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## The missing link in marine ecosystem-based management

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# **The missing link in marine ecosystem-based management**

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## **Introduction**

The world's coastal and marine areas are under increasing pressure. Issues of concern include depletion of fish stocks, pollution, destruction of habitats, and biodiversity loss (Halpern et al. 2008; Hoegh-Guldberg and Bruno 2010; MEA 2005; Sherman and Hempel 2008; UNEP 2006; WBGU 2013). These changes are mainly driven by expanding human activity, spurred by demographic change, economic growth, technological innovations, and globalization of industry and trade. The coastal and marine areas are heavily affected by land-based activities and pollution sources, but there is also an increasing interest in the direct exploitation of marine spaces and marine resources. Extensive fishing and shipping activities are now accompanied by rapid development of aquaculture, offshore oil and gas, mining, renewable energy, tourism, and numerous other uses of the ocean. While the sea has always served as a vital source of nutrition, a transport artery, and a repository for sewage and waste, the present human impacts are unparalleled in scale and scope.

The increasing diversity and intensity of marine activities create, on the one hand, potential user conflicts. Various types of users may have overlapping and mutual exclusive spatial claims and interests, or their activities may have adverse effects on other stakeholders. On the other hand, the activities may affect the marine ecosystems and alter their structure, functioning, and productivity. These two aspects are closely linked. If the increasing socio-economic activities are not regulated and conflicts reduced, the marine ecosystems will be degraded, and if the health of the ecosystems is not maintained, their ability to provide ecosystem goods and services and to support current and future uses will be damaged. Hence, there is an urgent need for management solutions that can meet both sets of challenges, i.e., user-user conflicts and conflicts between use of the ocean and marine environmental conservation.

The concept of integrated, marine ecosystem-based management promises to include both aspects (Arctic Council 2013; Curtin and Prellezo 2010; Ehler and Douvere 2009; McLeod et al. 2005; Secretariat of the Convention on Biological Diversity 2004). The concept is based on an

understanding of the complex linkages between ecosystem components and the interactions between ocean, land and atmosphere. The social system is perceived as an integral part of many ecosystems. The fundamental idea is to establish an overarching governance framework that can promote existing and emerging uses of the ocean while minimizing user conflicts and protecting ecosystem integrity and the future delivery of valuable ecosystem services. This means that the ecosystem approach takes both user-user conflicts and the use-environment conflicts into consideration. The ambition is to reconcile ecological, economic, and social objectives, which is to be achieved by the use of best available knowledge, stakeholder participation, coordinated management, systems of monitoring and evaluation, effective enforcement, and a process of continuous learning and adaptation.

There is, however, a discrepancy between ideals and reality. Although the ecosystem approach is meant to provide a holistic framework, it tends to have a more narrow scope when put into practice. As the main concern is to maintain the marine ecosystems in healthy, productive and resilient condition, focus is primarily on the natural ecosystems and the cumulative impacts of human influences, not on stakeholder conflicts, the regulation of ocean uses, and the issues of governance. In other words, the environmental aspects dominate while the regulatory aspects receive more scant attention. This implies that the root causes of ecosystem deterioration and the challenges associated with handling the increasing human activities are dealt with only indirectly or to a limited degree.

In this paper, we address what we regard as a neglected aspect in the current design and implementation of integrated, ecosystem-based management. Our contention is that the coordination and harmonization of the expanding marine activities is not only a significant issue in its own right, but an important condition for safeguarding the environment. We will clarify this by presenting a comparative study of the relationship between the offshore oil and gas industry and the seafood industry in Norway and Viet Nam. The study is based on interviews and meetings carried out in 2013 and 2014 with representatives of the two industries, various government agencies, and research institutions in the two countries; newspaper articles; public plans and documents, and available research.

The remainder of the paper is organized as follows: We start by elaborating on what we have called the missing dimension of marine ecosystem-based management. Then we take a look at the potentials for conflict and synergy between the oil and gas industry and the seafood

industry. In the next section we present the basic characteristics of the two countries, their respective industries, and the relevant governance systems. This is followed by an analysis of the interactions between the two selected industries in Norway and Viet Nam and how the issues of conflict and cooperation have been handled. Finally, we discuss the conditions for balancing and mitigating user-user conflicts and the implications for marine ecosystem stewardship.

### **The missing dimension of marine ecosystem-based management**

The ecosystem approach was developed in the context of the Biodiversity Convention (Secretariat of the Convention on Biological Diversity 2004) and has been acknowledged internationally as a milestone in the management of ecosystems, including marine management (FAO 2012a). At the 2002 World Summit on Sustainable Development held in Johannesburg one of the targets agreed upon was to introduce an ecosystems approach to marine resource assessment and management by 2010. A number of countries have over the last decade developed integrated management plans for their coastal and marine waters (Ekebom 2013; Foley et al. 2010). Similar work has been undertaken for the large marine ecosystems of the world's regional seas (Sherman and Hempel 2008).

Unlike conventional types of natural resource management, which addressed single sectors, species or habitats, ecosystem-based management is about the functioning of the entire ecosystem. It aims at the conservation and sustainable use of biological diversity and ecosystem services. Many different handbooks and guidelines have been developed (e.g. Ehler and Douvère 2009; FAO 2012a; Pomeroy and Douvère 2008; Tallis et al. 2010), and marine ecosystem-based management typically includes the assessment of existing ecosystem conditions and human use patterns, mapping of major trends, identification of ecologically and biologically valuable areas, analysis of the ecosystems' vulnerability to human influences, setting of ecosystem objectives, evaluation of management strategies, and adoption of monitoring systems and indicators to measure the state of the ecosystems and the implementation success. In the implementation of marine ecosystem-based management, spatial planning and ocean zoning are important tools, and the establishment of marine protected areas (MPAs) has become a popular measure.

The ecosystem approach emphasizes the interdependence between human well-being and ecosystem well-being. Attention is directed to the impacts of human activities on the ecosystems and to the many benefits that healthy ecosystems provide. Increasing efforts have been made to

estimate the value of coastal and marine ecosystem services, which in the Millennium Ecosystem Assessment framework are classified as supporting, regulating, provisioning and cultural services (MEA 2005). Nonetheless, a general characteristic of the attempts to advance marine ecosystem-based management is that the ecosystems occupy center stage, while the social and economic aspects are relegated to the background (Ehler and Douvère 2009; St. Martin and Hall-Arber 2008). Focus is on the ecological attributes that are necessary to maintain or restore functioning and resilient ecosystems.

This bias is understandable as a reaction to traditional types of natural resource management (Curtin and Pallezo 2010: 823; Ray 2010: 364). Moreover, to achieve robust and sustainable management, it is necessary to understand how ecosystems work. It is widely acknowledged that more data and knowledge is required about ecosystem properties and dynamics, their spatial and temporal scales, the links between biodiversity and ecosystem services, and the ecosystems' ability to cope with multiple stressors (Haines-Young and Potschin 2010). This suggests that the ecological aspects must be given priority. However, the preoccupation with ecosystems also entails several paradoxes.

First, at the heart of the concerns for the environment lies the harmful effects that human activity is deemed to have – directly or indirectly – on biodiversity and ecosystem services. What can be governed are the human activities and influences, not the entire ecosystems. As pointed out by Foley et al. (2010: 956), marine ecosystem degradation is closely linked to “the current patchwork of complex, uncoordinated, and often disjointed rules and regulations governing use of coastal and ocean waters around the world”. Maintaining the marine ecosystems implies that we have to move away from a sector-by-sector and issue-by-issue management approach and consider the “multiple human uses and their compatibility, conflicts, and synergies with each other and with the ecosystem” (Foley et al. 2010: 956). Consequently, a key issue is how to balance all the interests and priorities that have to be considered within the framework of a comprehensive management approach.

Second, the one-sided focus on the ecosystems tends to disregard the ultimate links to human needs and expectations. It can be claimed that the maintenance of ecosystems and their components have an intrinsic value, but the very notions of “healthy ecosystems”, “ecosystem services” and “productive seas” have a human and utilitarian dimension. The concepts are related to the achievement of human goals. So while environmental policies and management strategies

have to be informed by ecological knowledge, they can never be derived from ecological principles alone. There are no ecological imperatives that unambiguously can be translated into policy recommendations. Instead, there are always many kinds of trade-offs between different types of benefits associated with alternative development paths and management strategies (Haines-Young and Potschin 2010). In the end, decisions about policy and management will be a matter of societal choice and necessary compromises.

It can be argued that the ecosystem approach takes the socioeconomic aspects into account. In all handbooks and guidelines on ecosystem-based management stakeholder participation is highlighted as a key (e.g., COBSEA 2011; FAO 2012a; Secretariat of the Convention on Biological Diversity 2004; Reed 2008). It is recommended to engage a broad range of participants in developing management options. Besides relevant public bodies, representatives of the private sector, academia, non-government organizations, and civil society should be included. Broad participation is seen as decisive for the provision of relevant information and knowledge, the sharing of visions and understandings, the quality of the decisions, and the acceptance of and compliance with the rules and regulations that are imposed. Yet, the problem is that the literature mainly tells how to select stakeholders and facilitate stakeholder involvement. There seems to be a firm belief in the simple idea that by bringing actors together and ensuring adequate information about the vulnerability of the ecosystems and the many benefits that healthy ecosystems provide, everybody will understand the urgency of conservation measures. What is missing is a discussion of the user conflicts and the conditions and mechanisms for reducing or resolving irreconcilable objectives and interests.

### **User conflicts and systems of governance**

To shed light on these issues, we have to turn to other fields of research which have evolved more or less separately from the theme of ecosystem-based management. There is a vast and diverse body of literature dealing with environmental and natural resource use conflicts (for an overview, see Stepanova and Bruckmeier 2013). In this interdisciplinary field, the many types and levels of conflict are emphasized. It is shown that conflicts can be caused by a mix of political, economic and social factors. They can be related to divergent interests and valuations of resources by various actors, access to and ownership of natural resources, scarcity of resources, competing resource uses, and unequal distribution of the benefits derived from the resources or the costs

associated with management measures. Resource use always takes place within a specific, place-based context, but is simultaneously linked up to global resource flows and large-scale economic and political systems.

For our purpose, it may be useful to draw on some strands of this literature as well as more general insights from industrial organization theory, game theory and governance theory. As pointed out in the theories of industrial organization (Knoke 2001; Porter 1985), firms and industries can be competitive or non-competitive. They are competitive if they act independently and contest for the same resources, goods or customers. They can, for example, be rivals in the same product markets, the same factor markets (including space and location), or vie more indirectly through the negative side-effects and externalities that one set of actors generate for others. Firms and industries are non-competitive if they operate in different domains and do not interact in any way or if they are working together to achieve common goals. In the latter case, there can be vertical linkages at different levels of the value chain or horizontal linkages at the same level. Forging and sustaining vertical linkages is normally aimed at improving productivity and the adoption of innovation along the value chain, while participation in horizontal linkages is aimed at creating economies of scale or scope, reducing transaction costs, sharing of knowledge and risks, and establishing common standards. Even without formal or informal cooperation firms and industries can complement each other and indirectly benefit from each other through the provision of public goods and spillover effects.

In coastal and marine management, both business actors, government agencies, researchers and non-government organizations are usually involved. It is a multi-actor and multi-level setting, centered round the exploitation and conservation of common-pool resources. This is a situation typically addressed in game theory (see Ostrom et al. 1994; Baland and Platteau 1996) and governance theory (Pierre and Peters 2000; Van Kersbergen and Van Waarden 2004). Game theory is an analytical tool to help understand and map the strategic interactions amongst individuals and institutions in the management of common-pool resources. As Garrett Hardin emphasized (Hardin 1968), if all actors are gain-seeking and make their decisions independently, this can lead to the destruction of the resources and the ruin of all. The basic question is therefore how to overcome such collective action problems either by government regulations, co-management solutions or the establishment of private property rights.

Governance theory claims that there has been a shift away from hierarchical steering by government to more networked and participative forms of governance which involve a variety of players. Correspondingly, the steering instruments have changed from legally binding rules and standards to economic incentives, procedural regulations, dissemination of best practice, and voluntary agreements. Conventional forms of government have not disappeared, but they now co-exist with new forms in a more hybrid mix. To understand the interaction dynamics in certain domains it is necessary to focus on the actors, the kind and level of interests or concerns they have, their power resources, and the rules of the game. The rules of the game are defined by formal rules, social norms, and the dominant interpretative schemes, concept and assumptions that are guiding the actors' behavior. In combination, these factors structure the interactions and condition the outcomes.

A central issue in the literature on environmental and natural resource use conflicts is how conflicts can be transformed into cooperation and peaceful co-existence by means of participation, dialogue, integration of sectorial management strategies, and development of synergies between resource use activities. Even though co-management and adaptive management are key concepts, the literature points out that there are no simple and standardized recipes to follow. The best solution will depend on the context. Based on these considerations it seems clear that the issues of user conflicts and mechanisms for conflict resolution deserve more attention. We will therefore take a closer look at two industries that are main users of the ocean, i.e., the seafood industry and the offshore oil and gas industry. We start by an account of potential conflicts and synergies between the two industries. Then we analyze how the relationship between the two industries has been handled in Norway and Viet Nam and what lessons can be learned from these two cases.

### **Competition and synergies between oil and fisheries**

The sea has been harvested since ancient times. For many fishers, fishing is not only an occupation but a way of life, and they see the sea as their historical and cultural heritage. Capture fisheries and aquaculture are still vital for many people's livelihood, income, nutrition, and health all over the world. Global fish production has grown substantially over the last decades, mainly due to aquaculture, and estimates show that fish production directly or indirectly supports the livelihoods of 660–820 million people, or about 10–12 percent of the world's population (FAO



2012b). In 2012, the total number of fishing vessels operating in marine waters was estimated at about 3.2 million (FAO 2014). Most of the vessels are small, but a rapid motorization and industrialization has taken place, and the fishing fleet can now operate in increasingly larger areas. According to FAO assessments, about 30 percent of the marine fish stocks are overexploited, more than 60 percent are fully exploited and less than 10 percent are non-fully exploited (FAO 2014).

Large-scale offshore extraction of hydrocarbons took off in the Gulf of Mexico in the 1950s. Since then, offshore production has boomed in many regions of the world and increased tremendously. Today, about 30 percent of total oil and gas production comes from offshore wells, and this proportion is expected to increase in the future. Technological progress in exploration, drilling, exploitation and transportation has enabled offshore production further from shore and from deep-sea reservoirs. Fixed platforms are replaced by floating production facilities and subsea installations, and the projects are becoming more complex, the environment more extreme, and the risks increasing. Currently, offshore production involves more than 17,000 operating platforms worldwide (IFP Energies nouvelles 2012).

Both fisheries and oil and gas activities can have large environmental impacts. According to McLeod et al. (2005), fishing has the most obvious ecosystem effects by reducing and changing the composition of fish stocks, removing top predators from the marine food webs, damaging non-target species, and destroying habitats. Moreover, fishing operations and transport generate waste and emissions of greenhouse gases. The oil and gas industry also affects the marine ecosystems in all phases of activity, including exploration, development, exploitation, and removal of installations. Seismic activity entails acoustic disturbances. Construction and placement of platforms, subsea templates, pipelines and cables can affect the ecosystems adversely. During routine operations, discharges of produced water and pollution from drill cuttings and drilling mud are constant sources of oil and chemicals. Accidental oil spills, leaks, and major blowouts can have destructive effects on the marine and coastal ecosystems, and there are emissions to the atmosphere from flaring, vents, and turbine and fuel exhaust.

At the same time, the spatial co-existence of the two industries can cause significant conflicts (Thesen et al. 2013). The oil and gas industry can be a problem for the seafood industry and vice versa. The introduction of oil and gas activities into an area previously utilized for fishing can affect the fisheries negatively in several ways. There will be more traffic,

disturbances, and risks of accidents. In order to protect production facilities and subsea structures safety zones are usually established and access to the areas is restricted. This can be temporary, as in the case of seismic surveys, drilling of wells, and the development and closing of fields, or it can be prolonged, as in the case of fixed installations. Catches can also be reduced due to the scaring effect of the seismic sound waves and the environmental degradation that the oil and gas operations lead to, and fishing gear and vessels can be damaged because of spills, waste, and other injuries. In addition to these problems, the copresence of the two industries can have more indirect effects. Reduced landings and lower profitability in the harvesting sector will affect all downstream industries. Furthermore, when the oil industry moves into a region, the fishing industry can experience stronger competition for labor, and the costs of input to the industry and the general living costs can be rising. The very profile of the region can also change. Seafood from the region is no longer associated with clean seas and unspoiled nature but with oil and pollution.

Likewise, the fishing industry can create problems for the oil and gas industry. If prospective areas are important and recognized fishing grounds, it can be difficult to get them opened for oil and gas exploration and exploitation. The oil industry may experience that fishing vessels come too close to their facilities. It is well known that installations function as “fish magnets”. Since the areas around the platforms serve as marine protected areas and the lights from the operations tend to attract fish, the same areas can be attractive for fishers. This can pose safety and security hazards, and the costs of surveillance and control may increase. Bottom trawling and other fishing gear may damage pipelines, cables and other installations.

Nevertheless, under certain conditions the two industries can also benefit from each other and reap synergies. Fishers have detailed experience with respect to the sea, winds, weather and operation of vessels. Their knowledge and skills can be valuable for the offshore oil industry, and the fishing fleet can assist in some operations. Similarly, the entry of the oil industry can lead to better weather forecasting, monitoring, and search and rescue services in the ocean areas. Both industries can benefit from specialized suppliers that can transfer technology and know-how between the industries and serve them simultaneously. For the seafood industry, the oil industry can also bring wealth and greater purchasing power to the region, which can increase the demand for seafood products. The infrastructure of the region can be improved; the education and training

opportunities enhanced, and all actors may see the advantage of developing more attractive and vigorous coastal communities.

This means that the relationship between the seafood industry and the oil and gas industry can take many shapes. It can range from no overlap and contact at all to strong competition; from negative coordination in order to avoid conflicts to positive coordination in order to create synergies. The relationship between the two industries will hinge on where the relevant activities are taking place; what characterizes the two industries; the stakes involved, and the governance frameworks that are developed. In the following section we will look more closely into these constellations in two countries that are both important seafood producers and producers of offshore oil and gas.

### **Two coastal nations**

Viet Nam and Norway are dissimilar in many respects. The two countries are located in different parts of the world. Viet Nam is situated on the eastern tip of the Indo-China Peninsula in South East Asia, and Norway is located in Northern Europe, on the western and northern part of the Scandinavian Peninsula. The population size is clearly different. Viet Nam's population is estimated at about 90 million, Norway has only 5 million inhabitants. In terms of economic development, there is also a huge gap. Gross domestic product (GDP) per capita in Viet Nam was in 2013 in nominal terms 1,910 USD while Norway is ranked as one of the top countries in the world with GDP per capita of about 100,500 USD (World Bank 2014). This means that the income level is almost 53 times higher in Norway than in Viet Nam. Norway is ranked on top of the UNDP Human Development Index. Viet Nam has improved its index position in recent years but is still ranked as number 121 of 187 countries (UNDP 2014). Moreover, the political systems are different. In Viet Nam, the Communist Party is the only party allowed to rule, and there are restrictions on the freedom of association, the freedom of speech, and the freedom of the press. Norway is a liberal democracy with a multiparty system, free elections and freedom of the press. According to Transparency International's Corruption Perceptions Index, Norway is ranked as country number 5 and Viet Nam as country number 116 of the 177 countries that are covered (Transparency International 2013).

Notwithstanding these differences there are also many similarities between the two countries. They are of about the same acreage and have long coastlines bordering oceans that are

rich in living marine resources. The seabed and subsoil of the continental shelves contain valuable minerals and other natural resources. Viet Nam has a coastline of 3,260 km and claims territorial waters and a 200 nautical miles exclusive economic zone (EEZ) of one million sq. km, while Norway, with a lot of fjords and islands, has a coastline of 28,953 km and exercises sovereign rights over a marine area of more than two million sq. km.

In both countries the fisheries sector has always played a key social and economic role and has been the basis for livelihood and settlement along the coast. Viet Nam and Norway are still major seafood producers and exporters, and capture fisheries are to an increasing extent supplemented by aquaculture production. In 2012, total catches landed by Vietnamese fishing vessels were at 2.4 million tons and aquaculture production reached 3.1 million tons. The corresponding figures for Norway were 2.1 million tons and 1.3 million tons, respectively (FAO 2014). In Viet Nam, fishing and fish farming account for about 3 percent of national GDP and provide jobs to more than 4 million people. The Norwegian fisheries sector, which is more technologically advanced, has seen a rapid restructuring and rationalization in recent decades. Even though the industry is the country's second largest export industry and makes up 7 percent of total export, its contribution to GDP and employment is relatively modest. The seafood industry accounts for about 1 percent of Norway's GDP, and approximately 47,000 people are employed in fishing, fish farming, processing, trade, and the supply of associated services and equipment.

Another common feature is that both Viet Nam and Norway have become important offshore oil and gas producers over the last 40 years. At the initial stage, the two countries relied heavily on assistance from foreign oil companies, but the governments actively sought to build up national companies and develop their own oil and gas industries. Viet Nam brought in Russian partners and in 1977 established the wholly state-owned Vietnam Oil and Gas Company (PetroVietnam), followed in 1981 by Vietsovpetro, a joint venture between PetroVietnam and RVO Zarubezneft, which was Vietnam's first exploration and production enterprise. Norway, on the other hand, got assistance from Western companies and established Statoil in 1972. The national oil companies soon acquired a leading role. PetroVietnam is now a diversified conglomerate and serves as the primary operator and regulator of the industry. All oil and gas production in Viet Nam is carried out by PetroVietnam's upstream subsidiary – PetroVietnam Exploration Production Corporation (PVEP) – or through joint ventures or production sharing

contracts between PVEP and international companies. Similarly, Statoil controls more than 70 percent of Norway's oil and gas production. However, both countries have in recent decades boosted the exploration and exploitation activities and introduced market-based reforms, allowing for greater foreign company investment and cooperation.

Currently, oil and gas are produced in five basins in Viet Nam (Cuu Long, Nam Con Son, Song Hong, Malay-Tho Chu, and Phu Khanh). Total production of oil equivalents was 26.5 million tons in 2013. The Norwegian continental shelf is divided into three sections (the North Sea, the Norwegian Sea, and the Barents Sea), and the same year total production of oil equivalents was 215.4 million tons. Viet Nam has proven reserves of 4.4 billion barrels of crude oil and 24.7 trillion cubic feet of natural gas, while Norway's reserves are 5.8 billion barrels of oil and 73.8 trillion cubic feet of gas (EIA 2014). The petroleum sector accounts for about 20 percent of GDP and about 30 percent of state revenues in both countries, but the sector's share of export is much lower in Viet Nam (about 15 percent) than in Norway, where oil, gas and related equipment and services represent more than half of total export. The oil companies and the companies that supply the oil industry generate jobs for about 60,000 people in Viet Nam and 150,000 people in Norway (VPBS 2014; MPE/NPD 2014).

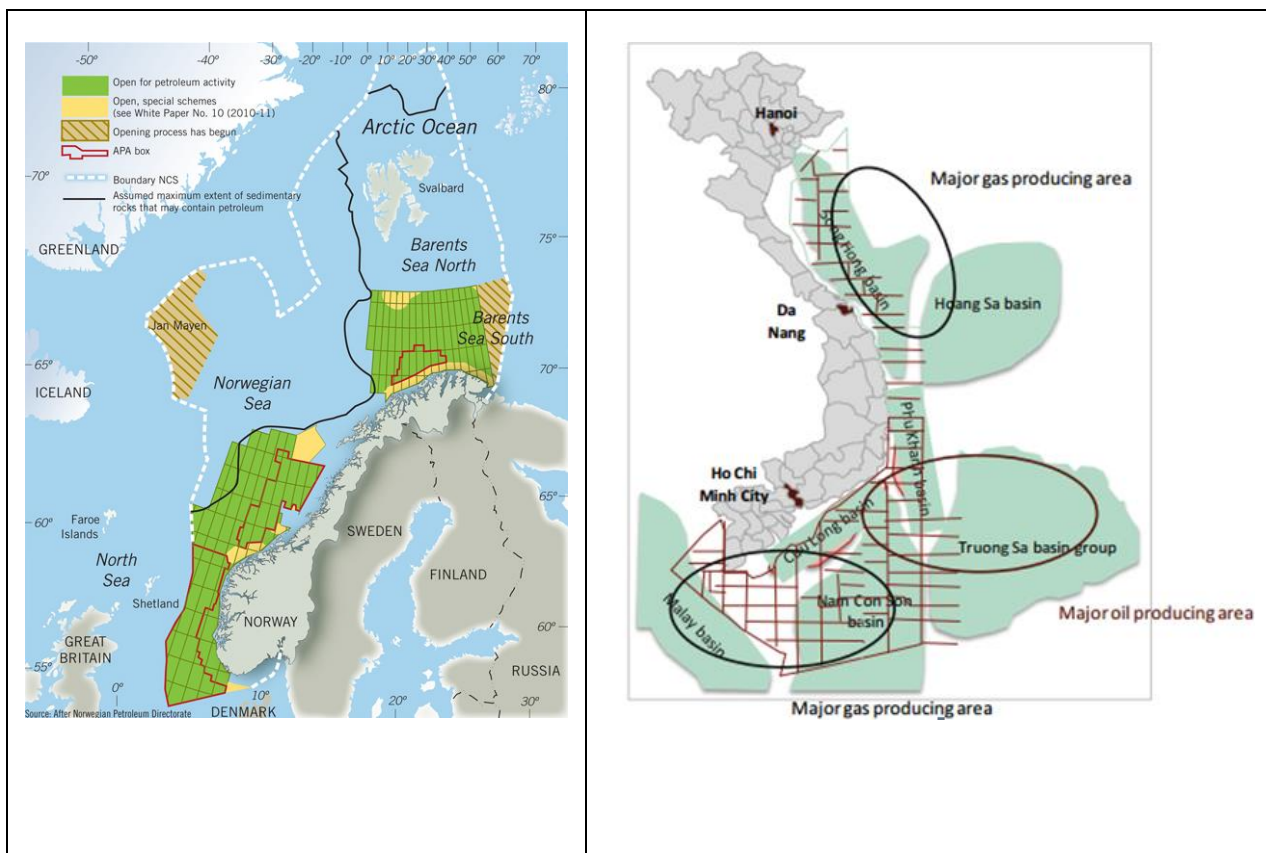
The two countries have their sectoral management systems for the seafood industry and the oil and gas industry, based on international law and cooperation. Viet Nam made a shift from a highly centralized planned economy to a market economy through the Doi Moi reforms in the mid-1980s, but still the national five-year plans play an important role. The plans specify growth targets, key tasks, and guidelines for the development of all regions, while detailed planning is carried out at provincial and lower administrative levels. The responsibility in Viet Nam for fisheries management resides with the Ministry of Agriculture and Rural Development. The ministry is concerned with marine economic development and pursues an open-access strategy with free entry of fishing vessels. Destructive fishing methods are banned, and several marine protected areas have been established, but otherwise there are few restrictions on input or output, no specific management measures are adopted for selected stocks, and there is no zoning of waters for different users. Despite some efforts at establishing co-management systems, community and stakeholder concerns have not been given priority in fisheries management. The ambitions for aquaculture are to increase production both for domestic consumption and export, and to create new jobs and income opportunities in rural areas. Hence, the ministry allows free

establishment in fish farming and seeks to improve the infrastructure for industrializing the sector. In order to promote sustainable development steps have been taken towards aquaculture area planning, regulation of feed and chemicals that can be used, and clarification of the rights and responsibilities of the farmers.

In Norway, the fisheries sector is managed by the newly merged Ministry of Trade, Industry and Fisheries, assisted by the Directorate of Fisheries, the Institute of Marine Research, and the Norwegian Coast Guard. Pursuant to the 2008 Marine Resources Act the living marine resources and its genetic material belong to Norwegian society as a whole. Under the act the ministry may adopt a wide range of measures including access limitation, vessel quotas, technical measures, and the establishment of marine protected areas. For all important species, total allowable catch is set annually in cooperation with neighboring countries, based on scientific advice, and the national quotas are then allocated to vessel groups and single vessels through a negotiation process encompassing all relevant stakeholders. The 2005 Aquaculture Act gives the ministry competence to regulate aquaculture through a scheme of licensing with detailed provisions. There is also a comprehensive regulatory framework relating to food safety and animal welfare, which applies to all seafood production.

The petroleum sector in Viet Nam is managed by the Ministry of Industry and Trade, but all major decisions regarding the oil and gas industry are taken by the Prime Minister's office. The Prime Minister proposes all new laws and regulations concerning the oil and gas industry and approves all new development plans, investment projects, and production sharing contracts. In practice, PetroVietnam is strongly involved in all these decisions. The overall policy objective outlined in the National Energy Development Strategy is to ensure energy supply security for the country's rapidly growing domestic demand. The 1993 Law on Petroleum, as amended in 2000 and 2008, is the principal legislative instrument that governs the sector. The law and supplementing decrees regulate exploration, petroleum operations, licensing processes, contracts, and tax issues. There are also regulations related to environment, safety and health. Since 2004, Viet Nam has held several international licensing rounds. The government determines the blocks that will be made available for exploration, and the oil companies must submit a plan for development and operation. The control of the licensees and their activities is conducted by PVEP on behalf of the authorities.

The Norwegian petroleum sector is under the control of the Ministry of Petroleum and Energy, assisted by the Norwegian Petroleum Directorate. The 2006 Act on Petroleum Activities, which replaced earlier legislation of 1985 and 1996, states that all resources on the seabed or below belong to the state and should be utilized and managed in the interest of the Norwegian people. Opening up of new areas for oil and gas development needs approval by Stortinget, the Norwegian parliament. Oil companies that want to operate on the Norwegian continental shelf must apply for a production license, which is awarded through a discretionary system to a group of companies based on their technical competence, financial strength and work commitments. If the oil companies make finds that are deemed economic viable, they must submit a plan for development and operation of the petroleum deposit (PDO) and a plan for installation and operation of facilities for transport and utilization of petroleum (PIO). Once these plans have been approved, the licensees can start developing the field. There is a comprehensive set of regulations related to safety, health and environmental issues, and the authorities exercise control both through various supervisory bodies and their ownership in Statoil and other companies.



<p>Figure 1a: Area status for the Norwegian shelf in June 2013</p> <p><i>Source: Oil &amp; Gas Journal</i></p>	<p>Figure 1b: Oil and gas basins in Viet Nam</p> <p><i>Source: PVEP</i></p>
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### **Experiences from Norway and Viet Nam**

Oil and gas exploration started in the 1960s in both Norway and Viet Nam, and the potential conflicts between fishing and offshore oil and gas activity soon became apparent. The fishers reacted to the interference of the newcomer. This was first highlighted in Norway, where production from the Ekofisk field in the North Sea started in 1971. Except from a minor gas field which came on stream in 1981, Viet Nam's first oil was produced by Vietsopetro from the Bach Ho field in 1986.

When the oil activity commenced in Norway, the fishers had a strong political voice through the Norwegian Fishermen's Association, and they were backed by the Ministry of the Fisheries. The entry of the oil industry also coincided with a growing environmental awareness internationally. As the first country in the world, Norway got its Ministry of the Environment in 1972. As the petroleum sector grew in scope and significance, there was an increasing focus on the negative environmental aspects of the petroleum industry and the disadvantages that it might imply for the fishing industry. Fishing in the North Sea is mainly pelagic and conducted by mobile vessels, but the fishers complained that they lost access to important fishing grounds and got their gear damaged due to debris left by the oil operations. They therefore asked for economic compensation. In 1976, a large group of trawlers threatened to block the harbor of Stavanger, the oil capital of Norway. The government responded by introducing a compensation scheme for fishers who suffered economic loss as a result of having fishing grounds occupied by the oil industry. This scheme was made permanent by the 1985 Act on Petroleum Activities. The government also launched a campaign for cleaning up the seabed and made the oil companies responsible for pollution, waste and other measures that could cause damage and economic loss to the fishing industry.

While the conflicts were reduced in the North Sea, strong engagement arose around the issues of opening new areas for oil and gas drilling and the inadequate oil spill emergency preparedness. Throughout the 1970s, there were heated debates in Norway on whether the oil and gas activity should remain limited to the North Sea or extended north of the 62nd parallel north.



The blow-out on the Ekofisk Bravo platform in 1977, which was the first major North Sea oil spill, and the capsizing in 1980 of the Alexander Kielland drilling rig, which killed 123 people, underscored the risks and hazards associated with the petroleum operations. As a consequence, the Storting adopted stricter legislation pertaining to safety and environmental protection. However, the parliament also decided to open for oil and gas activity along the coast of central and northern Norway, where two thirds of the Norwegian fishers were located.

In Viet Nam, the oil activities started in the Cuu Long basin, which has been the primary area for oil production since the 1980s. Most of the petroleum has been found in shallow water with a depth of up to 200 meter. The Vietnamese fishing fleet is clearly different from its Norwegian counterpart. The vessels are less motorized, most of them are small and have less than 90 HP, and they can only operate in inshore areas up to 4-5 nautical miles from the coast and in less than 50 meter depth (Han 2007). The Cuu Long basin, which stretches over an area of 60,000 sq. km, is located fairly close to the coast, and this area has been a traditional fishing ground for purse seine vessels. The fishers, with the support of the Vietnamese Fishing Association and the Ministry of Fisheries, complained about oil spills and waste, but their protests were not heard. As the oil industry expanded, gradually larger areas were seized by the oil industry. The fishers now frequently fished close to rigs and platforms, which turned out to be attractive fishing spots. This situation was regarded as hazardous by the oil industry, and the industry asked the government for help. Like in Norway, Viet Nam introduced a safety zone of 500 meter around all oil and gas installations. But unlike Norway, fishing was prohibited in a radius of 2 nautical miles from any part of the installations. The restrictions also applied to subsea installations and for each side along the pipelines. As the Bach Ho-Rong field came to include a group of platforms, the prohibited areas was extended to the whole cluster and became almost 150 sq. km. Based on these zones, the oil industry started reporting illegal fishing to the provincial fishing departments and demanded that the fishers were fined. In addition, PetroVietnam took their own steps by contracting with the border military to protect oil fields and seismic survey vessels; requiring all production companies to have their own vessels, and offering standby vessels from PV Drilling Company and National Southern Oil Spill Response Center. Thus, the initial encounter between the oil industry and the fishing industry was very different in Norway and in Viet Nam. Put simply, in Norway, the oil industry was seen as the problem, and measures were taken to

safeguard the fishers. In Viet Nam, the fishers were seen as the problem, and measures were taken to protect the interests of the oil industry.

During the first decade, the Norwegian debate was highly polarized. The relationship between the fishing industry and the oil and gas industry was frequently portrayed as an either-or; the two industries were mutually exclusive. Gradually, this situation changed. The level of conflict was reduced. Three sets of factors have been important in this context: government policy, initiatives taken by the two industries, and more general structural changes. The declared aim of all Norwegian governments has been to make room for both the petroleum industry and the fishing industry. A number of measures have been taken to facilitate peaceful co-existence. First, before a new area is opened for petroleum exploration and exploitation, the Ministry of Energy and Petroleum must carry out an impact assessment, including consequences for other industries, the environment and society. Second, blocks are not announced if they cover important spawning areas and fishing grounds. The sea off Lofoten and Vesterålen, for example, which is a vital spawning ground for cod, has not been opened. Third, the oil companies must carry out impact assessments as part of their PDOs and PIOs for new fields. These assessments, like the assessments undertaken by the ministry, are made subject to public hearings, and all inputs must be responded to and treated openly by the Ministry of Petroleum Energy before the case is submitted to political decision. Fourth, if, in connection with seismic surveys, exploration drilling, development, and operation, there are potential conflicts of interest with fishing, time and area restrictions or other rules are imposed to avoid problems. Fifth, strict security requirements are introduced and enforced for all oil and gas operations, and the oil spill preparedness has been developed based on a three-tiered concept. Sixth, a number of research projects have been initiated to investigate the effects of oil spills and seismic surveys on fish, eggs and larvae.

In Norway, the two industries also recognize each other as important users of the ocean. The Norwegian Oil and Gas Association and the Norwegian Fishermen's Association have established the joint forum "One Ocean", where the leaders meet regularly. They have also set up joint working groups that deal with issues of conflict and how they best can be avoided or resolved. The Norwegian Oil and Gas Association has made guidelines for seismic surveys, and the two industries are collaborating with the relevant sector authorities in pilot projects and other initiatives to foster coordination and co-existence.

These processes have been facilitated by structural changes in both the oil and gas industry and the fishing industry (Hersoug 2010). From mainly being an oil producer, Norway has more and more become a producer of natural gas, which has less adverse impact on the marine environment. Many new fields have been developed by subsea solutions, and both subsea installations and pipelines must allow for overtrawling according to Norwegian law. More mature fields imply that the amount of produced water per unit of produced oil is increasing, but the oil companies generally have a good track record when it comes to spills and debris. The fishing industry has also changed. The number of fishers and vessels has been substantially reduced over the last forty years. Currently, there are about 6,000 vessels active in fishing. Similarly, the aquaculture industry has been transformed and is now dominated by a few, vertically integrated companies. Another important development is that the oil and gas industry and the fishing industry have become more integrated. Several owners of fishing vessels have invested in supply vessels; people move between jobs in offshore and fishing; fishers have been engaged by the oil companies in their oil spill response systems, and a large number of Norwegian companies today provide services and equipment to both industries.

The development has been different in Viet Nam. The relationship between the two industries has remained very unbalanced. The government has proclaimed the oil and gas industry as one of the pillars of the national economy, and the development of the petroleum sector has been given much higher priority than the development of the fisheries sector. Some measures, though, have been taken to ease conflicts and avoid confrontation. These have mainly been initiated by the oil industry. To keep fishers away from platforms and rigs, PetroVietnam has organized a series of courses for local fishers to teach them about safety and security rules, oil spill response, and the dangers of coming close to the oil and gas installations. Fishers who have been willing to attend the courses and promise not to fish in the prohibited zones, have been provided support in terms of money, insurances, fishing gear, and free life jackets. In 2003, PetroVietnam also introduced a compensation scheme for fishers who got their gear destroyed. This scheme was improved in 2012, but the compensations offered are still very low and difficult to obtain, according to the fishers. The local authorities in the Binh Thuan province, where fishing and oil and gas activity are overlapping, recently submitted a document to the government asking for an annual support fund from the oil and gas industry of 200 billion VND for the fishers in this area (Binh Thuan Online 2013).

Viet Nam has experienced many oil spill incidents. Since 1994, campaigns have been launched to mobilize volunteers for cleaning up the beaches. The oil pollution in the coastal and marine areas derives from multiple sources, of which many are unknown. A large portion is related to shipping in the form of illegal discharges from tankers and ship accidents. The South China Sea, called the East Sea in Viet Nam, is one of the most important trade routes in the world. Almost a third of global crude oil trade and over half of global LNG trade passes through the area (EIA 2013). Oil pollution also comes from land-based urban and industrial sources, brought by the dense network of rivers in Viet Nam. In addition, oil exploration and exploitation is an important source. The most serious incident found place in 2007, when oil from an unknown source continuously hit 20 coastal provinces of Viet Nam for more than six months and caused large damages. Oil pollution is shown to affect marine biodiversity, fishing and aquaculture in the coastal provinces (Duong et al. 2012), but it also has consequences for tourism, sea transportation and many aspects of daily life. Due to the increasing vulnerability to oil spills, the government of Viet Nam in the late 1990s started developing legislation and sought international assistance, including from Norway. The first two decrees on oil spill safety were issued in 1999. It was determined that all oil spills should be reported to the regulator PetroVietnam. A national plan to cope with oil spill incidents was approved by the Prime Minister in 2001. The plan included the establishment of three regional centers for oil spill response in northern, central and southern Viet Nam. Today, these centers, together with PV Drilling, are equipped with recovery vessels, booms, skimmers, storage tanks, and shoreline cleanup equipment. The regional centers are under direction of Viet Nam National Committee for Search and Rescue (Vinasarcom), which belongs to the Ministry of Defense. New and more detailed regulations regarding oil spill response were adopted in 2005 and 2013, dividing the national oil spill response system into three levels (grassroots, regional and national level), and specifying, among other things, the responsibilities for contingency planning, capacity building, and training and exercises. Like Norway, Viet Nam has signed several cooperation agreements on search and rescue and oil spill preparedness and response with neighboring countries.

Viet Nam established the Ministry of Natural Resource and Environment in 2002, and the Law on Environmental Protection was promulgated in 2005. The law contains many provisions affecting the oil industry. Environmental impact assessments are required in connection with large-scale natural resource projects or projects having potential risks or adverse impact on the

environment. There are provisions for the collection, storage and treatment of hazardous waste. All dumping of waste in the waters off Viet Nam is forbidden. A comprehensive environmental monitoring program will be set up for the marine environment, encompassing the impacts exerted by major industries, and the law elaborates on compensations for damage caused by environmental pollution and degradation. As regards oil spills, Viet Nam follows the polluter pays principle when the responsible party is known, while the government pays for the oil spill response related cost in case of “mysterious spills”.

In practice, these rules are not implemented in any efficient way, and the enforcement and monitoring of compliance is rather weak. PetroVietnam has required all oil companies to monitor the environment around the installations. PetroVietnam apparently has data back to 1986, but these data are not publicly available. Environmental impacts assessments, including effects for other industries and society, are not undertaken as part of the planning of new field developments. Studies have shown that the oil companies discharge large amounts of drilling mud and cuttings (Hai 2008). Little is known about how waste is taken care of and if the oil companies, as expected, remove all installations when operations are terminated. The oil spill response system has been improved, but it still has limited capacity. A national network of stations for environmental monitoring has been established, including 17 fixed stations and 2 mobile stations. However, lack of resources and coordination of measurements imply that there is no good database that can be used for management purposes. The annual reports on the state of the environment, which are prescribed by the law, are produced but focus on certain topics such as biodiversity in 2005, rivers in 2006, air in urban areas in 2007, craft villages in 2008, and industrial zones in 2009. The state of the national environment is only reported to the parliament every five year. Furthermore, there are no resources and clear mechanisms for compensation of damages and loss caused by environmental pollution and degradation. In the case of oil spills, very few compensation claims have been settled, and the compensated amounts have only covered 20-30 percent of the assessed losses incurred (Huynh et al. 2008).

Even though the fishing industry and the oil and gas industry in Viet Nam recognize each other as important users of the ocean and contributors to the national economy, there is no organized communication between them at industry level. Vessels involved in the protection of petroleum installations or seismic activity have been sent to take part in search and rescue operations when fishers have been subjected to accident, but otherwise there is little cooperation.

The fishers largely get run over by the oil interests. In the marine waters of Binh Thuan, for example, a seasonal closure was established near Phu Quy Island to protect the mackerel when the fish aggregated to reproduce. This was abrogated in 2003 when the oil companies wanted to carry out seismic surveys in the area. One problem for the fishers is that they face PetroVietnam, a company which is both operator and regulator at the same time. Another is their weak voice. The Vietnamese Fishing Association was merged in 2000 with the Aquaculture Association to become the Vietnamese Fisheries Association, and was reorganized again in 2014, and in 2007 the Ministry of Fisheries was made part of the new Ministry of Agriculture and Rural Development.

There are still conflicts between the fishing industry and the oil and gas industry in Norway, too. Many Norwegian fishers claim that the oil industry always has the upper hand, and the Ministry of Fisheries and Coastal Affairs was recently discontinued as a separate ministry. But today, the conflicts mainly revolve around two issues. The first is seismic surveys. The seismic activity has greatly increased over the last years, and it is increasingly on a collision course with important seasonal fisheries. Several measures have been launched to improve the dialogue and coordination, but the fishers are protesting loudly. Over the last few years a high number of applications for compensation due to spatial conflict between fisheries and seismic activity have also been granted. The second issue is opening of the sea off Lofoten and Vesterålen for petroleum exploration and production. The oil industry is eager to get access to this promising area, but the majority of the fishers are clearly against. This is a very important spawning ground where the continental shelf is particularly narrow, and the area is always occupied by the fishers during the rich seasonal fisheries. In the fight for Lofoten and Vesterålen the fishers have the environmental organizations as their allied. For the environmental NGOs, however, climate considerations have become a more important argument against further oil and gas development.

In Viet Nam, many new pipelines are under construction. This can give rise to more conflicts between the two industries if the subsea installations are not constructed to withstand trawling and fishing remains prohibited in their vicinity. There are also concerns about the oil spill emergency system and the lack of comprehensive environmental assessments. Currently, however, the domestic conflicts between fisheries and oil have been overshadowed by the big territorial conflict between Viet Nam and China. In this dispute both the oil and gas industry and

the fishing industry are called upon to demonstrate and protect Vietnamese sovereignty. PetroVietnam is intensifying its drilling campaign and is signing new contracts on petroleum exploration and exploitation with foreign companies, and the government has launched a new program providing financial support for the building of new vessels for offshore fishing. This program creates new opportunities for shipbuilding and repair yards, such as Song Thu and Vinashin corporations, which used to supply the oil and gas industry. But as both the fishing industry and the oil and gas industry are moving to more offshore areas, new areas of overlap and conflict between the two industries may also emerge.

## **Discussion**

Both Norway and Viet Nam have signed a number of international conventions and treaties that emphasize environmental protection, biodiversity, and sustainable development. The two countries are contracting parties to, among other things, the UN Convention on the Law of the Sea, the Convention on Biological Diversity, the CLC Protocol 92, and MARPOL 73/78. Today, government policies in both countries aim at an integrated management of coastal and marine areas, based on an ecosystem approach. In Norway, integrated management plans have been developed for the Barents Sea–Lofoten area, the Norwegian Sea, and the North Sea and Skagerrak. In Viet Nam, the government issued a decree in 2009 on integrated management of natural resources and protection of the marine environment and islands. This was followed up in the 2012 Vietnam Law of the Sea, which deals with the sovereignty and jurisdiction rights of Viet Nam; operations in Viet Nam's maritime zones; maritime economic development, and the management and protection of the sea and islands. A new system of coastal spatial planning is under preparation; meetings have been held between representatives of navigation, fisheries, oil and gas, and other stakeholders, and a pilot project is carried out in Quang Ninh.

A common denominator of these plans is that they identify valuable and vulnerable areas and extend the traditional instruments of land-based spatial planning to include the coastal and marine areas. Focus is mainly on the ecosystems and conservation, and the objectives are sought to be achieved by means of zoning arrangements, monitoring systems, and the establishment of marine protected areas. The weakness of this approach, however, is that the issues of user conflicts and governance of expanding industrial activities are not seriously dealt with. If the fundamental idea is to establish an overarching governance framework that can promote existing

and emerging uses of the ocean while minimizing user conflicts and protecting ecosystem integrity, these aspects cannot be neglected. Unfortunately, there are few international rules and guidelines that apply to the resolution of user conflicts. Since fishing and petroleum extraction primarily are regulated by the coastal states within their exclusive economic zones, this is left to the coastal states. Typically, the introduction of marine ecosystem-based management is led by environmental agencies and supported by research institutions and non-government organization in which ecologists and marine biologists play a predominant role. The new management systems also tend to be superimposed on existing sectoral planning and management systems that largely live on. Thus, the environmental agencies, which normally are quite weak, take care of the ecosystems, while other agencies with their vested interests take care of fisheries, oil and gas development, transportation, tourism, and so on.

The experiences from Norway and Viet Nam show that it is necessary to pay more attention to the interactions between industries and the way user conflicts is governed. In the literature discussing “The Tragedy of the Commons”, the classical point of departure was independent and self-interested actors who all utilize the same resource. Ostrom showed that communities can be able to sustainably govern a shared resource, provided there is a limited set of resource appropriators, clearly defined boundaries, understandable rules, effective monitoring and sanction systems, good mechanisms of conflict resolution, and the self-determination of the community is recognized by higher-level authorities (Ostrom 1990). Our case is different and involves more large-scale and complex systems. The fishing industry and the oil industry are exploiting renewable (fish) and non-renewable (oil and gas) resources, and both are users of the sea as a common-pool resource or heritage. Each industry itself can have harmful effects on marine ecosystems and ecosystem services, but they can also pose many challenges to each other. As we have shown, there are a number of potential conflicts between the fisheries sector and the offshore oil and gas sector.

These conflicts can be left unresolved or they can actively be dealt with by the two industries and government. Interdependencies can give rise to different reactions (Schimank 2007). They can lead to unilateral actions and adjustments in order to accommodate the other parties. When, for example, fishers avoid fishing close to pipelines because they are afraid that their gear may become snagged, they take unilateral action. The same do supply vessels that give fishing vessels a wide berth because they notice that fishing is taking place. Interdependencies



can also trigger reciprocal attempts to influence other parties or important third parties in order to align them with own agendas and interests. This can be done by means of money and payments, threats of punishment, or by mobilizing expert knowledge in order to convince others about the beneficial effects of certain courses of action. If the interaction is iterative, it may form the basis for mutual negotiations. This is a process of give and take, which can be characterized by issue linkages, reputational effects, and the building of trust and shared understanding. Negotiations can concentrate on negative coordination, i.e. how to avoid conflicts and possible veto points, or they can include positive coordination, i.e. how to create synergies and new and more optimal combinations (Scharpf 1994). But self-regulation by industry has its limitation. The relationship between the industries can be very asymmetrical, and the ability to take part in negotiations can vary. This means that governmental intervention can be crucial for establishing frameworks and rules that structure the interaction. The willingness to engage in self-regulation and voluntary agreements can also be prompted by legislative threat or inducements (Héritier and Eckert 2008).

Our study indicates that Norway has come a long way in resolving disputes and fostering cooperation between competing users of the ocean. Integrated marine management has become something more than zoning the ocean. Concern for fisheries and the environment is now integrated into sectoral legislation. There is a close dialogue between the ministries and agencies responsible for the seafood industry and the oil and gas industry, which involves both the two industries and other stakeholders. The two industries are also collaborating to achieve common goals and find joint solutions. In Viet Nam, the relationship between the fishing industry and the oil and gas industry is still largely a non-issue. Measures have been taken in order to separate fishers and oil and gas installations, and the fishers have been offered compensation in a few cases, but principally it is the oil industry that has precedence.

There is no comparable data available to explore the state of the marine environment and the environmental impacts of the fishing industry and the oil and gas industry in Norway and Viet Nam, respectively. It is therefore hard to gauge what the differences in the relationship between these two industries mean for the marine environment. However, our study clearly indicates that promoting a harmonious relationship between main users of the ocean, such as the fishing industry and the offshore oil and gas industry, also has a bearing on the environment. The mechanisms are quite simple. It can be argued that industrial actors will be guided by their economic interests, but these are never given or fixed. Instead, they are subject to interpretation.

The actors have to clarify their strategic options by weighing the desirable against the possible; the expedient against the appropriate, and with a view to an open and uncertain future. In these learning processes identities, preferences, and orientations may change. When the interdependencies between industries are given attention and defined as a public matter, each industry has to acknowledge the other as part of its environment. The actors of one sector have to consider how their operations affect the resource base, operational conditions, and future prospects of the other sector, and they have to justify their own positions. Inevitably, they have to see their own activities from different angles and perspectives. In the first place, the scope can be relatively narrow and limited to negative coordination, which is what zoning of the oceans is about, but when contacts and negotiation systems are established, the scope can be widened. In a societal context where environment concerns are considered important, the interactions can stimulate technological and organizational innovations to the benefit of the environment.

In Norway, the conflicts between the fishing industry and the oil and gas industry have put pressure on both the authorities and the oil companies. The tensions have been a constant source of improvement of legislation, cooperation models, and technology. This has been beneficial both for the industries and the environment. In the coastal and marine areas of Norway, there is overexploitation of certain species, some habitats are threatened, and there is a risk of acute oil pollution, but overall, the environment is in good condition. In Viet Nam, the situation is bleaker. Many fish stocks are overexploited, destructive fishing methods are still widespread, and coral reefs and other critical fish habitats are rapidly getting destroyed (FAO 2004). Pollution is also a serious problem. One source is the oil activity, from which there have been a number of oil spill incidents. The oil production has impacts on marine biodiversity and has caused economic losses in aquaculture and fisheries in coastal provinces.

Our study also highlight some of the conditions for improving the interaction between competing users of the ocean to the benefit of the marine environment: Firstly, the level of economic development seems to be important. Viet Nam is much poorer than Norway. A typical attitude has therefore been that first we have to think of economic and social development, and then we can care about the environment. Secondly, the relative strength of the industries matters. The oil industry is powerful and advanced in both countries, but in Norway the fishers are relatively better organized, they have a stronger political voice, and the technological level is much higher than in Viet Nam. The same holds for the aquaculture sectors. The huge gap

between the two industries in Viet Nam makes it more difficult to achieve integration and synergies. Thirdly, the way the different industrial interests are represented and taken care of in government institutions will affect the relationship between the industries. In Viet Nam, this is much more skewed than in Norway. PetroVietnam has close links to the Prime Minister's office; the petroleum industry is given top priority, and the oil and gas sector possesses vastly more expertise than the fisheries sector. Fourthly, the environmental management systems are of importance. There must be skilled staffs and monitoring systems that can provide essential information about the status of the marine environment. There also have to be effective systems for monitoring, control, and surveillance of the economic actors. These systems are less developed in Viet Nam than in Norway. And finally, it is crucial that the issues get politicized. There must be room for free and open discussions; transparency and accountability, and leeway for environmental groups and NGOs. The environmental organizations, together with the fishers, have ensured a lively and critical political debate in Norway, but similar conditions have been absent in Viet Nam. In sum, this has implications for the goal of preserving clean and rich oceans.

## **Conclusion**

The world's coastal and marine areas are under increasing pressure. There is a race for space, and the ecosystem approach is now widely adopted as the basis for spatial planning and integrated management efforts. In principle, it includes both user-user conflicts and conflicts between use and conservation, but when put into practice, it usually has a more narrow scope. Focus is mainly on the natural ecosystems, while stakeholder conflicts, the regulation of ocean uses, and governance issues are paid more scant attention.

This paper has discussed what we regard as neglected aspects in the design and implementation of ecosystem-based management. This has been done by studying the conflicts between the fisheries and the offshore oil and gas industry. We have highlighted how these two industries can affect both the marine environment and each other, and we have taken a closer look at the interaction between the two industries and the systems of governance in Viet Nam and Norway.

The study shows that the expanding industrial activities and the relationship between the two industries have been handled differently in Viet Nam and in Norway. In Norway, the real

conflicts have been acknowledged. In order to find common ground, the government has intervened and the two industries have made great efforts aimed at peaceful co-existence through cooperation, compromises, and technological development. This has changed the rules of the game and contributed to raising the environmental standards. In Viet Nam, there has been a growing environmental awareness, and measures have been taken to prevent biodiversity loss and environmental degradation, but the relationship between the two industries has largely been a non-issue. The oil industry has set the terms in close cooperation with a government bent on economic development and energy security. A positive interaction between the fishing industry and the oil and gas industry has been difficult to achieve, and this has been to the detriment of both the industries and the environment.

The general lesson is that the ecosystem approach to marine management must move away from a relatively one-sided focus on ecosystems and pressures that can be critical to biological diversity and the integrity of the ecosystems. The ecosystem approach must adopt a governance perspective and include user conflicts, regulation of industrial activities, and new ways to promote sustainable development in a broad sense. Environmental protection requires dialogue, the balancing and moderation of users, and models of development that foster resource efficiency, productivity, and equitable distribution.

The paper has focused on two important users of the ocean – the fishing industry and the oil and gas industry. However, the coastal and marine areas are affected by many other human activities and pollution sources. The bulk of them are land-based, including coastal development, agricultural run-off, and emissions from cities and industrial centers, but the oceans are also getting increasingly crowded due to shipping, tourism, offshore wind farms, mining and other uses. Many of these activities are crossing borders and have effects well beyond the EEZs of the coastal states. This makes the governance challenges even greater, but it also lends weight to the main message of our paper.

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