Fishing for the Future: Trends and Issues in Global Fisheries Trade

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E15 Expert Group on Oceans, Fisheries and the Trade System

Overview Paper
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<th>Full Form</th>
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<tr>
<td>AB</td>
<td>Appellate Body</td>
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<tr>
<td>ACP</td>
<td>Africa, Caribbean and the Pacific</td>
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<td>ADB</td>
<td>Asian Development Bank</td>
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<td>AFT</td>
<td>Aid for trade</td>
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<tr>
<td>AIPs</td>
<td>Aquaculture Improvement Projects</td>
</tr>
<tr>
<td>ALADI</td>
<td>Asociación Latinoamericana de Integración (Latin American Integration Association)</td>
</tr>
<tr>
<td>ASCM</td>
<td>Agreement on Subsidies and Countervailing Measures</td>
</tr>
<tr>
<td>ASEAN</td>
<td>Association of Southeast Asian Nations</td>
</tr>
<tr>
<td>AUS</td>
<td>Australia</td>
</tr>
<tr>
<td>BFT</td>
<td>bluefin tuna</td>
</tr>
<tr>
<td>CAN</td>
<td>Comunidad Andina de Naciones (Andean Community)</td>
</tr>
<tr>
<td>CARICOM</td>
<td>Caribbean Community</td>
</tr>
<tr>
<td>CBD</td>
<td>Convention on Biological Diversity</td>
</tr>
<tr>
<td>CCAMLR</td>
<td>Commission for the Conservation of Antarctic Marine Living Resources</td>
</tr>
<tr>
<td>CITES</td>
<td>Convention on International Trade in Endangered Species of Wild Fauna and Flora</td>
</tr>
<tr>
<td>CPUCH</td>
<td>Convention on the Protection of the Underwater Cultural Heritage</td>
</tr>
<tr>
<td>DWFN</td>
<td>distant water fishing nation</td>
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<tr>
<td>EEA</td>
<td>European Economic Area</td>
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<td>EEZ</td>
<td>Exclusive Economic Zone</td>
</tr>
<tr>
<td>EC</td>
<td>European Commission</td>
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<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agriculture Organization</td>
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<tr>
<td>FIPs</td>
<td>Fishery Improvement Projects</td>
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<tr>
<td>FTA</td>
<td>free trade agreement</td>
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<tr>
<td>GATT</td>
<td>General Agreement on Tariffs and Trade</td>
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<tr>
<td>GDP</td>
<td>gross domestic product</td>
</tr>
<tr>
<td>GSP</td>
<td>Generalised System of Preferences</td>
</tr>
<tr>
<td>ICCAT</td>
<td>International Commission for the Conservation of Atlantic Tunas</td>
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<td>ICTSD</td>
<td>International Centre for Trade and Sustainable Development</td>
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<tr>
<td>IDB</td>
<td>Inter-American Development Bank</td>
</tr>
<tr>
<td>IMO</td>
<td>International Maritime Organization</td>
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<tr>
<td>IPOA-IUU</td>
<td>International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing</td>
</tr>
<tr>
<td>ITC</td>
<td>International Trade Centre</td>
</tr>
<tr>
<td>ITLOS</td>
<td>International Tribunal of the Law of the Sea</td>
</tr>
<tr>
<td>IUU</td>
<td>illegal, unreported, and unregulated</td>
</tr>
<tr>
<td>LDCs</td>
<td>least developed countries</td>
</tr>
<tr>
<td>LV</td>
<td>landed value</td>
</tr>
<tr>
<td>MARPOL 73/78</td>
<td>International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978</td>
</tr>
<tr>
<td>MERCOSUR</td>
<td>Mercado Común del Sur (Common Market of the South)</td>
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<tr>
<td>MFN</td>
<td>most favoured nation</td>
</tr>
<tr>
<td>MPA</td>
<td>marine protected area</td>
</tr>
<tr>
<td>NAFTA</td>
<td>North American Free Trade Agreement</td>
</tr>
<tr>
<td>NAMA</td>
<td>non-agricultural market access</td>
</tr>
<tr>
<td>NEPAD</td>
<td>New Partnership for African Development</td>
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<tr>
<td>NGO</td>
<td>non-governmental organisation</td>
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<tr>
<td>NOAA</td>
<td>National Oceanic and Atmospheric Administration</td>
</tr>
<tr>
<td>NZ</td>
<td>New Zealand</td>
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<tr>
<td>OECD</td>
<td>Organisation for Economic Cooperation and Development</td>
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<tr>
<td>R&amp;D</td>
<td>research and development</td>
</tr>
<tr>
<td>RFMOs</td>
<td>regional fisheries management organisations</td>
</tr>
<tr>
<td>RTA</td>
<td>regional trade agreement</td>
</tr>
<tr>
<td>SIDS</td>
<td>small island developing states</td>
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<tr>
<td>SIFAR</td>
<td>Support Unit for International Fishery and Aquatic Research</td>
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KEY MESSAGES

• The ocean and the freshwater ecosystems of the world make massive contributions to people's well-being via the many vital social and environmental services they provide (for example, food and nutrition, employment and incomes, carbon cycling and sequestration). A range of human activities in and around the ocean, including the exploitation of natural resources, have an impact on the health of ocean and freshwater ecosystems, and the health of fish stocks, presenting an additional dimension to the challenge of sustainable fisheries.

• The impact that the huge increase in fishing has had on wild fish stocks, and the significant increase in aquaculture production in the 20th century, have resulted in severe environmental impacts. Many capture fisheries have been overfished for so long that their biomass appears to have decreased by more than 50 percent. This has significant effects on marine ecosystems and the health of oceans.

• Global marine catch is expected to remain stagnant in the medium term, so growing demand for fishery products will increasingly be met by aquaculture, which will remain dominated by Asian producers, especially China. Increasing reliance on farmed fish means price swings in aquaculture could have a significant impact on prices in the sector overall, and more volatility in prices of this essential foodstuff.

• Various fisheries and aquaculture management and governance institutions have been established to support the sustainability of oceans and fisheries. However, the prioritisation of short-term gains, the lack of precautionary and ecosystem-based management, and the weakness of enforcement mechanisms have impeded progress towards sustainable management of fisheries. The erosion of the resource undermines communities' long-term interests, including food security, employment, and income.

• Trade in fish and fishery products, often along global value chains of production, is extensive and particularly important to developing countries. Imports are dominated by a few large markets—the European Union, Japan, the United States, and China, whose trade policies have a significant impact on fisheries trade.

• Trade policy tools (including tariffs and subsidies) and other trade measures (food safety and sustainability standards) affect fisheries production, processing, and trade patterns. The impact of these measures on development and the environment depends on how well the underlying resource is managed, although there is strong evidence that capacity-enhancing subsidies tend to have a negative impact on fish stocks.

• Private and public actors have tried to use trade-related measures to respond to the development and environmental challenges around oceans and fisheries. Multilateral efforts include agreement on port state measures to stop illegal, unreported, and unregulated (IUU) fish from entering trade, and negotiations on disciplines on harmful subsidies in the World Trade Organization (WTO). Significantly, governments are also turning to regional trade agreements to advance subsidy reform and measures to address IUU fishing. The threat of import bans by major importers appears to have had some success in motivating exporting countries to address their vessels' IUU fishing. Private food safety standards have proliferated, and the growth of traceability and sustainability standards is increasingly attracting the attention of governments.

• Trade-related measures can help to address the challenge of sustainable oceans and fisheries use, but will need to be part of coherent policy frameworks, including improvements to the management and governance of fisheries resources at all levels and socio-economic adjustment measures.
EXECUTIVE SUMMARY

This paper provides an overview of the intersection between oceans and fisheries issues, and trade policy. It surveys the current state and major trends in global fisheries and trade in fishery products; the environmental and social dimensions of fisheries; and explains how the international community has tried to meet the policy challenges of oceans and fisheries using both resource management and trade policy tools. The paper forms the basis of a programme work by the E15 Initiative Expert Group on Oceans, Fisheries and the Trade System to develop policy options for the global trading system.

Oceans and fisheries serve a host of crucial social and environmental functions. Oceans provide half the planet’s oxygen and fix a quarter of the world’s carbon dioxide. Fisheries provide three billion people with up to 15 percent of the animal protein they consume, and provide employment to at least 140 million. The ability of oceans and fisheries to continue to provide these functions depends on their sustainable use.

Global wild fisheries production is dominated by anchoveta, tunas, and other pelagic species, with catch values distributed relatively evenly between large and small fishing nations. Many fish stocks are overfished, however, and are producing less than they could at healthy levels. Despite a hugely over-capitalised global fishing fleet, catch levels are expected to remain almost stagnant over the next 10 to 20 years. This inefficiency represents a net economic loss to the global economy of around US$50 billion per year. With the world’s oceans fished to their apparent limit, growing demand for fishery products will have to be met by aquaculture, which will remain dominated by producers in Asia, particularly in China. Increasing reliance on aquaculture production means that the price of farmed fish is likely to have a greater influence on the overall price of fishery products, which could lead to greater volatility in the price of this essential food source. This could also lead to many developing countries being forced to use their limited foreign currency to import fish and fishery products. The rapid expansion of aquaculture has also raised concerns about its environmental impact.

Overfishing, along with other stressors, has seriously damaged marine ecosystems and exacerbated the challenges faced by small-scale fishing. In particular, the exploitation of natural resources in and around the ocean can have a significant impact on ocean ecosystems. To the extent that these activities also have an impact on the health of fish stocks, they present an additional dimension to the challenge of sustainable fisheries. Attempts by the global community to address challenges of sustainable production by improving the governance and management of fisheries resources range from national management of fisheries resources, to regional fisheries management organizations (RFMOs) for international fisheries stocks. These attempts have not, by and large, successfully met the challenge of balancing current and future use of fisheries. The prioritisation of short-term gains over long-term sustainable use; the lack of precautionary and ecosystem-based management; and the weakness of enforcement mechanisms often lead to stocks being overfished. Overfishing reduces the amount of fish caught in the medium term (quickly eroding short-term gains) and, if continued, risks eliminating the resource. In addition, climate change is already affecting the distribution of fish stocks, and thus have an impact on the populations that depend on them.

Trade in fish and fishery products is extensive, and shapes the global production of fish. It is particularly important to developing countries, some of which are major players in the sector as a result of their integration into the global value chains of fisheries production. While a lot of developing country exports currently go to wealthy countries, South-South trade is likely to become increasingly important in the medium term. Least developed countries (LDCs) and small island developing states (SIDS) are often particularly reliant on exports of fishery products. For some, compensation under agreements granting access to their fishing resources is an important source of national revenue, although this compensation often represents only a small percentage of the value of the resource, and concerns have been raised about the sustainability of the level of fishing taking place.

A variety of trade policy tools, including tariffs and subsidies, and public and private trade measures, such as food safety and sustainability standards, are used to shape fisheries production and trade. Tariffs are, overall, low and falling, and on processed fishery products imported into developed countries. Reform of tariff levels presents two policy tensions. First, tariff “escalation” has raised concerns about its impact on development prospects, but so has the trend towards liberalisation, which erodes the tariff preferences enjoyed by some developing countries. Second, the impact of tariff liberalisation on fisheries stocks is ambiguous and depends on the management and governance systems in place.

Fisheries subsidies present a further policy tension. The impact of subsidies on fisheries resources depends on how they are designed, and how the underlying resource is managed. Some, such as support for monitoring or managing fisheries, support investment in the resource. In the absence of perfectly enforced management (which is very rarely achieved), there is a strong evidence that the provision of other subsidies, which enhance fishing capacity, tends to lead to negative impacts on the sustainability of fish stocks. Capacity-enhancing subsidies can also create competitive distortions between fishing nations. On the other hand, reforming subsidies is politically and economically difficult, particularly for vulnerable communities that depend on subsidised fishing, and because many large fishing enterprises are able to exert disproportionate political power.
INTRODUCTION

The global ocean and the freshwater ecosystems of the world provide many vital services to humanity (Noone et al. 2013). The world's ocean provides 50 percent of our oxygen and fixes 25 percent of global carbon emissions (GOC 2014). It is thus one of the largest "carbon sinks" in the world and a crucial moderating force in the planet's climate. The health of the ocean therefore has direct implications for all life on Earth.

Fisheries are of immense scale and economic importance, which also means they have a significant environmental impact that must be managed effectively to ensure sustainability. According to the United Nations Food and Agriculture Organization (FAO), marine and inland fisheries and aquaculture supplied the world with about 148 million tonnes of fish in 2010, with a first-hand total value of US$218 billion (FAO 2012). Using the average global multiplier, a measure of the average economic impact of a dollar of landed value (LV) of fish sold at the dock, these sectors created economic impacts of nearly US$660 billion in 2006. Of the total amount of fish supplied, about 40 percent was marketed live, fresh, or chilled, while 46 percent was processed in frozen, cured, or other prepared forms for human consumption, with the remaining 14 percent allocated to non-food uses (FAO 2012).

Fish and fishery products are among the most traded food commodities in the world. According to the FAO (2012), these products represent about 10 percent of total agricultural exports and 1 percent of world merchandise trade in value terms (US$102 billion); in 2010, 38 percent of total fishery production was exported in various forms. Fisheries and aquaculture are particularly important in developing countries where they support numerous small-scale artisanal and subsistence fishers, who often provide crucial food supplies; sustain regional economies; and support the social and cultural values of their areas. These sectors are crucial to livelihoods in many coastal communities around the world. This heavy dependence also poses a major socioeconomic challenge: on how to balance current and future needs for fishery resources (UNEP 2011a).

Dissatisfaction with public fisheries management efforts has led to the emergence of private sustainability labels, driven by the demand of large food retailers in the United States (US) and European Union (EU) for verifiable assurances of sustainably sourced product. Non-governmental organisations (NGOs) have been instrumental in building demand for improved traceability and verified sustainability of fishery products. Many large retailers now impose food safety and traceability requirements in addition to public standards, as well as sustainability requirements, "down" their supply chains. While the impact of these standards on development and the sustainability of fisheries resources is debated, governments are becoming increasingly involved in verifying not only the food safety of fishery products, but also their traceability and sustainability.

The international community has attempted to discipline the use of trade policy tools to address the economic, environmental, and development policy challenges around sustainable use of fisheries resources. Negotiations in the WTO around market access for fishery products take development concerns into account, but have not yet reached a conclusion. In the absence of progress in WTO negotiations on fisheries subsidies, some Members are moving to include these disciplines, as well as measures addressing IUU fishing, in their regional trade agreements, for example, in the Trans-Pacific Partnership Agreement (TPP). Plurilateral subsidy disciplines would be a significant development, a signal that some governments prioritise the benefits of fisheries subsidy reform over concerns that economies that are not a part of the agreement will benefit (as free-riders) from that reform. Large fish importers, the EU and the US, also appear to have had some success in using unilateral import bans (or the threat thereof) to motivate exporting countries to address their vessels' IUU fishing.

This overview paper is designed to inform the development of conclusions and policy options for the global trading system by the E15 Initiative Expert Group on Oceans, Fisheries and the Trade System. Its presentation of the issues reveals a number of policy tensions that could shape these options, including around the price volatility implications of increasing reliance on farmed fish from Asia; the impacts of tariff liberalisation; the need to reform subsidies; and the role of the private and public sectors in establishing food safety and sustainability standards for fishery products. The most significant tension is between current and future use of fisheries resources, and, by extension, between current and future economic benefits and jobs. The nature of fisheries means that resolving this tension will require coherent use of trade policy together with effective fisheries management and governance tools.
Throughout the 20th century, this balance was so tilted towards humanity’s current needs that the oceans’ ability to meet humanity’s future needs became a concern. The declining state of the world’s oceans (Noone et al. 2013, Rogers et al. 2014) and the fisheries they support has now been an item on the global agenda for many years, but the efforts of the international system at cooperation, both in the United Nations (UN), including the FAO, the Organisation for Economic Co-operation and Development (OECD), the World Bank, the WTO, and at regional levels, have not delivered results strong enough to reverse and restore ocean health.

Despite the progress achieved on ocean governance in agreements such as the UN Convention on the Law of the Sea (UNCLOS) and the UN Fish Stocks Agreement, national, regional, and local fisheries management schemes are frequently not delivering sustainable fisheries. In an attempt to fill in the gaps in management, private sector efforts have begun to build markets in developed countries for products from certified sustainable fisheries, but mislabelling and IUU fishing undermine both sustainability efforts and government revenue streams. The economics of the fishing industry continues to be distorted by subsidies that incentivize overfishing and overcapacity (for example, Milazzo 1998; OECD 2000; Isaksen et al. 2014). WTO Members agreed in 2001 to negotiate reductions in these subsidies, but after more than ten years, the negotiations remain deadlocked, partly as a result of fundamental disagreements over the respective level of commitments expected from emerging and more advanced economies.

While this overview paper focuses on the relationship between fishing and aquaculture and trade, there are many areas where human activity has an impact on ocean and freshwater ecosystems, including climate change and ocean acidification; pollution from land-based and marine sources; coastal development; shipping; the petro-chemical industry, and so on (Noone et al. 2013). The exploitation of natural resources in and around oceans, in particular, can impact the health of ocean ecosystems. An additional dimension to the challenge of sustainable fisheries is therefore the extent to which other ocean activities impact the health of fisheries stocks. It is the synergistic effect of these multi-stressors, together with irresponsible fishing and aquaculture practices, that have resulted in the observed negative impacts on freshwater, coastal, and marine ecosystems. Hence, to tackle ecosystem degradation and ensure sustainability, we need a more comprehensive ecosystem approach to governance and policy reforms. We also require considered and cooperative policy responses from the international community at levels never seen before (Sumaila et al. 2011; Miller et al. 2013). The global response will need to integrate the use of trade policy tools as well as the management and governance of fisheries resources themselves.

As a contribution to the process of articulating these responses, the International Centre for Trade and Sustainable Development (ICTSD) and the World Economic Forum convened, under the E15Initiative, a group of experts on oceans, fisheries, and the trade system. The goal of this E15 expert group is to analyse topical ocean and fisheries issues, and present concrete proposals to inform the development of trade-related responses by the international community. The proposals developed will therefore be designed to serve as inputs to ongoing negotiations in the WTO and the global trade system.

This paper is organized into four sections. The first section provides an overview of global catches by species and fishing nations. We then discuss the environmental dimensions of oceans and fisheries. In the following section, we address the social dimensions of oceans and fisheries and identify the links between the social and environmental dimensions of fisheries. Finally, we focus on international fisheries trade, and the trade-related policy responses of the international community to some of the challenges mentioned.

### AN OVERVIEW OF GLOBAL CATCHES BY SPECIES AND COUNTRIES

#### MARINE LANDINGS AND LANDED VALUES BY SPECIES AND COUNTRY

In this section we identify the main species/groups of fish landed from wild capture and aquaculture as well as by the top fishing nations. Table 1 identifies the top ten marine species/groups of fish landed globally in 2012. We see that pelagic species (for example, anchovies, herrings, sardines), especially small pelagics, dominate the landings table with anchovetas at the very top. These top ten species together contributed about 29 percent of the estimated total annual global catch of marine fish in 2012.

In value terms, pelagic species, tunas, and invertebrates were at the top of the table. Together, the top ten species contributed about 33 percent of the estimated total annual global LV of marine fish caught in 2006 (Table 2).

In terms of who is doing the fishing, China topped the list in 2012, with Indonesia coming in second. Table 3 reveals that the top ten fishing nations of the world land about 60 percent of the total global catch of marine fish. In terms of LV, the top ten fishing nations captured about 52 percent of global marine fish LV in 2006 (Table 4). Over the period from 2000 to 2010, an estimated 11 percent of the catch of these top ten countries was caught on the high seas.4

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**TABLE 1:**
Top Ten Fish Species/Group in terms of Landings in 2012

Source: FAO 2014.

<table>
<thead>
<tr>
<th>Common name</th>
<th>Landings (’000 tonnes)</th>
<th>Percent of global landings</th>
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</thead>
<tbody>
<tr>
<td>Anchoveta</td>
<td>4,693</td>
<td>6</td>
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<tr>
<td>Alaska pollock</td>
<td>3,271</td>
<td>4</td>
</tr>
<tr>
<td>Skipjack tuna</td>
<td>2,795</td>
<td>4</td>
</tr>
<tr>
<td>Sardinellasesnei</td>
<td>2,345</td>
<td>3</td>
</tr>
<tr>
<td>Atlantic herring</td>
<td>1,850</td>
<td>2</td>
</tr>
<tr>
<td>Chub mackerel</td>
<td>1,581</td>
<td>2</td>
</tr>
<tr>
<td>Scads nei</td>
<td>1,442</td>
<td>2</td>
</tr>
<tr>
<td>Yellowfin tuna</td>
<td>1,352</td>
<td>2</td>
</tr>
<tr>
<td>Japanese anchovy</td>
<td>1,296</td>
<td>2</td>
</tr>
<tr>
<td>Largeheadhairtail</td>
<td>1,235</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: FAO 2014.

**TABLE 2:**
Top Ten Fish Species/Group in terms of Landed Value in 2006

Source: Sea Around Us (Watson et al. 2004; Sumaila et al. 2007; Swartz et al. 2013). Note that the FAO does not report landed values at this level of detail and what is reported here is the latest provided by the Sea Around Us project at the University of British Columbia (www.seaaroundus.org).

<table>
<thead>
<tr>
<th>Common name</th>
<th>Landed value (million USD)</th>
<th>Percent of global landed value</th>
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<tbody>
<tr>
<td>Pelagic fishes</td>
<td>17,677</td>
<td>16</td>
</tr>
<tr>
<td>Anchoveta</td>
<td>4,344</td>
<td>4</td>
</tr>
<tr>
<td>American sea scallop</td>
<td>3,133</td>
<td>3</td>
</tr>
<tr>
<td>Skipjack tuna</td>
<td>2,395</td>
<td>2</td>
</tr>
<tr>
<td>Atlantic cod</td>
<td>2,094</td>
<td>2</td>
</tr>
<tr>
<td>Yellowfin tuna</td>
<td>2,076</td>
<td>2</td>
</tr>
<tr>
<td>Natantian decapods</td>
<td>1,880</td>
<td>1</td>
</tr>
<tr>
<td>Bigeye tuna</td>
<td>1,576</td>
<td>1</td>
</tr>
<tr>
<td>European anchovy</td>
<td>1,538</td>
<td>1</td>
</tr>
<tr>
<td>Sandlances</td>
<td>1,534</td>
<td>1</td>
</tr>
</tbody>
</table>
TABLE 3:  
Top Ten Countries in Landings in 2012  
Source: FAO 2014.

<table>
<thead>
<tr>
<th>Country</th>
<th>Landings ('000 tonnes)</th>
<th>Percent of global landings</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>13,870</td>
<td>17</td>
</tr>
<tr>
<td>Indonesia</td>
<td>5,420</td>
<td>7</td>
</tr>
<tr>
<td>US</td>
<td>5,131</td>
<td>6</td>
</tr>
<tr>
<td>Peru</td>
<td>4,808</td>
<td>6</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>4,069</td>
<td>5</td>
</tr>
<tr>
<td>Japan</td>
<td>3,611</td>
<td>5</td>
</tr>
<tr>
<td>India</td>
<td>3,402</td>
<td>4</td>
</tr>
<tr>
<td>Chile</td>
<td>2,573</td>
<td>3</td>
</tr>
<tr>
<td>Vietnam</td>
<td>2,419</td>
<td>3</td>
</tr>
<tr>
<td>Myanmar</td>
<td>2,333</td>
<td>3</td>
</tr>
</tbody>
</table>

TABLE 4:  
Top Ten Countries in Landed Value in 2006  

<table>
<thead>
<tr>
<th>Country</th>
<th>2005 real value (million USD)</th>
<th>Percent of global landed value</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>13,293</td>
<td>12</td>
</tr>
<tr>
<td>Japan</td>
<td>8,354</td>
<td>8</td>
</tr>
<tr>
<td>US</td>
<td>8,248</td>
<td>8</td>
</tr>
<tr>
<td>Indonesia</td>
<td>6,202</td>
<td>6</td>
</tr>
<tr>
<td>Peru</td>
<td>4,645</td>
<td>4</td>
</tr>
<tr>
<td>Thailand</td>
<td>3,743</td>
<td>3</td>
</tr>
<tr>
<td>Chile</td>
<td>3,704</td>
<td>3</td>
</tr>
<tr>
<td>Korea Rep</td>
<td>3,167</td>
<td>3</td>
</tr>
<tr>
<td>India</td>
<td>3,004</td>
<td>3</td>
</tr>
<tr>
<td>Spain</td>
<td>2,506</td>
<td>2</td>
</tr>
</tbody>
</table>
AQUACULTURE PRODUCTION BY SPECIES AND COUNTRY

Table 5 presents the main species/groups produced by the world’s fish farms in volume in 2012. The table highlights the clear difference between the top ten marine species caught (Table 1) and the top species produced through aquaculture (Table 5). For aquaculture production, the top ten species together contributed 77 percent of the total global production. The concentration is even more pronounced given that carp-like species together with miscellaneous freshwater fishes contributed almost 50 percent of the global total.

Table 6 also presents the main species/groups, but this time in terms of the value of production in 2012. The table shows the top ten species together contributed almost 90 percent of the global total, which is in stark contrast to the much smaller proportion represented by the top ten species of wild fish by LV.

Table 7 displays the aquaculture production of the top ten fish farming countries in the world in 2012. We see that China reigns supreme with more than 60 percent of global production. India comes in a distant second. What is striking is that only three non-Asian countries—Norway, Chile, and Egypt—made it to the top ten table. According to China Statistics Yearbook (CSP 2008), 60 percent of the country’s aquaculture production in 2007 was from freshwater culture and the remainder from marine culture. Further, while almost 80 percent of China’s marine production was shellfish (for example, shrimps and scallops), nearly 90 percent of its freshwater output was fish such as carps and tilapia. The data reveal that Chinese aquaculture output is consumed almost entirely by China itself, and this is not entirely surprising given the types of species farmed and the involvement of many small-scale fish farmers in the industry.

Table:<br>Top Ten Aquaculture Species/Groups in terms of Quantity Produced in 2012<br><br>Source: FAO FIGIS Database.<br><br>Table:<br>Top Ten Aquaculture Species/Groups in terms of Value in 2012<br><br>Source: FAO FIGIS Database.
According to the OECD-FAO Agricultural Outlook 2013-2022, in the next decade, increased demand for fish will continue to stimulate production, which is expected to reach about 172 million tonnes in 2021. As in recent years, this increase is likely to be mainly driven by aquaculture, which is expected to increase by 33 percent over the period 2012-2021 compared to a small 3 percent growth in capture fisheries. Asian countries will continue to dominate the aquaculture sector. While aquaculture expansion might face certain limitations, including water constraints, limited availability of optimal production locations, and the rising cost of feeds, overall growth in fishery production will continue to exceed that of beef, pork, or poultry (OECD-FAO 2013) in the next ten years.

### TABLE 7:
Production from Top Ten Farmed Food Fish Producing Countries in 2012

<table>
<thead>
<tr>
<th>Country</th>
<th>Production (tonnes)</th>
<th>Percent of global production</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>41,108,306</td>
<td>61.7</td>
</tr>
<tr>
<td>India</td>
<td>4,209,415</td>
<td>6.3</td>
</tr>
<tr>
<td>Vietnam</td>
<td>3,085,500</td>
<td>4.6</td>
</tr>
<tr>
<td>Indonesia</td>
<td>3,067,660</td>
<td>4.6</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>1,726,066</td>
<td>2.6</td>
</tr>
<tr>
<td>Norway</td>
<td>1,321,119</td>
<td>2.0</td>
</tr>
<tr>
<td>Thailand</td>
<td>1,233,877</td>
<td>1.9</td>
</tr>
<tr>
<td>Chile</td>
<td>1,071,421</td>
<td>1.6</td>
</tr>
<tr>
<td>Egypt</td>
<td>1,107,738</td>
<td>1.5</td>
</tr>
<tr>
<td>Myanmar</td>
<td>885,169</td>
<td>1.3</td>
</tr>
</tbody>
</table>

Source: FAO 2012, which is based on nationally collected official data.

### ENVIRONMENTAL DIMENSIONS OF OCEANS AND FISHERIES

Fishing effort has seen rapid increases since World War II, when most fishing was still concentrated in coastal waters. Similarly, aquaculture production has seen a huge increase, which has made it a significant contributor to total global fish supply since the mid-1990s. These rapid increases have led to a number of concerns over their environmental impacts. Here, we first summarize the most recent evidence of the environmental impacts of fishing on key species and the ecosystem at large, including the status of relevant stocks, and the environmental consequences of farmed fish production. Finally, we look at the governance measures in place to manage fishing, including the local, national, and regional resource management schemes in place, and summarize the latest information available on their effectiveness.

#### EVIDENCE OF THE ENVIRONMENTAL IMPACTS OF FISHING

**Sustainability of current extraction rates**

Fishing effort increased rapidly following World War II, particularly off Europe, North America, and Japan (Sumaila et al. 2013). The spatial coverage of global fishing effort also rapidly expanded to cover most of the world’s oceans by 2005 (Swartz et al. 2010), with an increase in overall fish catches continuing until 1996, when they peaked at about 86 million tonnes (t). Catches thereafter have been relatively stable, or even declining, according to FAO statistics. The expansion of the geographic extent of fishing has been accompanied by a ten-fold increase in global fishing effort since 1950 (Figure 1), a figure that rises to 25-fold for Asia over the same period (Watson et al. 2013). Overall, the decline in global catch per unit effort suggests a decrease in the biomass of many fished populations, likely by over 50 percent (Watson et al. 2013). The reasons for this large increase in fishing effort are many, with ineffective management, technological innovation, and the provision of subsidies chief among them. The expansion of capacity has been such that the World Bank and FAO estimated in 2009 that the total global catch could be achieved with only half of the effort actually employed (World Bank-FAO 2009).
More specifically, some of the most traded fish (for example, tuna and cod-like species) are reported to be currently overfished in many parts of the oceans. Examples of highly traded fish include Namibian hake and Atlantic bluefin tuna (BFT). BFT stocks are highly migratory and have a long life span of up to 30 years. Total catches of BFT were stable at around 5,000 t to 8,000 t per year from the 1950s to the 1970s. From the mid-1990s, the catches increased steadily from 9,000 t to 40,000 t per year, followed by a substantial decrease in catch to 24,000 t per year in the last decade (ICCAT 2008; Sumaila and Huang 2012). This stock is currently reported to be at risk of being overfished to depletion. Other examples exist—stock assessment scientists report that bigeye tuna stocks in the Western Central Pacific Ocean (WCPO) are currently being overfished (Langley et al. 2009), meaning that more fish are being removed from the stock than the stock is capable of regenerating (Bailey et al. 2013). Similarly, Hampton (2002) states that there has been a significant depletion of yellowfin tuna stocks in some areas of the WCPO due to fishing.

The result of massive overcapacity in the global fleet and the depletion of fish stocks (which have become harder and harder to catch) is a substantial net economic loss to the global economy; the World Bank and FAO estimated that this amounted to around US$50 billion in 2004 (World Bank-FAO 2009). An updated recent estimate put the loss at US$67 billion a year (Sumaila et al. 2012).

The ecosystem impact of overfishing

The rapid increase in fishing effort after WWII was partly caused by the development of highly efficient fishing methods and technology on board fishing vessels (echo sounders, fish finders, gear, and vessel technology) combined with poor management regimes that did not allow for effective caps on fishing effort. The combined effects of the sheer volume of fishing, and the fishing gear and techniques applied, has resulted in a number of environmental impacts, including (i) overfishing of fish stock; (ii) destruction of fish habitat; (iii) the fishing down of marine food webs; (iv) ecological disruption; and (v) by-catch problems.5

Irresponsible fishing may arise not only when commercially targeted species are overexploited, but also when target species are exploited in a sustainable manner. Modern fishing operations, using available technology and science, coupled with the scale and intensity of fishing driven by high market demand, are enough to produce serious negative impacts on non-target species and on the surrounding marine ecosystems. Even when the volume of target stock taken is sustainable, the modification of the population structure and dynamics of the target stock, such as depletion of spawning stocks or alteration of spawning or migratory behaviour, can have a negative impact on the marine ecosystem, separate and apart from the impact on non-target species. Further, fishing impacts the marine habitat through the use of fishing techniques such as bottom trawling, and ghost fishing by lost and abandoned nets and traps. The use of fishing gear such as trawls and dredges may modify or destroy habitats, thereby reducing seabed complexity and removing macrobenthic organisms that provide shelter (Sainsbury et al. 1993; Auster et al. 1996).

Fishing a stock to depletion also has severe knock-on effects throughout the ocean ecosystem. When top predators such as large shark species are fished out, they trigger trophic effects in the shark food chain, which affect the predator-prey dynamics of the ecosystem and the overall biodiversity of the ocean. Some studies suggest that declining forage-fish populations impact the survival of marine mammals (for

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5 By-catch refers to fish and other marine life that are caught unintentionally as part of fishing operations.
example, Hansen 1997) and the breeding success of seabirds (for example, Anker-Nilssen et al. 1997). It is suggested that fishing may even eliminate trophic groups or keystone species, thereby altering the overall community structure of an ecosystem (Botsford et al. 1997; Hall 1999). Fishing usually results in unintentional kill of untargeted marine life such as juvenile fish (as by-catch, for example), corals, sharks, whales, sea turtles, and birds. This unintentional killing of species can have significant effects on marine ecosystems; for instance, it could impact fish community structure by altering predator-prey relationships (see, Mehl 1991).

This evidence points strongly to the importance of taking an ecosystems approach to fisheries management, so that the potential for effects such as those described can be taken into account when setting catch limits. The impact of fishing on the ocean’s ecosystems is not fully known. The effects for which we have evidence, described above, may only reflect a small proportion of the real impact of fishing. This underlines the importance of respecting the precautionary principle when assessing the impact of human activities on the natural environment.

Managing the ecosystem impact of overfishing in small-scale fisheries

Avoiding and repairing the ecosystem impacts of overfishing can be particularly difficult for small-scale fisheries (SSF) because of a range of additional challenges related to factors that are external to the fisheries per se but within the broader social-ecological system (McConney and Charles 2008). These include, according to the United Nations Environment Programme (UNEP 2011a), (i) negative impacts of industrial and foreign fleets depleting coastal fish stocks, and, in some cases, destroying coastal fishing gear; (ii) degradation of coastal environments and fish habitat through land-based sources of marine pollution, including development of urban areas, shrimp farming, tourism, mangrove extraction, and so on, leading in each case to reduced fish stocks; (iii) infrastructure challenges, such as limitations on transportation of fishery products; and (iv) global forces, such as climate change and globalization of fish markets, which can negatively affect SSF.

Overfishing by SSF themselves contributes to the problem in many cases. But it is important to recognize that given the above external factors, “solving” the sustainability challenge for SSF, in particular, requires coordinated, multi-faceted approaches that aim to improve fishery governance at a local level—so that coastal fishers are involved in developing, and thereby supporting, fishery management measures—while simultaneously dealing with other fleets, and market and infrastructure issues to improve coastal environmental quality (UNEP 2011a).

Ecological impacts of aquaculture

The rapid growth of aquaculture has raised concerns about the environmental sustainability of future industry growth. Central to these concerns are the mostly negative environmental impacts brought about by aquaculture (for example, Naylor et al. 2000; Pauly et al 2002). A global review of 75 species-production systems showed that the higher overall aquaculture production levels were, the higher were aquaculture’s environmental impacts (Hall et al. 2011), including (i) disease and parasite transfer (Krkošek et al. 2007); (ii) escapees (Naylor et al. 2000; Jensen et al. 2010); (iii) disease and parasite transfer (Krkošek et al. 2007); (ii) escapees (Naylor et al. 2000; Jensen et al. 2010); (iv) waste discharge (Milewski 2001); (iv) the introduction of exotic species; (v) residues from chemical and drug uses; and (vi) the utilization of fishmeal and fish oil to feed farmed fish (Naylor et al. 2000). However, the farming of some species (for example, mussels and seaweed) can have positive effects on the environment (Hall et al. 2011).

There are different aquaculture systems—extensive; semi-intensive; and intensive (de Silva and Hasan 2007). The level of environmental impact varies across production systems, species farmed, and the country where the farm is located. Inland pond culture, which is used widely in countries such as China and India, has been identified as having the greatest impact among the different ways farming affects the environment. Marine cage and pen culture methods of farming fish (for example, salmonid, shrimps, and prawns) impact wild fish populations the most because of the need for fishmeal and oil as feed for farmed fish and other animals. Eel production impacts are noteworthy because of the high energy consumption the production entails. Overall, mollusks and seaweed farming place the least demand on the environment, and actually reduce eutrophication (Hall et al. 2011).

Both the aquaculture industry and policymakers have made great efforts to address these environmental problems (Asche et al. 1999). An example of a problem that has been reduced significantly is the use of chemicals and antibiotics in the farming of some species. New technologies have been developed to minimize some of them—for instance, closed containment systems have been proposed and tested for salmon aquaculture in major producing countries such as Canada and Norway (Liu et al. 2013). Offshore aquaculture technology for farming finfish is being developed. Such new technologies have the potential to reduce the incidence of escapees and the spreading of disease, but problems such as the need for fishmeal and fish oil to feed fish being farmed still persist. Even though the use of wild fish as feed is said to be decreasing, still, quite a sizable amount is used for this purpose. This means that the growth of aquaculture production will still depend, to some extent, on the health of capture fisheries.

A real issue to be taken into consideration is that many of the new technologies that are being developed are yet to

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6 There are many definitions of “small-scale” but essentially such fisheries are characterized by being relatively more labour-intensive and less capital-intensive, more tied to coastal communities and less mobile (Berkes et al. 2001; Charles 2001; Pauly 2006). Other terms sometimes used for these fisheries are “artisanal” (versus “industrial”), “coastal” or “inshore.”
be deployed for large commercial farming due to their high investment costs (Liu and Sumaila 2007). In the long-term, however, the economic advantages of efficient input use, and consumer demand for sustainability, would likely result in production process improvements that could gradually spread through the aquaculture industry. It is anticipated that this “technological change surrounding feed production and feeding practices will enable aquaculture to become more efficient and sustainable in nature as we move into the medium- to long-term horizon" (World Bank 2013: 71).

GOVERNANCE MEASURES IN PLACE TO MANAGE FISHING

Up until the 20th century, not much attention was paid to fisheries management, except for a few local fisheries. This was because before then it was thought that humans could never overfish. This view of ocean fisheries and their inexhaustibility is captured by the following 1883 quote from the British government’s top fisheries scientist at the time, Thomas Huxley, "Any tendency to overfishing will meet with its natural check in the diminution of the supply, … this check will always come into operation long before anything like permanent exhaustion has occurred." The folly of this assumption became apparent in the 20th century, when it became obvious that the combination of rising demand for fish, increasing trade, the subsidized development of huge fishing capacity, and rapid technological progress could indeed result in massive overfishing. This, in turn, led to the development of management and governance systems for fisheries, whose aim was, and still is, to counteract the baleful influence of the "common pool" nature of fisheries. Various management instruments have been developed over time, ranging from limited entry programmes, total allowable catches (TACs), quotas, access rights to marine protected areas (MPAs), and spatial planning.

Fisheries are managed by local, national, regional, and global institutions, depending on whether fish stocks are domestic, transboundary or highly migratory, using a combination of these management instruments. Hence, different levels of governance institutions, ranging from international organisations such as the UN to local management arrangements by fishing communities (for example, customary fishing-rights areas known as qoliqoli in Fiji) have been established in many countries to manage fisheries.

National management

Fisheries are managed by a set of institutions at the national level by either full-fledged ministries, such as the Ministry of Fisheries and Marine Resources in Namibia, or a government department, such as Fisheries and Oceans Canada. As is to be expected, countries have different objectives and capabilities when it comes to managing fish stocks and marine ecosystems.

When evaluating how well countries are doing, two approaches immediately come to mind. First, the approach of Pitcher et al. (2009), which uses the FAO’s Code of Conduct for Responsible Fisheries (FAO 1995) as the baseline of assessment, could be a good basis for evaluating how successful maritime countries are in managing their fisheries resources. Pitcher and his collaborators undertook a detailed evaluation of the 53 maritime countries that together landed about 96 percent of the global marine catch reported for 1999.

The authors found (2009: 658) "dismayingly poor compliance" by many of these countries. No country achieved a score in the "good" category, and the average score of all countries was just over the fail threshold. Norway, the US, Canada, Australia, Iceland, and Namibia had overall compliance scores with confidence limits that overlapped with the 60 percent score. At the bottom of the ranking were 28 countries that together landed more than 40 percent of global fish catch. These countries achieved "fail" grades overall (Pitcher et al. 2009).

Another approach that has been used to assess how well countries are doing in terms of managing their fish stocks sustainably is a bioeconomic model of open access. Essentially, fisheries economists assess how close a fishery is to open access equilibrium (which, by the way, may be constantly changing), that is, at an equilibrium at which total revenue is equal to total cost (Gordon 1954). Using company financial data for the top 1,000 fishing companies in the world based in 43 countries,7 Sumaila et al. (2012) demonstrated that most of the companies (~80 percent) and most of the countries in which they operated (~70 percent) reported zero pre-tax profit share of sales (Figure 2), an economic indicator that was used as a proxy for profit. The analysis further showed that many of the companies or countries that did not report zero pre-tax profit actually reported negative numbers. A key reason for these companies continuing to fish even though there are reporting zero or negative pre-tax benefits is that many countries provide tax payers’ money to the fishing sector (as for other sectors, for example, agriculture) in the form of subsidies.8

Given the above and other evidence from the fisheries literature such as Myers and Worm (2003) on large predators, Pauly et al. (1998), and Costello et al. (2012), we can conclude that many maritime countries, if not all, have a long way to go before their management of fisheries can be said to be sustainable ecologically, economically, and socially.

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7 The data used for this analysis was taken from Plimsoll (2011), which reported financial data for the world’s largest 1,000 fishing companies. The purpose of this report is to provide information to investors who want to put their money into fishing companies. We are therefore confident that the data is pretty accurate since no company would deliberately report that they are not making a profit if their goal is to attract investors.

8 See section on Fisheries Subsidies for discussion of proposed policies to eliminate harmful subsidies.
The outcomes described above—overfishing, overcapacity, and low or negative profits—are not surprising because bioeconomic models predict them. Essentially, in a situation where there is no effective management; IUU fishing is rampant; harmful subsidies are provided to fishers; and access rights are not well-defined, these undesirable outcomes are the result of individually rational, but non-cooperative, behaviour (Clark 1990; Munro 1979; Sumaila 2013a). Management systems are created to reduce the occurrence of these undesirable outcomes by avoiding these situations. More practically, over time, different management approaches and tools, including the setting of TACs; the implementation of gear regulations; the institution of limited entry programmes; the introduction of taxes, levies and fees; the buying back of vessels; the implementation of access rights to fishing; and the creation of MPAs have been put in place to manage fisheries and change the incentives for individually rational but socially undesirable behaviour and outcomes.

**Regional management**

RFMOs are the management institutions that were created through the UN Fish Stocks Agreement and other agreements, as discussed in Young (2011), to help ensure the sustainable use of high seas fisheries resources. These organisations have received mixed reviews (see, for example, Cullis-Suzuki and Pauly 2010). Among the reasons in the literature for the mixed reviews are (Sumaila et al. 2007):

1. RFMOs have limited powers to enforce their rules;
2. global coverage of RFMOs is a mosaic of managed fisheries, with some managing a multitude of fisheries, while others manage just a few specialized fisheries;
3. the free riders, that is, states that choose not to join RFMOs, continue to fish outside RFMO rules, and thus undermine conservation measures;
4. fishers register (or re-flag) their fishing vessels in states that are not members of the RFMOs concerned and continue to exercise their (claimed) freedom to fish on the high seas unrestricted by the conservation measures set by RFMOs;
5. IUU fishing is widespread on the high seas (High Seas Task Force 2006);
6. the huge subsidies being paid to the fishing sector in many countries fuel fishing on the high seas (Sumaila and Pauly 2006); and

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**FIGURE 2:**

Pre-tax Profit Share of Sales Value for Leading Fishing Companies

Source: Sumaila et al. 2012.
Global fisheries management

UNCLOS, which was adopted by the Third United Nations Conference on the Law of the Sea in 1982 and entered into force in 1994, is arguably the fundamental law guiding international fisheries management. It lays out the legal regime for the world’s oceans and seas and establishes a framework for ocean governance, specifying the rights and responsibilities of maritime countries with respect to their duty to use living resources sustainably while protecting and preserving the marine environment (UN 2010).

Another important framework is the UN Fish Stocks Agreement, which is an implementing agreement of UNCLOS adopted in 1995 by the United Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks. The Agreement, which entered into force in 2002, applies to straddling fish stocks and highly migratory fish stocks in areas beyond national jurisdiction, that is, the high seas. The main goal of the Agreement and others not mentioned here (see, for example, Young 2011) is to ensure the long-term conservation and sustainable use of these stocks. As noted, these Agreements are the basis for the establishment of regional and sub-regional fisheries management organisations with significant conservation obligations. In some cases, the organizations established have a system of compulsory dispute settlement (UN 2010; Young 2011).

In addition to UNCLOS and the UN Fish Stocks Agreement, there are several governance instruments at the global level such as (i) the Convention on Biological Diversity (CBD); (ii) the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); (iii) the Convention on the Protection of the Underwater Cultural Heritage (CPUCH); (iv) International Maritime Organization (IMO) Instruments; (v) International Convention for the Prevention of Pollution from Ships (MARPOL 73/78); and (vi) the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 (London Convention).

The long list of agreements and conventions notwithstanding, there are still gaps in the global institutional and legal frameworks on ocean issues. Two regulatory gaps identified by Gjerde et al. (2008) are i) the ecosystem and precautionary approach are not consistently incorporated and/or applied in all relevant existing instruments; and ii) compliance and enforcement mechanisms are lacking. The level of commitment to and lack of accountability for conservation and resource management is a major weakness in the international governance framework. The low priority attached to fisheries and the level of commitment is obvious when one contrasts the standards and rules regarding fisheries conservation and management with those that obtain in other areas of economic activity or other types of activity that states wish to regulate. In many other areas, one finds standards and rules that are clear and precise, along with systems for dispute resolution and sanctions to ensure compliance. The fact that the Code of Conduct for Responsible Fisheries (FAO), probably the most comprehensive instrument for fisheries management, is a non-binding instrument underscores this point. Fisheries management would be well served if the Code were turned into a binding and enforceable treaty with dispute resolution and sanctioning mechanisms. Also, there have been calls for an agreement on the effective management of the high seas (see Warner 2009; GOC 2014).

It is difficult to imagine how we can make progress in achieving sustainability without far-reaching reforms of the way fisheries are managed, particularly at the national level. The underlying problems include political and economic incentives that favour short-term gains over longer-term conservation and sustainability (Weitzman 2001), and in the case of many developing states, the additional problem of limited resources and capacity. In designing incentives and disincentives to support the sustainability of oceans and fisheries, the international trading system could be deployed fruitfully, for example, by blocking illegally caught fish from entering the market. The commitments to conservation and sustainability as formulated in UNCLOS and related international legal instruments would also need to be strengthened.

SOCIAL DIMENSIONS OF OCEANS AND FISHERIES

Fish stocks are among the planet’s most important resources and have been supporting humanity for millennia. Beyond playing a crucial regulating function in global climate and marine ecosystems, fish support human well-being through employment in fishing, processing, and retail services (Pontecorvo et al. 1980; FAO 2010; Dyck and Sumaila 2010; Teh and Sumaila 2013), and provide food security for people, particularly in developing countries (Zeller et al. 2006). Improving the sustainability of global fisheries will require careful attention to the socio-economic implications of fisheries, both in the short and long term. This section begins by explaining in more detail the role fisheries play...
in supporting food security, and in national revenues and employment. It then identifies the inter-linkages between the environmental and social policy imperatives around fisheries, and the looming challenge posed by climate change.

CONTRIBUTION OF FISHERIES TO SUSTAINABLE DEVELOPMENT

Food security

It is currently estimated that about 80 million t of ocean fish (the equivalent of 80 million mature bulls in weight) are landed from capture fisheries annually, a decline from about 86 million t at its peak in 1996 (FAO 2010). The key reasons for this decline include overcapacity and overfishing resulting from ineffective management and ill-advised policies such as those that provide capacity-enhancing subsidies, and the lack of clearly defined access rights to fishing. In addition, IUU fishing is a problem, with about 11 million t to 26 million t per annum of fish caught by IUU vessels (Agnew et al. 2009). Fish is a good source of protein, micronutrients, minerals, and essential fatty acids. It provides three billion people with up to 15 percent of their dietary animal protein. This figure rises to nearly 20 percent in low-income, food-deficit countries (FAO 2009a). Evidence from coastal communities in large developing countries such as Nigeria and India, and SIDS such as Papua New Guinea, underscores just how valuable fisheries are to the food security of many of the world’s economically challenged communities (for example, Allison et al. 2009).

National revenues

The value of ocean fish at first landing has been estimated at about US$84 billion per annum (Sumaila et al. 2007; FAO, 2009a; Swartz et al. 2013), with an additional US$10-24 billion per annum formally unaccounted for due to IUU fishing (Agnew et al. 2009). This first-hand value does not capture the total contribution of the fisheries sector to national economies because the sector depends on manufactured goods, including boats and nets. Also, the fish is sold through a chain of supply and at each step value is added, whether through packaging (for example, canning), processing, marketing, transport, or management (Pontecorvo et al. 1980).

Using economic multipliers for the fishing sector reported in Dyck and Sumaila (2010), we present the estimated total economic impact of fishing for 2006 in Table 8. We see from the table that the fishing sector contributed about US$300 billion to the global economy that year. The LVs in some regions were much higher than in other regions due to a combination of ecology and economics. Some regions are blessed with high-value species such as BFT and shrimp while others have low-priced species, such as anchovies in the waters of Peru.

The higher multipliers for some regions are mainly due to the fact that those regions are able to add more value at various stages in the value chain. Also, in general, the longer the production chain, the more total added value is generated. Thus, regions in which most fish is processed locally would end up with higher multipliers relative to those who do not process locally, all else being equal.

Employment

The FAO estimates that about 140 million people are employed directly and indirectly in the fishing sector globally, while Teh and Sumaila (2013), by including the SSF sector as much as possible, estimated that a larger number, some 260 million people, are employed worldwide. Figure 3 reports the number of people employed both in the harvest and post-harvest parts of the fisheries sector, taken from Teh and Sumaila (2013). It tells an important story, which is that most of the fisheries sector jobs are in large developing countries where they play crucial socioeconomic and livelihood functions for millions of people.

<table>
<thead>
<tr>
<th>Region</th>
<th>Landed value (USD billion)</th>
<th>Average multiplier</th>
<th>Economic impact (USD billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>6.3</td>
<td>2.59</td>
<td>16.2</td>
</tr>
<tr>
<td>Asia</td>
<td>53.7</td>
<td>2.67</td>
<td>143.3</td>
</tr>
<tr>
<td>Europe</td>
<td>19.0</td>
<td>3.12</td>
<td>59.2</td>
</tr>
<tr>
<td>Latin America</td>
<td>12.5</td>
<td>2.05</td>
<td>25.6</td>
</tr>
<tr>
<td>North America</td>
<td>12.9</td>
<td>3.52</td>
<td>45.5</td>
</tr>
<tr>
<td>Oceania</td>
<td>3.0</td>
<td>3.27</td>
<td>9.9</td>
</tr>
<tr>
<td>World total</td>
<td>107.6</td>
<td>2.80</td>
<td>301.2</td>
</tr>
</tbody>
</table>

LINKS BETWEEN ENVIRONMENTAL AND SOCIAL DEVELOPMENT DIMENSIONS

The degree to which we effectively manage our fisheries resources impacts our ability to meet key development goals, for example, food security, jobs, and incomes for tens of millions of people around the world, especially in developing countries. This is because healthy fish stocks support a host of economic activities—ranging from actual fishing to marine research and recreational fisheries, all the way through to the restaurant sector. Hence, without fish stocks, the millions of people currently employed in the sector, both in the harvest and post-harvest segments, would have to look for jobs and incomes elsewhere in the economy, not to mention healthy dietary protein, which would be lost. This point is particularly relevant to small-scale, subsistence, and artisanal fishers, who are the majority of fishers in the world. Finally, it has been estimated that more than 10 million tonnes of fish are lost to overfishing and mismanagement of global fisheries, which results in the loss of millions of dollars of income, many jobs, and the potential to feed many of the malnourished people in the world (Srinivasan et al. 2010). In fact, recent improvements in the estimation approach applied here shows that the loss reported is an underestimate (Costello et al. 2013, Srinivasan et al. 2013).

One of the most direct potential links between the environmental and social dimensions of fisheries is the emergence of climate change. Changing ocean temperatures are likely to drive fisheries populations away from the tropics, towards more temperate seas. According to the Intergovernmental Panel on Climate Change (IPCC), “[s]pecies richness and fisheries catch potential are projected to increase, on average, at mid and high latitudes (high confidence) and decrease at tropical latitudes (medium confidence)” (2014: 17). This “[r]edistribution of marine fisheries catch potential towards higher latitudes poses risk of reduced supplies, income, and employment in tropical countries, with potential implications for food security (medium confidence)” (IPCC 2014: 18).

For communities in the tropics, therefore, climate change could mean a significant reduction in the amount of fish they can catch. The more reliant a community is on fisheries for livelihoods and food, the sharper may be the impact on their economic and nutritional vulnerability. By contrast, communities that rely on fisheries in temperate zones may see their catch increase, and their economic security strengthened. These remain, however, forecasts. Reducing the uncertainty that surrounds attempts at modelling the effects of climate change would enable stronger conclusions to be drawn about its impact on capture fisheries and trade. In the meantime, the precautionary management of fisheries appears all the more important (World Bank 2013).

It is important to note that prioritizing short-term social and economic gains above long-term gains in terms of sustainable use can result in resource depletion and environmental degradation. This is probably one of the main reasons why fisheries are in such a poor state today. There is very often a presumption in favour of food security, jobs, and income in the short run with the belief that conservation and long-term sustainability can be dealt with another day. This is what leads fisheries managers to set TACs and quotas above recommended levels and extend subsidies to secure short-term catch when the scientific evidence points towards lower catch limits and reduced effort. The consequent overfishing not only reduces the amount of fish caught in the medium term (quickly eroding short-term gains), but, if continued, risks eliminating an essential resource. In developing countries, where large numbers of people are dependent on fisheries for survival, food security,
and employment, the tendency for short-term social and economic objectives to override the long-term objectives of fisheries management is even greater.

Moving from the current pattern of resource use towards more sustainable patterns, which may include reforming subsidies and other economic incentives, will need to take these socio-economic realities into account. The change will be particularly difficult to address without identifying alternative means of sustenance and livelihoods. The benefits, however, could be substantial. Sustainable management of fisheries resources would help to ensure these livelihoods can continue to be pursued. It could also help to support communities’ resilience to the impact of climate change (World Bank 2013).

GLOBAL TRADE IN FISH AND FISHERY PRODUCTS

Fish and fishery products are among the most traded food commodities worldwide, with developing countries accounting for the bulk of world exports. The share of total production that is exported increased significantly from 25 percent in the mid-1970s to nearly 40 percent in 2011, reflecting the sector’s growing degree of integration in the global economy (FAO 2012). In recent years, liberalisation policies, technological innovations, improvements in processing, packaging, and transportation, as well as changes in distribution and marketing, have further accelerated this trend, while facilitating the emergence of complex supply chains in which goods often cross national borders several times before final consumption.

Figure 4 provides an overview of global trade flows by major regions. While developing Asia, Oceania, and Latin America and the Caribbean have consolidated their role as net fisheries exporters, the EU and the US continue to show consistent trade deficits in fish and fishery products. By value, Africa has been a net exporter since 1985, but showed a small trade deficit in 2011. However, in volume terms, Africa is a net importer, reflecting the lower unit value of imports.

Developing countries as a group account for more than 50 percent of all fisheries exports in value terms (60 percent in volume). China, Thailand, Vietnam, and Chile are among the leading players. Overall net exports of fish and fishery products from developing countries exceed those of agricultural commodities such as rice, meat, sugar, or coffee (FAO 2012). In terms of export markets, developed countries have traditionally represented a major outlet with roughly

INTERNATIONAL TRADE

Global trade in fishery products plays a significant role in shaping the harvesting and use of fish, and therefore will be an important part of a transition to sustainable fisheries. This section provides an overview of global trade flows in fish and fishery products as well as future trends affecting the sector. It then moves on to review trade policy measures applied in major producing and importing countries, including tariff and non-tariff measures, fisheries subsidies, and access agreements. The section ends with an overview of recent developments in international frameworks governing trade in fish and fishery products at the global and regional level.

**FIGURE 4:**
Fishery Trade Flows by Regions (USD ‘000)

**LEGEND:**
- Imports
- Exports

Source: FAOSTAT database
two-thirds of developing country exports directed to them. A growing share of these exports consists of processed fishery products prepared from imports of raw fish that are processed and re-exported.\(^\text{11}\) This re-export phenomenon reflects the growth of global value chains, and that low-cost processing means fish may be caught in one part of the world, processed in another, and consumed in a third.

The EU, the US, and Japan are highly dependent on imports for their consumption. The EU is the largest single market in the world, with about 26 percent of world imports (excluding intra-EU trade). In recent years, however, a number of emerging markets have grown in importance, including China, Brazil, Mexico, and the Russian Federation, and the regions of Asia and the Near East in general. Indeed, while developed countries were responsible for 86 percent of total imports in 1990, this figure fell to 76 percent 20 years later (FAO 2012). Over time, South-South trade is likely to grow in the wake of rising disposable incomes in emerging economies, gradual trade liberalization, and a reduction in high import tariffs with expanding membership of the WTO, and the entry into force of a number of bilateral trade agreements with strong relevance to fisheries (see the section entitled ‘Role of Trade Policy’).

**Main players in global trade**

Table 9 provides information on the top ten exporting countries of fishery commodities by value. Countries listed in red are among both the top ten exporters, and the top ten importers of fishery products (by volume) in the world. China, Norway, and Thailand lead the table, in that order. In terms of volume (Table 10), China is again the world leader, followed closely by Norway and Peru.

For several smaller exporters, fish and fishery products also represent a considerable share of total merchandise trade, highlighting the critical importance of trade in this sector for job creation, income generation, and ultimately growth and development. Figure 5 illustrates this point by looking at the average share of fisheries in total exports of the top exporting LDCs and SIDS between 1990 and 2009. In countries like the Seychelles, Maldives, Cape Verde, and Mozambique, fisheries represented between 25 percent and 50 percent of total merchandise exports, with this share rising to 60 percent or even 75 percent in certain years. This very high level of reliance on fisheries resources suggests these countries may be particularly vulnerable if the health of the fish stock decline as a result of overfishing, or if fish stocks move as a result of climate change.

When it comes to importing countries, the US, Japan, and Spain top the list in value terms, whereas China followed by Japan top the list when imports are measured in quantities (see Tables 11 and 12). It should be noted that several members of the EU made it to the top ten tables with total imports higher than China’s, indicating that the EU as a group would easily top at least the table by value.

The majority of fish imported into China is wild rather than farmed fish. Pollock and whitefish constitute about 60 percent of China’s imports. China also imports sizable amounts of salmon and herring (CSP 2008). Japan is famous for its high demand for tuna species, and is reported to import up to 80 percent of Atlantic BFT. The top three fish species imported into the US are shrimp, salmon, and tuna (NOAA 2012). Worldwide, shrimps are the most important fish product traded in value terms. It is worth noting that a key environmental concern with shrimping is the huge amount of by-catch and discarding that it entails (for example, Andrew and Pepperell 1992).

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**TABLE 9:**

Value of Fishery Exports by Top Ten Countries in 2009

<table>
<thead>
<tr>
<th>Country</th>
<th>Million USD</th>
<th>Percent of global value</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>9,309</td>
<td>10</td>
</tr>
<tr>
<td>Norway</td>
<td>6,794</td>
<td>7</td>
</tr>
<tr>
<td>Thailand</td>
<td>6,177</td>
<td>7</td>
</tr>
<tr>
<td>Vietnam</td>
<td>4,304</td>
<td>5</td>
</tr>
<tr>
<td>US</td>
<td>4,176</td>
<td>5</td>
</tr>
<tr>
<td>Denmark</td>
<td>3,746</td>
<td>4</td>
</tr>
<tr>
<td>Canada</td>
<td>3,166</td>
<td>3</td>
</tr>
<tr>
<td>Spain</td>
<td>3,116</td>
<td>3</td>
</tr>
<tr>
<td>Chile</td>
<td>3,041</td>
<td>3</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2,856</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: FAO FishStat database.
**TABLE 10:**
Quantity of Fishery Exports by Top Ten Countries in 2009

<table>
<thead>
<tr>
<th>Country</th>
<th>Quantity ('000 tonnes)</th>
<th>Percent of global quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>2,605</td>
<td>8</td>
</tr>
<tr>
<td>Norway</td>
<td>2,519</td>
<td>8</td>
</tr>
<tr>
<td>Peru</td>
<td>2,201</td>
<td>7</td>
</tr>
<tr>
<td>Thailand</td>
<td>1,676</td>
<td>5</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>1,419</td>
<td>5</td>
</tr>
<tr>
<td>US</td>
<td>1,307</td>
<td>4</td>
</tr>
<tr>
<td>Chile</td>
<td>1,276</td>
<td>4</td>
</tr>
<tr>
<td>Denmark</td>
<td>1,167</td>
<td>4</td>
</tr>
<tr>
<td>Spain</td>
<td>1,043</td>
<td>3</td>
</tr>
<tr>
<td>Germany</td>
<td>847</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: FAO FishStat database.

Note: Countries listed in red are among both the top ten exporters, and the top ten importers of fishery products (by volume) in the world.

**TABLE 11:**
Value of Fishery Commodities Imported by Top Ten Countries in 2009

<table>
<thead>
<tr>
<th>Country</th>
<th>Million USD</th>
<th>Percent of global value</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>12,892</td>
<td>14</td>
</tr>
<tr>
<td>Japan</td>
<td>12,891</td>
<td>14</td>
</tr>
<tr>
<td>Spain</td>
<td>5,679</td>
<td>6</td>
</tr>
<tr>
<td>France</td>
<td>5,404</td>
<td>6</td>
</tr>
<tr>
<td>China</td>
<td>4,980</td>
<td>5</td>
</tr>
<tr>
<td>Italy</td>
<td>4,880</td>
<td>5</td>
</tr>
<tr>
<td>Germany</td>
<td>4,150</td>
<td>4</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>3,487</td>
<td>4</td>
</tr>
<tr>
<td>Denmark</td>
<td>2,723</td>
<td>3</td>
</tr>
<tr>
<td>Korea Republic</td>
<td>2,666</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: FAO FishStat database.
As noted, countries listed in red are among both the top ten exporters, and the top ten importers of fishery products (by volume) in the world. Together, the countries in red control around one-third of all global fisheries trade. Their trade policies (in the case of Spain, Denmark, and Germany, those of the EU) therefore play a particularly important role in shaping global trade flows.

FUTURE TRENDS IN PRICES AND TRADE

As outlined previously, OECD-FAO Agricultural Outlook 2013-2022 predicts that increased demand for fish will continue to stimulate production, which is expected to reach about 172 million tonnes in 2021. This growth is likely to be mainly driven by aquaculture, which is expected to increase by 33 percent over the period 2012–2021, particularly in Asia, compared to a small 3 percent growth in capture fisheries. By 2030, total production should reach 186 million tonnes (World Bank 2013), with aquaculture supplying more than 60 percent of fish destined for direct human consumption, compared to roughly 50 percent today (World Bank 2013). The expansion of aquaculture might, however, face certain limitations, including water constraints; limited availability of optimal production locations; and the rising costs of fishmeal, fish oil, and other feeds, but overall fishery production will continue to exceed that of beef, pork or poultry (OECD-FAO 2013) in the next ten years.

Fish prices are influenced by demand and supply factors, including the costs of production and transportation, but also of alternative commodities, including meat and feeds. As illustrated in Figure 6, the sector is expected to enter a decade of higher prices and production costs, with prices increasing in the medium term in nominal and real terms. This tendency will be the outcome of several factors. Income and population growth are expected to support increased demand and trade for food feed, fibres, and fish. Changing diets, rising incomes, and urbanisation will likely lead to enhanced consumption of meat, including fish in fillets or prepared and preserved forms, thus creating more residual production to be used in fishmeal manufacturing. When combined with a weaker dollar, these trends should continue to sustain high agricultural prices, particularly for meat, fish, and biofuels. In addition, there are supply-reducing factors such as a limited potential for increased capture fisheries production and cost pressure from some crucial inputs (for example, fishmeal, fish oil and other feeds) in aquaculture. Finally, high energy and oil prices will have an effect on both demand and supply of agriculture and fishery products through higher supply costs and increased demand for agriculture feedstock used for biofuels production. With aquaculture accounting for a much larger share of total fish supply, the price swings of aquaculture products could have a significant impact on price formation in the sector overall, possibly leading to more volatility (FAO 2012).

From a trade perspective, the sector will strengthen its integration in global markets, with a significant share of total fishery production being exported (39 percent, including intra-EU trade). Imports by developing countries of unprocessed fish as raw material for their processing industries or for domestic consumption are likely to grow further. Exports, on the other hand, will be driven by Asian countries, which are expected to benefit from growing investment in the aquaculture sector. In 2021, 55 percent of

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### TABLE 12:

<table>
<thead>
<tr>
<th>Country</th>
<th>Quantity ('000 tonnes)</th>
<th>Percent of global quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>3,613</td>
<td>11</td>
</tr>
<tr>
<td>Japan</td>
<td>2,477</td>
<td>8</td>
</tr>
<tr>
<td>US</td>
<td>2,116</td>
<td>7</td>
</tr>
<tr>
<td>Thailand</td>
<td>1,568</td>
<td>5</td>
</tr>
<tr>
<td>Spain</td>
<td>1,502</td>
<td>5</td>
</tr>
<tr>
<td>Denmark</td>
<td>1,273</td>
<td>4</td>
</tr>
<tr>
<td>Nigeria</td>
<td>1,234</td>
<td>4</td>
</tr>
<tr>
<td>Germany</td>
<td>1,197</td>
<td>4</td>
</tr>
<tr>
<td>Korea Republic</td>
<td>1,159</td>
<td>4</td>
</tr>
<tr>
<td>France</td>
<td>1,074</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: FAO FishStat database.
Note: Countries listed in red are among both the top ten exporters, and the top ten importers of fishery products (by volume) in the world.
world fish exports for human consumption will originate from Asia, with China as the world’s leading exporter (Figure 7).

**ROLE OF TRADE POLICY**

Trade flows are determined by comparative advantages and resource endowments, and also significantly by government policies. Trade policies have traditionally played a critical role in shaping production patterns and, ultimately, affecting the use of natural resources. Fisheries subsidies and the way in which they are allocated in the EU, Japan, and increasingly in several developing countries have long played a determining role in production decisions, often resulting in unsustainable fishing practices and the overexploitation of stocks.

Changes in tariff barriers as a result of a growing number of regional trade agreements (RTAs) or autonomous liberalisation efforts are likely to further enhance the sector’s integration in global markets. At the same time, consumers in more affluent markets increasingly require high standards of quality assurance, and demand guarantees that the fish they purchase is produced sustainably. In this context, some countries have expressed concerns that stringent quality- and safety-related import standards, together with requirements that products meet international

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RTA here refers to the use given to the acronym in the General Agreement on Tariffs and Trade (GATT)/WTO to designate preferential trade arrangements, whether of bilateral, plurilateral, regional or cross-regional composition. In this sense, it encompasses free trade agreements (FTAs), as well as regional and cross-regional integration schemes of diverse depth, including customs unions.
animal health and environmental standards and social responsibility requirements, might act as barriers to small-scale fish producers and operators attempting to penetrate international markets and distribution channels. The following sections provide an overview of the main trade policy issues affecting global fish trade.

**Tariff barriers**

Stagnating domestic fishery production has meant developed countries have relied on imports and on domestic aquaculture to cover their increasing domestic consumption. The coming into force of UNCLOS in 1994, giving coastal and island states control over 200 nautical miles of their coastal water as Exclusive Economic Zones (EEZs), further strengthened this trend. With restricted access to foreign EEZs, several OECD countries had to increasingly rely on trade to meet their domestic demand. This largely explains the relatively low levels of tariff protection compared to agricultural products applied in several developed countries on fish and fishery products, with only a few exceptions in the form of tariff peaks on a limited set of sensitive products. At the same time, several countries maintained relatively higher levels of protection on processed fish, often to protect their processing industry and to promote domestic value addition.  

In developing countries, on the other hand, tariff barriers tend to be slightly higher. Figure 8 provides an overview of average tariffs on fish and fishery products among the top fish exporters and importers, making a distinction between tariff ceilings bound under the WTO and tariffs applied in practice on a most favoured nation (MFN) basis. The difference between bound and applied rates is significant, with the latter being on an average 50 percent lower than bound rates. These differences are essentially the result of autonomous liberalisation efforts undertaken by individual countries over the past decades.

Besides unilateral liberalisation, tariffs have also been significantly reduced as a result of RTAs signed over the last two decades. Today, these preferential deals form a highly complex web of regional integration schemes and bilateral agreements. While several of them focus on promoting deep economic integration, others are shallower in nature and remain limited to trade in goods. Most agreements, however, go beyond WTO commitments and cover fish and fishery products in a substantive—if not fully comprehensive—way. To illustrate this trend, Figure 9 provides an overview of existing bilateral and regional agreements currently in force among the main importers and exporters that cover fishery products.

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1. As described later in this paper, the establishment of EEZs also stimulated trade between coastal and island states with excess fish stocks in their EEZs and distant water fishing nations (DWFNs) with capacity to fish on the high seas through so-called access agreements.
Finally, on top of RTAs, most OECD countries—and several emerging economies such as India, China, Korea, or Turkey—provide trade preferences to fish and fishery products originating from developing countries and LDCs as part of their Generalised System of Preferences (GSP). For some beneficiaries, these preferences constitute a major competitive advantage vis-a-vis other producers.

Preferential treatments, whether granted through GSP schemes or RTAs, are conditional on exporters’ compliance with relevant rules of origin. These confer an economic nationality to a product traded internationally and set the minimum requirements that need to be fulfilled for exporters to benefit from the preferences established under RTAs or trade preference schemes. As with other goods, such rules differ among RTAs and GSP schemes and can be burdensome or difficult to comply with, particularly for smaller developing countries.

In the case of GSP schemes, these are designed on a unilateral basis by preference granting countries, without any harmonized standard. In the case of RTAs, the proliferation of different set of rules results in additional transaction costs to the detriment of private sector actors.

In addition to average tariff levels, tariff structures, including tariff escalation, also matter as they can lock countries, particularly developing countries, into the export of low value-added, raw fishery products. In this context, some have argued that tariff escalation—that is, imposing higher tariffs on processed products and lower ones on raw materials—could provide an incentive to overfish in the sense that countries might end up exporting a greater quantity of unprocessed products to achieve a similar level of earnings as processed or value-added products would provide. Others question such a relationship between tariff escalation and the level of wild catches, arguing that exporting countries do not have such a fixed revenue requirement. They also point to the fact that tariffs might not be the only obstacle and that moving towards higher levels of processing often requires particular infrastructure and technological capabilities which do not exist in many developing countries. Keeping these caveats in mind, it is, however, widely recognised that tariff escalation de facto constitutes a disincentive to product processing, transformation, and value addition in exporting countries.

A look at the structure of applied tariffs in major importing countries by HS chapter tends to confirm that most developed countries have very low tariffs on fishery products on average, including some tariffs so low—below 1 percent—as to be considered “nuisance” tariffs. However, they also confirm some important cases of tariff escalation with duties on processed fish and fishery products almost systematically exceeding those of raw fish (Figure 10). For example, in Japan or the EU, average tariffs on prepared and preserved fish are roughly twice as high as those applied to fresh or frozen fish. As highlighted, this higher level of protection on transformed products reflects an attempt at promoting domestic value addition by protecting processing industries from foreign competition.

It should be noted, however, that these figures only refer to MFN applied rates. As highlighted, several countries benefit from preferential market access in the form of unilateral trade preferences or as a result of RTAs where such tariff escalation might be absent or at least attenuated.

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**Figure 9:**
Regional Trade Agreements Covering Fisheries among Selected Importers and Exporters

Source: Author’s elaboration, based on IDB, ADB and WTO data.
Multilateral tariff reductions under the Doha Round of trade negotiations could go a long way in removing such phenomenon, as illustrated in Figure 10. Based on the tariff cut formula envisaged in the draft WTO negotiating texts, the red lines indicate what the level of bound rates would be after applying the proposed tariff reductions. This is largely due to the harmonizing nature of the “Swiss formula” currently under negotiation, which tends to cut higher tariffs significantly more than lower ones.\(^1\)

From a sustainable development perspective, the question of tariff liberalisation presents a number of policy tensions. The first is balancing the interests of those that would benefit versus those that might lose if tariffs on fishery products are lowered. Given the economic significance of the sector, many fish-exporting nations are pushing for new tariff liberalisation commitments in multilateral and regional negotiations. Removing market access barriers, such as tariff escalation, that lead to higher tariffs on processed products, could help developing countries expand their participation in international trade, adding value to their exports, generating income, and employment.

On the other hand, several developing countries have been concerned that further trade liberalisation might affect the value of trade preferences granted to them through different GSP schemes. This is particularly the case of Africa, Caribbean and the Pacific countries (ACP) who have traditionally benefited from significant preference margins in the EU market under the Lome Convention and the Cotonou Agreement. By removing tariff escalation for ACP countries on certain products, while maintaining it for other trading partners, such preferences have facilitated the development of industrial processing plants such as canning factories or loining plants for tuna in countries such as Fiji, Ghana, Kenya, Ivory Coast, Madagascar, Mauritius, Papua New Guinea, Senegal, the Seychelles, and Solomon Islands (Campling 2008). These preferences have by and large been preserved in the EU market, where import-competing industries, notably in Spain, have ensured that canned tuna would be excluded from most EU RTAs. For these countries, removing tariffs across the board on an MFN basis would result in the erosion of their preference margin and might affect the competitiveness of their processing industry.

The second policy tension relates to balancing the increased demand and potential economic gains from liberalisation with the need to limit catch levels to ensure the long-term sustainability of fish stocks. From a sustainability perspective, the relationship between tariff liberalisation and capture fisheries and aquaculture production is ambiguous. Tariff reduction could lower prices for consumers and increase demand for fishery products. In the absence of effective management regimes to ensure that production is kept at levels consistent with sustainability objectives, the pressure generated by trade liberalisation could contribute to increased fish harvests, exacerbating the overexploitation of fish stocks.\(^2\)

But these effects are likely to vary depending on domestic fisheries management policies, the method of production (for example, capture vs. aquaculture), and country-specific social, economic, and political factors. If revenue from additional trade was invested in fisheries management, for example, trade could help to support sustainable fisheries development and long-term food security.

### Fisheries subsidies

Fisheries subsidies have been defined in various ways by global or regional organisations (such as FAO 2001a; OECD 2000; and Asia-Pacific Economic Cooperation [APEC] 2000), by consultant groups (such as MRAG 2000), and by academics (such as Schrank and Keithly Jr 1999; Sumaila and Pauly 2006).

A subsidy is generally understood to be some type of government support to a given private sector.\(^3\) The 1994 WTO Agreement on Subsidies and Countervailing Measures (ASCM) (WTO 1999), which provides the legal definition of a subsidy in international trade law, defines subsidy as a “financial contribution” by a government or any public body which confers “benefit” to the private sector via:

1. transfers of funds including grants, loans, and equity infusions or potential transfers of funds such as loan guarantees;
2. foregone government revenue from tax exemptions;
3. goods and services provided to the private sector other than general infrastructure;
4. indirect support through government payments into private funding mechanisms; or
5. any form of income or price support.

The ASCM also limits its definition of a subsidy to programmes “specific” to certain enterprises, industries, regions or groups thereof, with the aim of excluding any programmes that may be considered provision of general services by government. The ASCM establishes a broad prohibition on subsidies contingent on export, or on the use of domestic over imported products. It also contained a list of “non-actionable” or permitted subsidies (including to help companies adjust to stricter environmental standards) but this provision expired in 1999.

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\(^{1}\) For the purpose of this simulation, we have assumed that the EU, Japan, and the US would reduce their bound rates using a Swiss formula with a coefficient of 8 and that China (treated as a developing country in the WTO) would apply a Swiss formula with a coefficient of 20.

\(^{2}\) According to the WTO’s World Trade Report 2010, economic theory suggests that property rights regimes of different strengths governing the same natural resource can shape trade flows. Countries with a scarcity of a natural resource may still find themselves exporting the resource to resource-rich countries if the exporting country’s property rights system is weak.

\(^{3}\) The discussion here draws from Swartz and Sumaila (2013).
FIGURE 10: Tariffs on Fish and Fish Products

Source: WTO Tariff Download Facility.

LEGEND:

- Applied MFN
- Post Doha Rate
The OECD definition of subsidies ("government financial transfers") is broader than that of the WTO, covering "interventions associated with fishery policies, whether they are from central, regional or local governments" (OECD 2000: 129). Under this definition, programmes such as management, research, and enforcement, as well as the contributions by governments to international fisheries access agreements that are not explicitly addressed in the WTO (1999), are also included. Meanwhile, the FAO uses a much broader definition of fisheries subsidies—"fisheries subsidies are government actions or inaction outside of normal practices that modify—by increasing or decreasing—the potential profits by the fisheries industry in the short-, medium- or long-term" (Westlund 2004: 7). APEC also takes a broad approach, defining subsidy as all government support measures to the fishing industry (2000). A similarly broad definition was also used in the recent global analysis of fisheries subsidies by Sumaila et al. (2010).

Different kinds of subsidies have different effects on the fish stocks targeted by the subsidised industry. Sumaila et al. (2013) identify three different types of subsidies according to the impact they tend to have on fisheries resources.

i) Beneficial subsidies, including those to fisheries management programmes, research and development (R&D), support investment in fisheries resources.

ii) Capacity-enhancing subsidies, including those for boat construction, renewal and modernisation, fuel subsidies, and fishery development programmes, tend to promote dis-investment in the resource once fishing exceeds the economic optimum.

iii) Ambiguous subsidies, including those to vessel buy-back programmes and rural fisher community development, can promote or undermine investment in the resource depending on the circumstances.

The classification above identifies the impact different subsidies will tend to have on the resource. The actual environmental effects of capacity-enhancing and ambiguous subsidies on the fish stocks targeted by the subsidised industry will depend on the type of fisheries management regime in place as well as on the state of the fish stocks (Hannesson 2001; OECD 2006; UNEP 2011b).

Environmental effects of capacity-enhancing subsidies

In open access fisheries, where entry is not restricted, subsidies that improve the profitability of the fishery, like capacity-enhancing subsidies, will lead to overcapitalization and overexploitation (Munro and Sumaila 2002). In the absence of effective control of fishing effort, the abnormal profit generated by these subsidies will encourage reinvestment in the fishery, as fishing enterprises compete to capture a greater share of the abnormal profit until it is dissipated through a combination of reduced catch and increased cost ("too many vessels chasing too few fish"). Hence, capacity-enhancing subsidies in open access fisheries will tend to undermine the sustainability of the natural resource.

Effective controls of catch in the form of a total allowable catch (that is, regulated open access fisheries) can mitigate the overfishing effect of fisheries subsidy programmes. Nevertheless, if the management regime does not also effectively control fishing effort (for example, by capping the number of fishing vessels or licences allowed), capacity-enhancing subsidies provided to the fishing industry will still likely lead to fleet overcapacity. This commonly leads to attempts by fisheries managers to limit the fishing activity of the overcapitalized fleet through the gross shortening of fishing seasons (Munro and Sumaila 2002). Some consequences of this "race to fish" include reductions in price due to flooding of the market; inferior quality of catches; and overcapacity in processing facilities to cope with highly seasonal peaks in fish supplies.

The analysis of regulated open access fisheries assumes the total amount of catch is perfectly enforced, so the negative effects of capacity-enhancing fisheries subsidies on sustainability can be mitigated. However, in reality, perfect enforcement is rarely, if ever, achieved. Moreover, overinvestment in a fishery caused by capacity-enhancing or ambiguous subsidies may lead to greater industry pressure to increase the caps on the total catch, potentially to levels beyond what would be considered biologically sustainable.

Economic effects of capacity-enhancing subsidies

Further, from a societal standpoint, the introduction of capacity-enhancing subsidies in fisheries distorts economic incentives in a society, needlessly attracting human and other resources into an industry where they yield a lower return than they would if they were employed in other sectors of the economy. Provision of capacity-enhancing subsidies, therefore, represents a net welfare loss to society, even in the presence of effective management (Cox and Sumaila 2010).

In the international arena, the effects of fisheries subsidies have been perceived in terms of trade distortion. That is, ambiguous and capacity-enhancing subsidies to industries targeting the international market can harm unsubsidized industries in other countries by reducing their market competitiveness. It is likely that such effects exist in fisheries, given that a large proportion of the global catch is traded internationally (FAO 2010), although the trade-distorting effects of fisheries subsidies have yet to be explicitly challenged in international forums such as the WTO. WTO Members are presumably unwilling to challenge other Members’ subsidies for fear of being targeted themselves. Moreover, with regard to shared and straddling stocks, the overfishing effects of subsidized fleets may cause considerable harm to the economic performance of unsubsidized fleets at the production level by reducing the biological productivity of the jointly targeted stocks.
This analysis suggests that capacity-enhancing and ambiguous subsidies deserve the most policy attention. Beneficial subsidies, which support the sustainability of fisheries resources, should presumably be encouraged wherever possible. A key policy challenge here is how to manage the transition from harmful to beneficial subsidies.

**Quantifying global fishing subsidies**

In Sumaila et al. (2013), the authors came to the conclusion that global fisheries subsidies were about US$35 billion in 2009 dollars. Capacity-enhancing subsidies constituted the highest categories provided, at over US$20 billion. For all regions, the amount of capacity-enhancing subsidies is higher than other categories, except North America, which has higher beneficial subsidies. The value of subsidies paid by developed countries is far greater (65 percent of the total) than that paid by developing countries (35 percent of the total). We see in Figure 11 that fuel subsidies, possibly the most harmful of all subsidies, receive the largest amount of money.19

In Figure 12, we present the latest subsidies data for different countries to provide a more in-depth understanding of fisheries subsidies.

Figure 12 shows that Japan provides the highest amount of subsidies among developed countries (19.7 percent of total), followed by China (19.6 percent of total). For all countries, the amount of capacity-enhancing subsidies is higher than other categories, except for the US, for which the level of beneficial subsidies is higher, and Canada and Australia, for which the level of ambiguous subsidies is higher.

Figure 13 shows that Europe provides the highest amount among major fishing entities (26 percent of total), closely followed by Japan (21 percent of total), and China (20.7 percent of total). All entities have higher capacity-enhancing subsidies, except the US, for which the level of beneficial subsidies is higher.

We see in Figure 14 that even though Africa gives the lowest subsidies in absolute terms, it tops the chart when we consider subsidy intensity with respect to LVs. It should be noted that Africa and Latin America have the highest subsidy intensities, meaning that they get much less in terms of LV for each dollar of subsidy they provide to their fishing sector. This may well be because a good chunk of their catches are by small scale artisanal and subsistence fishers, most of whose catch are not captured by the official statistics (see, for example, Cisneros et al. 2013). Having said this, one policy implication of the high subsidy intensity revealed in Figure 14 is that countries in Africa and Latin America need to seriously consider the cost and benefits to them of continuing to provide subsidies, especially the harmful ones, to a sector that seems to bring in little revenues relative to the amount of subsidies provided. Policymakers need to ask whether the provision of such subsidies is the best use of scarce public funds.

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**Note:** It is worth noting that even though these numbers are probably the most comprehensive, they are still controversial because of the statistical approach used to fill in data gaps.
FIGURE 12:
Subsidy Estimates for the Ten Largest Subsidizing Developed Fishing Countries

LEGEND:
- Beneficial
- Capacity-enhancing
- Ambiguous

Source: Sumaila et al. 2013, adapted from FAO 1992; Milazzo 1998, Sumaila and Pauly 2006; and Sumaila et al. 2010. It should be noted that because of their size and level of sophistication, China and Russia were considered in this study to be developed fishing nations.

FIGURE 13:
Subsidy Estimates by Major Fishing Countries/Political Entities

LEGEND:
- Beneficial
- Capacity-enhancing
- Ambiguous


FIGURE 14:
Subsidy by Landed Value for Each Continent

LEGEND:
- Ambiguous
- Capacity-enhancing
- Beneficial

Source: Adapted from Sumaila et al. 2010.
Sumaila et al. (2013) identify some of the many inter-governmental and non-governmental organisations have made efforts to address the fisheries subsidies issue, although arguably without achieving much concrete success. Examples of such organizations are the OECD (2000) and APEC (2000); the New Partnership for African Development (NEPAD), the Caribbean Community (CARICOM), the Association of Southeast Asian Nations (ASEAN) and the South Pacific island countries. NGOs such as the World Wide Fund for Nature (WWF), Oceana, BirdLife International, and Greenpeace have played important roles in putting fisheries subsidies on the global agenda.

Probably the biggest policy achievement in disciplining subsidies is the recent new EU Common Fisheries Policy, which prohibits harmful fisheries subsidies such as those for the building of new boats. While it would be interesting to see how this new policy is actually implemented, it represents good progress. So what can we learn from this reform, and why was it possible? It appears that the combination of the availability of scientific knowledge and data on the magnitude and negative effects of subsidies, in particular, to the European public; the solid contributions of a number of NGOs; and the appointment of a dynamic and conservation-conscious European Fisheries Commissioner made this change in European fisheries policy possible.

These efforts have given fisheries subsidies the high profile it now enjoys in international fisheries policy debate and placed it firmly on the WTO agenda. The WTO became active in the effort to discipline fisheries subsidies both for environmental reasons and because economic theory has clearly demonstrated that some subsidies can distort the market and therefore trade. As explained, fishing industries that receive subsidies (outside those for fisheries management) get an undue advantage in the market place over those who do not. Because fisheries are classified as industrial products in the WTO, subsidies to them are subject to the rules on industrial subsidies. Under the WTO Doha Development Agenda (the Doha Round), negotiations on additional disciplines specifically for fisheries subsidies are part of the trade “Rules” negotiating group along with negotiations on industrial subsidy disciplines. The need to discipline capacity-enhancing subsidies, including those that distort markets and give an unfair advantage to the recipient, is compelling. Greater transparency regarding subsidies is also necessary.

The essential role of fishing (including highly subsidized fishing) for food security and incomes in vulnerable communities means that in reforming subsidies some level of flexibility is required for developing countries and small-scale and subsistence fisheries. Fisheries are complex systems and much depends on the local context, including the effectiveness of the resource management system. Disciplining subsidies without addressing current weaknesses in fisheries conservation, and management may not achieve the desired objective. The impact of capacity-enhancing subsidies on fisheries means that subsidies is one area of reform that is required; but it must be done together with reforms to improve governance arrangements and the conservation and management of fisheries systems, including the elimination of IUU fishing.

Food safety/traceability requirements

Food safety standards are an essential market access requirement for the export of fish and fishery products to major consumer markets. They are frequently accompanied by traceability requirements to enable the identification of food safety problems in the supply chain and to meet consumer demand for information about the source of the fish they consume.

WTO Members’ national food safety systems are subject to the disciplines of the Agreement on the Application of Sanitary and Phytosanitary Measures (the SPS Agreement) (WTO 1999). National food safety requirements in the EU, the US, and Japan apply to the entire production chain and establish the primary responsibility of the private sector in meeting standards, with government oversight; all three use risk-based inspection and audit procedures, and include traceability and rapid alert systems (Palin et al. 2013).

National governments’ requirements are increasingly being supplemented by private food safety and traceability standards from private buyers of seafood. Recent research (Washington and Ababouch 2011; Henson and Humphrey 2009) attributes this in part to that large food retailers in the EU and North America (and, in the US, the food service industry) are responsible for an increasing proportion of sales of seafood in supermarkets and restaurants. As supply chains become more vertically integrated, independently certified private food safety standards provide additional verifiable assurance to companies on the safety and quality of the seafood they source (Washington and Ababouch 2011).

With seafood increasingly coming from aquaculture, standards on farmed fish have also proliferated. Aquaculture-specific certification schemes tend to cover both food safety and the environmental and social impacts of aquaculture production (see Table 13). Several different standards exist in the key markets for eco-labelled products, the US and particular EU countries (the Netherlands, the UK, and Germany) (Washington and Ababouch 2011). In 2013, three key aquaculture labelling organisations (Global Aquaculture Alliance, Global GAP, and the Aquaculture Stewardship Council) agreed to work together to reduce duplication in their three certification schemes. The challenges presented by the proliferation of private food safety standards, and a recognition that food safety is a “pro-competitive issue,” have also led to retailer-driven efforts to establish equivalence mechanisms for food safety standards, such as the Global Food Safety Initiative (Washington and Ababouch 2011: 16).

Food safety standards appear to present both challenges and opportunities for producers. Meeting public and private food
safety requirements provides access to large and lucrative markets, but can require significant up-front and ongoing investment in technology and processes by the fisheries industry (WorldFish Centre 2008). Where economies of scale and access to capital facilitate compliance with new standards, the need to comply with new requirements can encourage consolidation in an industry (Henson and Humphrey 2009). Public food safety standards appear to function as requirements for entry to a particular market; private standards as requirements for entry to a particular supply chain.

In as far as standards limit entry to markets, trade also appears to flow “around” them. There is evidence that public and private demands for food safety certification and traceability in export markets can lead to the formation of two streams of fisheries production in fish-exporting developing countries—large-scale production with the capital required to make investments to meet strict sanitary requirements in some export markets, and smaller-scale production for domestic consumption and export to less demanding markets (Washington and Ababouch 2011, Manarungsan et al. 2005).

Evidence of new agri-food exports from developing countries, including Ethiopia, Ghana and Senegal, entering global markets suggests that neither public nor private standards are insurmountable requirements for market access (Henson and Humphrey 2009). However, the playing field is not at level one. The per-unit cost of implementing food safety standards puts smaller producers within countries, and producers in poorer countries, at a relative disadvantage (WorldFish Centre 2008). LDCs and SIDS are often highly dependent on exports of fishery products given their small resource base and small domestic market. For capital-poor producers in export-dependent economies, keeping up with the proliferation of public and private standards is a particular challenge.

Overall, the specific impact of private standards in the agri-food industry on developing country exports is difficult to distinguish among all the other competitiveness factors (Henson and Humphrey 2009). The evidence suggests that public food safety standards actually represent more of a challenge for market access than private standards (Washington and Ababouch 2011). Given that importing countries are not likely to want to lower their food safety standards to make them more accessible, building the capacity of producers in developing countries (and their governments) to implement sanitary standards may be a more feasible solution. The WTO’s Standards and Trade Development Facility, for example, coordinates and finances capacity-building work that helps developing countries to implement SPS standards, both to improve their domestic production and to help improve access to markets. The facility has completed a number of fisheries-related projects, including supporting the compliance of fish processing in Cape Verde with SPS requirements and the harmonisation of aquaculture certification in ASEAN countries.

Sustainability standards

Private sustainability standards for fishery products have emerged in a number of developed country markets, partly as a reaction to the perceived failure of national governments to properly manage fisheries within their EEZs and under RFMOs (Washington and Ababouch 2011). The demand drivers are similar to those for private food safety standards. For large food retailers with their own private brands of seafood and for the food service industry in the US, independent certification of the sustainability of fishery products helps to provide a form of “insurance” against negative reputational risks associated with the impact of their sourcing policies on the environment and a point of competitive difference (Washington and Ababouch 2011). Many different standards are used by a wide range of players, from fishers to processors, traders and wholesalers, across a very heterogenous industry.

The two largest marine capture fisheries certification schemes, by proportion of global capture, are Friend of the Sea (FoS) and the Marine Stewardship Council (MSC). Together, the two schemes claim to cover around 18 percent of global marine fisheries production, although after processing and repackaging the amount of labelled product actually sold on the market may be much less than this (Washington and Ababouch 2011). FoS certification covers around 10 percent of global capture, however around 80 percent of the volume of landed catch covered is made up of Peruvian anchovy (Washington and Ababouch 2011). The majority of FoS products are sold in the US and specific EU markets. As of August 2014, 238 fisheries carried MSC certification (see Table 13), representing about 8 percent of global capture. Most MSC product is sold in the US and in specific EU markets (Netherlands, France, Sweden, the UK, and Germany), although an increasing number of licences have also been sold in China (MSC 2013).

Other schemes (for example, KRAV in Sweden and Naturland in Germany) provide certification of organic aquaculture and relatively small scale sustainability certification schemes for marine wild capture fisheries (MRAG 2009). As part of their campaigns to encourage consumers to choose sustainable fish in restaurants and supermarkets, several NGOs have produced recommendation lists. These recommendation lists fill an important information gap because their coverage of species is far wider, although much less detailed and fishery-specific, than that of certification schemes (MRAG 2009). More broadly, NGOs have been instrumental in building

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21 See the Standards and Trade Development Facility website at http://www.standardsfacility.org/.
22 See the Friend of the Sea website at www.friendofthesea.org/.
# Table 13: Summary of Selected Certification Schemes

<table>
<thead>
<tr>
<th>Source/Quality of information</th>
<th>Frequency of re-certification (for fisheries / aquaculture)</th>
<th>Independent (3rd party) certification?</th>
<th>Traceability included</th>
<th>Small-scale and/or data deficient certified?</th>
<th>Number of fisheries certified</th>
<th>Number of aquaculture operations certified</th>
<th>Indicative cost of certification/audit (Euro)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOS</td>
<td>3-5 years</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>~78</td>
<td>~100</td>
</tr>
<tr>
<td>MSC</td>
<td>5 years</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Few</td>
<td>238</td>
<td>30,000</td>
</tr>
<tr>
<td>MEL-Japan</td>
<td>5 years</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>20</td>
<td>15,000</td>
</tr>
<tr>
<td>GlobalGAP</td>
<td>Audit</td>
<td>Annual</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>~286</td>
</tr>
<tr>
<td>GAA</td>
<td>Audit</td>
<td>Annual†</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>3,175†</td>
</tr>
<tr>
<td>Naturland</td>
<td>✓</td>
<td>✓/x</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>?</td>
</tr>
</tbody>
</table>

Notes: SA = stock assessment from the fishery; Ind = indirectly (that is, issue is not specifically addressed and is considered to be beyond the scope and remit of the scheme, but some aspects are indirectly assessed through other measures).

1 Counts individual species within a single audit as separate fisheries. In practice, some are mixed fisheries.
2 Not specified, but none of the “certified until” dates for certified farms, hatcheries, or processing plants listed on the BAP website ([www.bestaquaculturepractices.org](http://www.bestaquaculturepractices.org)) were more than one year in the future.
3 Refers to the number of BAP-certified aquaculture farms cited on GAA website listed below.
4 Relates to cost of membership or registration and the cost of certification audit or annual inspection.
5 Accreditation is not to Naturland’s procedures, but to ISO65.
6 Naturland certification committee takes the certification decision, not the certification body.

Source: Adapted from MRAG (2009: 18) with updates of coverage in italics. Updates as of Aug 2014 from:

- MSC: “MSC in Numbers” page of MSC website, www.msc.org;
- Marine EcoLabel-Japan: List of certified fisheries as at March 2014 from [http://www.melj.jp/eng/index.cfm](http://www.melj.jp/eng/index.cfm);
demand for improved traceability and verified sustainability of fishery products. Table 13 provides a summary of the characteristics of several key certification schemes.

Private sustainability standards in fisheries are part of a wide proliferation of private sustainability standards. While there are still only a few private sustainability standards applicable to capture fisheries, there are many more applicable to aquaculture. The proliferation of private standards has motivated international organisations to help producers (and their governments) understand what standards are applicable to their products and how to reach them. The United Nations Forum on Sustainability Standards (UNFSS), for example, facilitates research and dialogue around the role of voluntary (private) sustainability standards and their impact on sustainable development.23 The International Trade Centre (ITC) has developed a very detailed online tool called Standards Map, which allows the public to access information about more than 130 voluntary standards and protocols applicable to different goods and services, and allows producers to self-assess their compliance with each standard.24

Trade impacts of private sustainability standards

The impact of private sustainability standards on trade and production patterns appears to be quite context-specific. The costs of acquiring, and maintaining, certification accrue mainly to the fishing industry involved, and vary considerably depending on how large and complex the fishery is; the amount of pre-existing information; and kind of certification involved. Independent third-party MSC certification can cost up to US$250,000, while simpler certification schemes, like FOS, cost only around US$2,000 (Washington and Ababouch 2011). Some governments (for example, the Netherlands, New Zealand) have provided financial assistance to help their fishing industry get certified or cooperated with their fishing industries to certify their fisheries’ sustainability (for example, Alaska, Iceland) (Washington and Ababouch 2011). Fully government-funded certification could, it has been argued, be considered a subsidy to the industry (MRAG 2009). The largest cost element of a certified fishery, however, remains the underlying cost of managing the resource sustainably (Roheim and Sutinen 2006).

Recent research reports “little hard evidence” of economic benefits accruing directly to fishers from certification, where there was evidence of a price premium for certified product, it appeared to relate to “a specific fishery and/or market situation” rather than a generalizable economic reality (MRAG 2009: 59). Retailers presumably benefit from some reputational insurance, but for fish producers, the main benefits appear to consist of access to supply chains and more stable relationships with buyers that require a steady supply of certified seafood products (Washington and Ababouch 2011). This is not an insignificant benefit, of course; the ability to reliably sell definite volumes of product provides useful certainty to producers.

Environmental impacts of private sustainability standards

The impact of private certification on the health of certified fisheries, and the broader marine ecosystem, is also not clear-cut (FAO 2012). Overall, most certified fisheries were well-managed before certification (Washington and Ababouch 2011). This is likely to have made the initial up-front costs of certification (for example, data collection) less of a barrier. While there is some evidence of positive changes in fishing practices as a result of certification, the environmental impact of certification appears to be more likely to come indirectly, including through the identification of gaps and improvements in management systems that would presumably improve the status of target stocks and potentially the stock’s broader ecosystem (Washington and Ababouch 2011). The current expansion phase of existing certification schemes could eventually provide more evidence of the possible impacts of certification on both trade patterns and the marine environment.

Development impacts of private sustainability standards

As noted, demand for private sustainability standards is concentrated in the US, particularly in the food service industry, and certain EU markets where consumers are both more sensitive to environmental concerns and prefer processed and frozen seafood. The nature of this demand also shapes the kinds of marine capture species for which certification is demanded—in 2009, six fisheries, covering salmon, hake-type fish, and herring accounted for 78 percent of all MSC products (Washington and Ababouch 2011).

The impact of marine capture fisheries eco-labelling schemes on developing countries has, so far, been relatively limited. Except for farmed shrimp, catfish, and canned products such as tuna, demand for certification usually applies to processed and frozen seafood. The nature of this demand also shapes the kinds of marine capture species for which certification is demanded—in 2009, six fisheries, covering salmon, hake-type fish, and herring accounted for 78 percent of all MSC products (Washington and Ababouch 2011). Aquaculture certification standards, which are more relevant to developing country producers, appear by and large to be better adapted to their realities. GlobalGAP and the Global Aquaculture Alliance, for instance, both allow small-scale producers to pool resources and become certified as a group or cluster (MRAG 2009).

If sustainability certification were to become a de facto market access requirement for the kinds of marine capture fishery products developing countries produce, either for export or domestic markets, developing country producers could face significant challenges. The existing single-species certification process is not well suited to the multi-species, small-scale fishing more common in developing countries.

23 See the UNFSS website: http://unfss.org/.
24 Standards Map is available on the ITC website at http://www.standardsmap.org/.
and while certification might enable more security of demand, the significant investment required could be prohibitive for fragmented and resource-poor producer communities (Washington and Ababouch 2011).

Evidence of developing countries fisheries achieving certification, however, suggests the challenge is not impossible. FOS’ relatively low audit costs and achievable sustainability standards have been cited as the reason it is relatively more accessible for fisheries in developing countries (MRAG 2009). By comparison, only 8 percent of MSC-certified fisheries are in developing countries, mainly Latin America, but the organisation is developing tools to make certification more accessible for developing country fisheries (MSC 2013). The greatest barrier to sustainability certification in developing countries is likely to remain the large public cost of managing fisheries sustainably. However, there appears to be a growing recognition that the process of achieving sustainability certification can provide impetus to improvements to domestic fisheries management (Washington and Ababouch 2011).

Trends in fisheries sustainability standards

Washington and Ababouch (2011) suggest that as large multinational supermarkets and retail chains consolidate their market presence in East Asian, Eastern European, and Latin American markets, retailer-driven demand for sustainable seafood could increase. Conversely, research into MSC certification suggests there are factors that may limit the broader uptake of eco-labelled fishery products, including a lack of concern for fisheries sustainability, lack of financial returns for producers, and difficulties in assuring the quality of sustainability measurements (Kaiser and Edwards-Jones 2006). The question of consumer demand for certified seafood is an area of ongoing investigation. Recent research (Uchida et al. 2013) suggests there is latent willingness to pay a premium for eco-labelled seafood in one of the largest import markets, Japan, which is currently not active because consumers are not sufficiently aware of the state of global fish stocks and the purpose of fish product eco-labels.25

The market could also face supply-side constraints. Multinational supermarket and retail chains demand assured supply of large volumes of sustainably sourced seafood of consistent quality at particular price points. As Washington and Ababouch (2011) explain, some retailers have already had to reduce their targets for procurement of certified fish because of limited supply, which could be exacerbated by management measures such as harvesting restrictions in certified fisheries. One solution that has emerged connects purchasers and fisheries producers that do not meet certification criteria through Fishery Improvement Projects (FIPs) and Aquaculture Improvement Projects (AIPs). The projects help providers to meet the sustainability criteria demanded by purchasers and gradually improve the sustainability of their activities.26 Washington and Ababouch also describe (2011: xiv) a “fledgling sense of the limits” of private schemes, particularly from industry in countries with strong fisheries management and who question whether costly private certification is really necessary.

Finally, sustainability labelling in fisheries is attracting an increasing amount of government attention. As seafood certification becomes an increasingly important market phenomenon, it may attract the attention of regulators seeking to define national standards for both legality and sustainability claims. Some governments are also looking at defining their own fisheries sustainability standards; Iceland, the EU, and France have already established standards (Washington and Ababouch 2011). The National Oceanic and Atmospheric Administration (NOAA) of the US is also considering the development of a national fisheries certification label for US-produced capture and aquaculture products.27

If or when governments begin to establish their own standards for sustainability labels to be applied to domestic production, or to imports, or both, various international codes of good practice may become relevant ways to encourage a degree of coherence, if not harmonization, between them. Many private labelling schemes use the FAO’s Code of Conduct on Responsible Fisheries Management as a reference point in developing their sustainability guidelines. The FAO has also developed guidelines for the eco-labelling of products from marine fisheries (2009) and from inland capture fisheries and aquaculture production (2011), and a draft framework for the assessment of eco-labelling schemes against these guidelines.28 These guidelines also provide a sense of the role that governments see eco-labels playing, and their own involvement with them. The 2009 guidelines establish that states should be involved in eco-labelling schemes, and that they may establish their own schemes. These schemes, however, should be voluntary instruments, and should be non-discriminatory and consistent with rules under the WTO (FAO 2009b). The relevant WTO rules are discussed in the WTO section below.

Access Agreements

The coming into force of UNCLOS in 1994 gave coastal and island states control over their coastal waters up to a 200 nautical miles radius as their EEZ. This control stimulated trade in fisheries access rights between coastal and island

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25 Interestingly, research has found that consumers are willing to pay more for eco-labelled seafood when they think the information provided about declining stock status is credible; when they perceive the information to be exaggerated, their willingness to pay more for the certified seafood is negligible (Uchida et al. 2014).

26 See www.sustainablefish.org.

27 See the NOAA website at http://www.fisheries.noaa.gov/op/Sustainability/Sustainable_Seafood_Certification.html.

countries with excess fish stocks in their EEZs and distant water fishing nations (DWFNs) with capacity to fish in the high seas and distant EEZs. This trade is usually covered by access agreements, which grant permission to use a defined amount of fishing effort in an EEZ for a particular period, usually in exchange for a financial payment or in some cases barter trade, whereby access to a particular species is exchanged for reciprocal access to another species.

Access agreements are predominantly between developing coastal and island states—often with little or no capacity to fish in their EEZs—and a developed DWFN. These agreements vary widely in scope and coverage. The EU has traditionally focused on West Africa, and the Indian and Pacific Oceans, targeting tuna and tuna-like species (for example, swordfish, albacore), pelagic fish, shrimp, squid, and octopus. These agreements are usually bilateral in nature, between the host country and the EU. They involve financial compensation for the fishing of a defined quantity of a specified fishery species.

Japan, Korea, and Taiwan have agreements in the Atlantic, Indian, and Pacific Oceans targeting high-value tuna species for sashimi and sushi, as well as white fish and squid. The Russian Federation, on the other hand, tends to focus more on low-value, high-volume pelagic fish, such as sardines and mackerel (DFID 2008). The US has negotiated the only multilateral fisheries access agreement, with 17 Pacific island countries, targeting tuna, a straddling and migratory species. This multilateral approach enables close coordination of fishing activities, with the surveillance measures paid for from the access fees (Mbithi 2006).

Overall, most fisheries access agreements involve financial compensation representing only a small percentage of the value of the catch. These access fees, although low, are important to the development of SIDS, where they contribute a large share of gross domestic product (GDP), particularly if one takes into account the effect generated from value-added activities, such as employment, shipbuilding, and support services (Mbithi 2006). At the same time, there are concerns that these agreements, particularly when negotiated with DWFNs that have traditionally provided significant production-enhancing subsidies to their fishing sector, could result in unsustainable practices and negatively affect fish stocks in the EEZs of the host countries. The extent to which those agreements constitute a subsidy in themselves is also a highly debated question (see sections on subsidies).

**POLICY RESPONSES**

Most of the trade-related policy responses of the international community to the policy challenges identified have focused on disciplining the extensive subsidies provided to the fishing industry, and at impeding illegal fishers’ ability to bring their fish to market through port states. Other initiatives have looked at lowering market access barriers, with a sometimes uncertain effect on fish stocks. This section reviews recent developments in the WTO, UN, FAO, and regional trade and fisheries management agreements.

**World Trade Organization**

Current negotiations under the Doha Round will affect fisheries in two main ways. First, through tariff cuts under non-agricultural market access (NAMA) negotiations, and second, in the Negotiating Group on Rules, which, as described, deals among other things with the crafting of new disciplines on fisheries subsidies. While these negotiations have been paralyzed since 2008, the recent agreement reached in Bali around trade facilitation has created some political momentum, which could help overcome previous deadlocks in some areas.

Beyond tariff and subsidy negotiations, general WTO disciplines on trade in industrial products apply to the fisheries sector. The WTO Agreement on Technical Barriers to Trade (the TBT Agreement) establishes rules that are relevant to governments’ development of voluntary standards or mandatory technical regulations. Certain government measures related to the import and labelling of marine resources have been challenged in the WTO dispute settlement mechanism, giving birth to an important jurisprudence on the application of technical regulations and standards to imports. Finally, financial assistance to overcome supply-side constraints and foster trade in fish and fishery products has been provided under the Aid for Trade (AfT) initiative.

**Market access negotiations**

According to the most recent draft negotiating texts issued in December 2008, fish and fishery products will be subject to tariff reduction based on a general formula, which would result in tariffs of a maximum of 8 percent for developed

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29 As explained, fish and fishery products are not covered by the WTO agreement on agriculture and are therefore considered together with industrial products.

30 The rules applicable to mandatory technical regulations and voluntary standards are different. The TBT Agreement (WTO 1999) establishes that technical regulations can be legitimate and necessary in some circumstances. Under Article 2.2, it obliges Members to ensure that their technical regulations “are not prepared, adopted or applied with a view to or with the effect of creating unnecessary obstacles to international trade,” and goes on to clarify that “technical regulations shall not be more trade-restrictive than necessary to fulfill a legitimate objective, taking account of the risks non-fulfillment would create.” One such legitimate objective is the protection of the environment. With respect to voluntary standards, Article 4 of the Agreement obliges Members to ensure that their central government standardizing bodies follow the Code of Good Practice for the Preparation, Adoption and Application of Standards annexed to the Agreement. The same article also obliges WTO Members to “take such reasonable measures as may be available to them to ensure that local government and non-governmental standardizing bodies within their territories” also comply with the Code of Good Practice. Many of the principles in the Code of Good Practice, including transparency and non-discrimination, would seem to be relevant to private standards.
countries and between 20 and 40 percent for developing countries. Assessing the exact impact of those negotiations remains impossible at this stage, not least because of the numerous flexibilities, exceptions, and caveats envisaged in the negotiating modalities. Assessing the extent to which those flexibilities will be used on fish and fishery products and by which WTO Member therefore remains highly speculative.

In addition to the possibility of various categories of developing countries applying more gentle cuts on certain products, WTO members of the ACP group have expressed concerns that tariff cuts across the board will affect their preference margins. Those countries have traditionally benefited from trade preferences on a large set of products, including fishery products, which will erode as MFN tariffs fall. They therefore requested that the EU apply MFN tariff cuts on certain key “preference erosion” products over a longer transition period to allow preference-receiving countries to make the necessary adjustments. This will apply to several fishery products, ranging from yellowfin tuna to swordfish, shrimps, and octopus.

At the same time, a group of fish exporters, including Canada, Iceland, Hong Kong China, New Zealand, Norway, Oman, Singapore, Thailand, and Uruguay have pushed for a sectoral initiative on fish and fishery products. This initiative would go beyond general tariff formula cuts and eliminate virtually all tariffs over a shorter period among a group of countries. While participation in such sectoral initiative is non-mandatory, it will require a critical mass of countries, probably representing 90 percent of world trade, to operate. In the case of the EU, though, the initiative will not apply to those preference erosion products mentioned before the expiration of the longer transition period. Overall, developing countries, including large emerging economies such as India, China, Brazil, and South Africa, have been reluctant to participate in sectoral initiatives, making it very unlikely the initiative will reach the necessary critical mass.

Fisheries subsidies negotiations

Negotiations around disciplines on fisheries subsidies in the WTO are guided by an original mandate from 2001 and a supplementary mandate agreed in 2005, under the latter of which Members were instructed to "strengthendevelopment and coordination among Members, including through the prohibition of certain forms of fisheries subsidies that contribute to overcapacity and over-fishing." Participants were asked to "undertake further detailed work to, inter alia, establish the nature and extent of those disciplines, including transparency and enforceability." The 2005 mandate also establishes that "appropriate and effective special and differential treatment" for developing country fisheries, under which the disciplines were applied progressively—less strictly to artisanal fishing conducted closer to shore, and more strictly to commercial and industrial-scale fishing. The draft text also included a "general discipline" clause disciplining subsidies that caused harm to straddling or highly migratory stocks whose range extends into another WTO Member’s EEZ, or stocks in which another WTO Member had an identifiable fishing interest. The text also established a minimum standard for fisheries management schemes that had to be in place for permitted subsidies to continue, and improved notification obligations. Subsidies provided by LDCs were exempt from the prohibitions and fisheries management requirements.

Negotiations on this text failed to find many areas of convergence, and in 2008, the chairman issued a "roadmap" of further questions for the group. The most recent chair’s report of April 2011 identified areas where differences in position were less pronounced (for example, on subsidies to IUU fishing) and areas where they were still substantial (for example, on subsidies to vessel construction and fuel subsidies). A key area of contention is the role of disciplines on fisheries management, along with (or some argue instead of) disciplines on subsidies in addressing overfishing. The following are some other key sticking points.

i) Whether and how flexibility to continue to provide subsidies should be extended to small-scale fisheries and how these should be defined, including whether the definition also applies to developed country fisheries.

ii) Whether and how operating cost subsidies, particularly those to fuel, should be disciplined, and if so, how to take account of Members’ different fuel taxation regimes.

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32 Other fish include Lesser African threadfin, Sompot grunt, sea catfish, Yellow croaker, Largeheadhairtail, Cassava croaker, White grouper, Red Pandora, and Flagfinmojarra.
34 See WT/Min(01)/DEC/1, 20 Nov 2001 and WT/Min(05)/DEC, 22 Dec 2005, Annex D, para 9.
iii) How special and differential treatment for developing countries should be structured, including whether it should provide flexibility to subsidise fishing on the high seas.

iv) How an "adverse effects" discipline on subsidies that affect shared stocks should work.37

Restructuring the negotiations could help to move them forward. The negotiations could, for instance, focus on developing a "small package" of disciplines that could be adopted as part of the overall Doha Round outcome or, alternatively, as an "early harvest" agreement. This could include improved transparency obligations and addressing some kinds of subsidies, and could be structured around:

i) the kinds of subsidies Members are more likely to agree are harmful, for example, subsidies to vessel transfers or to vessels engaged in IUU fishing;

ii) the nature of the fish stock targeted by the subsidised vessels, for example, disciplining subsidies provided to vessels that target overfished stocks, straddling or shared stocks, or fishing on the high seas;38 and/or

iii) the type of vessel doing the fishing, for example, disciplining subsidies to deep-sea trawlers, gill-netting, or factory ships.

The negotiations could also be linked to negotiations on subsidy disciplines in other areas (agriculture, industrial goods) or linked to other elements of trade policy specifically affecting the fisheries sector, including tariff reductions, and support for adjustment programmes or for utilising market access. Disciplines could also be applied in a step-wise approach, starting with commitments on improved notifications and transparency; a commitment not to increase existing subsidies; and then to progressively move subsidies from harmful categories to less harmful categories.

**WTO jurisprudence**

There have been several WTO disputes related to fishery products. One of the most prominent early cases was the United States – Import Prohibition of Certain Shrimp and Shrimp Products or Shrimp-Turtle dispute brought in 1996. In this dispute, the WTO’s Appellate Body (AB) established a number of important principles. The AB clarified that WTO Members could and should take measures to protect endangered species. The AB also referenced multilateral environmental agreements, including CITES, in deciding that trade measures to protect marine species (in this case sea turtles) fit within the General Exceptions article of the GATT (Article XX), as measures taken to conserve “exhaustible natural resources.”39

More recent cases, including the Chile-Swordfish dispute in 2000 and the EU-Herring complaint brought by the Faroe Islands in 2013, concerned trade measures taken by the defendants as a consequence of the complaining countries’ alleged overfishing. Both cases involved potential parallel proceedings in the International Tribunal of the Law of the Sea (ITLOS) and were settled by the parties outside the WTO before decisions were issued.40 Other complaints have progressed through the WTO dispute settlement system, the two most recent being the US-Tuna II dispute and the EC-Seal Products dispute.

The US-Tuna II dispute concerned a US regulation setting out the requirements for use of the “dolphin safe” label on tuna sold in the US market. The EC-Seal Products dispute concerned a European regulation that banned the sale of seal products in the European market except in specific circumstances, including where these had been produced in specific ways during hunts by indigenous communities or as part of marine resource management efforts (that is, culling seals to reduce their predation on commercial fish stocks). These cases focused on several obligations in WTO agreements, including the obligation to provide national treatment to imported products in Article III.4 of the GATT, and the national treatment and MFN non-discrimination obligations in Article 2.1 of the TBT agreement.

The decisions reached so far have clarified a number of broad principles, including:

i) Where national regulations modify the conditions of competition in a market between domestic and imported products to the detriment of imported products, the impact on imports must be the result exclusively of a “legitimate regulatory distinction” between products rather than discrimination against imports.

ii) To avoid being discriminatory, regulations should be designed and applied to treat products from different sources “even-handedly” and should be appropriately “calibrated” to reflect different levels of risk of the negative outcome the measure is designed to address.

iii) Trade-restrictive measures may be adopted in pursuit of legitimate policy objectives, including environmental objectives, but the degree of trade restriction needs to be balanced against how much contribution the measure makes towards achieving the policy objective.

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37 See TN/RL/W/254, 21 April 2011.
38 See, for example, Sumaila (2010, 2013b).
40 In the case of the Faroe Islands dispute the settlement was reportedly based on a re-negotiation of the Islands’ fishing quota (Nicolau 2014).
iv) WTO Members must use international standards (developed by organisations open to all WTO Members) for their own regulations wherever appropriate.41

These decisions, along with interpretations of the environment-related exceptions in Article XX of the GATT, suggest that while the rules of the WTO preserve space for governments to take trade-related (even trade-restrictive) measures to protect the environment, these measures will be scrutinised closely to ensure that they are not used to discriminate unfairly against imports.

Aid for trade

AFT may help address some of the problems faced by developing countries in the fisheries sector, as well as help them to explore new opportunities to create value and adapt to climate change. This could include tackling not only supply-side constraints and market access issues, such as providing means to meet SPS measures and technical requirements, but also managing the adjustments linked to achieving sustainable fisheries management. The costs of greening the fisheries sector, implementing fisheries management regimes, and making the necessary labour adjustments make finding the right international financing mechanisms crucial. AFT can also be used innovatively to trigger investment in new and sustainable high-value production and export areas in the fisheries sector, including in sustainable aquaculture and eco-labelling, for countries to increase their competitiveness.

AFT in the fish sector has increased constantly since the launch of the initiative, with a cumulated amount of nearly US$3.5 billion committed since 2002. Nearly three-quarters of the assistance has focused on fishing policy and administrative management (35 percent) or on fishery development (40 percent), while 16 percent has focused on fishery services and the rest on research, education, and training. While absolute amounts dedicated to the fishery sector have increased, this represents only a limited share of total aid for trade flows. The proportion of AFT flows dedicated to the fisheries sector has declined from nearly 2 percent of total AFT disbursements in 2003 to less than 0.7 percent in 2012, which could reflect a relative decline of the sector in priority for the donor community, and, given that AFT is demand-driven, among recipients as well (see Figure 15).

United Nations

Fisheries sustainability and the role of subsidies have been discussed in the UN, particularly in the context of discussions on the global sustainable development agenda. In particular, the issue of subsidies that lead to IUU fishing and fishing overcapacity was addressed by the UN General Assembly in its resolution 59/25 of 17 November 2004. This was also taken up at the sixth meeting of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea.

Sumaila et al. (2013) provide examples of the range of actors that have been involved in building, through consultation and research, awareness of the importance of fisheries subsidies. UN agencies such as the FAO and UNEP have contributed significantly to the building of understanding and dialogue around fisheries policy reforms, including fisheries subsidies

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41 These concepts and principles are explained well in the Appellate Body decision in US-Tuna II (see WT/DS381/AB/R 16 May 2012). The decision has been controversial. The WTO Appellate Body characterised the US law around the use of the ‘dolphin safe’ labels as a mandatory technical regulation because the label could not be used without adhering to the specifications. Critics of the decision have pointed out that this blurs the fundamental distinction established by the TBT Agreement between technical regulations, compliance with which is mandatory, and standards, compliance with which is voluntary. This, it has been argued, “suggests that any legislative or regulatory act that affects market access and contains legally mandated and enforceable conditions may constitute a technical regulation” (Trujillo 2012).
reform. This has been achieved through a number of multi-stakeholder workshops; the commissioning of reports by UNEP (for example, UNEP 2003); and the convening of expert consultations in partnership with international agencies by FAO (2001a). Academic research, e.g. Kaczynski and Fluharty (2002), has highlighted problems related to subsidies to fishing access agreements and their impact on developing countries. The Support Unit for International Fishery and Aquatic Research (SIFAR) has also examined the implications of subsidies and trade liberalization in four countries—Guinea, India, Bangladesh, and Vietnam.

In the outcome document of the United Nations' Rio+20 conference in 2012, UN members reiterated their commitment to conclude multilateral disciplines on fisheries subsidies in the WTO. The document also encourages states, in light of the state of fisheries resources, to “eliminate subsidies that contribute to overcapacity and overfishing, and to refrain from introducing new such subsidies or from extending or enhancing existing ones” (UN 2012: para 173). This same commitment was picked up in the margins of the WTO’s Ministerial Conference in December 2013, where ministers and ambassadors representing Argentina, Australia, Chile, Colombia, Costa Rica, Ecuador, Iceland, New Zealand, Norway, Pakistan, Peru, Philippines, and the US pledged to “refrain from introducing new fisheries subsidies that contribute to overfishing or overcapacity or extend or enhance existing such subsidies, and to work within the WTO and other fora to improve fisheries subsidies reform and transparency”.42 Both these developments, however, reflect only political statements of commitment to subsidy reform, not enforceable, or even legally binding, obligations. While political support is an essential prerequisite for reform, the shared nature of many fisheries suggests that mutually enforceable obligations between subsidising governments will be needed to achieve real reform of subsidies.

Illegal, unreported, and unregulated fishing

Countries involved in the harvesting and trade of fish are using global, regional, and, most recently, national trade-based measures to try and stem the amount of IUU fish that enters global markets. Some of these measures, particularly the imposition by large import markets of serious economic consequences for non-compliance with legality requirements, appear to be effective in shaping governments’ behaviour.

National regulations

Under the EU’s IUU regulation (Council Regulation No. 1005/2008), which came into force in 2010, all fish imported into the EU must be accompanied by a catch certificate verified by an authority of the vessel’s flag state (and qualifying RFMO if relevant) (EU 1998-2014). The EU can block fish imports from non-cooperating flag states. The US has the similar ability to impose import bans on products from non-cooperating flag states under the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (NOAA 2007). The NOAA submitted a report in early 2013 listing ten countries whose vessels had been found to engage in IUU fishing. If these countries take insufficient action to remedy the problem, the US may deny their vessels entry to US ports and/or ban import of fishery products (NOAA 2013a).

The overall impact of the EU’s IUU fishing regulation on trade is not yet clear. An early independent assessment of the impact of the regulation noted that although around 9 percent of fish imports into the EU had been estimated to be illegal, the amount of trade before and after the regulation was implemented did not change, which, the assessors argued, created a strong implication that the measure had not been effective (Lutchman et al. 2011). A more recent assessment of the effectiveness of the regulation notes that although traceability of fishery products was key to the effectiveness of the regulation, it had been “severely compromised” by the scheme’s reliance on paper documentation and by complicated trade flows, and that it was not clear how consistently the scheme is implemented by different EU member states (Palin et al 2013: 12). For fish producers that already export to the EU and meet private chain-of-custody certification requirements, the IUU regulation may represent an additional but unavoidable cost. For producers in developing countries with a large amount of non-industrial catch, many small ports, and low dependence on the EU market, like Indonesia, the additional cost of complying with the IUU regulation may lead to further diversion of product to other markets (Oceanic Developpement 2009).

The US and EU experiences suggest that attaching serious economic consequences for non-compliance with an import rule may help to change government behaviour. In 2011, the US identified Colombia, Ecuador, Italy, Panama, Portugal, and Venezuela as having vessels under their flag participating in IUU fishing. By 2013, all six countries had acted to address these problems, including by sanctioning fishing vessels, improving regulations, and monitoring and enforcement.43 Under the EU scheme, warnings for non-cooperation were issued to Fiji, Panama, Sri Lanka, Togo, Vanuatu, Belize, Cambodia, and Guinea in 2012. Fiji, Panama, Sri Lanka, Togo, and Vanuatu made progress in addressing IUU fishing by vessels under their flag. In contrast, Belize, Cambodia, and Guinea did not sufficiently address their vessels’ IUU fishing, and were declared “non-cooperating” in November 2013. A ban on imports of fishery products fished by vessels under their flags was imposed in March 2014 (European Commission [EC] 2013a, 2014). Japan and the US have agreed to cooperate with the EU on the implementation of

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this regulation by exchanging information about IUU activity (EC 2012a).

**Regional Fisheries Management Organisation trade measures**

Efforts to increase the traceability of fishery products to help close down IUU fishing and support the sustainability of international fish stocks often rely on catch and trade documentation schemes of RFMOs. These systems have traditionally suffered from a number of weaknesses. Some relate to design; as MRAG argues, “most, if not all, of the trade documentation schemes ... are targeted at verifying only the catch of non-members on the assumption that members accurately report their own catches” (2010: 16). Scheme requirements only apply to countries that are members of the RFMO or cooperating non-members; companies in member states may re-flag their vessels to avoid the rules; and member states’ enforcement and verification of paper-based documentation systems is often poor (Roheim and Sutinen 2006, MRAG 2010). Several RFMOs are gradually introducing improvements to their monitoring, control, and surveillance systems, including vessel monitoring systems, electronic catch documentation systems to reduce fraud, and the use of unique vessel identifiers as the basis for authorised vessel lists (NOAA 2013b). The Commission for the Conservation of Antarctic Marine Living Resources’ (CCAMLR) fully electronic catch and trade documentation systems, for instance, has been largely successful in limiting IUU fishing that takes place in its area, and in preventing illegally caught toothfish from being traded (MRAG 2010).

Some RFMOs (including the International Commission for the Conservation of Atlantic Tunas [ICCAT]) have the ability to recommend that member countries ban the import of fishery products from contracting and non-contracting parties whose vessels were undermining their management efforts. In other words, the ability to take trade measures is built into the compliance mechanisms of agreements other than the WTO. In ICCAT’s case, trade measures have been imposed on Equatorial Guinea and non-parties, including Bolivia, Cambodia, Georgia, and Sierra Leone (Koehler 2013). The question of flag and coastal states’ obligations and responsibility for vessels engaged in IUU fishing has recently been put to ITLOS in a request for an advisory opinion from the Sub-Regional Fisheries Commission composed of several West African States.44

**Food and Agriculture Organization instruments**

The FAO’s 1995 Code of Conduct for Responsible Fisheries encourages states to ensure that trade-related measures applied to fishery products are non-discriminatory and consistent with WTO rules. Against this backdrop, governments have, within the FAO, agreed on a number of frameworks to combat IUU fishing. The FAO’s 2001 International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA-IUU) encourages states to use a variety of tools, including trade-related measures, to reduce IUU fishing and the access of illegal products to markets (FAO 2001b). Several countries have adopted national plans of action as part of their implementation of the IPOA-IUU, including the EU, US, Japan, New Zealand, Australia, Argentina, Chile, and Fiji.45

Vessels may evade domestic and international attempts to enforce fishing rules, but they must at some point bring their fish to markets. Ports are therefore a “crucial economic choke point in the IUU fishing industry supply chain” (Kuemlangan and Press 2010: 264). The FAO Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing adopted in 2009 goes further than the IPOA-IUU in establishing binding obligations on parties to take measures at their ports to deter IUU fishing, including inspecting and denying access to port services to fishing vessels that have engaged in IUU fishing (FAO 2009c). The agreement will enter into force after 25 ratifications, and as of July 2014, had ten.

**Regional trade agreements**

Several trading entities, particularly the US and the EU, have sought to use RTAs to address fisheries issues including management, flag and port state responsibilities, trade in illegally caught fish, and fisheries subsidies.

Leaked texts of the TPP Agreement being negotiated between Australia, Brunei, Canada, Chile, Malaysia, Mexico, New Zealand, Peru, Singapore, Vietnam, Japan, and the US reveal that negotiators are considering several obligations relevant to marine fisheries, including a prohibition on subsidies to vessels listed by a flag state or RFMO for IUU fishing, and subsidies that target overfished stocks. Parties would use their “best efforts” not to add to or extend existing subsidy programmes. The draft text would also require parties to notify all their fisheries subsidies to other parties, and to take a series of measures to combat IUU fishing, including implementing port state measures.46 Plurilateral subsidy disciplines would be a significant development, a signal that some governments prioritise the benefits of fisheries subsidy reform over concerns that economies not part of the agreement would benefit (as free-riders) from that reform.

In the context of the Trans-Atlantic Trade and Investment Partnership (TTIP) negotiations, the initial position paper of the EU includes references to the EU and US’ common determination to address trade in natural resources (including fish) obtained illegally and to “measures to

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44 See the ITLOS case page at http://www.itlos.org/index.php?id=252&L=0%20and%207%3D2.
46 The texts were published by Wikileaks on its website at www.wikileaks.org.
enhance trade in legal and sustainable timber, fish, or wildlife products” (EC 2013b: 3). The initial study for the Japan-Korea-China FTA includes references to the parties’ joint commitment to cooperation in fisheries management. Japan and Korea have suggested several specific areas of cooperation, including joint controls of IUU fishing (METI 2011). Several other RTAs, including the EU-Colombia-Peru agreement and the EU-Singapore FTA, recognise the importance of fisheries management, particularly monitoring and control of their flagged vessels, and addressing IUU fishing. The recently concluded agreement between Korea and Turkey includes trade-related measures to support sustainable fishing in an indicative list of areas of cooperation.

The implementation of provisions in other bilateral trade agreements on illegal trade in forestry products could provide examples and lessons on the use of trade measures to support sustainable resource management. The US-Peru Trade Promotion Agreement, for example, includes an Annex on Forest Sector Governance, under which Peru, in particular, took on a number of obligations, including strengthening its domestic forest governance and addressing the illegal trade in timber products. The Annex is subject to the Agreement’s binding dispute settlement provisions, including potential trade sanctions, and non-compliance can also lead to shipments of wood being stopped.

Frequently, it is domestic-flagged vessels rather than foreign-flagged vessels that are responsible for IUU fishing. In exploring new trade-related measures that could help address IUU fishing, the questions of what kinds of activities and what products are covered by the definition of IUU may emerge. The FAO International Plan of Action on Illegal, Unreported and Unregulated Fishing, for example, applies to both domestic and foreign-flagged vessels.

Finally, it is worth noting that the TTP and TTIP are also expected to establish new disciplines covering product standards and requirements that could be relevant to trade in fishery products between the parties to each agreement. The outline of the TPP Agreement agreed in 2011, for example, indicated that the agreement would include new commitments on SPS standards covering “regionalisation, cooperation and equivalence” and TBT disciplines covering conformity assessment, potentially regulatory cooperation, and trade facilitation, besides other issues. Both sections would include new transparency disciplines. Leaked texts of the draft environment chapter of the agreement include references to the parties’ recognition that the value of voluntary market-based incentives can contribute to regulatory efforts around environmental protection. The EU intends to press for the TTIP to promote voluntary and market-based measures, which appears to include sustainability as well as ethical tradeschemes (EC 2013B).

CLOSING REMARKS

This paper began by providing an overview of the shape of global fisheries, identifying levels of catch by species and fishing entities. It then discussed the environmental dimensions of oceans and fisheries exploitation, particularly the consequences of overfishing. It covered the social dimensions of oceans and fisheries in the third section, and explained the inter-relationship between the environmental and social dimensions. In the final section, it provided an overview of the shape of international fisheries trade and described the many trade-related policy and market tools that are used to shape production, processing, and trade of fishery products.

By exploring the environmental and development aspects of oceans and fisheries, the links between them, and their relationship to trade and trade measures, this paper has provided a comprehensive picture of the policy challenges facing the international community, and how it has attempted to address them. The inter-relationships between many of the issues underscore the policy tensions inherent in designing trade policy to address them, and that trade policy must be part of a coherent, multi-faceted solution that includes strengthened management and governance frameworks. International trade has shaped fisheries production significantly over the last century; the task for this E15 Expert Group is to identify how trade policy can achieve equally significant positive changes on oceans and fisheries in the decades to come.

47 See Article 274 of the Trade Agreement between the EU, Colombia, and Peru (EC 2012b) and Article 13.8 of the EU-Singapore Free Trade Agreement (EC 2013c).
48 See Article 5.10 of the Framework Agreement Establishing a Free Trade Area Between the Republic of Korea and the Republic of Turkey (Republic of Turkey Ministry of Economy, 2012).
49 See Chapter 18 of the US-Peru Trade Promotion Agreement (United States Trade Representative 2006).
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Implemented jointly by ICTSD and the World Economic Forum, the E15 Initiative convenes world-class experts and institutions to generate strategic analysis and recommendations for government, business and civil society geared towards strengthening the global trade system.