BONUS call 2014: Sustainable ecosystem services

Project acronym: Go4Baltic

Project full title: **Coherent policies and governance of the Baltic Sea Ecosystems**

Project coordinator: Senior researcher, Head of section Berit Hasler, Aarhus University

Project participants:
1) Aarhus University (AU): Senior researcher, Head of section Berit Hasler
2) University of Helsinki (UH): Professor Markku Ollikainen
3) Swedish University of Agricultural Sciences (SLU): Associate professor Katarina Elofsson
4) Natural Resources Institute Finland (Luke): Principal research scientist Antti Iho
5) University of Warsaw (WU): Professor Tomasz Zylicz
6) SEIT Stockholm Environment Institute Tallinn Centre (SEIT): Senior researcher Kaja Peterson.

Key theme addressed: 4.1. Governance structures, performance and policy instruments

Subthemes:
2.1. Natural and human-induced changes in catchment land cover patterns, including the role of e.g. agriculture, forestry and urbanization
2.4. Eco-technological approaches
4.2. Linking ecosystem goods and services to human lifestyles and wellbeing

2) Objectives, concept and expected outcome of Go4Baltic

The proposed project Go4Baltic examines coherence, synergies and conflicts, between national and international environmental and agricultural policies across the Baltic countries. The aim is to provide policy relevant advice and recommendations for reductions of the eutrophication in the Baltic Sea in coherence with climate and agricultural policies.

Go4Baltic focuses on :
The Baltic Sea Action Plan (BSAP), the EU freshwater and marine policies (WFD and MSFD national implementation as well as national policies and plans), agricultural policies (CAP implementation and national policies) and climate mitigation policies. These policies are chosen due to their importance for the Baltic Sea region. They interact across type of environmental problem, governmental levels, sectors, countries and regions and, therefore, entail great potential for both conflicts and/or synergies. Among the different sectors which affect the ecological state of the Baltic Sea, the agricultural sector is of particular importance, because of its contribution to both eutrophication and climate change, and the mitigation of these problems.

Policy coherence between these polices is important for the marine environment of the Baltic Sea as it determines the consistency of the incentives which polluters (industries, farmers and others) receive through the different policy objectives, policy instruments and implementation practices. For eutrophication, which is the focus of Go4Baltic, horizontal policy coherence involves first of all coherence between *agricultural structural policies* and *policies regarding the aquatic environment* (freshwater, coastal and marine) and *climate mitigation policies.* Furthermore, vertical coherence means, *integration of policy mixes across spatial scales* and administrative layers, can also be of importance.

Methodologically, Go4Baltic develops and applies a concept that will integrate methods and approaches from different disciplines to a coherent interdisciplinary methodological framework. We call this methodological concept "PECaM "– integrating Policy analysis, Economic analysis and modelling, Catchment datasets and Modelling. The concept PECaM integrates methodologies and models within political science, economics, hydrology and land-use, and measures the environmental effects in terms of the loadings of nutrients to the Baltic Sea regions, with loadings defined by the BSAP (HELCOM, 2007) and greenhouse gas (GHG) emissions as defined by IPCC (2006; 2013) . By applying this conceptual and modelling framework, we examine implications of changes in policies and prices for the achievement of policy objectives, policy instrument choice and implementation, land-use changes, environmental effects (loadings), cost-effectiveness and acceptability for regulated agents and end-users of the means for managing the Baltic Sea ecosystems. The study on policy coherence in these issues bring about policy relevant results of high academic standards both at applied and theoretical levels

Go4Baltic is divided into six work-packages (WPs), with a strong emphasis on the contribution from fields within social science, to suggest new solutions for improving the Baltic Sea environmental quality, and at the same time with a strong focus on connecting social science to hydrological and land-use assessment and modelling in the entire Baltic Sea catchment as well as in specific catchments. Hereby we aim at strong interdisciplinary cooperation.

The analyses and modelling in the four research WPs utilise the most recent knowledge from Baltic Sea research, EU projects and national studies, as well as the international literature within these fields, summarised in the description of State of the Art (see below). The PECaM concept enables analyses and assessments at the scale of the whole Baltic Sea region and its seven sub-sea regions (as defined in the BSAP (HELCOM 2007, 2013a,b)) as well as at lower spatial scale down to sub-catchments and farm level. Hereby we address the problem stated in the state of the art of the 4.1. Call-text: "*Missing are studies which cover the whole Baltic Sea area in sufficient depth and detail for general policy implications and advice*". The PECaM concept proposed in Go4Baltic aims to fill this gap through analysis of the following main research questions:

- How successful are national and international policies in promoting low-cost abatement in the short and long term, with specific focus on eutrophication?

We focus on dimensions of policy design, policy implementation and the role of policies in fostering innovation, and, furthermore on economic analyses on data on how the current environmental/aquatic and agricultural policies are implemented at national levels today. We will identify inconsistencies in current policy frameworks which may have resulted in suboptimal policy effects. Specific emphasis will be given to explain what factors drive policy successes and failures.

We will analyse whether the implementation motivates technological development, and whether the national policies and international agreements foster technology diffusion, e.g. diffusion of technologies in livestock production to reduce nutrient losses, as well as development of eco-technologies. The project goes behind the mere registration and assessment of costs and effects of different instruments and measures, by identifying the drivers for the development of the solutions, and hereby identifies successes as well as failures in the existing regulatory setup. This topic is addressed in WP 2, with linkages to WP3, WP4 and the dissemination in WP5. Our second main research question is:

- How policy coherence can be achieved, and what are the effects of improving policy coherence and ecosystem management at different scales of the Baltic Sea?

This question is answered by analysing and modelling the relationship between the agricultural sector, GHG emissions, and the aquatic environment. We examine how current and new policies and policy instruments within agricultural, environmental, land use and GHG mitigation policies, can be reformed, developed and used to obtain coherence and synergies in the management of the Baltic Sea ecosystems. These analyses are built on catchment data- and modelling of the effects of the various scenarios on nutrient loading to the Baltic Sea regions, with loadings defined in the BSAP, GHG emission and soil carbon storage to ensure consistency in data, methods and results (WP 1). Coherence between policies will be addressed in WP3 and WP4, answering the following questions:

- How likely is it that future changes in agricultural policy in terms of commodity prices, subsidies and regulations will influence the structure of the agricultural sector and, hence, the impact of the sector on eutrophication and climate? This is done with a specific focus on livestock production in different parts of the Baltic Sea catchment (WP1 and WP3).
- How do the GHG emissions from the agricultural sector develop in the future under different plausible scenarios for European agricultural policy and the world market? Which policy mixes can be used to achieve a cost-efficient and coherent implementation of both greenhouse gas and nutrient emissions? When are there synergies and conflicts, respectively, between the two environmental aims? These questions are analysed in WP4 and WP1.

Moreover, implementation occurs at multiple levels: from EU level to national, regional and local level. This raises two questions that will be addressed in both WP 3 and WP 4:

- To what degree do national policies and programs of measures promote synergies and inhibit conflicts to provide coherent signals to farmers (the top down perspective)?
- How do farmers respond to multiple policy objectives and instruments, and what are the implications for policy coherence (the bottom-up perspective)?

To answer these questions we will specifically: analyse how farmers react to nutrient and climate policies and, in particular, to different actual and potential subsidy schemes; analyse how farmers perceive and react to present regulations; analyse whether these regulations and policies are conflicting or coherent according to farmers; analyse how farmers will react and adjust to different changes in policy instrument mixes. The research questions are analysed through a quantitative farmer survey in Denmark, Sweden, Poland and Estonia, including a choice experiment on farmers trade-offs between these subsidy schemes.

Based on the answers to the presented research questions, the outcome of Go4Baltic will be policy advice that can increase cost-efficiency and reduce conflicts among stakeholders. It answers the classical policy question: What must be done? We present our recommendations as a “BAltic Sea Socio-economic Action Plan”, BASAP, pinpointing important steps for policy improvements in the short and long run. The formulation of such an action plan, as well as policy briefs, synthesizes the results for use and discussion among end users; i.e. both decision makers and stakeholders.

3) State of the art, theory and methods

Policy coherence

At the Copenhagen meeting in 2013 the HELCOM contracting parties agreed to further align the implementation of the ecosystem approach to enhance efficiency and reduce conflicts between policies (HELCOM 2013b). Ecosystem-based approaches to marine policy require an analysis of the coherence and/or conflicts of sector policies that regulate activities impacting on the marine environment. These policies can be both environmental, infrastructure, planning, economic and structural policies, such as the agricultural policy. Nilsson et al. (2012: 395) define policy coherence “*as an attribute of policy that systematically reduces conflicts and promotes synergies between and within different policy areas to achieve the outcomes associated with jointly agreed policy objectives”.* Following Nilsson et al, coherence may be assessed through analysis of policy objectives, policy instruments and implementation practices, the latter referring to the transformation of political intentions into administrative practices. Howlett and Rayner (2007), Gunningham et al. (1998) and Mickwitz (2009) suggest examination of whether policy objectives are coherent, and whether the sectorial policy instruments interact to provide consistent or contradictory behavioural incentives. These frameworks are, however, relatively general and need further development to enhance their empirical applicability.

In Go4Baltic we take a slightly different and more model-oriented route as we develop and apply the integrated concept PECaM, which include policy analysis, agricultural modelling, game-theoretic modelling and integrated ecological-economic catchment modelling tools to analyse the effects of policy mixes and the implementation of measures on nutrient loads, GHG emissions, carbon storage as well as on costs and technological development. The use of these methods and approaches are adjusted to the needs of each of the work-package tasks, and to facilitate interdisciplinary assessment of existing and future policy mixes. Our focus on implementation is specifically directed at the actors’ level; the polluters, and more specifically farmers, rather than at the administrative levels. The concept includes models , data sampling and economic and policy analytical approaches at Baltic wide level as well as in case studies across the Baltic Sea regions, to facilitate Baltic wide and comparative analyses of how mixes of these policies, under different assumptions of the future, can be implemented coherent and cost-efficient. We pay specific emphasis to farmers’ implementation practices and preferences.

Spatial integrated modelling at catchment and Baltic wide levels

Previous research projects have developed cost-effectiveness models integrating economic and natural science models and methodologies (Elofsson, 2010; Wulff et al., 2014; Hasler et al., 2012; Hasler et al 2014, Hyytiainen et al., 2014; Ahlvik et al., 2014, Rygnestad et al 2002). This branch of cost-effectiveness model studies identifies how predetermined load reduction targets can be achieved at least cost by appropriate allocation of a range of abatement strategies across spatial locations (e.g., Brouwer and De Blois, 2008). All the mentioned Baltic wide studies conclude that restoring the Baltic Sea will be expensive. If water quality action plans are not built on the most cost-effective distribution of abatement measures, it would be possible to obtain the desired level of water quality improvement at lower total costs. This improvement of cost-effectiveness can be achieved both by shifting the combination of abatement measures and the implementation of measures from one spatial location to another. Unsurprisingly, spatially explicit modelling of abatement effectiveness and abatement cost has therefore proved to be essential for identifying cost-effective combinations of abatement measures (Konrad et al., 2012; Iho, 2005; Iho and Laukkanen, 2012). In the Baltic Sea region this is especially important because of the heterogeneity in catchment characteristics, in land use and agricultural production, the latter being one of the major sources to eutrophication in this region. We will build our integrated catchment modelling on previous experiences with integrated modelling (Hasler et al 2012;2014; Konrad et al 2012) as well as experiences with catchment modelling (Andersen et al., 2014; Thodsen et al 2014), and utilize and improve the models already developed (Kronvang et al 2008). Integrated assessment and modelling (IAM) approaches, combining several quantitative models representing different processes and scales into one framework, allowing for multi scale analysis of environmental, economic and social issues, has been performed by Jansson et al. (2011) to assess land-use changes in EU.

In Go4Baltic we develop a concept, PECaM, with similarities to that in Jansson et al. (2011), but with a stronger focus on the links to policy analysis and with a more specific focus on eutrophication of the Baltic Sea, reductions of greenhouse gas emissions from agriculture, and carbon sequestration. In the WPs as well as for the synthesis we use the models developed by Gren et al. (2013), Ahlvik et al. (2014) and Hasler et al. (2012) separately and integrated. Furthermore, we apply catchment scale models to assess the economic and environmental effects of policies, policy mixes and farmer adaptation in further depth. The spatial scales used in the analyses are further described in section 4b.

Policy instruments, implementation at Baltic wide- and farm level spatial scales

Earlier research on the Baltic Sea has compiled information on the state of implementation of policy instruments; e.g. Eckersberg's (1997) comparison of local use of environmental policy instruments in Nordic and Baltic countries, and more recently Salomon and Sundberg's (2012) analysis of instruments and measures used for nutrient load reductions in the agricultural sector in the Baltic Sea littoral countries. This latter study showed a large variation in implementation levels and efforts, but the study, which was part of the project BalticCompass, did not explore the social and economic determinants or the economic consequences of the measures. Data from this study, as well as other Baltic studies (Baltic Deal, RECOCA (Wulff et al., 2014)), Baltic Manure (Kässi et al., 2013), the EU commissions 'Fitness Check of the Water framework Directive' (EU commission, 2012) and other data sources (Eurostat, national sources) will be applied in Go4Baltic.

Policies influence innovation of new technologies and can reduce costs as can learning-by-doing. Technology adoption and diffusion of agri-environmental measures is investigated by e.g. Fuglie and Kascak (2001) and more recent empirical research, which is mainly applied to the energy sector, has shown that learning-by-doing can have a considerable impact on abatement costs (Berglund and Söderholm, 2006). The general literature on technology diffusion (Blackman, 1999; Geroski, 2000; Keller, 2001), identifies typical processes for the impact of learning and innovation on abatement costs. In Go4Baltic, technology diffusion and innovation will be explored inspired by these studies, using data from the above mentioned sources and statistics, as well as data on number and content of patents.

Studies of adoption of measures and implementation practices of different policies, e.g. agricultural and environmental policies, using experimental approaches combined with quantitative surveys have been increasingly used (Pedersen et al., 2012; Christensen et al., 2011; Beharry-Borg et al., 2012; Broch and Vedel, 2012). Data from such surveys and experiments (choice experiments) can be used to elicit how social and economic factors can explain the implementation, or lack of implementation. This type of approach provide information of farm heterogeneity in decisions and likely implementation strategies under future conditions on changed prices, subsidies and command and control restrictions and measures (Czajkowkij et al 2014).

In Go4Baltic we make a common Farm survey to sample data to answer our questions on how policy mixes are adopted by farmers and how the instruments might influence technology diffusion. Based on initial policy document analysis (e.g ., JRC, 2013; Salomon and Sundberg, 2012) quantitative farmer questionnaires will be developed and used, including choice experiments on different subsidy schemes to explore farmers trade-offs between different policy choices, and scheme characteristics, and to assess the heterogeneity amongst farmers in countries around the Baltic Sea. Latent class models on choice experiment data (Jaeck and Lifran, 2014) can be used to analyse the data and examine conflicts and coherence in policy implementation. This type of surveys and experiments can be directly useful for analysis of policy acceptance and adoption of measures across farming systems and farm types (e.g. farm sizes and intensity), but also as inputs for agent based models and other types of agri-environmental models (Rupf et al., 2012). The Go4Baltic Farm Survey will be made and submitted in WP1, and data from the Go4Baltic Farm Survey will be used in WP2, WP3 and WP4.

International and national cooperation

The poor environmental state of the Baltic Sea is an international environmental problem and a textbook example of the so called "tragedy of the commons" (Hardin, 1968), where individual countries or agents' independent and rational actions, being in their own self-interest, are not in accordance with the societal long-term interest. An international environmental agreement, such as the HELCOM BSAP is an example of an international policy to overcome this problem. Non-cooperative and cooperative game theories are traditional approaches to investigate

International Environmental Agreements (IEAs) (Finus, 2001; Barrett, 2003). In the regulation of polluting behaviour, time plays a key role, because the credibility and efficiency of regulating policies can only be examined over time. Dynamic game theoretic approaches (Jørgensen et al., 2010; Van Long, 2010) have previously been applied to acid rain and climate change problems, by e.g. Kaitala et al. (1992, 1995), Eyckmans and Tulkens (2003), Dutta and Radner (2009), Ruis and de Zeeuw (2010). However, there are few empirical models of water pollution, and only a couple are applied to the Baltic Sea (Markowska and Zylicz, 1999; Ahlvik and Pavlova, 2013). In Go4Baltic we use the approaches in Markowska and Zylicz (1999), Ahlvik and Pavlova (2013) together with recent results on the distribution of costs and benefits from Ahtiainen et al (2014) and Ahlvik et al (2014).The methodological approaches that together form the PECaM concept used in Go4Baltic is presented in table 1 in section 4.

4) Progress beyond the state of art and interdisciplinarity

4a Interdisciplinarity and model framework

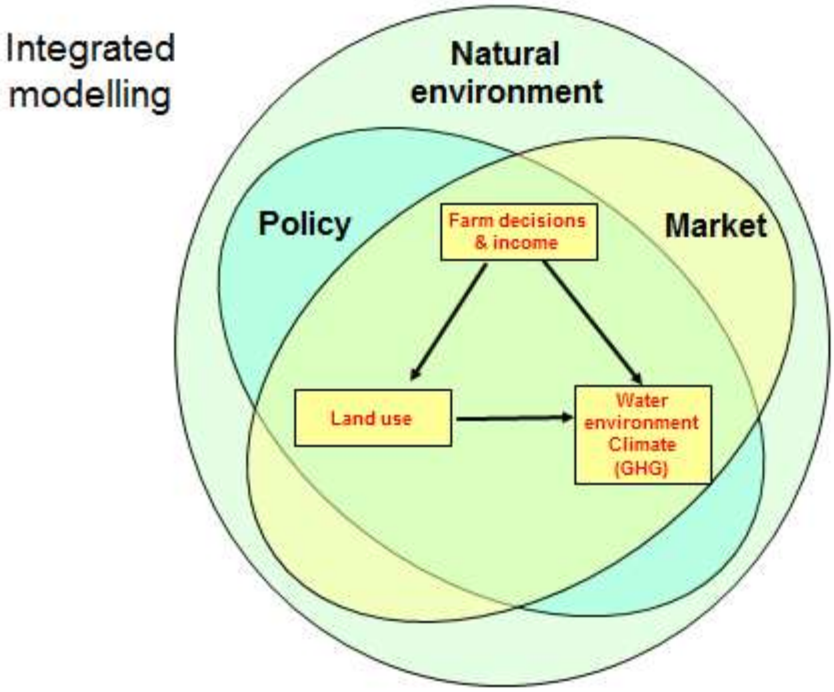
To our knowledge the PECaM type of concept to perform integrated and interdisciplinary analysis of coherence between policies, instruments and implementation processes at both international (Baltic-wide) and lower spatial levels has not been accomplished before. The interdisciplinary concept is novel through (i) the linking of behavioural experience from the past and expectations about future economic and policy development inside and outside the environmental policy arena, (ii) the recognition of the simultaneous importance of strategic considerations that affect policy design at national and international level and dependence of individual farmers' responses to policy design. This approach is feasible to develop and use because it builds on a number of already developed methods and models. The project extends the earlier use of these models by interlinking model output and input, and doing this at a scale which has not been done before. The interdisciplinary approach, together with disciplinary analyses where needed, is necessary to enable analyses of both drivers, causes and effects of policies, instruments and measures, and therefore necessary in the study of how to achieve coherence.

Policy analysis is relevant for the assessment of how effective policy mixes and instruments are in reaching the goals, and for providing a deeper understanding of how the policies affects the agents, beyond the economic understanding of agents' response necessary to optimize the economic return. *Economic analysis* is relevant to account for cost-effectiveness, total costs, drivers for innovation and technological change. *Catchment data sampling and modelling* is relevant to model and measure the land-use and resulting emissions to air and water. The methodological contribution is further described under state of the art. The common Farm Survey and the catchment data will be used in many of the WPs, and the cost-minimisation models will also be used in several of the WPs. In table 1 the methodologies (policy analysis, economic and catchment approaches are outlined together with a categorization of how the disciplines are integrated. The use of the methods; for which type of analysis and at which spatial level, is indicated in Table 1.

Table 1. The interdisciplinary and spatial scale characteristics of Go4Baltic

PECaM methods and approaches to study coherent policies and governance of the Baltic Sea Ecosystems							
Methodologies and approaches				Spatial scale			
Policy analy-sis	Economic	Catchment/ Land use/hydrology Models		Baltic Sea reg.,	Nat. level	Catch-ment	NU TS 2
Sampling of data on implemented policies, analysed by random effect models and cluster analysis			WP2 & 5		👍	👍	
	Integrated modelling : identification of cost-effective nutrient abatement: economic abatement costs, nutrient leakage and load effect functions, spatial catchment data, marine models. Optimisation models, Balticwide least cost models.		WP 1, 2, 3,4 & 5	👍	👍	👍	
		Datasets as input to economic models..	WP1 & 5	👍	👍	👍	👍
	Game theoretical models		WP3 &5	👍			
	CAPRI agricultural sector model integrated with catchment modelling, SWAT.		WP1,2 ,3 & 5	👍	👍		👍
	Farm catchment programming models; nutrient load,GHG emissions and soil carbon storage effects linked to farm economic models and agent based models.					👍	
Agent based models			WP4			👍	
Farm survey and choice experiment,			All WP		👍	👍	

Figure 1 also illustrates the integrated analysis and modelling, linking natural and social science – the natural environment, policies and market conditions in analyses of agricultural changes, farm decisions, changes in land use and effects on water environment and climate gas emissions.



Adapted after Bateman 2011

As can be seen from Figure 1 land-use, and hence land-use data,are important when linking natural and social science in this domain. Land-use data include data on crop allocation, livestock production, fertilisers etc. The spatial scales and the use of catchment data and analyses will be further explained in section 4b.

4b. The scale of the analyses, the use of catchment data and ability to generalise results

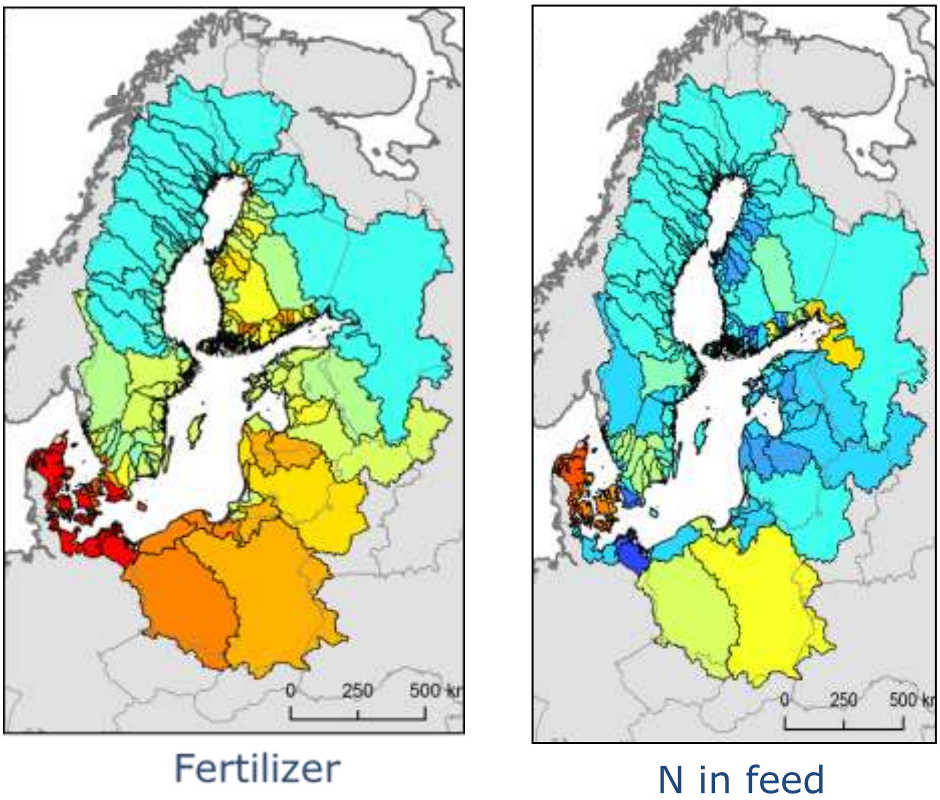
The analyses and modelling in Go4Baltic will use land use data as well as data on agricultural technologies and performance at different spatial scales, as presented in Table 1 – from Baltic-wide scale to small catchments. The map in Figure 2 presents a map of the regions and catchments that will be used for analyses,as presented in Table 1: The 7 Baltic Sea regions (corresponding to the Baltic Sea regions in Table 1), the 9 littoral countries around the Baltic (corresponding to the national level in Table 1), the   22 catchment s (drainage basins), and the 117 sub-catchments of the Baltic sea area (corresponding to Catchment scale in Table 1). The NUTS2 regions are not shown at this map.

Figure 2. The 7 Baltic Sea regions , the 9 countries, 22 drainage basins and 117 subcatchments

Abbreviations: [Bothnian Bay (BB), Bothnian Sea (BS), Gulf of Finland (GF), Gulf of Riga (GR), Baltic Proper (BP), Danish Straits (DS) and Kattegat (KT)] and the 22 main drainage basins [Germany into Baltic Proper (DE-BP), Germany into Danish Straits (DE-DS), Denmark into Baltic Proper (BP-DK), Denmark into Danish Straits (DS-DK), Denmark into Kattegat (KT-DK), Estonia into Baltic Proper (BP-EE), Estonia into Gulf of Finland (GF-EE), Estonia into Gulf of Riga (GR-EE), Finland into Bothnian Bay (BB-FI), Finland into Bothnian Sea (BS-FI), Finland into Gulf of Finland (GF-FI), Lithuania into Baltic Proper (BP-LT), Latvia into Baltic Proper (BP-LV), Latvia into Gulf of Riga (GR-LV), Poland into Baltic Proper (BP-PL), Russia into Baltic Proper (BP-RU), Russia into Gulf of Finland (GF-RU), Sweden into Bothnian Bay (BB-SE), Sweden into Baltic Proper (BP-SE), Sweden into Bothnian Sea (BS-SE), Sweden into Danish Straits (DS-SE), Sweden into Kattegat (KT-SE)].

Figure 3 illustrates the differences in fertilizer inputs and use of nitrogen in feed between the 117 catchments. Blue and green colours represent low inputs per ha, while red, orange and yellow colours represent high inputs per ha. The maps indicate the potentials of studying differences in farm structure, technological development and policy implementation at catchment scale because of the large heterogeneity between these catchments. This heterogeneity is important to take into account in the analyses of how policies and instruments to regulate nutrients and greenhouse gases, work.

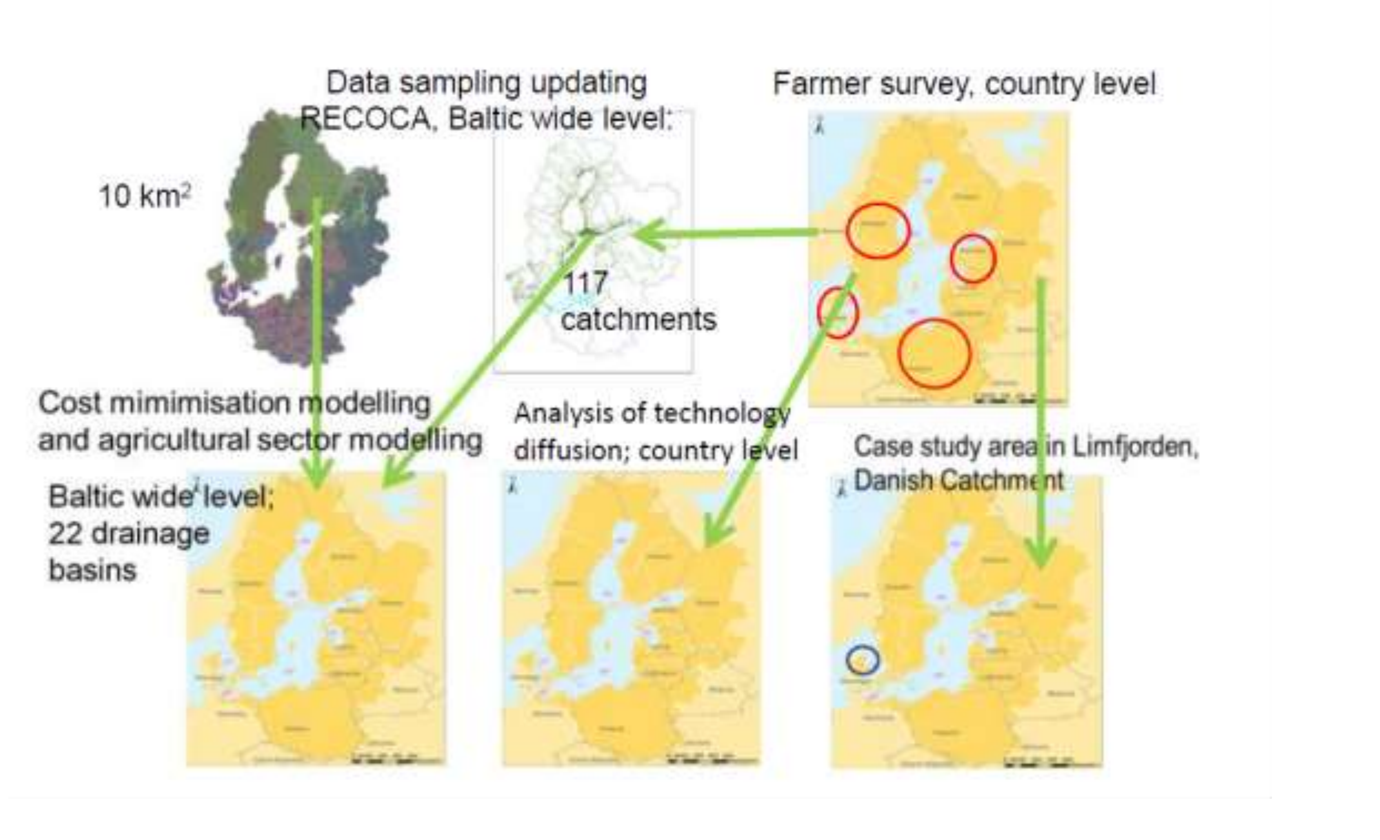
Figure 3: Fertiliser N and N in feed in the 117 Baltic catchments.-



Source: Humborg C., personal communication, January 2015. Based on NANI calculations (Wulff et al 2014).

Figure 4 further illustrates the scale of the different analyses in Go4Baltic.

Figure 4: Geographical location for the analyses in Go4Baltic



The **left hand side of Figure 4** illustrates that we will combine data at the 10 km 2 grid scale and *117 catchment scale* and update these data sets for studying cost-effectiveness, synergies and conflicts between policies at the Baltic wide level , using these data sets and already developed models (cost.minimisation models and the model CAPRI, see further description in WP1). The datasets were initially sampled in the BONUS project RECOCA , but will be updated and further developed.

Moving against the right side of the Figure 4 the maps illustrate that we will also analyse reasons and motivation factors for e,g. technology diffusion at *national levels*(see WP2), but with an aim to discuss the findings in a Baltic wide setting. Instruments to motivate manure trading will also be studied at national scale (WP3), also with the aim to discuss the usefulness, cost-effectiveness etc- of this instrument in the countries around the Baltic Sea .

A Farmer survey, shown in the right hand side, is planned for the four countries Poland, Estonia, Sweden and Denmark. The countries are chosen because they represent different farming structures and adoption of technologies relevant for nutrient utilisation, and therefore the data from this survey will enable comparisons between these countries. This Farmer survey will be developed in WP1 and used in WP2,3, and 4, and therefore used for the analyses of coherence between policies in these countries, but possibilities for generalisation will be discussed. Covering these 4 different countries, which are different with respect to agricultural production and structure, as well as natural conditions, the results from the Farmer survey can be linked to the catchment data for the 117 catchment further qualifying this updated data set. This will provide new knowledge and far more detailed and geographically distributed information than what is presented in Figure 3.. It would have been ideal if all countries could be covered in the survey, both for the purpose of generalisation and for comparison between countries and areas. Due to budget restrictions this is however not possible. Attempts will be made to apply for additional resources to extend the number of countries covered by this survey, and positive indications have been achieved from the BalticEye project, who are interested in collaboration on this survey.

Together with the Baltic wide catchment analyses, WP1 , WP2 and WP3 aim to explore technology adoption, farmers' perceptions and behaviour and the mechanisms of policy adoption and incentives more in detail at different spatial scales, further explained in the WP descriptions. These issues will also be investigated by applying more theoretical modelling (WP4), which has relevance at a general level.

In the right hand side of Figure 4, a map shows the countries where the farmer surveys will be conducted. In the lower right hand side of figure 4 a map showing that detailed agent based modelling (ABM) of instrument and measures adoption will be performed in a Danish catchment (WP4). The ABM study will only be performed in this Danish catchment as it is very time-consuming and resource demanding to set up the data for such a model. The results will however be discussed comparing the farm structure and natural conditions of this catchment to other intensive agricultural areas around the Baltic. With use of the results from the Farmer survey more general findings regarding policy instruments, coherence and potential synergies and conflicts will be discussed. The agent based model study is further described in WP4.

The spatial scales, details, expected outcomes and policy relevance of the parts of Go4Baltic are further explained in the WP descriptions.

5) Relevance to the thematic content of the call, contribution in producing expected outcomes specified for the themes addressed

The main theme addressed by Go4Baltic is theme *4.1.:" Governance structures, policy performance and policy instruments ".* The project focuses on the present coherence and conflicts between agricultural, climate mitigation and environmental policies, as well as on improving the future policy coherence. By developing an integrated model and analysis concept we will provide scientific results and recommendations for advice on the optimal and coherent policy mixes in different policy settings and at different scales of time and space, as requested in the call. As a product to end-users we will develop and present a "Baltic Sea Socio-economic Action Plan", synthesizing the project results, conclusions and ideas into recommendations for how coherent and cost-efficient policies can be achieved.

Three supplementary themes in the call are found relevant for Go4Baltic:

2.1. Natural and human-induced changes in catchment land cover patterns, including the role of e.g. agriculture, forestry and urbanization: The expected outcome from the project relevant for this theme is use and further extension of the comprehensive datasets from the BONUS project RECOCA and a further extension of these data and models, to enable modelling and measurement of how natural characteristics, such as soil types and retention; as well as human activities and pressures, affect the nutrient loads to the sea, the GHG emissions and the carbon storage. The data and models will be used to explore how scenarios for land-use changes, changes in use of inputs etc driven by changes in policies, subsidies etc. affect the nutrient loading, GHG emissions and carbon storage.

2.4. Eco-technological approaches: are analysed in in terms of how policies can create incentives for the use of eco-technical approaches such as wetland construction and compensation mussel production in fjords in order to take up excess nutrients from the fjord and pumping oxygen into the sediments in the sea. In WP2 and WP4 we analyse the adoption of wetlands (restored and constructed ponds) and in WP2 we analyse the incentives for mussel production and pumping sediments. These analyses are built on analysis of literature – not new experimental studies.

4.2. Ecosystem services: Payment for nutrient and carbon regulating ecosystem services are analysed. The integrated concept is also suited to be linked to marine models and valuation of cultural and provision ecosystem services, but this is not a direct part of the project. It can however be achieved by linkage to Ecosystem services projects (TEEB Baltic, Ahtiainen et al., 2014), although it will not be linked in the present project.

6) Table 2. List of work packages .

WP no.	Work package title	Type of activity	Lead appli-cant, No	Lead appli-cant abbre-viation	Personmonths	Start month	End month
1	Assessment of catchment data, nutrient loads to sea regions and socio-economic response	RTD	1	AU	29,5	1	35
2	Development and adoption of policy and technology	RTD	2	SLU	58,7	1	35
3	Agricultural and environmental policy instrument coherence—at farm and agricultural sector level	RTD	4	LUKE	61	1	35
4	Coherence of Climate and aquatic policies	RTD	3	UH	61,5	1	35
5	Synthesis and formulation of recommendations for "A Baltic Sea Socioeconomic Action Plan".	OTHER	1	AU	22,9	1	36
6	Management	MGT	1	AU	12	1	36
				Total:	245,6	1	36

7) Work package descriptions

Work package number	1	Start date or starting event:			Month 1	
Work package title	Assessment of catchment data, nutrient loads to sea regions and socio-economic response					
Activity type	RTD					
Participant number	1	2	3	4	5	6	All
Participant abbreviation	**AU**	UH	SLU	LUKE	WU	SEIT	Total
Person months per participant:	**18,5**	0	3	1	3	4	29,5

Objectives

- Provide consistent data on land-use and agricultural management in the Baltic Sea drainage basin (10 km grid scale and regional scale) for baseline and socio-economic scenarios.
- Model results on least cost solutions for BSAP (Link to WP2, WP3, WP4 and WP5).
- Translate socio-economic scenarios into resulting effects on agricultural nutrient losses and loads to the sea regions (Link to WP2, WP3 and WP5).
- Make a Go4Baltic farm survey to sample data on farmers' choices of measures and policies, with focus on fertiliser application and use
- Translate socio-economic scenarios into resulting effects on soil organic carbon storage and GHG emissions (Link to WP4 and WP5).

Description of work

Task 1.1: (AU) *Developing data sets.* WP1 will establish common baseline data sets covering the entire Baltic Sea region to be used throughout the project on agricultural production, GHG emissions, and the nutrient load of the Baltic Sea. Data will be provided on a detailed (10 km) grid and at an aggregated level (NUTS2). The data set constructed in the RECOCA project for the year 2005 (Andersen et al., 2014) will be updated to 2013 using regional, national and EU statistics. Andersen et al. (2014) divided the Baltic Sea drainage basin (1.7 mio. km^2) into 10 km grid cells and described land use and agricultural practices for each cell. The data set is geographically linked to soil data (HWSD, 2008) and climate station data (JRC, 2012). Furthermore, the data set is linked to estimates for nutrient retention in ground water and surface waters disaggregated into 117 river basins/catchments around the Baltic (Wulff et al., 2013).

Task 1.2: (SLU, AU) *Effects of socio-economic scenarios.* Farm type specific nutrient balance outputs from the CAPRI model scenarios (Jansson and Heckelei, 2011; Kempen et al., 2011) (linked to WP 3) will be formatted to inputs to agricultural nutrient loss models (Wulff et al., 2014) and subsequently routed through groundwater and surface water retention systems yielding a resultant loading of the Baltic Sea. For nitrogen, the rootzone nitrogen leaching function developed by Andersen et al. (2014) will be re-formulated and re-estimated to make it compatible with CAPRI outputs. For phosphorus, no general loading model linked to phosphorus balances exist. WP1 will construct a data set of model simulations of catchment responses to increasing inputs of agricultural phosphorus with the process-based model SWAT (Neitsch et al., 2011) taking into account relevant phosphorus loss transport pathways (surface and subsurface). The model simulations will be performed using existing SWAT model set ups for type watersheds in the Baltic Sea drainage basin (Thodsen et al., 2014). From this data set, using multivariate statistics, WP1 will seek to develop a general phosphorus loading function which can be linked to CAPRI outputs. Effects on GHG emissions at farm type level and regional level will be estimated by the CAPRI model and aggregated to Baltic Sea drainage basin level (Jansson et al., 2010). Effects on soil organic carbon storage will be estimated using IPCC tier 2 methods (regional level) supplemented by national research.

Task 1.3. (AU, , SEIT, WU, SLU) *The Common Go4Baltic Farmer survey***.** A questionnaire based survey, will be developed and submitted to representative samples of farmers in Denmark, Sweden, Poland and Estonia. A study by the EC (JRC 2013) reviews a catalogue of measures, e.g., buffer strips, wetlands, reduced fertilization and other measures, and describe barriers, costs and effects of implementation as perceived by river basin managers in the involved countries (Sweden, Denmark, Finland, Estonia and Poland). The JRC reviewed perception of farmers' barriers towards participation in the schemes too. However, the JRC study did not interview farmers directly, and did not enter into the complex decisions and trade-offs between e.g. agricultural production and environmental protection when several, sometimes conflicting, subsidy schemes are available for the farmers. Also farmers differ in terms of e.g. farming systems, farm size and production intensity and this may influence uptake. In The Go4Baltic Farmer survey we will analyse these complex decisions through quantitative questionnaires where we will ask farmers questions about their use of subsidy schemes and how they respond to other policy instruments, but unlike e.g. JRC (2013) and the Baltic Compass project (Salomon and Sundberg, 2012) we will explore how farmers perceive the incentives embedded in the policy instruments and how they make trade-offs between them, by asking farmers directly, instead of asking e.g. river basin managers. The development of the survey will be based on document analysis, qualitative interviews with farmers and the consortiums existing knowledge on farmer incentives. Existing subsidy programmes in the WFD River Basin Management Programme (RBMP/Programme of Measures (PoM)); the agri-environmental subsidies in the CAP pillar II and the payments in the CAP pillar I will be analysed, as well as hypothetical subsidy schemes as they could look like in the future. The survey will, in addition to the quantitative (closed) questions on farmers' actual choices between existing subsidy types and measures also include a choice experiment (CE) (Czajkowskij et al 2014). The CE presents farmers for hypothetical alternatives where subsidies and related measures are combined, and farmers are asked to choose their preferred alternative (Christensen et al., 2011; Beharry-Borg et al., 2012). From this experiment, farmers' willingness to accept to implement measures if they get paid a certain amount (which is specified in the choice sets), and their trade-offs between specific attributes in the scheme (e.g. contract length), and between other programmes, can be elicited. The survey will also include questions on storage of manure and on application of fertilizers and manure (amounts, timing, application methods) as this type of quantitative information is generally not available. The survey and the included choice experiment will be set up, tested and submitted as part of this task. The resulting data will be used in various ways in WP2, WP3 and WP4.

Task 1.4. (**AU,** SLU, LUKE) *BSAP least cost solutions.* Data from task 1.1. will be used for updating of cost-minimization models for the entire Baltic Sea basin, and linked to task 1.2. Consistent cost-minimization modelling will be performed with models developed in Gren et al. (2013), Ahlvik et al. (2014) and Hasler et al. (2014). The different least cost solutions with the three models (Gren et al 2013, Hasler et al 2012 and Ahlvik et al 2014) will be analysed and discussed with respect to the different model assumptions' and their importance for the least cost solutions, the distribution of measures, and the potential interpretation for nutrient trading between Baltic Sea countries. Furthermore the model used in Gren et al. (2013) and Hasler et al. (2012) will be merged to utilize the novelty of them in terms of number of measures and dynamics (Gren et al., 2008, 2013) and spatial features (Hasler et al., 2012).

The results of the cost-effectiveness modelling and CAPRI scenarios will be disseminated in a report and in a policy brief, and the results of the WP will be synthesised for the report "A Baltic Sea Socio-economic Action Plan ".

Deliverables

D1.1. *DB:* Data sets on land use and agricultural management available for WP 3 and 4, M12
D1.2. *DB:* Dataset from Farm survey established , DK, SE, EE and PL. M12.
D1.3. *DB*. Data sets on land use and agricultural management available for the wider research community via the BONUS portal. M24.
D1.4: *RE*: Report on effects of socio-economic scenarios on nutrient loading and resulting loads to Baltic sea regions, and on GHG emissions and soil organic carbon storage. M24.:
D1.5: *RE:* Report comparing least cost results from three Baltic wide models; lessons learnt for advice to end-users. M25.
D 1.6. *PP:* Policy brief describing CAPRI scenario results for nutrient loads and marine water quality, as well as cost-effectiveness results for BSAP. M25.
D1.7: *PP:* Final input text to the report "A Baltic Sea Socio-economic Action Plan". M35.

Work package number	2		**Start date**			Month 1	
Work package title	Development and adoption of policy and technology						
Activity type	RTD						
Partcipant number	1	2	**3**	4	5	6	All
Participant abbreviation	AU	UH	**SLU**	LUKE	WU	SEIT	Total
Person months per participant:	**6**	0	**47**	4	0,7	1	58,7

Objectives

- Investigate the cost-effectiveness of aquatic policies that countries have adopted
- Examine whether Baltic Sea policies on international and national level have led to innovation of new technologies which could potentially reduce abatement costs
- Examine to what extent innovations and increased experience with abatement technologies can be expected to significantly reduce costs of complying with Baltic Sea targets.

Description of work

Task 2.1: (**SLU**, AU, LUKE) *Reasons for and consequences of countries choice of policy instruments.*

The first task is to investigate determinants and consequences of countries choice of policy instruments. The stringency of environmental policy can be expected to depend on environmental, social and economic conditions, such as the severity of the environmental problem, the influence of different stakeholders on policies, the presence of corruption and democracy, the economic importance and state of the affected sector, and political culture and tradition (Pellegrini and Gerlagh, 2006)). The economic and environmental consequences of the policy regime depends on the stringency of the regime (Esty and Porter, 2005), the design of policy instruments and the type of economic activities to target with the instruments (Harrington et al., 2000).

We aim to use existing data on the state of implementation of policies and measures to reduce eutrophication (e.g. Salomon and Sundberg 2012), in combination with data that will be collected about social and economic factors in the different countries, which can be expected to affect implementation. Agricultural policies aimed at supporting farmer income and production, can potentially have a detrimental impact on emissions. Higher agricultural subsidies to environmentally damaging activities imply that stringency of environmental policies and instruments must be higher to reach the same emission reduction. The described types of data are used to analyse the social and economic determinants of policy stringency for different priority measures in the Baltic Sea countries.

The analyses will be carried out at both micro- and macro level. At the micro level, the common Go4Baltic Farm survey will be carried out and used in this task (cf. Task 1.3., WP1). The survey includes both quantitative (closed) types of questions and a choice experiment (cf. Pedersen et al 2012; Beharry-Borg et al 2012). The choices and trade-offs between agri-environmental and production subsidies will be specifically analysed as part of this task. The traditional production support in e.g. the CAP's Single Payment Scheme has a potentially harmful impact on the environment, while the agri-environmental schemes try to compensate for this.

At the macro-level, social and economics determinants, discussed above, of countries stringency of policy

instruments, and magnitude of implementation of measures, will be investigated. This is done using the above mentioned data on different agricultural priority measures in the Baltic Sea countries. This analysis will be carried out using econometric methods, following, e.g., Pellegrini and Gerlach (2006).
Second, we aim to use the same data on implemented policy instruments and measures as discussed above complemented by data on actual load national reduction as calculated by HELCOM. The aim of this part of task 2.1. is to compare the actually implemented policy with the cost-effective policy. This analysis will be carried out using data on implementation of measures and achieved load reductions in a Baltic-wide cost-effectiveness model (WP1, task 1.3.), building on BALTCOST (Hasler et al 2013) and Gren et al. (2008). Thereby, we can identify costs of the actually implemented strategy and compare with the cost-effective implementation of policies. This will require the estimation of costs and environmental impact of measures which are currently not included in cost-effectiveness models for analysis of BSAP targets (Gren et al., 2013, Hasler et al, 2013), but where the measures are included in the actual policies. The results of task 2.1 will help to identify barriers to successful implementation of low-cost policies.
Task 2.2. (SLU, AU, LUKE, SEIT, WU) *The impact of national and international policies on innovative activity aiming at reducing emissions or improving nutrient management.* The second task in WP2 is to estimate the impact of national and international policies on innovative activity where innovations have a purpose to improve effectiveness of nutrient management and abatement. This is done by (i) examination of the impact of policies on patenting activity at national level, where patents are aimed at reducing nutrient emissions or improving nutrient management and (ii) by investigation of the drivers of the adoption of novel practices for fertilizer handling by farmers.

Studies have shown that environmental patenting activity increases with pollution abatement cost, with stringency of environmental regulation and as a result of general organizational changes which encourage environmental innovation, as is also suggested by the famous Porter-hypothesis, which stipulates that such forces provide incentives for cost-reducing innovations (Jaffe et al., 2002; Horbach, 2008). We will examine the impact of major changes in environmental policies and targets on national and international level on innovative activity which targets nutrient reductions in the littoral countries. This includes taking into account also the possible importance of agricultural policy changes for innovations for nutrient management in the agricultural sector. The number of patents, as registered in publically available patent databases, will be used as a proxy for innovations made. Different explanatory variables are identified from the literature and collected from statistical sources, and the timing of major policy and target changes are identified. The resulting panel data will be analysed using random and fixed effect models. Results will indicate whether innovators have perceived that policies and targets will lead to an increased demand for more effective or cheaper technologies to reduce or manage nutrients.

We will analyse more in-depth the actual adoption of novel technologies for manure and fertilizer handling by farmers. Regulations have provided impetus for companies to develop new technologies for manure handling, because tighter regulation could make farmers invest in new technologies. But regulation may also have caused innovation in farming practices at farm and inter-farm level, as farmers were given incentives to increase utilization of manure. This will be studied using Denmark as an example, considering the significant rate of technology development in manure handling that has taken place here (Hansen et al 2013). We will investigate technology supply and demand, and the choice between technologies and agri-environmental measures as responses to policy requirements. Supply will be analysed by tracing the development of new technologies /practices for handling manure from livestock and developments in the regulatory framework shaping fertilizer use to examine causes or correlations and the regulatory pull. A distinction can be made between policies that affect the demand for new technologies (e.g., regulatory requirements aimed at the farmer) and policies that aim to promote the supply of new technologies (e.g., development subsidies). We will use time series analysis or carry out a comparative study between countries around the Baltic Sea with stringent vs. lax manure regulation and rates of technology development. This will be combined with key informant qualitative interviews with business representatives for businesses developing and/or producing new technology. On the demand side, we will analyse to what extent the diffusion of technology, i.e. the uptake of technology at the farm level, is driven by regulation regarding use of fertilizer. To assess this, the Go4Baltic farm survey will include questions to elicit which factors that are influencing the adoption of new technology. A further examination of the effects of innovations will also be carried out, including the impact of the new technology on nutrient load and possible side effects and whether those depend on the character of regulation. This investigation, where environmental impact assessment is applied and farmer costs are identified, will also contribute to the third task described below.

Task 2.3 (SLU, AU, LUKE): *Will innovations and learning-by-doing affect the optimal Baltic Sea policy?*
The third task is to examine whether there can be significant cost savings expected in the future as a result of innovation of new technologies and learning-by-doing, which can reduce the costs of applying existing technologies. Earlier empirical research, which is mainly applied to the energy sector, has shown that learning-by-doing can have a considerable impact on abatement costs. For this task, we aim to identify typical processes for the impact of learning and innovation on abatement costs from the literature (Berglund and Söderholm, 2006; Blackman, 1999; Geroski, 2000; Keller, 2001; Fuglie and Kascak, 2001). These processes will then be included in a Baltic-wide model for dynamic, cost-effective achievement of nutrient targets for the Baltic Sea (cf. WP1, task 1.3). This dynamic model will draw on BALTCOST (Hasler et al., 2012) and Gren et al. (2013) for data on nutrient abatement costs, and on Gren et al. (2013) for the modelling of Baltic Sea dynamic responses to reductions in nutrient loads. The results will allow for conclusions of the role of learning and innovation on cost-effective timing and location of abatement.
Task 2.4 (**SLU**, AU) The major policy relevant results for the WP will be discussed and disseminated to end user in a policy brief, as well as for the synthesis report, "A Baltic Sea Socio-economic Action Plan".

Deliverables
D2.1. *RE:* Report on policy instrument implementation, its determinants and cost-effectiveness. M12.
D2.2: *RE*: Report on the impact of agricultural and eutrophication on innovations for nutrient abatement and management. M28.
D 2.3.*PP:* Policy brief on the development and adoption of policy and technology. M28.
D2.4: *RE*: Report on the potential role of learning and innovation for the cost-effective, long-term and Baltic wide strategy to meet internationally agreed targets. M34.
D2.5. *PP*: Final input text to the report "A Baltic Sea Socio-economic Action Plan" M35

Work package number	3		**Start date**		Month 1	
Work package title	Agricultural and environmental policy instrument coherence—at farm and agricultural sector level					
Activity type	RTD					
Participant number	1	2	3	**4**	5	6	All
Participant abbreviation	AU	UH	SLU	**LUKE**	WU	SEIT	Total
Person months per participant:	16,5	2	2	**35**	4,5	1	61

Objectives

- To analyse coherence and acceptance of agri-environmental policies, with a specific focus on livestock farming
- To understand the role of policy coherence for common and conflicting interests, at international level (Baltic-wide), with an emphasis on the harmonization of national and Baltic-wide agri-environmental programs.
- To analyse coherence from the farmers' perspective, highlighting the advantages and disadvantages for planning and production
- Modelling manure trading as a novel instrument to simultaneously facilitate spatial distribution of nutrients in manure and manage GHG emissions

Description of work

Task 3.1. (LUKE and WU**)** *Game-theoretic modelling of policy coherence***.**
The Marine Strategy Framework Directive (MSFD) and the Baltic Sea Action Plan (BSAP) call for coordinated actions between the littoral countries. For EU member states, the agri-environmental policies under the second pillar of the CAP are the main tool to curtail the major source of nutrient loading: agriculture. These policies, however, are not coordinated between littoral countries.
The first objective is to model how improved coordination would affect the nutrient loading and hence the state of the Baltic Sea as opposed to a Business-As-Usual scenario without coordination. We construct a game-theoretic model, which mathematically represents strategic interactions among the Baltic Sea member states. Benefit and cost functions of reducing agricultural phosphorus and nitrogen load to the Baltic Sea are based on recent studies on benefits for reduced eutrophication (Ahtiainen et al., 2014) and costs of nutrient abatement measures (Ahlvik et al., 2014). The game is solved in both the non-cooperative and fully

cooperative scenarios, with the option for side payments to make coordination beneficial for all countries (Markowska and Zylicz, 1999; Ahlvik and Pavlova, 2013). The second objective is to analyse whether linkages between agri-environmental schemes, the Marine Strategy Framework Directive and the Baltic Sea Action Plan could stabilize the cooperation.

Task 3.2. (AU, WU, SEIT**)** *Implementation practices among farmers: Adoption of spatial nutrient abatement strategies and subsidy schemes* This task aims to expand the policy relevant knowledge about farmers' implementation of policies, and how farmers choose between different policy options, e.g. subsidies, if they are offered different types. The analysis focuses specifically on the barriers and possibilities for coherent implementation of agricultural and environmental policies at the farm level in order to assess how the CAP pillar II instruments can be used to foster coherence with CAP pillar I, the WFD River Basin Management Plans and national BSAP plans.

A range of policy instruments and implementation approaches will be analysed through the common Go4Baltic Farmer Survey (cf WP1), as well as literature, e.g. JRC (2013) "The "RBN (River Basin Network) on WFD and Agriculture", the Baltic COMPASS project (Salomon and Sundberg, 2012), HELCOM Balthazar project (HELCOM, 2012), material from HELCOM agricultural and Environment forum, HELCOM BATMAN knowledge and policy forum and state of the art modelling and assessment studies (Lankoski and Ollikainen, 2003; Lankoski et al., 2006; Lankoski, et al., 2008, Konrad et al., in prep; Maes et al., 2012; Hasler et al., 2012; Pedersen et al., 2012).

Using the common Go4Baltic Farmer survey, farmers' perceptions and responses to agri-environmental policies and subsidy schemes in the CAP pillar II and the Programme of Measures (PoM) in the River Basin Management Plans (RBMP) will be examined. Specific emphasis will be on examining how many and what policy objectives and measures farmers consider, which policy measures different farmer types adopt, as well as how the different instruments examined (price changes, subsidies, command and control) will result in different adaptation at different farms. This knowledge is important for the /implementation of locally targeted policies.

The choice experiment of the Go4Baltic Farmer survey will be analysed regarding farmers' willingness to accept different types of subsidies, and their trade-offs between subsidy types: subsidies used for the Programme of Measures (PoM) in the River Basin Management Plans (RBMP). Specific attention is devoted to the fact that many studies show that farmers attend to objectives in a sequential or lexicographic manner, paying attention only to one or a few salient objectives, or that they fail to make complete trade-offs as otherwise assumed in economic modelling (Louviere, 1984; Scott, 2002). Thus, to ensure that the assessment of the effectiveness of policy instruments and particularly the extent to which expected policy synergies are realized at the farmer level, this task analyses farmer responses to policy instruments and examines how many and what policy objectives and measures farmers consider

Task 3.3. (LUKE, SLU, AU) **Livestock production structural development around the Baltic Sea**

The structural development of agriculture in the Baltic sea region shows a tendency to increased farm sizes, and especially livestock production tends to be concentrated at larger farms, and at the same time the livestock production increases in the eastern countries in the region, i.e. in Lithuania, Estonia, Latvia and Poland. The milk quota abolition in 2015 might speed up the process of structural change of dairy farms in particular (e.g. Jansik, Irz and Kuosmanen, 2014). Factors of production, for example capital, move across borders. In some countries, Poland, Lithuania, Latvia and Estonia, it is becoming more common to have full or partial foreign ownership on farms, which increases the growth of individual farm sizes. This task analyses this structural development, its economic fundamentals, potential environmental effect on nutrient loads and GHG emissions. The needs for actions to achieve coherence between the agricultural structural development and the achievement of WFD and BSAP targets are examined. Consequences and finally the policy needs are evaluated. This task will coordinate its work with WP1. The CAPRI model will be used for scenarios for the livestock sector, the associated nutrient loading and GHG emissions, as CAPRI will be used to estimate nutrient surpluses, linked to SWAT for nutrient leakage modelling and for modelling of the nutrient loads to the Baltic Sea. The extension of the modelling in this task is the focus on livestock production scenarios.

Task 3.4. (LUKE, UH) Manure trading and exchange market

The key environmental concern with the ongoing trends of agglomeration and intensification of livestock production is the spatial accumulation of nutrients in manure. Oversupply of manure is a problem because existing farms don't have adequate areas to utilise the nutrients in manure effectively at the farm. The excess manure could be spread to other farms' fields if there are incentives to do so; making the demand balance the supply. In this task we will analyse the cost-effectiveness of manure trading as an approach for combatting_spatial nutrient accumulation and managing GHG emissions. As the instrument is novel, the objective of the task is to shed light on the theoretical operation of the tool. This will be supported by policy simulations which examine the economic potential of the instrument. We will also analyse coherence across policies, if nutrient trading were implemented on top of the existing mix of environmental and agricultural policies in the littoral countries (Nilsen et al., 2012; Howlett and Rayner, 2007). The idea of the introduction of a market for trading manure is to create a market place for field areas suitable for manure application, and thereby enable the spreading of manure to a larger area than today. Any farmer possessing a suitable field could offer parcels for application. Any livestock producer *or any other legal entity* could ask for application areas. A negative market price would mean that the farmer offering land for application should be subsidised for accepting manure, a positive price would make the manure a normal traded good. In either case the manure market would offer NGOs, private citizens or governments a flexible way of directly influencing the application location and intensity of manure. The task will be completed jointly with LUKE and UH, with project participants Iho and Ollikainen having recent experience in comprehensive analysis of novel market based instruments (see Iho et al., 2014). The analysis will be closely tied with Task 2.2 which analyses the technological innovations that would help manure spread on a larger field acreage.

Task3.5. (LUKE, UH, AU, SLU) The major policy relevant results for the WP will be discussed and disseminated to end user in a policy brief, as well as for the report "A Baltic Sea Socio-economic Action Plan"..

Deliverables:

D3.1. *SP* Scenarios for livestock development in the Baltic region.M30.

D3.2. *TE:* A policy tool for evaluation of manure nutrient trading, developed in cooperation with end users . M32

D3.3. *SP*, scientific article on farmers choices of subsidy schemes in PoM and CAP.M32.

D3.4. *SP*, scientific article on the results of the game-theoretic modelling .M34.

D3.5.PP: Policy Brief on Agricultural and environmental policy instrument coherence .M34.

D 3.6. *PP* Final input text to the report "A Baltic Sea Socio-economic Action Plan". M 35.

Work package number	4	**Start date:**			Month 1		
Work package title	Policy coherence between climate and water policies in agriculture						
Activity type	RTD						
Participant number	1	**2**	3	4	5	6	All
Participant abbreviation	AU	**UH**	SLU	LUKE	WU	SEIT	Total
Person months per participant:	15,5	**42**	0	3	0	1	61,5

Objectives

- To examine the horizontal and vertical coherence between policies targeting agricultural climate emission to the atmosphere and nutrient loads to the aquatic systems.
- We concentrate our analysis on the *horizontal policy coherence*. We will examine how the key measures and policy instruments designed to promote reduction of climate emissions impact nutrient loads from agriculture. In a similar vein, we examine how the key measures and instruments in agricultural water policies impact climate targets. The aim is to trace out possible synergies and conflicts between key measures and policy instruments and outline the optimal joint policy design.
- Policy coherence is examined from two angles: *optimal policies (top down) and practical (bottom up) policy implementation*. The former entails analytical theoretical work guided by economics and the latter by the theory of governance guided by political science. Case studies in Denmark and Finland illustrate, complement and provide further empirical insights to the analytical work.

Description of work

Task 4.1. (UH) *Optimal joint policy design for climate emissions and nutrient effluents*
Agriculture is a nonpoint source polluter of nutrients to waterways but a point source polluter of climate emissions. Farmers' participation in nutrient reduction programs is either voluntary or mandatory. In addition, both types of pollutants are interdependent via several measures, for instance positively via

fertilizer use and buffer strips but negatively via the choice of cultivation technology (no till) and long-term green set-aside if grass is not harrowed. This task draws on a farm model and examines theoretically how to design vertically coherent joint optimal policies for both nutrient loads and climate emissions when these two pollutants are interdependent. The optimal policy is contrasted to a second-best optimization where both pollutants are regulated independently keeping the control of other pollutant exogenous. Also, the incentives to participate in the voluntary agricultural water protection measures are scrutinized in the presence of mandatory climate policy. All measures and their intensities are linked to both nutrient loads and climate emissions. This task produces theoretical academic contributions, which provide a starting point for practical applications in Task 4.2, where voluntary water policy in agriculture is contrasted to exogenous and mandatory climate policies. The analysis provides a clear picture of how farmers' changing participation in water protection activities, how the protection intensities modify and how reallocation of actions along the catchment area impact the amount of nutrient loads entering the Baltic Sea.

Task 4.2. (AU, WU, UH) *Farmers' preferences and motivation to accept Payment for Ecosystem services related to aquatic and climate policies*

Eco-technological measures can be used to utilise the regulating ecosystem services (ES) of soils and water. Wetland restoration, wetland construction (ponds), set-aside converting arable land to permanent grasslands, as well as buffer zones along waterways and lakes, are measures utilising these regulating services by storage of carbon as well as nutrient retention and transformation (Maes et al, 2013; JRC 2013). Climate and aquatic policies and policy incentives, such as CAP pillar II subsidies, other types of payment for ecosystem services (PES) as well as command and control regulation, provide different incentives for farmers to convert their land to wetlands, buffer zones and set-aside. The CAP subsidies can be regarded PES if and only they deliver the ES. Incentives for the provision of these ES will be explored by two different approaches:i) in task 4.2 by utilising the farm survey results, and ii) in task 4.3 by utilising the data in agent based modelling. In task 4.2, the Common Go4Baltic farm survey, including choice experiments, will be used to elicit farmers' trade-offs between different subsidy schemes and their preferences for measures like creation of wetlands, set aside, buffer zones etc (cf. JRC 2013) or maintain their current practices. This part is coordinated with task 3.2, and will focus on how farmers make the choices, and if there are inconsistencies in the incentives. Incoherent and conflicting incentives aimed at farmers are likely to prevent intended synergies from implementation. From the outset policy objectives might seem to cohere, but farmers may not respond in a way that maintains coherence. The data from the choice experiment in the farm survey will investigate the trade-offs farmers' make, also coordinated with task 3.2.

Task 4.3 (AU) *Agent based modelling of PES.*

In this task the results from the choice experiment will be used to inform the decision making processes in agent based farm models (Rupf et al., 2012; Beharry Borg et al., 2012). An agent based model currently under development for the Danish catchment Limfjorden (Hansen et al, in prep) will be utilized as a framework for demonstrating this concept. By employing a detailed and spatial agent based models for this case study catchment we will explore how different mixes of subsidy and payment schemes, together or without command and control regulation, will motivate farmers to convert their land. The modelling will also address the effects on nutrient and carbon storage and potential differences between the measures in their capacity to capture carbon and to improve the nutrient retention. Another effect of wetlands, beside the effects on nutrient retention which can provide additional support and subsidies for this measure, is flood control by wetlands. The effect of adding subsidies as payment for the flood control effect can be modelled in addition to the carbon storage and nutrient retention.

Task 4.4. (HU) Synthesis as input for the report" A Baltic Sea Socio-economic Action Plan" .

Deliverables

D4.1. *SP*: Research paper on the trade-offs between payments for ecosystem services. M28.
D4.2. *PP.* Policy brief on Policy coherence between climate and aquatic policies towards agriculture. M30.
D4.3. *SP*: Research paper on the optimal coherent water protection and climate policies for agriculture. M34.
D4.4 *SP*: Research paper on the second-best water policies under exogenous mandatory climate policy participation incentives and abatement effort in agricultural water policy. M34.
D4.5. *PP.* Final input text to the report "A Baltic Sea Socio-economic Action Plan ". M35.

Work package number	5	Start date:			Month 1	
Work package title	Synthesis and formulation of recommendations for "A Baltic Sea Socioeconomic Action Plan"					
Activity type	OTHER					
Participant number	**1**	2	3	4	5	6	All
Participant abbreviation	**AU**	UH	SLU	LUKE	WU	SEIT	Total
Person months per participant:	**8**	4	3,2	3,5	2,7	1,5	22 9

Objectives

- To synthesize and disseminate the results from the project, regularly during and in the end of the project, in Policy Briefs.
- To facilitate the scientific discussion among experts and with stakeholders and decision makers in HELCOM, EU and the littoral countries.
- To present the results of the project in a popular-scientific report recommending "A Baltic Sea Socio-economic Action Plan".

Description of work (

Task 5.1.(**AU,**SLU, UH, LUKE) An external and internal webpage will be set up. Policy briefs, arrangements and other results will be communicated on this page. A link to the partners' homepages will be established. The WP leaders will be responsible for uploading results for each WP; and coordinator will be responsible for uploading and announcing policy briefs and arrangements relevant for the project.
Task 5.2. (**AU,** SLU, UH, LUKE) Each WP will be responsible for one or more policy briefs to stakeholders across the Baltic sea littoral countries, where main policy relevant questions and results are communicated. The WP leaders will be responsible for these Policy Briefs in cooperation with WP participants in charge and the Management Board. The coordinator has the overall responsibility for the production and dissemination of Policy Briefs.
Task 5.3: (**AU**, SLU, UH, LUKE, SEIT; WU): Planning project workshops. Each PI will be responsible for either hosting or contributing to a workshop for all project participants, with end users in Tallin (month 20) and Helsinki or Stockholm, (month 28). One of the themes for all these workshops will be dissemination of results to relevant stakeholders. Draft policy briefs from the WP 1,2,3 and 4 will be presented to stakeholders, and discussed.
Task 5.4: **AU**, SLU, UH, LUKE, SEIT, WU): End user conference presenting the synthesis of the project for end users and other experts. Draft of the synthesis report will be launched (explained in task 5.5.)The conference will be held in Copenhagen (month 36).
Task 5.5.: **AU**, SLU, UH, LUKE, SEIT, WU): Based on the discussion of the policy briefs, responses from the scientific community and end users of the results of WP 1 to 4, a synthesis of the results will be made. This synthesis will be presented in a report, with the title "A Baltic Sea Socio-economic Action Plan" (BASAP). The results communicated in this synthesis report will be drafted by the WP leaders and discussed in project meetings, and the status of the work with the different parts of the synthesis will be on the agenda for all project meetings.

Deliverables

D5.1: PP. Homepage. M1.
D5.2: ER. Report from project workshop in Tallinn with invited end users. M20.
D5.3 ER. Report from Project workshop in Helsinki or Stockholm, with invited end-users. M28.
D5.4 RE. Report of the dissemination of 4 policy briefs, made available in WP1-4. M35.
D5.5 ER. Report from End user and expert conference (max 60 participants) in Copenhagen. M36
D5.6 PP. Release of synthesis report: "A Baltic Sea Socio-economic Action Plan". **M36.**

Work package number	6	Start date:				Month 1
Work package title	Management					
Activity type	MGT					
Participant number	1	2	3	4	5	6	All
Participant abbreviation	AU	UH	SLU	LUKE	WU	SEIT	Total
Person months per participant:	5	1,5	1,5	2	0,5	1,5	12

Objectives

- The aim is to guide and manage the project, including both the daily and the strategic management.
- The objective of the strategic management is to ensure the usability of the project's analyses and results, to facilitate end-user communication and to disseminate and to monitor the scientific and interdisciplinary work.
- The objective of the regularly and daily management is to coordinate and monitor that the project activities are in accordance with the DoW and the strategic aims, and to ensure that the use of the financial resources in the project are in accordance with the plan and the Financers' guidelines.

Description of work and role of participants

T6.1 Project management [lead by **AU, contributed by WP leaders and PI's**] The project coordinator (Berit Hasler) is responsible for ensuring that the project is delivered on time and within the budget. The main tasks include:

- Establishing Management board – consisting of coordinator, WP leaders and PIs.
- Monitoring progress in the WPs, collating and submitting scientific, financial and technical reports to BONUS EEIG and national funding institutions
- Overall responsibility for organizing and coordinating annual project meetings, in cooperation with work-package leaders and PIs;
- Guiding, supporting and coordinating the work of WP leaders;
- Initiating and monitoring the implementation of the "Communication plan", the interdisciplinary cooperation between project participants and other experts, including other BONUS projects
- Resolving problems and ensuring good communication throughout the project;
- Establishing and inviting members to End-user Advisory Group (EAG) together with WP leaders and PI's. EAG will be invited for workshops, the end-user conference and WP initiated discussions.
- Representing the project to the wider scientific and end-user communities and liaising with other BONUS projects;

Three annual project meetings will be organised during the project period (kick off and two meetings). Two additional project workshops and an end user conference (approx. 60 participants) are planned; the project workshops are planned for discussions and preparation of Policy Briefs and the report ("A Baltic Sea Socioeconomic Action Plan"). The project meetings will, together with the project workshops, be a platform for all participants to disseminate and discuss project results, agreeing on follow up meetings and discussions, preferably via Skype and videoconferences. The annual project meetings will also be the venue for agreeing on revisions of the plans for the next project year. End users and stakeholders in the EAG will be invited for presentations and discussions during the annual meetings and the workshops, to enable feedback on project results, draft policy briefs and drafts of the content of the synthesis report.

T6.2 Day to day coordination and management (AU-coordinator and WP leaders, PIs)

Tele/videoconferences or Skype meetings will be held regularly organised by coordinator, with participation from WP leaders and PIs. The purpose of these meetings is to discuss and coordinate the progress and cooperation between the WPs, and to ensure the interdisciplinary development. Furthermore scientific and policy relevant issues can be brought up for discussions.

T6.3 Financial administration [**AU-coordinator** with all PIs]

This task includes activities such as financial accounting, monitoring and reporting in accordance with the EU and the relevant national research funders, related to the regulations of the BONUS research programme. Project coordinator sets up internal procedures needed for accounting and financial reporting as specified in the General Principles of the Model Bonus Grant Agreement and other guidance provided by the financers.

Deliverables

D6.1 Periodic progress report I, including minutes from Kick-off. M13.
D6.2 Periodic l progress report II. M 25
D6.3. Periodic progress report III. M 38.
D6.4. Final progress report. M38.

Project participants.

List of participants:

Participant	Person in charge (PI)	Key personel	Roles in the project
AU	Berit Hasler, senior researcher, head of section, environmental economist. Coordinator PI AU WP lead WP 5 and 6 Contribution to WP1, WP2, WP2 and WP4.	Hans Estrup Andersen, senior researcher (WP leader WP1), Gitte Blicher Mathiesen, senior researcher, Pia Frederiksen, senior researcher, head of sec. Helle Ørsted Nielsen, senior researcher, 1 NN post doc, policy analysis 1 NN post doc, economics	Provision of catchment datasets, contribution to integrated modelling at catchment and Baltic wide scale (WP1,WP3,WP4,WP5,WP6) Policy analysis, case studies of farmers (WP2,WP3,WP4) Policy analysis, farm survey WP1, WP3, WP4. Innovation WP2 Farm survey WP1, WP3 and WP4, policy instrument choices, Farm survey, choice experiment, cost minimization modelling (WP1,WP2,WP3,WP4)
SLU	Katarina Elofsson, associate professor, environmental economics PI SLU Lead WP2. Contribution to WP5 and 6.	Torbjörn Jansson, associate professor, economic modeller. Ing-Marie Gren, professor, environmental economics. NN PhD student, environmental economics	CAPRI modelling linked to catchment and marine models (WP1, WP2, WP3, WP5). Results used in WP4. Cost-minimization modelling, regulations (WP1,WP2,WP5) Cost-effectiveness, economic technology analysis and modelling (WP2,WP5)
LUKE	Antti Iho, Prinsipal research scientist, environmental and agricultural economics. Lead WP3, contribution to WP4, WP5 and WP6.	Sami Myyrä, professor Lassi Ahlvik, mathematical economics, Phd student, Yulia Pavlova, principal research scientist, mathematical economist. Olli Niskanen PhD – student, Environmental spatial economics.	Agricultural economics (WP3) Game theoretic modelling , cost-minimization and effectiveness, marine modelling (WP1,WP3,WP5) Game theoretic modelling (WP3) Economic and geospatial modelling (WP3,WP4,WP5)
UH	Markku Ollikainen, professor, environmental economics PI HU Lead WP4, contribution to WP 5,	NN PhD student, environmental economics	Agri-environmental modelling including GHG measures, modelling, theoretical modelling. (WP4,WP5,WP6)

	WP6		
WU	Tomazc Zylich, professor, dean, Environmental economics, PI WU Game theory WP3. WP5,WP6.	Mikolaj Chajkowkij, associate professor.	Environmental economics, contribution to farm survey, choice experiment. Design and data analysis. (WP1, WP2, WP3, WP4, WP5)
SEIT	Kaja Peterson, , PhD, Programme Director	Tea Nõmmann, Director Helen Poltimâe, PhD, economist Piret Kuldna, MSc, policy analyst	Agricultural and Environmental economics and policy, contribution to farm survey (WP1, WP2, WP3, WP4, WP5, WP6)

The Go4Baltic project proposal builds on interdisciplinary collaboration and networks developed within the former BONUS project RECOCA(Wulff et al 2014), BalticSTERN (Hyytiäinen et al., 2014; Ahtiainen et al., 2013, 2014; Hyytiäinen and Ollikainen, 2012) and the the Baltic Nest Institute (BNI) (Hasler et al 2014).) The Go4Baltic will, with its focus on new interdisciplinary research on policy instruments and policy integration, extend the research area of these networks, and at the same time build on the extensive knowledge of interdisciplinary research within these networks. The Go4Baltic consortium includes solid skills and experiences in delivering interdisciplinary policy relevant advice and recommendations for reductions of the eutrophication in the Baltic Sea in coherence with climate and agricultural policies. Although the project will use and develop interdisciplinary approaches integrating natural and social science approaches the primary strength of the project and the project participants is the strong focus on social science methods, as these are necessary to understand, examine and propose changes in policy mixes and instruments, where the efficiencies are dependent on both the ability to target the pollution, to the least costs, but also of the adaptation of the policies among the regulated agents. By having this focus Go4Baltic will also develop new interdisciplinary cooperation between social science disciplines – political science and policy analysis, sociology, geography and economics.

The coordinator of the project, Berit Hasler, is experienced in leading research projects both as project leader, WP leader in larger projects and as Head of section at the Department of Environmental Science (AU). The members of the Management Group (MG) are also experienced with this type of interdisciplinary, applied projects. The MG constitutes of the WP leaders and the PIs from each of the institutions, and the MG group constitutes the main decision-making and management body of the project. WP leaders are in charge of their respective WPs, and the decision making process is structured around regularly project meetings, management board (MB) meetings and WP meetings, where the main foci are knowledge sharing, progress and the common dissemination for end-users .

End user involvement

An End-User advisory group (EAG) will be established consisting of both experts and organizations representing end-users with a broader perspective on the Baltic Sea development and policies.
National end users from ministries and organizations will be approached during the study, and invited to workshops and meetings.

The end-user involvement in the project will be emphasised by:

Discussing and identifying important end-users at the Kick-off meeting

i) Inviting end users such as HELCOM and BSAG to participate in the EAG. BSAG has accepted the invitation, and there has been one meeting with the HELCOM Secretariat where interest was expressed and also a possible link between the project and the coming HELCOM Holistic Assessment II (HOLAS II) was identified. This is considered an important use of the results from Go4Baltic.
ii) Establish cooperation with the BalticEye at Stockholm University, led by professor Christoph Humborg and funded by the Baltic 2020 foundation. Baltic Eye offers Go4Baltic to use the communication platform for end-users established by Baltic Eye, and use this for contacts to the European Commission and other end-users. Baltic Eye is invited to participate in the EAG.

iii) National ministries, farmers organisations etc. are also potential end-users that will be contacted throughout the project, some of them in cooperation with Baltic Eye, National ministries will be invited to participate in workshops and the End-user conference(cf. WP5).
iv) End users will be invited to the end-user conference in the end of the project period, and the identified end –users (subject i)) will receive the policy briefs.
v) The policy briefs from the WPs will be disseminated to end-user, and also be used for articles in newspapers and popular scientific journals, and hereby a wider range of end-users might be reached, as well as the wider audience in the countries involved.

In addition to the mentioned end-users (BSAG, HELCOM and BalticEye, as well as chosen representatives from national Ministries) the EAG will consist of experts who have interest in Go4Baltic and experience of interest for Go4Baltic. The experts will be invited from other BONUS projects and Baltic wide projects. Experts have been contacted and approved their interest in participation.

To ensure cost-effectiveness regarding the advice and communication with end-users this group shall however not be too large (approximately 10 members). All EAG members will be invited for workshops, special sessions of the annual project meetings and for the end-user conference in the end of the project. The end-user conference will be open for more participants, including the national and international end-users mentioned above. The results are also disseminated in four policy briefs and a synthesis report presenting the recommendations for "A Baltic Sea Socio-economic Action Plan".

Support activities

To efficiently transfer results and recommendations the project organizes two workshops (WP5) directed to end-users. These two-day interactive workshops will allow for knowledge transfer from the project participants to the end-users but the main idea with the workshops is also to facilitate discussions and mutual learning, feedback on project results, draft policy briefs and drafts of the content of the synthesis report. The project will cover the costs of the workshops, but the participants are assumed to cover their travelling and accommodation costs. Meals will be organized for the participants, and efforts will be made to create a creative and good atmosphere for the networking among researchers and the end-users. The decision on the workshop venue will be made based on the accessibility and attractiveness of the location to workshop participants, availability of accommodation and the

overall costs, and if possible the workshops, as well as the annual project meetings, will be hosted by the participants' institutions (but paid by the project). The End-user conference will be arranged in Copenhagen in the end of the project, for approximately 60 participants. The synthesis of the work in the report "A Baltic Sea Socioeconomic Action Plan" will be the theme for this conference. The synthesis report will be discussed during the whole project duration to ensure that the project results will present usable recommendations for the use and development of policies in the Baltic Sea-region. Final inputs from each of the work packages are planned as inputs to the report. It will form the red thread of the work.

Policy relevance and potential end-users

The policies in focus for the Go4Baltic project proposal are The Baltic Sea Action Plan (BSAP), the EU freshwater and marine policies (WFD and MSFD), their national implementation, agricultural policies (CAP implementation and national policies) and climate mitigation policies. These policies are chosen due to their importance for the Baltic Sea region, but also for the potential conflicts and synergies that may arise in their implementation.

In 2013 HELCOM issued a revised set of nutrient load reduction targets for each of the Baltic Sea 7 sea regions, as well as for each of the 9 littoral countries (HELCOM a,b), and the fulfilment of these targets will be costly (Hyytainen et al 2014, Gren et al 2013, Hasler et al 2012, Ahlvik et al 2014). The achievement of good ecological status as demanded by the WFD has also proved to be costly and demanding, and both HELCOM and the EU Commission pay attention to how increased coherence and synergies can be achieved between the CAP and WFD. The research team in the Go4Baltic proposal aim to explore how the nutrient loads and GHG emissions might develop under different scenario assumptions for agriculture, modelled by CAPRI and linked to SWAT models that measures the resultant nutrient leaching, the retention of the nutrients and the resulting nutrient loading to the 7 Baltic Sea regions, as well as the GHG emissions and carbon storage. These results are policy relevant both for international end users in HELCOM and other Baltic Sea organisations, as well as for national end users in the Baltic Sea countries. These end users pay an increasing interest to how cost-effective policies can be achieved, both at international and national level. Cost-effective implementation solutions for the BSAP targets will be provided by consistent use of three different cost-minimisation models where we will utilise their comparative advantages and provide consistent advice on the total costs and cost-effective choice of measures based on the available models (Gren et al 2013, Ahlvik et al 2014 and Hasler et al 2012). By including GHG emission reductions and also the effect of carbon storage in the same models we can also examine trade-offs between climate and nutrient policies.

In Go4Baltic we aim at examining the current implementation of nutrient reduction and climate policies, and compare and evaluate this implementation against the prediction of the most cost-effective policy options. We also aim to examine the incentives for technological development and innovation, e.g. in the livestock sector w.r.t incentives for innovative nutrient handling technologies. This has large focus in HELCOM; and is also considered important in many of the countries, and the results will therefore be policy relevant at both international and national levels. Examinations of the economic -and other determinants that influences the uptake of measures and subsidy schemes have been studied in the past, but continued and new interest have been given to this area in terms of how synergies between CAP and the WFD can be further developed. There have been much focus on the measures, and lesser on the necessary instruments to implement measures. Knowledge of how farmers might react and trade-off between different policy mixes and subsidies are relevant in this context, and in particular how livestock farmers might react to policies to regulate the use and utilisation of livestock manure. Go4 Baltic will produce new knowledge about farmers' uptake of measures as well as the economic incentives to improve the utilisation and nutrient recycling by e.g. manure trading.

There is also an increasing focus on climate mitigation policies in agriculture (in climate policy terms: land-use, land-use change and forestry sector, LULUCF). The set of mitigation measures in agriculture to reduce GHG emission is large, and some measures promote at the same time reduction in nutrient runoff but some others may increase nutrient loads. These trade-offs will be examined, especially farmers' behaviour and choices when they navigate in a mixed systems of mandatory and voluntary requirements for the regulation of both nutrients and climate. In this context the increasing attention to how ecosystems functions and ecosystem services can be both valued and utilized, is of importance, as this is an entrance to new subsidy schemes for e.g. farmers, where they can be offered payment for ecosystem services (PES). Knowledge about how the heterogeneous agricultural sector in the Baltic region might react and choose between measures and subsidies is relevant for coherence between these different policies.

By engaging with end-users in workshops by disseminating results, policy brief, and the synthesis report "A Baltic Sea Socioeconomic Action Plan" we aim at disseminating the results of Go4Baltic, which we assess is of large relevance for the international organisations such as HELCOM, the Ministries in each country as well as for organisations for agriculture and environment in each of the littoral countries. The results will also be presentated at the end-user conference in the end of the project. In addition to these dissemination activities we will use the project homepage and the institutions communication offices to disseminate our results to the wider public. The partners' national networks will also be used for dissemination.

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