

Part IV

Assessment of Marine Biological Diversity and Habitats

One of the main services provided by the oceans is food for human consumption, resulting in benefits for human health and nutrition, economic returns, and employment. These benefits can be enjoyed sustainably, but only if the intensity and nature of harvesting and culture are appropriately planned and managed, and access to the potential benefits is made available.

Part IV of the WOA reviews these issues under the headings of the Ocean as a source of food (Chapter 10), Capture fisheries (Chapter 11), Aquaculture (12), Fish stock propagation (13), Specialized marine food sources (14), and Social and economic aspects of fisheries (15). Chapter 10 summarizes the contributions of seafood to human nutrition and alleviation of hunger, discussing both patterns at regional and global scales and their trends over time. Chapter 11 looks in more detail at capture fisheries, presenting trends over time both globally and regionally in overall harvest levels and fishing gear used. It also looks at major species harvested at these scales, and the sustainability of use of the harvested species. It also looks at the ecosystem effects of fishing, considering the nature, levels, and where information is available, trends, in effects on bycatch species, marine food webs, and habitats. Chapter 12 reviews the same types of information for aquaculture, considering overall production and production of key species at global and

Chapter 10. The Oceans as a Source of Food

Contributors

4. Value of marine fisheries and mariculture

Fish harvested or cultured from the sea provide three classes of benefits to humanity: food and nutrition, commerce and trade, and employment and livelihood (see Chapter 15 for additional detail). All three classes of benefits are significant for the world.

4.1 Food and nutrition

According to FAO (2014) estimates, fish and marine invertebrates provide 17 per cent of animal protein to the world population, and provide more than 20 per cent of the animal protein to over 3 billion people, predominantly in parts of the world where hunger is most widespread. Asia accounts for 2/3 of the total consumption of fish. However, when populations are taken into account, Oceania has the highest per capita consumption (approximately 25 kg per year), with North America, Europe, South America and Asia all consuming over 20 kg per capita, and Africa, Latin America and the Caribbean are around 10 kg per capita. Per capita consumption does not capture the full importance of the marine food sources to food security, however. Many of the 29 countries where these sources constitute more than a third of animal protein consumed are in Africa and Asia. Of these, the United Nations has identified 18 as low income, food deficient economies (Karawazuka Béné, 2011, FAO, 2014b). Thus fish and invertebrates, usually from the ocean, are most important where food is needed most.

Table 1. Total and per capita food fish supply by continent and economic grouping in 2011

	Total food supply (million tonnes live weight equivalent)	Per capita food supply (kg/year)
World	132.2	18.9
World (excluding China)	86.3	15.3
Africa	11.0	10.4
North America	7.6	21.7
Latin America and the Caribbean	5.9	9.8
Asia	90.3	21.5
Europe	16.4	22.1
Oceania	0.9	25.0
Industrialized countries	26.4	27.0
Other developed countries	5.6	13.7
Least developed countries	10.3	12.1
Other developing countries	89.9	18.9
LIFDCs ²	21.2	8.6

¹ Preliminary data

² Low income food deficit countries.

Source: FAO Information and Statistics Branch, Fisheries and Aquaculture Department, 2015.

Not only are marine food sources important for overall food security, fish are rich in essential micronutrients, particularly when compared to micronutrients available when meeting human protein needs from consumption of grains (WHO 1985). Compared to protein from livestock and poultry, fish protein is much richer in polyunsaturated fatty acids and several vitamins and minerals (Roos et al 2007, Bonhan et al 2007). Correspondingly direct health benefits relative to reducing risk of obesity, heart disease, and high blood pressure have been linked to diets rich in fish (Allison et al. 2013).

It should be noted, however, that there are also potential health risks from consumption of seafood, particularly as fish at higher trophic levels may concentrate environmental contaminants, and there are occasional outbreaks of

course faces subsistence fisheries as well. In the food chain for fishery products, risk of problems need to be assessed, managed and communicated to ensure problems can be addressed. The goal of most food safety systems is to avoid risk and prevent problems at the source. The risks come from contamination from toxins or pathogens and the severity of the risk also depends on individual health, consumption levels and susceptibility. There are international guidelines to address these risks but substantial resources are required in order to continue to build the capacity to implement and monitor safety protocols from the water to the consumer.

Because of the several limiting factors affecting wild fish catch today (see Chapter 11), it is forecasted that aquaculture production will supply all of the increase in fish consumption in the immediate future. Production is projected to rise to 100 million tons by 2030 (Hall et al 2011) and to 140 million tons by 2050, if growth continues at the same rate.

Estimates by the World Resources Institute (White et al, 2014), assuming the same mix of fish species, (

“cash crop” value to fish catches of even small subsistence fishers. Most of this “value” is not captured in the formal economic statistics of countries, and probably varies locally and seasonally (Dey et al. 2005). However studies have shown that the selling or trading of

more than 514 billion in fish products in 2011, although slightly over half of that was from trade among EU Member States (<http://www.fao.org/3/a-i4136e.pdf>). Fish trade is truly global, with FAO recording fish and fish products exported by 197 countries, led by China which contributes 14 per cent of the total exports.

Developing countries contribute over 60 per cent by volume and over 50 per cent by value of exports of fish and fish products. Although this trade generates significant revenues for developing countries, through sales, taxation, license fees, and payment for access to fish by distant water fleets, there is growing debate about the true benefits to the inhabitants of these countries from these revenue sources (Bostock et al., 2004; World Bank 2012). The debate centres whether poor fishers would benefit

6. Conclusions

This chapter sets the stage for assessing the role of the oceans as a source of food. The chapters to follow will assess in depth the ways that food is taken from the sea. Each chapter will consider the trends in yields, resources, economic benefits, employment, and livelihoods, the interactions among the trends, and their main drivers, on global and regional scales as appropriate. They will also look at the main impacts of the various food-related uses of the ocean on biodiversity both species and habitats. Some of these interactions will also be considered, from the perspective of the affected components of biodiversity, in Part VI of the World Ocean Assessment. Each chapter will also consider the main factors that affect the trends in benefits, resources used and impacts. Together a picture will emerge of the importance of the ocean as a source of food, and of fisheries and mariculture as sources of commerce, wealth, and livelihoods for humankind, with a particular focus on the world's coastal peoples.

Working Paper, Installment 5 of Creating a Sustainable Food Future. Washington, DC:
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