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COLLECTIVE ACTION FOR THE MARINE ENVIRONMENT: LESSONS FROM SOCIAL DILEMMA RESEARCH

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PREFACE

Scientific knowledge, evolved from environmental psychology and other disciplines, indicates clearly that people can take care of the environment with good results under some conditions. On the other hand, science also reveals some of the obstacles related to the fact that people are people.

How humans think and act regarding environmental problems has been studied in various contexts. These studies are not only interesting to reflect on, but can also form the basis of scientific knowledge to be used by authorities, managers and others with an interest in improving their environmental status.

For those of us wanting to improve the environmental status of the various basins, estuaries or coastal areas of the Baltic Sea, knowledge and tools are both valuable and necessary. The Swedish Institute of the Marine Environment has asked Anders Biel, Professor at the Department of Psychology, University of Gothenburg, to synthesise the scientific knowledge gained from social dilemma research on how to handle common properties in cooperation with other people, regions and nations. This may concern how to handle nutrients, quantities, when and what to fish, and other activities on land and at sea.

Anders Biel is the author of this report and takes responsibility for the recommendations provided. At the Swedish Institute of the Marine Environment, we hope that the report will be useful for personal reflections, as a basis for discussion among stakeholders, and as a contribution to the joint drive to work together to improve the marine environmental status.

Eva-Lotta Sundblad
Scientific Coordinator, Swedish Institute for the Marine Environment
Gothenburg, September 1, 2015

FÖRORD

Under vissa förutsättningar kan vi människor ta hand om miljön och ansvara för att den bevaras. Det finns tydliga resultat från forskning inom miljöpsykologi och andra discipliner som indikerar det. Samtidigt visar vetenskap och forskning också på några av de hinder som finns för att vi ska agera miljövänligt och som hänger ihop med vår mänskliga natur.

Hur människor tänker och agerar avseende miljöproblem har studerats i olika sammanhang. Studierna är inte bara intressanta att reflektera över, utan kan också utgöra en bas av vetenskaplig kunskap som kan användas av myndigheter, beslutsfattare och andra som arbetar för att tillståndet i havet ska förbättras.

För att uppnå en bättre miljö i Östersjön, är kunskap och verktyg både värdefulla och nödvändiga. Havsmiljöinstitutet har gett i uppdrag till Anders Biel, professor på Psykologiska institutionen vid Göteborgs universitet, att göra en syntes över den kunskap som kommit fram genom forskningen kring sociala dilemman och användningen av kollektiva nyttigheter. Syftet är att belysa hur man bör agera för att förvalta gemensam egendom i samarbete med andra människor, regioner och nationer. För Östersjön kan det bland annat handla om hur man ska ta hand om näringsämnen, när, vad och hur mycket som ska fiskas, samt andra aktiviteter på land och på sjön.

Anders Biel är författare av rapporten och ansvarar för dess innehåll och de rekommendationer som ges. På Havsmiljöinstitutet hoppas vi att rapporten kommer att användas, såväl för personlig reflektion som för diskussioner mellan olika intressenter och beslutsfattare, samt även som ett bidrag till det gemensamma arbetet för att åstadkomma en bättre miljö i havet.

Eva-Lotta Sundblad,
Vetenskaplig koordinator vid Havsmiljöinstitutet
Göteborg, 1 september 2015

CONTENT

SVENSK SAMMANFATTNING

Östersjön är till nytta och glädje för många och berör många länder. Det är en gemensam tillgång som utsätts för utsläpp och nedskräpning. Därför är både samarbete och förvaltning nödvändigt, även om det är svårt i praktiken. Inom Helcom samarbetar olika länder för att lösa miljöproblemen i Östersjön. Bland annat görs statusbedömningar angående övergödningen, vilken till stor del orsakas av mänsklig aktivitet. Dilemman uppstår för olika aktörer då de i sin vardag och andra situationer ska besluta om vad de ska prioritera eller välja; egen vinning i närtid, eller gemensam nytta. Detta sker på många nivåer i samhället: lokalt, nationellt, och internationellt.

Sociala dilemman uppstår då beslut ska tas av fler än två parter, där effekterna av besluten även påverkar många andra. Parterna agerar ofta anonymt, och det är alltså inte allmänt känt vad var och en gör. Forskning om sociala dilemman och om handlande för gemensam nytta har identifierat faktorer som stödjer eller hindrar samarbete. Det är såväl experiment som fältstudier. I denna rapport görs en genomgång av relevanta studier kring storskaliga dilemman. Syftet med rapporten är ge råd baserade på dessa studier.

Experimentella studier visar under vilka förutsättningar människor är beredda att prioritera den gemensamma nyttan. En faktor som har uppmärksammats på individnivå är att människor antingen kan vara mer motiverad av att gynna sig själva, eller av att gynna det gemensamma. En annan faktor som särskiljer individer är vilka värden som de bejakar. Olika värden kan vara mer eller mindre starka och kan på olika sätt vägleda vilka beslut människor tar. Hit hör exempelvis miljövärden, vilka har betydelse för miljörelaterade handlingar.

Det finns också faktorer i situationen som påverkar i vilken omfattning individer väljer att samarbeta. Tre situationsfaktorer nämns här: Det ena är effekten av belöningar och straff, men där slutsatsen ännu är oklar. Det andra är kommunikationen mellan parterna, vilken har visat sig vara bra för miljömässigt beteende. Det tredje är ”framing”, det vill säga hur man beskriver situationen. Genom att till exempel beskriva en valsituation i ekonomiska termer stöds egoistiska motiv, medan samarbete understöds om situationen beskrivs i rättvisetermer.

Osäkerhet är ofta betydande i storskaliga dilemman. Man vet kanske inte hur stor resursen är, vad andra gör, eller vad konsekvenserna blir av ens eget handlande. Ytterligare ett bidrag till osäkerhet är att konsekvenserna av ett handlande ofta infaller mycket senare än själva handlingen, och dessutom inte sällan på en annan plats. I den brist på kunskap som finns bedömer människor resursens tillstånd väl optimistiskt, vilket leder till överutnyttjande.

Resultat från naturligt förekommande dilemman visar också att kunskap och förståelse är viktiga. Kunskap är till nytta när övervakning, tillsyn och sanktioner behöver användas, då det är lättare att acceptera sådana styrmedel om det finns kunskap om situationens allvar.

Enbart kunskap om sakernas tillstånd räcker dock inte för att människor skall samverka. Normer kan vara det kitt som gör att människor själva kan upprätthålla samarbete. Normer anvisar hur man kan agera och vad man bör göra. Andra omständigheter som visat sig underlätta samarbete är program för övervakning av resursen, kommunikation, och att obehöriga inte kan nyttja resursen.

Huruvida det är fördelaktigt att den gemensamma tillgången, till exempel ett hav, sköts av privata aktörer eller av en gemensam förvaltning beror på flera aspekter. Till dessa hör hur stor den gemensamma tillgången är (jämför en insjö med ett hav), hur komplext det är att förstå, hur tillståndet för den gemensamma tillgången utvecklas, och i vilken mån den är kommersiellt exploaterbar.

Även den tillit man har till andra personer i sin omgivning samt tilliten till aktörer på andra nivåer i samhället är viktigt för samarbetet.

Rapportens författare, Anders Biel, drar utifrån studierna följande slutsatser av relevans för hanteringen av övergödningen i Östersjön:

En viktig faktor är *kunskap om dilemmats natur*. Om människor har kunskap om problemens art, finns möjlighet att få till stånd en samverkan. Vad gäller Östersjön har bland andra Helcom bidragit till att informera om miljöns tillstånd. Det verkar därför rimligt att anta att det finns en utbredd kunskap om de akuta miljöproblemen, och även vad de orsakas av. Detta har i sin tur resulterat i nationella planer och åtaganden för vad som behöver göras, vilka tyvärr alla inte levt upp till.

Sociala normer kan vara vägledande för hur människor kan agera genom att beskriva vad folk i allmänhet gör. Sociala normer kan också vara av moralisk art, påbjudande, och uttrycka vad människor bör göra i en given situation. Om en part avviker från en påbjudande norm kan det leda till att omgivningen bestraffar beteendet.

Länderna kring Östersjön lever inte alltid upp till sina åtaganden för att minska övergödningen. Myndigheter bör med eftertryck se till att åtaganden följs för att såväl de beskrivande som påbjudande normer ska bidra till samarbetet. Då skulle också *tilliten* till andra parter och aktörer upprätthållas. Även tilliten mellan olika länder kan då fungera, så kallad horisontell tillit. Även den så

kallade vertikala tilliten, alltså förtroendet mellan myndigheter och aktörer på lägre nivå, exempelvis inom jordbruket, behöver stärkas. Om myndigheter menar allvar med sina åtaganden, är aktörer på lägre nivå beredda att anstränga sig.

Parallellt kan nya *styrmedel* behövas som är riktade mot industrier eller sektorer som starkt bidrar till övergödning. Vad som också bör beaktas är arten av styrmedel. Styrmedel skall vara anpassa efter vad som bör göras, och till långsiktiga åtaganden. Rena marknadslösningar, såsom handel med utsläppsrätter leder uppmärksamhet till ekonomiskt tänkande vilket dessvärre uppmuntrar egennyttan snarare än den gemensamma nytta. Det är istället av vikt att fokusera på en framtida och gemensam målbild.

1. INTRODUCTION

The Baltic Sea – a shared responsibility

The Baltic Sea is one of the largest brackish seas on Earth. Its enclosed nature makes it vulnerable to pollution. However, there is an inflow of fresh water from many rivers and an essential inflow of seawater into the Baltic Sea. Several polluters that affect the status of the Baltic Sea have been identified. Among these are both point sources, such as municipal wastewater treatment plants, industries and fish farms, and also diffuse sources, such as losses from agriculture and forestry. These problems are aggravated by the presence of heavy metals.

Activities in many countries contribute to these environmental problems. Nine countries have a coastline facing the Baltic Sea. Another six countries have activities that also affect the catchment area. Thus, to get to grips with these problems, strategies that involve several countries are called for. In order to meet this requirement, HELCOM (the Helsinki Commission) was established. It is the governing body of the Helsinki Convention, which was first signed in 1974 to protect the marine area of the Baltic Sea. HELCOM works to protect the marine environment of the Baltic Sea from all sources of pollution through intergovernmental cooperation between the nine coastline countries: Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden, and also the European Community.

In 1979 a status assessment was carried out, and was based on the monitoring of the Baltic Sea undertaken jointly by all of the contracting parties. Eutrophication was identified as an environmental problem, considered partly to be caused by human activities. Subsequent assessments recognised that nutrients in runoff from arable land may have been a significant source of eutrophication. With its Baltic Sea Action Plan (BSAP[1]) in 2007, HELCOM proposed maximum allowable loads of nutrients, phosphorus and nitrogen, per sub-basin in the Baltic Sea; reductions required to reduce eutrophication to a target level that would correspond to a good ecological and environmental status by the year 2021; and per-country, per-year nutrient load reductions to reach the target level.

[1] Besides BSAP, there are directives, mainly at European level, that address water pollution. These directives will be commented on only where they have implications for policy issues relating to eutrophication.

Map of the Baltic Sea region, according to the Helcom definition. The light green area represents the catchment area of the Baltic Sea. Map from Helcom.

The Baltic Sea – a common good

The Baltic Sea represents a common good, shared by several countries, and benefits many users. In order to manage this common good over time, cooperation between stakeholders is essential. Still, maintaining cooperation is not an easy task. Countries may agree that the inflow of nutrients into the Baltic Sea must be reduced, and by how much. However, a single country may try to limit its share of the reduction, hoping that other countries will take on a larger burden. The countries are facing a dilemma, where governments in each

country may be tempted to act for their own good (known as defection) rather than cooperating for the common good. Similarly, farmers may face a dilemma. Thus, every single farmer may be tempted to use nitrogen fertilisers extensively, thereby increasing his own short-term benefits, while at the same time contributing to negative impacts in the Baltic Sea.

As this example shows, governing the Baltic Sea involves actors at different levels, and designing effective institutions that promote cooperation across many parties is a difficult and complex task. Research on social dilemmas and collective action has identified several factors that promote or prevent cooperation. One should bear in mind that the bulk of this research has been carried out as experiments in the laboratory. In these experiments, the participants are mostly students, not politicians, fishermen or others that are involved in naturally occurring dilemmas. Although valuable to them, the resource available to participants is generally money and not an environmental common good. However, findings from the experimental studies reported here are directly adaptable to real-life dilemmas, although not easily implemented in large-scale[2], real-life dilemmas.

The aim of this report is to give advice to the actors involved in marine social dilemmas, based on scientific knowledge. The following exposé presents a selected review of experimental research that is relevant to large-scale dilemmas, complemented by studies of real-life dilemmas in the marine environment. Findings from these two fields of research will be compared. Where the findings overlap, more valid conclusions that can be drawn about the factors that promote cooperation are described. Finally, some guidelines for reducing eutrophication in the Baltic Sea are proposed. But before the experimental research is reviewed, the structure of a social dilemma is presented.

2. THE DILEMMA STRUCTURE

From time to time, people must choose between promoting their personal interests and benefitting collective interests. Such conflicts have been termed social dilemmas (Dawes, 1980). Some would argue that human beings are motivated only by individual or egoistic concerns (e.g. Hardin, 1968), while others would claim that people carry with them a mixed bag of motives (e.g. Caporael et al., 1989; Etzioni, 1988). This conflict between individual and

[2] In contrast to local dilemmas or dilemma studies in the laboratory, large-scale dilemmas concern situations where action choices are made by people in collectives that are weakly united and where individuals are geographically separated.

collective interests has been highlighted in two well-known anecdotes: the prisoner's dilemma and the tragedy of the commons. Although the prisoner's dilemma does not have direct relevance for explaining behaviour in a social dilemma, it is presented in some detail as it is often referred to in the context of social dilemmas.

Prisoner's dilemma

The prisoner's dilemma (Flood, 1958) describes a situation where two prisoners, independent of each other, are asked to confess to or deny a potential crime. Should one of them confess, and the other deny, the confessor has his sentence reduced while the denier receives the harshest punishment. Should both confess, the confession is rewarded with a smaller reduction than if only one of them confesses, while if both deny they are better off than if they confess, but worse off than if you are a single confessor. Hence, from an individual point of view, confession is the dominant strategy. No matter what the other prisoner decides to do, confession results in a better outcome for the individual. However, this is not true at collective level. If both prisoners deny that they committed the crime, they are better off than if they both confess. One should bear in mind that the prisoner's dilemma applies to a situation where only two parties are involved. In this dilemma, and as pointed out by Dawes (1980), the negative effects of the egoistic choice fall completely upon the other party. Moreover, both know with certainty the choice of the other party. Hence, each party can punish the other for defection, as prisoners sometimes do, or reward the other for cooperation.

Social dilemma

A social dilemma, on the other hand, incorporates decisions from more than two people or parties, and often from many more. This turns a social dilemma into a different dilemma to the prisoner's dilemma. Thus, *results from research on the prisoner's dilemma cannot be applied to social dilemmas*. In a social dilemma, the *effects* and harm of an egoistic choice *are distributed between many others*. Furthermore, people in a social dilemma often act *anonymously*. As a result, those affected may not know who caused the negative effects. For example, should a factory choose not to clean its foul water, people downstream will be affected and will perhaps be unaware of what caused the problem. Moreover, *future costs for cleaning are passed on* to other parties. Another example concerns fish. Each fisherman faces a decision about how many fish to catch. The stock of fish can be sustained, provided enough fishermen exercise restraint. However, if just one or just a few fishermen limit their catch, the stock may collapse and their restraint would be of no help. The second anecdote highlights decisions in a social dilemma. "The tragedy of the commons" was depicted by Garret Hardin as a dilemma where a herdsman comes to the rational conclusion that the positive utility of having an additional sheep on the commons is greater than the negative effects of the

increment of the total number of animals grazing on the same commons. The tragedy is that all rational herdsmen sharing the commons come to the same conclusion, adding more and more animals to the commons, ending as Hardin described it: “Freedom in a commons brings ruin to all” (Hardin, 1968 p. 1244).

Fishingboat in Rönnäng, Sweden. Photo: Shutterstock.

Hardin’s rather bleak view of human nature has been questioned by research. According to Hardin, human beings are interested only, or primarily, in their own private benefits. Others have argued that people carry with them a mixed bag of motives. Some individuals are more likely than others to help others or forsake their own good for the benefit of nature. More importantly, most people can sometimes stand up for the common good, provided that the circumstances are right. Circumstances that affect behaviour in social dilemmas are often referred to as situational. The following examines experimental research on dilemmas that addresses individual and situational factors of potential importance for behaviour in environmental dilemmas, and is followed by field studies of naturally occurring dilemmas in marine environments.

3. EXPERIMENTAL RESEARCH

Research on social dilemmas has contributed mainly to knowledge about the conditions or circumstances under which people are prepared to prioritise the common good over their own private interests. Such knowledge is often presented in terms of individual and situational factors (e.g. Biel & Thøgersen, 2007; Messick & Brewer, 1983).

3.1. INDIVIDUAL FACTORS THAT AFFECT COOPERATION

Social value orientation

Among individual factors, *social value orientation* has received most attention. Social value orientation concerns people's motives in social dilemmas and can broadly be divided into pro-self motives (individual or egoistic) and pro-social motives (cooperative or altruistic). When people are guided by *pro-self motives* their main concern is how they themselves are affected by various choices in a social dilemma: "Were our country to decide to reduce discharges and losses of nitrogen by 50%, how would that affect our agriculture and, ultimately, our economy?" On the other hand, when *pro-social motives* guide their actions, they view the dilemma from a moral perspective and show concern for other people or the common good (Liebrand et al., 1986): "Were our country to decide to reduce discharges and losses of nitrogen by 50%, how would that affect the future condition of the Baltic Sea?" According to researchers working with social value orientation (see, e.g. McClintock & Liebrand, 1988), social value orientation is part of people's *personality***.** This implies that a person's value orientation will be stable over time and across situations. Some research also supports that in real-life pro-socials cooperate to a greater extent than pro-selves. For example, they commute more by public transport and less by private car than pro-selves (van Vugt et al., 1995).

Value system

Expressed in a somewhat different terminology, people may also vary in terms of which *values* they subscribe to. Values are cognitive representations of abstract goals in a person's life (e.g. equality, a world at peace, protecting the environment, social power, ambition). Values transcend situations, guide people's behaviour and vary in importance (Schwartz, 1992). Some of these values (e.g. equality, a world at peace) correspond to a pro-social orientation, while others (e.g. social power, ambition) are compatible with a pro-self orientation. Typically, if people adhere to one pro-social value they are likely to adhere to other values of the same kind and also less likely to have pro-self values. Thus, one may speak of *differences in value system between individuals, organisations and cultures*. In the latter case, dominant political ideologies may

determine which values decision makers adhere to. A common finding is that pro-social values are positively associated with pro-environmental behaviour (e.g. Stern et al., 1999).

Stability versus variability

A noticeable difference between social value orientation and a value system concerns the implicit assumption about how easily influenced each is by situational factors. Variations in social value orientation are assumed to reflect personality characteristics, which in turn are expected to be stable over time. This implies that there is limited room for external influence and behavioural change. On the other hand, although value systems are assumed to have some stability over time, research stresses that *the situation that people are in largely determines the values that are likely to guide their behaviour*. For example, Messick (1999) emphasised the importance of social aspects for behaviour in social dilemmas. The perceived appropriateness in a situation and the rules that guide behaviour are social elements. People often ask themselves: "What kind of situation is this?" If the situation is perceived as a collective problem, it is more likely that the social aspects of one's identity are evoked than if the situation is perceived as a personal problem. Such social aspects can refer to pro-social motives, while personal aspects are more likely to evoke pro-self motives. This view of human behaviour is in line with the assumption that people carry with them a mixed bag of motives. In addition, other studies show that the way in which people perceive a situation can be influenced by how the situation is described. Hence, individual differences should not be over-emphasised. Rather, *behaviour in social dilemmas is to a large extent influenced by situational factors*. For example, when the economy in a country is strong, politicians may be more likely to emphasise environmental values over economic achievements, while the reverse may be true when the economy is perceived as weak.

3.2. SITUATIONAL FACTORS THAT AFFECT COOPERATION

Three situational factors that have been addressed in experimental research could be of particular importance for cooperation in large-scale dilemmas. These are rewards and punishment, communication between the actors in the dilemma, and how the dilemma is described or framed.

Rewards and punishments

Rewards and punishments are external means of influencing people's behaviour in a desirable direction. A common assumption is that the greater the reward or the punishment, the more likely people are to cooperate. However, this assumption may be questioned. An initial remark is that rewards and punishments come at a cost – a cost that may exceed potential benefits. Take the phenomenon of crime as an example. Most people do not commit

crimes. Their conscience tells them not to, and so do social norms about appropriate behaviour. Still, some do. Should the police authority be provided with more resources in the hope that the crime rate will decrease, or could the money be used more efficiently to turn some people into lawful citizens? A second remark is that the effect of rewards and punishments is not linear. It is simply not the case that an extra monetary reward always increases the likelihood of cooperation; it may even back-fire. A third remark is that monetary rewards lead people to defect and preclude attention to, and knowledge about, other utilities such as moral and social norms (Dawes, 1980). Hence, people concentrate on the individual benefits and drawbacks of their behaviour rather than focusing on the social and moral aspects (see page 16 under Framing). In short, they turn the social dilemma into an individual dilemma. Pro-self rather than pro-social motives will guide behaviour.

Presently, too little is known about the potential costs and benefits of coercion and rewards in social dilemmas. This is not to say that rewards and punishments should not be used, only that more research is required to establish the conditions under which such policy instruments are more or less effective.

Communication

Communication is an important factor for promoting cooperation in social dilemmas. Communication increases cooperation for many reasons, including mutual commitments about appropriate behaviour, the development of a group identity and the reinforcement of prior norms, increased trust and positive expectations of others´ cooperative behaviour (Orbell et al., 1988). Group identity makes the social aspects of the situation salient (e.g. Gächter & Fehr, 1999). Once people make commitments, they tend to honour them. For one thing, commitment may impact on an individual's trust in others sticking to their commitments (Ostrom, 1998). Moreover, even if people make their commitments anonymously they follow through (Kerr et al., 1997). Most likely, commitments evoke an internalised or personal norm that commitments should be honoured.

Once people make commitments, they tend to honour them. Photo: Shutterstock.

Negotiation processes provide an illustration of part of these mechanisms, and of the importance of how discussions are conducted. For example, President Carter of the USA established peace negotiations between the Egyptian president Anwar Sadat and the Israeli Prime Minister Menachem Begin at a meeting at Camp David in Maryland, USA. One important ingredient was to get the two parties away from the pressure exerted by the press, and from their own political constituencies. Hence, established identities and loyalties were weakened. This in itself was certainly not enough to come to an agreement. Negotiations went on for months and reached a deadlock. Eventually, one of the negotiators showed a picture of his grandson. A group identity, grandfather, was established. This identity in turn was associated with what a grandfather should do, namely make the world a better one for his grandchildren. Commitments were made (although, sadly, not honoured by followers).

In local dilemmas, face-to-face communication is a natural ingredient in managing the commons. In large-scale dilemmas, where the actors are geographically spread out, it is not easily established. Since face-to-face communication between actors in large-scale dilemmas does not evolve naturally, it is important to create arrangements or institutions where groups of actors can meet. At the same time, their common goals should be defined and emphasised.

Framing

How options, outcomes and actions are described or framed could affect cooperation rates. Frey and Oberholzer-Gee (1997) studied how framing influenced the acceptance of the construction of a repository for spent nuclear fuel in Switzerland. Four municipalities had been singled out as promising candidates. Inhabitants participated in a survey and just over 50% were willing to accept a repository in their municipality. In a second wave, they were

offered an additional financial payment to cover potential drawbacks. The payment varied between 1.6 and 4.8 thousand euros annually. If anything, willingness to accept should increase with the additional payment. As a matter of fact, the acceptance rate dropped to 25%, irrespective of the size of the sum. Why? The introduction of a payment evoked a new decision frame. Previously, acceptance was based on the importance of fair decision processes and considerations about societal utilities. Once a payment was introduced, individual gains and losses came into play. Rather than thinking about, and accepting, a fair procedure for the construction of the repository, respondents started to dwell on the personal risks associated with a repository and the potential decrease in the value of their homes.

In a similar vein, Tenbrunsel and Messick (1999) had two groups of role-playing managers that were asked by their company to allocate their budget to running scrubbers that would reduce emissions of a toxic gas. If the managers ran their scrubber 80% of the time on average, the company would reach its goal of reducing its emissions. In one of the groups a weak sanctioning system was introduced. If they as managers did not comply with the company's policy and instead ran their scrubber for less than 80% of the time, there was a small risk that they would be met with a small sanctioning cost. In the group without sanctions, around 75% of the managers cooperated, while less than 50% did so in the sanctioning group. How did a weak sanction (the risk of an extra cost for not running the scrubber) that was intended to increase cooperation actually reduce cooperation? The answer is that without a sanction, the decision was seen as an ethical one. The right thing to do was to avoid cheating and allocate money to running the scrubbers. Once sanctions were introduced, the decision was framed as a business decision. Because the sanction costs were so low, and there was a cost involved in running the scrubber, costs rather than ethical considerations determined the decision.

Both examples provide evidence that the introduction of financial incentives can turn a social dilemma, guided by norms about justice and fairness, into an individual dilemma where decisions are based on a business frame and where cooperation is determined by a cost-benefit analysis.

3.3 UNCERTAINTY

When people act in large-scale dilemmas, their decisions about which course of action to take is surrounded by uncertainty. For one thing, people may lack knowledge about the problem at hand. In the case of fishing, fishermen may not know the size of the fish stock and its rate of replenishment. Another aspect of uncertainty relates to the lack of feedback between behaviour and its consequences. For example, forestry and farming actors are not directly aware

of their contribution to eutrophication in the Baltic Sea. Each type of uncertainty can severely affect people's propensity to cooperate.

Knowledge and uncertainty

Values and social norms can have a positive effect on cooperation in social dilemmas. However, where values and norms are not *mentally activated* their effect may be small. This mental activation may, in turn, depend on several factors. One such factor is a knowledge and understanding of the problem at hand. Unless people know about the problem, how can they be expected to cooperate in the first place? Such knowledge is provided mainly by natural scientists and taken to a wider audience via the media. Still, knowledge is in itself not sufficient to induce cooperation. This is due to the fact that knowledge is often associated with uncertainty. For example, studies reveal that uncertainty about the size of a particular resource is paired with *optimism*. This means that people harvest more than they should (Gustafsson et al., 1999), resulting in, e.g. over-fishing of a given stock. But even without uncertainty, people misbehave. Studies by Robert Gifford (2000, 2007) address this issue. Gifford has developed a computer-based fishing game where participants can harvest from a stock of fish. Participants in these studies are sensitive to the size of the stock. When the stock decreases they adjust their catch downwards. Yet, despite the fact that they know about the rate of fish regeneration, and the size of the stock after a fishing season (hence no uncertainty), they do not adjust sufficiently and the fishery is destroyed over a number of fishing seasons. This tendency is much stronger in larger groups, (corresponding to a large-scale dilemma) than in smaller groups (equivalent to a local dilemma).

Are there any fish today? Photo: Shutterstock.

Thus, actors must understand that they are part of a social dilemma, and must be informed about the state of the resource and how it develops over time. One should bear in mind that although knowledge is essential, it does not in itself guarantee cooperation.

Timing of consequences

Many environmental problems that are characterised by unsustainable development are of a global nature. Not only are they social dilemmas but they are also large-scale dilemmas. The large scale of the dilemma contributes to the inadequate feedback between behaviour and consequences. This in itself adds to the uncertainty. This uncertainty can be of both a geographical and a temporal nature. The consequences of a specific behaviour in one place may turn up elsewhere on Earth. Behaviours here and now may have consequences that manifest themselves in the future. John Platt (1973) called the temporal aspect of the dilemma a social trap. People enter the social trap by *acting upon present individual consequences while disregarding future collective consequences*. They continue on this trajectory and realise too late that there is no point of return. According to Platt, an obstacle to changing course is that individual consequences here and now are perceived as certain, while future collective consequences are uncertain. Why give up personal benefits now in favour of uncertain collective benefits in the future?

The consequences of a specific behaviour in one place may turn up elsewhere on Earth. Photo: Shutterstock.

The problem of not paying attention to the future has been addressed from another point of departure by Yaacov Trope and Nira Liberman (2003; 2010). Here, two concepts are of importance: *construal level* and *psychological distance*. Events may be mentally construed or represented at a low or a high level. A low level refers to features that are both concrete and here and now. “As a company, we shall reduce our emissions of sulphur by 30%.” A high level relates to an abstract and schematic mental construal. “As a company, we shall contribute to a better environment.” Psychological distance may refer to time,

but also to place and social distance. Events can be perceived as taking place in a near or a distal future, near in space or far away (e.g. in another country), and concern known or unknown people. These two concepts are related such that a small psychological distance (near in time and place, well-known others) coincides with a low construal level, while a large distance is associated with a high construal level. Moreover, a concrete or low-level construal invites thinking in terms of individual consequences, while principles, values and norms are linked to an abstract or high-level construal. "Presumably, principles more easily apply to the distant future, but as the situation gets closer in time, morals and ideologies seem to lose their relevance" (Wakslak et al., 2006, p. 175). Unfortunately, at least when it comes to environmental dilemmas, people have a tendency to concentrate on the here and now.

Like Trope and Liberman, Platt highlights *the difference between behaviours that are guided by consequences here and now and behaviours that are guided by distant-future choices.* These researchers also have in common that they postulate that an ethical point of view is more likely to guide distant future than near future behavioural choices. However, Platt seems more pessimistic when it comes to humans' ability to apply a distal future perspective. Trope and Liberman leave more room for a high mental construal level and associated norms and values to guide human behaviour. However, how to retain this higher mental level over time is an issue that needs to be addressed.

3.4. SUMMARY OF EXPERIMENTAL RESEARCH

Social factors influence the mental activation of values and norms. The importance of framing was emphasised above. In particular, the difference between a market frame and a non-market or social frame has been demonstrated in research. A market frame tends to activate thoughts about benefits and costs, while a non-market frame is associated with thoughts about fairness, justice and what one ought to do. Communication among group members is another significant social factor for the activation of values and norms. Communication elicits a group identity, which in turn makes the social aspects of the situation salient and increases the likelihood that people will cooperate for the common good. The importance of temporal construal should also be borne in mind. Whereas thinking about incidents in the near future tends to elicit more concrete thoughts, often in terms of individual consequences, a distal event tends to elicit more abstract and general thoughts in terms of values and norms.

4. NATURALLY OCCURRING DILEMMAS

A conflict took place in a mussel-cropping and mussel-fishery in the Wadden Sea, a part of the North Sea at the Dutch, German and Danish coast. With many fishermen involved, each stakeholder possessed little knowledge about how much each and every other fisherman fished. Thus, each fisherman continued to fish without restraint, disregarding the aggregated consequences. Applying a social dilemma perspective, Beckenkamp (2009) analysed this conflict and proposed a solution involving several steps: The first step is to identify the relevant stakeholders within the dilemma. Where there are many fishermen, they should preferably be divided into subgroups. In a second step, the relevant action space of each stakeholder is identified. This action space relates to the variation in catch that each fisherman can consider for himself. In a third step, the various combinations of action space for each of the stakeholders should be presented, and each stakeholder should put them in order on the basis of priority. In this way, a better understanding of the dilemma at hand is gained through active participation in this game. For example, it could be clear that each fisherman prefers to fish too much, or that some show restraint while others over-fish.

The Wadden Sea, marked with middle blue colour. Map from Wikipedia, modified.

Knowledge and understanding

As was pointed out above in the context of the conditions needed to balance social dilemmas, the actors involved must have a knowledge and understanding of the dilemma at hand. Still, *knowledge and understanding alone will not result in a stable solution*. A report on the red snapper fishery of the Gulf of Mexico, an ocean basin bordered by the United States, Mexico and Cuba (MRAG, 1997), hints at *why* this could be the case. Red snappers are severely overfished in the Gulf. Bycatch by shrimpers was identified as the single most important cause. More fish than shrimps were caught, and dead fish were thrown back into the ocean. Regulations were proposed, but even though shrimpers were aware that these would help to stop the problem of overfishing, they resented control and regulation. Presumably, egoistic incentives associated with the profits they made on the shrimps loomed larger than collective interests. If people are to voluntarily stand up for the common good, the costs or efforts must not be perceived as too high (see also Diekmann & Preisendoerfer, 2003).

Fish discard in the sea. Photo: YouTube/Fish Fight.

Control and sanctions

But even if stakeholders could agree on refraining from over-harvesting, the situation is extremely reactive to defection by some of the group members. *Control and sanctions* may be called for, and should be easier to accept if a knowledge and understanding of the dilemma have been provided (Beckenkamp, 2009). Through control and sanctions, the responsible institution signals what society expects from each fisherman, but also what each fisherman can expect others to do, i.e. the institution emphasises the importance of social norms.

Research on justice has addressed the issue of *sanctions in social dilemmas*. An interesting theory has been presented by Schroeder et al. (2008). The theory makes a distinction between restorative and retributive justice. The authors argue that a small amount of disobedience should be tolerated. This means that sanctions should not be too harsh after only one transgression. Instead, the goal should be to make restitution to victims and to restore social order. It should signal that the behaviour was wrong, but be forgiving[3]. In other words, it should appeal to the conscience of the transgressor. If, for example, a wastewater plant exceeds its limits for discharges once, a warning could be an appropriate signal. However, consistent defection should not be tolerated. Such behaviour calls for retributive justice, for example in the form of substantial fines. Retributive justice does not only concern punishment. It also reasserts the importance of group values and social norms. Other group members make it clear that reiterated, and presumably intentional, defection will not be tolerated.

4.1 CONDITIONS FOR GOVERNING THE COMMONS

As Hardin assumed that every individual pursues only his or her own interests, his solution to the social dilemma includes "mutual coercion mutually agreed upon" (1968, p. 1247). Each stakeholder has to give away the free right to the common and allow constraints or coercion from an authoritarian government. Dawes (1980) argued against coercion as a standard solution to social dilemmas, and so did Ostrom (1990). Her studies show that many commons have been managed without coercion by authorities. Rather, *social norms have been the cement that unites people and invokes cooperation*. Ostrom (1998) emphasised the importance of the *norm of reciprocity*. For the norm of reciprocity to be salient, certain conditions should be fulfilled. People should have the opportunity to identify who else is involved, assess the likelihood that others are cooperators, cooperate on the basis that others can be trusted to cooperate, refuse to cooperate with those who do not reciprocate, and punish those who betray trust. In local communities where the same people interact over extended periods, social bonds and a common social identity grow stronger.

[3] Support for the importance of initial forgiveness can also be found in Axelrod (1984).

This does not imply that governance of the commons is unnecessary. The commons must be governed, and (at least for local common pool resources) preferably by the stakeholders themselves, see condition 3 below. Examples of local common pool resources are irrigation systems and coastal fisheries. To achieve effective governance, *certain conditions* have been shown to facilitate control (Dietz et al., 2003, p. 1909):

1. The resources and the use of resources by humans can be *monitored*, and the information can be verified and understood at a relatively low cost …

2. *Rates of change* in resources, resource-user populations, technology, and economic and social conditions are moderate.

3. Communities maintain frequent *face-to-face communication* and dense social networks … that increase the *potential for trust*, allow people to express and see emotional reactions to distrust, and lower *the cost of monitoring behaviour* and inducing rule compliance.

4. *Outsiders* can be excluded at a relatively low cost from using the resource…

5. *Users support* effective monitoring and rule enforcement.

These conditions apply more easily to local than to large-scale dilemmas. The challenge is to devise institutional arrangements for larger-scale dilemmas that help to meet these criteria (see also McGinnis & Ostrom, 2008). Some *governance requirements* for large-scale dilemmas have been suggested (Dietz et al., ibid.):

1. Providing *information* about the state of the environment and human actions, along with information about uncertainty[4] and values (market value as well as other values that are even harder to capture, e.g. the value of biodiversity).

[4] Uncertainty is inherent in social dilemmas. This concerns environmental uncertainty (resource size and variation) as well as social uncertainty (behaviour of other stakeholders) (see Biel & Gärling, 1995). Strangely enough, aggregated data that usually contribute to validity may counteract valid knowledge. Dietz et al. mention the northern cod, where estimates by fishery scientists indicated that the stocks were rebuilding, so generous catch limits were established. Unfortunately, this policy was based on aggregated data for the total cod stock and disregarded several other important issues. For example, failure to consider that there were distinct populations with different characteristics and that coastal fishery landed smaller cod, thereby undermining the total stock. The lesson to learn from this example is to bear in mind what the relevant population is when attempting to reduce environmental uncertainty.

2. Establishing *procedures* for dealing with conflicts between stakeholders.

3. Inducing *rule compliance* by establishing governance instruments (see above on restorative and retributive justice).

4. Providing *infrastructure* (physical and technological).

5. Being *prepared for change*.

The first requirement originates from the need to provide knowledge and understanding about the dilemma. The second and third requirements both concern the importance of a formal structure to handle potential conflicts between groups of stakeholders. The next requirement addresses the need for financial capital to monitor resource use and the behaviour of human users, along with providing technologies that obstruct the exploitation of the commons. The fifth requirement recognises that things do change and that institutions must be designed to allow for changes, for example in terms of which rules to apply or which policy measures to use.

Finally, the authors also suggest some *principles* for the robust governance of environmental resources on a larger scale. These principles are analytic deliberation, nesting and institutional variety. It is important that resource-users, interested members of the public and scientists all are *involved in a well-structured dialogue* about the resource. The suggestion by Beckenkamp that knowledge and understanding are important is in line with this principle. Moreover, since governance is not exerted by one "level" alone, institutional arrangements for *governance must be nested in many layers*. As for the Baltic Sea, local levels or municipalities can be represented at national level, at national levels within HELCOM, and in HELCOM and other commissions and organisations within the EU. Furthermore, not all institutions are public sector. Market-based institutions must also be *included, creating a variety of institutional types*.

4.2 COMMUNITY-BASED MANAGEMENT REGIMES VERSUS PRIVATE OWNERSHIP

Rose (2002) contrasted Hardin's solution to governing the commons with the solution supported by Ostrom´s research. According to Hardin (1968), the commons could either be privatised or be governed by authorities. In line with Hardin's solution, Tradable Environmental Allowances (TEAs) can be used based on private ownership. The present European carbon emission trading scheme provides a good example of a TEA. Ostrom has shown that management of common pool resources (CPR) can be undertaken at local level on a voluntary basis by a demarcated group of users. Rose called this a

Community-Based Management Regime (CBMR) for common property resources, which is perhaps a more encompassing term. In particular, Rose compared TEAs with CBMRs.

CBMRs and TEAs have in common that they both relate to property ownership. In CBMRs the property is common; in TEAs it is privately owned. In neither case is the resource open for all to use. Of more interest is perhaps what these regimes fail to share. Some distinctive characteristics between TEAs and CBMRs are mentioned by Rose: (i) In TEA regimes permissible usage is negotiated between legislators and the public. In CBMRs the entitled collective develops its own practice; (ii) In TEA regimes, regulatory bodies allocate allowances to individual holders who can trade these allowances among themselves. In CBMRs, community norms often form the basis for individual allowances and trading is rare. The importance of practice in developing CBMRs is most likely linked to the fact that they have a long duration, while a TEA regime is a relatively new form of governance.

Certain resource characteristics or conditions may favour one or other of the two regimes. Rose mentions three characteristics that could result in different strengths and weaknesses: resource size, resource complexity and commerce in resources.

Resource size

CBMRs often encompass a local and restricted resource. Local actors can monitor each other's behaviour, and there is room for the establishment of norms and horizontal trust (trust among users). Should the same group of actors manage a large-scale resource, social norms may not be there to guide action. Rose takes nineteenth-century whalers as an example. Crews often came from the same towns, where common social norms and customs had developed. At sea they cooperated in capturing whales. However, no norms ever developed that would regulate the total catch of various types of whale, resulting in the decimation of stocks. Long-term governance that resided in the local community was absent. Norms that governed practice at home were not transferred to the new, large-scale environment. Moreover, the problem of monitoring resource-size augmented.

TEAs seems better adapted to large-scale dilemmas. As TEAs are formally structured by governments, they may be easier to encompass within intergovernmental agreements. Moreover, efficient trading requires a thick market. A thick market includes a high number of buyers and sellers. As a result, many transactions take place and prices become less volatile and assets more solid. There are more potential traders for large-scale than small-scale resources. Where trust is established, it is trust between regulators and the

public. Important criteria are whether allowances are fairly allocated and that monitoring allows control of the targeted problem, such as pollutants.

Resource complexity

This concerns the level of use, the total amount of harvest or the cap on any given environmental resource, for example a fish stock. Should the yield be set in line with a maximum amount, bearing in mind that the resource must not be endangered? Or should the yield be related to an economic goal such as the difference between revenues and the costs of extraction? Since many factors other than direct size of catches affect resource size, both solutions may run into problems.

In practice, total caps based on an economic model are seldom used under TEAs. Rather, a cap based on historic practice, for example levels of carbon dioxide pollutants, has been used as a benchmark. This may match perceptions of fairness, and facilitate introduction. At the same time, this solution may face opposition when the total cap is to be reduced (cf. the European carbon emission trading scheme). In fishing, a precise measure of a particular species has sometimes been used. The risk here is that fishermen catch more than their allowances permit, and that this is very difficult to monitor. Since larger species are more profitable than smaller ones, smaller specimens may be thrown back into the sea. The same could be true for bycatch. In CBMRs the responsiveness to variations in the size of the resource is greater. This is true in particular for resources that are stationary and possible to monitor.

Commerce in resources

CBMRs are less sensitive to natural resource variations but more sensitive to changes in commercial pressure. When a sudden demand for the resource from the outside appears, for example for ivory or fish, norms for handling the temptation for individual gain are not in place. Within TEAs, there is an immediate response to variations in demand through the price mechanism. Should CBMRs be exposed to such temptations, authorities should consider regulations and assistance to the local community.

Finally, Rose acknowledged that community resource management is intertwined with human rights concerns. Community management practices are often established by traditional peoples. Hence, to recognize CBMRs and to allocate property rights to the participants is not only a way of regulating the commons; it is also a means of honouring human rights.

4.3 STRATEGIES TO PROMOTE RESOURCE MANAGEMENT

In a similar vein as Rose, van Vugt has identified four strategies to promote successful resource management: information, identity, institutions and

incentives (van Vugt, 2010). Incentives, and in particular economic incentives as they are treated by van Vugt, have been covered above under Framing (see page 16 under Framing). The other three strategies are discussed below.

Information

Among other things information can contribute to reducing uncertainty. This goes for environmental uncertainty, i.e. uncertainty surrounding the size of a resource and how it changes, as well as for social uncertainty or how others use the resource (Biel & Gärling, 1995). With regard to environmental uncertainty, people are generally over-optimistic about the size of the resource, which in turn may cause overuse of the resource (Gustafsson et al., 1999; Gärling et al., 1998). Social uncertainty is closely linked to trust, since people in large-scale dilemmas lack information about the behaviour of others. Reducing environmental uncertainty about a resource, for example a fish stock, requires reliable information about the size of the stock and its rate of replenishment. The reduction of social uncertainty requires information about others' harvesting behaviour. Where many others cooperate, or where reliable trend data indicate that many others have converted from defection to cooperation, social uncertainty is reduced and trust is established (Klandermans, 1992). An important ingredient with regard to information about both kinds of uncertainty is that people have trust in the messenger.

The importance of trust was pointed out by Palmer (1991a) in his study of mussel fishery in Maine. An authority had the right to ban mussel-harvesting if the mussels carried a disease and human health was threatened. The authority undertook testing. However, the test results were kept secret and when the authority ordered the cessation of fishing, trust between the authority and the fishermen was undermined.

It is also worth mentioning that the degree of cooperation depends on the causes that people attribute to a threat against a resource. When the authority proclaimed the mussel embargo, fishermen perhaps suspected that the authority had a motive other than promoting health and did not realise that natural causes, a disease, could have triggered the ban.

Identity

Experimental research shows that where people feel attached to other stakeholders and share a social identity, they are more inclined to cooperate and protect the environment (Brewer & Kramer, 1986; Orbell et al., 1988; van Vugt, 2001). One reason is that they have trust in others to cooperate. A second motive is that they contribute to group interests. An elegant study of lobster fishery by fishermen from two ports in Maine (Palmer 1991b) confirms these findings from experimental research. Palmer showed that fishermen from the port with stronger social bonds than those from the port with weaker

bonds exchanged far more information (via an open radio network between vessels) about the location and supply of lobsters. A sensible explanation of this difference is that social networks breed trust, and social norms develop with regard to the exchange of information – norms that endure. As a result, knowledge about the extent and size of the stock increased. Where ties were weaker, each crew had only knowledge about its own catches.

Institutions

The importance of trust for cooperation was emphasised above. Those who draw upon a resource must rely upon others not to exploit it (horizontal trust). From time to time authorities step in to regulate the use of resources. It is then of utmost importance that stakeholders can trust the authorities (vertical trust) to apply transparent and fair procedures (Lind & Taylor, 1997). This is true for both small-scale dilemmas, such as the regulation of fishery in local waters, and large-scale dilemmas, such as the reduction of e.g. nutrient discharges from agriculture into the Baltic Sea.

5. EXPERIMENTAL AND FIELD RESEARCH: A COMPARISON

Some findings from experimental and field research overlap. Both emphasise the *importance of information* to stakeholders about the nature of the dilemma. Information should be disseminated to politicians, authorities and anyone involved in the dilemma. There is also an agreement that information about the state of the resource and the behaviour of resource-users is essential. The former reduces resource uncertainty, while the latter reduces social uncertainty. Another component that the two kinds of research spell out as important to induce cooperation is *social norms*, in their descriptive as well as in their prescriptive form. Descriptive norms spell out what people do. Hence, *descriptive norms* coincide with the reduction of social uncertainty. *Prescriptive norms* signal what people ought to do in a particular situation. They are moral in nature and situate behaviour in a social dilemma in the moral sphere.

Both areas of research also underline the importance of trust. Experimental research has targeted mainly *horizontal trust*, while research on natural environmental dilemmas also underscores the importance of *vertical trust* (between authorities and actors). In the laboratory, the significance of group cohesion, or sometimes group conflict (see Bornstein, 2003), for cooperation has to a large extent guided research. In the natural environment, as compared with the laboratory, it is evident that many interest groups are involved in using, as well as governing, the dilemma. Hence, the nested and hierarchical nature of the dilemma becomes salient. A particular aspect of vertical trust focused on is trust in regulators, and the importance of fair and transparent procedures.

Experimental research has, to a greater extent, highlighted the importance of *values* and of *framing*. Framing affects how the dilemma is perceived, and which criteria guide human evaluation and behaviour. If the dilemma is embedded in a social context, social norms, values, and trust come into play. However, if it is embedded in an individual context, benefits and drawbacks for the individual become salient.

Finally, one should bear in mind that this comparison builds on a thin layer of research on real-world environmental dilemmas. In addition, far too little attention has been paid to the time dimension in both strands of research. Research, has largely ignored the fact that the environmental consequences of actions in the present often manifest themselves in the future, as have policy makers. Since actors lack feedback on their behaviour, they can ignore the fact that they contribute to environmental degradation.

6. CONCLUSIONS OF THE SCIENTIFIC REVIEW

When it comes to the marine environment and dilemmas, research has targeted mainly fishery. Less attention has been paid to other problems, such as eutrophication or chemicals. Why this is the case is unclear. Perhaps fishery is perceived as a natural "ingredient" of the marine environment, while eutrophication and chemicals are associated with land-based activities. In the former case, there is a direct link between activities at sea and marine consequences. Moreover, in the latter case there is a time delay between activities on land and consequences in the sea. The more complex structure surrounding eutrophication could compound this in that more actors are involved. Whatever the case, more research is called for if we are to gain a better understanding of how to counter eutrophication and the discharge of chemicals into the sea. However, as these problems involve stakeholders other than fishery, and are embedded in different hierarchies, the findings from the research on fishery may not transfer to other domains.

It is not only fish harvesting that is important for the marine environment. There is also an impact from using resources for the production and consumption of other food, as meat and vegetables. Photo: Shutterstock.

Evidently, social norms are important in establishing appropriate environmental behaviour. One should bear in mind though that social norms come in different shapes and guises. In local communities, where the same people interact repeatedly, social bonds and a common social identity grow stronger. Not only can co-operators and defectors be identified, trust among residents also enables norms like the norm of reciprocity to develop. This is partly due to the fact that well managed local resources are mostly community-based, are not open to the world, and are of long duration.

In environmental settings where people cannot observe the behaviour of others, general benevolence norms, or *what people ought to do* in a particular situation, could be activated and could promote cooperation (Biel & Thøgersen, 2007). This applies mainly to *large-scale dilemmas*. In particular, people with stronger environmental values are likely to be guided by such prescriptive norms. However, even among people with stronger values, these are not chronically accessible. People do not always perceive that their behaviour contributes to the dilemma. One reason could be that they lack knowledge about certain environmental problems and how human behaviour contributes to negative effects. Issue entrepreneurs need to inform the public about existing environmental problems. In addition, procedural information about alternative behaviours and how to go about performing these should also be communicated (Dahlstrand & Biel, 1997).

Despite the fact that people are informed, prescribe to environmental values, understand the dilemma structure of the problem and realise that they have a responsibility to contribute to its solution, they may still not cooperate. Cooperation comes at a cost and even if people understand what must be done, it could be seen as too costly. *This is where policy must step in*. However, in order for a policy to be successful, politicians and authorities must be trusted to act for the common good, act on the basis of stated intentions and ensure that people behave in line with regulations.

Information about environmental consequences is also an important issue, as is how it is communicated. Sustainable development is a concept that has attracted widespread attention over recent decades. Perhaps unsustainable development would be a better target: to plan for what should be avoided rather than approached. Eight of the Ten Commandments in Exodus prescribe what should not be done. In natural sciences, sustainable development has been defined in the negative (see Holmberg et al., 1996) and in terms of what nature should not be exposed to. According to Holmberg, the general principles for a sustainable society state that substances extracted from the lithosphere (the solid part of the Earth) must not systematically accumulate in the ecosphere (the part of the atmosphere in which it is possible to breathe), society-produced substances must not systematically accumulate in the ecosphere, and the physical conditions for production and diversity within the ecosphere must not systematically be undermined. Moreover, psychological research shows that negative information draws more attention than positive (Fiske, 1980). People are more prepared to avoid a product that is harmful to the environment than to choose a similar product that is beneficial to the environment (Grankvist et al., 2004). In the finance industry, institutional investors apply “negative screening”, implying that they avoid companies in their portfolio that are judged to be negative in terms of ethical or environmental criteria. However, “positive screening” based on the same

criteria but with a positive evaluation, is rarely applied (Hedesström et al., 2011). In the moral sphere, it could be the case that a specification of what one should not do is in most instances more precise, and a better guideline for evaluation and action, than a specification of what one should do. For example, it could be an efficient strategy to define policies in terms of actions that contribute to the degradation rather than the improvement of the environment. Actors may be unwilling to improve the environmental status, but resent being known as the ones that damage it.

An additional factor that may conceal the dilemma relates to framing effects and incentives associated with behaviour. In particular, *economic incentives have been shown to promote an individual perspective and a focus on private rather than collective consequences*. Where people consider an issue moral, and economic incentives are introduced to influence behaviour, moral motivation is crowded out (Frey, 1997). And once moral motivation has been crowded out, social norms, trust and values no longer guide valuations and behaviour. Moreover, actors concentrate on benefits and drawbacks in the short run and disregard time-lagged consequences. *Hence, the time frame for valuation shrinks.* A social dilemma is turned into an individual dilemma, leaving concerns about the environment and other people behind. As an example, farmers could find it profitable to increase their use of nitrogen fertiliser as they will produce more at a lower cost. However, such use often results in time-lagged eutrophication in rivers and seas, which are consequences that accrue to society as a whole. Here, structural changes in the form of new policy measures may be required.

The dilemma may also be concealed by the fact that people often focus on the near future rather than the distal future. Hence, they think in terms of individual consequences rather than in terms of values and norms. Admittedly, one should expect that people stick to a distant-future perspective, associated with thoughts about values and norms, for a longer time period. However, it could be vital that such a perspective is introduced in a decision process. International negotiations around a common good, such as clean seas, could be a good example. To the extent that each country comes with its own agenda, and discussions start with the presentation of these agendas, negotiations are anchored in the pros and cons for each country. The frame changes if thoughts about the common good and how to preserve it for future generations are used as a starting point for negotiations. In the latter case, it would be easier to anchor in shared responsibility for, and commitment to, what ought to be done.

7. PRACTICAL IMPLICATIONS FOR REDUCING EUTROPHICATION IN THE BALTIC SEA

It has been established that the eutrophication status of the Baltic Sea is troublesome. As the input of nutrients to the sea has its origin in society, the Ministers of the Baltic Sea States declared in 1988 that nutrient discharges should be reduced by 50% between the late 1980s and 1995. Knowledge about which sectors and activities contribute to nutrient inputs is available. HELCOM and various directives have identified arable land, livestock production, shipping and wastewater treatment as important degrading sources. In their fourth pollution load compilation, HELCOM (2004) also identified forestry as a main source of losses of nitrogen and phosphorus (also briefly mentioned in HELCOM, 2011). With the exception of forestry, these sectors have been addressed in the thematic assessment of the effects of nutrient enrichment in the Baltic Sea region (HELCOM, 2009). Despite national programmes in each country around the Baltic Sea to reduce nutrient loads, the situation is far from satisfactory. This should perhaps come as no surprise. The Baltic Sea Action Plan (HELCOM, 2007) was adopted as recently as 2007. New measures take time to implement and inputs of nutrients will continue in the interim. Moreover, to get all parties on board, elements of the measures negotiated and introduced in each country are voluntary, albeit commitments are entered into at the Ministerial level. On the positive side, voluntary agreements increase commitment as they are viewed as internally motivated and not enforced. On the negative side, voluntary agreements can have a negative impact on accomplishment. Although the 1988 Ministerial Declaration stated that nutrient discharges should be reduced by 50% between late 1988 and 1995, by 2006 phosphorus reduction stood at 45%, while nitrogen reduction was just 30%. In particular, reduction targets for agriculture had not been fulfilled.

The potentially negative aspects of voluntary procedures may be related to how policy instruments and declarations are shaped. There are several European policies addressing water quality. Some legally-binding directives (e.g. the Urban Waste Water Directive and the Nitrates Directive) leave room for national choices. Each member state can either declare the whole country as a sensitive area/vulnerable zone or designate sensitive areas/vulnerable zones. In the former case, the provisions of the directive relating to sensitive areas/vulnerable zones must be implemented for the whole country. In the latter, the implementation is restricted to the designated areas/zones only. In addition, monitoring and assessment are left to the member state to control. The implementation of the Baltic Sea Action Plan has been agreed upon by the contracting states. HELCOM, in turn, is responsible for assessing its implementation. So far, national implementation has been seriously delayed, and reporting to HELCOM about measures taken is inadequate (WWF, 2013).

As HELCOM does not have any binding authority, voluntary implementation may account for the lack of progress.

To avoid a lack of commitment both to marine action plans and to a means of carrying them out, some recommendations based on previous scientific reviews and conclusions for promoting cooperation to the benefit of the Baltic Sea are proposed.

- Knowledge about causes as well as consequences of nutrient discharges in the Baltic Sea is essential to improve its present condition. The main sources of nitrogen and phosphorus have been identified. Consequences of eutrophication are well known. Collection of additional information is costly, and economic resources are scarce, decisions must be taken about when sufficient information has been collected to exert pressure on main sectors or sources causing eutrophication. As the knowledge situation the now stands, more emphasis could be put on implementing actions already agreed upon on at the expense of developing new eutrophication indicators and indicator-based assessments. Thus, national authorities and regional bodies should enforce the implementation of actions already agreed upon by concentrating on curtailing activities that are the sources of nutrient loads.

- *Vertical trust*. Having said that, actors must be informed about why they should change their behaviour, and they must also trust policy makers and regulators. *Information* about reasons for change includes the present and anticipated future state of the Baltic Sea, and how it is affected by activities in various sectors. The work by HELCOM has established a common ground for factual knowledge about the state of the Baltic Sea. To further support vertical trust, make sure that all relevant parties are involved in the process that results in policies that aim to regulate behaviour. Involvement entails face-to-face communication and the establishment of social networks. This process also increases accountability as parties make commitments along the way. The parties involved also get to learn about the various perspectives and interests that are represented. With increasing vertical trust, the risk of having to deal with conflicts will decrease. Nevertheless, conflicts will probably arise and resolving disputes in negotiations, where HELCOM can have an empowering role, could be a fruitful governance approach.

- *Horizontal trust*. Involved parties must also trust in other actors' willingness to cooperate for the common good, i.e. horizontal trust must also be established. Just as the involvement of all parties can

breed vertical trust, it can also breed horizontal trust. There is a potential risk though that distrust is maintained if suspicion arises that a country avoids reporting on, or leaves out, implementations that should have been made. Moreover, injustice may be perceived should one country declare the whole country a sensitive area while another country selects only certain areas as being sensitive. If parties are not committed to cooperation for the common good, defection by one party in a social dilemma signals that others can follow suit. To reduce this risk, the reporting process for the implementation of the BSAP should be strengthened. Where rules are violated, sanctions should not be too harsh after a first transgression: they should signal that the behaviour was wrong, but show forgiveness (restorative justice). Consistent violation should not be tolerated however, and sanctions should be harder in a bid to reassert the importance of group values and social norms (retributive justice).

- *Framing*. Finally, the framing of policy issues is important. In negotiations, try to *anchor on a common and desirable future state* for the Baltic Sea. In the first instance, avoid presenting reduction targets for each country. The risk one runs is that parties in the negotiation focus on what is feasible in the short run for "our country" rather than what is desirable in the longer term to manage the common good. In a second step, agreements about improvements that must be made and commitments to strategies that need to be in place in order to reach a desirable state should be established before more detailed plans and policy measures are negotiated. Market-based measures might be one approach to managing shared resources, but they require careful consideration. Regional trading with nutrients (HELCOM, 2009) has been suggested. However, the present European emission trading scheme for carbon, expected to secure cost-effectiveness, leaves a great deal to be desired. Hence, a trading system may not contribute to its prime goal of being cost-effective. In addition, trading turns the focus away from the common good and instead onto financial gains and losses. Where involved countries have an understanding of what ought to be done, there is an obvious risk that they might lose sight of the common good.

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