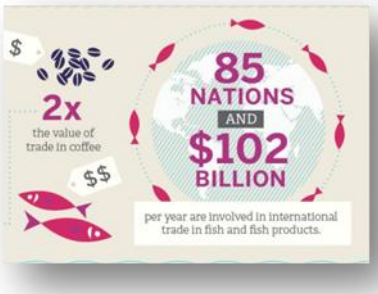
Geography chapter 2 /The ocean – managing our living resource

Introduction. There is only one World Ocean, which covers 72 % of the Earth's surface and is essential to humanity. All human beings depend on the sea, even if they live far inland. It plays a role in the social, economic and environmental balance of all countries of the world. The best estimate suggests that the value of global ocean services may be worth about US$ 23 trillion a year, only slightly less then the world's GNP.

Your goals for this chapter – *The ocean plays a major part in the natural life of our planet. How ? We make such use of the ocean. In what ways ? We are harming the ocean ecosystem. What sustainable management of the oceans may be undertaken ?*

1. The essential ocean



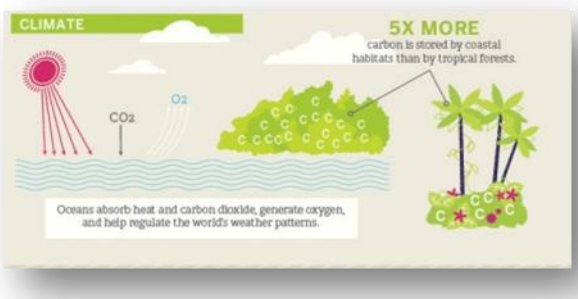
1 **a. A vital resource** - The ocean is a vital source of animal protein for billions of people throughout the world. Overall, fish provided more than 2.6 billion people with at least 20 percent of their average per capita animal protein intake. Coastal areas comprise 20 percent of the Earth's surface yet contain over 50 percent of the entire human population, and it will be 75% in 2025.

1 b. Oceans account for much of the planet's prosperity.

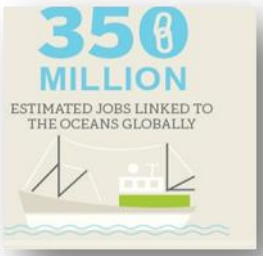
The ocean holds considerable amounts of precious mineral and energy resources such as oil, gas, salt,… There are 6,000 offshore oil and gas installations in operation worldwide that provide 25 to 30 percent of the world's energy supply.

It accounts for 140 million jobs in fishing and aquaculture and many more in indirect employment in sea related activities. Shipping accounts for the transport of 90% of the world's international traded goods. Tourism plays an important role in the economy of many coastal nations (25 % of total export earnings in the Pacific and 35 % in the Caribbean islands). The ocean has also a fundamental political and military strategic importance.

1 c. Importance of oceans in climate balance



The ocean releases more oxygen into the atmosphere than all the world's forests combined thanks to marine vegetation (phytoplankton). The ocean plays a fundamental role in controlling the global climate: it exchanges heat and gases with the atmosphere through currents and winds at the surface of the sea. Oceans can absorb about a thousand times as much heat as the atmosphere.



About 90 % of the world's total carbon content has settled to the bottom of the ocean, primarily in the form of dead biomass

2. Marine problems and major threats.

2 a. Massive overfishing

The global fishing fleet is 2-3 times larger than what the oceans can sustainably support. In other words, people are taking far more fish out of the ocean than can be replaced by those remaining. As a result:

- As many as 90% of all the ocean's large fish have been fished out
- Unless the current situation improves, stocks of all species currently fished for food are predicted to collapse by 2048 (World Wildlife Fund).

2 b. Shipping

Sub-standard ships and poor shipping practices are leading to massive marine pollution and damage, because of :

- Release of oil and chemicals through accidental spills and operational discharges
- Dumping of waste : such as garbage and sewage
- Physical and other damage: through dropping of anchors, noise and wave disturbances, and striking of whales and other marine mammals

2 c. Pollution

A staggering amount of waste - much of which has only existed for the past 60 years or so - enters the oceans each year. Over 80% of marine pollution comes from land-based activities. From plastic bags to pesticides - most of the waste we produce on land eventually reaches the oceans, either through deliberate dumping or from run-off through drains and rivers.

This includes :

- **Oil spills –** they cause huge damage to the marine environment.
- **Fertilizers** - runoff from farms and lawns is a huge problem for coastal areas. The extra nutrients cause eutrophication - flourishing of algal blooms that deplete the water's dissolved oxygen and suffocate other marine life. Eutrophication has created enormous dead zones in several parts of the world, including the Gulf of Mexico and the Baltic Sea.
- **Seas of garbage-** Solid garbage also makes its way to the ocean. Plastic garbage, which decomposes very slowly, is often mistaken for food by marine animals. High concentrations of plastic material, particularly plastic bags, have been found blocking the breathing passages and stomachs of many marine species, including whales, dolphins, and turtles.
- **Sewage disposal-** In many parts of the world, sewage flows untreated, or under-treated, into the ocean. For example, 80% of urban sewage discharged into the Mediterranean Sea has been untreated.

- **Toxic chemicals -** Almost every marine organism is contaminated with man-made chemicals, such as pesticides and chemicals used in common consumer products.

2 d. Climate change

The Intergovernmental Panel on Climate Change predicts a further rise of between 1.4°C and 5.8°C by the end of the century. Climate change could therefore well be the knock-out punch for many species which are already under stress from overfishing and habitat loss.

Both **rising sea temperatures and acidification** are due to become increasingly extreme throughout this century, along with other climate change impacts such as rising sea levels and more frequent - and more severe – **storms.**

Rising sea temperatures are already having a major influence on the distribution of marine species and, as with rising temperatures on land, on the timing of the cycles of life in the Ocean. They are also partly responsible for the phenomenon of coral bleaching, devastating large areas of the worlds coral reefs.

Ocean acidification is a direct result of the absorption of carbon dioxide by the Ocean. This threatens all marine animals and plants that secrete calcium carbonate as part of their structure. We believe that this has already caused a reduction in the size and growth rates of some marine animals.

Coral bleaching - One of the most visually dramatic effects of climate change is coral bleaching, a stress response caused by high water temperatures that can lead to coral death. Recent years have seen widespread and severe coral bleaching episodes around the world, with coral mortality reaching 70% in some regions.

Conclusion. What solutions ?

Improvement of fisheries. It is essential that the management of fisheries has to be improved for the sake of global food security in the future, as well as to mitigate their devastating impact on the Ocean. Some actions may include:

• Reducing the capacity of global fishing fleets.
Eliminating harmful fishing subsidies.

• Implementing technical improvements in fishing methods to prevent ecosystem-impacts, including the by-catch of non-target species.

Reducing CO2 emissions. There is an urgent need to reduce CO2 emissions. There is also a pressing need to develop carbon sinks to reduce current CO2 levels in the atmosphere.

Marine Reserves. Marine Reserves are the marine equivalent of national parks. Based on the same scientifically-developed model used to manage terrestrial over-exploitation, Marine Reserves are protected no-take areas.

By building pockets of resilience, Marine Reserves will allow the Ocean to revert to its natural state, with diverse ecosystems and healthy habitats.