

## VI. LARGE MARINE ECOSYSTEM GOVERNANCE – ANOTHER APPROACH

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The management of the global commons has always been a difficult task. Free access to common resources normally leads to the indiscriminate exploitation of such resources for the short-term benefit of a few privileged people or groups. The world is already well-acquainted with this problem with regard to terrestrial land use but the issue is also of rising importance for our oceans.

Three main uses of the ocean have been identified: the ocean as a resource provider, as a transport medium and as a battlefield.<sup>1</sup> All three uses reach back thousands of years. To these might be added a fourth one that unfortunately is becoming more and more visible: the ocean as a dumping ground for all kinds of waste. Research is also being conducted into another potential use of the ocean as an alternative human habitat, and such 'ocean urbanisation' projects may gain importance in the future. Space, water and resources (both living and non-living) are still seen and treated as commons even if under the sovereignty of coastal states.

The Large Marine Ecosystem (LME) approach to ocean governance has evolved from the management of one of these commons, the fish resources in the sea.

### **The impact of fishing on marine ecosystems**

Fish populations and catches are not distributed evenly in the ocean. More than 90% of landed fish is caught in coastal waters or in deeper offshore waters. The North Atlantic with the Norwegian coast and the North Sea, waters around Japan, and upwelling areas off Namibia and Peru provide the highest catches. The South China Sea (SCS) is heavily exploited by commercial fisheries and accounts for around 10% of global fisheries production because of the huge area it covers.

Areas such as the Norwegian Sea or the North Sea have been intensively exploited for more than 150 years with the result that the first problems of overfishing had already become apparent in the late nineteenth century. Awareness of this problem led to the first joint research and management initiatives, manifested in the foundation of the first International Council for the Exploration of the Sea (ICES) in 1902. It was already clear at that time that sustainable management of fish stocks could only be achieved

1. See Philip E. Steinberg, *The Social Construction of the Ocean* (Cambridge University Press, 2001).

through international cooperation merging scientific knowledge and instruments to provide a solid basis for the protection and conservation of fish resources. It was also understood that fish migrate within the North Sea and fish stocks move from the territorial waters of one country to those of another (at that time the territorial sea limit was only three nm).

After World War II fisheries underwent extensive technical modernisation driven by growing consumer demand that peaked in the early 1970s and led again to massive overfishing in the North Sea, this time for herring. Cod and other species were also declining and countries were intensifying their fishing activities, including by extending their operational areas. This led to international conflicts, e.g. when Iceland provoked British fishermen by unilaterally extending its territorial fishing limit from 12 to 50 nm in 1972 (having already extended it from 4 to 12 nm in 1958), and to 200 nm in 1975.

Facing the decline of commercially important stocks and the upcoming regulations and constraints originating from the new United Nations Convention on the Law of the Sea (UNCLOS), it became very clear to fisheries scientists from the ICES that old methods of stock management dealing only with single species were no longer functional and that multispecies and a more holistic approach needed to be developed.

Taking into account the migration patterns of fish and issues of species interaction, the interrelationship of species with the environment, and the impact of fisheries on the ecosystem, as well as the needs of the fishing industry and consumers, the approach of the ICES was to develop a multispecies, multisectoral and multinational management scheme that is ecosystem-based and respects the distribution area of the target species.

A series of workshops and symposia was launched in 1984 to structure and shape such an approach along holistic principles. An important milestone was the first Intergovernmental Oceanographic Commission (IOC) of UNESCO LME meeting in 1991 which strongly recommended overcoming the sectoral approach in marine resources management and specifically in the UN agencies, and developing a transboundary LME multisectoral and multidisciplinary ecosystem-based strategy. In the symposium in 1993, a set of criteria for defining LMEs was agreed upon: LMEs should be of large area (greater than 200,000 sq km), have topographically/morphologically defined boundaries, and a unique hydrography. They can be current-driven systems (e.g. the Benguela and Canary Currents) or semi-enclosed seas (e.g. the Baltic, Mediterranean, the Yellow Seas, etc.). A total of 66 LMEs are defined under this framework, distributed mainly along the coast and covering about 40% of the ocean area. About 90% of world fish catches originate from LMEs.

## The LME approach

The LME approach includes five modules covering all aspects of management of marine resources:

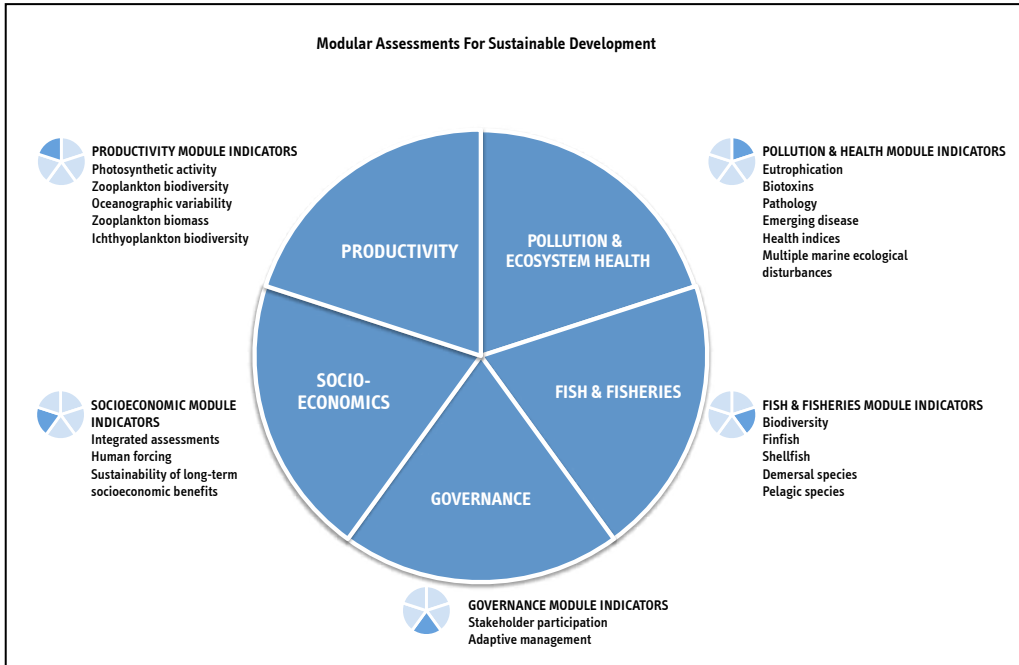
1. The productivity module deals with basic processes in the ecosystem and its functioning, including aspects of biodiversity and physico-chemical processes in the ecosystems;
2. The pollution & ecosystem health module covers natural and human impacts on the ecosystem such as eutrophication, pollution and diseases;
3. The fish & fisheries module may be compared with classical fisheries management assessing the state and productivity of the fish stocks;
4. The socio-economic module includes economic, cultural and social aspects. It should identify human drivers of ecosystem change;
5. The governance module is related to administrative, political and legal issues connected to the management of the LME and strives to involve all relevant stakeholders.

The LME approach makes use of principles and instruments developed in Integrated Coastal (Zone) Management and Marine Spatial Planning procedures.

The process of LME management is supported substantially by the United Nations Development Programme (UNDP) via Global Environment Facility (GEF) funds with 22 projects approved so far involving 112 countries.<sup>2</sup> One of the first projects to be funded, and in the meantime one of the most successful, is the Benguela Current Large Marine Ecosystem (BCLME). This marked the beginning of a long process which eventually culminated in the signing of the Benguela Current Convention. After gaining independence from South Africa in 1990, Namibia strove for the development of a profitable and sustainable fisheries industry to make use of the rich living resources along its coast. The IOC together with international experts drew up a first plan for a development project. The science-driven Benguela Environment Fisheries Information and Training (BENEFIT) programme provided the basis for the preparation for the BCLME project funded by the GEF.

During the first funding phase of the LME project a Transboundary Diagnostic Analysis (TDA) is performed and a Strategic Activities Programme (SAP) developed. The TDA in particular is a process, where all participating countries are challenged to think beyond their own borders, identify common problems and respect the interests of neighbouring countries. The process is most successful if accompanied by solid scientific work on the living resources aimed at implementing a joint, LME-wide environmental monitoring programme.

2. Alfred M. Duda, 'Strengthening global governance of Large Marine Ecosystems by incorporating coastal management and Marine Protected Areas', *Environmental Development*, 2015.

**Figure 1: The five modules of the Large Marine Ecosystem management approach**

Source: Derived from Lewis M. Alexander, 'Large marine ecosystems: A new focus for marine resources management', *Marine Policy*, vol, 17, no. 3, May 1993, pp. 186-98.

This combination of support projects, scientific research and a TDA/SAP was applied in the Benguela Current area, and led to the formation of the Benguela Current Commission (BCC) at the end of the first BCLME project phase. The commission is a regional body designed to coordinate regional cooperation in all fields of sustainable development, resource use, management and conservation of the BCLME. The BCC was able to smoothly continue its work into a second phase, and prepare the political ground for the Benguela Current Convention, signed in 2013 by the governments of Angola, Namibia and South Africa.

## The South China Sea Large Marine Ecosystem (LME)

The South China Sea Large Marine Ecosystem (SCSLME) flanks seven countries (China, Philippines, Malaysia, Brunei, Indonesia, Singapore, Vietnam) and extends over 3.1 million sq km. Due to a large shelf area (1.9 million sq km) fish productivity is very high. With annual landings of 12-14 million tonnes, the SCSLME contributes around 10% of total world fish production, with Thailand and China accounting for the largest share. Nearly 3,800 fish species are listed for the area, concentrated especially in the small-scale

**Map 4: The range of application of the Benguela Current Convention including the exclusive economic zones of Angola, Namibia and Western South Africa**



Source: Based on GEBCO data.

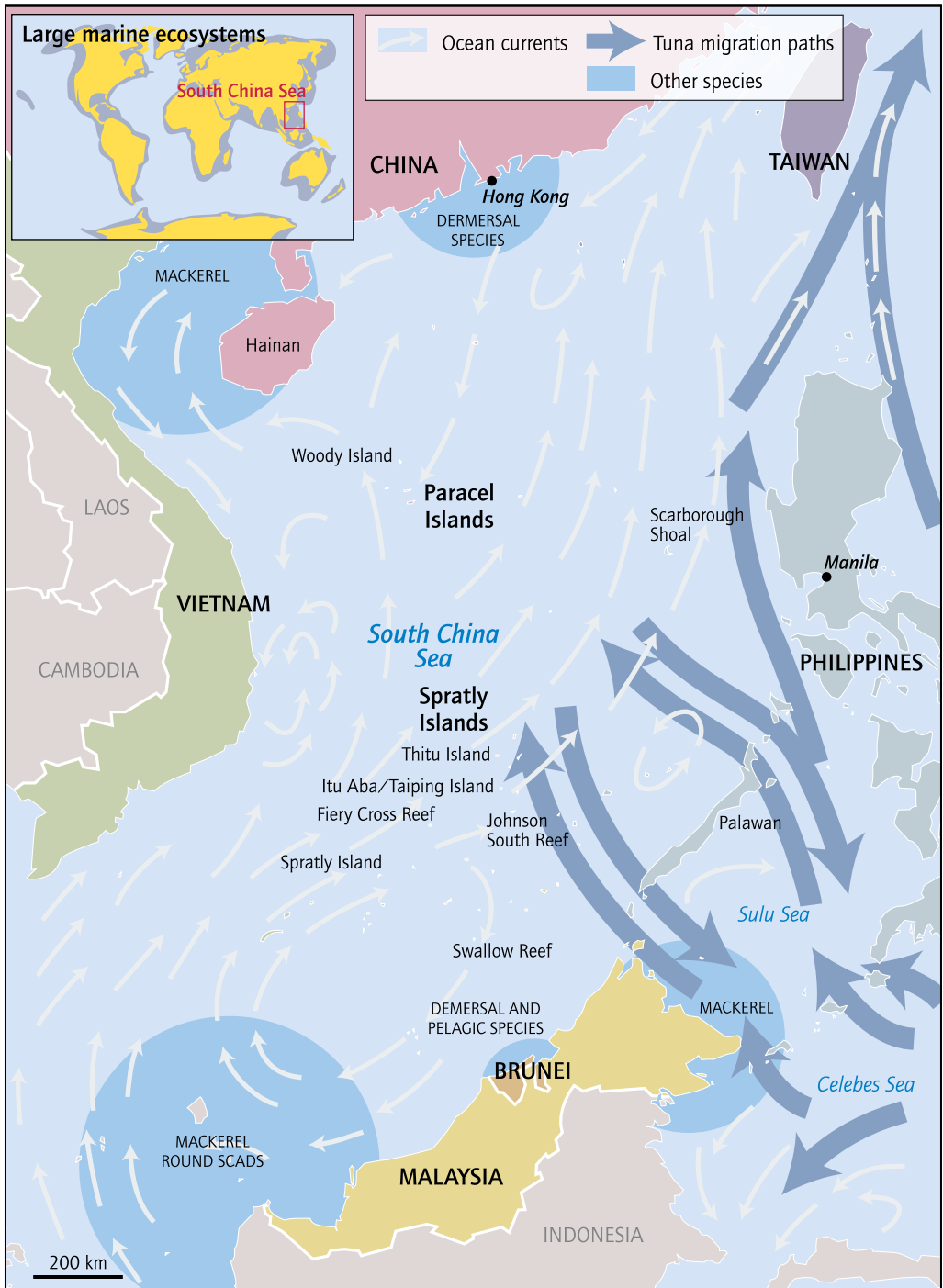
fisheries along the coastlines but also serving as feeding grounds for tuna species migrating through the area and thus being of high regional ecological importance. Tuna fisheries contribute approximately 350,000 tonnes to the world catch, valued at more than USD 400 million.

Major conflicts of interest in the SCSLME are emerging due to growing fishing fleets in the different countries leading to overexploitation of living marine resources, and increasing demand for and exploitation of non-living marine oil and gas resources.

The coastal waters along Vietnam, Hainan and Malaysia are highly productive fishing grounds. However, the pattern of water currents and tuna migration routes show how deeply interconnected the seas in this entire area are. Nutrients, organisms and pollutants are all distributed in the SCSLME, interacting with one another to different degrees. The ongoing prospection of oil and gas fields and the potential for future exploitation as indicated in the map of seafloor characteristics (see below) indicates potential future areas of conflict when oil and gas rigs begin to impact negatively on biodiversity and fishing grounds.

The SCSLME is beset by many difficult problems and large areas are the subject of ongoing territorial disputes. As it constitutes one of the richest areas in the ocean concerning living (and perhaps also non-living) marine resources, sustainable development requires a transboundary and trans-sectoral ecosystem approach. The LME approach to marine resource management has been adopted by the UN as an effective way to implement sustainable development and it supports it via UNDP and GEF. It is seen as the only or one of the very few ways to bring nations together and solve their common problems.

Map 5: The South China Sea Large Marine Ecosystem (LME)





## Conclusion

The implementation of an LME approach in the SCS is seen as extremely complicated due to the overall political context in the area. The Regional Seas Programme (RSP) initiated by the United Nations Environment Programme (UNEP) and the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) programme initiated by the UNDP could be used to further introduce, support and strengthen transboundary developments on a regional scale on the basis of an ecosystem approach. Several initiatives in the SCS over the last couple of decades have shown that measures concentrating on certain issues and of restricted spatial extent can be successful:

- The RSP is supported by the UNEP and deals mainly with environmental issues. The RSPs covering environmental issues in the area (South Asian Seas Action Plan - SASAP) focus on Integrated Coastal Zone Management (ICZM), oilspill contingency planning, human resource development and the environmental effects of land-based activities.
- PEMSEA is supported by the UNDP and designed to strengthen partnerships, networking and collaboration as well as stimulating governance and management changes. PEMSEA is a regional partnership programme implemented by the UNDP and executed by the United Nations Office for Project Services (UNOPS). The project, started in 1994, was originally known as Prevention and Management of Marine Pollution in the East Asian Seas. Its objectives are strengthening partnerships, networking and collaboration and stimulating governance and management changes in the seas of the East Asia region. PEMSEA has already been instrumental in the adoption of several national and regional agreements, including the following:
  - The Putrajaya Declaration of Regional Cooperation for the Sustainable Development of the Seas of East Asia adopted by Brunei Darussalam, Cambodia, People's Republic of China (PRC), the Democratic People's Republic of Korea (DPRK), Indonesia, Japan, Malaysia, the Philippines, the Republic of Korea (ROK), Singapore, Thailand and Vietnam on 12 December 2003.
  - The Haikou Partnership Agreement was signed in 2006 by the signatories of the Putrajaya Declaration and Japan.
  - The Manila Bay Declaration signed in 2001.
  - The Bohai Sea Declaration on Environmental Protection (only China).

The disadvantage of many of those sectoral agreements lies in the difficulties in harmonising rules and overcoming contradictions in regulations and policies, which stem mostly from a general lack of attention by governments to environmental solutions when sensitive political issues are at stake. A successful implementation of the LME approach to the management of the SCS requires due coordination of policies at the local, national and regional level, as well as a sufficient degree of institutional cooperation. According to the principles of good ocean governance, the ultimate goal should be to strive for a holistic approach in addressing transboundary and transsectoral issues espoused by all countries.