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Cooperating for sustainable regional marine governance

The case of fisheries and nutrient runoff from agriculture to the Baltic Sea,
Synthesis report

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Acronyms

AC	Advisory Council
AES	Agri-Environmental Schemes
BNI	Baltic Nest Institute
BOA	Board of Agriculture
BSAC	Baltic Sea Advisory Council
BSAP	Baltic Sea Action Plan
BSR	Baltic Sea Region
CAP	Common Agricultural Policy
CCB	Coalition Clean Baltic
CFP	Common Fisheries Policy
CPR	Common Pool Resource
EAM	Ecosystem Approach to Management
EC	Epistemic Community
ENGO	Environmental Nongovernmental organisation
ES	Eutrophication Segment
EU	European Union
GDP	Gross Domestic Product
GES	Good Ecological Status
HELCOM	Helsinki Commission
ICES	International Council for the Exploration of the Sea
IEA	Integrated Ecosystem Assessment
IPCC	Intergovernmental Panel on Climate Change
LRF	Federation of Swedish Farmers
MARE	Marine Research Eutrophication

NGO	Non-Governmental Organisation
NIP	National Implementation Plan
PES	Payments for Ecological Services
PP	Precautionary Principle
STS	Science and Technology Studies
TAC	Total Allowable Catch
WWF	World Wildlife Fund

Summary

This research project has targeted two key challenges to the ecological integrity of the Baltic Sea, eutrophication (too much nutrients) and overfishing. The point of departure has been the overarching assumption that cooperation – within as well as between local, national and transnational levels – significantly influences environmental governance outcomes. Methodologically, the broad concept of cooperation was disaggregated into three components: Interests, knowledge and management, arguing that actor interests, use and availability of knowledge, and organisation of measures to improve maritime environments all matter. Empirically, four sub-case studies addressing these components at the three governance levels were selected: Farmer perspectives (local level), Epistemic communities and media framing (national level), and regional collaboration to reduce eutrophication (transnational level). The Baltic Sea was chosen as case study area, because of its ecological vulnerability, diversity of ecosystem services, and history of cooperation among the Baltic Sea countries. Even though results from case studies cannot be generalised to other empirical settings and contexts, outcomes from this project most likely are of relevance also for other regional seas.

At an overarching level, the results of this research project support the claim that cooperation at all levels is pivotal for sound governance, whether among users and stakeholders at local levels, within or between countries. However, this claim needs to be qualified, because (a) cooperation is not inherently good, but only when it is voluntary and directed towards environmental improvements (form), and (b) identified targets and objectives are most effectively and efficiently reached in cooperation (objective). This means, among other things, that group composition becomes a key parameter in relation to the *form* of cooperation. At transnational levels, for example, it is not necessarily the case that reduction of nutrient leakage to the Baltic Sea is most effectively undertaken – overall and in parts – in form of all Baltic Sea countries collaborating on equal footing. Sometimes it can

be preferable that sub-groups comprising proactive countries take the lead, rather than risk to be held back by lowest common denominators within the larger group. Furthermore, creative cost-sharing schemes can unlock negotiation stalemates, provided that sufficient degrees of legitimacy underpin reached upon agreements. Arguably, sound governance requires that collaborative schemes are not embarked upon, when action to reach the identified *objective* more effectively can be taken without such schemes or can be undertaken within already existing structures. For example, it has been showed in this project that a complex regulatory web on eutrophication abatement exist at the transnational level, comprising HELCOM initiatives and recommendations, as well as many different EU directives, strategies and policies. Arguably, a key challenge will be to further scrutinise these structures, and distinguish between when cooperation could improve governance outcomes, and when policy and management diversity among the Baltic Sea countries is positive and constructive.

Uncertainties play crucial roles in environmental governance. It has been shown in this project that it can be fruitful to distinguish between ontological and political uncertainties. When there are substantial uncertainties regarding the severity of a potential threat to ecological integrity (large ontological uncertainty), policymakers need to carefully assess sometimes are conflicting scientific advice, and adoption of the Precautionary Principle may be appropriate. If, on the other hand, major uncertainties concern preferences and strategic considerations of other actors (governments, stakeholders, NGOs and others), focus must be placed on how to reduce and harness such political uncertainties. In many cases, policymakers face complex combinations of ontological and political uncertainties, which makes appropriate governance challenging.

Although stakeholder participation is an integral part of most governance frameworks, this project has shown that conflicting views among key stakeholders can lead to “trembling” in transnational negotiations on environmental cooperation. National stakeholders and interest organisations are strategic actors, and they are likely to adopt positions that promote specific rather than general interests. In competitions over how environmental threats such as Baltic Sea eutrophication and overfishing are framed and communicated in mass media, conflictual positioning between actors may surge, which in turn can lead to trembling; governments become uncertain on which positions to adopt in transnational negotiations. Such trembling may lead to negotiation failures or sub-optimal outcomes. However, rather than attempting to curb competition over framings among

stakeholders, a more effective way to reduce trembling can be for public authorities and policymakers to interact with key stakeholders on a continuous basis in order not to be surprised over how they strategically choose to frame problem areas when negotiations are approaching.

Environmental taxes and subsidies have become major policy tools in most countries' governance frameworks. Influencing actors' behaviour with strategically designed monetary incentives is often effective and efficient, but this research project has shown that changed monetary incentives sometimes interact with sectoral and ideological norms in complex ways. The results indicate that such norms may counteract strategically designed monetary incentives if norms and monetary payoffs are in conflict. Therefore, monetary incentives should, if possible, be carefully attuned to norms and perceived legitimacy related to, for example, farmer responsibility to produce food and to maintain the productivity of farmlands, in order to improve governance outcomes. However, because of the complexity of interactions between economic incentives on the one hand, and norms and legitimacy on the other, this topic requires additional research efforts. If economic incentives are not carefully designed and adapted to local and sectoral contexts, such schemes may crowd out valuable norms that will not be easy to restore.

The results from this research project illustrate that governance of marine environments is challenging, because of the abundance of variability among, and interactions between, ecosystem services, governance layers, actor interests, types knowledge and uncertainties, and management options. Although scientific knowledge by nature aims for generality, contextual variability and uncertainties call for governance frameworks that aim to integrate systemic factors, but allow for idiosyncratic and context-dependent variability.

1. Introduction

Most contemporary marine environmental problems are transnational in character. This implies that cooperation between states is required for effective management of natural resources as well as for reducing pollution. While global treaties cover a variety of environmental disturbances, regional initiatives can often provide complementary structures in terms of closer cooperation in smaller, and typically more homogenous, groups of countries. However, a shared concern for the marine environment among a group of countries does not necessarily imply that all *individual* countries have motives to respond positively. It can be tempting to free-ride on others' contributions in order to benefit from environmental improvements such as a cleaner Baltic Sea, without having to incur the cost of such efforts. However, if all countries attempt to free-ride, no improvements will be forthcoming, and all countries are likely to be made worse off than if they had cooperatively redressed the shared concern or problem.

To address collective action problems comprising free-riding, easy-riding and under-provision of collective goods, effective institutional structures for collective action need to be in place. The design of such institutions must be carefully adapted to context-dependent norms, uncertainties, knowledge gaps and communication barriers. Moreover, stakeholder inclusion in decision-making as well as implementation processes is often described as imperative to ensure that these context-sensitive design conditions are met and robust governance outcomes likely.

This report brings together findings from the research project *Cooperating for sustainable regional marine governance – the case of fisheries and nutrient runoff from agriculture to the Baltic Sea*, funded by the Foundation

for Baltic and East European Studies and carried out 2013-2018.¹ The overarching ambition in this research project was to identify and analyse underlying incentive patterns, normative ambitions, and cognitive structures – all of which, may hamper or facilitate transnational cooperation on threats to Baltic Sea ecosystems. However, to better understand such abstract structures, two case-study areas were selected to shed light on more general phenomena. Thus, this report summarises and synthesises factors that were found to condition, or in other ways influence, regional environmental cooperation, using management of nutrient leakage (eutrophication) and fisheries as empirical examples. Furthermore, the ambition has been to reflect upon the possible implications of results and to discuss how the findings of this research project can be useful in future regional marine governance.

The analysis adopts a multilevel and multidimensional perspective, emphasising interactions among drivers, mechanisms and institutions at transnational, national, sub-national and local levels. Focus is placed on state interests, framing of environmental problems, the roles of norms, and stakeholder participation in policy formulations and implementation processes. More specifically, it is analysed how eutrophication mitigation efforts and fisheries management in the Baltic Sea are influenced by (a) transnational environmental cooperation within the Helsinki Commission institutional framework, (b) knowledge, uncertainty and the roles of science, (c) mass media framings and (d) mechanisms to influence norms and behaviour among local end-users.

The Baltic Sea was chosen for this study primarily because of the limited number of littoral states, the long record of institutionalised cooperation on environmental issues, and the vulnerability to many forms of ecological disturbances. The limited number of countries facilitates the analysis of incentive structures among governments. The long history of the Helsinki Commission (HELCOM) dating back to the mid-70s, together with the increased importance of the EU in the region after the latest round of enlargement in 2004, makes it possible to analyse comparably mature institutional structures, as well as less formal interactions. Arguably, the ecological vulnerability of the Baltic Sea implies a high degree of policy relevance because increased pollution loads or heightening of other stress factors are likely to lead to substantial losses of ecosystem services. Possibly, some of these

¹ The following articles and reports were published as results of this research project and have been used as the primary material in this synthesising report; Hassler (2015; 2016), Saunders (2015; 2016), Saunders et al. (2017) and Jönsson & Karlsson (2016).

changes will be irreversible. The case of eutrophication was selected for several reasons, the most important being the priority placed on this issue among the Baltic Sea countries and the availability of data at both regional and national levels. In contrast, fisheries represent an interesting case because it concerns more of a direct resource use issue compared with eutrophication and represents a sector where the EU has exclusive competence in most aspects through its Common Fisheries Policy (CFP).

This report continues as follows: After a brief section on method and material, a theoretical framework is elaborated building on the concepts of interest-based, knowledge-based and managerial cooperative components. This framework is then used as a tool to structure the analysis of the empirical cases. Thereafter, a section follows where an integrated perspective on regional environmental cooperation is elaborated. The report concludes with some reflections on how this research project has contributed to the understanding of regional environmental cooperation more broadly, the policy implications that can be inferred and areas are identified where further research is needed.

2. Method and material

Although the methodological approaches that have been adopted in the individual studies that this report synthesises vary, they share a common trait of being qualitative. This means that it has not been possible to generalise results by drawing inferences from sample to population. Instead, focus has been placed on selection of cases that have been found to be salient, policy relevant and complex, and at the same time shed light on the role of cooperation on Baltic Sea fisheries and eutrophication. In order to more precisely define these cases, spatial and temporal boundaries have been used, based on their analytical value, availability of data, and other practical factors. The analytical value of the case is closely connected with potential for *analytical generalisation*. In contrast with statistical generalisation, an analytical (or theoretical) generalisation can be made when a case study, comprising one or several cases, is used to substantiate, or have a bearing on, a theoretical claim (Yin 2018). In this research project, the overarching theoretical claim has been that cooperation – between individuals, groups or states – potentially can improve environmental governance and sustainability. Furthermore, the claim is made that significant aspects of such cooperation can be validly captured by the conceptual components *actor interests*, *knowledge* and *management* and that cooperative structures are likely to differ between governance levels and type of actors. This deconstruction of the overarching concept of cooperation facilitates both identification of key factors that influence how cooperative structures evolve and the subsequent analysis of how these factors influence the effectiveness of the cooperation undertaken (Stokke 2012)

Within the two cases of eutrophication and fisheries, focus was placed on cooperation among governments, interaction between sector organisations and ENGOs (Environmental Nongovernmental organisations), and between individual stakeholders and public authorities. To address variation in governance levels (individual, domestic and transnational) and empirical

study area (fisheries and eutrophication), as well as in cooperation components (actor interests, knowledge and management) a wide range of case study settings that would facilitate credible engagement in theoretical claims were drawn upon (Table 1).

Table 1. Sub-cases selected to shed light on dimensions of actor interests, knowledge and management.

Theoretical dimension	Governance level	Empirical sub-case
Actor interests	Transnational	Eutrophication, transnational cooperation
Knowledge	Transnational & domestic	Eutrophication & fisheries, group
Management	Local	Eutrophication individual farmers

2.1 Transnational levels: Actors interests and roles of knowledge (eutrophication and fisheries)

Transnational cooperation on eutrophication was selected as a sub-case to illuminate the role of actor interests primarily because data on costs and benefits from reduced nutrient leakage are available at the national level. This means that depending on how cost-sharing schemes are designed and how ecosystem services benefit countries, reasonably clear national interests can be attributed. From an actor's interest perspective, individual nations can be assumed to prefer low contributions in cost-sharing schemes. However, suggesting too low contributions in such negotiations is likely to reduce others' willingness to contribute and since substantial parts of the benefits from less pollution are collective goods, nations must balance reduced costs with how this influence others' willingness to contribute. Thus, strategic situations emerge where actor interests and interdependence clearly frame decision-making.

Apart from previous scientific studies and various reports, National Implementation Plans (NIPs) of the Baltic Sea Action Plan (BSAP) comprised the empirical material used in the study on transnational collaboration on reduction of eutrophication. These NIPs were submitted to the Helsinki Commission in accordance with the BSAP agreed upon in 2007. The NIP texts from all Baltic Sea countries were analysed using qualitative text analysis, where the reports were first read carefully and preliminary themes were developed. Thereafter, all reports were carefully read again to corroborate the preliminary themes. Country profiles were finally written,

where the relevance of each theme for every country was delineated. It should be noted that the NIPs were structured in quite divergent ways, because no clear guidelines were provided by the Helsinki Commission. Some reports were detailed, others were not, and some seemed to build on other reports that had been written for other purposes. However, since the reports were published at the homepage of the Helsinki Commission and thus readily available, the reports were analysed more as conveyors of information on how the Baltic Sea countries framed national implementation of the BSAP, than as detailed apolitical accounts on national investments and strategies.

Effective science/policy relationships have been essential in addressing issues of cooperation in relation to institutional responses to complex environmental governance questions such as eutrophication and fishing. There are however, different views on how relationships between scientific/expert knowledge and interest-based politics do and should underpin environmental governance practices. To examine these relationships and their implications for cooperation, the contrasting theoretical frameworks of Science and Technology Studies (STS) and Epistemic Communities (EC) were applied to fishing and eutrophication to assess what explanatory value they had in each issue area given their different issue characteristics, institutional arrangements and political urgencies.

A combination of methods was applied in the case studies including document analysis of a wide range of relevant academic literature, policy documents and meeting minutes linked primarily to HELCOM and ICES. Empirical understandings through these sources were expanded and verified through participatory observation at relevant meetings, as well as by formal and informal interviews with actors of the respective expert communities. Linked to the eutrophication case, participatory observations and informal interviews with 15 key scientists and HELCOM representatives were performed during 2011–2016 at scientific conferences and policy events. In addition, a roundtable with invited experts and decision-makers was arranged in 2013 on Swedish Environmental Quality Objectives (where eutrophication was one topic covered), as well as two panel discussions with invited experts at the annual Swedish politician and expert events in Almedalen (2015 and 2016). Furthermore, an in-depth semi-structured interview was undertaken (2015) with a Swedish university scientist with extensive experience in eutrophication science and policy in Sweden and the BSR. The fisheries data presented were derived from long-term ethnographic field study, including document studies of policy papers, meeting minutes, reports and correspondence, 27 semi-structured formal interviews and numerous

informal interviews and communications with Advisory Council (AC) stakeholders, involved scientists and policy-makers, as well as, participatory observations of 29 AC meetings held between 2008 and 2015.

2.2 Domestic level: Mass media and interest organisations (eutrophication)

At the domestic level, the main focus in this project was placed on analyses of media framings of eutrophication in Sweden and how such framings can influence regional cooperation aimed to improve the ecological status of the Baltic Sea (Jönsson & Karlsson 2016). A combination of quantitative and qualitative text analysis methods was applied to printed media material on BSAP and eutrophication in 2012-2013. Furthermore, reports and position papers were analysed and a series of interviews were conducted. The analyses included printed media (paper and digital) local and national newspapers, journals and magazines from organisations and authorities, and web news. However, in-depth analyses were limited to newspapers. Using the search engine “Retrieve”, various combinations including “HELCOM” and “BSAP Baltic Sea” were used to find relevant articles. All identified articles – 124 in total – were analysed in order to identify frames and frame elements (topics, sources, main problems, causes and solutions) related to Baltic Sea eutrophication. In order to capture frame building processes, in-depth analyses were carried out on three articles from major Swedish newspapers (i.e., Dagens Nyheter and Aftonbladet). To gain additional understanding of stakeholder perspectives, four representatives from environmental non-governmental organisations, the business sector, and governmental authorities were interviewed (2015) on issues related to positions advocated, framing strategies, views on media and on other stakeholders’ positions and activities, and reflections on cooperation and governance. Thus, the methodology adopted made it possible to identify positions, strategies and frames in the Swedish public discourse and among some of the dominating actors.

2.3 Local level: Farmer norms and incentives in management (eutrophication)

The relationship between agri-environmental payments and the role that different farming norms played in a willingness among divergent farmers to change farming practices towards reducing nutrient run-off and therefore mitigating eutrophication were examined. Key aims of agri-environmental

schemes are to steer farmers' behaviour and create norms towards more sustainable practices. This approach however largely disregards other aspects of farmer identity and the stickiness of existing norms closely linked to some farmer's dispositions, what Bourdieu calls habitus, which may limit the willingness of farmers to voluntarily reform practices, even with monetary incentives. One way to examine this was to look at how different types of farmers – conventional and alternative farmers – reflect on what they see as 'good farming' practices while considering the links between agri-environmental schemes and adoption of environmental practices, particularly in relation to nutrient run-off.

In addition to a review of relevant academic literature and policy documentation, the empirical material for this research was drawn from ten in-depth semi-structured interviews with five alternative (organic) and five conventional farmers. Representatives from The Federation of Swedish Farmers and the Swedish Board of Agriculture (BOA) were also interviewed. A variety of land ownership, management arrangements and farming interests were represented by the 10 farmers interviewed, reflecting a diversity of farms. The semi-structured interviews with farmers focussed on understanding how different farmers developed notions of the 'good farmer' and how this related to their experiences and views about their own farming practices and the environment. This involved collecting views and experiences from farmers concerning: (1) traits/ characteristics/symbols that constitute a good farmer; (2) current agricultural policy regarding environmental regulation and voluntary schemes and (3) interrelations between organic and conventional farmers. The questions put to the two institutional actors varied somewhat to those asked of the farmers. The BOA representative provided information about the content and direction of Swedish agro-environmental schemes and the farmers' representative spoke in general terms about the direction of agri-environmental policy, particularly in relation to water pollution/nutrient run-off.

3. Three cooperative components: Interests, knowledge and management

To capture the diversity of factors influencing environmental regional governance at different levels, several theoretical perspectives are drawn on in this report. However, to improve analytical clarity, three broad cooperative components are first elaborated theoretically (Stokke 2012). These three components are then brought together into an integrated theoretical framework. The individual components, as well as the full framework, are then used as tools to guide the analysis of cooperative structures in Baltic Sea eutrophication and fisheries management.

From a regional policy perspective, the governments of the Baltic Sea littoral states are the most important actors, while the EU together with various international treaties comprise additional key regulatory structures. The states are understood here as so-called *composite actors*, that is, actors that in fact comprise a multitude of smaller groups, factions and stakeholders, apart from the national government. States, as composite actors, are assumed to be sufficiently institutionalised to adopt agency, that is, to act strategically to promote state interests. However, unlike unitary actors, composite actors can be riven by internal tensions between political factions, stakeholder organisations, NGOs, and other domestic groups, which means that consistent agency – effective ability to influence outcomes in a desired direction – can be compromised. Thus, whether a composite actor is able to coherently promote well-defined state interests has to be assessed from case to case. Sometimes, internal tensions lead to collective action failures and outcomes that may seem to be at odds with state interests. Nevertheless, and without diminishing the importance of various stakeholders, governments ultimately decide whether to sign treaties and other agreements. Thus, the key role of governments in regional policy-making must be incorporated in the analytical framework.

To understand cognitive and political underpinnings of regional environmental statecraft – why some issues become salient and objects for regulation and action programmes while others are hardly discussed at all, the roles of science and media need to be carefully considered. An important aspect of science’s influence on environmental cooperation concerns if epistemic communities have emerged to address environmental policy problems. These communities of experts tend to influence policy-making in transnational settings, especially if there is an effective consensus on the causes behind the observed problem and on the most appropriate remedies. However, the impact of epistemic communities does not only depend on their internal coherence, but also on the type of problem in focus and to what extent other groups are able and willing to mobilise. An argument can be made that the complexity of interfaces between science and politics so far may have underestimated in the Epistemic Communities approach.²

It is assumed in most of the Epistemic Communities literature that scientific process benefits from keeping politics at a distance, because this reduces risk of bias. In contrast, approaches in Science and Technology Studies typically suggest that it is not possible to separate scientific advice from politics (Saunders et al. 2017). In fact, attempts to conceal interlinkages between science and policy can make it harder to elaborate legitimate and implementable management strategies. Components from both Epistemic Communities and Science and Technology Studies literatures will be used in the analytical framework in this report to capture the breadth of cognitive aspects in Baltic Sea environmental cooperation.

The role of *mass media* may influence regional cooperation in many ways, although few regional media have yet been established. Environmental disturbances such as eutrophication and over-fishing can consciously or unconsciously be differently framed, and thus influence public perceptions in different directions. Typically, interactions between mass media and citizens are assumed to be interactive; Media can both reflect and influence public perspectives (McNair 2011). In terms of media influence over political processes, media can contribute to how a problem is represented and to tone the discussion that is established about problem. Both of which may

² In similarity with Pielke (2007), politics and policy are used as two distinct concepts in this report, where politics primarily refers to competition over distributional issues (“who gets what”) and policy primarily refers to strategies to implement the decisions taken. However, while this distinction may be reasonably clear in theory, things are typically less clear-cut in reality, which is a key topic brought up in this report.

have implications for the urgency and design of policy responses (or indeed, whether there is a policy response at all). Furthermore, media can influence key actors' strategies as well as influence their legitimacy among readers, listeners and viewers (Wolfsfield 2001).

Implementation of transnational agreements and states' compliance with treaties can be assumed to be influenced by underlying incentive structures, which in turn are formed by actor preferences in relation to perceived and actual contextual circumstances. From a transnational collective action perspective, states are assumed to be most concerned with promoting national interests. Therefore, distribution of costs and benefits from reduced pollution or reduction in fishing effort among states needs to be mapped in order to understand how national interests may vary. For example, the biophysical nature of a particular ecological disturbance can profoundly influence states incentives to undertake remedial action, depending on perceived net benefits from such measures.

However, a case can be made that the effectiveness of treaties and action programmes ultimately depend on the behaviour of *individuals*, be it consumers, farmers or fishers (Stokke 2012). From a policy perspective, individual behaviour can principally be influenced in three different ways; through formal regulation, economic incentives or information/knowledge sharing. All three mechanisms typically become more effective if a particular action or concern is not only influenced by changed incentives, but through change in norms as well. If norms change in the desired direction, the need for monitoring, enforcement and public information is reduced, which in turn typically reduces management costs. This may be particularly important in some cases, where effective management is either excessively costly and/or extremely difficult to undertake. Therefore, environmental policy change is typically aimed at both direct behavioural change and at long-term change in norms.

The theoretical perspectives briefly referred to above will now be elaborated upon. A theoretical framework will be constructed and subsequently used as an analytical tool to structure narratives on eutrophication and over-fishing in the Baltic Sea.

3.1 Interest-based cooperative components: Policy-making in transnational settings

Although *state interests* in isolation cannot fully explain the complexities of transnational environmental interaction, these interactions cannot be under-

stood without such a component (Barrett 2005; Sandler 2004). Unanimous, or almost unanimous, consent is typically required before treaties, action plans, and other forms of international agreements can enter into force, because countries cannot be forced into acceptance or compliance. Stable institutional structures that facilitate cooperation among states can often facilitate reaching agreements. However, without an adequate assessment of how governments value costs and benefits connected with different outcomes, for example regarding stricter requirements on nutrient leakage reductions or lowered fishing quotas in the Baltic Sea, regional coordination of national policy-making cannot begin to be grasped. Furthermore, without realising the complex relationships between collective goods and incentives for states to free-ride, failures to realise mutually beneficial outcomes in transnational negotiations can seem quite incomprehensible.

When adopting a systemic approach as a complement to individual state interest-driven models, *adaptation* becomes a key concept in addressing how effects upon ecological systems caused by human activities may change cost and benefits from mitigation efforts, and thus feed into collaborative structures. For example, the more apparent negative consequences from nutrient leakage into marine habitats become, the more urgent and salient the issue typically will become among decision-makers (Andresen et al. 2000). Thus, unexpected changes in the functioning of marine ecosystems, new knowledge, new substances entering the marine environment, and accidents such as oil spills may induce changes in requirements, regulations, strategies and policies (Hassler 2014). However, such shifting circumstances at regional levels seldom translate into national policy changes in straightforward ways because impact on national interests typically vary among countries and temptations to free-ride can lead to collective action dilemmas (Hardin 1982).

The formation of state interests is seldom problematised in interest-based approaches building on rationality and utility-maximising assumptions. Instead, they are simply assumed to reflect how benefits and costs from measures taken are distributed among countries. However, what matters is not so much some kind of “objective” account of state interests, but rather governments’ *subjective* perceptions of what is in their best interest. These subjective preferences can be assumed to be based on actual outcomes but are also influenced by factors such as inadequate information, uncertainties, stakeholder pressures, issue linkages, and various forms of domestic and international policy and political considerations. Although subjective preferences cannot be measured directly, only inferred indirectly

through observations of behaviour, surveys or in other indirect ways, it can – depending on the specific case – be important to complement estimates of actual outcomes with assessments of subjective components that might influence state interests.

Framing is way to capture knowledge and interests in a combined analytical conceptualisation where the way an issue is represented and interpreted influences actors' preferences and therefore – presumably – behaviour. How an issue is framed in media and public discussions has been shown to influence its policy impact, depending on aspects such as frame resonance, competition and uncertainty (Benford & Snow 2000). For example, environmental issues such as eutrophication or over-fishing, can be framed in different ways, which can influence the dynamics of political power struggles. Depending on what aspects are placed in the foreground, how cognitive underpinnings are addressed, and priors referred to, the issue can evoke disparate reactions in public discourses. In other words, frame divergence does not necessarily depend on cognitive, ideological or interest-driven divides between actors, but could alternatively be interpreted as outcomes of social processes where pieces of described reality are put together to form larger narratives. Framing mechanisms can be of two different kinds, *structural* or *strategic*. Structural framing captures how established social and institutional structures give privilege to certain interests and knowledge claims. Thus, structural framing largely depends on prior organisation, often privileging established patterns of power. In contrast, strategic framing places agency in focus, assuming stakeholders to intentionally frame the issue in ways that promote their interests. This often leads to competition among framings, where different groups strive to get the upper hand in the public discussion.

3.2 Knowledge-based cooperative components:

Prescription and complexity in science-policy interfaces

Knowledge, it can be argued, is becoming increasingly important in preventing, mitigating and adapting to environmental change. This means, among other things, that science plays increasingly important roles in underpinning policy within, as well as between, countries. It was suggested by Peter Haas that epistemic communities can play important roles in transnational environmental governance (Haas 1990; 1992). This approach has subsequently been elaborated upon and applied in a range of different empirical areas such as desertification (Corell 1999), nuclear arms control

Adler (1992) and climate change (Gough & Shackley 2001). Epistemic communities primarily comprise scientists and experts in various research institutions and public administration entities engaged in nature protection, environmental problems, and resource use such as protection of marine habitats, eutrophication, and fisheries, who share a common understanding of the problem at hand and what to do about it. The more successful epistemic communities are in formulating consensual standpoints, the more political impact they are assumed to obtain. Moreover, it is assumed that the more effectively science can be shielded from politics, the larger potential for policy influence it will have (Haas 2004).

However, this rather simplistic, if not positivistic (Lidskog & Sundqvist, 2002), portrayal of the possibilities to separate politics and science can be contrasted with quite different understandings in Science and Technology Studies (Saunders et al. 2017). In this literature, it is argued that science and policy are inherently intermingled and cannot be fully disentangled (Jasanoff 1996). Indeed, it is suggested that it is neither possible, nor desirable, to attempt to make such a separation, because this would obfuscate the analysis of the complex ties between science and policy-making.

To reach a better understanding of how EC can potentially have concrete policy impact, micro-level theoretical foundations related to science-policy interfaces *within* epistemic communities need to be specified and empirically grounded. However, to capture these internal workings of the epistemic communities, contextual factors need to be considered to interpret how context shapes epistemic communities' capacity to act over time in different policy settings. Moreover, the type of problem addressed needs to be taken into the analysis, because different environmental problems can have divergent implications for various stakeholders and organised interests. For example, while efforts to reduce eutrophication necessarily involve, among others, farmers (nutrient run-off from agricultural lands), municipalities (wastewater treatment, artificial wetlands, urban design), transportation policy-making on land and on seas, fisheries mainly involve the fishery and environmental sectors. However, whereas research on eutrophication mainly involves marine biologists, problems related to sustainable fisheries may comprise both research on natural resource use and environmental protection, two research communities that quite often have different views on what constitutes appropriate problem descriptions and management strategies (Wilson 2009).

It has been suggested that *coherence* and *uncertainty* comprise two key aspects of epistemic communities' policy influence (Cross Davies 2013). It

seems reasonable to assume that the more coherent an epistemic community can formulate a joint standpoint on a particular environmental problem, including ecosystem or pollution reduction targets that need to be met, the greater the influence it will have over policy. The more precisely required pollution changes are defined, the more restricted the set of policy alternatives become and politicisation is likely to have less traction to influence policy. However, while exclusion of politics in formulation of required changes may increase coherence within the epistemic community, it may also make it less policy-relevant and/or salient to policy-makers, and it has been noted that a tension may exist between “scientific purity” and influence over policy (Andresen et al. 2000).

However, because international scientific expert bodies explicitly tied to a treaty (for example, IPCC, the Intergovernmental Panel on Climate Change) or more loosely connected with advisory functions (e.g. ICES, the International Council for the Exploration of the Seas) have become a more common governance architecture during the last decades, separation of science and policy has become increasingly complicated. Moreover, it is becoming gradually more common to bring stakeholders into the workings of expert bodies. Therefore, the Science and Technology Studies critique regarding the inseparability of science and policy has a bearing not only on how scientific outputs from these bodies, or epistemic communities, are fused into subsequent policy processes, but also in the actual production of policy advice within these bodies. In other words, to be able to address how the production of knowledge influences internal coherence in existing ECs, the messiness of science-policy interfaces emphasised by STS scholars needs to be made an integral part of the analytical framework.

Somewhat paradoxically, despite increasing amounts of data being collected on ecosystems’ status and functioning, the importance of both acknowledging and addressing increasing uncertainties has increased. This is indicated by increasing calls being made for ‘uncertainties’ to be integral to the production of scientific knowledge as well as management strategies. The traditional, positivistically oriented and linear view that science can, and should, “speak truth to power” and that the only problem is how to appropriately package key scientific messages into digestible policy advice, is challenged by Science and Technology Studies scholars writing on post-normal science (Funtowicz & Ravetz 1993). Because of the multifaceted uncertainties not only in our knowledge on ecosystems, but equally important in our understanding of how different management strategies will unfold, definitions of relevant knowledge need to be broadened (Lidskog

and Sundqvist 2015). Science is not enough. It has to be complemented with input from alternative cognitive sources emanating from practice and traditional experiences. Thus, the roles of uncertainties – but also to some extent values, norms, attitudes and interests – have to be interrogated to make it possible to analyse what impact epistemic communities have, and can have, on policy-making. New questions can be asked, when a co-production of knowledge perspective rather than “science speaking truth to power” is used as a foundation for cognitive input into policy processes. Questions that may contribute to a more realistic understanding of epistemic communities’ impact on policy and management.

3.3 Managerial cooperative components: Tensions between actor incentives and treaty targets in multilevel settings

To reach a deeper understanding of implementation phases of environmental treaties and agreements, it is necessary to adopt a multi-layered approach where interactions between actors at local, national and international levels are placed in focus. Since global as well as regional environmental treaties represent agreements among sovereign states, it can be assumed that each signatory part is of the opinion that national interests, based on all aspects that the individual state considers relevant to include, for example, long term effects upon reputation, are best served by becoming part of the agreement. This means that to understand transnational collective action, national interests must be mapped and interpreted, since these are the prime policy drivers.

In order to increase realism in the analysis of transnational environmental collective action, the biophysical nature of the resource or polluting substance needs to be mapped as well, in order to assess how costs and benefits from mitigation will be distributed among affected countries, that is, to what extent it is a *joint product* (Sandler 2004). The concept of joint product is designed to describe to what extent remedial initiatives can be expected to benefit different countries equally (a collective good) and to what extent it will benefit some countries more than others (private good components). Based on such a mapping of how expected costs and benefits from remedial action will be distributed among treaty parties, a more realistic account of country incentives to contribute to mitigation plans, considering relevant country-specific factors like GDP, sectoral interests, public pressure and political-administrative traditions.

However, when entering the treaty implementation phase, incentives to comply may be at odds with what was agreed upon. In fact, it might not be perfectly clear what full compliance would entail. This implementation problematique will probably become even more complex as transnational environmental cooperation seems to move away from traditional monitoring of compliance towards complex assessment of national action programmes. To move from political declarations of percentage cuts in emissions, to more fine-tuned and context-dependent reduction schemes, it seems that a larger emphasis is now placed on asking, or maybe requiring, treaty parties to hand in national plans on what the objectives are and how they will be achieved. With this shift it is likely that national as well as transnational accountability and transparency will be increasingly important, as more detailed observations will be required to assess whether or not the individual treaty parties' national plans are complied with (Hassler 2016).

The EU framework is a unique regulatory structure, being distinct from national as well as international policy-making and implementation (Haigh 2016). To a considerable extent, it resembles international relations because of its heavy dependence upon the will of the larger member countries, but similarly to individual nation-states, its Regulations and Directives can be upheld in a European-level court. Environmental policy in general and fisheries in particular is an area where the EU has a significant influence. The fishery sector is in most parts an exclusive competence, which means, among other things, that EU decides on yearly quotas in Baltic Sea fisheries in accordance with its CFP (Common Fisheries Policy) and that catch levels should be sustainable in the long run. The BSAC (Baltic Sea Advisory Council, one of seven Advisory Councils of the EU), is of especial importance not only in policy-making, but in implementation phases as well. It consists of representatives from industry and other interest organisations. It is funded by the EU and its main objective is to provide the EU as well as individual EU Member States with advice on fisheries management. Through being integrated in the CFP in this way, these councils provide a forum for deliberation between industry and other interest organisations, which in turn is likely to influence implementation outcomes.

Moving down to the local level, implementation ultimately depends on the behaviour of individual actors in interaction with institutional structures. Leakage of nutrients from agricultural lands and fisheries management are two examples where there are signs pointing in the direction that individual incentives are complex, and therefore especially important to analyse. In both cases, individuals' compliance is often hard to ensure, since

temptations to free-ride may be substantial where, for example, individual fishers have weak incentives to be restrictive, especially when quotas are perceived to be low in relation to locally estimated stocks. Individual farmers may have even weaker individual incentives to undertake costly leakage reductions, because eutrophication effects typically will not be apparent in the vicinity of the farm, but rather in downstream marine areas. Thus, attribution is difficult to determine. Adding to this complexity, monitoring of compliance is typically costly, both in fisheries and agriculture, since it requires extensive and frequent controls to be effective. In contrast with traditional modelling in economics where monetary incentives often are assumed to be precise instruments that allow fine-tuning of individual behaviour, increasing scholarly attention is now being paid to closer scrutiny of other factors that may influence uses of natural resources at micro levels, some of them possibly working against monetary steering as the dominant policy mechanism. In small-scale fisheries, inclusion of stakeholders and practitioners in management of local fish stocks has been shown to potentially improve governance outcomes through co-production of knowledge and increased trust among users in management schemes (Rova 2004). In commercial fisheries, the discrepancies between ICES advice on quotas and politically decided TACs (Total Allowable Catches) have decreased during the last years, in parallel with inclusion of stakeholders (Saunders et al. 2017). However, whether there is a causal link between two developments is not yet fully clear. In a similar vein, reduction of nutrient leakage from agricultural soils has been shown to be more effective when monetary incentives are integrated into co-management models where stakeholder knowledge and perspectives are actively included in the over-all management design. It has been shown that in such cases economic incentives interact with social norms variables to explain the contribution behaviour of individual participants (Kerr et al. 2013:1; Van Hecken & Bastiansen, 2010).

3.4 Interactions between the cooperative components

The three collaborative components elaborated upon above may be distinct in theory, but in reality they are interlinked in various and often complex ways. Therefore, they need to be brought together again in order to increase the over-all validity of the theoretical construct and to facilitate identification of interlinkages. A first important interlinkage is the theoretical relevance of interests and incentives at all levels, ranging from individual

user and stakeholders to governments and international organisations. This means that the same logic on incentives to act can be applied to individual farmers, fishers, as to, for example governments, epistemic communities and other actors.³ Thus, temptations to free-ride, exclusion of externalities and collective action problems may be analysed in similar ways, irrespective of governance level.

However, the logic of the link between individual incentives and collective action crucially depends on how the individual and the collective are defined. Whenever NGOs, governments, states or any other group is defined as a composite actor, that is, theoretically viewed as a single actor rather than as a collective, second order collective action dilemmas may emerge, because group members may free-ride or in other ways behave strategically, which may make the “behaviour” of the group “irrational” despite the rationality of the individual group members. Thus, strictly speaking, composite actors can only be used metaphorically as actors in collective action theory. However, given the impracticality of determining, for example, how a government policy depends on all relevant domestic and international influences, composite actors such as governments or states are often part of International Relation theories. Adopting a pragmatic approach, an assessment can then be made as to whether a reasonably clear government policy exists and how it relates to observable or assumed dominating domestic interests. If this seems to be the case, the analyst can continue with the analysis of the interaction among the states in the region to see if there are indications of collective action problems.

A second interlinkage is related to the somewhat unclear connections between epistemic communities and political influence noted above. Although it has been observed that such communities can influence political outcomes, the mechanisms connecting the strength of epistemic community and level of political influence tend to be under-elaborated. For example, commonly there are vagaries around how coherent they are, to what extent competing communities exist, and how salient the environmental problem is. This suggests that having potential to influence policy outcomes as a result of meeting epistemic community attributes such as

³ However, this is not to say that all actors react in the same way to a given change in incentives. Depending on factors such as individual preference orderings, discounting of future costs and benefits, norms and context, behavioral change may differ. However, except for in rare cases, the direction of change from a unidirectional change in incentives, by for example a tax or subsidy increase, can be reasonably well predicted.

coherency and saliency does not necessarily translate into political leverage or effective policy-making. At least two theoretical mechanisms seem plausible, one indirect and one direct, where members of the community deliberately try to influence policy. First, mass media can be seen as an important link between expert communities and policy makers. A possible interlinkage, or mechanism, could be that a strong community dealing with a salient issue is likely to get more media coverage than a weak community concerned with a less prominent environmental problem. An argument could then be made that more media coverage is likely to give a higher degree of influence over policy outcomes.

However, although this interlinkage may seem intuitive, other alternatives may be relevant both on the extent of policy influence and the type of influence. For example, issues where there are competing epistemic communities with differing perspective on the nature of the problem and how to best manage it (i.e., a cognitive controversy) may attract greater media coverage than issues where there is more of a consensual view. Getting a higher degree of media coverage may lead to a more active response by policy-makers, but since the expert communities are divided, opportunities may open up for fractious interest groups to leverage uncertainty in-line with their interests or for decision-makers to cherry-pick and choose the expert views aligned most closely with their respective political strategies. Thus, the amount and type of policy influence exerted by epistemic communities in these situations are difficult to generalise upon and the relevance of suggested mechanisms must be judged on a case to case basis.

Furthermore, a link between the rationalistic incentive structures elaborated upon above and epistemic community influence could be suggested. These communities typically comprise scientific experts as well as experts from various organisations and administration. In most cases, scientists dominate. Although it is likely that experts from organisations and administrations are influenced from the interactions in the epistemic communities, which in turn can influence policy choice, an even more interesting aspect is probably to what extent, and through what means, ECs directly influence policy choices.

Apart from the increasing role played by scientific panels and other expert groups on environmental issues, epistemic groups can have considerable incentives to influence government policies regarding problem framing as well as preferred management options. Thus, a link between rationalistic promotion of interest and policy choices may exist also here. An important question to ask in this respect is why such communities com-

prising mainly scientists invest time and resources in influencing policy, rather than to exclusively focus upon advancing their academic careers. The answer to this question most likely varies from case to case and therefore can only be ascertained in relation to the particular case being studied. Reasonable hypotheses based on opportunism and idealism can be formed, suggesting that epistemic groups (1) actively try to influence policy because of career opportunities in administration or because such outreach is increasingly valued in academic environments (i.e., due to the increasing emphasis by research funders placed on practical applicability of results) or (2) may have a genuine concern for the state of the environment (e.g., conservation biology). Analysing an epistemic community's influence on environmental policy seem to require that such questions are given due notice.

Turning now to the managerial component, where implementation of regional action programmes, directives or other transnational agreements are placed in focus, a third interlinkage concerns how previous phases of an implementation process can influence eventual outcomes. A valid argument can be made that the implementation phase does not begin with concrete action, but much earlier, when objectives are first discussed (Haigh 2016). Already in these first, preliminary discussions, the future agreement, directive or programme could have been framed in different ways, giving higher priority to some aspects over others. Depending on what impact this framing had on eventual policy choices, subsequent implementation can be substantially influenced. If proper consideration was not given to implementation mechanisms and likely effects during the policy decision, implementation problems are likely to emerge later on. Thus, the implementation phase cannot be properly understood without considering how the programme, directive or agreement was first formulated.

In a similar vein, the decision-making process following the first framing of the objectives, including process (which stakeholders that were allowed to participate in the decision-making process, how the discussions on how to formulate the decisions were set up and similar aspects) as well as how concrete formulations on, for example, monitoring, reporting and consequences from non-compliance, can be assumed to influence how the implementation process unfolds. In other words, to understand implementation processes, it is not sufficient to study the implementation phase as such, but its full history has to be tracked in order to understand eventual outcomes.

To sum up on theory, it can be concluded that it is important to ponder each of the three cooperative components on their own merits, but depending on the particular questions being asked, it may also be important to

consider interactions between the interest-based, knowledge-based and managerial cooperative components in order to understand the larger picture of transnational treaty implementation. The rather loose analytical framework elaborated in this section should thus be seen as a broad framework, from which relevant parts are selected for the analysis of cooperation, or lack of cooperation, in specific areas of Baltic Sea eutrophication and fisheries. In the following section, sub-cases are analysed making use of the framework described above. These sub-cases comprise empirical studies as well as theoretical elaboration on a specific part of the framework as well as being closely connected to the larger concern of the report, *cooperation for sustainable resources management in the Baltic Sea*. In the following section, the different parts of the analyses will be brought together to render a comprehensive image of the role of cooperation in the protection of the Baltic Sea environment.

4. Actor interests in transnational cooperation on Baltic Sea eutrophication

4.1 Introduction

In this section, focus is placed on how underlying structures related to biophysical factors and socioeconomic parameters, together with national interests, form incentive patterns. These incentive patterns can in turn be assumed to guide, delimit and frame, if not determine, national strategies on transnational collective action on natural resource management and pollution.⁴ The case of regional strategies to reduce nutrient leakage will be used here as an example, showing how a mapping of distribution of costs and benefits from pollution mitigation among involved countries, together with varying national capacities, can contribute to a better understanding of underlying incentives assumed to influence transnational cooperation. It will furthermore be shown how treaty reporting instruments can be used to identify potential threats to efficient implementation of national commitments, when countries have strategic incentives not to openly reveal their true preferences.

Transnational collective action theory suggests that under-provision of collective goods such as mitigation of pollution and protection of natural resources is to be expected, due to free-rider temptations and incongruities between national and regional interests (Keohane 1984). Theoretically, the most important reason for this under-provision is the anarchic nature of the international system, where states are forced to look after their own interests, since central authorities corresponding to governments and parliaments in modern states are lacking. In this situation, states are assumed to prioritise national interests before collective outcomes. This does not

⁴ This section builds primarily, but not exclusively, on Hassler (2015) and Hassler (2016).

mean that international cooperation is inconceivable, but rather that it will be hard to accomplish, and individual incentives may need to be altered and stabilised in institutional structures in order for cooperation to be viable (Barrett 2005).

To understand cooperative incentives in transnational settings it is necessary to address collective outcomes as well as individual interests. If net collective (regional) gains from cooperation on, for example, reducing Baltic Sea eutrophication are negative, it is not possible to make all countries better off through their participation in a mitigation treaty. This implies that some countries have to be pushed into participation, which tends to result in unstable outcomes and implementation deficits.

However, a more common situation is that estimated net collective gains are positive, which makes cooperation potentially mutually beneficial (Hassler 2015). Two fundamental factors to consider here are the distribution of cost and benefits and to what extent benefits are collective; that is, not only benefitting the country investing in mitigation. Only rarely are costs and benefits distributed evenly among participating countries, and even when they are, differences in terms of available economic resources (GDP), administrative capacity and culture, and other factors tend to make cooperation challenging. Moreover, the more collective benefits are, and the more valuable they are, the more tempting free-riding tends to be, because of the large potential gains. If benefits can be realised without paying the cost of mitigation, cooperation may unravel despite substantial benefits at the aggregate, regional level. However, the relation between the salience of mitigation efforts and free-riding temptations is complex. Sometimes high saliency makes it easier for countries to solve collective action challenges, while in other cases, saliency can imply larger benefits from free-riding, and thus temptations not to contribute.

A possible mechanism that may influence cooperative structures and stabilise institutions especially in the long run was suggested in Hassler (2015), where traditional assumptions of national interests and state sovereignty according to what was briefly outlined above are combined with the possibility of adaptive feed-back loops. These feed-back loops are assumed to create links between individual strategies, collective outcomes and resulting impact at the individual level, which in turn may create incentives to revise previous strategies. A process-oriented perspective is thus adopted, where a sequence of strategy choices are assumed to take place, with possibilities to update previous priorities using new information about other actors behaviour as well as unexpected ecosystem changes, rather

than a static view of optimising strategic choices momentarily.⁵ Although actors are assumed to be forward-looking and to base their strategies on expected outcomes at the collective level, how other countries act and how ecosystems respond to changing or new pressures can seldom be perfectly predicted, which means that adopted strategies have to be updated as events and developments unfold. Thus, it can be expected that an adaptive component is built into policy-making and management processes, influencing choice of strategies in an iterated manner; where adaptation pressures to some extent can be assumed to place boundaries on country strategies. These boundaries are likely to be more restrictive, the more unexpected future outcomes are expected to be.

4.2 Collective action challenges in distribution of costs and benefits from reduced eutrophication

Turning now to a concrete example of how national mitigation strategies can be used as a source for identifying possible threats to efficient treaty implementation, the case of BSAP (the Baltic Sea Action Programme) in general and the Eutrophication Segment (ES) in particular will be addressed.⁶ BSAP was adopted by all HELCOM (Helsinki Commission) member countries in 2007 with the eventual objective to reach Good Ecological Status (GES) on Eutrophication, Biodiversity, Chemical Hazards and Maritime Activities no later than 2021. In order to reach the agreed upon targets for reduced nutrient leakage, estimates were made of country contributions upon which national targets were set. Research efforts following the setting of country target emission levels to be reached no later than 2021, shows that distributions of costs and benefits from a successful implementation of the BSAP GES are likely to be very heterogeneous. Some countries have large leakages and thus face substantial reduction costs, without necessarily expecting to gain as much as some others (because of short coast lengths, for example), which does not necessarily mean that benefits are perceived to

⁵ The suggested adaptive loop mechanism suggested here has important similarities with the game theoretical modelling of an iterated sequence of Prisoner's dilemma, where it can be shown that cooperative equilibria may exist (Hassler 2004). However, an important difference is that the adaptive feedback loop cannot be predicted in advance. It can only update strategies post hoc, when actors can observe actual outcomes. Given information shortages regarding other actors' priorities and uncertainties on ecosystem change, the full consequences of adopted strategies can seldom be adequately predicted.

⁶ This section builds on Hassler (2016).

be large enough to cover those costs. In contrast, other countries may have comparably small investment needs due to reduction commitments, but stand to gain much more from the overall reaching of Baltic Sea GES.⁷

These variations in costs and benefits, together with an improved eutrophication status of the Baltic Sea as a collective good, thus inviting free-riding, may pose a significant challenge to the implementation of the BSAP ES. This is because proactive states (countries with high expected benefits) can be assumed to be frustrated over weak implementation efforts among others, whereas countries that expect significant net costs can be assumed to place various demands on others to fully implement the agreement.⁸ Apart from incentive structures coloured by discrepancies between national costs and benefits, other factors such as administrative traditions, economic resources, stakeholder pressures, governance structures and public concern may substantially influence how efficiently regional mitigation programmes are implemented. It is often difficult to map government priorities in international relations because negotiations with other countries tend to be framed and presented strategically where information is not only shared to increase transparency, but can also be used as tool for promoting state interests. Due to these complications, government preferences often have to

⁷ While estimating costs for investments and other ways to reduce nutrient leakages are hard to make, estimating expected benefits is even harder, comprising substantial uncertainties on how reduced leakage translates into observable ecological improvements. Furthermore, methodological challenges arise such as how could these improvements be converted into monetary units, in order to facilitate comparison of cost and benefits. In the eutrophication case discussed here, differences in estimates of national benefit are primarily based on variation of Willingness to Pay for such improvements according to surveyed undertaken by Ahtiainen et al. in 2012.

⁸ The dichotomy of private (one owner) and collective (at least two owners) goods does not reflect real conditions very well. A continuum between private and collective ownership of a collective good is a more realistic way to portray actual conditions, because the good can then be described as partly private and partly collective. The concept of *joint product* captures this idea, where the degree of jointness describes to what extent the good is collective. That is, the extent that the good benefits more than one actor (Cornes and Sandler 1984; Sandler 2004). Generally, the higher the degree of jointness there is, the more tempting free-riding becomes, since actors can then benefit without contributing. It should be noted, though, that degree of jointness does not necessarily correspond to an individual actor's incentives to, for example, invest in a collective good. Rather, what determines this actor's decision to invest or not is whether expected costs to this actor are lower than expected benefits, and if no other actor is expected to face such a net benefit from the investment. In this case, the good in question will not produce unless the actor with expected net benefits goes ahead. Thus, it is relevant how much others may gain from externalities that determines the strategy of this actor, but only whether they expect their own benefit to be large enough to motivate the cost or not.

be mapped using refined methods to increase validity. One such method is to scrutinize implementation reports tied to treaties, since various forms of scheduled reporting mechanisms are usually agreed upon in treaties as mechanisms to increase collective coherence and to put some pressure on treaty parties to comply.

The BSAP ES includes such a mechanism, in form of a National Implementation Programme (NIP) that all HELCOM countries were required to submit in 2010, three years after the agreement was signed and thereby became binding. However, these NIPs were not intended to report implementation status among the Baltic Sea countries, but rather how they *planned* to implement national measures starting no later than in 2016, in order to reach agreed upon reduction targets no later than 2021. In Hassler (2016) it is shown how treaty reporting instruments can be used to get a glimpse of state priorities in mitigation efforts, expectations of support, issue salience, capacity, governance structures, path dependencies and other factors could be in identifying potential threats to efficient implementation under, or even before, actual implementation has commenced. In an analysis of the BSAP ES implementation programmes it is shown that rather clear indications exist, pointing in the direction that the unequal distribution of costs and benefits among HELCOM member countries matters and may cause friction in the implementation process.

However, the analysis also shows that although large differences in expected costs and benefits are likely to matter, the relation between national net benefits and states' willingness to comply is most likely complex, where a number of other factors may influence national strategies as well. For example, resource availability (GDP/Capita) can be an important factor, because the higher incomes are, the lower percentage of income a given investment cost corresponds to, and it is furthermore reasonable to assume the higher incomes are, the higher individual willingness to pay will be for a given level of concern.⁹

⁹ It is possible that not only GDP/capita matters, but also total GDP, that is, a country with larger population can be expected to pay more than a smaller country, everything else given. However, in this context this reasoning can become somewhat absurd. Assume, for example that Russia would be expected to invest four times more in mitigation, and Germany about 15 times more, than Sweden, only comparing GDP differences. Nothing in the history of Baltic Sea transnational environmental cooperation points in this direction, but rather than high GDP/capita tends to increase willingness to invest, especially if it is paired with tangible factors such as long coastlines and valuable archipelagos (Hassler 2003).

The analysis of the NIPs shows that the HELCOM member countries can be placed in four groups (Table 2), depending on how the implementation of the BSAP ES was framed.

Table 2. Typology of countries ordered into groups based on main aspects portrayed in the NIPs (adapted from Hassler 2016).

Profile	Countries	Key characteristics (examples)
1. Collaboration and support in the shadow of administrative-legalistic legacies	Russia	Expected external support; Tensions between domestic administration and dominating contemporary governance structures.
2. Towards EU integration in the shadow of administrative-legalistic legacies.	Estonia, Latvia, Lithuania, Poland.	Priority given to implementation of EU Directives rather than to BSAP ES; Tensions between domestic administration and dominating contemporary governance structures.
3. EU Priority One, with confidence.	Denmark, Germany.	Priority given to implementation of EU Directives rather than BSAP ES; Prior achievements make additional investments less relevant; Governance discourse important.
4. Special interests, confidence and engagement.	Finland, Sweden.	Focus on biophysical special interests (e.g. archipelagos, long coastlines); Prior achievements make additional investments less relevant; Proactive attitude vis-à-vis regional efforts and responsibilities; Governance discourse important.

It is not surprising that Russia ends up in a group of its own, considering that EU has a key role in contemporary management of the Baltic Sea environment, while Russia is the only coastal state that is not member of the EU. But it is also quite clear that Russia signals expectations to receive support to investments that would benefit the Baltic Sea environment, such as modernisation of the wastewater treatment sector. Possibly, these expectations are grounded both in resource shortages and in the substantial costs in relation to benefits if Russia is to honour the BSAP ES national reduction targets. It can be noted that a lot of space in the Russian NIP is devoted to

how competence and responsibility should be distributed among domestic authorities. In contrast, scant interest is given to key components of contemporary governance strategies, such as stakeholder participation, decentralisation and co-management. Thus, transnational collaboration with especially the Scandinavian countries and Germany may be hampered by these differences in management discourses.

The second group identified comprises Estonia, Latvia, Lithuania and Poland. These countries share a history of having been occupied or dominated by the Soviet Union. Similar tensions between domestic jurisdictional considerations and contemporary environmental governance discourses as in Russia are apparent in these four countries as well. In contrast with in the Russian NIP, EU Directives loom large here. These countries had to make a complete overhaul of previous jurisdictions before becoming members of the EU, and it can be argued that it is still of great importance to build trust in domestic structures and practices. In fact, there seems to be a tendency for BSAP targets to be crowded out by EU directives that are mandatory and need to be transposed into domestic regulations. Thus, to the extent that differences exist between BSAP guidelines and EU directives, with a tendency to prioritise the latter. The Polish report is conspicuous compared with the three Baltic States because of the substantial investments in the reduction of nutrient leakage into the Baltic Sea that is needed to fulfil BSAP targets. These requirements feed into rather open-ended discussions on how to finance investments, especially in more effective wastewater treatment facilities.

Also, in the third group of countries, comprising Germany and Denmark, EU directives are placed in the foreground. The argument is made that by fulfilling relevant Directives and domestic regulations – and in the German case, especially requirements related to the Wadden Sea – national BSAP targets will be reached as well. The importance of modern wastewater treatment plants in relation to nutrient leakage is underlined, but it is argued that marginal benefits from additional investments are reducing because of the already high standards in these countries. In some contrast with Group 1 and 2, increased integration over sector borders and efforts to improve stakeholder participation and public consultations as means to improve transparency and legitimacy are discussed. However, somewhat surprisingly these discussions are quite vague and brief, which gives an impression that these aspects either are not prioritised in the relation to implementation of the BSAP or that their roles are taken for granted and need not to be concretised in the National Implementation Programmes.

In the fourth and final group, Sweden and Finland represent the most proactive stance in relation to the BSAP. These two countries have historically been forerunners, for example in the establishment of HELCOM and in environmental support to the former Soviet Union countries in the 1990s (Hassler 2003). From a rationalistic collective action approach, this is not surprising given their long coastlines and beneficiaries of ecosystem services from areas such as tourism, recreation, leisure boating and coastal real estates. Moreover, because of the comparably limited nutrient leakage from these countries, national costs from a strict implementation of the BSAP ES reduction scheme would most likely be much smaller than expected gains, which implies that proactive stances are to be expected. However, somewhat paradoxically, both Sweden and Finland underline their national interests in reaching BSAP targets, despite that this may invite requests for revised financial burden-sharing. From a strategic perspective, this may indicate a willingness to negotiate over how to finance the overall reduction scheme if this is required for bringing countries that face heavy investment costs and comparably modest benefits from improved ecosystem services on board.

4.3 Sum up

Summing up on interest-based conditions for collaboration on Baltic Sea eutrophication, although state interests play key role in negotiations over how to manage transnational environmental problems, mapping of these interests and identification of structural impediments that may modify adopted strategies is a complex challenge. While countries that expect to be net beneficiaries from successful efforts to curb pollution can be assumed to – via the exploitation mechanism – take on proactive roles, costly investments in collective goods are only rational if they are expected to influence others' behaviour. If not, it is quite possible (everything else given) that this country will succumb to free riding temptations. Side-payments can be used, for example in partial financing of wastewater treatment facilities in countries such as Poland and Russia, which expect net losses from a complete fulfilment of the BSAP reduction targets. Given that aggregate benefits are larger than aggregate costs, theory shows that it is possible to find cost sharing schemes that make all countries better off through a mechanism where net beneficiaries pay net losers to do more.

However, real world political dirtiness often clouds theoretical claims. From a general point of view, the existence of potential solutions that make everyone better off seldom guarantees that countries will be able to reach

such outcomes. Since all countries are likely to prefer as high net benefits as possible, negotiations typically become thorny and can easily break down completely or end up in watered down agreements and modest implementation efforts. From a more specific point of view limited to the BSAP ES context, it has been shown in this example that domestic differences in administrative structures and capacity, diverging views in relation to stakeholder participation and other contemporary governance components, as well as transnational crowding out caused by EU directives and environmental treaties can put spanners in the works, resulting in outcomes far from the “rational ideal”. Therefore, a more realistic conclusion than to opt for optimality might be to adopt an incremental and compartmentalised collaborative strategy where countries with substantial expected benefits assist those worse off with support that is conditioned on domestic co-funding. In such a strategy, incrementalism facilitates adaptive learning and conditionality facilitates credibility in terms of engagement on both donor and recipient sides, especially if the assistance is targeted to marginal improvements in nutrient leakage in the recipient country that are not likely to be acted otherwise.

Turning now away from the implementation of the Eutrophication Segment in the Baltic Sea Action Plan to the complex and shifting relations between science and policy and the role of media and communication, the following section is focused on how coherence and uncertainties may influence outcomes in Baltic Sea fisheries and eutrophication management, and how media may influence – or be influenced by – stakeholder strategizing.

5. Knowledge and communication in eutrophication and fisheries management

5.1 Introduction

As elaborated upon in the section on Theory above, uncertainties play important roles in environmental policy, from local and national levels to regional and global. Typologies distinguishing among different forms of uncertainties have shown to be useful in understanding theoretical as well as policy-oriented implications. Renn (2008) distinguishes between *complexity*, *uncertainty*, and *ambiguity*, where complexity refers to cases with a multitude of causal relationships that are interconnected in various ways, uncertainty describes confidence in assumed causal relationships, and ambiguity relates to situations where stakeholders make different evaluations of possible outcomes. In a somewhat similar vein, but more directly tied to the possible complementarities between Epistemic Community and Science and Technology Studies perspectives, a distinction can be suggested between *ontological* and *political* uncertainty. Ontological uncertainty refers to a combination of Renn's complexity and uncertainty regarding the causal relationships characterising the environmental problem in focus, or more simply, how certain it can be assumed that, for example, reduced nutrient loads lead to increased algae bloom and anoxic conditions, or that a particular quota in fisheries does not lead a collapse of fish stocks. Ontological uncertainties can be assumed to influence the coherence of ECs, because the more uncertainty, the larger the set of possible positions become. Thus, in cases with high levels of uncertainty, ECs tend to become more fragmented. However, prevalence of such ontological uncertainties can also lead to managerial countermeasures such as adoption of the Precautionary Principle and adaptive governance.

In contrast, political uncertainty refers to the inherent difficulties in predicting policy outcome and implementation efficiency based on scien-

tific claims alone. The primary focus here is placed on problematising linear models where policy implications are assumed to follow directly from scientific findings, based on the STS premise that policies, and even more so eventual outputs and outcomes, not only depend on scientific knowledge (including ontological uncertainties), but also political considerations, stakeholder pressures and other possibly confounding factors. This problematisation can have both analytical (de facto) and normative implications. Arguably, eventual outcomes seldom exactly match scientific advice, not even when existing ECs have high degrees of coherency. Thus, from an analytical perspective, outcomes cannot be understood from a scientific perspective alone. Moreover, it can be argued that from a normative view that scientific advice can only be a part of the foundation for political decision-making because environmental concern ought not to override equity, health, welfare or are aspects deemed relevant. Despite ecological boundary arguments such as in the Planetary Boundaries literature (Rockström et al. 2009) emphasising that these boundaries cannot be transgressed without potentially very serious consequences, practical policy-making always involves balancing of ecological and socioeconomic goals.

Realising that science-policy interactions tend to be complicated, a further step away from simple linear reasoning to achieve more realistic governance accounts is to see not only the science-policy interface as inherently complex, but also the policy-implementation process (Haigh 2016). Arguably, policy-making and implementation phases cannot be fully compartmentalised, simply because the different phases are not independent from each other. Starting in the final end-point – the policy goal in terms of ecological and socioeconomic outcomes – and working backwards towards the first discussions on policy change it is likely that changes in any part of the chain could influence final outcomes. Furthermore, actors involved in different parts of the process can be assumed to strategically attempt to intervene to promote interests that may, or may not, fit policy goals. Thus, to understand outcomes, and to be able to assess procedural legitimacy in terms of, for example, transparency and stakeholder influence, the whole chain of events needs to be interpreted as an interconnected whole. Assessing policy adequacy, implementation efficiency and outcomes separately cannot provide the full picture, especially not when actors can potentially strategically intervene in all parts of the chain of events.

While increased stakeholder participation is encouraged by most observers, the impact on policy-making tend to be complex and hard to predict. Typically, there is no uniform position among stakeholders that easily

incorporated into government policy. Instead, competitions among stakeholder groups often emerge on how the problem ought to be understood, what the most appropriate countervailing measures to be used are and how responsibilities ought to be distributed. This competition among stakeholders can be described as a fight over problem framing, where dominance over the framing gives proponents an upper hand in terms of ability to influence government policy. The frames are often strategically formulated and designed to promote ideological and/or interest-based positions aimed to, for example, promote environmental protection or sector interests. However, they also need to have an ontological and cognitive foundation to be convincing. Therefore, frames often are portrayed as factual descriptions without ideological components, so as to be as powerful as possible. Arguably, the suggestion that potentially all actors have agency does not mean that they are equally resourceful in relation to this *second face of power* (Bachrach & Baratz 1962).

5.2 EC coherence and uncertainties in Baltic Sea eutrophication management

At first glance, the case of eutrophication appears to follow a reasonably straight linear path, initially managing ontological uncertainties mainly related to the importance of the problem and the main causes behind it (Saunders et al. 2017). Eutrophication as a form of pollution emerged in the 1960s and scientist were in agreement that excess nutrients from anthropogenic sources was the main factor behind increased algae blooms and expanding areas of the seafloor suffering from oxygen shortages or depletion (hypoxic or anoxic conditions). As evidence of this anthropogenic eutrophication in the Baltic Sea was firmly established as a key environmental problem in the 1974 Helsinki Convention.

However, despite this early scientific agreement on the existence of a major pollution problem, a rather intense discussion subsequently ensued for a number of years whether it was most effective to reduce nitrogen or phosphorous leakage into the sea. Interestingly, this intra-scientific argumentation partly took place between scientists from two different disciplines; limnologists and marine ecologists. As a reaction to these scientific disputes, a number of new research projects were started with the main objective to determine whether reduction efforts ought to target nitrogen or sulphur. Notwithstanding the fact that the resolution of this scientific debate would have considerable economic implications because it is much

more expensive to substantially remove nitrogen than phosphorous, this does not seem to have influenced outcomes much. Instead, a rather broadly accepted view among representatives from both scientific disciplines slowly emerged where it was agreed that whereas it is most important to reduce nitrogen to reduce algae bloom during spring, phosphorous was the main limiting nutrient during summer. Thus, there was a need to add a nitrogen reduction component to the existing reduction of phosphorous in wastewater treatment plants.

While simplistic, it can be argued that ontological uncertainty up to this stage was successfully managed within the scientific community. The early disagreements were resolved by investing in additional research efforts and the coherence of the EC was quite successfully restored. Moreover, to address political uncertainties – how to go from understanding the nature of the eutrophication problem to large-scale investments to reduce nutrient leakage from the Baltic Sea catchment area – a political decision support system, the Nest System, was developed in the research programme MARE and was subsequently established as the Baltic Nest Institute (BNI). Probably the most important contribution of BNI was large-scale model that included not only mapping of phosphorous and nitrogen leakages around the Baltic Sea, but also estimated reduction costs using willingness to pay estimates (Hassler 2016).¹⁰

Thus, at the time of the signing of the Baltic Sea Action Plan (BSAP) in 2007 all Baltic Sea governments knew (a) that according to scientific estimates, the aggregated benefits from substantial reduction of nutrient leakages outweighed estimated aggregated costs and (b) the size of the reductions that were required for each country if the ecological targets specific in the BSAP were to be met.

However, the Nest System is based on a cost-benefit rather than an ecosystem boundary foundation and although it addresses both ontological and political uncertainty in relation to cost-benefit ratios, it does not consider the other major political uncertainty, the collective action problematique (Hassler 2015). Because a compartmentalised linear knowledge-decision-

¹⁰ In willingness to pay studies, surveys are constructed where respondents are asked how much they would value, in monetary terms, a certain environmental improvement. The responses are then aggregated into aggregate numbers, for example how much the citizens of country value the improvements. In contrast, ecosystem services as used as a more direct measurement of the benefits emanating from various aspects of healthy ecosystems, such as fish stocks and other natural resources, but also less tangible aspects such as clear bathing waters and opportunities for other leisure activities.

making-implementation design has been used, where the implementation phase was not seriously considered already in the first planning of the process, political uncertainty still looms large as it is still unclear how free-riding is handled and how countries that expect negative net benefits from implementation of the BSAP Eutrophication Segment are supposed to be willing to implement their parts of the program. The very limited BSAP Fund that has been established does not come close covering net costs in especially Poland and Russia (Hassler 2016).

In conclusion, management of ontological uncertainty in the case of Baltic Sea eutrophication has, despite a period of controversy over its causes, been successful. This means that the Epistemic Community has a rather high degree of coherency, which has most likely facilitated influential communication with policy-makers. More precisely, the role of the NEST system that integrated environmental data and modelling on Baltic Sea eutrophication has had a direct and tangible impact on nutrient reduction targets and distribution of responsibility among the countries in the region (Saunders et al. 2017). However, the coherency of the EC may have been bought by compartmentalisation and a linear approach to management, which means that political uncertainties have not yet been sufficiently resolved, especially not on cost-sharing schemes (Hassler 2016). Although nutrient leakage is likely to be reduced, especially among countries such as Sweden and Finland with high expected net benefits, it is not clear to what extent BSAP will result in reduction measures that would not have been taken also without the BSAP.

5.3 EC coherence and uncertainties in Baltic Sea fisheries management

In contrast with Baltic Sea eutrophication management where ontological uncertainty has been substantively reduced but political uncertainty so far only partially addressed, fisheries management has been characterised by a complex intertwining of ontological and political uncertainties, or by “co-production of science and policy” in the words of Jasanoff (2004). This intertwining to a considerable extent is related to the tensions between short-term benefits and free-riding in natural resource use and ensuring long-term sustainability. The primary ontological uncertainty is related to the difficulties of estimating future fish stocks, which is needed to be able to recommend annual quotas, but also relates to the complexity of understanding ecosystem links between different species and their environments.

These uncertainties create negotiation space over quota setting in different sub-regions and in regard to different fish species.

The traditional management mechanism has been the so-called *TAC machine*, where the EU Commission prepares a proposal on quotas for the upcoming one or two years based on scientific advice mainly from ICES (International Council for the Exploration of the Seas), which the EU Council of environmental ministers makes the final decision on (Holm & Nielsen, 2004). Thus, science and policy in this traditional model have been separated, although intra-scientific tensions between fisheries and marine biology scientists have been described (Wilson 2009). However, this does not imply a linear model where political processes strictly adapt to scientific advice. Instead, scientific advice has been used as starting point for negotiations rather than as a fixed boundary condition, where the eventual TACs have often been higher than ICES advice, sometimes quite substantially so. Therefore, it can be argued that the coherence of the EC was protected by the use of the traditional TAC model, but the advice produced was “moderated” by subsequent political processes within the EU.

However, the science-policy interactions in Baltic Sea fisheries evolved over time. The credibility of the previous system was threatened by the substantial ontological uncertainties related to predictions of future stock sizes (Dankel et al. 2012). When future stocks proved to have been underestimated, authorities and scientists were criticized for being overly cautious when setting quotas. With the benefit of hindsight, the argument that quotas were unnecessarily low was easy to make. The *Precautionary Principle* (PP) was introduced in the 1990s as a policy instrument and as an attempt to increase legitimacy among stakeholders by clarifying ontological and political uncertainties. The introduction of the PP contributed to a clearer separation between responsibilities attributed to scientists on the one hand, and stakeholders and policy-makers on the other hand, by creating a *space of uncertainty* rather than a boundary condition, in which somewhat different outcomes in terms of quotas could be accepted without overly threatening the legitimacy of the system. Thus, the PP protected the coherency of the ECs because of its vagueness, while simultaneously forcing policy-makers to shoulder political responsibility in case they had not been cautious enough and fish stocks started to decline.

During the last one and a half decades Baltic Sea fisheries management has evolved further, towards more emphasis placed on participatory governance – the “democratic turn” – and adoption of the Ecosystem Approach to Management (EAM). The democratic turn comprises two major com-

ponents; problematisation of EC responsibility for policy outcomes and stakeholder participation in environmental management as a foundation for improved public legitimacy (Saunders et al. 2017). Although the view that science shall be governed by internal structures such as “peer review” and selection of method and theory is well established, not the least regarding environmental policy, expectations have been rising that ECs ought to contribute more to practical solutions and policy-making than before. Furthermore, improved, broadened and deepened dialogue between ECs, stakeholders and the public is becoming part and parcel of most scientific grant applications for public funding. These expectations are closely related to public legitimacy, where increased and improved stakeholder participation is not only assumed to enrich knowledge underpinning of policy-making, but also provide intrinsic qualities of importance to public legitimacy. This claim is built on the underlying assumption that participation in policy-making and implementation processes may instil a sense of shared responsibility and possibilities to influence outcomes, which in turn can increase legitimacy. The establishing of *Advisory Councils* in the EU Common Fisheries Policy (CFP) in 2002 is an example of an attempt to bring stakeholders into management processes, as it gives sector representatives and environmental protection organisations an opportunity to give input into quota setting processes as well as broader management objectives. The ICES initiative to explore the potential of so-called Integrated Ecosystem Assessments (IEAs) is another initiative aimed at bringing scientific ecosystem expertise and socioeconomic objectives into an integrated management strategy (Möllmann et al. 2014: 1188).

In conclusion, management of ontological and political uncertainty have followed quite a different trajectory in Baltic Sea fisheries compared with reduction of eutrophication. Whereas the development over time in reduction of eutrophication has followed a linear path where policy measures have been built on EC recommendations, fisheries management has co-evolved in a more complex way, where a tension between resource use and preservation has been a key component all along. Thus, rather a consensual co-management trajectory, policies in this area have evolved under this tension, within the boundaries provided by ontological and political uncertainty. Somewhat paradoxically, despite a presumed expansion in EC understanding of ecosystems, anthropogenic pressures and changing fish stocks, socioeconomic considerations seem to have become increasingly important during the last couple of decades. However, whether this development with repeated attempts to improve integration between ecological and social

systems will lead towards reduced tensions is unclear. There is still a considerable degree of reluctance among many scientists to broaden the perspective too much, as this might lead to even larger zones of uncertainty and watering down of what may be perceived as “sound science”.

5.4 Eutrophication in media and transnational negotiations

In this section, the formation of political uncertainty will be further interrogated by zooming in on how interaction among stakeholders not only influences government policies as such, but also how competition among stakeholders – especially if it is played out in public media – can obfuscate government strategies in the eyes of other governments and thus influence transnational cooperation. In other words, the way competition among stakeholders plays out in domestic contexts can significantly influence the composite character of states as actors. The more complex competition among stakeholders is and the more openly it plays out, the more challenging the conceptualisation of states as rational actors tend to become.

While ontological uncertainty on eutrophication was shown above to be relatively limited as the main environmental implications are rather clear that nutrient leakages need to be reduced to reduce eutrophication, political uncertainty is substantial, particularly on how to handle cost-sharing of mitigation measures and how to reduce free-riding. The example of domestic discussions in news media in Sweden on the BSAP negotiations on the ES segment between 2012 and 2013 is used in this section to give a glimpse into the complexity of stakeholder participation. It is shown that the impact it has on governmental policy-making is hard to predict and highly dependent to specific cases. Thus, political uncertainty is key component when analysing science-policy interactions.

In the preparation before the Ministerial meeting held in October 2013 on BSAP ES reduction targets, business organisations and NGOs participated and actively tried – with some success – to influence aspects related to effort sharing in the draft Ministerial Declaration (Jönsson & Karlsson 2016). The Coalition Clean Baltic (CCB) suggested that additional mandatory components were necessary. However, the Federation of Swedish Farmers (LRF) had now become more active and argued that the suggested reductions in Sweden were impossible to reach. These divergent views between stakeholders sparked off a quite intense discussion between environmentalists and farmer representatives that propagated into the Swedish government, resulting in different views in the environment and agri-

culture ministries (Jönsson & Karlsson 2016). New drafts of the Declaration were presented in May and June 2013, but the revised formulations did not reduce tension on the distribution of reduction targets among the Baltic Sea countries. In quite an unexpected development, both environmental NGOs and LRF turned up the heat by presenting new material speaking in favour of their respective positions, and the government seemed to have been unable to broker an agreed position between the ministries. In the final stages of the negotiations, Sweden raised doubts on how the national responsibilities had been calculated and managed to soften some requirements on Swedish farmers.

In an analysis of media frames on Baltic Sea eutrophication related to the 2013 BSAP Ministerial meeting undertaken by Jönsson & Karlsson in 2016, it was found that a total of 124 articles were published in Swedish news media (national and local). Many of these articles were not directly emanating from the Ministerial meeting as such, but rather from other initiatives, for example, publication of new reports, workshops, conferences and press releases. Thus, stakeholders strategically provided the different sections of the media with material that they were likely to find relevant for underpinning news articles or editorials. The over-arching meta-frame was that eutrophication was a problem caused by human activities, primarily agriculture, and that restrictions in one way or another were unavoidable. Furthermore, the visibility of excessive algae blooms and the nuisance caused by them – one of several effects from too much nutrients in the water – made the problem of eutrophication apt for photographic media coverage in particular.

At a somewhat more specific level of frames where stakeholders fought over the control of the main interpretations and perspectives, responsibility, conflict, and economic consequences emerged as key themes. In the dimension of responsibility, it was of great importance to control who to blame, not only between sectors (agriculture or other sources), but also whether it was reasonable to blame Swedish farmers, when less had been done to reduce nutrient leakage in some other Baltic Sea countries. Closely related to attribution of responsibility, conflict dimensions played out in the media took a kind of “us against them” attitude, where Poland, Russia and the Baltic States were portrayed as not doing enough. Alleged economic consequences played an important role in some media material, where “impossible” reductions of nutrient leakage threatened to severely hurt Swedish farmers.

In order to get the upper hand in the competition between eutrophication frames, LRF chose to focus less on the ecological problems caused by nutrient

leakage – which are hard to repudiate – and more on who to blame. By picking up factual elements such as historical mismanagement of phosphorous that contemporary farmers cannot be blamed for and the relatively ambitious efforts that already have been taken in reducing nutrient leakage by Swedish farmers. Because of these factors, fulfilling the strict requirements on reductions first suggested in BSAP were not seen as realistic and attempts to nevertheless follow such a path would put many farmers out of business. Rather than trying to exploit the limited space of ontological uncertainty related to the negative effects from eutrophication on the Baltic Sea environment that was available, the larger political uncertainty space was utilised to form a narrative where Swedish farmers were the victims rather than the villains. Thus, a “farmer frame”, here represented by LRF, was built on questioning responsibility and how realistic suggested Swedish reductions were, and thus formed a means to promote farmers’ positions.

In contrast, the “NGO frame”, here represented by WWF, was based on the unambiguous clarity of the ontological position forwarded, where the link between nutrient leakage and clearly visible and undisputable disturbances of the Baltic Sea environment was emphasised. However, the most significant aspect in the NGO frame was not the link between observed eutrophication and nutrient leakage as such, but rather the responsibility of the government to curb nutrient pollution from agriculture. Thus, although there was a clear conflict between the farmer and the NGO frames, they were not strictly opposed, but did promote different policy directions that at least placed pressured the government to take action. The outcome of this process was an ambivalent Swedish position that had repercussions on the negotiations on national leakage reductions with the other Baltic Sea countries.

In conclusion, competition over frames does not always simply lead to positive agonistic (Mouffe 2000) relations where argumentation induces refinements of political strategies, but may instead instil and entrench conflict, at least when the competition plays out in media. This example has shown that stakeholders (mainly LRF and WWF) mobilised on the issue of the Swedish position in the BSAP negotiations on reduced national targets on nutrient leakage to the Baltic Sea and were able to increase media coverage on the issue of Baltic Sea eutrophication. Although the attention eutrophication got in mass media shows that stakeholders can influence political agendas, and probably also political decisions, it seemingly did not promote cooperation on management of the Baltic Sea environment. However, although stakeholder mobilisation, participation, and exerted influence may not be a panacea to the overarching problem of cooperation, turning

back to more hierarchical governing modes where civil society is excluded from policy-making is hardly a viable, or desired, alternative. Therefore, stakeholder participation processes and institutions may need to be further refined and better adapted to specific cases, with the objective of finding arenas where largest common denominators can be found. Furthermore, additional research on how to promote constructive, democratic, and inclusive stakeholder participation processes, not least at transnational levels, is needed. It seems to be the case that the difference between the yearly quotas suggested by ICES to the EU and the quotas eventually decided upon by the Commission has decreased during the last decades. It has not been possible to analyse to what extent this depends on increased process legitimacy due to improved inclusion, but it is possible that stakeholder inclusion has contributed to closer convergence between ICES and the EU.¹¹

5.5 Sum up

When comparing the eutrophication and fisheries cases, it is striking that whereas the “pure” role of science in combatting eutrophication made it easier to negotiate a pollution reduction plan, the “messy” and inclusive process of ICES contributed to improved process legitimacy. The concepts of ontological and political uncertainty can shed light on why the outcomes turned out so differently. The eutrophication case has been characterised by low levels of ontological uncertainty, that is, early on it became clear that nutrient leakage causes eutrophication (mainly algal blooms and “dead” sea bottoms). This view of the problem was accepted by most experts, which contributed to the coherence and strength of engaged Epistemic Communities. However, because of the collective nature of the Baltic Sea environment where free-riding is a constant threat to successful cooperation, political uncertainty looms large. So far, it has not been possible to steer implementation of the Eutrophication Segment in the BSAP from a regional vantage point, despite the agreement in principal that all countries have a responsibility and would benefit from reduced eutrophication. Thus, the efforts that are undertaken to reduce nutrient leakages are determined

¹¹ However, this does not necessarily mean that fisheries management has become more sustainable. Internal changes in ICES giving more weight to ecosystem management perspectives have brought scientists and other experts and representatives in closer contact. This may have led to more pressure on ICES environmental scientists to give more weight to non-ecological factors, such as social and economic dimensions, when assessing appropriate quotas (Hassler et al. 2013).

primarily by national perspectives, and to some extent by EU requirements. Without cooperative institutions above the state level that can convince governments to pay their shares for significant reduction of nutrient leakage coupled with the authority to direct investments to where they are used most efficiently, the BSAP targets will not be met in the foreseeable future.

In contrast, fisheries management is – somewhat paradoxically – characterised by less political uncertainty, because there is a broad agreement on the overarching objective to favour exploitation of fish stocks within the limits of long-term sustainability. Because of the combined resource use/sustainability perspective built into contemporary fisheries management, Epistemic Communities and stakeholder representative are in closer contact than in the eutrophication case. However, because of the complexity of determining long-term sustainable fishing quotas for different species in different parts of the Baltic Sea, there is considerable ontological as well as epistemological. This has opened a policy space, where actors and stakeholders can occupy different positions, while still claiming to have support from the broadened scope of legitimate knowledge resulting from inclusion of sector representatives and other stakeholders in policy-making, for example on quotas. However, while the divergent views on appropriate quotas and other regulations make decision-making challenging, implementation may benefit from having stakeholders onboard.

It has been shown in this research project that one way for stakeholders to influence political outcomes can be to turn to the mass media. During the preparation of the HELCOM negotiations on national nutrient leakage targets in 2013, NGOs and sector organisations were able to communicate their respective views on the problem of Baltic Sea eutrophication via national media in Sweden. The divergent views picked up in mass media made eutrophication more salient in Swedish public discussion, which in turn influenced the governmental negotiations, although it has not been possible to measure the more exact impacts on eventual decisions. However, although the possibility for stakeholders to stimulate public discussion on significant environmental problems is positive from a democratic governance perspective, it is more difficult to assess if the conflictual positions on what to do and who to blame for harmful nutrient leakage in the mass media had any positive effect on regional cooperation and collective problem-solving. It is possible that the public discussion clarified different aspects and ideological positions on eutrophication management that could be valuable in the further deliberations on appropriate policies (agonism),

but it is also possible that the heated debate in mass media created further cemented opposed views (antagonism).

In the following section the interest is shifted from regional cooperation towards micro foundations related to farmers' perceptions of their role in nutrient leakage reductions. This is a crucial aspect of overall eutrophication management, since nutrient run-offs from farm lands comprise the largest share of total nutrient load to the Baltic Sea and individual farmers therefore play key roles in any strategy to improve the environmental status of the Baltic Sea.

6. Managing the local level: Potential for cooperation among farmers

6.1 Introduction

The collective and dispersed character of nutrient leakages pose challenges about how to bring about a critical threshold of behavioural change among farmers so that positive effects on Baltic Sea water quality becomes clearly visible. Fragmented participation by small numbers of farmers will not lead to such positive outcomes. Swedish farmers engage within the multifunctional agricultural field, which increasingly demands and expects *all* farmers to embed social and environmental objectives into production considerations. While multifunctionality as a rural development approach has been adopted at EU and national levels for over 20 years, recent challenges of environmental concern, food security, climate change adaptation, and more efficient agricultural production have given rise to an institutional push in Europe for ‘sustainable intensification’ through The EU Bio-economy Strategy.

The Bio-economy Strategy emphasises ‘sustainable intensification’ of production driven by science, and policy communities converge ‘around the need to produce more food and energy’. Some see this directional change as being at odds with the long-promoted EU policy of multi-functionality which has been linked to post-productionist notions of agricultural change and rural development. In contrast with the Bio-economy Strategy, multi-functionality is concerned with diversification of rural development to deliver public and private goods. In doing so, broad aims are pursued, such as conserving rural life and landscape, place-based socio-economic engagement and environmental protection (Horlings and Marsden 2011; Kitchen and Marsden 2011). These two agricultural paradigms – sustainable intensification and multi-functionality – are contested views over transformative paths towards sustainable agriculture (Kitchen and Marsden 2011).

Developing a deeper understanding of farmers' attitudes and behaviour towards the environment is particularly important in a European context at a time when the EU has recently reviewed the Common Agricultural Policy (CAP). The CAP was reformed mainly because the growing urgency of 'greening' the CAP and ongoing and growing concerns about agriculture's contribution to eutrophication of the Baltic Sea (Powell et al. 2012). Despite the concerns of multi-functionality and the recent urgency given to bio-economy, the aim of Axis 2 of the CAP is still to enhance the environment and rural areas by supporting land management (Höjgård and Rabinowicz 2014:4). Emphasis is placed in Axis 2 on multifunctional agriculture, with agri-environmental payments serving as the most important mechanism to achieve this.

6.2 The use of monetary incentives for changing behaviour

Agri-environmental schemes (AES) is a subset of the larger category of Payments for Ecological Services (PES), which have rapidly emerged around the world as a key environmental governance approach. Among other environmental goals (for example, protection of biodiversity and landscape aesthetics), AES are explicitly aimed at changing farming practices to reduce the effects of production on downstream water quality. Or more precisely, to reduce the nutrient content in run-off from farming; often categorized as *watershed protection*. AES have long been used in Sweden as a policy tool to induce farmers to participate in measures aimed at mitigating eutrophication of the Baltic Sea.¹² In agriculture, AES, for several reasons, are widely seen as a superior to command and control instruments. First, the voluntary character of AES is likely to make them less politically contentious as a policy tool. Second, they tend to have lower costs for monitoring and enforcement (the dispersed character of nutrient inflows to the Baltic Sea makes it difficult to design effective and efficient command and control regulations). Third, farmers typically get increased flexibility (exercising the benefits of local knowledge) in how to achieve the outcomes sought. Environmental taxes, for example, on fertilisers can be an alternative policy tool to internalise costs that otherwise would not have been included in the economic decision-making process of the farmer. The mechanism for behavioural change is then that it is assumed that the farmer will use less

¹² Policy *tools* and *instruments* are here used interchangeably, as links between policy *objectives* and achievement of policy *goals*.

fertilisers when they cost more. However, such taxes are likely to be politically controversial. This was illustrated in Sweden, where taxes were introduced on nitrogen-based fertilisers, which resulted in decreasing fertiliser use, but were subsequently – after substantial political disagreements on their appropriateness – abolished in favour of AES and other policy instruments (Bragadóttir et al. 2014:135).

AES are underpinned by an assumption that monetary incentives can influence farmer behaviour in a politically preferred direction.¹³ However, a number of doubts about the effectiveness of AES have been raised in the literature such as, how well standardised character ‘mitigates adaptation to local conditions (Burton & Schwarz 2013); how, and whether, they engender local innovation (McGuire et al. 2013); effect on procedural and distributive equity (Powell et al. 2012); ‘crowding- out’ of socially derived sources of motivation (local norms) (Kerr et al. 2013); and whether AES, as disembedded from local institutions, lead to lasting and ‘sufficient’ behavioural change (Muradian et al. 2013; Pattanayak et al. 2010). Furthermore, several studies suggest that the effectiveness of voluntary agro-environmental initiatives can be reduced if farmers’ actions in these schemes do not become embedded in farmer norms (Burton and Paragahawewa 2011; Burton 2012). These studies indicate that it can be important to explore farmers’ norms (linked to identity and social recognition) and how they relate to a propensity to take environmental action (see Boonstra et al. 2011, writing in the Swedish context).

Water in the agricultural context is rival and non-excludable – therefore fulfilling the two essential criteria that defines a common pool resource (CPR).¹⁴ Fisher et al. (2010) advise us that ‘CPRs are systems or resources that deliver services or benefits to people, while ecosystem services are the processes of ecosystems that deliver benefits’ (p.1254). These insights

¹³ In EU policy-making, AES are not likely to be operating as the only policy tools affecting land management for conservation. A coexisting range of policy instruments mechanisms affecting land management are likely to be in place, comprising command and control tools (including cross compliance measures), farm advisory services, as well as AES.

¹⁴ Water flows through an agricultural landscape (unless captured or diverted in some way). Water in this context is rivalrous in the sense that it is limited and there are competing demands on it that affect its availability/ and for our purposes, quality for others, i.e. subtractability (incl. farmers) and non-excludable in that it flows through the landscape (both on the surface and in subterranean modes) and is difficult to assign property rights to (perhaps until it becomes to be in a more containable and accountable form such as an irrigation channel).

suggest there may be lessons from the CPR literature which may help to understand AES and its relationship to farmer behavior. The complex character of diffuse nutrient leakage from agriculture suggests that the path for change may lie in enabling local collective action in response to measurable localised catchment problems (FAO 2007).

From a catchment management perspective, efforts to reduce fertiliser leakage must be provided at a sufficient level at the scale of the catchment to attain desired objectives. Kuhfuss et al., (2016) in a French context, reports on an approach to AES design called ‘collective conditionality’, which is a measure to attain a collective threshold of environmental efforts in a catchment area. In this approach, individual agri-environmental contracts are coupled with specific bonus incentives that are only available if a minimum level of catchment-wide participation is met.¹⁵ Application of AES in this form would need to be measurable and performance-based to show that production efficiencies and water quality goals are compatible and can be achieved simultaneously (McGuire et al. 2013). This would make visible the environmental benefits of farmer actions (or vice versa) in a localised context. Certainly ‘the CPR theory literature shows the possibilities of galvanizing small-scale collective action around environmental problems’ (Ostrom 2000). However, building such collective action is not without its challenges particularly in relation to demonstrating that the effort (to develop rules, build trust, monitor and sanction) would be worth the collective benefit.¹⁶ Aside from this, there is also considerable uncertainty about the degree to which farmer norms may hinder behavioral change (Saunders 2016), even in the face of monetary incentives designed in a two-stage performance-based payment arrangement. Additionally, given that the adverse effects of nutrient leakage are likely to occur remote from the farm source, demonstrating mutual benefit would not be straightforward, even with ‘collective conditionality’. That said, lessons from CPR management research may be able to generate insights for more effective AES implementation, particularly around how to garner collective action at localised catchment scales.

¹⁵ This design has some similarities with most international treaties, where a minimum number of signatories is required for the agreement to become binding. This clause is important, because without it, few countries would be willing to commit themselves without such a guarantee not to suffer from others’ free-riding.

¹⁶ Lundqvist (2004) argues that in the Swedish context, this is trying to be done under the EU Water Framework Directive by setting up farmer collective action around eutrophication mitigation in localized catchment organizations called ‘joint property water management associations’.

6.3 Norm changes

Saunders (2016), while exploring farmer's norms about what constitutes a 'good farmer in relation to socio-environmental behaviour, found that while there appears to be substantial divisions between conventional and organic farmers on this issue, conventional farmers may be open to adopting better agri-environmental practices if they were convinced that over time that these practices would increase the viability of their farm. These findings suggest that while productivist norms (seen as high input, high yield, high efficiency) are unsurprisingly predominant among conventional farmers, these norms are also susceptible to change over time, particularly if agriculture is seen as an unstable field, where there are clearly various institutional and market pressures acting in concert for socio-environmental reform. Extending this argument, Saunders (2015) suggests that AES may foster capacities among farmers that are conducive to the acceptance of sustainable farming practices¹⁷, which may increase farmers receptivity to change behaviour under circumstances where conservation practices become more favourable. For example, where it is evident that there is a direct connection between production practices and land degradation on their own land or through demand-driven factors such as growing market demands or increased price margins for organic produce. The problem that is confronted here will not be fully addressed just by equipping farmers with additional knowledge about the adverse implications of their farming practices for their own and other farmers' futures as well as the Baltic Sea more generally; particularly when such knowledge is incongruous with deeply held norms that underpin farming practices. Saunders (2016) suggests that growing economic incentives both through opportunities in the market and governance mechanisms, such as AES are unlikely to be sufficient drivers of change to address water quality and other agricultural-related environmental concerns in the short-term; even if it appears to be rational in terms of material costs incurred by farmers to do so (Gavriletsa and Richerson 2017). The forces for change outlined above are predominately aimed at individual farmers as land managers and do not address (at least fully) social norms that are unaligned with what might be regarded

¹⁷ The disposition to change towards more favourable agri-environmental practices is likely to be stronger in AES with a greater collective action dimension as discussed below in the context of the eutrophication problem.

as sustainable farming practices¹⁸. Experience elsewhere and in other fields has shown that collective action initiatives in common pool resource settings may be more empowering of participating actors and effective in undergirding social change around resource use than provision of individual incentives (alone). Collective action initiatives, such as the innovative French ‘AES collective conditionality approach’ example discussed above, that involves performance-based economic incentives, localised scale feedback loops indicating links between action and environmental state (incl. agricultural growing conditions) in a peer-based collaboration arrangement, may be more effective in building norms around nutrient run-off and sustainable farming practices more generally. While free rider problems are still likely to be a persistent challenge, there are at least two factors which might militate against this. First, there is an incentive to participate to meet the eligibility requirements for an initial AES payment and the second payment because it is conditional upon achieving catchment-wide improvements in water quality.¹⁹ This second performance-based payment (dependant on effective collaborative action) may also provide social incentives, such as peer group pressure on recalcitrant farmers to actively participate.

In general terms, a hybrid AES/co-management (collective action) institution is likely to be seen as a more effective policy response than heavy handed regulatory control (where compliance is mandatory) approaches to environmental management in agricultural settings for several reasons. While it can be argued that the more conventional AES design may be limited in their capacity to generate norm changes among some farmers, it can also be suggested that a hybridised AES that fuses individual incentives with localised collective action (in a type of co-management arrangement) may offer a promising way forward. This is an argument that has also been forwarded by others – see (FAO 2007; Kuhfuss et al. 2016).

While the policy related suggestion of a hybrid AES/co-management institution may have some traction, the longer-term ambition is, or should be, to support norms among farmers that embed environmental actions

¹⁸ In the farming context, Saunders (2016) argues that there are different social norms that guide what is seen as good farming practices among different types of farmers in Sweden.

¹⁹ This requires a threshold involvement of farmers in the scheme. Clear attribution of the causes of changing water quality (an assumption of this scheme) may result in complex methodological problems, which could turn political if payments are disputed or where there is a complex of factors that affect water quality in the catchment and attribution is more difficult.

with acts of productive value (to the farmer), so that they pass unobserved or unremarked on as the ‘proper’ role of the farmer. Achieving this however, may be to some extent dependent on how ‘widely’ farmers conceive the role of the farmer in society, i.e., whether emphasis is placed on farmers as an efficient producer of food and fodder (productivist agriculture) or as a provider of range of private (food) and public goods such as environmental good and services (multifunctionality).

6.4 Sum-up

It is clear that increasingly pressure from policy and market forces is being brought to bear on farmers to improve their environmental performance. The empirical evidence presented by Saunders (2016) as part of this project suggests that environmental considerations in farming practices (at least in Sweden) vary considerably between different types of farmers. The results indicate that conventional farmers were concerned primarily with optimising productivity as well as ensuring the ongoing ‘sustainable use’²⁰ of their farms. Alternative farmers, on the other hand, tended to see productivity as including a wide range of socio-environmental goals with diversification strategies, including the production of public goods. This finding reinforces the point that the deeply held norms of what constitutes the proper role of the farmer and its links to notions of productive value may be key to understanding the possibilities of a shift to a more sustainable agriculture. The results of this study do not however support a view that perspectives and practices between these two types of farmers are irredeemably polarised. It was evident that some conventional farmers not only make decisions in terms of production optimisation, but also see themselves as stewards of the land who respect and care for local environments. It seems to follow that such farmers would be willing to consider and perhaps accept changes to their existing production practices, if such changes promised to make their farms more economically viable or if the productive capacity of their land was threatened by not taking action. This raises the sticky ‘problem’ in terms of our focus on cooperation around eutrophication mitigation measures that the major ‘beneficiaries’ of farmers reducing nutrient leakage from agricultural land are not the farmers themselves²¹ but remote water bodies (and their users), such as the Baltic Sea. Arguably, the

²⁰ Seen largely as productivist norms.

²¹ Noting that reducing nutrient run-off would mean less input costs for farmers.

conventional farmers, at least to some extent, see that optimising productivity and giving greater environmental consideration in farming practices as a zero-sum game, where trade-offs need to be made between what may be seen as conflicting goals. Agri-environmental payments can be seen as compensation payment to farmers for the costs of implementing environmental practices. Whether, or the extent, that this works as an incentive to reform their farming practices in light of environmental concerns, is difficult to say – some farmers may be incentivised by other factors – keeping in mind that AES are not the only governance mechanism in place promoting environmental outcomes in land management. In Sweden, and most other EU countries, there are co-existing range of policy mechanisms affecting land management in addition to AES, including regulation (including cross compliance measures) and farm advisory services – whether these measures act in a complementary or reinforcing way it is difficult to say. Market forces are also likely to be playing a role here as well. Whilst claims of local environmental stewardship may not necessarily relate to changes in farming practices that give improved environmental outcomes, the recognition that both conventional and alternative farmers see environmental management in loose terms to be part of good farming practice provides at least provides a basis for ongoing engagement with farmers about environmental reform.

7. Building a broader understanding of the roles of cooperation in marine environmental governance – Assembling perspectives

7.1 Introduction

The results from this research project indicates that to successfully manage transnational environmental such as eutrophication and over-fishing, it is necessary to consider actors' interests, knowledge, and management components. Moreover, transnational environmental problems do not only require international agreements, but as importantly, national willingness and capability to turn the agreements into effective national frameworks that promote local willingness and capability to contribute adequately. It is also important to consider dynamic aspects such as adaptation due to changing circumstances and interactions between governance levels. All these aspects are of potential relevance when studying marine ecosystem disturbances or resource use, but depending on type of problem, some aspects can influence outcomes more than others. In Table 3 below, key components of what can be labelled *cooperative problem-management* are given for each governance level, together with empirical examples.

Rather than adopting a hierarchical perspective in the analysis of regional, environmental cooperation that departs from global treaties, continues via regional and national governance levels and view local levels as where implementation of already decided policies are to be carried out, the discussion in this chapter starts with the local level. The main reason for this is the pivotal role played by local actors and institutions. Arguably, cooperation can be successfully undertaken at local levels also without influence exerted from governance layers above, while the opposite is rarely observed in the sense that regulations at national and international levels that are not perceived as legitimate and reasonable at local levels tend not to be successful. Thus, even though coordination from above can be valuable –

even necessary – cooperation at the local level is typically required for effective outcomes.

Table 3. Cooperative problem-management: Components and governance levels.

Cooperative component	Governance level		
	<i>Local</i>	<i>National</i>	<i>Transnational</i>
<i>Interest-based</i>	Cooperation among local stakeholders with divergent interests.	Laws and programmes on environmental taxes and subsidies.	Treaties, EU, regional agreements.
<i>Knowledge-based</i>	Cooperative mechanisms to promote “blended knowledge”.	Cooperation among NGOs and sector organisations.	Acquiring legitimate knowledge to underpin international agreements.
<i>Management</i>	The role of norms in local management.	Interaction between policy instruments.	Compliance without sanctions.

It should be noted that while it is necessary to consider the potential relevance of all aspects in Table 3 when analysing the effectiveness of existing governance institutions, this does not necessarily imply that such a framework can be used as a blue-print for *designing* new institutions. For designing new institutions, the suggested framework may be used as a point of departure, but a deeper contextualisation is then required. Without such a contextualisation, appropriate advice cannot be given.

In the following sections of this chapter, concrete results will be discussed in relation to collective problem-management.

7.2 Cooperative problem-management components at local levels

Cooperation among local actors and stakeholders does not require shared interests. Quite the contrary, cooperation may benefit from dissimilarities among participants, because agreements and exchanges can then be made mutually beneficial. Based on the assumed self-interest of resource users, for example farmers, programmes to alter incentives such as AES have been tried. Although there are plenty of examples where such changes in indivi-

dual incentives – both by increasing costs for fertilisers and chemicals with negative side-effects on the environment, and by subsidising land-use initiatives that have positive effects – have changed behaviour in expected directions, the results of this project show that such attempts to alter individual incentives do not co-exist without friction with subjective norms among resource users. When incentive programmes match reigning norms among resource users, powerful synergies can evolve, but when they do not match, outcomes are hard to predict. In fact, such programmes have been described to sometimes crowd out established norms and make them wither away. Furthermore, such withered away norms are often hard to recreate.

Arguably, the main difference between individual incentives and norms as drivers for change is not related to self-interest regarding the former, and altruism regarding the latter. Rather, self-interest seems to be a key component of both. The uneasy relationship between norms and incentives rather seem to be due to contextualisation and adaptation. While AES programmes may seem reasonable from a general point of view, they have typically not gradually emerged in a particular locality, in a particular group of people. In contrast, norms emerge incrementally, typically reflecting collective action outcomes that have been beneficial, or at least not disadvantageous, for the group (which not necessarily imply that all group members have benefitted), as have been shown in the literature on Common Property Resources. Thus, while AES programmes are flexible and can be used to promote behaviour that have positive effects further away from the resource users, but lack contextual roots, norms are contextually adapted, but have low degrees of flexibility and are focused on the benefits of the community.

Knowledge, and lack thereof, influence what extent potential for mutually beneficial cooperative outcomes are realised. It often makes theoretically neat solutions to solve collective action dilemmas unworkable among games that real actors play. While increased knowledge often, but not always, facilitate cooperation, both knowledge and uncertainty can be made used of strategically, and distributions of knowledge and uncertainties can become important power resources. Results from this project exemplify that uncertainties related to the specifics of nutrient leakages to the Baltic Sea can undermine the legitimacy of policies that seem reasonable at higher governance levels. While it has been shown that (a) measures to substantially reduce nutrient leakage to the Baltic Sea most likely are cost-effective at the aggregate level and leakages from individual countries can be estimated with reasonable precision (Ahtiainen 2012), this is generally not the case for individual farms. It would be too expensive to measure not only

run-off from individual plots, but as importantly to what extent these leakages eventually end up in the Baltic Sea. Because individual farmers should not be required for more than actual run-offs from their plots, legitimate payment schemes are difficult to develop. Thus, due to uncertainties that cannot be cost-efficiently eliminated, solutions that all involved actors find legitimate are hard to negotiate, and the eventual outcomes typically is either no payments for nutrient leakage or taxes on fertilisers. Neither is efficient from an economic point of view, since no payments means that individual farmers have then too weak incentives to reduce leakages, and taxes do not discriminate between different propensity for leakage.

Summing up, the findings of this project indicate that construction of legitimate, cost-efficient and robust governance at local levels for sustainability constitutes a substantial challenge. There are no individual policy-instruments that can solve all problems; neither economic, nor formal regulation or soft law policy tools. Rather, forms need to be found for carefully and adaptively balancing individual incentives, norms and knowledge claims in order to improve, or at least not reduce, legitimacy and incentive structures. How to balance these factors depends on contextual factors, which means that management needs to be sensitive to local circumstances, including varying stakeholder interests and norms. More research is needed on how economic incentives such as taxes and subsidies interact with norms on what it means to be, for example, a responsible farmer. Without a deep understanding of these intricate social processes, existing norms on responsibility can become successively diluted.

7.3 Cooperative problem-management components at national levels

It was argued in the previous section that national laws and environmental programmes on taxes and subsidies need to be adapted to local circumstances and reigning norms to be efficient and perceived as legitimate. However, local contextualisation is not sufficient. Congruence and balance among competing sector interests must be sought also at higher administrative levels. Moreover, potential interactions – synergistic and antagonistic – between different policy tools need to be carefully considered, not least regarding how costs and benefits from regulation are distributed among stakeholders and socioeconomic groups. While national regulations, economic incentives and norms or policy interaction have not been studied in this project, the role of sector organisations in relation to governance and

cooperation has been analysed in the sub case on media framings in Sweden of Baltic Sea eutrophication (Jönsson & Karlsson 2016).

It has been showed in this project that even though the simplified assumption that states tend to act rationally to promote national interests in negotiations with other states, it can be necessary to open up the conceptual black box of the state and take a closer look at how domestic sectoral interests can influence government positions. A better understanding of how competing sectoral interests influence governmental positions in transnational negotiations does not only contribute to the analysis of negotiation outcomes. It also sheds light on distributional aspects related to formation of government positions; who has the power to influence government positions, and who has not.

It was showed in the sub case study on media framings of eutrophication that two rather distinct stakeholder positions were formed before the ministerial meeting held in October 2013 on BSAP ES reduction targets; LRF, representing farmer interests and WWF, representing environmental protection interests. These two groups rather successfully interacted with media, feeding them reports, press releases and documents that served to promote their respective interests. As expected from theory, they strategically promoted framings that were believed to efficiently influence the government's position in desired direction in the upcoming negotiations.

It can be argued that mobilisation of sectoral interests in theory can result in policy outcomes that reflect the diversity and strength of competing preferences and thus contribute to a pluralistic democracy (Dahl 1971). However, there are at least three aspects that may complicate relations between stakeholder influence and representation of preferences more broadly. First, as showed in the sub case study on media framing of Baltic Sea eutrophication, competition between stakeholder groups in attempting to influence government positions do not only inform policy-makers about their views and interests, it can also make decision-making to “tremble”.²² Heated competition among stakeholders is easily conveyed into decision-making bodies, which in turn tends to politicise internal decision-making processes. The effect this “trembling” has on the transnational negotiations is uncertain, but it can be hypothesised that it does not promote cooperative

²² A “Trembling Hand Perfect Equilibrium” is a game theoretic term describing equilibria that allow for small probabilities that an actor chose unintended moves. In this report, “trembling” refers more broadly to situations where actors unexpectedly alter negotiation strategies, which may have negative effects upon all parties.

outcomes. Second, the results arrived at in this project have indicated that stakeholder sector organisations at the national level may be more influenced by promoting actor interests rather than reflecting complex norms, compared with views among, for example, local farmers. The comparably strong norms among local farmers on what it means to be a farmer are intertwined with pressures to make a living in complicated ways. It can be hypothesised that that national sector organisations that represent farmer interests tend to focus more on those interests than on deeper layers of norms, although this needs to be corroborated in further research. Third, the strength of sectoral interest organisations may not fully correlate with preferences at lower levels, because transaction costs – how difficult it is to turn individual interests among stakeholders and citizens into effective lobbying power – vary between groups. For example, transaction costs tend to be lower in interest groups with few members that have strong individual interests than in groups with many, but less engaged, members.

Summing up, cooperation at the national level is structured by existing institutions and regulations. Laws and economic policy tools play key roles in modern governance of marine environments. However, sector and civil society organisations as well as various types of stakeholders can influence governance outcomes as well. It has been showed in this project that one way to influence government positions in transnational negotiations is to use mass media to convey framings that are designed to promote stakeholder interests. Depending on how dominating framings become, government positions can be changed in different directions. However, it is also possible that increased competition among competitive frames increase tensions and make cooperative outcomes harder to reach. The resulting “trembling” of government positions can increase uncertainties in negotiations, which may jeopardise mutually beneficial, cooperative outcomes.

7.4 Cooperative problem-management components at international levels

Multilateral treaties, EU Directives, regional agreements and sub-regional arrangements together form institutional frameworks for environmental governance on of the Baltic Sea. With the partial exception of EU policy tools, these institutions are all built on consensual decision-making without formal possibilities to sanction non-compliance. It has been showed in this research project (example of transnational collaboration on reduction of nutrients leakages) that expected collective net benefits from reduced pol-

lution does not guarantee that appropriate measures are taken. Three important reasons why mutually beneficial cooperative outcomes may not be reached are (a) collective action problems and (b) transaction costs and (c) weak epistemic communities.

This research project has shown that collective action challenges in regional environmental governance can be substantial. Two rather different approaches have been taken to overcome these challenges in the areas of Baltic Sea fisheries and abatement of eutrophication. Baltic Sea fisheries is largely a EU competence, and all Member States have to follow the Common Fisheries Policy. In contrast, the Baltic Sea countries are not bound by EU regulations (although some EU directives influence national policies to some extent), which means that they must find cooperative frameworks without much coordination of national policies and in absence of established sanctioning mechanisms. However, although the wide-ranging institutionalisation of fisheries creates high level of governance coherence and has the potential to be more effective and efficient than the comparably soft institutional frameworks that exist for collaboration on reduction of nutrient leakage, underlying tensions and conflicting interests are strong in both cases. Arguably, different opinions on, for example, fish quotas and conflicts of interests among Member States as well as among stakeholders are not so much harnessed by EU competence, but rather internalised into EU institutions. Thus, while fish quotas are set in internal EU negotiations, negotiations on abatement of nutrient leakage by necessity become more explorative and improvised.

A major advantage with formalised insitutional policy frameworks such as the EU Common Fisheries Policy compared with ad-hoc negotiations such as those on Baltic Sea eutrophication, is that transaction costs are reduced in the former. Policy processes have been firmly established, which means that uncertainties are reduced and others behaviour as well as decision-making mechanisms have become easier to predict; political uncertainty has been reduced. However, formalisation and fixation of policy processes, while improving predictability and reduces uncertainty, typically suppress development of new mechanisms and procedures as well as make learning from trial and error more complicated. Thus, depending on type of governance object, distribution of interests, number of actors, issue salience and other parameters, proper formalisation of policy processes may vary.

It has been showed in this project that apart from collective action problems and transaction costs, epistemic communities sometimes substantively influence outcomes at the transnational level. Low ontological uncer-

tainty tends to increase epistemic community coherence, which in turn often makes it more influential. In many situations, such increased coherence improves conditions for transnational cooperation, because political uncertainty related to possible policy and management options is reduced. Our results show that although the coherence of the eutrophication epistemic community decreased because of increased ontological uncertainty (disagreements on whether nitrogen or phosphorous was the main driver of Baltic Sea eutrophication), scientific positions gradually became realigned towards a broadly shared view that primary drivers can differ between sub-basins, and may change seasonally. In contrast, the fisheries epistemic community was found to be more divided, primarily because scientific perspectives – and policy recommendations – often differ between environmental and fisheries scientists.

In sum, this project has showed that transnational cooperation is influenced by all three aspects; collective action problems, transaction costs and epistemic community coherence. Moreover, although these three aspects can be disentangled in theory for analytical purposes, they are mutually constitutive in empirical terms. For example, it can be argued that transaction costs heavily influence collective action problems, as do political as well as ontological uncertainty. Furthermore, epistemic communities, although built on scientific knowledge and established expertise, are hardly entirely and always immune against political biases.

8. Conclusions

This research project has showed that cooperation in relation to governance of fisheries and reduction of eutrophication is constituted and influenced by complex and multifaceted underpinnings. To better understand how governance structures are formed and evolve, interactions between actor interests, knowledge and management at various administrative levels need to be viewed as parts of an interdependent system. Such conceptually informed empirical insight may support interventions in desired directions. For example, a well-designed transnational agreement on reduced nutrient leakage will probably have limited effect, if underlying political and ontological uncertainties have not been thoroughly addressed, and fishery quotas will be of limited value if national and local compliance have not been addressed beforehand. Based on applying this integrative perspective to analyse the project results presented in this report, the following brief conclusions are drawn and recommendations suggested:

- For transnational environmental cooperation to be effective, governments may need to invest more in trying to understand domestic conditions in other countries in order to find additional potential for agreements.
- Showing that joint transnational action to reduce pollution has larger benefits than costs does in no way guarantee successful collaboration. This should rather be a first, necessary step, that must be followed by carefully designed framework, where aspects such as burden-sharing, monitoring, sanctioning and compliance are likely to play crucial roles.
- For governance to be effective, it is important to distinguish between ontological and political uncertainty. When ontological uncertainty is substantial, policy-makers must carefully assess conflicting scientific claims and consider precautionary principles. When political uncertainty dominates, additional resources may need to be invested to map conflicting policy objectives and to broker agreements that mitigate

negative effects on stakeholders and the environment and thus to act as a force for ‘positive change’.

- Stakeholder inclusion and participation is a key component in modern environmental governance. However, when powerful stakeholders frame a problem area in conflicting ways, government policies may become indecisive (“trembling”), which may negatively influence transnational negotiations. To reduce the risk of this occurring, stakeholder positions need to be carefully mapped well before negotiations are initiated.
- Economic incentives can be powerful policy tools, but when they target users that are guided by strong normative or cultural convictions therefore they must be designed and used with caution. When economic incentives and norms are in conflict, valued norms on, for example, individual responsibility, can be weakened or lost and re-establishing such norms can be very difficult. Ideally, economic incentives are designed in such a way so as to be compatible with norms to synergistically influence resource management in positive ways.
- Additional research that targets interdependence between interests, knowledge and management at multiple governance levels and in different issue-areas is needed. However, rather than searching for blueprints and generalised solutions, it is probably more fruitful to increase generalised, scientific understanding, that can be drawn on, rather than applied, when assessing individual empirical cases.
- Moreover, the understanding of how economic incentives and norms interact need to be improved. Schemes for environmental taxes and subsidies influence outcomes in different ways, depending on contextual conditions. Therefore, case studies need to be made in key areas to improve evidence-based underpinning of policies before they are adopted.

9. Literature

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