



Book - Unit 1 - Introduction

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Course: Introductory Course to the International Legal Framework on Marine Biodiversity

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Table of contents

1. Why protecting the marine environment?
 - Endemic species
 - Other uses
2. Impact of human activities
 - Industrial and agricultural activities
 - Population
 - Deforestation and mining
 - Tourism and infrastructure development
 - Fisheries
 - Invasive alien species
 - Climate change
3. Definition of marine biodiversity
4. The international legal framework

1. Why protecting the marine environment?

Our seas and oceans cover about 70% of the earth's surface and play important functions in maintaining and sustaining the earth's ecological balances. The seas and oceans produce a third of the oxygen that we breathe, offer a valuable source of protein and moderates global climatic change.

Marine and coastal areas are home to a wide variety of ecosystems, for example, coral reefs found in both tropical and temperate areas, sea-grass beds and mangrove forests. Most of these ecosystems support a diverse spectrum of marine life, ranging from top predators such as marine mammals to organisms such as algae, which are at the bottom of the food web. Maintaining the abundance within and the biodiversity of these ecosystems is crucial for fisheries worldwide, including aquaculture. For many people throughout the world, the marine environment is not only a vital source of protein, but the activities which it sustains, such as fisheries, transport and tourism, also provides them with an income.

Endemic species

The need for the protection and preservation of marine biodiversity is especially necessary for organisms and habitats that are highly endemic, meaning they are unique to a defined geographic location.

For example, the Indian Ocean is known to have 482 different species of coral, 27% of which live only at one location. Another example is the Baltic Sea, which is the largest body of brackish water in the world and contains many unique habitats that support rare marine organisms. Seamounts on the deep sea-bed are known for their endemism as well.

Other uses

It is not just living marine resources that are beneficial to humans. The exploitation of non-living marine resources such as oil, gas, sand, gravel, and diamonds and other precious minerals provides states with substantial revenues.

The benefits of the marine environment are also not limited to tangible resources. Other uses include the laying of submarine telecommunication cables and pipelines, maritime transport, tourism and various types of building activities. These latter building activities do not necessarily have to be related to resource exploitation, for example by oil rigs, but could also take the form of land reclamation, artificial islands or installations for producing energy from the water, currents or winds.

Another use of the marine environment is marine scientific research, which has provided actual and potential benefits to all states on issues such as weather forecasting, the study of effects of ocean currents, and natural forces at work on the ocean floor. Marine bio-prospecting is aimed at identifying applications or uses of marine living organisms, parts thereof or their genetic material. While some regard it as marine scientific research, others prefer to treat it as a resource activity.

2. Impact of human activities

All of these uses, whether related to resources or not and whether they take place on land or at sea, have an impact on the marine environment and possibly on biodiversity.

The expansion in types of uses of the marine environment as well as their intensity has not always been accompanied with adequate regulation at the national, regional or global levels. Also, if such regulation was in fact in place, compliance has often been inadequate to prevent serious adverse consequences for marine biodiversity.

The most serious threats to marine biodiversity are degradation and loss of habitats, overexploitation and indiscriminate fishing practices, marine pollution, invasive alien species and climate change.

Industrial and agricultural activities

Industrial activity and modern agricultural practices produce many pollutants that are either discharged directly into the marine environment or end up in the marine environment through the atmosphere or through rivers.

Examples of pollutants are agricultural chemicals, heavy metals and nuclear waste. Once in the marine environment, these pollutants can cause ailments and death of living organisms, destroy marine habitats and otherwise have adverse effects on the functioning of marine ecosystems. If affected organisms are consumed by humans, serious human health concerns can also arise.

Population

Increasing global human population in recent decades and demographic trends of increasing population densities in coastal areas pose further problems to the marine environment.

An estimated 50% of the current global population lives on the coast, or within 60 kilometres of the coast, and that percentage is still increasing. Many of the cities that currently experience the highest population growth, such as São Paulo, Shanghai, Hong Kong, Manila and Djakarta, are on or near the coast. These burgeoning populations do not only increase pressure on the utilization of resources in coastal areas but are also a continuously growing strain on the marine environment due to increased human activity both at sea and on land.

The impact of untreated human waste alone is already a serious concern.

Deforestation and mining

Deforestation and mining, even if occurring many hundreds of kilometres inland, often lead to widespread erosion and thereby large increases in sediment load in coastal areas. This has smothered coral reefs and other coastal habitats in Indonesia, Malaysia, the Philippines, Sri Lanka and in many other places in the world.

Conversely, the construction of dams for hydro-electricity generation or for irrigation purposes has led to dramatic reductions in sediment loads, but with equally severe consequences for coastal ecosystems. The Nile Delta is reported to be sinking at an alarming rate due to a combination of lack of sediment input, enhanced erosion and severe reduction in nutrient load. Such problems have led to the collapse of fisheries in many places, including in the eastern Mediterranean region.

Tourism and infrastructure development

As a considerable segment of tourism occurs in coastal areas, it poses a sizeable threat to marine biodiversity. Such tourism can be land-based or vessel-based.

Land-based tourism in coastal areas commonly requires permanent infrastructure, such as hotels and marinas. The establishment of this infrastructure has often led to the destruction of critical coastal habitats such as mangrove forests, wetlands, estuaries and coral reefs. Infrastructure development is often undertaken without proper evaluation of the functions and benefits of these habitats to local or regional ecosystem processes. Once constructed, the use of this infrastructure may also affect marine biodiversity, for example through the discharge of sewage, and tourism activities carried out in the marine environment, such as boating, recreational fishing, diving, snorkelling and marine wildlife viewing. Coral reefs also suffer from extraction of coral for jewellery or souvenirs. This practice has resulted in the extinction of red and black corals in the Mediterranean and in the tropics. In Sri Lanka, reef cover is declining at an annual rate of 10% due to indiscriminate extraction methods.

Vessel-based tourism, or cruise tourism, has grown considerably in recent decades. The environmental concerns of the increasing use of ever bigger vessels are largely similar to those of merchant ships. Once cruise vessels call in port, however, the environmental impact differs fundamentally. While supplying cruise vessels with large amounts of food, fresh water and fuel, collecting and processing huge quantities of various types of garbage and receiving many short-time visitors provides ports with financial benefits, these activities also lead to environmental and biodiversity concerns.

Fisheries

The essence of many of the problems currently faced by marine capture fisheries is caused by the fundamental characteristics of marine fish, namely that they are a common property and renewable natural resource that moves around freely.

Failure to regulate will therefore inevitably lead to over-exploitation and economic inefficiency and ultimately to conflict at the national and/or the international level. As many fish stocks are not confined to single regulatory areas and cannot therefore be regulated by one single authority, it is often essential that fisheries management authorities cooperate in order to align their regulatory efforts. Non-alignment will eventually lead to declining catches in transboundary stocks on both sides of a maritime boundary. As the successful regulation of marine fisheries often depends on cooperation at the international level, the sovereign equality of states under international law is often perceived as a stumbling block. As no state, in principle, can be forced to do something against its will, international regulation may often be at the level of the 'lowest common denominator' and experience 'free rider' problems. This does not mean, as is by now widely recognized, that unilateral coastal State authority is a sufficient guarantee for sustainable fisheries.

A form of fishing that is currently highly criticized for its threat to biodiversity is deep-sea fishing, in particular those fisheries that use techniques like bottom-trawling or that target seamounts. Some extremely destructive fishing practices, such as those involving the use of explosives or poison, such as cyanide, are sometimes still used by fishermen in developing states. While this satisfies short-term nutrition or financial needs, such desperate behaviour kills many non-target species, destroys entire habitats and has severe mid-term and long-term nutrition and financial implications. Generally, by-catch of commercial uninteresting species, which is commonly discarded, is acknowledged to be a huge problem. Media attention to this problem is nevertheless frequently limited to by-catch of high profile species, such as marine mammals, birds and sea turtles.

Invasive alien species

The intentional or accidental introduction of aquatic organisms into the marine environment is certainly not a new phenomenon, but has received continuously increasing attention in recent years. Intentional introduction of alien or new species usually occurs for perceived benefits, for example resource exploitation, but often overlooks the risks associated with limited scientific knowledge about the impacts of introduction.

There are various so-called pathways of accidental introduction. One of these is by means of large merchant vessels up-taking and discharging water used for ballast tanks, which mainly serve to ensure a vessel's stability once it has offloaded its cargo. Due to the global nature of merchant shipping, the biodiversity threats and consequences of accidental introduction of alien species through ballast water are experienced throughout the globe.

For example, the introduction of the North American comb jelly by ballast water into the Black and Azov Seas has contributed significantly to the collapse of fisheries, with massive economic and social impacts. The Caspian Sea is presently facing the same threat and this invasive alien species has also been found in and have been found in the Baltic Sea and the Atlantic coast of Norway.

Climate change

Climate change is negatively affecting the Oceans too. As water temperatures and currents alter climate patterns, ecosystems are disturbed as species are forced to migrate to find their most suitable conditions to spawn and feed. Marine environment is also harmed by the acidification caused by airborne CO₂ pollution. Oceans absorb one third of CO₂ emitted into the atmosphere. The higher concentration of CO₂ into the seawater, the more acidic the oceans become. This alteration of the natural chemical balance affects marine ecosystems, such as coral bleaching.

3. Definition of marine biodiversity

Usage of the term (marine) biodiversity follows the definition laid down in article 2 of the Convention on Biological Diversity (“CBD”).

Accordingly, biodiversity does not just include diversity at the species-level, such as marine plants, mammals, fishes and other living organisms, but also diversity of the ecosystems of which these species are part and genetic diversity within species. Concrete components of biodiversity are habitats, ecosystems, communities of species and genetic material.

The term “marine environment” herein is used in a broad sense, and encompasses seas and oceans and its marine life, including gulfs and coastal areas, but not inland waters. The course has a special focus on marine capture fisheries (excluding therefore aquaculture) and the way in which these fisheries are managed in order to protect and preserve marine biodiversity.

4. The international legal framework

Law, both international and national, is an indispensable tool for regulating human activities with the object of preventing or minimizing threats to marine biodiversity.

This course examines the current international legal regime for the protection and preservation of marine biodiversity, with a special focus on marine capture fisheries.

The international regime consists of legally binding and non-legally binding instruments, adopted at the global level or at the regional or sub-regional level. While the primary objective of many of these instruments may not always be the protection and preservation of marine biodiversity, they do contribute to that objective. The discussion concentrates on the main global and regional instruments even though relevant instruments adopted at the bilateral level and those within the European Union are certainly no less relevant.