allocated for the support scheme, which aims at reducing ammonia and methane emissions from the stables. All considered projects much include the establishing of in-house acidification or other technologies with effects on ammonia and methane emissions.

International:

- JRC finalised in February 2017 the BREF document, where SATs (both in-house, in-storage and in-field acidification) are recognised – see European Commission, Joint Research Centre. 2017. Best Available Techniques (BAT) Reference Document for the Intensive Rearing of Poultry or Pigs (BREF). http://eippcb.jrc.ec.europa.eu/reference/BREF/IRPP/JRC107189_IRPP_Bref_2017_published.pdf.
- The European Commission issued in 2017 Commission Implementing Decision (EU) 2017/302 of 15 February 2017 establishing best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for the intensive rearing of

Baltic Slurry Acidification		
poultry or pigs ⁴ , which makes SATs (both in-house, in-storage and in-field acidification) compulsory BATs in all EU Member States.		
vi	End-user acceptance	HELCOM has recently organised a survey among their member states to clarify how measures for ammonia emissions are used, regulated and supported in the different countries. According to the survey answers, the potential of slurry acidification technology to mitigate ammonia emissions is not yet well-recognized by all relevant authorities. To our own information, the project has so far not lead to increased use of slurry acidification, apart from use of the pilot installations in the project.

⁴ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32017D0302>

Annex 2: Selected recommendations from Manure Standards

Annex 2.1: Pitfall i – plans for producing recommendations and create impacts

Manure Standards was co-financed under Priority 4 of the Baltic Sea Region Programme, and in this way expected to support the implementation of the EU Strategy for the Baltic Sea Region (EUSBSR), which has “Clear waters” as one of its aims, to be achieved via the implementation of EU’s agro-food sector related environmental legislation.

In line with this, the objectives for the project were formulated as follows in the project plan:

Section 3.8 Objectives and results: The project objective is to provide the target groups (farmers, advisory, authorities, policymakers) with enhanced capacity to govern and/or practically turn manure use towards improved sustainability and resource-efficiency via enhanced capacity to recycle manure nutrients, and reduced risk of harmful environmental effects of agriculture to the Baltic Sea.

This capacity building is reached via

- 1) development of new, scientifically based, transnationally equal manure tools for determination of manure quantity and quality (=manure standards),*
- 2) testing the new manure tools in cooperation with the target groups*
 - a. in practical manure use (e.g. farm-level nutrient bookkeeping, incl. manure fertilisation plans and nutrient balances), and*
 - b. in chosen manure regulation / voluntary policy instruments (e.g. sufficient manure storage capacity),*
- 3) giving clear guidelines and recommendations on the use of the manure tools in practice as validated with the impact assessments and piloting,*
- 4) planning national and transnational actions to implement the new manure tools on farms and in policymaking, and thus resulting in enhanced manure use and decreased emissions to the Baltic Sea. Once the manure tools are implemented in policy instruments and in practical manure use, all BSR countries will stand on equal ground in regulation and in emission reduction targets related to manure.*

One of the project’s work packages, WP5, was planned to be conducted in close cooperation with the HELCOM Agri group that consists of representatives of ministries, agencies and research organizations of BSR countries. One of the outputs of WP5 was planned to be a regional policy

document: draft HELCOM guidelines/recommendation on manure standards. The aim of WP5 was also to involve other national stakeholders including authorities and policy makers with three national events during the project time.

The project objectives and planned activities show that there was a clear intention to provide recommendations for BSR regional policy and also involve national policy level. However, there were no measurable targets in the project plan.

Annex 2.2: Other pitfalls (ii – vi)

Manure Standards

- | | | |
|-----|----------------------------|--|
| ii | Project results | <p>The project has developed a document with recommendations – see https://www.luke.fi/manurestandards/wp-content/uploads/sites/25/2020/04/Manure-Standards_recommendations_FINAL.pdf.</p> <p>There are 12 slides with recommendations, divided into the groups: Main principles, availability of manure data, maintenance of manure data and responsibilities, methods for manure data generation, manure sampling and analysis, manure mass balance calculation, manure fertilisation, and nutrient balances. Two possible methods were equally tested and developed. The project produced manuals for taking representative manure samples and made recommendations for best practices in analysing manure. Also, calculation tools for manure mass balance calculation were made to provide a starting point to either develop existing national calculation tools or to implement a new national calculation tool.</p> |
| iii | Clarity of recommendations | <p>Interviews among key stakeholders of the project concerning the clarity of the policy recommendation had the following result:</p> <p>Germany:</p> <ul style="list-style-type: none">• Respondent: One person from Ministry of Energy Transition, Agriculture, Environment, Nature and Digitization of the State of Schleswig-Holstein and one person from Ministry of Agriculture and Environment Mecklenburg-Western Pomerania• Summary: The project was presented during a HELCOM Pressure Meeting. However, due to the similarities to their own ongoing works, the results of the project and their recommendations were not followed up. <p>Poland:</p> <ul style="list-style-type: none">• Respondent: Dr. Piotr Skowron Institute of Soil Science and Plant Cultivation in Puławy• Summary: Dr Skowron said that the project recommendations were clear. <p>Denmark:</p> |

Manure Standards

- A suitable and willing person for interviewing was not identified.

iv Communication efficiency

Interviews among key stakeholders of the project concerning the communication efficiency concerning this policy recommendation had the following result:

Germany:

Same as for pitfall iii).

Poland:

- Respondent: Dr Piotr Skowron Institute of Soil Science and Plant Cultivation in Puławy
- Summary: Project recommendations were disseminated among relevant administrative actors in Poland, and the mentioned HELCOM Recommendation supported from Polish side.

Denmark:

- A suitable and willing person for interviewing was not identified.

v Policy integration

The recommendations are in a more elaborated form adopted by HELCOM, who was project partner, in HELCOM Recommendation 41-3 of 4 March 2020 – see <https://helcom.fi/wp-content/uploads/2020/04/Rec-41-3.pdf>.

With reference to Henriette Hossy from the Danish Environmental Protection Agency, see below concerning P management measures recommended by Baltic COMPASS, Denmark has used standard values for manure for decades, and the project is therefore not likely to cause any change in Danish policy framework. The answer provided by the German respondent (see pitfall iii) indicates the situation is the same for Germany.

vi End-user acceptance

N/A

Annex 3: Selected recommendations from Green Agri

Green Agri was financed by Central Baltic Programme 2014-2020. The project was implemented in the period from September 2015 to August 2019. The partnership comprised Estonian and Latvian organisations and the project was not aiming at policy impact in the wider Baltic Sea Region.

Some key messages from the project included:

- Farms are different in size and situations (manure type, sector, farmer competence, economic and managerial capacity, etc.). Therefore, individual professional advice is needed to support decision making on investments and best practices for manure management
- Cooperation between farms and external services about manure spreading should be developed. Alternatively, measures should be taken to increase the availability of economically and environmentally efficient manure spreading with investment intensive technologies. This is especially important for small and medium farms and farms operating with different types of manure.
- Information about recommendations and best practices should be delivered to farmers in appropriate and efficient ways to ensure the utilization. Practical training and information exchange through on-farm seminars, field days as well as focused study trips (national and international) are most efficient, giving farmers access to get direct hands-on experiences before making decisions about investments.

Public events with measurement of emissions during spreading of manure brings direct information for farmers about environmental processes. This helps to generate a deeper understanding about needs for the use of proper practices and technologies on farm level. Therefore, research should be linked more practically with the farming to bring more targeted results for both parties.

In general, the society has only slight information about the environmentally friendly practices and technologies that farmers already use, especially in EU countries, and a negative, emotional pressure on farming is growing. Informative campaigns and activities should be widened to increase society's understanding for farming practices.

As the project covered only Estonia and Latvia, we did not find it relevant to perform a detailed gap analysis for it.

Annex 4: Selected recommendations from BONUS PROMISE

Annex 4.1: Pitfall i – plans for producing recommendations and create impacts

BONUS PROMISE is co-financed by the BONUS programme, which has a strategic research agenda, building on objectives dealing with ecosystem, coast and catchment area, marine goods and services, societal responses, and observation and data management in the BSR.

In line with this, the objectives for the project were formulated as follows in the project document:

Section 2 Concept, objectives and expected outcome of the project: PROMISE will convey backbone data on potentially hazardous contaminants in organic and recycled P fertiliser materials, will assess environmentally sound strategies for P fertilisation that fully acknowledge food safety and security and thus will deliver the scientific background for the justification of fundamental changes in existing fertiliser practices within the BSR. The project will create prerequisites for business development in the field of incineration technologies; produce knowledge to support political decision making while also contributing to Baltic Sea protection by helping to close P cycles in the region.

The specific objectives of the project are:

- 1) To collect a representative number of samples of original waste materials, farmyard manure and recycled P-rich fertilizers in Finland, Germany and Sweden.*
- 2) To preserve the sampled material for sample exchange with other research institutions.*
- 3) To assess the contamination of sampled materials with heavy metals, xenobiotics and pathogens.*
- 4) To apply cutting-edge technology in order to produce recycled P fertilizers which fulfil agricultural, nutritional and environmental demands. These are plant availability of P, innocuousness with regard to contaminations with heavy metals, xenobiotics and human pathogens.*
- 5) To define norms for recycled P fertilizer materials.*
- 6) To elaborate strategies for a balanced P supply in different regions of the BSR.*
- 7) To contribute to saving the natural finite resource P globally.*

...

Specific policy requirements addressed by the strategic idea: Essential prerequisite for better utilization of P-rich waste streams is the mandatory acceptance of these materials as recyclable, valuable P sources that can replace the use of finite reserves of primary P.

Therefore, the quality of the secondary P sources needs to be evaluated by up-to-date scientific methods.

The addressed themes in the thematic content of the call were: 1) Theme 2.4, Eco-technological approaches to achieve good ecological status in the Baltic Sea (key theme), 2) Theme 2.1 Natural and human-induced changes in catchment land cover patterns, including the role of e.g. agriculture, forestry and urbanization (supplementary theme), 3) Theme 2.2 The role of coastal systems in the dynamics of the Baltic Sea (supplementary theme).

The aim of BONUS PROMISE was to produce data on contaminants in recycled organic P fertilisers, P bioavailability, apply thermochemical post-treatment on ashes and study its influence on contaminants and P bioavailability, not to produce policy recommendations. Some conclusions are described below.

Annex 4.2: Other pitfalls (ii – vi)

BONUS PROMISE

- | | | |
|-----|----------------------------|--|
| ii | Project results | Currently organic P-rich materials on the market need to inform their phosphorus fertiliser value based on chemical solubility tests. These tests do not always correlate with the actual bioavailability. Therefore, a common and reliable methodology needs to be verified and agreed. |
| iii | Clarity of recommendations | <p>Results about phosphorus bioavailability analysed with different methods were described in a detailed manner in the dissemination activities listed in iv. Interviews among key stakeholders of the project concerning the clarity of the policy recommendation had the following result:</p> <p>Germany:</p> <ul style="list-style-type: none"> • A suitable and willing person for interviewing was not identified. <p>Poland:</p> <ul style="list-style-type: none"> • A suitable and willing person for interviewing was not identified. <p>Denmark:</p> <ul style="list-style-type: none"> • A suitable and willing person for interviewing was not identified. |
| iv | Communication efficiency | <p>The result was for instance communicated via the following references:</p> <ul style="list-style-type: none"> • Publishable summary (BONUS PROMISE final report: https://www.bonusportal.org/projects/innovation_2014-2017/promise) • Report on P availability according to Hedley fractionation and DGT method in project's homepage (https://portal.mtt.fi/portal/page/portal/mtt_en/projects/promise/Publications) • Presented for the project's national reference group consisting of persons from Finnish Ministries of Agriculture and Forestry. |

BONUS PROMISE

- Presentation about BONUS PROMISE-project at a HELCOM meeting in Berlin in 27-28 March 2017 (Title of the presentation: Finnish examples of steps towards better P recycling)
- Workshop presentation in European Nutrient Event (18.-20.10.2017, Basel, Switzerland)

Interviews among key stakeholders of the project concerning the communication efficiency concerning this policy recommendation had the following result:

Germany:

- A suitable and willing person for interviewing was not identified.

Poland:

- A suitable and willing person for interviewing was not identified.

Denmark:

- A suitable and willing person for interviewing was not identified.

v Policy integration

Germany:

- We are not aware of any evidence of policy integration.

Poland:

- We are not aware of any evidence of policy integration.

Denmark:

- The current Danish Cabinet Regulation on fertilisers is from 2008 (Cabinet Regulation of 27 August 2008)⁵ and the recommendation of BONUS PROMISE has therefore so far not affected Danish policies on analysis method for phosphorus.

vi End-user acceptance

Germany:

- We are not aware of any impact on end-user acceptance.

Poland:

- We are not aware of any impact on end-user acceptance.

Denmark:

- In accordance with the above, the BONUS PROMISE recommendation has not affected end-user acceptance concerning analysis methods for P in livestock manure.

BONUS PROMISE

- | | | |
|-----|----------------------------|---|
| ii | Project results | Manure is a valuable nutrient source. The phosphorus fertilisation value of manure and digested manure is comparable to mineral fertilisers. Total P content and bioavailability of 100% are therefore to be taken as the basis for application, otherwise there may in some situations be risks for over-fertilisation with P. |
| iii | Clarity of recommendations | <p>Results about phosphorus plant availabilities in e.g. undigested and digested manures were described in a detailed manner in the dissemination activities listed in iv.</p> <p>Interviews among key stakeholders of the project concerning the clarity of the policy recommendation had the following result:</p> <p>Germany:</p> <ul style="list-style-type: none">• A suitable and willing person for interviewing was not identified. <p>Poland:</p> <ul style="list-style-type: none">• A suitable and willing person for interviewing was not identified. <p>Denmark:</p> <ul style="list-style-type: none">• A suitable and willing person for interviewing was not identified. |
| iv | Communication efficiency | <p>The result was for instance communicated via the following references:</p> <ul style="list-style-type: none">• Publishable summary (BONUS PROMISE final report: https://www.bonusportal.org/projects/innovation_2014-2017/promise)• Report on P availability according to Hedley fractionation and DGT method in project's homepage (https://portal.mtt.fi/portal/page/portal/mtt_en/projects/promise/Publications)• Presented for the project's national reference group consisting of persons from Finnish Ministries of Agriculture and Forestry.• Presentation about BONUS PROMISE-project at a HELCOM meeting in Berlin in 27-28 March 2017 (Title of the presentation: Finnish examples of steps towards better P recycling)• Workshop presentation in European Nutrient Event (18.-20.10.2017, Basel, Switzerland)• Workshop between BONUS projects and the HELCOM and BONUS secretariat representatives (6.11. 2017, Stockholm, Sweden), hosted by the Baltic Nest Institute• Presenting results from the BONUS PROMISE during the seminar arranged by the Finnish Chemical Societies (29.3.2017, Helsinki, Finland) |

- Presentation about BONUS PROMISE results in the 2017 DGT Conference in Gold Coast in Australia in 6-8.9.2017 (Title of the presentation: Phosphorus bioavailability in different types of organic materials as predicted by DGT)

Interviews among key stakeholders of the project concerning the communication efficiency concerning this policy recommendation had the following result:

Germany:

- A suitable and willing person for interviewing was not identified.

Poland:

- A suitable and willing person for interviewing was not identified.

Denmark:

- A suitable and willing person for interviewing was not identified.

v Policy integration

Germany:

- We are not aware of any evidence of policy integration.

Poland:

- We are not aware of any evidence of policy integration.

Denmark:

- Danish fertilising regulation comprises since the plan period 2017/18 a flat-rate P fertilising limit, and standard values for the P content of livestock manure has been regulated for decades. The used phosphorus availability rate for livestock manure when making fertiliser planning depends on the used planning software. In Denmark, it is generally considered that P in livestock manure has an availability of 90% in the first crop year, and an availability of 100% over a longer term.

Thus, the recommendation of BONUS PROMISE has not influenced Danish policies.

vi End-user acceptance Germany:

- We are not aware of any impact on end-user acceptance.

Poland:

- We are not aware of any impact on end-user acceptance.

Denmark:

- In accordance with the above, the BONUS PROMISE recommendation has not affected end-user acceptance concerning availability of P in livestock manure.

Annex 5: Selected recommendations from Baltic COMPASS

Annex 5.1: Pitfall i – plans for producing recommendations and create impacts

Baltic COMPASS was co-financed by Interreg Baltic Sea Region 2007-2013 under the programme Priority 3 - Baltic Sea as a common resource, having 3.1 Challenges in water management as the area of support. In line with this, the objectives for the project were formulated as follows in the project document:

Section 3.3: The strategic objective of Baltic COMPASS is to contribute in reducing eutrophication (nutrient over-enrichment) of the Baltic Sea through fostering win-win solutions for agriculture, municipal and environmental sectors, based on problem definitions which are relevant for stakeholders within the whole drainage area. Seven sub-objectives will enable to move towards the strategic objective:

- 1) Strengthen the transnational and cross-sectorial dialogues and regional BSR identity, especially across west-east divide;
- 2) Enhance utilization of best practices and interactive ICT decision support tools;
- 3) Accelerate investments in best available environmental technologies and solutions;
- 4) Provide new perspectives for agriculture run-off assessments in a spatial planning context;
- 5) Strengthen policy formulation and implementation through stakeholder involvement and adaptation;
- 6) Contribute to shaping future cost- and eco-efficient agri-environment support schemes; and
- 7) Promote BSR as a pilot region for innovative solutions related to combating eutrophication in a global context.

More information is available at http://eu.baltic.net/Project_Database.5308.html?&contentid=42&contentaction=single.

The objectives are formulated in a generic way without indication of precise, concrete and detailed explanations, without presentation of expected impacts or success criteria.

Annex 5.2: Other pitfalls (ii – vi)

Baltic COMPASS

- | | | |
|----|-----------------|---|
| ii | Project results | Livestock manure-based biogas production deserves a wider disseminated use due to its ability to improve the nutrient cycling, for instance via increased bioavailability of nitrogen in the digestate compared to the influent material.

The conclusion was for instance communicated via the following references: |
|----|-----------------|---|

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- The newsletter "Innovative Agro-Environmental Technologies for Sustainable Food Production in the Baltic Sea Region, Issue No. 2, February 2011, page 4.
https://www.agrotechnologyatlas.eu/docs/bc_wp4_technologies_newsletter_2_february_2011.pdf.
- Foged, Henning Lyngsø & Claus Grunge Ellegaard Mortensen (editors). 2011. Sector Study - Prioritised innovative agro-environmental technologies for sustainable food production in the Baltic Sea Region. 130 pp.
https://www.agrotechnologyatlas.eu/docs/repo20905_Baltic_Compass_Sector_Study.pdf

iii Clarity of recommendations

It is not clear, in which way the biogas production should be developed, for instance whether the production should be organised regionally or on-farm. There are no clear suggestions to policymakers, how they could support the biogas production, such as suggested amendments of the legislation or proposals for support schemes.

It is, however, mentioned that phosphorus management measures are behind-laying driving incitements for wider use of anaerobic digestion based on livestock manure, as well as important preconditions for managing this. The distribution of livestock manure fractions that are in surplus on the livestock farms could be valuable influents to regional biogas plans, from where it can be distributed to farms in need of more P.

The project itself supported biogas production investments in

- an extruder (Aarhus University), making it possible to use haylage from otherwise unused natural grasslands near a river as influent for co-digestion with manure;
- a mobile pig slurry separation unit (Bornholm), from which the separation solids were delivered to a centralised biogas plant;
- improved biogas plant configuration, including a macerator and larger digestate storage tanks (Vecauce) – this was in fact an investment under the extension project Baltic COMPACT.

Interviews among key stakeholders of the project concerning the clarity of the policy recommendation had the following result:

Germany:

- A suitable and willing person for interviewing was not identified.

Poland:

- A suitable and willing person for interviewing was not identified.

Denmark:

- Respondent: Henriette Hossy, Danish Environmental Protection Agency.

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- Summary: The project ended already seven years ago. Not directly involved in the project, neither the name of the project or its conclusions were immediately remembered. The concrete investment the project made (an extruder for pre-treatment of natural grasses to demonstrate boosting of a manure-based biogas production at the biogas plant belonging to Aarhus University) was recalled as a good example for recycling nutrients to the agricultural loop from a river bank where they otherwise would end up in waters sooner or later. However, the use of extruders is not considered as being spread to other biogas plants, but rather instigating a dialogue about the role of biogas plants in nutrient recycling, especially phosphorus, and finding solutions for profitable biogas production without use of energy crops. The recommendation is not remembered to have had direct influence on Danish policies, which, however, simultaneous with the project implementation was changed in the favour of anaerobically digestion of livestock manures and limiting the allowed use of energy crops. In this way, the recommendation and connected activity of Baltic COMPASS was highly relevant.

Macro-regional level:

- Respondents: Tarja Haaranen, Ministry of the Environment of Finland, member of HELCOM Agri group for many years and former Chair of the group. Mikhail Durkin: Executive Secretary, Coalition Clean Baltic, former Professional Secretary of HELCOM responsible for land-based pollution including agriculture.
- Summary: Both respondents remembered the project, took part in events, visited the website and met with project people. HELCOM was a partner in the project. One respondent remembers this specific recommendation from the project, and one does not. The respondent remembers that this recommendation came at the time of discussions on the sustainability of biogas production in Germany.

iv Communication efficiency

The abovementioned newsletter had about 300 receivers, including many persons representing international, national and regional authorities, as well as many connected to universities, research, farmer organisations and farm advisory.

Apart from this, the conclusion was also presented at several seminars and conferences, including the annual conference in the years 2009 to 2013 Greener Agriculture for a Bluer Baltic Sea Stakeholder Conference (GABBS).

Interviews among key stakeholders of the project concerning the communication efficiency concerning this policy recommendation had the following result:

Germany:

- A suitable and willing person for interviewing was not identified.

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Poland:

- A suitable and willing person for interviewing was not identified.

Denmark:

- With reference to the above explanation concerning clarity of recommendations, the communication efficiency is suggested to be high.

v Policy integration

Germany

- In 2013, there were 9,035 biogas plants in Germany, whereof 7,850 related to agriculture and predominantly based on energy crops as influent biomass (mainly maize silage and related biomass) according Torrijos (2016⁶). A typical biogas plant was producing electricity from the biogas, whereas the heat was ventilated away in many cases, resulting in a typical energy efficiency below 50%. The biogas plants had a good economy favoured by high subsidies that allowed the mentioned practices. The demand for maize silage was big, and lead to import from neighbour countries, including Poland and Denmark. The digestate was not in all Germany considered as a fertiliser according Nitrates Directive derived legislation (Foged, 2008⁷). The climate impact and environmental load of the enormous German biogas production was not considered to be in line with the potential positive effects of agricultural biogas production due to the way it was organised (see https://www.agrotechnologyatlas.eu/docs/biogas_policy_brief.pdf). Already in 2012, the situation started to change when an amended Renewable Energy Act came into force (EEG 2012 – see <https://www.clearingstelle-eeg-kwkg.de/eeg2012>) to meet the encountered problems. The subsidy was lowered and gave preference to use of waste products. Amendments of the Act in 2014 and 2017 reinforced the policy change towards use of manure and agricultural wastes as influent biomass in the German biogas production, and a so-called maize-cap of 60% was introduced. The changed policies had the effect that the annual number of new biogas plants was reduced from about 1,000 to about 50. Currently, the maize-cap, meaning the maximal amount of maize silage and related biomass for the biogas production is 47%, and will be lowered further to 44% in 2021 (Eyl-

⁶ Torrijos, Michel. 2016. State of Development of Biogas Production in Europe. Procedia Environmental Sciences Volume 35, 2016, Pages 881-889.

⁷ Foged, Henning Lyngsø. 2008. Biogasproduktion i Tyskland. <https://docplayer.dk/18818859-Biogasproduktion-i-tyskland.html>

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Mazzega et al., 2019)⁸. The new Fertiliser Regulation (Düngeverordnung – see http://www.gesetze-im-internet.de/d_v_2017/) regulates digestate in the same way as livestock manures. Most of the German biogas plants were established between 2000 and 2010, and by 2030, the fixed remuneration under the Renewable Energy Act is expired for a large number of the existing biogas plants, who will not be able to survive economically using maize silage at market prices and producing biogas without subsidies.

Concludingly, the policy development in Germany has closely followed the recommendation of Baltic COMPASS.

Poland

- We are not aware of any evidence of policy integration.

Denmark

- The official target set out by the Danish Governments Green Growth Plan from 2009 was that 50% of the livestock manure production by 2020 should be used for green energy production, including biogas production. The policy target, which would lead to a Danish biogas production of 16.8 PJ was given up in 2015, where the Danish Government replaced it with more ambitious and broad plans for development of the biogas production, which for all sectors would reach 23 PJ. The support for manure-based agricultural biogas production was increased in 2012, and several other support measures were introduced. Read more in
- Foged, H. L. 2020. Danish policies on agricultural biogas production and status for their implementation. https://organe.dk/docs/Danish_agricultural_biogas_policies_and_status.pdf

The mentioned Baltic COMPASS conclusion and related activities have thus been relevant for supporting concurrent policy development and shown examples of ways to organise the biogas production in a sustainable way.

Macro-regional level

Biogas is mentioned in the HELCOM Revised Palette of measures for reducing phosphorus and nitrogen losses from agriculture that is a list of voluntary measures for the BSR countries and was approved in the HELCOM Ministerial Meeting 2013. Both respondents remembered that the project results had an impact on the preparation of the palette of measures, and it is mentioned as

⁸ Eyl-Mazzega, Marc Antoine and Carole Mathieu (eds.). 2019. Biogas and biomethane in Europe. https://www.ifri.org/sites/default/files/atoms/files/mathieu_eyl-mazzega_biomethane_2019.pdf.

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one of the references. However, it is not mentioned as a reference for this specific measure.

vi End-user acceptance

Germany

- As mentioned above, the German biogas plants have reduced their influent biomass type from being dominated by maize silage and related material (corn cobs, whole grain silage, etc.) to 60% in 2014 and 47% today. The annual expansion in number of biogas plants is reduced from about 1,000 with a questioned sustainability, to about 50 that are forced to use wastes as influent biomass and to consider the digestate as a fertiliser according the German Fertiliser Regulation.

Poland

- We are not aware of any impact on end-user acceptance.

Denmark

- The agricultural biogas production has had double-digit annual growth rates in the last years, and has in 2018 reached 12.2 PJ, including a minor industrial biogas production. Livestock manure make up 87% of the influent amounts at agricultural biogas plants. The production of agricultural and industrial biogas would reach 19.2 PJ by 2020 in case of a similar increase of 57% from 2018 to 2020 as for the period 2016 to 2018. The total Danish biogas production would then exceed 20 PJ by 2020. Read more in
 - Foged, H. L. 2020. Danish policies on agricultural biogas production and status for their implementation.
https://organe.dk/docs/Danish_agricultural_biogas_policies_and_status.pdf

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ii Project results

Phosphorus management, including P-norms, P-indices, standard figures for livestock manure are behind laying driving incitements for deployment of those technologies, as well as important pre-conditions for managing them.

The conclusion was for instance communicated via the following references:

- The newsletter "Innovative Agro-Environmental Technologies for Sustainable Food Production in the Baltic Sea Region, Issue No. 2, February 2011, page 4.
https://www.agrotechnologyatlas.eu/docs/bc_wp4_technologies_newsletter_2_february_2011.pdf.
- Foged, Henning Lyngsø & Claus Grunge Ellegaard Mortensen (editors). 2011. Sector Study - Prioritised innovative agro-environmental technologies

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for sustainable food production in the Baltic Sea Region. 130 pp.

https://www.agrotechnologyatlas.eu/docs/repo20905_Baltic_Compass_Sector_Study.pdf

- Foged, Henning Lyngsø. Undated. Policy Brief "Need for standard values for livestock manure in the Baltic Sea region".
<https://www.agrotechnologyatlas.eu/docs/Policy%20brief%20Need%20for%20standard%20values%20for%20livestock%20manure%20in%20the%20Baltic%20Sea%20region.pdf>

The mentioned policy recommendation actually made it into regional policy becoming a part of the HELCOM Ministerial Declaration 2013 – see e.g.

https://portal.helcom.fi/meetings/AGRI_ENV%206-2014-116/MeetingDocuments/4-4%20Nutrient%20content%20in%20manure.pdf.

iii Clarity of recommendations

BalticSea2020 did support a seminar on the subject and the production of a report about this issue, especially about P-indices:

- Foged, Henning Lyngsø. 2011. Phosphorus indices - status, relevance and requirements for a wider use as efficient phosphorus management measures in the Baltic Sea Region. Published by Baltic Sea 2020. 27 pp.
https://www.agrotechnologyatlas.eu/docs/pindex_report.pdf

Interviews among key stakeholders of the project concerning the clarity of the policy recommendation had the following result:

Germany:

- A suitable and willing person for interviewing was not identified.

Poland:

- A respondent gave an explanation, which however did not relate to the specific recommendation about P management measures, wherefore we must disregard the answer.

Denmark:

- Respondent: Henriette Hossy, Danish Environmental Protection Agency.
- Summary: The project ended already seven years ago. Not directly involved in the project, neither the name of the project or its conclusions were immediately remembered. However, after being reminded:
 - The recommendation about the use of P-indices was recalled, although it was not considered relevant for Denmark at that time. However, since then, Denmark has introduced flat rate P-norms, and the issue of P-indices has been taken up again and the Danish Ministry of Environment and Food funded a larger project, among other to develop phosphorus loss risk maps for Denmark.

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- The recommendation about use of standard values for livestock manure was not considered relevant for Denmark, having used such standards for decades. However, the discussion about the recommendation in HELCOM work group meetings was remembered, and the Danish position was that BSR farms should be requested to make nutrient accounting, for which standard for manure would be required.

Concludingly, the recommendation was considered rather clear, and although not considered relevant earlier, the issue of P management measures has become part of Danish policies since then.

Macro-regional level:

- Respondents: Tarja Haaranen, Ministry of the Environment of Finland, member of HELCOM Agri group for many years and former Chair of the group
Mikhail Durkin: Executive Secretary, Coalition Clean Baltic, former Professional Secretary of HELCOM responsible for land-based pollution including agriculture
- Summary: Both respondents remembered the project, took part in events, visited the website and met with project people. HELCOM was a partner in the project. This recommendation combines many issues and both respondents remember at least some of the topics in this recommendation being recommended by the project. Both respondents remember that the paragraph in the HELCOM Ministerial Declaration 2013 about manure standards was influenced by recommendations from Baltic COMPASS and Baltic MANURE projects.

iv Communication efficiency

The abovementioned newsletter, having about 300 receivers, including many persons representing international, national and regional authorities, as well as many connected to universities, research, farmer organisations and farm advisory.

Apart from this, the conclusion was also presented at several seminars and conferences, including the annual conference in the years 2009 to 2013 Greener Agriculture for a Bluer Baltic Sea Stakeholder Conference (GABBS).

Interviews among key stakeholders of the project concerning the communication efficiency concerning this policy recommendation had the following result:

Germany:

- A suitable and willing person for interviewing was not identified.

Poland:

- A suitable and willing person for interviewing was not identified.

Denmark:

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- In line with the explanation given for pitfall iii).

v Policy integration

Germany

- In Germany, a substantial phosphorus management was established. According to the Fertiliser Regulation (DüV) of 2017, fertilisation with phosphorus-containing fertilisers must determine the plant requirements and the total phosphate content of the fertiliser must be known. The phosphate content must be measured using scientifically established methods. Plant requirements are calculated depending on the yields and qualities to be expected under the respective site and cultivation conditions, the amount of phosphate available in the soil and the nutrient specification. Therefore, representative soil samples must be analysed at least every 6 years.
- On fields where the average phosphate content is above a limit, phosphate-containing fertilisers may only be applied up to the amount of the expected phosphate plant uptake. The expected phosphate plant uptake can be taken into account for a maximum of three years during a crop rotation. In case harmful changes in the water body are found as a result of the application of phosphate-containing fertilisers, the responsible regional authorities can reduce the allowed phosphorus fertilisation or even prohibit the application of phosphate-containing fertilisers.
- Otherwise, the control value for phosphate determined as part of the yearly nutrient balance of the last six years of fertilisation should be as low as possible and may not exceed a maximum of 10 kg of phosphate per hectare and year.
- The German phosphorus platform DPP e.V. (<https://www.deutsche-phosphor-plattform.de/>) was established as an important network in order to use phosphorus more efficiently as a scarce resource and to open up new phosphorus sources. In addition, some research projects e.g. "InnoSoilPhos" are funded.

Poland

- Phosphorus is mentioned in Polish regulations:
 - Warsaw, July 26, 2018. Item 1438 REGULATION OF THE MINISTER OF AGRICULTURE AND RURAL DEVELOPMENT amending the regulation on the detailed manner of applying fertilisers and conducting training on their use
<http://prawo.sejm.gov.pl/isap.nsf/download.xsp/WDU20180001438/O/D20181438.pdf>
 - The Regulation contains rules for the application of natural fertilisers containing phosphorus, with particular reference to the buffer zones. Act of 20 July 2017 - Water Law (Journal of Laws of 2018, item 2268 and of 2019, items 125, 534 and 1495)

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<https://sip.lex.pl/akty-prawne/dzu-dziennik-ustaw/zmiana-ustawy-prawo-wodne-oraz-niektorych-innych-ustaw-18910316>.

- o Other provisions regarding the limitation of phosphorus water pollution from natural fertilisers are listed in chapter 4 of the Water Law.

However, there are no clear and concrete limitation of phosphorus fertilisation in the form of flat-rate or other limiting phosphorus fertiliser norms, neither requirements for use of standard values for manure or P-indices.

Denmark

- Denmark introduced in 2016 flat rate P-norms for fertilising. The introduction is done as part of a policy switch to emission-based regulation, whereas earlier agro-environmental regulations were entirely linked to production units. A pragmatic principle had earlier been to consider the phosphorus in livestock manure to be linked to the content of nitrogen in the manure, and pig farms had on that basis earlier had to respect a limit of 140 kg nitrogen per ha in livestock manure instead of the 170 kg limit given by the nitrates Directive. The limit for phosphorus fertilising depends on the fertiliser type and is for instance 30 kg phosphorus per ha for mineral fertiliser, and 35 kg phosphorus per ha for phosphorus in pig manure.
- Guiding crop needs for P fertiliser is provided by Ministry of Environment and Food in an annual collection of rules and guidelines for fertilising⁹ that has existed for many years. The guideline is also holding information about standard values for manure, including defined chemical content of phosphorus in manure.
- A Danish P-index was earlier developed by researchers and tested in practice in cooperation with the farm advisory services under auspices of The Danish Environmental Protection Agency more than 12 years ago. A P-index is again being considered, and DEPA has funded a larger project¹⁰ that among other develops maps for P loss risks.
- The introduced P fertiliser norms in Denmark is in line with the recommendation of Baltic COMPASS.

Macro-regional level

HELCOM Ministerial Declaration 2013 included the paragraph to establish by 2016 national guidelines or standards for nutrient content in manure and

⁹ https://lbst.dk/fileadmin/user_upload/NaturErhverv/Filer/Landbrug/Goedningsregnskab/Vejledning_om_goedsknings-og_harmoniregler_i_planperioden_2019_2020_version2.pdf

¹⁰ <https://mst.dk/media/165841/projektbeskrivelse-fosforkortlaegning-af-vandomraader-og-dyrkningsjorde.pdf>

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develop by 2018 guidelines/recommendation on the use of such standards. Both respondents remembered that the paragraph was influenced by recommendations from Baltic COMPASS and Baltic MANURE projects.

vi End-user acceptance

Germany

- Germany has as mentioned started to regulate the phosphorus fertilisation via the Fertiliser Regulation (DüV) of 2017, which the end-users have had to accept.

Poland

- N/A

Denmark

- All Danish farms have to consider and obey in their fertiliser plans and fertiliser accounts the introduced phosphorus limits.

Annex 6: Selected recommendations from Baltic DEAL

Annex 6.1: Pitfall i – plans for producing recommendations and create impacts

Baltic DEAL was co-financed under Priority 4 of the Baltic Sea Region Programme, and in this way expected to support the implementation of the EU Strategy for the Baltic Sea Region (EUSBSR), which has “Clear waters” as one of its aims, to be achieved via the implementation of EU’s agro-food sector related environmental legislation.

In line with this, the objectives for the project were formulated as follows in the project document:

Section “Objectives of the project”: The long-term strategic objective is to reduce agriculture’s contribution of nutrients to the Baltic Sea using a cost-efficient approach. Within the time frame of the project period, Baltic DEAL has the following objectives:

- To develop a common and trans-national Baltic Sea region strategy and approaches to advance and strengthen agricultural advisory services and related demonstration activities with a focus upon good agri-environmental practices, taking national and economic conditions into account.
- To build a strong co-operative platform and network for farmers and advisory services for concerted actions during the project period and beyond.
- To test, evaluate and refine the strategy and approaches in some selected focus regions, eg. the B7 Islands, including willingness to invest in measures and technologies
- To demonstrate, document and disseminate best practices and agri-environmental measures on more than 100 demonstration farms around the Baltic Sea.

The project has with the objective “To develop a common and transnational Baltic Sea region strategy” an ambitious plan for producing policies for the BSR. However, it is not clear what this policy could comprise.

Annex 6.2: Other pitfalls (ii – vi)

Baltic DEAL

- | | | |
|----|-----------------|--|
| ii | Project results | <p>Each farmer can carry out soil and feed analyses and prepare nutrient balances to optimise usage on the farm</p> <p>Each advisory can encourage soil analysis and nutrient balances on all farms</p> <p>The recommendation was for instance communicated via the following references:</p> <ul style="list-style-type: none">• The final project brochure |
|----|-----------------|--|

Baltic DEAL

- Toolbox on best agri-environmental practices on the project website (www.balticdeal.eu no longer available)

iii Clarity of recommendations

Taking soil analysis and calculating nutrient balances was described in a detailed manner on the project website. The recommendation in the brochure and the toolbox of measures were targeted towards farmers and advisors and thus it is not clear what is the implication for policymakers.

Interviews among key stakeholders of the project concerning the clarity of the policy recommendation had the following result:

Germany:

- A suitable and willing person for interviewing was not identified.

Poland:

- A person was interviewed, but the response not related to the specific recommendation about feed and soil analyses.

Denmark:

- Respondent: Henriette Hossy, Danish Environmental Protection Agency.
- Summary: The project ended already seven years ago. Not directly involved in the project, neither the name of the project or its conclusions were remembered. However, after being reminded:
- Nutrient balancing is considered relevant, especially for cattle farms, but the Danish position was rather that farms should be requested to produce nutrient accounts (as already mentioned under Baltic COMPASS). Nutrient balancing was seen as requiring a more complex calculation methodology, and therefore also to be more complex to enforce in practice.

Thus, the recommendation was not considered relevant for Denmark, where specific feed and soil analysing is not direct part of agri-environmental policies.

Macro-regional level:

- Respondents: Tarja Haaranen, Ministry of the Environment of Finland, member of HELCOM Agri group for many years and former Chair of the group
Mikhail Durkin: Executive Secretary, Coalition Clean Baltic, former Professional Secretary of HELCOM responsible for land-based pollution including agriculture
- Summary: Both respondents remembered the project, visited the website and met with project people. The project was more distant to the respondents than Baltic COMPASS or Baltic MANURE since it was more targeted to farmers and farm advisors. Both respondents

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can associate this recommendation with the project. However, this was recommended by other projects as well at the time.		
iv	Communication efficiency	The recommendation was given in the final brochure of the project that was distributed in events and it was available on the project website. The toolbox of measures on the project website was available from 2011 to 2018. The toolbox of measures was also advertised in the project events, newsletter and Facebook page. Interviews among key stakeholders of the project concerning the communication efficiency concerning this policy recommendation had the following result: Germany: • A suitable and willing person for interviewing was not identified. Poland: • As for pitfall iii) Denmark: • As for pitfall iii).
v	Policy integration	<u>Germany</u> According to the Fertiliser Regulation (DüV) 2017, each farm has to calculate a nutrient balance for nitrogen and for phosphate no later than March 31. This must be summarized in a multi-year nutrient comparison. For this purpose, the supply and return of these nutrients for the agricultural area as a whole or the summary of the results of the comparisons for each field must be compared. The control value determined on average over the last three years of fertilisation should be as low as possible and may exceed no more than 50 kg of nitrogen per hectare and 10 kg of phosphate per hectare and year. The principle of nutrient balancing was already introduced with the Fertiliser Regulation of 2007¹¹. <u>Poland</u> We are not aware of any policy integration. <u>Denmark</u> Farmers are recommended to acquire soil and feed analyses in order to make their fertiliser and feeding plans as accurate as possible. This practice has not changed due to the recommendation of Baltic DEAL.

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In general, Danish advisers are not recommending farms to make nutrient balancing. Danish farms are by law requested to deliver fertiliser accounts latest 31 March for the preceding harvest year. A fertiliser account is a declaration of all fertilisers used on the farm, therefore not a nutrient balance calculation.

Thus, Baltic DEAL has not influenced Danish policies on soil and feed analyses or nutrient balancing.

Macro-regional level

According to the respondents, the project results had an impact on the HELCOM Ministerial Declaration 2013, and it has a paragraph to promote and advance towards applying, by 2018 at the latest, annual nutrient accounting at farm level taking into account soil and climate conditions giving the possibility to reach nutrient balanced fertilisation and reduce nutrient losses at regional level in the countries. In order to get the acceptance to include this paragraph into the Declaration, it was important that nutrient bookkeeping was recommended by a project that had farmer and advisory organizations as partners.

The measure is included in the HELCOM Revised Palette of measures for reducing phosphorus and nitrogen losses from agriculture that is a list of voluntary measures for the BSR countries and was approved in the HELCOM Ministerial Meeting 2013. Both respondents remember that the project results had an impact on the preparation of the palette of measures, and it is mentioned as one of the references. However, it is not mentioned as a reference for this specific measure

vi End-user acceptance Germany

- All German farmers are subject to the Fertiliser Regulation of 2017, and earlier to that of 2007.

Poland

- N/A

Denmark

- In accordance with the above, the Baltic DEAL recommendation has not affected end-user acceptance concerning soil and feed analysing or for nutrient balancing.

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ii Project results Each country can support a network of demonstration farms

Baltic DEAL

Each advisory can co-operate with demonstration farms and provide support in describing and analysing the economic and environmental effects of measures implemented.

iii Clarity of recommendations

The recommendation is rather clear. One of the project outputs was creating a network of demonstration farms that were presented at the project website and they were used for demonstration purposes during the project.

Interviews among key stakeholders of the project concerning the clarity of the policy recommendation had the following result:

Germany:

- A suitable and willing person for interviewing was not identified.

Poland:

- A suitable and willing person for interviewing was not identified.

Denmark:

- No interviewing was done. The relevant person in the Danish Ministry of Environment and Food has resigned since the project ended. It is rather clear from the explanation given under criteria iv and v that the recommendation is considered without relevance for Denmark.

Macro-regional level:

- Respondents: Tarja Haaranen, Ministry of the Environment of Finland, member of HELCOM Agri group for many years and former Chair of the group.

Mikhail Durkin: Executive Secretary, Coalition Clean Baltic, former Professional Secretary of HELCOM responsible for land-based pollution including agriculture.

- Summary: Both respondents remembered the project, visited the website and met with project people. The project was more distant to the respondents than Baltic COMPASS or Baltic MANURE since it was more targeted to farmers and farm advisors. Both respondents can associate this recommendation with the project.

iv Communication efficiency

The recommendation was given in the final brochure of the project. The project's own demonstration farms were presented in many presentations during the project time, and there were also many study visits to the project's demo farms.

Interviews among key stakeholders of the project concerning the communication efficiency concerning this policy recommendation had the following result:

Germany:

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- A suitable and willing person for interviewing was not identified.

Poland:

- A suitable and willing person for interviewing was not identified.

Denmark:

- In line with the above pitfall iii).

v Policy integration

Germany

Germany supports a variety of demonstration projects or farms as part of a BMEL funding program (e.g. "Indicators for the early detection of nitrate loads"). The recommendations of Baltic DEAL did not influence German support to demonstration farms.

Poland

Not considered.

Denmark

There is in Denmark no support given to demonstration farms. A public supported network of demonstration farms, "Helårsforsøgene" under The National Livestock Research was closed down in early 1990'es, considered not to be relevant anymore. SEGES, the large Danish farm advisory organisation owned by the farmer organisations, has for decades been running a large programme of National Field Trials to test new varieties, fertilisers, plant protection products and cultivation methods, which also serves for demonstration purposes.

The recommendation of Baltic DEAL did therefore not influence Danish policies on demonstration farms.

Macro-regional level

The specific recommendation on demonstration farms was not included in the HELCOM Ministerial Declaration 2013 or other HELCOM policy documents.

vi End-user acceptance

Germany

N/A

Poland

Not considered.

Denmark

In accordance with the above, this Baltic DEAL recommendation did not cause any change in Danish policies, and could not therefore also have affected end-user acceptance.

Annex 7: Selected recommendations from Baltic MANURE

Annex 7.1: Pitfall i – plans for producing recommendations and create impacts

The main long-term aim of Baltic MANURE was described as to change the general perception of manure from a waste product of animal production to a resource, while also identifying potential for business opportunity relating to manure processing that will lead to improved nutrient cycling. Several project outputs were described that would help achieve this, one of which were making recommendations for sustainable manure use and handling chains. This can be found in the original application text as well as the introductory.

Annex 7.2: Other pitfalls (ii – vi)

Baltic MANURE

ii	Project result (example of many)	Ensure sufficient covered manure storage capacity. The general idea promoted by the project was to use manure as a fertiliser resource and therefore the storage should be covered to avoid nitrogen losses and to avoid undesired dilution of manure. Furthermore, storage capacity should be sufficient so that late autumn and winter spreading can be avoided since plants cannot take up the nutrients at that time. Manure produced during the year should be spread before sowing or to growing crops to optimize nutrient uptake. The above recommendation was made since several of the large-scale case-study farms in the Baltic MANURE project did not have sufficient capacity to utilise the manure as fertiliser during the growing season or storages were not covered.
iii	Clarity of recommendations	It was not clear if this recommendation was intended towards farmers, advisors or policymakers. It was also not clearly stated or defined what was meant by "sufficient" storage capacity. Since all countries have some regulation on manure storage capacity, this recommendation should have been much clearer about increasing the storage capacity or possibly even directed towards better enforcement of the regulation. Storage covers were not clarified either but was left for the general acceptance that a natural crust is also a cover. Interviews among key stakeholders of the project concerning the clarity of the policy recommendation had the following result: Germany:

Baltic MANURE

- A suitable and willing person for interviewing was not identified.

Poland:

- Respondent: several people were asked in three ministries; they didn't remember the project.
- Summary: The project was known mainly among scientific circles.

Denmark:

- Respondent: Henriette Hossy, Danish Environmental Protection Agency.
- Summary: In general, the project was not remembered, neither this recommendation. Denmark has for decades had legislation in place for ensuring a sufficient storage capacity and rules for cover on manure stores. It was remembered that The EU Commission at that time was concerned about Danish rules for field heaps of manure, but the Baltic MANURE recommendation does not deal with this issue.

Macro-regional level:

- Respondents: Tarja Haaranen, Ministry of the Environment of Finland, member of HELCOM Agri group for many years and former Chair of the group
Mikhail Durkin: Executive Secretary, Coalition Clean Baltic, former Professional Secretary of HELCOM responsible for land-based pollution including agriculture
- Summary: Both respondents remembered the project, took part in events, visited the website and met with project people. Both respondents remember that this kind of recommendations were given but cannot be sure to associate it specifically to this project because it is so general.

iv Communication efficiency

The recommendation was reported via the following references:

- Final project Magazine "Results, cases and project recommendations" published in December 2013. No longer available online.
- Sindhøj, Erik & Lena Rodhe (editors). 2013. Manure Handling Techniques on Case-Study Farms in the Baltic Sea Region. JTI Report 409, Industry & Agriculture. JTI – Swedish Institute of Agricultural and Environmental Engineering. Uppsala, Sweden. ISSN 1401-4963.

The final project magazine was printed in hardcopy and distributed at events. It was also sent out in pdf format to the project stakeholder list and was available on the project website up until the end of 2018.

The above-mentioned technical project report was available on the project website until 2018 but is still available through DiVa at www.diva-portal.org

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Apart from these publications, the recommendation was also presented at several seminars and conferences, including Ramiran 2012 and the 2013 Greener Agriculture for a Bluer Baltic Sea Stakeholder Conference (GABBS).

Interviews among key stakeholders of the project concerning the communication efficiency concerning this policy recommendation had the following result:

Germany:

- A suitable and willing person for interviewing was not identified.

Poland:

- The project was not remembered.

Denmark:

- The project was not remembered.

iv Policy integration

All countries have some requirements on manure storage capacity. The recommendation should have been more specific about either increasing the storage capacity or better enforcement of the current regulations.

Germany

According Fertiliser Regulation (DüV) of 2017, the capacity for storing manure and digestate residues, which are to be used as organic fertilisers, must be harmonized to the needs of the respective farm and water protection in this region. In addition, the amounts of rainwater and wastewater, as well as silage leakage and remaining storage quantities that cannot be pumped out must be taken into account.

The minimum storage capacity is

- 6 months for slurry, animal faeces, silage leakage, digestate;
- 2 months for solid manure from hoofed or cloven-hoofed animals, compost; and
- 9 months for farms > 3 GV¹² / ha and for farms without own agricultural area.

However, there existed already a 6 months storage demand in the previous Fertiliser Regulation from 2007, and the main change is the increase to 9 months for the farms with a very high livestock density above 3 GV per ha.

Poland

64¹² German Large Livestock Unit (Großvieheinheit), defined as the number of live animals weighing 500 kg. See also <https://www.bauernhof.net/enzyklopaedie/grossvieheinheit-gv/>

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In 2018, Poland introduced a new Water Law, resulting in designation of the whole country as Nitrate Vulnerable Zone, whereas this before 2018 only was 4,6% of the Polish area. In this connection, Poland has in 2020 issued a regulation about manure stores: Official Journal 243/2020 Regulation of the Council Of Ministers on the adoption of the "Action Program to reduce water pollution by nitrates from agricultural sources and to prevent further pollution", Section 1.4. Storage conditions for natural fertilisers and leachate treatment.

- It is required to provide an impermeable surface for storing solid natural fertilisers and an appropriate capacity of covered tanks (in particular with a flexible cover or a floating cover), tanks for liquid natural fertilisers, which should have a tight bottom and walls.
- If livestock are kept on deep litter, manure may be stored in a livestock building with impermeable ground.
- It is possible to temporarily store the manure directly on agricultural land (however, not longer than for a period of 6 months from the date of creation of each pile), the manure can be re-deposited in this place after 3 years. Does not apply to chicken manure.
- Manure, slurry or temporary pile storage areas must be at least 25 m away from wells or water intakes or water banks.
- Capacity for solid manure storage period for 5 months and for liquid manure 6 months. Currently, there is a transitional period during which farmers are required to securely store solid animal fertilisers and to provide tanks with capacity for at least 4 months for liquid animal fertilisers. For farms keeping animals in the area of 210 LUV, the transition period ends at the end of 2021, for holdings with fewer animals the adjustment period ends in 2024.

However, Baltic MANURE did not cause changes in Polish policy framework concerning manure stores.

Denmark

The Danish regulations about sufficient manure storage capacity is given by "Bekendtgørelse nr. BEK nr 760 af 30/07/2019 - Husdyrgødningsbekendtgørelsen" (Cabinet Regulation No. 760 of 30 July 2019 – "The Cabinet Regulation on Livestock Manure"). The Cabinet Order is according our information not available in English

In brief the Regulation determines the following:

§22 contains decisions about cover on tanks for liquid manure, including digestate of any biomass of vegetable origin:

- Tanks must have cover.
- Tanks situated closer than 300 metres from neighbours or sensitive nature must have a solid cover (e.g. tent, roof, concrete deck or fabric membrane) or a tight cover (natural surface crust layer or

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equivalent). It was in 2013 estimated by Copenhagen University¹³ that 10-12% of the Danish slurry is stored in tanks with solid cover, and the share is probably a few percent higher today.

- The solid cover at tanks situated near sensitive nature can be replaced with a technology that appears at the Technology List of the Danish Environmental Protection Agency.
- According the Technology List, in-house acidification and in-tank acidification can replace a solid cover.
- A logbook must be kept in case of tanks with tight cover.

Link to the legal provision – all in local as well as English language:

- The Cabinet Regulation on Livestock Manure:
<https://www.retsinformation.dk/Forms/R0710.aspx?id=209913>
- The Technology List:
<http://eng.mst.dk/trade/agriculture/environmental-technologies-for-livestock-holdings/list-of-environmental-technologies/>
- Logbook: <http://mst.dk/media/mst/7879772/logbog.pdf>

Although the mentioned Cabinet Regulation was updated in 2019, the specific rules concerning manure storage capacity were introduced already with Cabinet Regulation no. 11 of 3 January 1992. Requirements for cover of manure storages were introduced already in 2002 as part of an Action Plan for Ammonia. Therefore, Danish policies has not been affected at all by the recommendation of Baltic MANURE.

Macro-regional level

HELCOM has in the Annex III part II of the Helsinki Convention regulation about sufficient manure storage capacity but it was adopted before the project time already.

v End-user acceptance Germany

The recommendation of Baltic MANURE did not have a direct impact on end-user acceptance.

Poland

The recommendation of Baltic MANURE did not have a direct impact on end-user acceptance.

Denmark

Baltic MANURE

In accordance with the above, Baltic MANURE did not cause any change in Danish policies and could therefore also not have affected end-user acceptance.

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ii Project result (example 2)

Control water additions to slurry and separate and re-use cleaning water when possible

The general idea promoted by the project was to use manure as a valuable resource and unnecessary dilution will increase the cost of handling and spreading and therefore decrease its value. This is particularly relevant for farms with manure that has low DM content.

iii Clarity of recommendations

The above recommendation was directed towards farmers and advisors as a simple measure to improve the value of manure, decrease costs for handling and was not a policy recommendation.

Interviews among key stakeholders of the project concerning the clarity of the policy recommendation had the following result:

Germany:

- A suitable and willing person for interviewing was not identified.

Poland:

- Respondent: several people were asked in three ministries; they don't remember the project.
- Summary: The project was known mainly in scientific circles.

Denmark:

- Respondent: Henriette Hossy, Danish Environmental Protection Agency.
- Summary: In general, the project was not remembered, neither this recommendation. Denmark has for decades had legislation in place for cleaning water and effluents from silage etc.

Macro-regional level:

- Respondents: Tarja Haaranen, Ministry of the Environment of Finland, member of HELCOM Agri group for many years and former Chair of the group

Mikhail Durkin: Executive Secretary, Coalition Clean Baltic, former Professional Secretary of HELCOM responsible for land-based pollution including agriculture

- Summary: Both respondents remembered the project, took part in events, visited the website and met with project people. Neither of the

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respondents can be sure that they have heard this recommendation specifically from Baltic MANURE project. There have been also many manure-related projects since.

iv Communication efficiency

The recommendation was reported via the following references:

- Final project Magazine "Results, cases and project recommendations" published in December 2013. No longer available online.
- Sindhøj, E., A. Kaasik, K. Kuligowski, I. Sipilä, K. Tamm, A. Tonderski, L. Rodhe. 2013. Manure Properties on Case-Study Farms in the Baltic Sea Region. JTI Report 417, Industry & Agriculture. JTI – Swedish Institute of Agricultural and Environmental Engineering. Uppsala, Sweden. ISSN 1401-4963.

The final project magazine was printed in hardcopy and distributed at events. It was also sent out in pdf format to the project stakeholder list and was available on the project website up until the end of 2018.

The above-mentioned technical project report was available on the project website until 2018 but is still available through DiVa at www.diva-portal.org.

The recommendation was presented at a national event in Sweden where it received considerable interest and two articles were published in national agricultural newspapers concerning it.

Interviews among key stakeholders of the project concerning the communication efficiency concerning this policy recommendation had the following result:

Germany:

- A suitable and willing person for interviewing was not identified.

Poland:

- The project was not remembered.

Denmark:

- The project was not remembered.

iv Policy integration

Germany

According Fertiliser Regulation (DüV) of 2017, the capacity for storing manure and digestate residues, which are to be used as organic fertilisers, must be harmonized to the needs of the respective farm and water protection in this region. In addition, the amounts of rainwater and wastewater, as well as silage leakage and remaining storage quantities that cannot be pumped out must be taken into account. The recommendations of Baltic MANURE did not affect this.

Poland

Not considered.

Denmark

- A Cabinet Regulation on livestock manure has been in force for decades, including its main provisions, whereas the latest version is from 2019 (BEK

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nr 760 af 30/07/2019 -

<https://www.retsinformation.dk/Forms/R0710.aspx?id=209913#id96a7a1ff-afc6-474e-83dd-fee652f8cbdd9>). The Cabinet Regulation determines the needed storage capacity to be 9 months, including water used for cleaning, silage effluents, etc.

- Denmark introduced in 1997 a Cabinet Regulation on control with tanks for storing manure and silage effluents, latest amended in 2012 (BEK nr 1322 af 14/12/2012 - <https://www.retsinformation.dk/forms/R0710.aspx?id=144331#Not1>).

Macro-regional level

- The specific recommendation was not included in the HELCOM Ministerial Declaration 2013 or other HELCOM policy documents.

v End-user acceptance

Probably this recommendation had little direct impact on end-users since farmers were unlikely to read the English report or the project summary. At one national event there were maybe 20-30 farmers present who were interested in this, but it was then re-published in popular science fashion in two national agricultural newspapers so it is possible that it got some farmers to consider the issue, but this is impossible to validate or quantify.

Germany

N/A

Poland

In accordance with the above, Baltic MANURE did not cause any change in Polish policies and could therefore also not have affected end-user acceptance.

Denmark

In accordance with the above, Baltic MANURE did not cause any change in Danish policies and could therefore also not have affected end-user acceptance.



This technical report presents on basis of deductive research that also involves interviewing of key target stakeholders, gaps between envisaged and realised policy impacts of seven projects to promote sustainable manure management. It was among other concluded that projects are more likely to be integrated into policies and be implemented by end users if they adhere to some basic principles: 1) Objectives are SMART and in line with end-user needs; 2) Activities match the objectives and leads to the production of the foreseen results; and 3) Representatives of the administration and the end-users are directly involved in project partnerships and activities.

The aim of the SuMaNu project platform is to enhance the capacity of authorities, policy makers, farmers and advisors to use and govern the use of nutrients, especially from manure, in a sustainable way and to reduce nutrient leaching. The project also aims to enhance the capacity of the target groups to understand the concept of nutrient recycling. This will be done by summarizing the project results to science-based recommendations that will be created in close cooperation with the target groups and communicated via the wide networks of the partnership. SuManu is a EUSBSR Flagship Project, co-funded by the Interreg Baltic Sea Region Programme 2013-2020. The project has nine partner organisations.
