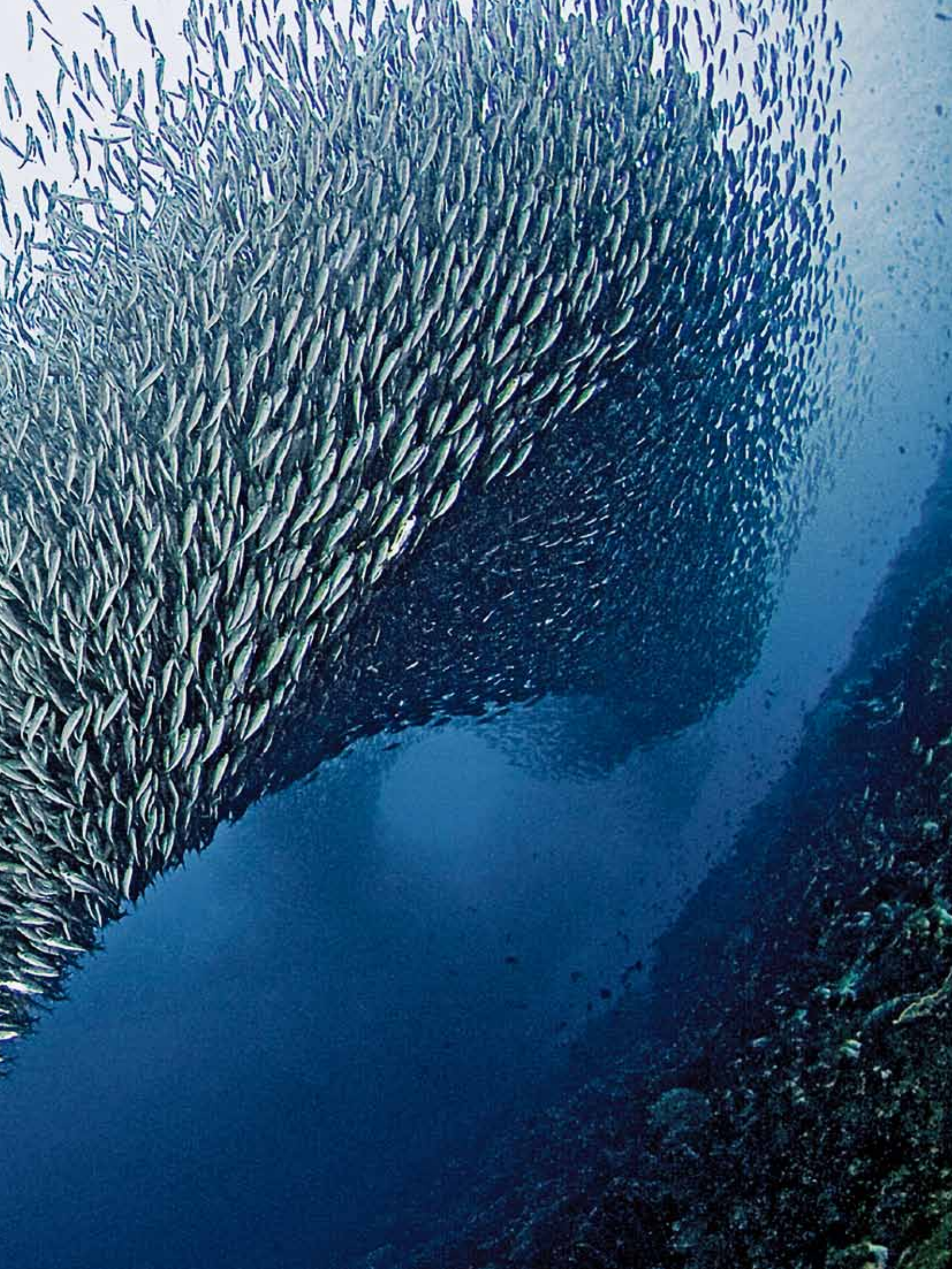

world ocean review
Living with the oceans. 2013

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The Future of Fish – The Fisheries of the Future

The first World Ocean Review aimed to provide a comprehensive overview of the state of our oceans. This second issue concentrates in greater detail on a single aspect – the future of fish and fisheries. Fish and people have been intimately linked with each other for thousands of years. Fish is an important food, it is the subject of myth, while in some cultures – and in Christianity – it is considered a divine symbol. However, we humans are not treating this precious ocean resource with the care it needs. Never before have we exploited the world's fish stocks as rapaciously as during the past 50 years – reason enough for us to devote this volume entirely to the issue.

Fish are a widely distributed resource. Around the world there is a total of about 30,000 different species, of which approximately 15,000 live in the sea. They are a crucial element of the various marine habitats. Fish and all other living organisms in the sea are linked through complex food webs. Humans, through their fishing practices, are tampering with this network of relationships. If large numbers of any one fish species are removed, there are also repercussions for the other organisms which depend on this species. Slowly we are beginning to understand how severely fisheries have impacted on the massive ocean system and what changes we have already inflicted on marine environments. Specialists already know that in future it will not be enough to consider commercially-interesting fish species in isolation. For this reason many experts are developing new fisheries management concepts based on the entire ecosystem, which will allow for the interactions between the different species. Fortunately many nations are now working together to protect jointly-exploited stocks or "Large Marine Ecosystems" – such as along the coast of southwest Africa. Sustainable fisheries which conserve stocks are of particular importance to the developing countries. Along coastal areas, fishing represents the main occupation and fish are the most important source of animal protein. In nations such as Bangladesh and Ghana fish accounts for more than 50 per cent of the animal protein in the population's diet.

Even today non-industrial fishing from small craft often predominates in the developing countries. The number of such artisanal fishermen worldwide is estimated at about 12 million. In contrast the industrialized nations now fish with modern vessels. The largest of these, known as factory ships, can take vast amounts of fish from the sea. The fish are immediately processed, packaged and deep-frozen on board. Only about 500,000 people worldwide work in the industrial fishing industry. The amount they catch per person is many times that caught in the nets of artisanal fishermen.

Factory ships with deep-freeze facilities on board make it possible to fish in any ocean, no matter how far from the coast. The fish no longer spoils as it used to do on long voyages. Since the 1960s, therefore, we humans have been able to exploit global fish stocks at will, far beyond their tipping points. The outcome is that today, according to Food and Agriculture Organization of the United Nations (FAO) data, more than a quarter of fish stocks are overfished. Since 1950 the amount of the annual fish catch worldwide has increased fivefold. In 2011 alone,

Overall conclusion

78.9 million tonnes of fish and seafood were harvested from the sea. In order to catch such large amounts over a period of many years, the fisheries have spread further and further south from the traditional grounds of the Northern Hemisphere to take in all maritime regions. Once the stocks had been exploited, the fleets moved on to new fishing grounds. Overfished species were replaced by other lesser-known and scarcely-exploited species. Fisheries have also penetrated into ever-deeper waters. Today the nets of some trawlers extend to depths of 2000 metres, partially or completely destroying important underwater regions such as cold-water coral reefs and habitats at seamounts.

Despite all the bad news, the situation is not entirely desperate. There are some examples of good fishery practices, mainly in regions or nations which entered the industrial fishing industry relatively late and were prepared to learn from the mistakes of others. These include Alaska, Australia and New Zealand. Most nations have for many years oriented their fish catch to individual limit reference points which are calculated by fisheries scientists. The researchers make recommendations of maximum annual tonnages of fish which should be caught within a certain region. Despite this, too many fish have been taken. One reason is that these reference points are beset by uncertainties, and another is that policy-makers and fisheries regularly exceeded the limit reference points. Alaska, Australia and New Zealand, by contrast, pursue the concept of a long-term sustainable yield which is guided by the current status of stocks. Their reasoning is that if the stocks are healthy, more fish can be caught in the long run, and greater revenues can be generated. This concept of "maximum sustainable yield" (MSY) was very controversial for a long time, because its original aim was solely to maximize yields – not to conserve the fish resource. The current examples clearly show, however, that the concept conforms to local conditions and can be expanded to take account of ecological and social aspects such as fishermen's interests. For this reason many experts consider it a positive development that the MSY idea is slowly gaining acceptance at an international level. It does seem to be capable of preventing overfishing.

A major problem today is illegal (IUU) fishing. Most illegal fishing is carried out in the territorial waters of developing countries, as these nations cannot afford to establish effective fisheries control structures. It is estimated that between 11 and 26 million tonnes of fish are caught illegally each year, further weakening already overfished stocks. But here too there are encouraging signs. International cooperation projects, for instance, have been involved in developing monitoring systems in West Africa which act as a deterrent and keep IUU fishermen away. On the other hand illegal fishing is likely to remain an attractive option for black market dealers because rapid population growth will continue to drive up the global demand for fish.

From a nutritional point of view is makes sense to eat fish regularly because fish caught in the wild is a natural, healthy food. It contains high-quality proteins, valuable fatty acids and many minerals. Consumption today is the

highest in the industrialized nations, at 28.7 kilograms per head per annum. The lowest is in Africa, at 9.1 kilograms. Experts believe that more and more fish will be consumed worldwide in future. Therefore, if we do not want to plunder the ocean fish stocks any further, the only alternative is aquaculture, or fish farming. Large amounts of fish and seafood are already produced by this method. In 2010 a total of 60 million tonnes of fish, mussels and crustaceans came from aquaculture. Global production has increased by 8.4 per cent per annum in recent decades – more than any other food industry. Its growth is unabated, particularly in Asia which accounts for 89 per cent of global aquaculture production. However, it is vital for fish farming to become more environmentally sound. Various factors have given the sector a bad name, including antibiotics in the fish, overfertilized waters and the felling of mangrove forests to establish new facilities. Many international projects have now been successful in making production more sustainable, and the first products from ecologically managed operations are already on the market. Relevant eco-labels are currently becoming established. Consumers in the industrialized nations, particularly Europe and the USA – the world's largest importers of fish – are called on to assert their influence in this respect.

Aquaculture has also been under fire for processing ocean fish into the fishmeal and fish oil which is fed to the farmed fish. The problem is that considerably more than 1 kilogram of marine fish is required to produce 1 kilogram of farmed fish. Critics view this as a waste, claiming it would be better to eat the wild fish directly. The counterargument is that there is no demand anyway for the small fish species used in aquaculture facilities. As fishmeal and fish oil prices have soared in recent years in response to the high demand from China, researchers have been trying to reduce the proportion of fish in the feed – by replacing some of it with plant-based supplements and by using more digestible feed mixes.

Wild capture fishery or aquaculture: we already know how the fishing industry could be improved. Now it is time for us to set the course for a sustainable future. This applies in particular to Europe where solutions for its new Common Fisheries Policy are currently under discussion. It is important to reduce the oversized fishing fleets of Portugal and Spain. Fears of high unemployment have prompted policy-makers to subsidize and modernize the fisheries for years, thus speeding up the sell-out of the fish stocks. The problem of bycatch is also unresolved. Fishermen throw overboard any undersized fish and those for which they have no licence. Most of the creatures die. In some cases this discard amounts to 70 per cent of the catch – an enormous waste. In future improved licensing systems and monitoring by CCTV cameras or state observers on board should help to bring the problem under control. The next few months will show whether the policy-makers, particularly the EU Fisheries Ministers, manage to introduce a sustainable fisheries management system. It is to be hoped that this publication will help convince them of its importance.

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