Role and impact of China on world fisheries and aquaculture
This study reviews China’s mariculture and marine fisheries with emphasis on the operations of its Distant Water Fleets (DWF). China’s DWF are analysed with some emphasis on the subsidies they receive from their government, their Illegal, Unreported and Unregulated catches and practices, the challenges they represent to international agreements, and to competing fleets from the EU, particularly in six focal countries, i.e., Mauritania, Senegal, Madagascar, Mauritius, Ecuador and the Solomon Islands. Finally, the trade of Chinese fishery and mariculture products is reviewed with some emphasis on the import of fish feed by China, which may increasingly impact some food-deficient countries.
This document was requested by the European Parliament's Committee on Fisheries.

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<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AIS</td>
<td>Automatic identification system</td>
</tr>
<tr>
<td>BPI</td>
<td>Blue Ports Initiative</td>
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<tr>
<td>BRI</td>
<td>Belt and Road Initiative</td>
</tr>
<tr>
<td>CCAMLR</td>
<td>Commission for the Conservation of Antarctic Marine Living Resources</td>
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<tr>
<td>CFP</td>
<td>Common Fisheries Policy</td>
</tr>
<tr>
<td>COFI</td>
<td>Committee on Fisheries</td>
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<tr>
<td>DWF</td>
<td>Distant Water Fleets</td>
</tr>
<tr>
<td>EC</td>
<td>European Commission</td>
</tr>
<tr>
<td>ECA</td>
<td>European Court of Auditors</td>
</tr>
<tr>
<td>EEZ</td>
<td>Exclusive Economic Zone</td>
</tr>
<tr>
<td>EMOD-PACE</td>
<td>European Marine Observation and Data Network Partnership for China and Europe</td>
</tr>
<tr>
<td>EMODnet</td>
<td>European Marine Observation and Data Network</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>EUR</td>
<td>Euros</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agriculture Organization of the UN</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GFW</td>
<td>Global Fishing Watch</td>
</tr>
<tr>
<td>IATTC</td>
<td>Inter-American Tropical Tuna Commission</td>
</tr>
<tr>
<td>ICCAT</td>
<td>International Commission for the Conservation of Atlantic Tunas</td>
</tr>
<tr>
<td>IFFO</td>
<td>Fishmeal &amp; Fish Oil Organisation (now The Marine Ingredients Organisation)</td>
</tr>
<tr>
<td>IMO</td>
<td>International Maritime Organization</td>
</tr>
<tr>
<td>IOTC</td>
<td>Indian Ocean Tuna Commission</td>
</tr>
<tr>
<td>ITC</td>
<td>International TradeCentre (of the WTO)</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>---------</td>
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</tr>
<tr>
<td>IUU</td>
<td>Illegal, unreported and unregulated</td>
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<tr>
<td>MSC</td>
<td>Monitoring, control and surveillance</td>
</tr>
<tr>
<td>MoU</td>
<td>Memorandum of Understanding</td>
</tr>
<tr>
<td>MPAs</td>
<td>Marine Protected Areas</td>
</tr>
<tr>
<td>mt</td>
<td>Million tonnes</td>
</tr>
<tr>
<td>NMDIS</td>
<td>National Marine Data and Information Service of China</td>
</tr>
<tr>
<td>NPFC</td>
<td>The North Pacific Fisheries Commission</td>
</tr>
<tr>
<td>OACPS</td>
<td>Organisation of African, Caribbean and Pacific States</td>
</tr>
<tr>
<td>Pa</td>
<td>Per annum</td>
</tr>
<tr>
<td>PECH</td>
<td>European Parliament’s Committee on Fisheries</td>
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<tr>
<td>PSMA</td>
<td>Port State Measures Agreement</td>
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<tr>
<td>RFB</td>
<td>Regional Fisheries Body</td>
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<tr>
<td>RFMO</td>
<td>Regional Fisheries Management Organizations</td>
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<tr>
<td>SPRFMO</td>
<td>South Pacific Regional Fisheries Management Organization</td>
</tr>
<tr>
<td>USD</td>
<td>United States dollar</td>
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<tr>
<td>VMS</td>
<td>Vessel monitoring system</td>
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<tr>
<td>WCPFC</td>
<td>Western and Central Pacific Fisheries Commission</td>
</tr>
<tr>
<td>WFE</td>
<td>Whole Fish Equivalent or live fish weight</td>
</tr>
<tr>
<td>Wt</td>
<td>Weight</td>
</tr>
<tr>
<td>WTO</td>
<td>World Trade Organisation</td>
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EXECUTIVE SUMMARY

Overview of the Chinese fishing fleet, aquaculture, and trade

There is a large discrepancy and uncertainty in the number of vessels of the Chinese distant water fleets (DWFs). The low estimate of ‘visible’ vessels is around 900; a higher estimate assumes that about 2000 ‘invisible’ vessels must be added. However, the discrepancy may be that the larger number includes vessels operating in waters close to China, e.g., in Korea. Although the overwhelming majority of mariculture production along China’s coastlines consists of bivalves such as clams, mussels and oysters, which require no feed, the smaller tonnage of marine fish that are farmed, i.e., about 2 mt per year, generate a demand for feeds which has made China the world’s major importer of fishmeal. This is becoming a problem in some West African countries, e.g., in Senegal, where the small fish that were consumed by people are now diverted to fishmeal factories and exported to China. The overall situation of the Chinese fish and seafood sector is, from an international trade perspective, one of transition. This transition is from a leading processor of fish raw material for re-export as primary products (fillet) increasingly towards one of sourcing aquatic products – many of them prime items and some processed – for domestic consumption. The other key trend is the steady replacement of primary by secondary processed products in the Chinese export offer.

Fishing access agreements

For the EU, the fleets deployed by Chinese companies, and their impact both on the fisheries resources in the Exclusive Economic Zones (EEZ) of various countries and on the positions of the governments of these countries, obviously represent serious competition and a challenge. It is difficult to suggest a stance for the EU fleets fishing in the EEZ of various countries of the Global South other than strict adherence to the letter and spirit of the fishing agreements and local legislation regulating their operations. To the extent that Chinese or other distant water fleets do not adhere to such regulations, this good-faith behaviour should lead, in the countries where, e.g., EU and Chinese fleet compete, to the EU gaining respect and, eventually, more advantageous terms.

Fisheries subsidies

Chinese fleets operating in Mauritania and Senegal received high levels of subsidies from the Chinese government, while those operating in Madagascar, Mauritius, Ecuador and the Solomon Islands seem to have little ‘visible’ information on subsidies. This suggests that transparency is an issue not only regarding the deployment of fleets and their catches, but also regarding subsidies.

Illegal, unreported and unregulated (IUU) fishing practices

The large number of vessels of the Chinese distant water fleets, and the various techniques that enable these vessels to ‘go dark’, increase the chances of IUU infractions. This happens in spite of the attempt by most of the focus countries studied here to mitigate such infractions by adhering to international initiatives. However, the continuous lack of necessary data in reporting such infractions hinders international mitigation initiatives.

EU-China cooperation and agreements

In part due to agreements such as the Blue Partnership for the Oceans, cooperation and dialogue between the EU and China at the bilateral level has significantly increased in recent years. However, obstacles to cooperation include conflicting geopolitical agendas and the potentially compromised role of the central institutions of the EU in light of individual agreements between China and some EU Member States. At the regional and global levels, Chinese-EU cooperation is encouraged through their participation in Regional Fisheries Management Organisations (RFMOs) and mutual promotion of
ocean governance through recent agreements such as the Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean (CAOFA) and the WTO Agreement on Fisheries Subsidies.

**Consequences for the EU**

One of the most important environmental consequences of the Chinese fishing fleet on the EU’s distant-water fishing activities is the depletion of fisheries stocks, which is associated with environmental degradation and results in reduced resource availability for all actors involved. Furthermore, illegal fishing undermines any form of good governance that the EU might hope to see introduced. The main consequence of illegal fishing is the direct competition with legal fishing at all scales and along the entire supply chain, which represents a form of unfair competition for the EU and other relevant stakeholders. In terms of consequences for the fishing fleet for the EU, the study highlights the impact on local communities in host countries; the reduced access to resources; the unfair competition and the reduced availability of exported products. In addition, some of the consequences for the aquaculture sector are the impact on the fishmeal, on the EU caviar sector and on the Norwegian and Scottish salmon sectors.

**Recommendations**

Finally, the study suggests a series of recommendations focusing on how to best protect the EU against unfair global competition practices:

1. To develop an appropriate strategy to respond to China’s increasing domination of global fishmeal supplies, and to secure EU access to this important resource.

2. With a view to the future, to encourage EU seafood firms to seek primary processing partners outside China, e.g., focusing upon partners in other developing countries with capable but more cost-effective workforces (e.g., Vietnam, Cambodia, South Asia as well as Latin American or African alternatives).

3. To protect EU access to fishing opportunities, considering China’s expanding impact on access to fish stocks of interest to the EU, e.g., tuna, particularly in the Pacific and within the EEZ of Islands in the Western Pacific.

4. To encourage the Member States to refrain from negotiating individual agreements and to instead focus on cooperation with the EU’s central institutions.

5. To call for more transparency and reliable information on fishing activity and fisheries agreements of Chinese DWF at bilateral and global level.

6. To support and provide funding of civil society organisations investigating and reporting the activities of actors who prefer to operate in the dark.

7. To ensure an adequate implementation of the existing EU legislation (e.g., IUU Regulation, Due Diligence Directive). Amongst other benefits, this will contribute to implementing an adequate traceability system; to ensuring responsible fishing practices; to improving the safety at sea and labour conditions on fishing vessels; and to enhancing accurate reporting of catch.

8. To ensure a rule-based global system that considers the divergent interests of all parties is in place to regulate international ocean affairs and economic activities, including fisheries.

9. To ensure an effective implementation of international agreements on safety at sea of fishing vessels (Cape Town Agreement - IMO) and labour conditions on fishing vessels (ILO C188); and the negotiation of the agreement on Biodiversity Beyond National Jurisdiction would also
enhance a fair competition between China and the EU and contribute to the protection of the Ocean.

10. To strengthen the monitoring, control and surveillance units of the Department of Fisheries (or equivalent agencies) of the countries with which the EU has signed fisheries agreements, and thus to strengthen their capacity to enforce fisheries control.

11. In interactions with Chinese negotiators, to point out that China’s central government has proclaimed an ‘Ecological Century’ and insists on international cooperation leading to mutual benefits. This proclamation excludes the predatory practices that lead to unfair competition. Fisheries agreements and contracts should not lead to increased exploitation of fully or overexploited stock. The EU, through the appropriate agency, should fund EU and/or other scientific groups capable of assessing the state of targeted stocks of countries in the Global South to determine the level of exploitation.

12. The above point would also support the dialogue with China about the overfishing problem in the South China Sea; and about the need to reduce the Chinese subsidies for the distant water fleets that lead to unfair competition.
INTRODUCTION

This study is intended to provide the European Parliament (PECH Committee) with useful information about the role and impact of China on world fisheries and aquaculture.

It covers geopolitically "mainland China" as the territory governed by the People's Republic of China (PRC) excluding dependent territories of the PRC and other territories within Greater China, as they are considered separate entities in terms of fisheries.

Namely, the study addresses the following points:

- Provide an overview of the Chinese fishing fleet/catches, aquaculture sector, and import and export of fisheries and aquaculture products.
- A description of the practices of granting fishing licences to Chinese vessels (6 country case studies were developed: Eastern Atlantic: Mauritania and Senegal; Western Indian Ocean: Madagascar and Mauritius; Western Pacific: Solomon Islands; Eastern Pacific: Ecuador).
- A description of China’s subsidies for its fishing sector.
- A description of illegal, unreported and unregulated (IUU) fishing practices (focus on China's distant fleet).
- A description of the EU-China cooperation in fisheries at three levels (bilateral, regional, and global).
- An overview of China’s international agreements.
- Analysis of the environmental, socio-economic and geopolitical consequences of the Chinese fishing fleet and the Chinese aquaculture sector for the EU.
- Analysis of how best to protect the EU fisheries and aquaculture sector against unfair global competition practices regarding both sustainable fishing opportunities and sustainable aquaculture.
- Provision of recommendations for EU policy makers (and mainly for Members of the European Parliament).

The study was mainly developed on the basis of desk research and stakeholder consultations:

- Desk Research: a thorough review of all available information regarding China’s fisheries (e.g. key published documents/reports, Government data, industry information, etc.), aimed to develop a better understanding of the six thematic areas (catches, fleet, imports, exports, fishing activities outside Chinese waters and IUU), and to identify gaps and/or issues. A description of the approach / the sources used for data collection is presented in Annex 1. The complete list of references is also provided at the end of the study.

- Stakeholder consultations: in October 2022 the contractor consulted relevant stakeholders, including the EC, fisheries industry, NGOs, and other stakeholders. The list of stakeholders consulted is included in Annex 2.
1. OVERVIEW OF THE CHINESE FISHING FLEET, AQUACULTURE AND TRADE

This section presents an overview of the Chinese fishing fleet and its catches (section 1.1.), aquaculture sector (section 1.2.), and import and export of fisheries and aquaculture products (FAPs) (section 1.3.).

1.1. Chinese distant-water fishing fleet

This sub-section presents various aspects of the marine fisheries of the People's Republic of China ('Mainland' China). The total marine catches of Mainland China by sector are presented for the period 1950 to 2019.

Distant water fleets take, on average, between 30-35% of the total catch of China during the period 2000-2019 (see Figure 1 below; see also Oceana 2021).

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**KEY FINDINGS**

- The total marine catches of Mainland China currently amount to 14-16 million tonnes (mt), of which 3-4 mt originate from distant-water fishing, notably from the waters off West Africa and Western South America.
- China is the top fishing country in the high seas since 2014, and is one of five countries driving high seas fisheries and transhipment of large tuna and sharks, and more recently, of the squid fisheries.
- Distant Water Fleets (DWFs) of Mainland China (operated from 2018-2020) operate in hot spots around the focus areas chosen for this study, i.e., off of Ecuador, off the west of Africa (Mauritania and Senegal), off the east coast of Madagascar, around Mauritius and around the east and southern coasts of the Solomon Islands.
- Hot spots of transhipment activities confirm that these are usually taking place in the high seas and usually with reefers that fly third-country flags, i.e., dominated by Panama, known mostly for hiding beneficial ownerships.
- There is a large discrepancy and uncertainty in the number of vessels of the Chinese distant water fleets (DWFs). The low estimate of 'visible' vessels is around 900; a higher estimate assumes that about 2000 ‘invisible’ vessels must be added. However, the discrepancy may be that the larger number includes vessels operating in waters close to China, e.g., in Korea.

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Figure 1: Marine fisheries catch by Mainland Chinese domestic and distant water fleets

![Graph showing marine fisheries catch by Mainland Chinese domestic and distant water fleets](image)

Source: Based on data reported by Mainland China to the FAO, with adjustments for IUU catches from Pauly et al. (2014), Pauly and Le Manach (2015) and Tsui et al. (2020)

Figure 2 presents the heat map of Mainland Chinese-flagged vessels obtained from the GFW dataset for 2018-2021 (see Kroodsma et al. 2018). Note that this dataset does not include information on beneficial ownership.

**Figure 2: Average number of Mainland Chinese-flagged vessels per half degree cells operating in the world’s oceans in 2018-2020**

![Heat map showing distribution of Mainland Chinese vessels](image)

Source: GFW database (2022 version)

Figure 2 shows the extent of the reach of the Chinese DWF fleets, whose vessels are now showing up in the North Atlantic (from which they were absent in 2000-2011; Pauly et al. 2014) and in Antarctica,
The high concentrations (in red) of Chinese DWF are consistent with squid jiggers off the north-western coast of South America (off Peru and Ecuador; see Yue et al. 2014, Brush and Dury-Agri 2022, MOA 2019-2020, and the recent comprehensive New York Times article by Myers et al. 2022). Note also the concentration of Chinese DWF off the coast of West Africa, which might be reflective of the activity of fleets targeting small pelagic fish, as mentioned in Greenpeace Africa (2017)\(^2\) and in Yozell and Shaver (2019).

In 1991, four trawlers from the Shanghai Fisheries Group Co. targeting cephalopods marked the beginning of China’s involvement in Mauritanian waters (see Chen et al. 2017). Between 2007-2010, the distant water vessel "XinYu No.1" operated for 200-250 days per year and had an annual catch of small pelagics of 12,000-19,000 t, for which Zhang et al. (2011) give the following catch composition: 37% sardine (*Sardina pilchardus*), 26% horse mackerel (*Trachurus* spp.), 16% sardinellas, (*Sardinella* spp.), 10% Japanese mackerel (*Scomber japonicus*) and 1% largehead haitail (*Trichiurus lepturus*), the last a much-prized fish in China. The Chinese DWF operations started to target small pelagics in Mauritanian waters in 2006 with large scale trawlers, which counted 10 trawlers in 2011 (Zhang et al. 2011). By 2015, this grew to 50 trawlers from the Shanghai Fisheries Group Co. and the China National Fisheries Corp. targeting cephalopods in Mauritania (Chen et al. 2017). In 2019-2020, the catch of Mauritanian flagged vessels (which included vessels participating in the 25-year licence agreement signed by the government of Mauritania with the Hong Dong Fishing Company) was made up of 56% pelagic species and 23% cephalopods (see Groupe Multipartite National (GMN) FiTI de la Mauritanie 2022).

During the peak of Chinese-flagged DWF operations (2012), around 10 large mid-water trawlers targeting pelagic species operated in the area between Senegal and Morocco; this has since decreased due to high production costs, and a subsequent change from pelagic to bottom trawls (see Zhou et al. 2021).

Greenpeace (2017) also mentions the following details:

- While the small-scale pirogue fishery of Mauritania, which has been steadily increasing in recent years, was previously oriented towards the exploitation of octopus, the inshore fishery uses small (Mauritanians and Senegalese) vessels targeting octopus, and small purse seiners of various origins, e.g., flying the flags of Morocco, Turkey, and China, mainly targeting coastal small pelagic species. In recent years, catches of artisanal and coastal fisheries have increased significantly. Much of this new trend is due to increased fishing focus on small pelagic fishes, i.e., sardinella (*Sardinella* spp.) and bongo shad (*Ethmalosa fimbriata*) due to the expansion of the fish meal industry. Sardinella and bongo shad are shared stocks (Samb and Pauly 2000; Palomares et al. 2020) which have been overexploited for several years;
- In Guinea Bissau, industrial fishing is wholly carried out by foreign flagged vessels. In March 2017, about 177 fishing vessels (including 17 support vessels) operated in waters under Guinea-Bissau jurisdiction (official list of the Ministry of Fisheries). These are from China, France, Spain, Comoros, Panama, Senegal, Portugal, Greece, South Korea, Guinea Conakry, Curaçao, Cabo Verde, Guatemala, and Belize (i.e., a mixture of ‘real’ flags and flags of convenience; Miller and Sumaila 2014), and mainly exploit demersal species. A relatively small part of this industrial fleet, mainly European, targets tuna. There were six pelagic trawlers, including four flagged to Comoros, one from China and one from Guinea;

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• In Guinea, industrial fishing involves pelagic, cephalopod, shrimp and demersal fishing. This sector targets high quality species, e.g., croakers (*Pseudotolithus* spp.) threadfins (*Polydactylus* spp.), white grunt, sea bream, red carp, red mullet, flounder, grouper, etc.), mainly for export purposes. In 2017, some 70 licensed industrial vessels operated in waters under Guinean jurisdiction. Almost 56% (39 vessels) of this industrial fleet consist of bottom trawlers, with a strong presence of Chinese ships (35 vessels);

• In Sierra Leone, about 143 industrial vessels were operating in Sierra Leone waters in January 2017. This includes vessels from China (which account for 50% of the vessels), Spain, France, Belize, Curaçao, Panama, Guatemala, Cabo Verde, Senegal, Guinea, Ivory Coast, Italy, South Korea, St Kitts and Nevis and Comoros (again, a mixture of ‘real’ flags and flags of convenience). This industrial fleet is largely dominated by bottom trawlers (about 40% of the total) fishing for species such as demersal fish, shrimp and cephalopods. The other parts of this industrial fleet are tuna vessels and mid-water trawlers fishing for small pelagic species.

China was the top fishing country in the high seas, targeting squid, tuna, and mackerel species in 2014 (*Yue et al.* 2016), and this has continued to the present (*Myers et al.* 2022). Shi *et al.* (2014) suggested that over 40 Chinese-owned vessels were operating in the NW Pacific targeting Pacific saury (*Cololabis saira*). Recently, the Chinese Ministry of Agriculture and Rural Affairs approved the operation of 69 lift nets targeting mackerel to operate in the high sea areas of the NW Pacific (MOA 2020). Also, the ZheJiang Ocean Family Co. Ltd, which operates 4 tuna purse seine vessels targeting skipjack and yellowfin tuna operating in Papua New Guinea, Micronesia, Kiribati and Nauru waters, has deployed 14 longliners targeting big-eye tuna, yellowfin tuna, and swordfish in the Pacific, Indian, and Atlantic Oceans (see ZheJiang Ocean Family Co. Ltd 2022a, 2022b).

Miller *et al.* (2018) identified 694 cargo vessels from AIS data (2012-2017) from Kroodsma *et al.* (2018) that were capable of transhipments. They also report that only 45% of these vessels have flags corresponding to their beneficial ownership and that 47% of their activities occurred in the high seas. Russia and US-flagged fishing vessels mostly transhipped with Russia- and USA-flagged reefers inside their EEZs. China, Taiwan, South Korea and Japan-flagged fishing vessels mostly had encounters with variously-flagged reefers in the high seas, i.e., most likely flags of convenience (these encounters were dominated by Panama, Liberia, and Vanuatu-flagged reefers).

In the interest of showing these transhipment activities on a map, specifically for China, a dataset based on the method and assumptions of Miller *et al.* (2018) was extracted from the GFW database (see Kroodsma *et al.* 2018) for 2018-2020. Our results confirm those of Miller *et al.* (2018) and are presented in Figure 3 and Figure 5.
Figure 3: Average number of Mainland Chinese-flagged vessels per half degree cells operating in the world’s oceans that are suspected of being involved in transhipments in 2018-2020

Figure 3 suggests that the average number of Mainland Chinese-flagged vessels that were involved in transhipment is highest in the high seas of FAO Statistical Area 61 (Pacific, Northwest), 87 (Pacific, Southeast), and 51 (Indian Ocean, Western), with a small concentration in Area 41 (Atlantic Southwest). The Pacific Ocean transhipment activities might be associated with squid jiggers (also with longliners and purse seiners; see Boerder et al. 2018), while the Indian Ocean activities might be associated with pelagic fisheries (e.g., sharks and tunas, see White et al. 2019). The transhipment off the coast of Patagonia is most likely associated with tuna, squid and groundfish targeted by the trawl, squid jigger and longline fisheries (Broeder et al. 2018). Note that China is one of the five entities that drive high seas fisheries and transhipment, notably of large tuna and sharks, responsible for 14.4% of these activities (see White et al. 2019). The other four entities are Mexico (30.4%), Taiwan (22.7%), Japan (13.3%) and the USA (13.3%).

Figure 4 shows the number of Mainland Chinese-flagged vessels operating in the waters of our focus countries (except the Solomon Islands) reported to be inspected at port by the Ministry of Agriculture and Rural Affairs of the People's Republic of China (see MOA 2017-2020).3

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3 Note that no data is available for the Solomon Islands
Figure 4: Number of Mainland Chinese-flagged vessels operating in the focus study areas

Source: MOA 2017-2020

Figure 5 presents the number of vessels obtained from the GFW and the RFMO databases for the period 2012 to 2020. It should be noted that these numbers are lower than given in Blomeyer et al. (2012) and Pauly et al. (2014), which is likely due to the GFW database being incomplete, particularly in 2012 and immediately thereafter. Overall, given that the GFW data are known to be incomplete, and that the data for 2000-2011 were associated with a wide confidence interval, Figure 5 should be interpreted as suggesting that there were no large changes in the size of Chinese DWF from 2000 to the present.

Figure 5: Estimated number of Mainland Chinese-flagged fishing vessels operating in the world’s oceans

Source: GFW and the RFMO databases for the period 2012 to 2020
Five of the six focus countries (except the Solomon Islands) are signatories of the Port State Measures Agreement (PSMA; FAO 2016). The Port State Measures Support Programme (FAO 2022) that helps countries to build the capacity to comply with the PSMA lists five projects involving the six focus countries. These projects provide a total of $14.6 million USD (see Annex 3) to help build capacity in these countries. Four of these projects are current and are expected to boost awareness and advocacy about IUU fishing and improve mitigation of dark fleets (Cutlip 2016; Fujita et al. 2018; Valentine 2021).

Although Chinese-flagged vessels seem to be responsible for a large number of dark fleets (see Valentine 2021), European fleets are also going dark, as reported in Godfrey (2021), Heubl (2021), and Anon (2022a).

Note however, that the switching off of AIS data cannot be fully assumed to directly account for going dark. Issues with internet stability and other technological difficulties might also cause AIS switch off, as discussed in Fujita et al. (2018), Ferra et al. (2020), Brousseau (2021), Emmens et al. (2021), Arsenaut and Le Billon (2022). Thus, databases like the GFW whose data are being used for analyses like those done in this study would need to assure users that such issues have been addressed in the datasets that they provide to the wider public.

As to the number of Chinese vessels operating in regions outside of China: 689 data points (rows) were reported for 2001-2022. Slightly over half of these data points (380) were of Chinese DWF observed in 65 EEZs for 2010-2022, with a maximum number of Chinese DWF operations observed in 2013 in North Korea (604 vessels; see MOA, 2013), in 2018-2020 in Argentina (433 vessels; see Valentine, 2021), in Peru in 2018 (377 vessels; see MOA, 2018) and in Ecuador in 2020 (342 vessels; see Ford, 2020). About 41% of these observations covers the Pacific Ocean, 34% the Atlantic Ocean and 22% the Indian Ocean.

The Ministry of Agriculture and Rural Affairs of China noted 2,460 distant water fleet vessels in 2015 (Yue et al., 2016) with 569 squid jiggers (CNFC, 2015). By the end of 2019, 178 pelagic fishery enterprises in China operated 2,701 pelagic distant water fleets taking an annual catch of 2.2 mt (MOA, 2021).

The maximum number of Chinese vessels observed in the Atlantic and Pacific Oceans ranges from 600 to 610 (see Watkins et al., 2016; WCPFC, 2022), and the maximum observed in the Indian Ocean is 488 (see CNFC, 2015).

Gutierrez et al. (2020) estimated a very high number (16,966) of Chinese vessels operating in all oceans for 2017-2018, with 94.5% flying the Chinese flag and 5.5% flagged to a third country with possible beneficial ownership by Chinese operators. This very high figure likely includes vessels from China's domestic fleet and is thus ignored here.

The maximum recorded number of vessels for Mauritania is 169 (Chen, 2017; Chen, 2019; number of observations gathered (n) is 58), 112 for Senegal (Li, 2018; n=14), 132 for Madagascar (Carver, 2021; n=27), Mauritius 6 (55; MOA, 2017), 65 for Solomon Islands (Honiwala, 2011; n=9), and 342 for Ecuador (Ford, 2020; n=15). These numbers are higher than those recorded in Pauly et al. (2014) for these countries, but this does not allow inferences for the Chinese DWF as a whole (see also Figure 5).

Note however, that there are sources, notably Yozell and Shaver (2019) stating that only one third of the Chinese DWF is “visible,” which seems to be confirmed by Yue et al. (2016) and MOA (2021), i.e., 1000 vessels out of 3000. This would correspond approximately to the numbers in Watkins et al. (2016), WCPFC (2022) and CNFC (2015), i.e., about 1,100 vessels (see also Figure 4).

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One possible explanation for the discrepancy between the estimate of about 1000 for the number of vessels in China DWF (see Figure 5) and the high estimate of Yozell and Shaver (2019), which assumes that over two-thirds of China’s DWF makes itself invisible to the GWF, is that Yozell and Shaver (2019) counted Chinese vessels operating (from bases in China) in southern Japan and around the Korean Peninsula, which are not usually counted as part of the Chinese DWF (see Figure 5), and whose number was estimated as 2532 (95% confidence interval: 2094 – 2744; Pauly et al 2014). Clearly, there is a large amount of uncertainty there.

Irrespective of the absolute number of Chinese DWF vessels, GFW data can be used to determine hot spots of Chinese vessel concentration to confirm the validity of the choices of the focus countries for this study. For example, the hot spot off Peru and Ecuador in Figure 2 confirms the locally high number of vessels cited in Ford (2020).

1.2. Chinese marine aquaculture sector

**KEY FINDINGS**

- China’s mariculture industry reached 16 million tonnes (mt) in 2020, of which 14 mt are of bivalves, i.e., oysters (4.6 mt), clam (4.0), scallop (1.8), mussels (0.85), razor clams (0.79), cockle (0.36), with fish, crustaceans and other molluscs (snails, abalones, etc.) making up the rest.
- Overall, the industry generates about 52 billion Euros per year. However, various forms of pollution, which also affect exports, are a major problem.
- Fish and crustacean farming generate a huge demand for fishmeal, which has turned China into the largest fishmeal importer in the world, and may also impact the staple fish consumption of some of the food-insecure countries from which the fishmeal is imported.
- This is becoming a problem in some West African countries, e.g., in Senegal, where the small fish that were consumed by people are now diverted to fishmeal factories and exported to China.

This sub-section briefly reviews the major aspects of China’s mariculture industry (excluding seaweed), starting with Figure 6 showing the trends of production by major commodity groups (molluscs, overwhelmingly bivalves), crustaceans, fish and other groups, and in Figure 7 by province from 1950 to 2020.

From 1950 to 2019, mariculture in China developed exponentially, with a slow start from the 1950s to the 1970s, and a rapid, near linear increase to about 16 million tonnes per year thereafter (Figure 6).

From 2016 to 2020, the annual production increase was about 10% and the strongest increases were for bivalves (14 mt/year, representing almost all of the molluscs in Figure 6), crustaceans, and fish.
The major bivalve species farmed in Chinese mariculture are, according to Mao *et al.* (2019), mainly oysters (4.6 mt), clams (4.0), scallops (1.8), mussels (0.85), razor clams (0.79), cockles (0.36), with other molluscs (snails, abalones, etc.) making up the rest. The major species are the oysters *Crassostrea gigas, C. rivularis, C. plicatula, C. angulata* and *Ostrea denselamellosa*, the Manila clam (*Ruditapes philippinarum*), and the mussels *Mytilus galloprovincialis, M. coruscus* and *Perna viridis* (Mao *et al.* 2019). Razor clams include *Sinonovacula constricta, Solen grandis, S. strictus* and *Cultellus attenuatus*. Of these, *S. constricta* is the most important; its main production areas are in Zhejiang, Fujian, Jiangsu and Shandong. The clams are *Meretrix lusoria, M. lyrata, M. chinensis*, *M. veneriformis, Paphia undulata, Cyclina sinensis* and *Coelomactra antiquata*, while the blood clams include *Scapharca broughtonii* and *Tegillarca granosa* (Yang, 2021).

Figure 7 shows China’s mariculture production by province. As can be seen, for 2011 to 2019 there was an increase of 58% in Zhejiang, 41% in Fujian and Hainan, 38% in Hebei and Liaoning (33%) which dominate the production of the whole country. However, production declined in 3 provinces, i.e., Shanghai (-97%), Tianjin (-67%) and Guangxi (-15%), for causes that could not be elucidated.
One-sixth of the world's population rely on seafood as the main source of animal protein. With the increase in population and the improvement of living standards, the demand for aquatic products will continue to increase. In China, the improvement of living standards is the main driver for the increased demand for seafood, and thus the emphasis on the culture of seafood (Chen et al., 2012).

From 1959 to 1976, the production of mariculture increased steadily, driven by improvements in mariculture technology. From 1978 to 1992, the surface of coastal areas devoted to mariculture increased rapidly. However, serious environmental problems increased as well, as did the frequency of diseases. In spite of these issues, from 1992 to the early 2000s, the areas devoted to mariculture continued to increase, as did its production, outpacing mariculture increases in other parts of the world. The breeding technology of algae, shellfish, shrimp, and fish is now basically mature, and scientific research focuses on the breeding of new species, disease control and integrated mariculture, which has a lower ecological footprint (Chen et al., 2012). In the 21st century, the aquaculture of highly valuable species such as sea cucumbers and abalones has increased, and intensive aquaculture methods such as deep-water cages and factory farming have been developed (Li, 2007).

With the continuous development of China’s mariculture industry, the number of countries to which China exports mariculture products increased from 112 in 2002 to 170 in 2010. However, Japan, the United States, the European Union and South Korea are still the most important export markets for China (Chen et al., 2012). The Economic Cooperation Framework Agreement signed between Mainland China and Taiwan in 2010 increases the trade of seafood between the two. Also, exports to countries in Central and South America, Africa and Oceania increased. All these developments created favourable conditions for the further development of China’s mariculture.

According to the "China Fishery Statistical Yearbook for 2020", the output value of China’s marine aquaculture in 2019 was 358 billion Yuan (about 52 billion Euros), and the ratio of the output value of
aquaculture products to fisheries products was 79.5: 20.5. The aquaculture output and value of aquaculture have been increasing year on year, largely meeting the demand for seafood products (Zhu, 2021).

However, the rapid development of Chinese mariculture has caused environmental problems such as pollution and low efficiency. For example, the coastal waters, especially the intensive aquaculture waters, are seriously polluted, and the frequency of fish and other diseases, red tides and, *Enteromorpha prolifera* outbreaks keeps increasing (Li 2007). Moreover, due to the high protein content of the feeds given to carnivorous fish and invertebrates, pollution from nitrogen, phosphorus, organic matter and suspended solids is increasing (Yang *et al.*, 2020), especially from non-eaten feeds and faeces, which increase pathogenic bacteria and viruses in coastal seawater (Song *et al.*, 2019; (Yang *et al.*, 2020).

The use of pelleted feeds in China is still low, i.e., about one third of all feeds is comprised of pellets. Also, the feed conversion of most aquaculture species is still in the range of 2.1-4.0 (Mai *et al.*, 2001), far higher than in western countries. As a result, currently four to five million tonnes of forage fish are used as feed annually, much of it stemming from the Chinese domestic trawl fishery (Cao *et al.* 2015). Here, mariculture, rather than reducing fishing pressure on coastal ecosystems, actually increases it, including in other countries (e.g., Senegal), which now export fish feed to China that is derived from sardinella and other local staple fish (Hicks *et al*. 2019; Pauly 2019). Indeed, China has now become the largest fishmeal importer in the world ((Anon 2022b). This points to the need for better technologies and policies (Lei, 2010; Cao *et al.* 2015), involving, among other things a better utilisation of fish processing waste, and the use of plant-based feedstuff. Fortunately, feeds are not required in bivalve culture, which contributes the bulk of Chinese mariculture production.

In order to address these and related issues, the Chinese government issued in 2019 "Several Opinions on Accelerating the Promotion of the Green Development of the Aquaculture Industry," which is the first document of its kind approved by the State Council. This puts forward specific requirements for the Chinese aquaculture industry to reduce its environmental footprint. Also, in 2021, the State Council issued the "Guiding Opinions on Accelerating the Establishment and Improvement of a Green, Low-Carbon and Circular Development Economic System", which again emphasised the need to reduce the ecosystem impacts of agriculture and aquaculture.

Liu *et al.* (2022) warned that chronic impacts on coastal ecosystems would lead to tides, the emergence of diseases, and even a serious threat to future of mariculture.

Moreover, one of the problems that the aquaculture sector faces is the use of drug to avoid diseases. Ning *et al.* (2007) reported that in December 2002, due to excessive drug residues and microbial counts in poultry meat and frozen shrimp exported from China, the European Commission adopted a decision5 impacting the import of animal-derived products from China for human consumption or as animal feed (Anon. 2002), causing a loss to China’s aquaculture industry of more than 600 million US dollars. This question is further developed in section 6.1.2.

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1.3. **Chinese import and export of fisheries and aquaculture products (FAPs)**

**KEY FINDINGS**

- Chinese seafood trade is going through a period of significant change.
- China’s role as a primary seafood processor (filleting) to the world is changing in favour of secondary value-added processing.
- Rising Chinese wealth is unsurprisingly leading to increased imports of expensive prime seafood (fresh salmon, fillet products, shellfish) for domestic consumption.
- However, there is one thing that has not changed. This is China’s dominance of the trade in fishmeal. In 2012 China was importing 30% of the traded total, and provisional data for 2021 suggests this is now approaching 50%. When China’s domestic production is included, China appears to be consuming 60% of global fishmeal production.

Specific findings regarding China’s fish & seafood trade:

- Growing imports of prime whole fresh fish (Atlantic salmon).
- Reducing imports of raw whole frozen fish (northern gadoid white fish).
- Increasing imports of prime shellfish (shrimp, squid).
- Reducing exports of primary fish fillet products (whitefish & Pacific salmon).
- Offset by largely matching increased exports of secondary value-added fish & shellfish.
- But non-food import of fishmeal is the most important import from a resource impact viewpoint, by a large measure.
- Threats to the accuracy of trade data, as demonstrated by China’s seafood imports.

This sub-section focuses on the Chinese import and export of fisheries and aquaculture products including data on trade balance, fishmeal, on the geographic dimension and the key species and species groups involved. Moreover, this section includes recommendations specifically related to the case studies; offers an overview of the main environmental, geographical and socioeconomic consequences of the fisheries fleet and aquaculture sector for the EU; and it finally provides some conclusions and recommendations.

The approach adopted to elaborate this sub-section has been one of travelling from the general to the particular, i.e., looking at the big picture to identify relevant topics then moving on to assess these in greater detail. This means that the research has been structured as follows:

- **Overview** – analysis of China’s fisheries imports, exports and trade balance by major product category – e.g., fresh fish, frozen fish, fillets, crustacea etc, 2012 to 2021.
- **Geographic**: China’s seafood trade by **major origin** (imports) and **destination** (exports) 2012 to 2021.
• **Resource related**: Trade by key *species or species groups* – to tease out the significant species that have a high profile in the Chinese seafood trade and thus are likely to reflect the stocks subject to significant impact from Chinese activities.

These three analytical stages provide the basis for subsequent specific, detailed and relevant analysis expressed through brief case studies, based upon:

- Relevance to the six case study third countries.
- Prospects for providing insights regarding implications for the EU, especially the protection of EU interests.
- Significant wider global environmental, socio-economic and geopolitical implications.

The data used in this analysis is mostly that provided by the World Trade Organisation (WTO) through its International Trade Centre (ITC) TradeMap website and the FAO through its FishStat database. Much of the quantitative data is converted into live weight or whole fish equivalent (WFE) which both refer to the original weight of the whole aquatic animal when caught alive (see Appendix 2 for detail of conversion factors used), as opposed to product weight, so like can be compared with like.

1.3.1. Overview of the Chinese seafood trade patterns

From a trade perspective it is clear that China’s role in the global fish and seafood sector is changing. Over the past decade volumes have increased steadily by 3% pa (and faster at 5% pa in live weight or WFE terms). Imports reached over 4.4 million tonnes (product weight) in 2019 but have dropped back subsequently, no doubt with the pandemic a major factor (the clampdown on eating out, probably exacerbated by rumours that Covid could be imported in frozen seafood). The “headline” characteristics of the trade – which is of course huge, along with most aspects of the Chinese economy - can be summarised as:

- **China’s imports** of fish and seafood have risen to over 4 million tonnes within the past 10 years but may have been tailing off latterly, if provisional data is to be believed. In the perhaps more meaningful whole fish terms (WFE) Chinese seafood imports have settled down at 5.5-6 million tonnes, and are valued at $13-14bn annually.

- Expressed as product weight, **exports** were lower (3.7-4.2 million tonnes), but much exceed imports when converted to WFE values (7.5 to 8.5 million tonnes) worth around $20bn annually. The much higher WFE value reflects the high degree of processing.

However, although scale clearly dominates any perception of the Chinese seafood economy, it is the ways in which it is changing that are currently more interesting. Taking imports and then exports in turn, this section starts by assessing the key indicators of this change.

1.3.2. China’s Seafood Imports

It is in the makeup of the trade that the change is most apparent. Chinese imports are dominated by whole frozen fish and have been so for the past decade (and previously) – accounting for 65% of the total. Together with shellfish, whole frozen fish accounts for a very dominant 90% of imports, and taken together these categories have consistently been the major contributors to seafood imports.

However, frozen fish imports have actually been falling, with a rapid reduction after 2019 highlighting the change. Covid and associated continued lockdowns in China might explain the steep reduction in 2020-21, but analysis of the percentage of whole fish compared with China’s total fish import shows clearly that the decline began much earlier - in 2017 - and suggests this is a key underlying trend.
At the same time, imports of shellfish have been growing very rapidly (14% pa) and some minor seafood categories have been growing even faster – most notably fillet products. What appears to be happening is a consistent underlying trend towards increasing higher value imports that are offsetting a decline in arrivals of lower cost frozen raw material.

1.3.3. China’s Seafood Exports

Chinese seafood exports always exhibited a very different profile to that of imports. Whilst this is not surprising, it is instructive. Some whole frozen fish is exported but it is fillets that dominate (especially when their importance is highlighted through conversion to WFE values). Added to this are sizeable quantities of secondarily processed (value-added) seafood (fish and shellfish). Taken together these four categories accounted for close to 80% of all seafood exports, with molluscs (mostly squid) the only other significant category.

In terms of quantity, Chinese seafood exports have been effectively static over the past decade at 3.6 million tonnes, but did rise during the middle of the decade, peaking at 4.2 million tonnes in 2017. However, when translated into WFE, the figures are much higher (at 7.8 and almost 9 million tonnes respectively) – as would be expected given that processing leads to the discarding of as much as two thirds of the fish concerned. Seen this way, China is a net exporter of seafood, ostensibly demonstrating a substantial contribution from domestic capture and culture.

The overall rise and demise pattern applies similarly to most categories of seafood exports. The outlier is highly processed (value-added) seafood which has shown continuous rapid growth (6% pa), especially for fish per se, as opposed to shellfish. The overall outcome has then been a reduction of most of the primarily processed products exported, following a peak in 2017-18, largely offset by a rapid rise in their secondarily processed (value-added) alternatives. China’s seafood processing sector has apparently been “upping its game”.

1.3.4. Trade balance

What explains this import/export pattern is China’s well-established role in the global seafood sector as a specialist processor rather than a primary producer. Whole frozen fish are imported and processed fish – usually fillet – is exported, sometimes back to the original country of origin of the raw fish. It is, though, with this basic processing that the change mentioned above has become evident over the past 3-4 years. In short, China is processing less fish for export, but adding more value to what it does process, indicated by a move away from fillet and towards value-added products.

In addition, something else is also happening. This is to do with unit price (e.g., expressed as € or $US/kg), or more specifically, average unit border prices. Chinese exports have seen little change in prices (except in 2021, which may be erroneous as it is provisional). In contrast, import prices have been rising steadily and it appears that China is trading up when importing. The combined impact of higher unit values and the increase in shellfish imports – which are invariably highly priced items - appears to be the cause. Taking imports and exports together, the way the net trade position has evolved over the past decade is instructive:

- Whilst declining in relative terms as an import, net trade in whole frozen fish has remained largely steady until just recently.
- Shellfish trade has switched from net deficit to net surplus – i.e., more shellfish is being consumed in China. For crustacea, which is dominated by shrimp, the transition occurred between 2014 and 2015 – a period when commentators on the shrimp farming industry had suggested that
China was indeed moving from being a net exporter to net consumer of shrimp. The same has recently happened to molluscs (dominated by squid).

- Perhaps the most striking aspect to emerge is the clarity regarding the trend in net exports moving away from primary processed fillet towards secondary value-added products.

1.3.5. Fishmeal

One key element of the Chinese fish and seafood trade balance is missing from the preceding analysis. This is fishmeal – a nonhuman food item that can be overlooked. This would be a mistake, as fishmeal probably represents the area where China has the largest impact upon global aquatic bio-resources through trade. What tends to disguise the importance of fishmeal is the apparently relatively modest quantity in product weight terms (at least in comparison with China's total aquatic product trade – at just 1.3 million tonnes p.a. of fishmeal on average over the past decade). But when the volume of fish consumed in the production of fishmeal is considered, the impact is very significant. It takes 4.4 kg of whole fish to produce one kg of fishmeal, so when viewed in WFE terms, fishmeal constituted a majority import category at 8 million live weight tonnes in 2021 (this means that, when converted back to live weight, 8 million tonnes of whole fresh fish were processed to produce the 1.82 million tonnes of fishmeal that China imported in 2021). China’s exports are, on the other hand, minimal, at 2,000 tonnes or less, i.e. less than 0.2% of imports, so this is in effect an inwards-only trade - and a very large one.

The implications of this are certainly significant. If the data is correct, China is not just the dominant player in the global fishmeal trade (now accounting for 50% of the global import) but due to its domestic fishmeal production, possibly responsible for over 60% of all global consumption. China’s massive terrestrial farming industry (pork and chicken) no doubt accounts for much of this, but a huge aquaculture industry is also a key factor driving China’s clear dominance of the supply of this important global protein feedstock.

1.3.6. Key overview findings

Clearly fishmeal is a major part of the story and needs to be included in the analysis. At the same time, the general significance of whole fish equivalent (WFE) is clear, and so restating import data in WFE terms is instructive. Doing so makes the degree to which fishmeal has dominated China’s 2012-21 aquatic product imports clear – whilst it contributed 29% to imports over the decade in product weight terms, when converted to WFE the contribution was 59%, whilst the contribution by whole frozen fish dropped from 46% (product weight) to 23% WFE.

When looked at in this way, fishmeal clearly has resource implications that exceed those of the conventional seafood imports (although the latter is substantially more important economically, of course). So, although China is a net exporter of seafood, it is no such thing for aquatic resources overall when fishmeal is included. Indeed, there is now an annual WFE Chinese quantitative trade deficit of 1-2 million tonnes overall.

Taken together, these findings point to China having retained its role as “seafood processor to the world”, but one that is increasingly switching from filleting to more sophisticated value-adding. This is overlain by a move upmarket as the country has increased its imports of high-end shellfish. The latter trade is apparently aimed at domestic consumption, presumably funded by China’s increasing wealth. Specifically, key observable trends are:

**Imports.** The majority of Chinese fish and shellfish imports are raw or semi-processed materials, with four product categories accounting for the great majority (over 90%) of the total – these being

- Whole frozen fish: 65% (average 2012-21, product weight)
• Molluscs (mostly squid): 13%
• Crustacea (mostly shrimp): 12%
• Fish fillet: 4%

Some other products are exhibiting very rapid import growth (e.g., fresh fish, cured fish and “others” – including jellyfish and echinoderms) but from such tiny bases that current quantities are relatively minimal (though given the vast scale of the China economy, hardly insignificant). But most important of all is the very high level of fishmeal imports

Exports are more diverse from a product viewpoint - with 6 significant categories (i.e. contributing more than 2% to quantities) but with the top four contributing over 80% of the total. The key categories over the past decade, in order of importance (when ranked in WFE terms), are:

• Fish fillet: 23% (average 2012-21, product wt)
• Secondarily processed (value-added) fish*: 19%
• Frozen whole fish: 25%
• Secondarily processed (value-added) shellfish: 10%
• Molluscs: 14%
• Crustacea & cured: 7%

* was top of the list by 2020.

1.3.7. The Geographic Dimension

China sources seafood globally and exports very widely – for example the key raw material, whole frozen fish, arrived from 97 countries whilst key exports (fillets) were dispatched to 140 countries over the past decade. However, a far narrower range of partners accounted for the great majority of the trade, especially where imports are concerned.

Chinese imports by origin

Sourcing patterns are instructive - the origin of the fish can be telling, regarding the species involved. This section assesses the principal providers to China, concentrating on the four categories that account for the great majority of the imports. – these being whole frozen fish, fish fillet, crustacea (especially shrimp) and molluscs (especially squid), all assessed in product weight terms here.

The dominance of the leading suppliers is evident, as is the degree to which these leaders tended to increase that dominance over the decade (whole frozen fish being the only exception to this). Other trends noted regarding sourcing are as follows:

• In general, the top three sources provide more than 50% of the total supply within each category – confirming that sourcing tends to rely upon a narrow supply base.
• This is certainly the case for frozen whole fish raw material – where 60-70% arrives from the top three suppliers: Russia, USA and Norway, although latterly there has been some broadening of the supply base, so reducing Russian and US dominance.
• Primary processed fish imports (fillet) have grown rapidly whilst being very narrowly sourced – now with 82% sourced from a single supplier, Vietnam. This reinforces Vietnam’s emerging role as a key fish “contract” processor, able to challenge China on the basis of cost effectiveness. Although the
great bulk of Vietnam’s fillet exports are pangasius, rising Vietnamese exports of cold-water fish (gadoids and salmon) confirms Vietnam’s progress in this direction.

- For prime shellfish (essentially shrimp & squid), sourcing is more diverse but has latterly narrowed down to a more limited range of key suppliers, especially for shrimp, where Ecuador dominates. China’s transition from net exporter to net importer of shrimp may partially account for this (perhaps favouring bulk low-cost suppliers as this becomes more of a commodity market).

- Molluscs are more widely sourced, with Japan, Indonesia and Peru – the top current suppliers – each contributing less than 17%.

**Chinese exports by destination**

For Chinese seafood exports, the market leaders again take substantial market share, but this concentration is much less marked, and these exports reach a very wide range of markets. In this case five key categories have emerged as significant: whole frozen fish, frozen fish fillet, crustacea (e.g., shrimp, crabs, lobster), molluscs (squid, scallops and clams) and value-added fish (e.g. canned pelagics - large & small). Again, product weights are the basis for comparisons here.

Again, the Chinese trade pattern for key products is informative, with that for exports characterised as follows:

- As Chinese exports are far less concentrated upon a few countries than its sourcing, the top three tend to account for a much lower proportion of this more widely dispersed trade – mostly less than 50% for each export product category.

- Primarily processed fish mostly goes to western markets, with the EU still a major destination (with the EU taking 31% of the total over the past decade, rising to over 35% recently, with Germany the largest importer).

- Secondary processed (value-added) fish is more widely exported, destinations including many emerging markets as well as western markets (and with the EU, in this case, only accounting for 4% of the total for this category).

- Shellfish exports mostly go to wealthier Asian and western markets. However, the EU as a destination for Chinese crustacea is diminishing by 8% pa, having dropped to around 5% of the total. In contrast, for Chinese molluscs, EU demand has been rising by 2% pa, and now accounts for 11% of the total Chinese mollusc export.

**1.3.8. The key species and species groups involved**

For the purposes of this study, it is the species and species groups involved rather than the products that are of key interest. Understanding this is central to identifying the impact that China’s fish trade is likely to be having upon wild stocks. It also provides pointers regarding the likelihood that EU interests might be affected, as well as helping to interpret the involvement of the six case study third countries.

**Chinese imports by species group**

Trade data provides species and species group data, and whilst this is not necessarily consistent and is subject to misclassification, it is probably the best data available. The following analysis focuses upon the more important species where they are identified (much of the trade is undifferentiated species-wise). All quantities have been assessed in WFE terms to highlight the impact upon the respective resource. The range of species assessed was limited to the most important items, but still collectively represented 72% of the total import. The detail is provided in the attached Annex 4, and 19
species/species groups that were both differentiated and represented the key contributors to China’s seafood imports were identified. Taken in turn, key aspects noted for these were:

- **Salmon imports**: Atlantic salmon imports now dominate whole fresh fish imports, accounting for nearly 70% of the category. Fresh salmon must be air-flown, because fresh fish (unlike frozen) cannot be sent by land or sea from producer countries (mostly Norway in this case) to China as it is too perishable and the journey time is overly long. It is thus expensive ($11/kg), and so its use as raw material for exported products is unlikely, and the high-end domestic market is the likely end use. Pacific salmon is also imported in quantity but in this case, it is a whole frozen product at $3/kg, making reprocessing a practical option.

- **Whole frozen whitefish imports**: Alaskan pollock continues to dominate the category in spite of the decline in its import (-6%pa), and together with cod-like fish and flatfish still constitutes 44% of the category’s import. Arriving at $1.1-$1.3/kg, this is clearly a commodity product, priced for reprocessing.

- **Pangasius fillet imports**: China’s fillet imports are dominated by a single product from a single source – farmed pangasius catfish from Vietnam, which now accounts for 64% of the category after very rapid growth. A landed price of $2/kg for a fillet product explains its rise in popularity.

- **Crustacea – shrimp imports**: China’s crustacean imports have been rising across the species range, but it is shrimp where the growth has been exceptional. China’s pivot from net exporter to net importer must have played a part here, and it has been Ecuador that has been a major beneficiary (61% of the total). Much of the warm water shrimp imported could then only be farmed Penaeus vannamei, especially as the other major supplier, India, also now farms P vannamei. The other clearly differentiated type of shrimp imported is cold water shrimp, which mostly comes from Canada, but some is supplied by the EU – from Greenland and Denmark in particular. This is almost all imported in frozen form (at an average price of $US5/kg) which would make it potentially economic to reprocess for export or it could supply domestic demand.

- **Molluscs – squid & scallop imports**: Squid has been a major Chinese import and has continued growing at 6% pa over the past decade. The more surprising trade has been in scallops, growing at 25% pa to reach 670,000 tonnes, although this is perhaps overstated as it is assessed as shell-on (WFE) for a product believed to be mainly traded as detached meats. Both species can provide potential markets for the EU in China, but this is a market where Spain is the only EU member to have made much of an impression recently (and that at only a modest 6-7,000 tonnes pa).

- **Other product imports**: Jellyfish is the only other product category to make a significant contribution, but as with scallops the WFE estimate probably exaggerates the product – mostly believed to be traded in dried form. Even so, the 44,000 tonnes imported latterly represents the result of 27% pa growth, so is not inconsequential.

**Chinese exports by species group**

As with imports, Chinese exports are analysed in terms of their species composition, and as before the quantities shown are all whole fish equivalent (WFE), and the range covered is limited to the most important items, but still collectively represented almost 70% of the total export.

- **Whitefish fillet exports**: Fillet exports have declined as already noted, but still remain sizable. Alaska pollock fillet exports averaged 0.72 million tonnes (WFE) set against imports of raw whole pollock of 0.67 million tonnes – values close enough to confirm that reprocessing for export is
China’s main use of this pollock*. This is a product category that has particular relevance for the EU, which received 220,000 tonnes in 2021 (for Germany especially), although the quantity has been declining slowly.

- **Pacific salmon fillet exports**: the comparison made for Alaskan pollock applies similarly to Pacific salmon. An import of 160,000 tonnes (WFE) of whole salmon can be linked to a fillet export of 170,000 tonnes (WFE)* signalling another reprocessing trade.

- **Tilapia exports**: China is the world’s largest farmer of tilapia, with an industry closely tied to exports. These exports mostly go to the USA (fillets) and Africa (fish too small to fillet so exported whole), all frozen. This trade seems to have declined rapidly, especially since 2018, with the overall disruption to US/China trade likely to have been a determining factor.

- **Value added fish exports**: EU imports of these secondary processed products increased (in direct contrast to the declining trend for primary fillet products) rising from 17,000 tonnes in 2012 to 40,000 tonnes in 2021, showing growth of 10% pa, ahead of global growth of these Chinese exports of 9% pa. However, they still remain small in relation to primary processed fillet imports to the EU.

- **Tuna value-added exports**: China now exports 260,000 tonnes pa (WFE) of presumably mostly canned tuna, up from around 100,000 tonnes in 2012. If this does signal China’s intention to expand in the canned fish sector it will have implications for island states – especially case study countries such as the Solomon Islands, Mauritius and Madagascar, as well as Senegal and Ecuador. All are current or former players in the canned tuna industry, as well, of course, as the EU tuna industry.

- **Shellfish exports**: Chinese shellfish exports essentially reflect imports, with shrimp, squid and scallops prominent but with the addition of clams – with the latter two categories’ contributions probably inflated by conversion to WFE. Shrimp has shown the greatest change, as raw shrimp exports declined by 7% pa whilst value added exports were steadier – suggesting that domestic consumption was rising whilst secondary processing for export continued to increase.

* In the consultant’s experience, these discrepancies between the Chinese imported quantity and the reciprocal export of between 4% and 6% are not unusual for trade data and within the norm for errors, rather than signalling unexplained quantities (e.g., undeclared landings).

### 1.3.9. Case studies

In response to the issues raised by the preceding analysis, a number of brief case studies were assessed, especially wherever there was evident relevance for countries such as Mauritania, Senegal, Madagascar, Mauritius, Solomon Islands and Ecuador, EU interests or a wider impact upon the marine ecosystem and environment. These studies, which are set out in Annex 4, explored these aspects and form the basis for assessing the implications that Chinese trade in seafood (and aquatic bio-resources) has for the EU member states and the six case study third countries.

- **Case study 1: Fishmeal – China’s largest trade-related impact on global aquatic bio-resources**. China’s massive impact upon the global supply of fishmeal has already been described, and so this case study looks into this in more detail.

Relevance: Such is China’s domination of this trade that its impact is global, affecting all countries with livestock industries, in that a key feed ingredient is likely to get more expensive and perhaps less available. More specifically, two case study countries that are suppliers to China are directly affected – Ecuador, as a long-term supplier to China, and Mauritania (where a recently concluded EU fisheries agreement adds immediate relevance).
- **Case study 2: Prime Whitefish fillet exports**: China has traditionally played a leading role in the fish “re-processing” industry – where raw material (whole frozen fish) is imported, primarily processed as fillet and then exported, with the EU as a major recipient.

**Relevance**: The importance to the EU appears to be in decline, and the EU can probably expect reducing scope for “contract processing” of prime cold water fish by China, with alternatives where labour costs are lower possibly required. Germany, where Alaskan pollock is popular, is the Member State most likely to be impacted.

- **Case study 3: Value-added tuna exports**: Trade data suggests that China is developing its tuna industry, with expansion in the sourcing of raw material (through capture and trade) and processing.

**Relevance**: If China succeeds in becoming a leader in the tuna sector it will have a potential impact upon (i) the EU tuna fleet’s access to tuna in some states EEZ, particularly in the West Pacific (e.g., Solomon Islands) and (ii) countries involved in tuna processing (past and present) which include all but one of the case study countries. Furthermore (iii) it may have implications for the EU tuna canning sector (mostly Spanish now) which has already faced high levels of overseas competition and will not welcome further such competition.

- **Case study 4 - Ecuador, Vietnam & China - warm water shrimp (*Penaeus vannamei*).** A curious triangular relationship arose in 2016 which involved Ecuadorian shrimp, exported to Vietnam, that is believed to have eventually arrived in China. The event was telling regarding the integrity of global seafood trade data. As the detailed case study below shows, this shrimp has apparently “disappeared”, as it was not re-exported or consumed in Vietnam, where there is an oversupply of shrimp.

**Relevance**: This affects Ecuador as it has become closely tied to the Chinese market, whilst for EU consumers there is the potential eventual narrowing of warm water shrimp sourcing options as Ecuador becomes increasingly China-orientated. The distortion of trade reporting that this issue has highlighted, is seen as discouraging.

- **Case study 5 Salmon, Pacific and Atlantic.** Salmon exemplifies some of the key themes evident in Chinese seafood trade involving both China’s move towards higher value imports and role as a bulk fish processor – of fresh Atlantic salmon and frozen whole Pacific salmon.

**Relevant implications**: This trade would affect EU member states rather than third countries, and the potential impact could be mixed and probably minor, involving competition for raw salmon and availability of processed salmon.

- **Case study 6: Shellfish.** China is increasingly becoming an importer of prime shellfish, unsurprising in view of the longstanding popularity of seafood, rising national wealth and the predilection for extravagant entertaining.

**Relevance**: Cold water shrimp offers the EU export opportunities in China whilst China’s increasing demand for high value shellfish generally increases competition for supplies of products popular in the EU, and could raise prices.
2. PRACTICES OF GRANTING FISHING LICENCES

KEY FINDINGS

- Distant water fleets operating in the study areas usually gain legal access in these countries’ EEZs through joint ventures, bilateral agreements, private agreements and licensing.
- Details of these agreements or licensing often lack transparency as they are seen as commercially sensitive.
- The Sustainable Fisheries Partnership Agreements (SFPA) between the EU and various maritime countries are more transparent.
- In the six focus countries, currently only Mauritania, Mauritius, and Senegal have active SFPAs with the EU, Madagascar and the Solomon Islands have dormant SFPAs (there is no Implementing Protocol and therefore EU vessels are not allowed to fish), and Ecuador has no SFPA.
- In the past decade, China has been actively expanding the countries involved in its Belt and Road Initiative (BRI).
- All focus countries but Mauritius have joined the initiative, and the fisheries sector has been an important component of China’s involvement with these countries.
- However, concrete details on these agreements are not publicly available.
- Many of China’s distant water fishing companies also engage in joint ventures or private agreements in foreign countries. This makes it hard to trace who the actual beneficial ownership is and adds another layer of opaqueness on the operation of China’s distant water fleet.

This section includes a description of practices, including transparency issues, of granting fishing licences to Chinese vessels in Senegal (section 2.1), Madagascar (section 2.2), Ecuador (section 2.3), Solomon Islands (section 2.4), Mauritius (section 2.5), and Mauritania (section 2.6). These agreements are contrasted to what is known about the agreements offered by China as part of its BRI, the ‘Fisheries Transparency Initiative’ (FiTI) launched by some countries in 2015, and other initiatives.

The distant water fleets usually gain legal access to the fisheries resources in other countries’ Exclusive Economic Zones (EEZ) through joint ventures, bilateral agreements, private agreements and licensing. In exchange for access to the country’s waters, the foreign party will often contribute financially and/or make investments in infrastructure or training programmes for the local fisheries industry. However, the details of these agreements or licensing often lack transparency as they are seen as commercially sensitive. Furthermore, payments can be presented as aid or development projects for the host country. Of the six focus countries we looked at, all received aid and funding for their fisheries sector through engaging in fisheries-related agreements with other countries. However, whether or not these joint projects could actually be part of a fisheries access agreement is not known, since details of fisheries access agreements are opaque.

The Sustainable Fisheries Partnership Agreements (SFPA) between the EU and various maritime countries are more transparent. There are currently 13 active SFPAs, and the majority of them concern tuna or tuna and hake (Merluccius spp.); only four SEPA are mixed species agreements. In the six focus
countries, currently only Mauritania, Mauritius, and Senegal have active SFPAs with the EU. In these agreements, the EU gives financial and technical support to partner countries in exchange for access to the fisheries resources in their Exclusive Economic Zones (EEZs).

While an SFPA is actively in place, vessels from the EU are not allowed to engage in private agreements with the partner country, but are allowed to form joint ventures under specific conditions. However, aside from reports about the Spanish association Cluster de Empresas Pesqueras en Países Terceros (Vigo Empresa 2005), which includes 220 joint venture companies, and another group, Asociación de Empresas Comunitarias en Sociedades Mixtas de Pesca (ACEMIX), including 53 joint venture companies from Spain (Cooperativa de Armadores de Pesca del Puerto de Vigo 2022), there is little information on joint ventures from other EU members.

In order to address transparency issues in the fisheries sector around the world, a few countries have initiated a ‘Fisheries Transparency Initiative’ (FiTI) in 2015 (https://www.fiti.global/). Countries that decide to engage in FiTI are subject to an annual assessment of the transparency in their fisheries sector and given recommendations on how to increase credibility in their information in the future. However, up till now, only Mauritania and Seychelles are candidate countries that have been given annual assessments with full length reports submitted.

Ecuador, Madagascar, and Senegal have only publicly announced that they are committed to implementing the FiTI, without officially applying to become a candidate country yet. Mauritius and the Solomon Islands have not made any engagement with the initiative yet. However, stakeholders in Mauritius have been working with the FiTI to increase awareness on the importance of transparency. The FiTI also initiated a transparency assessment on information on Mauritius’s publicly available websites (Fisheries Transparency Initiative 2022a). As a result, out of six focus countries, Mauritania provides the most information on fishing access agreements and licensing practices available to the public.

The government of Mauritius, Mauritania, and the Solomon Islands have been publishing the number of licences they issued to different foreign countries every year (with and without bilateral agreements). The Mauritanian and Mauritius governments also publish the amount of revenue generated from fishing licences.

In the past decade, China has been actively expanding the countries involved in its BRI. Out of the six focus countries, all but Mauritius have joined the initiative, and the fisheries sector has been an important component of China’s involvement with these countries. However, concrete details on these agreements are not publicly available. Moreover, even when the countries have bilateral agreements in place, many of China’s distant water fishing companies also engage in joint ventures or private agreements in foreign countries. This makes it hard to trace who the actual beneficial ownership is and adds another layer of opaqueness on the operation of China’s distant water fleet.

### 2.1. Senegal

In Senegal, bilateral agreements, private agreements, joint ventures, and licensing are ways foreign vessels can gain access to Senegal waters (FAO 2022a, MPEM 2022). According to Niass and Seck (2011), there are records of joint ventures from Spain, Italy, Greece and China with Senegalese companies in 2010. However, other than the SFPA with the European Commission, the details of all the other
agreements and licences granted are not publicly available, or hard to access. This lack of transparency, coupled with corruption and illegal practices, is undermining the fisheries sector of Senegal (Vidal 2012a). In particular, governmental actions lack credibility and licences that were previously granted to foreign vessels have been revoked before, due to disapproval of local fishermen groups or non-governmental groups (Vidal 2012b; Gorez 2015; Pêche & Développement 2020; Nwoye 2020).

For example, in 2020, there were documents detailing Senegal issuing 54 fishing licences to vessels from different companies that were mostly joint ventures with Chinese investments (APRAPAM 2020). However, not only are the details on how much the companies pay for licensing these vessels largely unknown, but some of the companies only have a share capital of 100,000 CFA francs (about $150 USD), i.e., a symbolic sum investment amount. The approval of these fishing licences caused a lot of backlash from the local community, as those vessels also had IUU fishing incidents. This resulted in the Ministry publicly rejecting these licences (AFP 2020, Philippe 2020). However, it was later found that some of the vessels involved were secretly given licences (Nwoye 2022).

Outside of the joint ventures mentioned above, Senegal also became part of China’s BRI in 2018 (Bai 2018). According to Chinese state media, 112 vessels from China’s distant water fleet were registered in Senegal in that year (Li 2018). In the past decade, there are also different reports on Chinese distant water fleet companies sending vessels headed for Senegal for fishing opportunities with valid fishing licences (Intellivoire 2020; CNFC 2015; EJF 2022; MOA 2019, 2020a-d). However, details of how and what type of agreements these vessels were involved in were not disclosed.

### 2.2. Mauritania

Since joining FiTI, Mauritania has produced two reports with details on the fishing agreements it has with foreign fleets in 2018-2020 (see their website at [http://www.fiti-mauritanie.mr/](http://www.fiti-mauritanie.mr/)). Mauritania has an abundance of fisheries resources along its coast. However, Mauritania historically does not have a close relationship to the sea, and this had the effect that, although fisheries are now a major component of the country’s economy, the bulk of Mauritania’s income from the fisheries sector is derived from the selling of fishing licences to foreign countries, and not from fisheries products (FAO 2022b).

Foreign fishing vessels can obtain fishing licences under Mauritania’s ‘national scheme’ or ‘foreign scheme’. Under the foreign scheme, the bilateral and private agreements Mauritania has with the European Commission and with Japan and Russia provide licences to around 28% of the large-scale fishing vessels in the country’s waters. The remaining 72% of vessels are under the national scheme, which includes national vessels, but also vessels from the Chinese-based FuZhou HongDong and Poly HongDong company, and chartered Turkish and Senegalese vessels (Fisheries Transparency Initiative 2021, 2022b).

Since the first bilateral agreement for Chinese vessels to fish in Mauritanian waters in 1991, the Chinese distant water fleet has been a major player in Mauritania’s fisheries sector. In 2012, Mauritania was one of the many African countries that signed the “China-Africa Fishery Union”. Under the union, the Chinese party provided loans to joint ventures for fishing vessel and the African party provided fishing licences (Chinafrica 2012). The loans for the vessels were then repaid in instalments by the joint venture company (Chinafrica 2012).

The relations between the two countries were deepened in 2018, when the Chinese government signed an agreement with Mauritania to supply a loan for the construction of a fishing port in the capital (Embassy of the People’s Republic of China in the Islamic republic of Mauritania 2018). This was also the year that Mauritania became part of China’s BRI (Sacks 2021). In 2020, China also provided
Mauritania with a low-interest loan of $87 million USD for the construction of a new fishing harbour north of the capital, Nouakchott, that is capable of offloading 400,000 t of fish per year (NBSCXH 2020).

As made public by the disclosed agreement from FiTI, the agreement between FuZhou HongDong and the Mauritanian government signed in 2010 is a 50-year agreement. The agreement allows vessels from the company to catch over 100,000 t of fish per year in Mauritanian waters. Up till 2017, the company invested over $200M USD in total in the agreement, constructing ports, fishing vessels, and processing plants in the country, creating over 1500 employment opportunities (Foodex 2019). By 2020, the company had a fishery base that spanned over 90 thousand square feet and 169 fishing vessels given fishing licences from the Mauritanian government, producing over $70M USD per year in fishery products, making it the largest fisheries company in the country (NBSCXH 2020).

Similar to FuZhou Hong Dong, another Chinese company, Poly-HonDong Pelagic Fishery also has a 25-year agreement with the Mauritanian government that was signed in 2010 (FiTI Mauritania 2022, Le Ministère des Pêches et de L'Économie Maritime de La République Islamique de Mauritanie 2016). Through the agreement, the company was spared from all import customs and exempt from paying taxes on profits for the first 5 years (Prieur 2011). Furthermore, Poly HonDong was allowed to deploy 100 vessels in Mauritanian waters, with 80 vessels being owned and operated by the Chinese operators and 20 vessels being built for, and to be operated by, Mauritanian fishers.

However, within the agreement there was also a clause stating that if the Mauritanian fishers were not able to utilise the 20 vessels, the quota and operation of those vessels would be transferred to the Chinese vessels. As the local interest in the fisheries sector is low in Mauritania, this effectively means that Chinese companies have access to 100 vessels instead of the original 80 vessels. In return, the company invested $100M USD in 2010 to construct ports, fishing vessels, and processing plants in Nouakchott, creating 2000 employment opportunities (Embassy of the People’s Republic of China in the Islamic republic of Mauritania 2010). Starting in 2016, another subsidiary of the same company group, Poly Technologies Inc, began the construction of the multi-functional port of N’Diago that was estimated to cost $325M USD (NBSCXH 2020, Mulyungi 2021). It is the largest project China has in Mauritania, and upon completion the port serves as a commercial quay, fishing port, naval base, and ship yard. (NBSCXH 2020). This heavy involvement of China in Mauritania fisheries operations is not unique to China. The EU co-financed 20% of the construction and equipment of the fishing port of Nouadhibou through sectoral support funds (Defaux 2019). Germany, Japan, African Development Bank, and the World Bank has also provided financial aid for the construction or expansion of fishing ports (see Table 4).

2.3. Mauritius

In the past decade, Mauritius has had bilateral agreements with Seychelles, the Federation of Japan Tuna Fisheries Co-operative Associations (FJTFCA), and the European Commission. Outside of these agreements, vessels from Taiwan, China, Korea, Malaysia and Oman purchase their fishing licences directly from the licensing division of the Fisheries Division of Mauritius (Ministry of Agro-Industry and Fisheries 2012, 2013; Ministry of Ocean Economy, Marine Resource, Fisheries and Shipping 2018, 2019; Ministry of Blue Economy, Marine Resource, Fisheries and Shipping 2020). Overall, the majority of foreign licences are issued to European vessels (Ministry of Agro-Industry and Fisheries 2013). The revenue generated from fishing licence sales averages $1.5 million USD per year, making it around 70% of the total income of the Ministry. (Ministry of Ocean Economy, Marine Resource, Fisheries and Shipping 2017, 2018, 2019, 2020).

China currently does not have any bilateral access agreements with Mauritius. Instead, Chinese vessels purchase their fishing licences directly from the licensing division of Mauritius. Prior to 2012, the
Mauritius government published detailed breakdowns on how many fishing licences were issued to each foreign country without an annual fishing agreement. From those reports we can see that, on average, 70% of the foreign fishing licences that Mauritius issues for foreign vessels without fisheries agreements is actually to Taiwan-owned vessels from 2003-2011. In contrast, only 2-3 vessels owned by the People’s Republic of China obtained annual fishing licences from Mauritius (Ministry of Agro-Industry and Fisheries 2004, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013). Although it is not clear how that licence number has changed since 2012, in 2019 a free trade agreement was signed between Mauritius and China to deepen the relations between their countries (Mauritius Chamber of Commerce and Industry 2019). Within the agreement, enhancing cooperation in the fisheries sector between the two countries was one of the areas of focus. The agreement mentions that the cooperation was to be done not only through trade and investments in the ocean economy, but also through capacity building for fisheries and aquaculture development, fish stock assessment, fisheries management, and policy planning. While the agreement does not outline what specific actions will be taken, the areas of focus overlap a lot with the other fisheries-related agreements that Mauritius has with New Zealand, Australia, and the EU (See Annex 3).

2.4. Madagascar

In Madagascar, joint ventures and bilateral agreements, other than the SFPA with the European Commission, are also not published and lack transparency. There is a local industry group, Groupement des Aquaculteurs et Pêcheurs de Crevettes à Madagascar (GAPCM), that is made up of multiple joint venture fisheries companies backed by majority French investors. The industry group also has involvements from the Malagasy government, European Union, and the French Ministry of Foreign Affairs. These companies hold the majority of inshore fishing permits from the Malagasy government and include the largest shrimp company in Madagascar (GAPCM 2022a, 2022b; Carver 2018a). However, the details on the agreements between the companies and the government is not publicly available.

In 2017, Madagascar joined China’s BRI and the two parties agreed to strengthen the fisheries industry relations between their countries (SSAP 2017). Chinese distant water vessels involvement in Madagascar waters happens through joint ventures (Gorez 2020, Carver 2021). For example, one of the companies in the GAPCM group, SOMPECHE, is partly owned by the state-owned Chinese distant water fisheries company, CNFC Overseas Fisheries. CNFC purchased 77% of the company in 2009 to gain the right to fish in the country (CNFC Overseas Fisheries 2014, Carver 2021). Most often, the details on what each of those agreements entails are not known to the public. However, even when they are public, it is apparent that their terms are not always in the best interest of the local fisheries sector – this despite the overall support China gives to the host country.

For example, the agreement the government of Madagascar granted to the joint venture company Côte d’Or only requires the company to pay a nominal annual fee. In return, the company gets access to fish resources that normally generate high fees through multi-species licences, causing the Madagascar government to lose out on significant revenue that it would have otherwise gained (Gorez 2020).

In 2018, the Malagasy president also signed a fishing access agreement with a Chinese distant water company to allow 330 vessels to fish in Madagascar over the course of ten years, in exchange for 27 billion USD (Carver 2018b). However, there were a lot of protests from local fishers and NGOs when the agreement was announced. The Malagasy president who signed the agreement finished his term of presidency two days after signing the agreement; there are no signs that this agreement have been fulfilled after it was signed (Gorez 2020).
On 28 October 2022, the EU and Madagascar agreed on the text of a new sustainable fisheries partnership agreement (SFPA), together with its implementing protocol, restoring their partnership interrupted in 2018.

2.5. Solomon Islands

The Solomon Islands have joined seven other Pacific Island countries in signing “The Parties to the Nauru Agreement”. Under this agreement, the eight countries have adopted the “Vessel Day Scheme” (VDS), which controls the number of fishing days fishing vessels can purchase from each of the eight countries per year (PNA 2022). In 2017, the Solomon Islands gained around USD 23.6 million from access fees (MFMR 2017). As of 2021, multiple entities, including Japan, South Korea, the Philippines, Taiwan, Vanuatu, Fiji, Kiribati and China, planned and/or signed agreements with the Solomon Islands (e.g., multilateral, bilateral, sub-pooling, FSMA, and the Tokelau arrangement) (WCPFC 2022).

Although the last active SFPA between the European Union and the Solomon Islands ended in 2015, the EU has been indirectly involved in the Solomon Islands’ fisheries through the joint venture of Soltai Fishing and Processing Ltd. since 2010. Tri Marine, a fishing company controlled by two Italian nationals gained majority share and control over Soltai (Hamilton et al. 2011).

Between the Solomon Islands and China, in 2019, the Chinese government announced that the Solomon Islands joined the BRI and the 21st Century Maritime Silk Road, and both countries agreed to strengthen cooperation in the fisheries sector (International investment and trading network 2019). However, details on how the two countries will cooperate under those two initiatives is unknown. In 2022, a maritime cooperation agreement draft between China and the Solomon Islands was leaked to the media (Packham 2022). According to the agreement, China committed to constructing a deep-sea fishing base and a “blue economy cooperation base”, as well as the construction of fishing vessels and vessel repairs facilities in the Solomon Islands. Although the draft of the agreement was not yet signed, the implications of the terms of the agreement raised concerns from the U.S. and Australia, as they are the current security services providers for the country, and there is growing suspicion about whether the infrastructure China committed to can be used for military use (Kapetas 2022).

2.6. Ecuador

In Ecuador, there are records of joint ventures between Chinese corporations with Ecuadorian companies since 2003 (Xue 2006). Normally, information on registered fishing vessels, companies, and fisheries personnel are published on the website of the Ecuadorian Government. However, which of these vessels or companies are actually in joint ventures with foreign companies is not known. In a recent joint venture between China Ocean Group and MERCOSUR, it was reported that the two companies were committed to the development of fisheries-related infrastructure and training programmes in Manta, off Ecuador, in exchange for China having 100 distant water vessels operate in Ecuadorian and Colombian waters (OFweek 2020). In a similar way, countries like Spain have also signed agreements with Ecuador to provide training and assistance to the Ecuador fishing sector in order to strengthen Ecuadorian fisheries products in the international market (El Universo 2017) as over 60% of the country’s tuna exports go to the EU market (Feijóo 2021). However, whether these agreements are also tied to fishing access agreements is not known, as the EU currently does not have any SFPAs with Ecuador in place, and there are also no private agreements that are publicly known.

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8 https://www.pnatuna.com/content/pna-vessel-day-scheme
In the past five years, China has surpassed the EU in becoming the major export destination for Ecuadorian fisheries products (Bello 2021). Not only has Ecuador joined China’s BRI, but in the beginning of 2022, the government of China and Ecuador released a joint statement to commit to deepening the partnership between the two countries in trade and economics (XinHua News Agency 2022). Both parties agreed on deepening their partnership in the fishing industry by increasing communication in the area to promote proper fisheries management practices. However, concrete details on how those terms are to be realized in actuality are not available.
3. **CHINA’S SUBSIDIES FOR ITS FISHING SECTOR**

**KEY FINDINGS**

- China provides $2.4 billion annually to its distant water fleets operating in the Exclusive Economic Zones of other countries, and $68 million to its distant water fleets operating in the high seas.
- Harmful subsidies provided by China to its DWFs are concentrated on those operating along the coast of African countries (22 EEZs; amounting to an annual average income of $240 million US).
- China also provided beneficial subsidies worth $604 million in 2019 (or 15% of the total).
- Chinese government subsidies decreased by about 26% from 2014 to 2019, or an annual decline of 5.2%.
- The subsidy database did not have data for four of the six focus countries, suggesting that either the subsidies database is incomplete, and/or that these countries provide negligible subsidies to their fisheries.
- Results suggest that transparency is an issue not only regarding the deployment of fleets and their catches, but also regarding subsidies.

This section includes a description of China’s subsidies for its fishing sector (see also discussion in section 7.3).

The fisheries subsidies database of Sumaila et al. (2019b) contains information on harmful subsidies provided by the Chinese Government for its domestic and distant water fleets (DWF) operating in the Exclusive Economic Zones (EEZ) of 39 countries, and those operating in the high seas, for the period 2014-2019. Note that Pauly et al. (2014) reported that Chinese vessels operated in the EEZ of over 90 countries for the period 2000-2011. Thus, the database of Sumaila et al. (2019b) contains subsidies information for nearly half of the countries where Chinese vessels previously operated, or still do.

Three types of subsidies can be differentiated: 1) beneficial subsidies, such as the cost of ensuring safety at sea or managing fisheries; 2) harmful subsidies, which increase fishing capacity by reducing the cost of fishing operations, e.g., by providing cheaper fuel or tax-free import of spare parts, or reducing interest of bank loans for purchasing new vessels; and 3) ambiguous subsidies, whose impact on fishing capacity cannot be easily assessed prior to them being provided, e.g., vessel buy-backs, which can provide the funds for the down payment on new vessels or for fishers’ retirement.

This dataset suggests that harmful subsidies provided by China to its DWFs (see Figure 8) are concentrated on the Chinese fleets operating along the coast of African countries (22 EEZs; amounting to an annual average income of $240 million US). These data also suggest that the largest harmful subsidies (amounting to $1.8 billion US) provided by China to its DWFs are those that operate in six EEZs in Asia and Oceania. For instance, China has special agreements for exploiting shared stocks with North and South Korea and Japan (Pauly et al. 2014). Also, Chinese DWFs operating in the EEZ of four European countries (including Russia) are provided a total of $367 million US, while those operating in the seven EEZs in the Americas (in the USA and six South America countries, including Peru which
receives the highest subsidies in the region) received the equivalent of $29.5 million US of harmful subsidies from the Chinese Government.

Altogether, China provides its fleets a total of $5.9 billion US, with $3.4 billion (58% of the total) provided to fleets fishing within its own EEZ, $2.4 billion (41%) to distant water fleets operating in the EEZ of other countries and $68 million (1%) to distant water fleets operating in the high seas. OCEANA (2021) reports that China also provided beneficial subsidies worth $604 million in 2019 (or 15% of the total) and suggests a decline in Chinese government subsidies by about 26% from 2014 to 2019, or an annual decline of 5.2%.

Chinese DWFs operating in Africa received 4% of the total subsidies from their government, with the highest subsidies to DWFs operating in Namibia, Morocco, Guinea-Bissau, Angola, Côte d’Ivoire, and Guinea. Of the four focus countries in Africa, only two have data of Chinese DWFs operating in their EEZs in the subsidies database of Sumaila et al. (2019b). Chinese DWFs operating in Mauritania received $7.6 million US and those operating in Senegal received only about $3,000 US.

Given that the subsidy database did not have data for four of the six focus countries, this suggests that either the subsidies database is incomplete, and/or that these countries provide negligible subsidies to their fisheries. Also, and perhaps more importantly, the results suggest that transparency is an issue, not only regarding the deployment of fleets and their catches, but also regarding subsidies. The figure below, demonstrating harmful subsidies by continent and country obtained from Sumaila et al. (2019b), suggests that China provides large harmful subsidies to its fleets in Africa, the Russian Federation, Peru, Japan, and South Korea.

Figure 8: Harmful subsidies to the Chinese DWF by continent and country obtained

Source: Sumaila et al. (2019b).
4. **IUU FISHING PRACTICES**

**KEY FINDINGS**

- The unreported industrial catch of Chinese distant water fleets (DWF) subject to illicit trade is, on the average, 65% of the unreported DWF catch and 17% of the total DWF catch (1980-2019).
- The rate of increase in illicit trade volumes grew from about 9000 t·year⁻¹ in the 1980s to 15,568 t·year⁻¹ in the 2010s, or an average of about 18,000 t·year⁻¹ from 1980 to 2019.
- Greatest number of incidents were reported in Ecuador (35%), the Philippines (25%) and Mauritania (13%). Infractions reported in Senegal, Madagascar, Mauritius, and the Solomon Islands represent only about 2% of the incidents reported.
- Almost half (46%) of the incidents were committed by Chinese squid jiggers, 38% by longliners, 15% by purse seiners and the rest by trawlers.
- The switching off of AIS can be assumed to directly account for “going dark”. Lack of data on position of vessels are due to vessels ‘going dark’.
- Transhipment at sea from ‘catcher vessels’ to much bigger cargo vessels (‘reefers’) can hide the illegal origin of catches. Chinese DWFs mostly had encounters with variously-flagged reefers mostly in the high seas, i.e., most likely flags of convenience, with encounters dominated by Panama-, Liberia-, and Vanuatu-flagged reefers.
- Available databases suffer from opaqueness, i.e., unknown vessel names, origin or ownership. The implications of this opaqueness result in loss of income, notably in poor countries, e.g., $1.3 billion US is lost with 37% of the catch due to IUU fishing in West Africa.

This section describes IUU fishing practices (see also section 6.1.1 for a discussion of IUU fishing). The widespread term ‘IUU’ stands for ‘Illegal, Unreported and Unregulated’ fisheries catches and, by extension, to the fishing operations which generated these catches. Here, we argue that IUU catches can be broadly approximated by ‘illicit’ catches, linked to money, goods or value gained from illegal and generally unethical activity. Examples for various international fishing fleets are provided, with some emphasis on Chinese fishing operations.

Sumaila et al. (2020) report that the unreported industrial catch of Chinese distant water fleets (see Figure 1 for the catch data, and Annex 1 for the method) that may be subject to illicit trade is, on the average, 65% of the unreported DWF catch and 17% of the total DWF catch (1980-2019). The rate of increase in illicit trade volumes grew from about 9000 t·year⁻¹ in the 1980s to 15,568 t·year⁻¹ in the 2010s, or an average of about 18,000 t·year⁻¹ from 1980 to 2019.

According to a recent Special Report of the European Court of Auditors (ECA, 2022), the extent of illegal, unreported and unregulated fishing was estimated at 10 to 26 million tonnes worldwide in the early 2000s, i.e., 11 to 19% of reported catches, worth USD 10 to USD 23 billion (Agnew et al. 2009). It is worth mentioning that the same report considers: ‘that the control systems in place to combat illegal
fishing are partially effective; although they mitigate the risk, their effectiveness is reduced by the uneven application of checks and sanctions by Member States’.

Data gathered from 35 published sources (incidents committed by over 1100 vessels; see Figure 9 below), which suggest that illegal activities, often by industrial Chinese vessels (purse seiners, long-liners, trawlers and squid jiggers), can be categorised into the following types of incident (ordered from the most to the least records of incidents): infraction into an EEZ without licence or agreement, shark finning, harvest of protected species (e.g., seahorses), illegal transhipment, switching off of tracking systems, underreporting of vessel’s gross tonnage, labour abuse and slavery, use of fishing vessel to cover up for smuggling of regulated non-marine resources. EJF (2022) notes that the Chinese DWF’s main infractions are mostly (42% of 554 incidents) fishing without a licence/authorisation, followed by the use of illegal gear (11.5%) and catching of protected species (10.3%). The data we gathered here emulate EJF (2022)’s findings.

Figure 9 suggests that over 61% of these infractions by Chinese DWFs were observed or reported in the Pacific Ocean, with 26% reported in the Atlantic Ocean and over 8% in the Indian Ocean. The greatest numbers of incidents were reported in Ecuador (35%), followed by the Philippines (25%) and Mauritania (13%). Infractions reported in Senegal, Madagascar, Mauritius, and the Solomon Islands represent only about 2% of the incidents reported. Illegal fishing incidents might be more visible in Ecuador because of the issues with the Galapagos Islands large EEZ, and its supposed marine protected zones (see Arsenault and Le Billion 2022). Note that taken together, infractions in northwest Africa (from Mauritania to Nigeria) make up over 16%. The impact of illegal fishing is a big concern in this region because the local small pelagic fisheries (e.g., sardinella) market chain provides income to women fishmongers and the distribution of fish protein to inland communities (ADF, 2021; see also EJF, 2018). Thus, any disturbance to this status quo would be highly visible. The low number of incidents reported in the Indian Ocean, notably in the region around Madagascar and Mauritius, is doubtful. However, note that China signed a ‘secret’ 10-year right to fish in Madagascar in 2010 (see Mallory, 2013; White et al. 2022), which might have decreased the monitoring for IUU infractions by Chinese vessels; however, it would have been subject to scrutiny once it was revealed.

Figure 9 below presents distribution of vessels committing illegal, unreported and unregulated fishing activities, obtained from 50 references containing data on 1116 incidents worldwide. Note the prevalence of incidents in the high seas off Ecuador (Pacific Southeast) representing over 35% of all incidents. Other hotspots include the eastern seaboard of the Philippines (25%) and northwest Africa (13%).
This dataset also suggested that of the 135 incidents where the gear type was identified, almost half (46%) of the incidents were committed by Chinese squid jiggers, 38% by longliners, 15% by purse seiners and the rest by trawlers. Note that EJF (2022) explained that trawlers are the most common type of gears allowed in EEZ-specific offshore fishing projects, which might explain the small number of trawlers being reported committing IUU infractions. However, the recent development of the Chinese squid jigger fleet resulted in an increase in approved offshore fishery projects (see EJF 2022), that most likely also opened up the possibility of IUU infractions and thus the large portion of squid jiggers reported as IUU incidents.

The switching off of AIS data can be assumed to directly account for “going dark”. However, internet stability and other technological difficulties might also cause AIS switch off as discussed in Fujita et al. (2018), Ferra et al. (2020), Brousseau (2021), Emmens et al. (2021), Arsenault and Le Billon (2022). Thus, databases like the GFW, whose data are being used for analyses like those done in this study, would need to assure users that such issues have been addressed in the datasets that they provide to the wider public.

Transhipment at sea from ‘catcher vessels’ to much bigger cargo vessels (‘reefers’) can hide the illegal origin of catches. Miller et al. (2018) identified 694 reefers from AIS data (2012-2017) from Kroodsma et al. (2018) that were capable of transhipment activities. They report that 45% of these vessels are operated by their beneficial owners and that 47% of the activities occurred in the high seas. Russia- and USA-flagged fishing vessels mostly transhipped with Russia- and USA-flagged reefers inside their EEZs. On the other hand, China-, Taiwan-, South Korea- and Japan-flagged fishing vessels mostly had encounters with variously-flagged reefers mostly in the high seas, i.e., most likely flags of convenience, with encounters dominated by Panama-, Liberia-, and Vanuatu-flagged reefers.

Note that five of the six focus countries of this study (the Solomon Islands being the exception) are signatories of the Port State Measures Agreement (PSMA; FAO 2016). The PSMA is the “first binding
international agreement that specifically targets illegal, unreported and unregulated (IUU) fishing.” The minimum set of standard measures meant to be applied when vessels enter a country’s port or when a vessel is at port were drawn up in 2005 and approved during the 36th session of the FAO Conference of the Parties held on November 22 2009. The FAO then developed the Port State Measures Support Programme, designed to help countries to build the capacity to comply with the PSMA. Annex 3 lists five projects in which five focus countries studied here are involved. These projects provide a total of $14.6 million USD (Annex 3) to help build capacity in these countries. Four of these projects are current and are expected to boost awareness and advocacy about IUU fishing and improve mitigation of dark fleets (Cutlip 2016; Fujita et al. 2018; Valentine 2021). It is thus important to continue monitoring IUU incidents being committed (and repeatedly committed) within the EEZs of these countries.

Although Chinese-flagged vessels seem to be responsible for a large number of dark fleets (see Valentine 2021), European fleets are also going dark, as reported in Godfrey (2021), Heubl (2021), and Anon (2022a).

FAO’s Global Record of Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels provides a list of vessels committing IUU-related activities reported by 12 regional fisheries bodies (RFB; see Annex 5). This list contains 516 sightings of 204 vessels from 2003-2022 with 27% of sightings from ICCAT, 19% from the CCAMLR RFB, 15% from IOTC, 14% from GFCM, the rest from six other RFBs. Missing information on vessel flag and ownership were obtained from FleetMon for sightings that only had IMO data or vessel name. Only the records with matching IMO number and vessel name or records with a single vessel name match were integrated into the analysis. Most of these sightings (276) did not record flag information and only 114 of these recorded IMO data. More than half (279) of these did not record ownership information; only 61 of these recorded IMO data. Only nine of the 204 vessels are recorded to fly the Chinese flag, and none of these have IMO nor ownership information. Of those 204 vessels, 48 are assumed to be of the Chinese flag, but only three of these have IMO data and 34 have no ownership data. Those with ownership data (13 vessels) suggest nine owners, one of which, the Belfast Global SA, is registered in Panama, i.e., the top reefer flag operating in the high seas (see Miller et al. 2018).

Note that although China participates in eight RFMOs (as opposed to the EU’s participation in 18; see Gutierrez et al. 2020), the prevalence of IUU fishing by Chinese-flagged and owned vessels remains in the dark. As the FAO’s disclaimer notes, the data from these RFMO websites is provided by the FAO on an ‘as is’ basis, and is full of inconsistencies. The lack of flag, ownership and IMO information prevents proper use of this dataset. For this dataset to be of value, more research on the vessel names will need to be done, but that is a daunting and tedious task that might need more resources, other than access to the Internet. Such datasets suggest the difficulty in unmasking IUU incidents, and the absence of flags and ownership data show the opaqueness of such lists and implies that a large percentage of IUU incidents may still go unrecorded. The implications of this opaqueness result in loss of income, notably in poor countries, e.g., $1.3 billion US is lost with 37% of the catch due to IUU fishing in West Africa (Global Initiative Against Transnational Organized Crime 2015).
5. **EU-CHINA COOPERATION**

### KEY FINDINGS

- EU-China cooperation at bilateral level has advanced considerably in the past few years, partly due to the establishment and the political visibility of the Blue Partnership for the Oceans.
- The Blue Partnership for the Oceans has opened the path for cooperation and dialogue, and encourages the EU and China to cooperate on the Regional Fisheries Management Organisations (RFMOs) to promote better governance.
- The conflicting geopolitical agenda on the overfishing problem of South China Sea and the blocking of additional Maritime Protected Areas (MPAs) is slowing the effective progress of the cooperation between the EU and China.
- Individual agreements between China and some EU Member States might jeopardise the role of the EU’s central institutions in the cooperation with China.
- Chinese activities in the Arctic are another important component in global ocean governance, and both the EU and China were signatories of the Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean (CAOFA).
- At the global level, significant progress in ocean sustainability cooperation was demonstrated with the June 2022 WTO Agreement on Fisheries Subsidies.

This section was prepared based on desk research. The section presents an overview of the EU-China cooperation in fisheries at bilateral level, more specifically of the Blue Partnership for the Oceans; the cooperation at regional level, through the Regional Fisheries Management Organisations (RFMOs); and at global level, via the cooperation with the Food and Agriculture Organisation of the UN (FAO).

5.1. **Bilateral Level**

On the occasion of the 20th EU-China Summit celebrated in Beijing on 16 July 2018, the EU signed a unique partnership agreement with China (named the 'Blue Partnership for the Oceans: Towards Better Ocean Governance'). It was the first cooperation partnership of its kind between both sides. In the partnership, the two sides commit to protecting the marine environment and to coordinating actions and policies to achieve the protection of the oceans. In the declaration on the establishment of the Blue Partnership for the Oceans, the EU and China acknowledge their important role on the promotion of sustainable development and global ocean governance; and their cooperation on ocean affairs through several instruments such as the High-Level Dialogue on Law of the Sea and Polar Affairs, the High Level Dialogue on Fisheries, and the meetings of the EU-China Working Group on IUU fishing.

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16 Meetings held in 2016 and 2017.
Both sides ‘agreed on a Blue Partnership for the Oceans as a means to improve cooperation aiming at better ocean governance, sustainable fisheries, and a thriving maritime economy between the EU and China. Both sides also reaffirmed their commitment to fight against illegal, unreported and unregulated ( IUU) fishing, and their shared interest in dialogue on matters related to the Law of the Sea and polar affairs.’

The idea of the Blue Partnership originated from the Blue Growth agenda published by the European Commission in 2012. Given the considerable increase of technological resources developed in recent years to work offshore in ever-deeper waters; the awareness of the limitation of the marine resources; and the need to improve the energy efficiency of ships to reduce greenhouse gas emissions, the EU considered that there was an opportunity for blue growth, by controlling the potential of European waters. Blue Growth is intrinsically related to the concept of ‘blue economy’, that should focus on ‘improving human well-being and social equity, while significantly reducing environmental risks and ecological scarcities’ (UNEP, 2013 cited at Pauly, 2018). This concept should be present in all economic activities related to the oceans, coastal and marine resources (Ebarvia, 2016 as cited in Raftopoulos and Nissen, 2021) such that the blue economy should be sustainable and more locally-based (Pauly, 2018).

Besides, growth in the blue economy can contribute to EU’s international competitiveness, resource efficiency, job creation and new sources of growth whilst safeguarding biodiversity and protecting the marine environment, this preserving the services that healthy and resilient marine and coastal ecosystems provide (European Commission, 2012).

The following table summarises the main objectives and areas of cooperation and arrangements between the EU and China.

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Table 1: EU-China cooperation at bilateral level

<table>
<thead>
<tr>
<th>Date in EU-China Blue Partnership for the Oceans</th>
<th>Date</th>
<th>Goals/Objectives</th>
<th>Areas of cooperation</th>
<th>Arrangements</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.07.2018</td>
<td>16.07.2018</td>
<td>Enhanced cooperation</td>
<td>Ocean governance: conservation and sustainable use of marine biodiversity in the high seas, conservation of marine living resources in Antarctica</td>
<td>• Focal points (ensure coordination and involvement)</td>
</tr>
<tr>
<td></td>
<td>16.07.2018</td>
<td>Maintain, strengthen, create ocean governance mechanism and structures to promote clean oceans and sustainable investing climate</td>
<td>Blue economy</td>
<td>• High Level Dialogues (coordinating mechanism)</td>
</tr>
<tr>
<td></td>
<td>16.07.2018</td>
<td>Enhance technical cooperation (exchange of information and views on policy, initiatives)</td>
<td>Fisheries issues: fisheries governance and the prevention of IUU fishing</td>
<td>• Partnership Forum (held on occasion of High-Level Dialogues and assemble representatives from both Sides)</td>
</tr>
<tr>
<td></td>
<td>16.07.2018</td>
<td>Increase coherence and efficiency, quality, and impact of activities</td>
<td>Cross-cutting tools to promote the partnership</td>
<td>• Possibility of ad-hoc working groups</td>
</tr>
<tr>
<td></td>
<td>16.07.2018</td>
<td>Promote the circular economy within the blue economy (via clean technologies and best practices)</td>
<td>Marine pollution (including marine plastic litter and microplastics)</td>
<td>• Consulting/Informing on areas of mutual interest</td>
</tr>
<tr>
<td></td>
<td>16.07.2018</td>
<td>• Mitigation of and adaptation to climate change impacts on the oceans (including the Arctic Ocean)</td>
<td>Mitigation of and adaptation to climate change impacts on the oceans (including the Arctic Ocean)</td>
<td>• Communication measures on Partnership visibility, objectives, and principles</td>
</tr>
<tr>
<td></td>
<td>16.07.2018</td>
<td>• Efforts for increasing ocean literacy, observation, and open science and data</td>
<td>Efforts for increasing ocean literacy, observation, and open science and data</td>
<td>• Underline commitment to the Paris Agreement goals and progressing work in the International Maritime Organization (IMO) towards implementation of the IMO strategy for reduction of greenhouse gases (GHGs) from ships</td>
</tr>
</tbody>
</table>

First Blue Partnership Forum for the Oceans 05.09.2019

• Improve international ocean governance
• Implement Ocean Partnership established in 2018
• Achieve 2030 Agenda for Sustainable Development

• Blue Economy Finance Initiative and Principles
• Reinforce implementation of existing legal framework (ratification of the Port State Measures Agreement), enhancing RFMO performance, strengthening fight against IUU fishing and strengthening fisheries data transparency
• Planning of marine protected areas and advancement of global maritime spatial planning; EU proposal to create two marine protected areas in the Southern Ocean

To promote the EU’s environmental agenda and goals, particularly those aligned with marine conservation and sustainable use and the strengthening of global partnerships, the **16 Blue Partnership Principles** were established to align with the “blue” outcomes of joint marine conservation, scientific marine development, enhanced marine wellbeing, blue prosperity, and the construction of a world-wide “blue homeland” (“16 Principles for Blue Partnership”)\(^20\). The titles, measures, and objectives of the Blue Partnership Principles are presented in Annex 6.

Since signing the partnership agreement, both the **Chinese and the EU administrations have developed joint actions for implementing the Blue Partnership for the Oceans**.

Prominent actions on behalf of the EU and China include the initiation of two collaborative projects with the goal of developing a closer relationship regarding marine data. Both projects were launched in February 2020 with scheduled duration periods of 30 months.

The first project, European Marine Observation and Data Network (EMODnet) Partnership for China and Europe (**EMOD-PACE**)\(^21\) is funded under the EU Partnership Instrument (‘Strengthening international ocean data through the EU’s ocean diplomacy with China’)\(^22\). The goal of the project through, among other initiatives, the fostering of a close working relationship between the National Marine Data and Information Service of China (NMDIS) and the European Marine Observation Data Network (EMODnet), is to increase knowledge of the oceans and provide high quality marine data and data products globally in contribution to overarching marine environmental protection and sustainability objectives.

The second collaborative project, China-EU Marine Data Network Partnership (**CEMDnet**)\(^23\) was also developed with the expectation of positive contributions to the China-EU Blue Partnership for the Oceans. As a response to the EU-initiated EMOD-PACE project, the NMDIS initiated their own partnership to encourage marine data interoperability by connecting the EMODnet and NMDIS data-sharing platforms.

Furthermore, in January 2021, the EMODnet and the NMDIS signed a **Memorandum of Understanding (MoU) agreement**\(^24\) to continue the enhancement of EU-China cooperation on marine data and knowledge-sharing. The agreement outlined cooperation in the areas of specific types of data, knowledge and best practice exchanges, and common work plan development and implementation targeting issues such as ocean reanalysis, seabed habitat mapping, ecological vulnerability and coastal zone adaptation.

Moreover, China has also continued making efforts on the line established at the Blue Partnership for the Ocean by signing **bilateral Blue Partnership agreements with several countries**, including the Seychelles and Mozambique, **and EU Member States**, such as Portugal.\(^25\) China considers Portugal as a key stakeholder due to the role of Portugal in connecting maritime and road corridors, and has strongly invested in land and maritime infrastructures. However, as mentioned in the EP Study on the Role of China in World Fisheries (EP, 2012), the negotiation and content of some agreements seems not to be totally transparent (e.g., it is very difficult to find copies of the above-mentioned bilateral agreements). Besides, the signature of bilateral agreements with individual Member States, such as Portugal, might jeopardise

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\(^{22}\) EuropeAid/139904/DH/SE/R/CN

\(^{23}\) [http://www.cmoc-china.cn/pages/detail.html](http://www.cmoc-china.cn/pages/detail.html)


the role of the EU central institutions in the negotiations with China (Di Donato, 2020, as cited in Raftopoulos and Nissen, 2021).

Furthermore, despite the cooperation of both actors in the environmental questions, some geopolitical conflicts have also arisen, such as the overfishing problem in the South China Sea and the Chinese blockage to creating additional Marine Protected Areas (MPAs) in the Southern Ocean (Raftopoulos and Nissen, 2021).26

It is also important to consider the perspectives of China and the EU towards the Blue Economy itself. While the European Commission outlines the Blue Economy as “all industries and sectors related to oceans, seas and coasts” with a heavy emphasis on environmental sustainability,27 China’s perception can be viewed as somewhat differing to that of the EU because of the strong role of the Chinese state in guiding its economic policy. In an analysis of recent Chinese state discourse, scholars highlighted the link in China of the Blue Economy concept to that of “a state-centric vision of modernisation”28. The idea of economic nationalism (in which national power is tied to economic power) is considered to be encompassed within the Chinese Blue Economy goals since the discourse surrounding the Blue Economy is indicative of the ambitions of the Chinese state. In a 2019 policy brief by Premier Li Keqiang, Chinese state perspective of the Blue Economy was conveyed through the description of China’s desire to “vigorously develop the blue economy, protect the ocean environment, and construct a maritime power” (Li, 2019). In this statement, the concept of national maritime power is presented alongside the Blue Economy and ocean environmental protection goals. Concerns for the EU interests in this differing conception include the potential subordination of environmental sustainability initiatives, as well as challenges in prioritising damage incurred by industrial fishing and the marginalisation of weaker stakeholders due to the fact that “with the interweaving of ecological sustainability and economic growth, the [Chinese] economy still takes priority and is always entwined with the vision of a strong state and party” (Fabinyi et al, 2021).29

5.2. **Regional Level**

At regional level and global level, the Blue Partnership for the Oceans also encourages both the EU and China to cooperate in global and international fora. Hence, the Declaration of Establishment of the Partnership includes amongst the areas of cooperation for the EU and China to dialogue and cooperate in the areas of ocean governance, blue economy, fisheries and cross-cutting tools to promote partnership. More precisely, the Declaration states that the EU and China should focus on the ‘coordination and cooperation in Regional Fisheries Management Organisations (RFMOs) to which both sides are Parties to promote better governance, science, compliance and science-based fisheries management’ and on ‘promoting the initiatives of the FAO and of relevant RFMOs aiming at fighting IUU fishing activities and exchanging information relating to fishing vessels suspected of such activities and conducting necessary follow-up cooperation (…)’ (European Commission, 2019 p.5).

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28 https://journals.sagepub.com/doi/10.1177/1070496521995872
The following table presents the RFMOs in which both the EU and China are members and summarises the main objectives and areas of cooperation. 

**Table 2: RMFOs in which both China and the EU are members** (based upon the EC’s Regional fisheries management organisations)

<table>
<thead>
<tr>
<th>Year</th>
<th>Year</th>
<th>Members</th>
<th>Objectives</th>
<th>Areas of cooperation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1966</td>
<td>1966</td>
<td>International Commission for the Conservation of Atlantic Tunas (ICCAT)</td>
<td>• Cooperate in maintaining the populations of tuna and tuna-like fishes found in the Atlantic Ocean at levels which permit the maximum sustainable catch for food and other purposes</td>
<td>• Co-operation with the FAO of the UN and other Specialised Agencies  • Cooperation with other international fisheries commissions and scientific organizations  • Cooperation with appropriate international organisations and any Government member of the UN</td>
</tr>
<tr>
<td>1982</td>
<td>1982</td>
<td>Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)</td>
<td>• Combat illegal, unreported, and unregulated (IUU) fishing  • Establish Marine Protected Areas (MPAs) in the Southern Ocean  • Reduce seabird mortality  • Establishment/Conduct of the CCAMLR Ecosystem Monitoring Program (CEMP)  • Management of Vulnerable Marine Ecosystems (VMEs)  • Co-operative work with intergovernmental and non-governmental organisations (such as the Scientific Committee on Antarctic Research, the Scientific Committee on Oceanic Research, and the International Whaling Commission)  • Co-operation with the Antarctic Treaty Consultative Parties  • Co-operation with the FAO of the UN and other Specialised Agencies</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>2009</td>
<td>South Pacific Regional Fisheries Management Organisation (SPRFMO)</td>
<td>• Conservation and management of living resources in the high seas areas of the South Pacific  • Cooperation with inter-governmental organisations and NGOs (participation in SPRFMO Commission meetings, observer status granted to 17 NGOs)  • Adoption of new or revision of existing SPRFMO Conservation Management Measures (CMMs) that form regulatory framework for the SPRFMO fisheries; currently 23 CMMs in place (concerning issues such as technical measures, data collection requirements and</td>
<td></td>
</tr>
</tbody>
</table>
### Inter-American Tropical Tuna Commission (IATTC)

- **Year:** 1949 (initial Convention replaced by the Antigua Convention entered into force in 2010)
- **Parties:** 19 states + EU: Belize, Canada, China, Colombia, Costa Rica, Ecuador, El Salvador, EU, France, Guatemala, Japan, Kiribati, Korea, Mexico, Nicaragua, Panama, Peru, USA, Vanuatu, Venezuela
- **Objectives:**
  - Ensure the long-term conservation and sustainable use of the fish stocks of tuna and tuna-like species, associated species and their ecosystems throughout the Eastern Pacific Ocean (from Canada to Chile).

### Southern Indian Ocean Fisheries Agreement (SIOFA)

- **Year:** 2012
- **Parties:** 9 states + EU: Australia, China, the Cook Islands, EU, France, Japan, Republic of Korea, Mauritius, the Seychelles, Thailand
- **Objectives:**
  - Long-term conservation and sustainable use of the fishery resources in the Southern Indian Ocean
  - Promotion of sustainable fishery development
  - Account for the needs of developing States (particularly the least developed and small-island developing States) among the Contracting Parties

### Indian Ocean Tuna Commission (IOTC)

- **Year:** 1996
- **Parties:** 33 states + EU: Australia, Bangladesh, Belize, China, Comoros, Eritrea, EU, France, Guinea, India, Indonesia, Iran Japan, Kenya, Korea, Madagascar, Malaysia, Maldives, Mauritius, Mozambique, Oman, Pakistan, Philippines, Seychelles, Sierra Leone, Somalia, South Africa, Sri Lanka, Sudan, Tanzania, Thailand, UK, Yemen
- **Objectives:**
  - Ensure conservation and optimum utilisation of stocks (as covered by the organisation’s establishing Agreement)
  - Foster the sustainable development of fisheries

- **Co-operation:**
  - Co-operation with subregional, regional, and global fishery organisations and arrangements.
  - Co-operation with the WCPFC in overlapping areas.
  - Establishment of Non-Party Cooperating members in 2003 (Bolivia, Chile, Honduras, Indonesia, Liberia).
  - Direct co-operation for the States or through an international organisation.
  - Co-operation with Non-Members of the IATTC in meetings of the Commission as Observers.

- **Monitoring:**
  - Establishment of a Scientific Committee that serves as an advisory body to meetings, promotes cooperation in scientific research regarding fishery resources and impact on the marine environment and produces data and recommendation
  - Management work (such as through CMMs, Interim Bottom Fishing Measures, submission by Contracting Parties of a Bottom Fishing Impact Assessment for individual bottom fishing activities, management of demersal stocks)
  - Monitoring, control, and surveillance (register of ports, records of authorised vessels, high seas boarding and inspections procedures)
  - Compliance Monitoring Scheme adopted in 2018 to produce yearly assessment of compliance level in regard to SIOFA obligations
- Address management problems in high seas fisheries (unregulated fishing, over-capitalisation, excessive fleet capacity, vessel re-flagging to escape controls, insufficiently selective gear, unreliable databases, insufficient multilateral cooperation)
- Recognise special requirements of developing States
- Cooperation with other RFMOs
- Follow-up with guidelines of the Convention for the Conservation and Management of High Migratory Fish Stocks in the Western and Central Pacific Ocean (WCPF convention)

The North Pacific Fisheries Commission (NPFC) 2015 9 states + EU: Canada, China, EU, Japan, Republic of Korea, Russian Federation, Chinese Taipei, USA, and Vanuatu
- "Ensure the long-term conservation and sustainable use of the fisheries resources in the Convention Area while protecting the marine ecosystems of the North Pacific Ocean in which these resources occur" 30
- Uphold the Convention on the Conservation and Management of the High Seas Fisheries Resources in the North-Pacific Ocean
- Fisheries for Bottom and Pelagic fish stocks

30 https://www.npfc.int/about_npfcc
Furthermore, another significant geographic region of ocean governance cooperation is the Arctic. Both the EU and China were among the signatories of the October 2018 Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean (CAOFA). The signatories are referred to as the “Arctic 5+5” as they include the five Arctic Ocean coastal states (Canada, Denmark, Norway, Russia, and the United States) as well as the group of China, the EU, Iceland, Japan, and South Korea. China was the last among the group to approve the CAOFA, with the Chinese government only approving the agreement nearly three years later in May 2021. The agreement focuses on the prevention of unregulated fishing in the high seas portion of the central Arctic Ocean (CAO). While it has been praised as “a milestone for the protection of Arctic environment under international law”, China’s geopolitical concerns, particularly tensions with the United States regarding Arctic policy, were factors in the delay of the agreement’s approval.

In further context to China’s presence among Agreement signatories, it is essential to highlight the increased Chinese presence and demonstrated interest in the Arctic region in recent years. China has worked to construct a “robust Arctic identity” despite its geographical distance from the region, and this identity has been used to justify its engagement in Arctic governance and diplomacy (Lanteigne, 2020). In its January 2018 Arctic strategy, China positioned itself as a ‘near-Arctic’ state and even laid out a ‘Polar Silk Road’ economic strategy in a clear indication of its goals to access Arctic resources and shipping routes (Lino, 2020). In consequence for EU Arctic policy, China has exploited differing attitudes among the EU Member States towards its Arctic ambitions. While Central and Eastern European countries are characterised as more open to Chinese economic investments, Member States such as Denmark have expressed concerns about China’s Polar Silk Road initiative and worked with the US to prevent Chinese purchase of an abandoned former naval base in Greenland (Lino, 2020).

5.3. **Global Level**

At **global level**, as already mentioned the Blue Partnership for the Oceans also promotes the FAO initiatives to fight IUU fishing activities, and the coordination and cooperation in global fora, such as the FAO.

Within the FAO, China cooperates with the FAO since resuming its status as a member nation in 1973, while the EU has served as an FAO member (as a regional economic integration organisation) and cooperation partner since 1991. The FAO’s fisheries and aquaculture division is organised beneath the principal authority of the Committee on Fisheries (COFI), which holds biennial sessions and contains the subsidiary bodies of the Sub-Committee on Aquaculture and the Sub-Committee on Fish Trade. Both China and the EU are among the COFI’s 126 members.

Moreover, “Blue Growth” – which has since been reformulated as ‘Blue Transformation’ is cited as one of the COFI’s central themes and cooperation in recent years has taken place beneath initiative such the Blue Ports initiative (BPI) that was developed to enable more positive city-port relations focusing on ‘better

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34 Lino, Marisa. (2020). Understanding China’s Arctic activities. IISS. Available at: https://www.iiss.org/blogs/analysis/2020/02/china-arctic
37 As noted in the 2022-2030 Blue Transformation Roadmap: https://knowledge4policy.ec.europa.eu/publication/blue-transformation-road-map-2022%e2%80%932030-vision-fao%e2%80%93work-aquatic-food-systems_en
production, better nutrition, better environment, and better life’ (FAO, 2022). The EU and China demonstrated involvement within these initiatives, with the first FAO Blue Ports workshop organised by the Port of Vigo, Spain in June 2019. The workshop included two members of the work team from China and two from the European Union, including one member from the European Commission.

Finally, another significant development at the global level of cooperation between the EU and China regarding ocean governance was the adoption of the Agreement on Fisheries Subsidies by the World Trade Organization on 17 June 2022. By prohibiting harmful fishery subsidies, the Agreement is an important achievement in combating the depletion of fishery stocks around the world. The Agreement also marks the “first Sustainable Development Goal (SDG) target to be fully met, [and] the first SDG target met through a multilateral agreement.” Although the Agreement has been adopted, it is still necessary for two-thirds of the WTO members to deposit their instruments of acceptance in order for implementation to be set in motion.

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40 https://www.wto.org/english/tratop_e/rulesneg_e/fish_e/fish_e.htm
41 https://www.wto.org/english/news_e/news22_e/fish_29sep22_e.htm
Table 3: EU-China cooperation with the Food and Agriculture Organization of the UN (FAO)

<table>
<thead>
<tr>
<th>Mentions of specific EU-China cooperation</th>
<th>Aquaculture and Fisheries</th>
</tr>
</thead>
</table>
| FAO in China lists the Delegation of the EU to China as one of their international cooperation partners | • Committee on Fisheries (COFI) with Sub-Committee on Aquaculture and Sub-Committee on Fish Trade; COFI holds biennial sessions  
• Examine major international fisheries and aquaculture problems  
• Issue periodic recommendations to governments, regional fishery bodies, NGOs, fish workers, FAO and international community  
• Supplement work of other organisations working in the field of fisheries and aquaculture  
• Sub-Committee on Aquaculture provides forum for consultation and discussion on aquaculture and holds advisory role to the COFI on technical and policy matters  
• Key areas of work of the FAO Fisheries and Aquaculture Division include capture fisheries, management and conservation, fisheries policies, utilisation, trade, market, knowledge/information, and information networks  
• Several international plans of action and programmes in different target work areas |
5.4. China’s fisheries-related agreements and projects

The number of agreements has increased over the last 20 years, with EU dominance evident in Mauritania, Senegal, Madagascar and Mauritius. This demonstrates the EU’s historic interest in the fisheries of these countries. On the other hand, China’s dominance in Ecuador and the Solomon Islands might be reflective of its increased interest in squid fisheries. A list of fisheries-related agreements signed between the six countries of focus and other countries, including the EU and China, is presented in Annex 7.

Figure 10 presents a schematic representation of the agreements made by Chinese companies including those operated by the Chinese government (red) and the EU (blue) with the six focus countries over time. Note the larger number of agreements notably in the last 20 years, and the EU’s dominance in Mauritania, Senegal, Madagascar and Mauritius, which demonstrates the EU’s historic interest in the fisheries of these countries. Note China’s dominance in Ecuador and the Solomon Islands, which might be reflective of its increased interest in squid fisheries. The figures in brackets represent the item number from Table 21 in Annex 7.

Figure 10: Representation of the agreements made by Chinese companies
Role and impact of China on world fisheries and aquaculture

Mauritania
- China Africa Fishery Union (54)
- Fujian Hong Kong agreement (52)
- Poly Hong Dong agreement (51)
- Ndiago fishing port (57)
- Fishing base agreement (61)
- Fisheries agreement revision (63)
- Joined BRI and Maritime Silk Road (65)
- Fishing port low-interest loan (71)

- First bilateral agreement (47)
- Spain bilateral access agreement (42)
- Germany security support (46)
- EU joint venture subsidy scheme (45)
- Netherlands and Spain cephalopod private agreement (48)

Mauritius
- Free Trade Agreement (85)
- Direct licensing (79)

- First SFPA (77)
- EU bilateral project (78)
- EU bilateral project (81)
- EU bilateral project (83)
- EU bilateral project (82)

Senegal
- License revoked (93)
- China joint ventures (103)
- License revoked (93)
- Joined BRI (114)
- Vessels registered (115)
- Direct licensing (119)

- First SFPA (87)
- EU joint venture subsidy scheme (90)
- EU bilateral project (91)
- EU bilateral project (92)
- Germany bilateral project (95)
- Italy bilateral project (96)
- Spain joint ventures (97)
- France joint ventures (100)
- Netherlands bilateral project (121)
- Italy bilateral project (109)
- EU SFPA (107)
- EU bilateral project (98)
- EU bilateral project (97)
- Greece joint ventures (102)
- Italy joint ventures (101)

Solomon Islands
- Bilateral access agreement (138)
- Joined BRI (136)
- Deep-sea fishing base agreement (139)

- EU SFPA (123)

Source: own elaboration
6. CONSEQUENCES OF THE CHINESE FISHING FLEET AND AQUACULTURE FOR THE EU

KEY FINDINGS

- Chinese subsidies for their distant water fleet lead to unfair competition.
- Overfishing results in environmental degradation and reduced resource availability, as well as socio-economic implications for local communities.
- The risk of overfishing is exacerbated by the lack of reliable data and transparency around the number of fish landed.
- Health concerns and food security issues over the aquaculture products may affect the supply of Chinese products to the EU. However, this might also increase opportunities for domestic aquaculture production.
- The Chinese increasing demand for high quality seafood reduces the sources of supply of the traditionally importing nations. However, it also increases the export opportunities of some products.
- The EU aquaculture sector, largely depending on fishmeal, has been impacted by the extremely high cost of fish feed.

This section presents an overview of the main impact of China’s fishing fleet and aquaculture sector for the EU. The section is organised in three sub-sections presenting the identified environmental (subsection 7.1), socioeconomic (7.2) and geopolitical consequences (7.3).

Assessing the environmental, socioeconomic and geopolitical consequences of China’s distant water fleet is a complex exercise made harder by the lack of transparency. However, what is certain is that China’s distant water fishing fleet is the world’s largest and operates globally (Environmental Justice Foundation, 2022). As one of the stakeholders involved in the preparation of this study (the Environmental Justice Foundation - EJF) pointed out, the role and impact of China really is quite widespread; EJF described China’s fishing activities as “in a whole different league” to the EU and other fishing nations in terms of scale (>4500 Chinese vessels versus >250 EU vessels) 42.

It is worth keeping in mind that — as has already been discussed throughout previous sections of this study, and in detail under the section on trade (1.3) — one of the largest impacts of the Chinese seafood sector on global fisheries resources in general is the huge demand for fishmeal in their aquaculture and even agriculture sectors. It is worth recalling, for example, that China imports 60% of its fishmeal from pelagic fisheries in South America. This has knock-on effects on a whole array of factors relevant to the discussion in this section.

There are also general themes that run throughout this section, such as the unfair competitive advantage and the lack of transparency and data reliability. This is further exacerbated by the extent of Chinese subsidies for their distant water fleet. Therefore, it is important to keep in mind for this section,

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42 Coalition for Fair Fisheries Arrangements. Fishing outside EU waters: https://www.cffacape.org/long-distance-fleet#:~:text=The%20EU%20%E2%80%9CLong%2DDistance%20fleet%20waters%2C%20but%20excluding%20the%20Mediterranean.
that the consequences of China’s activities are cumulative and add up to create an overall system that fosters and encourages so-called bad practices (e.g., no enforcement of monitoring or control, a lack of transparency, promoting harmful fisheries subsidies, etc.).

6.1. **Environmental consequences**

This sub-section presents an overview of the main consequences for the fishing fleet (7.1.1), e.g., the depletion of fisheries resources and environmental degradation; consequences of the IUU; and for the aquaculture (7.1.2), e.g., food security concerns.

6.1.1. **Fishing fleet**

**Depletion of fisheries resources and environmental degradation**

One of the main environmental consequences of the Chinese fishing fleet on the EU’s distant water fishing activities is undoubtedly the depletion of fisheries stocks which is associated with environmental degradation and results in reduced resource availability for all actors involved. As Mallory (2013) points out, “fisheries governance experts argue that fisheries access agreements on the whole have led to unsustainable use of fisheries resources and have negatively impacted the socioeconomic development of host countries”. In Africa, fishing by distant water fleets has led to a depletion of fisheries resources through overfishing, catch misreporting and transhipment at sea, fishing in illegal areas and the use of inappropriate methods or gear (Mallory, 2013). One of the stakeholders consulted during the preparation of this study (EJF) described the declines in fisheries productivity in some areas where Chinese fishing fleets have been involved as “catastrophic”. Perhaps the best case of overfishing and resource mismanagement is the stocks of *Sardinella* in Mauritania where the EU currently has an SFPA in place.

Bonfil *et al.* (1998) reported a reduction in the overall sustainability of small pelagic fish stocks in Namibia of around 20% as a result of distant water fleets fishing in this country. This would obviously apply to both the EU and the Chinese fishing fleets; however, the activities of the EU fishing fleet are arguably more transparent. The same phenomenon was found to apply to small pelagic fisheries in Mauritania, Senegal, Ecuador and Iceland (Bonfil *et al.*, 1998). Similarly, the European Fish Processors Association – European Federation of National Organisations of Importers and Exporters of Fish (AIPCE-CEP), consulted during the preparation of this study, expressed concern about Chinese longline vessels in the Atlantic and Pacific tuna fisheries tipping fishing effort over sustainable levels. This same sentiment was echoed in the findings by the Joint Scientific Committees in their reports on the SFPAs with Mauritania and Senegal. These reports express concern over the state of exploitation of small pelagic and demersal stocks. However, it is important to distinguish tuna stocks - which form the majority of what is targeted by the EU SFPAs - from other targeted fish stocks since they tend to be better managed through the various tuna commissions.

The risk of overfishing is exacerbated by the lack of reliable data and transparency around the numbers of fish landed (as alluded to in previous sections of this study). Furthermore, the key fish resources prone to or subject to overfishing are generally ones that do not receive much coverage or scientific monitoring by the authorities in question. Poor management is exacerbated in the case of countries with underdeveloped infrastructure where the national governments themselves struggle to manage the coastal environment without the involvement of local communities (see case study on Madagascar under Section 1.1).

Moreover, one of the interviewees consulted during the preparation of this study (EJF) described the downward pressure (“a race to the bottom”) exerted by the decline in fisheries resource resulting in
increased pressure on fishing vessel skippers to meet their quotas, which may be correlated with a violation of human rights abuses and other illegal practices.

It is also worth mentioning the role that such ecosystem degradation caused by destructive fishing practices plays in the fight against climate change. Benthic habitats are known to be important carbon sinks and bottom trawling can cause significant disruption to these habitats. Furthermore, China's actions in areas such as the South China Sea pose an obstacle to the EU's stated aim to protect marine biodiversity. For example, interventions to halt the establishment of marine protected areas under the guise of protecting the country's fishing rights (Raftopoulos & Nissen, 2021).

Illegal, Unregulated and Unreported (IUU) fishing

Above all else, illegal fishing undermines any form of good governance that the EU might hope to see introduced. A report released by the Environmental Justice Foundation in the beginning of 2022 on illegal fishing in China's fishing fleet highlights that illegal practices such as fishing without a permit, the use of prohibited gear, fishing for protected species, shark finning and not reporting catch, are 'not negligible' (EJF, 2022). This study also reported a 'high frequency' of human rights abuses. The report concludes that the Chinese government is failing to effectively regulate or control its distant water fleet. However, as will be discussed in Section 8, there are actions that the EU can take to encourage China down a more constructive path. In fact, there is evidence of this already, such as in the case of illegal fishing and the overexploitation of fish stocks in South China Sea where the EU has restricted access to its market to products emanating from illegal fishing activities (Grare, 2021).

The first victims of illegal fishing are the coastal communities that depend on these marine resources for their livelihoods and for food security. For the purposes of this section of the study, the main consequence of illegal fishing is the direct competition with legal fishing at all scales and along the entire supply chain. This represents a form of unfair competition for the EU and other relevant stakeholders. As mentioned in various sections of this study, the theme of unfair competition and lack of a level playing field is recurrent. The report by the EJF (2022) outlines several instances of Chinese industrial-scale fishing operations destroying the fishing gear of local and artisanal fishers. In addition, they document numerous examples of Chinese vessels operating in areas reserved for local small-scale fisheries. The consequence of this for the EU, as we will see in the subsequent sections, is that the host countries equate Chinese actions with EU ones and attribute a negative reputation despite the EU's efforts at holding their fleets to a high standard. However, a positive consequence of the aforementioned illegal fishing practices could be that the host country increases observation, monitoring, registration and quality control.

6.1.2. Aquaculture

As mentioned earlier in the study, China's marine aquaculture sector has witnessed rapid growth that has come with sizeable ecological costs likely to limit the sector's future growth (Cao, 2016). There are already numerous reports of organic and chemical pollution around China's coast leading to large-scale hypoxia events that have changed the composition of the region's fish fauna (Kang et al., 2021). Liu et al., (2022) warn that such pollution is likely to lead to tides of harmful algal blooms which, in turn, could lead to disease outbreaks and mass mortalities for aquaculture producers, thereby threatening China's aquaculture sector.

Although one might think that the EU may benefit from a decline in China's global dominance of the aquaculture sector, which would then create a more level playing field. However, it is important to remember that: (1) China is not only the largest aquaculture producer in the world, but the second and third largest (Indonesia and Vietnam) generate only 25% and 12% of China's output. Thus, a reduction
of the growth of Chinese aquaculture is unlikely to create a level playing field for the E.U, whose member countries collectively generate an aquaculture production equivalent to 2% of China’s. Also, as alluded to in Section 5 of this study, the EU imports around 70% of its fishery products, of which a substantial component is sourced from China. Thus, a decline of Chinese aquaculture production, by affecting China’s exports, would be likely to result in a net loss to the EU.

As the global aquaculture sector continues to grow rapidly, one of the major issues faced by Chinese aquaculture, as with most aquaculture producing nations, is the increase in the incidence of disease. The typical response to this problem is the use, and sometimes overuse, of antibiotics which has led to a serious health problem in the form of drug residues in aquatic products. This, in turn, has made it difficult for China to export their famed aquatic products. For example, in 2001, the German Consumer Protection Centre issued an alert to ban the import of prawns containing excessive chloramphenicol, which were primarily produced in China and India. A year later, the European Commission adopted a decision limiting imports of Chinese animal-derived products destined for human consumption or animal feed, due to excessive drug residues and microbial counts. This policy, which was applied to frozen shrimp, resulted in a loss of 600 million USD to the Chinese shrimp farming sector.

Despite this ban being lifted in 2004, the EU maintains strict restrictions on drug residues in various aquatic products (Ning et al., 2007). Regardless, the occurrence of health concerns in Chinese-produced aquaculture continues to crop up (Chen et al., 2017; 2022; Yang et al., 2019). Although this has negative consequences to the EU in terms of supply disruption (keeping in mind that the EU is a net importer of aquatic foods), it is also possible that the EU benefits from such a situation through increased opportunities for domestic aquaculture production.

The aforementioned issue of diverting potential food fish for humans into animal feed also represents a form of inefficiency in terms of protein use. This is a global problem affecting food security not only in the EU but around the world.

6.2. Socio-economic consequences

This sub-section presents an overview of the main consequences for the fishing fleet (7.2.1), e.g., the impact on local communities in host countries; the reduced access to resources; the unfair competition and the reduced availability of exported products. Moreover, this sub-section shows some of the consequences for the aquaculture sector (7.2.2), e.g., the impact on the fishmeal, on the EU caviar sector and on the Norwegian and Scottish salmon sectors.

6.2.1. Fishing fleet

Impacts on local fisheries in host countries

As highlighted in the report by Bonfil et al. (1998), the activities of distant water fleets such as the Chinese (and EU) one can reduce the potential earnings of local fisheries by up to 50%. Although this is not a direct impact on EU fishing activities per se, there are obvious knock-on implications since one of the key aims of the EU SFPAs with the third countries is to improve socioeconomic conditions on the ground.

Loss of access to resources

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One of the main socioeconomic consequences of the activities of the Chinese fishing fleet on the EU fishing fleet is denial of access to key resources in countries where both entities have fishing rights. To set the scene, firstly, China’s demand for fishery products continues to grow, both in terms of fish for human consumption and fish to be used for fishmeal (60% of global consumption). The inherent consequence of this relentless demand is the reduced availability of a fishery resource to other interested parties such as the EU. The competition for fishing grounds between the EU and China has undoubtedly increased over the past two decades (Grare, 2021). Belhabib et al., (2015) note that the volume of EU catches has declined in recent years whilst Chinese catches continue to increase. To put the significance of this fact in context, it is important to keep in mind that 25% of EU fish are caught in West Africa.

As outlined in Section 2 of this study, foreign distant water fleets typically gain access to fisheries resources in other countries’ EEZs in exchange for that country contributing financially or investing in infrastructure/training for the local fisheries sector. However, and in contrast to the EU fishing agreements which are publicly available, since these agreements (with the exception of EU SFPAs, which are publicly available) are seen as commercially sensitive, the details are not shared. Moreover, information on the licences granted is not available and, in some countries, corruption and illegal practices are alleged. This has led - for example in the case of Senegal, with which the EU has a fishing agreement - the government of the host country in question to unilaterally suspend licences issued to foreign vessels (including EU vessels). This effectively represents a denial of access to resources. Local artisanal fishers and non-governmental organisations that oppose EU SFPAs typically group the fishing fleets of other countries such as China with those of the EU and perhaps unfairly campaign against this. This is a direct consequence of multiple countries fishing in the same area (Mallory, 2013). There are also anecdotal reports of some distant water fishing nations using the ‘excuse’ of resource conservation in order to enhance their own competitiveness in fishing areas by excluding new countries (Mallory, 2013).

This aforementioned lack of transparency and the apparent willingness by the host country governments to maintain such unequal relationships has resulted in a difficult environment for EU fisheries negotiators. However, as Mallory (2013) points out, China risks losing permission from host countries if it does not abide by their laws and does not adopt a cooperative attitude on protecting fisheries resources. This could be advantageous to the EU fishing fleet in terms of increased fishing opportunities. As mentioned in previous sections, if the EU is perceived as a partner that operates in a more beneficial way to the host countries, the EU fleet could eventually gain the upper hand.

**Unfair competition and lack of level playing field**

As referred to in section 3, Chinese subsidies to their fishing fleet are likely greater than EU subsidies or other nations’ fisheries subsidies. This contributes to the scenario of the unlevel playing field which already exists between the EU and the Chinese fishing fleets. Interviewed stakeholders from the European Association of Fish Processors and Traders (EFFAT) expressed concerns about the lack of transparency around ‘unknown subsidies’ to all phases of fishing (i.e., including shipbuilding). They also mentioned the potential of human rights violation on board fishing fleets either directly or indirectly associated with China.

As pointed out by Les Pêcheurs de Bretagne at the EU’s Market Advisory Council (MAC) working group meeting in May 2022, there is a risk to European catch marketing where the same product is also marketed by China. Les Pêcheurs de Bretagne provide the example of cephalopod fisheries, where there is a lack of scientific advice on total catch allowances. In such an instance, the EU’s marketed catch needs to meet high social and environmental standards and as a result might receive a lower scoring under the sustainability criteria of the marketing standards framework than the Chinese production.
He urges the MAC to push for inclusion of social and economic criteria under the marketing standards framework.

**Availability of exported products**

### Whitefish

As discussed in section 1.3, another key implication of China’s fishing activities is related to the primary processing of fish fillets. China has been traditionally the key producer and exporter of fish raw material in the form of primary products. However, it has now expanded into secondary processing of a number of key species that are consumed in high numbers by the EU, namely whitefish species such as Alaskan pollock. As such, the EU is currently receiving lower quantities of reprocessed fish through Chinese exports, and this has effects on EU Member States such as Germany that consume considerable volumes of these whitefish.

**Competition for the highest quality seafood**

Section 1.3 outlines the impact of China’s demand for seafood on EU consumers and their improved ability-to-pay which constitutes direct competition with the EU seafood market. This is possibly best exemplified in the case of Ecuadorian shrimp, for which China is the preferred destination given the recent rapprochement of the two countries. This leaves key EU importing nations such as Spain, France and Italy with reduced sources of supply. However, the EU also benefits from the Chinese demand through key exports such as Danish cold-water shrimp and brown crab from northern Europe.

**Bilateral economic relationships with individual Member States**

It is important to remember that China and the EU are major trading partners in fisheries and aquaculture products (EJF, 2022). However, the European Commission itself is not involved in exports to China, each individual EU Member State maintains its own individual bilateral agreements. As such, this situation allows China to apply rules to one EU Member State and not another and accept products (including fishery and aquaculture-derived) from one Member State but not another. Discussions at the EU Market Advisory Council working group meeting in May 2022 suggested that the nature of these individual bilateral relations creates fertile grounds for state-specific political agendas to be enacted. For example, if China is not happy with a given action that Ireland has taken within another sphere, it can retaliate by imposing stricter import restrictions on products from that country or not accepting imports from that country at all.

There is also the issue of differing standards for health certification, for example, the testing of cadmium levels in the white and brown meat of crab. As a result, there is a risk that consignments will be returned if they fail the tests due to the testing methodology implemented by the Chinese authorities. Representatives consulted from the Irish Killybegs fishermen’s organisation expressed concerns over the Chinese authorities inconsistently applying their policy of issuing health certificates to Irish-produced live brown crab one year and not the next. The organisation described these as “divide and conquer” strategies, which are on the grounds of excessive levels of metals such as cadmium. However, in reality, this is likely to be a form of political gamesmanship.

It is perhaps worthwhile to consider the potential challenge that bilateral cooperation between individual EU Member States and China poses to the successful negotiation of the EU’s interests as a united block. As mentioned in Section 5, the case of Portugal’s increasingly close ties with China is notable in this regard, with China making substantial investments in Portuguese ports (Raftopoulos & Nissen, 2021). Furthermore, the consequences of China’s actions affect some EU member states more than others. For example, French interests are particularly threatened by Chinese fishing practices in
the Pacific and Indian Oceans such as in French Polynesia, where Chinese vessels have been accused of illegal operations (Grare, 2021).

6.2.2. Aquaculture

Fishmeal

One of the key consequences of China’s aforementioned huge demand for fishmeal (60% of global consumption), is that key feed ingredients are likely to become scarcer and therefore much less affordable. As described in detail in Section 1.3, although China is a net exporter of seafood in whole fish terms, once fishmeal is factored in, China becomes a net importer of ‘aquatic bioresources’ with an annual trade deficit of 1.2 million tonnes overall. This demand is mostly fulfilled through fishing activities by the Chinese fishing fleet or foreign fleets that export to China. Therefore, EU aquaculture sectors largely dependent on fishmeal, such as seabass and seabream farms in the Mediterranean, will be adversely affected through higher costs and reduced profitability.

This is particularly pertinent given that the almost prohibitively high cost of feed is frequently cited as a major obstacle to continued growth of the sector (Naylor et al., 2021). The high cost of fish feed will also affect other neighbouring countries exporting farmed fish to the EU such as the Scottish and Norwegian salmon sectors, resulting in higher product costs for EU consumers. However, such an issue also affects countries outside the EU and also hurts other large aquaculture-producing countries. As such, it is possible that the EU aquaculture sector actually benefits at the expense of external markets struggling (i.e., EU consumers prioritising domestically produced farmed aquatic foods).

As has been mentioned previously, many of the third countries with which the EU has SFPAs are food-insecure and as such, should not be encouraged to export their small pelagic fish (e.g., Sardinella spp.) which can provide an important source of animal protein and micronutrients for the poorest members of their society. This is particularly problematic when such fish are used to make fishmeal for Chinese aquaculture. The consequences of this for the EU is that, by fishing in these same countries, their fleet is inadvertently contributing to a local scenario of food insecurity.

The EU caviar production sector

In the last 15 years, the steep growth in Chinese farmed sturgeon has led to the availability of much lower-priced caviar, thereby undercutting the global caviar production market — including the EU — by up to 10 times. To put this in context, Chinese caviar currently sells for around 140 euros per kg whereas the lowest that EU caviar-producing countries — namely Italy, France, Poland, Germany, Bulgaria and Belgium — are able to supply their caviar is around 400 euros per kg, almost three times more expensive than that produced by China (EUMOFA, 2018). Furthermore, the quality of Chinese-produced caviar is on a par with that cultivated by European producers, meaning it is hard for the EU to compete on the basis of quality alone. As consumers are unable to discern the difference in quality, the EU hospitality, restaurant and catering sectors are increasingly opting for cheaper caviar and the EU is now a net importer of caviar (EUMOFA, 2018).

The reason that this constitutes a form of unfair competition is that, even though there is high demand (and a preference) within China for foreign products, including EU-produced caviar, the government has put in place protectionist policies making it hard to import caviar from countries such as Italy and France. As the Federation of Aquaculture Producers consulted during the preparation of this study suggested, one way to level the playing field is to impose a stricter labelling and traceability scheme for all fishery and aquaculture products including caviar, so that consumers are able to discern exactly where their caviar is coming from. A similar phenomenon was pointed out by the French Comité
National de la Conchyliculure (CNC), regarding molluscs, whereby China restricts EU imports and as such tips trade flows in its favour.

**The Norwegian and Scottish salmon sectors**

As with the case of Ecuadorian shrimp, China’s increasing demand for Atlantic salmon from Norway and Scotland could have ramifications on the quantities available to the EU, thereby limiting sourcing options and potentially increasing the cost. However, this could also provide impetus to fledgling EU salmon-producing countries such as Denmark and Sweden, although current projections of growth in Chinese demand suggests that this will still only represent a small fraction of Norwegian or Scottish output.

### 6.3. Geopolitical consequences

Although the EU and China consider themselves as “strategic partners” in pursuit of cooperation on environmental and particularly maritime environmental issues, their interests in leading global environmental governance are also closely tied to their desire to develop their maritime economies and geopolitical agendas. Moreover, China continues to be an economic competitor and a “systemic rival” for the EU. While concrete bilateral actions remain limited, the two actors have developed a dialogue-centred partnership regarding ocean governance, as evidenced by their Blue Partnership agreement to advance the development of a Blue Economy. In line with this partnership, ‘the EU expects China to engage more actively in the areas of sustainable fisheries and marine resources including by supporting the establishment of additional marine protected areas in the Southern Ocean and delivering concrete results in the fight against illegal, unreported and unregulated fishing’. However, China’s actions regarding overfishing (particularly in the South China Sea) and marine conservation outline potential geopolitical consequences for the EU fishing fleet and aquaculture.

China’s fishing fleet has also been characterised as “an unofficial militia” and “the third arm of its navy” as it has engaged in alleged fishing activities in disputed territory (Grare, 2021). This hostile characterisation of Chinese fishing activities was echoed in a 2017 US report from the Pentagon that declared that China is “building a state-owned fishing fleet for its maritime militia force in the South China Sea”. Researchers have noted that the balance of power within the EU-China relationship has tipped towards China’s favour (Raftopoulos & Nissen, 2021). This is particularly evident in the case of climate and ocean governance, which have increased in stature for both parties due to the size of their coastline and the maritime sector’s increasingly important contribution to their economies (Raftopoulos & Nissen, 2021).

#### 6.3.1. EU access to fishing opportunities

As China increases its global reach, the fishing opportunities left for other nations are reduced. This is perhaps best exemplified by the case of China’s tuna canning sector which is explored in detail in Section 1.3. Given China’s apparent shortage of raw tuna for processing, an increased demand for existing tuna stocks has been noted which translates into direct competition with EU tuna-fishing

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nations such as the Spanish and French fleets. This is most poignant in the Western Pacific where the Chinese fishing fleet also fishes for tuna.

As highlighted in Section 1.1 on case study countries, as a result of China’s financial contributions towards fisheries development in Senegal in 2005, the country came to play a key role in the economic and social decisions taken by the Senegalese government. The consequences of this for the EU could include limiting their access to fishing opportunities and negating some of the core activities programmed within the SFPA between the two parties, such as promoting Senegalese on-land processing and improved fisheries management, etc. (Oceanic Development, 2005).

6.3.2. Reliability and integrity of data held by intergovernmental institutions

China has been frequently accused of inaccurately reporting its catch, production and trade statistics to key institutions such as the United Nations Food and Agriculture Organization and the World Trade Organization. This makes it harder for these bodies to issue accurate recommendations related to stock management, trade or taxation. Given the numerous examples outlined in the earlier sections of this report of false flag flying by Chinese vessels and secrecy surrounding agreements between China and countries in which it is fishing, it becomes very difficult for the EU fishing fleet to meet its obligations for due diligence and capacity building under its SFPAs.

6.3.3. Switching of allegiances by territories in question

It is interesting to note that due to the increased Chinese influence in the Solomon Islands, this country has now switched its political alignment from Taiwan to Mainland China. A similar phenomenon could occur in other coastal countries with large tuna stocks or that have/have had a tuna canning industry, and with which China has strong connections, e.g., Mauritius, Madagascar, Senegal and Ecuador. This phenomenon is exacerbated by joint partnerships between Chinese companies and other companies in the countries in question, such as the case of Ecuador as we have seen in Section 1.1.
7. PROTECTION FOR THE EU FISHERIES AND AQUACULTURE SECTOR AGAINST UNFAIR GLOBAL COMPETITION PRACTICES

KEY FINDINGS

- The EU’s best protection practices should be transparency and adherence to the letter and spirit of the fishing agreements it has with third countries and upholding local regulations relating to their operations. Ensuring adequate enforcement of the existing EU legislation and of international agreements on safety at sea and labour conditions on fishing vessels is also recommended.
- A rule-based global system that considers the divergent interests of all parties needs to be in place to regulate international affairs and economic activities, including fisheries.
- Strengthening the statistical units of the Department of Fisheries (or equivalent agencies) of the countries with which fisheries agreements are concluded might contribute to mitigating the current absence of reliable and detailed fisheries statistics.
- It is important that food-insecure countries are not encouraged to export the small fish that represent one of the only sources of animal protein and micronutrients available to the poorest members of their populations to make feeds for aquaculture in China or elsewhere.
- Another recommendation, in interactions with Chinese negotiators, or with their allies in various countries, is to point out that China’s central government has proclaimed an ‘Ecological Century’ and insists on international cooperation leading to mutual benefit. It is recommended to take this into account in interactions with Chinese negotiators.

This section suggests a series of recommendations focusing on how to best protect the EU against unfair global competition practices, such as the effective implementation of a rule-based global system (8.1); ensuring a level playing field (8.2); the removal of subsidies (8.3); the promotion of transparency (8.4); improved methods of data reporting (8.5); the use of electronic monitoring, control and surveillance (8.6) and of catch certification schemes (8.7).

This section also explores how to best protect the EU market supply (8.8); and finally, it briefly suggests some recommendations on the bilateral cooperation with China (8.9).

General remarks

In general, the best protection practice should be adherence to the letter and spirit of the fishing agreements it has with third countries and upholding local regulations relating to their operations. This will allow the EU to gain respect by host countries through good-faith behaviour vis-à-vis the bad actions of Chinese or other distant water fleets. This, in turn, could lead to more advantageous terms for the EU. The AIPCE-CEP have described the year-on-year decline in EU distant water fleet quotas (and consequential reduction in presence of the physical fleet) as a “loss of EU influence” in global fisheries management fora, which in turn emboldens other actors such as China to play a larger role in decision-making processes.
One of the interviewees consulted during this study (EJF), who is very experienced with the process of negotiations with Chinese senior government officials, commented that the Chinese government is well aware of the issues outlined in this study and could well take necessary actions to address them if they so wished. The EJF suggested that, in fact, the Chinese 5-year fisheries plans imply an almost deliberate policy to expand the distant water fishing fleet whilst preserving the resources within their own waters.

7.1. Effective implementation of a rule-based global system

Reflecting on the material presented above on China's role in distant water fisheries leads us to realise that it be explained, at least to a large extent, by China's history.

In the 15th Century, during the Ming Dynasty, China possessed a vast fleet of ocean-going vessels which it used to document its cultural and technical superiority over countries of the Indo-Pacific region, and which reached all the way to East Africa (Levathes. 1994).

However, under the Qing Dynasty, China failed to modernise and ended up, from the mid-19th century on, weak and unable to prevent western powers, from sacking Beijing and taking control of part of their territory, then invading China's coastal areas and much of her interior.

Moreover, even after 1949, when the People's Republic of China was founded, several disastrous policies of the ruling Communist Party set back the rebuilding of China's economy and, thus, its international influence. It was only in the 1980s that China could begin to assert herself in the global arena. Notably – and this is relevant to our topic here – 1985 was when the first Chinese distant water fleets started to operate from a base in Hainan, in the Southwest of China (Pang and Pauly 2001).

This background information on China's history is mentioned here because many actors may have difficulty accepting that China claims an important international role since the late 20th and early 21st centuries. This is, however, a fact that is a feature of the world in which we now live, and not an aberration that will somehow go away.

Fortunately, in the 21st century, most of the competition between cultures and countries' economies is limited through the legal and trade rules by the United Nations and the World Trade Organization (WTO), and not shaped by brute force, notwithstanding current armed conflicts such as those in south-eastern Europe or the Horn of Africa.

This means that a rule-based global system that considers the divergent interests of all parties needs to be in place to regulate international affairs and economic activities, including fisheries.

Already, the world has developed a powerful tool – the United Nations Convention on the Law of the Sea or UNCLOS – which contains international fisheries in the form of the 200-mile Exclusive Economic Zones (EEZ) that maritime countries can exploit for fishing or other resources as they see fit (Relano et al. 2021) or, for a fee, let other countries exploit (Belhabib et al. 2015).

UNCLOS works very well for strong countries such as the USA (which has not ratified it), whose Coast Guard can prevent incursions onto large parts of her EEZ designated as Marine Protected Areas (Relano et al. 2021). It does not work well for managing the fisheries of European countries, which often have EEZs smaller than the distribution range of exploited fish populations. UNCLOS also does not work well for low-income countries of the Global South, whose governments have no tax base to speak of, thus forcing them to provide foreign access to their natural resources, e.g., the fisheries resources in their EEZ.

UNCLOS is also disrespected in the South China Sea; there, China is challenging the fact that each maritime country, i.e., the Philippines, Malaysia, Indonesia and Vietnam, should have an EEZ extending
200 miles from their coast. This challenge is in contravention to the letter and the spirit of UNCLOS, as is the fact that China has turned several small atolls and reefs into ‘islands’ which, it claims, justify the extensions of its EEZ to the so-called ‘9-dash line’.\footnote{The 9-dash line, defining the approximate boundaries of a huge part of the South China Sea (SCS) that China claims control of, was first published by officials of the Republic of China (ROC) in 1947 (as an ‘11-dash line’). It was subsequently adopted by the People’s Republic of China (PRC), and extended to the east of Taiwan. The 9-dash line, includes large chunks of the Exclusive Economic Zones claimed by neighbouring countries (e.g., Malaysia, Philippines, Vietnam) and high seas area, both of which in contravention of the United Nations Law of the Sea Convention (https://en.wikipedia.org/wiki/Nine-dash_line).} The 9-dash line has no basis in international law, and it overlaps with the legitimate EEZs claimed by China’s neighbours.

The International Court in the Hague has condemned this ‘sea-grabbing’, to no avail. China’s determination to stick to an extreme position in this regard suggests that this is an issue of national security, and not one of access to fisheries resources. However, in other parts of the world, the Chinese government insists that it plays by the rules, even if Chinese companies do not.

One good example is the massive fishery for squid (mainly for the Humboldt squid, \textit{Dosidicus gigas}; see Arkhipkin et al. 2022) around the Galapagos Islands (a province of Ecuador). A massive Chinese fleet of squid jiggers operates about 20 miles away from the border of the Galapagos EEZ, i.e., in the high sea, thus ‘respecting’ the rules of UNCLOS (Relano et al 2021).

The irony is that while Ecuadorian politicians criticise this Chinese fishery, Ecuadorian vessels exploit the same squid stock inside the Galapagos EEZ, and that neither China nor Ecuador have assessed the squid population in the Central East Atlantic. It should also be mentioned here that squid populations appear to be increasing worldwide (Hunsicker et al. 2010; Doubleday et al. 2016), especially in the Eastern Central Pacific, not least because of the Ecuadorian fisheries for tuna and especially sharks (Anon. 2020), which prey on squid. Note also sharks are fished both for their fins (exported to China) and for their meat (exported to Peru and, increasingly, to Brazil).

This type of conflict, with China fishing in the high seas but adjacent to an EEZ, are likely to increase as the Chinese DWFs cease to consist – as they did earlier – simply of their coastal fleet operating off the coast of other countries (Pang and Pauly 2001).

One way to overcome conflicts of this sort in the long-term might be to make the high seas a huge fishing-free zone (White and Costello 2014; Sumaila et al. 2015). Turning the high seas, which make up 2/3 of the world’s oceans, into an immense Marine Protected Area would not reduce global fisheries catches because the overwhelming majority of fish caught in the high sea are ‘highly migratory,’ dashing in and out of the EEZ of maritime countries. Indeed, closing the high seas to fishing, which would be easy to monitor via satellites, would improve international equity, as it would allow two dozen countries to share in the catch that is presently near-monopolized by a handful of countries with huge DWFs (Sumaila et al. 2015).

Obviously, turning the high seas into a no-fishing zone may seem unrealistic. However, it is worth highlighting that in the 1960s, when Ecuador and Chile declared ‘patriotic sea’, reaching up to 400 miles into the ocean from their coasts, this was immediately condemned by the major distant water fishing nations of the time, notably, Japan and the ex-Soviet Union. Yet, only two decades later, the UNCLOS was ratified by a majority of the world’s maritime countries, which allowed every maritime country to claim EEZs of up to 200 miles from their coastlines. Thus, what may appear unrealistic now, might become widely accepted within a few years.

Another reason why closing the high seas to fishing might be an idea whose time has come is that the fishery sector, like all economic sectors, might soon have to reduce its greenhouse gas emissions. These
emissions are considerable (Greer et al. 2019a, 2019b) and largely unnecessary because overfishing has globally reduced fish populations. The catch per tonne of CO$_2$ emission of fishing vessels would be higher if international fleet capacity were reduced, which would also financially benefit the fleet operators and eliminate a justification for providing subsidies to fishing fleets. Indeed, limiting the subsidies the fisheries sectors that European, Chinese and other fleets will have to be implemented even if the recently concluded subsidies negotiations at the World Trade Organization (WTO) have again failed to establish rules for reducing subsidies. In this context, the EU might at some point take up the issue of banning fisheries on the high seas as part of humanity’s fight against global warming. It would reduce maritime criminality, ensure more equity in access to migratory fish stocks, and help combat warming. Most probably, China would not agree at first, but it might be convinced to join an international treaty extending the United Nations Convention on the Law of the Sea.

Moreover, the effective implementation of international agreements on safety at sea of fishing vessels (Cape Town Agreement - IMO) and labour conditions on fishing vessels (ILO C188) would also enhance a fair competition between China and the EU.

Furthermore, the EU is committed to protecting the Ocean through another tool: the negotiations on a Treaty of the High Seas (‘the implementing agreement on Biodiversity Beyond National Jurisdiction’ – BBNJ). The BBNJ is an international legally-binding instrument under the UNCLOS on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction. The EU ‘urges States to reach agreements and conclude the treaty in 2022’. Moreover, in the negotiations of the treaty the EU considers the MPAs as one of the key tools to ensure an effective and fair BBNJ. As stated by the Heads of State and Government and the EU, the EU believes that it is necessary to ‘enable the Conference of the Parties of the future treaty to effectively act and decide transparently on the establishment and management of area-based management tools and marine protected areas with effective management plans in order to conserve and sustainably use areas requiring protection in areas beyond national jurisdiction’.

Regarding more specifically the fisheries of tuna, it is also important to note that China is part of four tuna RFMOs and is obliged to follow the rules in this context. According to a recent ISSF report (ISSF, 2022) the tuna fisheries are mostly exploited sustainably as ‘86% of global tuna catch comes from stocks at healthy levels, and 9% require stronger management’.

**7.2. Level playing field**

One of the recurrent themes throughout this report is the level playing field between EU and non-EU fishery and aquaculture producers. This is a topic that is frequently discussed at meetings of the various

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47 The WTO agreement to disallow subsidies when overfishing occurs cannot be adequate, given that countries can claim the stocks they exploit are not overfished, or by performing fake assessments claiming the same

48 Progress of this sort was recently demonstrated by China’s acquiescence to establish the first high sea no-take Marine Protected Area in the Ross Sea, in Antarctica


EU advisory councils (e.g., the Aquaculture Advisory Council [AAC], the Market Advisory Council [MAC] and the Long Distance Fisheries Advisory Council [LDAC]). As noted by members of the MAC at a working group meeting earlier in 2022, one way of creating a level playing field between domestic and imported products is by ensuring that all imported products are fully traceable. The theme of an unfair competitive advantage was emphasised by interviewees from Oceana who described how hard it is for EU consumers to know where their aquatic food products are coming from, even if they wanted to avoid illegally or ‘dubiously’ caught fish. They pointed out that the issue cannot be solved through a single EU Regulation and as such, the overall system suffers.

Given that EU aquaculture products are subjected to higher environmental and health standards than Chinese products, the EU can insist on a stricter level of sanitary control, and on the general sustainability of the mariculture operation that produced seafood. The EU must uphold minimum requirements such as decent working conditions, decent wage and no physical abuse.

### 7.3. Removal of subsidies

The fact that Chinese fleets operating in Mauritania and Senegal were found to have received high levels of subsidies from the Chinese government whilst those operating in Madagascar, Mauritius, Ecuador and the Solomon Islands seemed to have little ‘visible’ information on subsidies suggests that transparency is an issue, not only regarding the deployment of fleets and their catches, but also regarding subsidies. Although it is encouraging to note that China was not the main obstacle to global efforts in 2022 by the World Trade Organization (WTO) to reduce harmful fisheries subsidies, Chinese subsidies to its fishing fleets still represent more than half of the world’s subsidies (Villasante et al., 2022). Furthermore, China has taken steps to curb dependence on subsidies, which is promising. However, the EU should push for continuing negotiations on overfishing and overcapacity of the recently concluded WTO subsidies agreement given that, in its present form, the agreement will do little to reduce the subsidisation of distant water fishing fleets.

Indeed, limiting the subsidies of the fisheries sectors of EU, Chinese and other fleets will have to be implemented even if the recently concluded subsidies negotiations at the World Trade Organization have again failed to establish rules for reducing subsidies. (The WTO agreement to disallow subsidies when overfishing occurs cannot be adequate, given that countries can claim the stocks they exploit are not overfished, or by performing fake assessments claiming the same).

### 7.4. Promoting increased transparency

In general, the EU should increase engagement with China and push for the application of equivalent standards of sustainability and transparency. The EU should also push its fleet and the fleets of all other distant water fishing nations to be more transparent and accurate in their reporting, i.e., ‘sunlight is the best disinfectant’. This can be achieved in several ways, for example, by strengthening existing data reporting systems, mandating the use of catch certification systems or by installing electronic monitoring systems, all of which are outlined below. The EJF (2022) urge the EU to push for effective implementation of the transparency agreements by partner countries and to tackle the factors that enable illegal fishing practices such as corruption. The AIPCE-CEP recommends that agreements with third countries to obtain fish licences should be transparent, as this can help the EU exert pressure on bad actors where appropriate. As underlined by Oceana, interviewed during the preparation of this study, transparency alone is not enough. The key point of transparency is that it leads to accountability.
In October 2022, Oceana has released a report about EU nationals fishing in third countries using fishing vessels with non-EU country flags. By its very nature, this form of fishing, although legal, leads to misreported catches, i.e., one component of IUU fishing, and the EU has not even begun to get a handle on this issue. For example, such individuals are not subject to any sanctions by the EU. Their main concern is that this goes against the EU’s zero-tolerance policy on IUU fishing and is a clear infringement of EU law. To stop this inaction, they recommend making information on the beneficial ownership by EU nationals of non-EU vessels publicly available. Such increased transparency would “allow fisheries managers and enforcement officials to determine who is legally accountable for – and profiting from – illegal activities”.

7.5. **Data reporting**

This report has made a clear case, amongst other recommendations, for strengthening the statistical units of the fisheries ministries (or equivalent authority) in the host countries with which fisheries agreements are concluded. This can be achieved either by capacity building or by out-posting personnel in the relevant locations. The rational basis of most of the fisheries agreements involving China (and often other entities) cannot be reliably assessed, given the absence of reliable and detailed fisheries statistics, which should also include estimates of catches that were made (legally or illegally) but not reported. Interviewed stakeholders from the AIPCE-CEP questioned whether the EU has reliable information on the size of the Chinese fleet, in particular the longline fleet, and whether EU inspectors are able to directly verify reported information. Interviewees representing EFFAT described how official Chinese statistics over-report the domestic catch and significantly under-report the catch by the distant water fleet, thereby “allowing local officials to claim they have met politically-determined domestic production targets while hiding the excessive catch by the distant water fleet that regularly exceeds fishing quotas”.

The large number of vessels of the Chinese distant water fleets and the various techniques that enable these vessels to ‘go dark’ increases the chances of IUU infractions. This happens in spite of the attempt by most of the focus countries studied here to mitigate such infractions by adhering to international initiatives. However, the continuous lack of necessary data in reporting such infractions hinders international mitigation initiatives, and this is why greater efforts in data reporting must be made.

Support for international monitoring and recording systems and institutions is important. Accuracy and timeliness are critical if these systems are to both retain the wider community’s confidence and to provide the basis for well-informed decisions concerning resource and economic management. This is of course a far wider issue than the seafood trade, but the imperative to understand a given segment of trade, if there is to be wise policy making, reinforces the broader need to ensure that these systems are respected. The example relating to several US$ billions worth of shrimp that is described above suggests that this is something of a concern.

7.6. **Electronic monitoring, control and surveillance (MCS)**

Interviewed representatives of the AIPCE-CEP expressed ‘deep concern’ regarding the general lack of transparency in the monitoring and control of Chinese fishing activity and the seafood industry. To this end, they recommend vessel monitoring system (VMS) in operation 24 hours, all year round. They also questioned whether existing Chinese monitoring centres had ever been inspected. Further recommendations include the reinforcement of RFMO mandatory decisions over the oceans with

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active EU involvement, upholding the FAO’s *Port State Measures Agreement* and not shying away from giving China a ‘red card’ through IUU card system. Interviewees from Oceana have also asked that VMS is compulsory for the Chinese fleet, just as is for the EU fleet. Besides, some stakeholders consulted (EJF) cast doubt on the relevance of any privacy issues surrounding the use of VMS/MCS that have been raised by MEPs in previous parliamentary discussions.

### 7.7. Catch certification schemes

A number of stakeholders that were interviewed in the preparation of this report mentioned the importance of having accurate and well-functioning catch certification schemes. Representatives from EFFAT mentioned for example the presence of 517 Chinese fishing vessels in Ghana, meaning that some of the ‘Ghanaian’ fish entering the EU market is in fact coming from the Chinese fleet. ClientEarth were particularly vocal about the importance of catch certificates and in their 2019 report, they recommend subjecting all imports to Member States to standardised control systems as a way to combat IUU fishing, and to make use of a catch certification scheme such as the database and application developed by the EU (‘CATCH’). They mentioned the impetus Council Regulation (EC) No. 1005/2008 (the IUU Regulation) has given in that regard. This regulation sets out clear pathways to tackle the entry of products from IUU fishing into the EU, but its success is contingent on the strict and consistent application of the IUU Regulation and in particular, vis-à-vis import controls. Interviewees from Oceana also expressed concerns at how easy it is to falsify catch certificates currently and urged the introduction of a more robust tamper-proof system. However, ClientEarth (2019), in line with the ECA (2022) report, warn that the divergence in the application of import control measures between Member States risks products of illegal fishing being diverted to countries with less stringent measures. Their report recommends that national authorities carry out the following:

a. Increase the number of random sample checks on fishery products;  
b. Inspect all catch certificates on third-country fishery products entering the EU;  
c. Make progress on implementing the IUU Regulation in order to set an example of good practice for other Member States;  
d. Increase resources to effectively control imports of fishery products; and  
e. Coordinate their import control activities between the relevant public bodies so that measures are implemented efficiently and effectively.

### 7.8. Protecting EU market supply

#### 7.8.1. The fishmeal sector

China’s domination of the global fishmeal supply could potentially signify a systemic risk to users in the EU i.e. livestock and fish farmers and their support industries. It seems that this will merit some strategic thinking by the EU alongside other Western countries, and the need to develop an appropriate strategy.

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to secure EU/Western access to this important resource. To this should be added concern about the management of the small pelagic and trash fish resources used to produce fishmeal. The ethical, socio-economic and pragmatic justification for the diversion of these resources to livestock feed ingredients as opposed to human food is an additional concern.

7.8.2. The secondary seafood processing sector

As with the fishmeal sector, the impact of China's domination of the consumption and production of seafood needs to be mitigated. As discussed in Sections 1.3 and 7, this is particularly important for the secondary processing of seafood. A number of EU-based seafood producers have relied upon China for the supply of primary processed aquatic food products (i.e., fish fillets), which often have an EU provenance to begin with (e.g., raw whole fish). Subsequent value-adding tends to occur within the EU, after the labour-intensive stages of the value chain had been migrated out to low-cost processors in China. As mentioned previously, China appears to be moving away from this activity and as such, EU-based operators within the seafood sector may have to consider seeking alternative processing partners over the coming years. This may mean focusing upon partners in other developing countries with capable but more cost-effective workforces, such as Vietnam, Cambodia, South Asia as well as Latin American or African alternatives.

7.9. Bilateral cooperation with China

7.9.1. Diplomatic talks

As outlined in Section 5, EU-China cooperation has advanced considerably in recent years through important initiatives such as the Blue Partnership for the Oceans signed in 2018. This has opened the path for cooperation and dialogue which would underline the potential of this avenue. Interviewee Steven Trent commented that from his experience in China, there was a lack of understanding of how the Chinese government hierarchy worked. For discussions with China to have a chance of success, they need to be aimed at a very high level (i.e., at the presidential level). He reiterated the importance of cooperation; that the approach has to be one of encouragement as opposed to 'bullying'. Interviewed representatives of EFFAT reminded the EU that China also relies on the EU to feed its large population and that despite being powerful in many ways, China is also quite vulnerable to food security issues; therefore, the EU should “not be afraid” to pressure China into compliance with relevant global environmental and labour regulations.

When interacting with Chinese negotiators or their allies, remind them of the ‘Ecological Century’ proclaimed by China’s central government. This proclamation underlines the concept of cooperation led by mutual benefit. Therefore, this should preclude predatory practices that lead to unfair competition. In addition to increasing multilateral cooperation mechanisms, the EJF (2022) also urge the EU to bring in relevant trade-based measures.

Representatives of EFFAT recommended that the EU pushes the International Labour Organization to elaborate standards for good labour practices specific to the fishing sector. They also mentioned the importance of properly enforcing the Due Diligence Directive, for which traceability is essential. They warn, however, that the way China structures its fishing fleets means that it has ‘ghost’ fleets in various locations (primarily in Africa) making traceability difficult. EFFAT suggested that these Chinese practices are in fact built to hide responsibility and shield ownership, and that therefore, a number of the fishing practices currently employed by China are not compatible with the Due Diligence Directive.

Interviewees from Oceana were keen to remind the EU that the push for increased collaborative decision-making between the EU and China should also be participatory for all other stakeholders too.
7.9.2. Access to fishing opportunities

China seems likely to further expand its fishing activities in the Pacific, particularly within the EEZ of Small Islands States in the Western Pacific. This is a part of what appears to be a broadly more active stance that China is adopting in the region, one to which Western nations are currently having to develop responses. Access to fishing resources is perhaps a minor aspect of this major geopolitical realignment, but it is one where significant EU interests could be disadvantaged. This will add to the importance of establishing workable, mutually fair and economically beneficial arrangements that embody long term sustainability with countries in the region.

7.9.3. Trade sanctions / diplomatic measures / limiting market access

As mentioned in earlier sections of this report, one method of addressing the issue of illegally caught fish is by having fully traceable and certified fishery products. Fortunately, there are existing technologies that can help with this. ClientEarth has produced several reports on the effectiveness of catch certification schemes within the EU. One of these reports recommends that the various international bodies involved in the fight against IUU fishing “must coordinate their IUU fishing control activities with shared electronic databases, clear strategies and structured plans that result in the lowest possible level of IUU fishing practices at an international level”57.

The EJF’s 2022 report recommends strengthening controls over imported products coming from the Chinese fleet to protect the domestic market from seafood produced through forced labour and other human rights abuses. When consulted during the preparation of this study, EJF suggested that the EU could limit China’s access to its markets while the EU market is still valuable to China. EJF emphasised the importance of fisheries being at the centre of the discussion around limiting general market access (i.e., not just limiting seafood market access).

7.10. Lead by example and call out bad practices

The EU should support ongoing efforts to investigate and publicly denounce the illegal practices by fishing vessels of any country, whether or not they have a fishing agreement with them. This will empower NGOs and lend them legitimacy, which in turn should benefit the EU fleets who are respecting norms.

Fisheries agreements and contracts should not lead to increased exploitation of fully or overexploited stock. The EU, through the appropriate agency, should fund EU and/or other scientific groups capable of assessing the exploited stocks of target countries in the Global South, such that the appropriateness of new exploitation schemes, by Chinese or other actors, can be objectively assessed.

With regards to aquaculture, it is important that food-insecure countries are not encouraged to export the small fish that represent one of the only sources of animal protein and micronutrients available to the poorest members of their citizens to make (or as) feeds for aquaculture in China or elsewhere.

With regards to mariculture product grown on feed extracted from animal-protein and micronutrient-deficient countries, it may be appropriate for the EU to fund a study that would derive an index that would express, for seafood on international markets, whether they were derived from seafood diverted from people in food-deficient countries.

8. CONCLUSIONS AND RECOMMENDATIONS

This last section summarises the conclusions of the study and suggests a list of recommendations focusing on how to best protect the EU against unfair global competition practices.

8.1. Conclusions

1. There is a large discrepancy and uncertainty regarding the number of vessels of the Chinese DWFs. The estimate ranges from around 900 ‘visible’ vessels to about 3000 when including ‘invisible’ vessels, although many of these may be operating in waters close to China (e.g., Korea) and are not considered to be part of the DWF.

2. The overall marine catches of Mainland China currently amount to 14-16 million tonnes (mt), of which 3-4 mt originate from distant-water fishing, where a large proportion are taken in waters off West Africa and off Western South America (off Ecuador and Peru).

3. China is one of the five countries that drive high seas fisheries and transhipment, notably of large tuna and sharks. The study identified hotspots of transhipment activity in the high seas of FAO Statistical Area 61 (Pacific, Northwest), 87 (Pacific, Southeast), and 51 (Indian Ocean, Western), with a small concentration in Area 41 (Atlantic Southwest).

4. There are concerns that a large number of vessels of the Chinese distant water fleets ‘go dark’, using techniques such turning off their AIS, which increases the possibility of IUU infractions. This has led calls for widespread adoption of VMS – satellite-based system that are tamper-proof. Distant water fleets operating in the study areas usually gain legal access to the focus countries’ EEZs by joint ventures, bilateral agreements, private agreements, and licensing. However, there is general lack of details and transparency on these agreements and licensing.

5. China provides 2.4 billion USD annually to its distant water fleets operating in the EEZs of third countries, and 68 million USD to its distant water fleets operating in the high seas. Most of the harmful subsidies provided by China go to the DWFs that operate across the coast of African countries.

6. Subsidy data was not available for four of the six focus countries which suggests data gaps and a lack of transparency, similar to the situation of limited information on deployment of fleets and their catches.

7. Considering the scale of Chinese subsidies in their distant water fleet, this leads to unfair competition in relation to EU fleets as well other fleets.

8. The risk of overfishing is exacerbated by the lack of reliable data and transparency on fishing activity as well as deficient monitoring systems in the main areas where Chinese DWF are active, including in the high seas. This has led to environmental degradation and reduced resource availability, as well as socio-economic implications for local communities in some areas.

9. China’s mariculture industry reached 16 million tonnes (mt) in 2020, and it generates about 52 billion EUR per year, most of which stem from production of bivalves. The bivalve industry struggles as a result of various forms of pollution, which also affect exports.

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58 Some recommendations were already discussed in the previous sections
10. Fish and crustacean farming represent a small part of overall Chinese mariculture production, but generate a huge demand for fishmeal due to inefficiency (feed conversion is in the range of 2.1-4.0).

11. China is the largest fishmeal importer in the world, and this has increased from 30% in 2012 of the traded total to 50% in 2021 (provisional data). When China’s domestic production is included, China appears to be consuming 60% of global fishmeal production.

12. China’s massive terrestrial farming industry (pork and chicken) no doubt accounts for much of this demand for fishmeal, but a huge aquaculture industry is also a key factor driving China’s clear dominance of the supply of this important global protein feedstock.

13. The EU aquaculture sector, largely dependent on fishmeal, has been impacted by the extremely high cost of fish feed.

14. From the perspective of international trade, the overall situation of the Chinese fish and seafood is one of transition (e.g., from a leading processor of fish raw material for re-export as primary products (fillet) increasingly towards one of sourcing aquatic products). Another relevant trend is the steady replacement of primary by secondary processed products in the Chinese export offer.

15. Rising Chinese wealth is leading to increased imports of expensive prime seafood for domestic consumption, increasing global competition for some products favoured by EU consumers.

16. Cooperation with China has considerably advanced in the recent past at bilateral and global level in the area of fisheries and ocean governance.

17. One of the main instruments of dialogue and cooperation between the EU and China at the bilateral level is the Blue Partnership for the Oceans. However, the fact that China is concluding individual agreements with some Member States might jeopardise the role of the central EU institutions in negotiations with China.

18. The conflicting geopolitical agenda on the overfishing problem of South China Sea and the blocking of additional Maritime Protected Areas (MPAs) is slowing the progress of effective cooperation between the EU and China.

19. At the global level, the recent signature in June 2022 of the WTO Agreement on Fisheries Subsidies was a milestone in ocean sustainability cooperation. Another significant milestone concerns the Arctic where both the EU and China were among the signatories of the October 2018 Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean (CAOFA).

8.2. Recommendations

1. To develop an appropriate strategy to respond to China’s increasing domination of global fishmeal supplies, and to secure EU access to this important resource.

2. With a view to the future, to encourage EU seafood firms to seek primary processing partners outside China, e.g., focusing upon partners in other developing countries with capable but more cost-effective workforces (e.g., Vietnam, Cambodia, South Asia as well as Latin American or African alternatives).
3. To protect EU access to fishing opportunities, considering China’s expanding impact on access to fish stocks of interest to the EU, e.g., tuna, particularly in the Pacific and within the EEZ of Islands in the Western Pacific.

4. To encourage the Member States to refrain from negotiating individual agreements and to instead focus on cooperation with the EU’s central institutions.

5. To call for more transparency and reliable information on fishing activity and fisheries agreements of Chinese DWF at bilateral and global level.

6. To support and provide funding of civil society organisations investigating and reporting the activities of actors who prefer to operate in the dark.

7. To ensure an adequate implementation of the existing EU legislation (e.g., IUU Regulation, Due Diligence Directive). Amongst other benefits, this will contribute to implementing an adequate traceability system; to ensuring responsible fishing practices, to improving the safety at sea and labour conditions on fishing vessels, and to enhancing accurate reporting of catch.

8. To ensure a rule-based global system that considers the divergent interests of all parties is in place to regulate international ocean affairs and economic activities, including fisheries.

9. To ensure an effective implementation of international agreements on safety at sea of fishing vessels (Cape Town Agreement - IMO) and labour conditions on fishing vessels (ILO C188); and the negotiation of the agreement on Biodiversity Beyond National Jurisdiction would also enhance a fair competition between China and the EU and contribute to the protection of the Ocean.

10. To strengthen the monitoring, control and surveillance units of the Department of Fisheries (or equivalent agencies) of the countries with which the EU has signed fisheries agreements, and thus to strengthen their capacity to enforce fisheries control.

11. In interactions with Chinese negotiators, to point out that China’s central government has proclaimed an ‘Ecological Century’ and insists on international cooperation leading to mutual benefits. This proclamation excludes the predatory practices that lead to unfair competition. Fisheries agreements and contracts should not lead to increased exploitation of fully or overexploited stock. The EU, through the appropriate agency, should fund EU and/or other scientific groups capable of assessing the state of targeted stocks of countries in the Global South to determine the level of exploitation.

12. The above point would also support the dialogue with China about the overfishing problem in the South China Sea; and about the need to reduce the Chinese subsidies for the distant water fleets that lead to unfair competition.
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ANNEX 1 – DESCRIPTION OF SOURCES USED FOR DATA COLLECTION

The main sources used to prepare section 1.1 of the overview were:

- **Sea Around Us catch data for Mainland China as a ‘fishing entity’** (see [www.seaaroundus.org](http://www.seaaroundus.org)) were used to provide an overview of the domestic and distant-water catches by Chinese fishing fleets. Domestic marine catches, based on FAO and other sources are provide for 1950 to 2019, and maps are provided of where the Mainland Chinese Distant-Water Fleets (DWFs) operated in 2018-2020. They did not consider, except in a few cases, the beneficial ownerships of the fleet, which are generally hidden through a number of shell companies registered in tax heavens. A similar situation applies to legal and illegal transhipments, although, in this case, it was possible to provide maps showing where most transhipments involving Mainland Chinese vessels are presented.

- **Global Fishing Watch (GFW) and Regional Fisheries Management Organization (RFMO) datasets:**
  
  i. Chinese-flagged vessels recorded in the GFW dataset (version 2022) for the period 2018-2020 were extracted as a CSV file. This period was chosen because it is likely less impacted by the lower GFW coverage of earlier years, i.e., there were less observations in 2012 and AIS data improved from 2013 onwards. Also, only vessels with haul hours >100 hours were used in the mapping process. The assumption here is that haul hours <100 hours might not be representative of fishing behaviour. Filtering for >100 hours seems to reduce data with fishing hours information by only 0.1-1.0%, and thus will not have a large impact on the data spread. Note, however, that vessels actually fishing but reporting <100 haul hours have been excluded from the analyses. The CSV files were then converted into shapefiles using the Sea Around Us base map of 150,000 half degree cells to create the heat maps of the annual average number of vessels per half degree cell;

  ii. RFMO-licenced Chinese vessels for the period 2012-2022 were extracted from the websites of the Inter-American Tropical Tuna Commission (IATTC), International Commission for the Conservation of Atlantic Tunas (ICCAT), Indian Ocean Tuna Commission (IOTC), South Pacific Regional Fisheries Management Organization (SPRFMO), and Western and Central Pacific Fisheries Commission (WCPFC). RFMO-listed vessels that are in the GFW dataset for the same years were kept in the GFW database. This were subtracted from the vessel number per year estimations in the RFMO dataset. This combined list of the number of fishing vessel IDs (MMSIs) by year was then graphed together with the number Chinese (DWF) vessels estimated earlier for a report to the European Parliament, covering the Chinese DWF in the period from 2000 to 2011 (Blomeyer *et al.* 2012) and subsequently published in the primary literature (Pauly *et al.* 2014).

  iii. Supplementary data on number of Chinese vessels operating in a specific region in a specific year were assembled from primary and grey literature (including Chinese, French and Spanish language documents). Such data were obtained from descriptions of Chinese-flagged vessels or vessels likely to be owned by Chinese enterprises, but using flags of convenience (Miller and Sumaila 2014) when operating within the 200-mile Exclusive Economic Zones (EEZs) of our 6 focal countries in 3 oceans (Eastern Atlantic: Mauritania and Senegal; Western Indian Ocean: Mauritius and Madagascar; Western Pacific: Solomon Islands; and Eastern Pacific: Ecuador). The required data were assembled for the years 2011-2021 and data from Pauly *et al.* (2014) were
added to extend the time series to the earlier periods covered in the earlier studies of Blomeyer *et al.* (2012) and Pauly *et al.* (2014).

Two sources of data were used to characterize the mariculture of China by province and for the entire country: (1) the annual production statistics for mariculture from 1950 to 2010 were downloaded from the website of the Sea Around Us, i.e., https://www.seaaroundus.org/ (Campbell *et al.* 2013, 2016) and, (2) for 2011 to 2019, official Chinese production data by provinces, and data from various publications (Liu *et al.* 2022; Zhang 2022; Zhu 2021).

Contrary to the catch statistics of the Chinese marine fisheries, which suffered from major deficiencies (Watson and Pauly 2001), and which have persisted (Tsui *et al.* 2020), China's mariculture statistics appear to reflect the realities on the ground (Campbell *et al.* 2013, 2016). Thus, the only modifications of official data that were performed were interpolation for years with ‘zeroes’ that were representing missing data. In such cases, gaps were linearly interpolated to avoid distorting otherwise obvious trends.

The production data assembled here focus on commercial groups including molluscs (mainly bivalves), fish, crustaceans and other invertebrates, which in this instance refer to the output of farming activities for human consumption. Algae are not included, mainly because they are not widely produced or consumed in other countries, although they are now, in China, the most abundant mariculture product.

Regarding section 1.3. on import and export of fisheries and aquaculture products, the approach adopted has been one of travelling from the general to the particular, i.e. looking at the big picture to identify relevant topics then moving on to assess these in greater detail. This means that the research has been structured as follows:

- **Overview** – analysis of China’s fisheries imports, exports and trade balance by major product category – e.g. fresh fish, frozen fish, fillets, crustacea etc, 2012 to 2021
- **Geographic**: China’s seafood trade by major origin (imports) and destination (exports) 2012 to 2012
- **Resource related**: Trade by key species or species groups – to tease out the significant species that have a high profile in Chinese seafood trade and thus are likely to reflect the stocks subject to significant impact from Chinese activities.

These three analytical stages provide the basis for subsequent specific, detailed and relevant analysis expressed through brief case studies, based upon:

- Relevance to the 6 case study third countries
- Prospects for providing insights regarding implications for the EU, especially the protection of EU interests
- Significant wider global environmental, socio-economical and geopolitical implications

The data used in this analysis is mostly that provided by the World Trade Organisation (WTO) through its International Trade Centre (ITC) TradeMap website and the FAO through its FishStat database.

Section 2 was prepared on the basis of a desk review of published reports, news articles, press releases, and peer-reviewed journals of English and Chinese language from news sources, non-governmental organizations, and government websites were searched for in search engines of Chinese journals, university library, Google Scholar, and Google. Keywords that were used, but not limited to, are “Fisheries Access Agreement”, “Sustainable Fisheries Partnership Agreement”, “Fishing right”, “Joint ventures”, “Fisheries permit”, “Distant water fleet”, “Foreign fisheries”, “Fisheries transparency”, “捕鱼
协 定”，“捕鱼权”，“中非合作”，“一带一路”，“渔业投资”，“21世纪海上丝绸之路建设”，和“远洋渔业”.

Websites of different government ministerial branches of the six focus countries, China, and the European Commission were also surveyed for information related to access agreements or practices in licensing to foreign vessels.

Data on the subsidies that China provides to its fisheries fleets were obtained from the database described in Sumaila et al. (2019b), which was based on Sumaila et al. (2019a), and estimated subsidies converted to ‘real’ 2018 US dollar values using 2017 exchange rates and average annual Consumer Price Indices. This database is used by the Geneva-based World Trade Organization (WTO) as key element of its between-countries negotiations on global fisheries subsidies; the subsidy estimates this database contains have so far not been challenged by the delegates of any country.

This database differentiates between subsidies classified as ‘beneficial’ (e.g., ensuring safety at sea, conduction scientific research devoted to assessing the status of exploited stocks), ‘harmful’ subsidies (i.e., subsidies that enhance fishing capacity, e.g., tax-free fuel, or cheap loans for ship-building) and ‘ambiguous’ subsidies (whose impact on fishing intensity is context-dependant).

The data used in the section on the IUU were gathered according to the methodology described in Specific Objective 1.1. In addition, Sea Around Us reconstructed catch data was used to estimate the scope of the likely ‘illicit’ trade from unreported catches using the method described in Sumaila et al. (2020). Illicit trade is defined as trade that “involves money, goods or value gained from illegal and generally unethical activity. It encompasses a wide variety of illegal trading activities, including human trafficking, environmental crime, illegal trade in natural resources, various types of intellectual property infringements, trade in certain substances that cause health or safety risks, smuggling of excisable goods and trade in illegal drugs, as well as a variety of illicit financial flows” (Annual Report of the Global Agenda Councils 2011-2012, 2012).

Sumaila et al. (2020) argues that unreported catches can thus be used to provide an estimate that can be related to illegal and unregulated catches. Note also that not all unreported catches are illegal, i.e., small-scale artisanal, subsistence and recreational catches are often not recorded and thus not reported. Thus, it is safe to assume that only a part of unreported catches would go into the illicit trade stream. Sumaila et al. (2014) assumes that only industrial (50-80%) and artisanal (30-50%, or more conservatively 10-30%) fisheries catches are subject to illicit trade. Furthermore, they also assume that neither subsistence nor recreational fisheries catches are subject to illicit trade.

Known limitations of the China (mainland) catch data, and their reconstructions (see, e.g., Pauly and Le Manach 2015; Tsui et al. 2020) prevent us from estimating the catch that maybe subject to illicit trade in the artisanal and industrial sectors in China’s own waters. However, distant-water fleets belong to the industrial sector by definition. Thus, based on Sumaila et al. (2020), we provide here an estimate of potential illicit trade based on unreported catches estimated by the Sea Around Us to be taken by the Chinese distant-water fleets since its entry into the industry in the 1980s (see also Shen and Huang, 2021). This initial estimation is supplemented with data obtained from primary and grey literature.
ANNEX 2 – LIST OF STAKEHOLDERS CONSULTED

- AAC – Aquaculture Advisory Council, 6 October 2022
- AIPECEE - EU Fish Processors and Traders Association, 7 October 2022
- ClientEarth, 10 October 2022
- EJF – Environmental Justice Foundation, 6 October 2022
- European Federation of Food, Agriculture and Tourism Trade Unions (EFFAT), 10 October 2022
- Europêche, 17 October 2022
- FEAP - Federation of European Aquaculture Producers, 11 October 2022
- KFO – Killybegs Fishermen’s Organisation Ltd., 6 October 2022
- LDAC – Long Distant Fleet Regional Advisory Council, General Secretary, 14 October 2022
- Oceana, 10 and 13 October 2022
- Spanish Association of Wholesalers, Importers, Manufacturers and Exporters of fish products and Aquaculture (Conxemar), 19 October 2022
- Unit A4, Fisheries control policy, Directorate A Policy Development and Coordination, Directorate General Maritime Affairs and Fisheries, European Commission, 3 October 2022
- Visvederatie, 10 October 2022
- World Wildlife Fund - International WWF Centre for Marine Conservation, China Office, 14 October 2012
- World Wildlife Fund - International WWF Centre for Marine Conservation, 17 October 2012
ANNEX 3 - PSMA SUPPORT PROGRAMMES APPROVED FOR THE SIX FOCUS COUNTRIES

The following table presents a list of projects where the recipient and beneficiary of programme aid include the six focus countries in this study. Data obtained from the Agreement on Port State Measures (PSMA) support programme information portal\(^59\) i.e., projects designed to build capacity to combat and mitigate illegal, unreported and unregulated fisheries.

### Table 4: List of projects

<table>
<thead>
<tr>
<th>Code</th>
<th>Approval Date</th>
<th>Start Date</th>
<th>End Date</th>
<th>Funds ($US)</th>
<th>Recipients</th>
<th>Beneficiaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCP/INT/313/SWE</td>
<td>31/05/2018</td>
<td>03/06/2018</td>
<td>30/12/2022</td>
<td>5 800 600</td>
<td>Cambodia, Equatorial Guinea, Mauritania, Mozambique, Panama, Papua New Guinea, Saint Lucia, Saint Vincent and the Grenadines, Solomon Islands, Sri Lanka, Sudan, Vanuatu, Viet Nam</td>
<td>Panama, Saint Vincent and the Grenadines, Sri Lanka, Equatorial Guinea, Papua New Guinea, Mozambique, Saint Lucia, Solomon Islands, Cambodia, Viet Nam, Mauritania, Vanuatu, Sudan</td>
</tr>
<tr>
<td>GCP/GLO/1047/GER</td>
<td>16/12/2021</td>
<td>31/12/2021</td>
<td>30/12/2026</td>
<td>4 587 156</td>
<td>Gambia, Kenya, Madagascar, Senegal</td>
<td>Kenya, Madagascar, Gambia, Senegal</td>
</tr>
<tr>
<td>Pew-FFAGapAnalysis</td>
<td>12/06/2016</td>
<td>12/06/2016</td>
<td>18/04/2017</td>
<td>85 000</td>
<td>Cook Islands, Fiji, Kiribati, Marshall Islands, Micronesia (Federated States of) Nauru, Niue, Palau, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu</td>
<td>Samoa, Nauru, Tonga, Fiji, Micronesia (Federated States of) Niue, Palau, Kiribati, Solomon Islands, Tuvalu, Cook Islands, Marshall Islands, Vanuatu</td>
</tr>
<tr>
<td>GCP/INT/321/EC</td>
<td>11/03/2018</td>
<td>12/03/2018</td>
<td>11/12/2021</td>
<td>1 803 617</td>
<td>Costa Rica, Ecuador, Peru</td>
<td>Peru, Costa Rica, Ecuador</td>
</tr>
</tbody>
</table>
ANNEX 4 - ADDITIONAL DATA RELATED TO IMPORT AND EXPORT OF FISHERIES AND AQUACULTURE PRODUCTS (FAPS)

Introduction

The data used in this analysis is mostly that provided by the World Trade Organisation (WTO) through its International Trade Centre (ITC) TradeMap website and the FAO through its FishStat database. Trade data is available for the 12 year review period (2012-2021), but that for 2021 is provisional and subject to possible future change. Much of this data is disaggregated to provide specific detail, but also unfortunately a lot of the data is aggregated in various “other” categories and thus relatively uninformative. Accordingly use is made of data where possible but in some cases the picture will inevitably be only partial. The analysis should then be viewed accordingly, and is anyway largely dependent upon the governments involved. Indeed, the risks of misstatement are made apparent in one of the detailed analyses undertaken.

The trade data generally shows quantities in terms of product weight, but for the purpose of this review, one of the more important indicators is the quantity of raw fish used in making these products. This can then be related to the output from respective capture or culture that provided the raw material, and thus provides an indication of the quantity of the resource involved. The convention is to convert traded products to whole/live fish weight so that a common quantity can be used throughout – this being “live weight” or whole fish equivalent (WFE). This is used throughout much of this trade section. Appendix 2 provides the conversion factors used, some qualifying notes and details of the sources for those conversion factors. The tables and graphs presented below show whether the data is shown in product weight or whole fish equivalent (WFE) terms.

The approach taken in this analysis is move from the general to the particular – so initially the trade as a whole is assessed, and from this the key relevant aspects are identified for more detailed analysis. This subsequently covers origins of imports and destinations of Chinese exports as well as the species or species groups involved.

Overview

From a trade perspective it is clear that China’s role in the global fish and seafood sector is changing. Over the past decade volumes have increased steadily by 3% pa (and faster at 5% pa in WFE terms). As the table below shows, imports reached over 4.4 million tonnes (product weight) in 2019 but have dropped back subsequently, no doubt with the pandemic a major factor (the clamp down on eating out, probably exacerbated by rumours that Covid-19 could be imported in frozen seafood). The “headline” characteristics of the trade – which is of course huge along with most aspects of the Chinese economy - can be summarised as:

- China imports of fish and seafood have risen to over 4 million tonnes within the past 10 years, but may have been tailing off latterly if provisional data is to be believed. In the perhaps more meaningful whole fish terms (WFE), Chinese imports have settled down at 5.5-6 million tonnes, and are valued at $13-14bn annually.
- Expressed as product weight, exports were lower (3.7-4.2 million tonnes), but much exceed imports when converted to WFE values (7.6 to 8.9million tonnes) worth around $20bn annually.
However, although scale clearly dominates any perception of Chinese seafood economy, it is the ways in which it is changing that are currently more interesting. Taking imports and then exports in turn, this section starts by assessing the key indicators of this change.

### 2.1 China’s Seafood Imports

It is in the makeup of the trade that the change is most apparent. Chinese imports are dominated by whole frozen fish and have been for the past decade (and previously) – accounting for 65% of the total. Together with shellfish, frozen fish accounts for a very dominant 90% of imports and taken together these categories have consistently been the major contributors to seafood imports.

**Table 5: Chinese imports of fish & seafood from 2012–2021 by main category, product weight**

<table>
<thead>
<tr>
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<td>Live fish</td>
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<td>16</td>
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<td>13</td>
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<td>16</td>
<td>22</td>
<td>26</td>
<td>16</td>
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<td>Fresh fish</td>
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<td>39</td>
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<td>49</td>
<td>55</td>
<td>90</td>
<td>105</td>
<td>65</td>
<td>78</td>
<td>2%</td>
</tr>
<tr>
<td>Frozen fish</td>
<td>1,951</td>
<td>2,090</td>
<td>2,101</td>
<td>1,889</td>
<td>1,935</td>
<td>2,143</td>
<td>2,313</td>
<td>2,529</td>
<td>2,203</td>
<td>1,433</td>
<td>65%</td>
</tr>
<tr>
<td>Fillets</td>
<td>34</td>
<td>48</td>
<td>54</td>
<td>51</td>
<td>61</td>
<td>88</td>
<td>156</td>
<td>278</td>
<td>276</td>
<td>167</td>
<td>4%</td>
</tr>
<tr>
<td>Cured dried fish</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>22</td>
<td>24</td>
<td>47</td>
<td>69</td>
<td>43</td>
<td>1%</td>
</tr>
<tr>
<td>Crustacea</td>
<td>128</td>
<td>144</td>
<td>153</td>
<td>175</td>
<td>195</td>
<td>223</td>
<td>381</td>
<td>842</td>
<td>739</td>
<td>794</td>
<td>13%</td>
</tr>
<tr>
<td>Molluscs</td>
<td>312</td>
<td>368</td>
<td>414</td>
<td>432</td>
<td>335</td>
<td>333</td>
<td>326</td>
<td>494</td>
<td>401</td>
<td>613</td>
<td>12%</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>7</td>
<td>16</td>
<td>43</td>
<td>29</td>
<td>51</td>
<td>1%</td>
</tr>
<tr>
<td>Value-added fish</td>
<td>6</td>
<td>11</td>
<td>13</td>
<td>14</td>
<td>16</td>
<td>19</td>
<td>24</td>
<td>30</td>
<td>35</td>
<td>26</td>
<td>1%</td>
</tr>
<tr>
<td>Value-added shellfish</td>
<td>69</td>
<td>62</td>
<td>79</td>
<td>87</td>
<td>31</td>
<td>38</td>
<td>39</td>
<td>43</td>
<td>27</td>
<td>48</td>
<td>2%</td>
</tr>
<tr>
<td>Total</td>
<td>2,543</td>
<td>2,768</td>
<td>2,874</td>
<td>2,724</td>
<td>2,647</td>
<td>2,944</td>
<td>3,391</td>
<td>4,437</td>
<td>3,861</td>
<td>3,277</td>
<td>100%</td>
</tr>
<tr>
<td>WFE*</td>
<td>3,581</td>
<td>3,966</td>
<td>4,200</td>
<td>4,083</td>
<td>3,797</td>
<td>4,235</td>
<td>4,915</td>
<td>6,868</td>
<td>6,064</td>
<td>5,577</td>
<td></td>
</tr>
<tr>
<td>Value $billion</td>
<td>$5.7</td>
<td>$6.2</td>
<td>$6.8</td>
<td>$6.6</td>
<td>$7.1</td>
<td>$8.3</td>
<td>$11.9</td>
<td>$15.8</td>
<td>$12.7</td>
<td>$13.7</td>
<td></td>
</tr>
</tbody>
</table>

Source: ITC TradeMap  *WFE whole fish equivalent or live weight

But frozen fish imports have actually been falling as the graph below makes clear. The rapid reduction after 2019 highlights the change. Covid-19 and associated continued lockdowns in China might explain the steep reduction in 2021-21, but the curve showing the whole fish % of China’s total fish trade shows clearly that the decline began much earlier - in 2017 - and suggests this is a key underlying event. At the same time, imports of shellfish have been growing very rapidly (14%p.a) and some minor seafood categories have been growing even faster – most notably fillet products. What appears to be happening is a consistent underlying trend towards increasing higher value imports that are offsetting a decline in arrivals of frozen raw material.
Chinese seafood exports always exhibited a very different profile to that of imports. Whilst this is not surprising, it is instructive. Some whole frozen fish is exported but it is fillets that dominate (especially when their importance is highlighted through conversion to WFE values). Added to this are sizable quantities of secondarily processed (value-added) seafood (fish and shellfish). Taken together these four categories accounted for close to 80% of all seafood exports, with molluscs (squid mostly) the only other significant category.

Table 6: Chinese exports of fish & seafood from 2012-2021 by main category, product weight

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Live fish</td>
<td></td>
<td>80</td>
<td>90</td>
<td>91</td>
<td>94</td>
<td>89</td>
<td>82</td>
<td>89</td>
<td>93</td>
<td>98</td>
<td>99</td>
<td>2%</td>
</tr>
<tr>
<td>Fresh fish</td>
<td></td>
<td>35</td>
<td>38</td>
<td>28</td>
<td>28</td>
<td>28</td>
<td>20</td>
<td>21</td>
<td>25</td>
<td>33</td>
<td>36</td>
<td>1%</td>
</tr>
<tr>
<td>Frozen fish</td>
<td></td>
<td>966</td>
<td>935</td>
<td>1,018</td>
<td>977</td>
<td>1,078</td>
<td>1,181</td>
<td>1,135</td>
<td>1,152</td>
<td>891</td>
<td>708</td>
<td>25%</td>
</tr>
<tr>
<td>Fillets</td>
<td></td>
<td>1,014</td>
<td>1,048</td>
<td>1,055</td>
<td>962</td>
<td>984</td>
<td>983</td>
<td>930</td>
<td>892</td>
<td>696</td>
<td>639</td>
<td>23%</td>
</tr>
<tr>
<td>Cured dried fish</td>
<td></td>
<td>78</td>
<td>81</td>
<td>77</td>
<td>75</td>
<td>79</td>
<td>95</td>
<td>98</td>
<td>84</td>
<td>64</td>
<td>55</td>
<td>2%</td>
</tr>
<tr>
<td>Crustacea</td>
<td></td>
<td>189</td>
<td>195</td>
<td>194</td>
<td>177</td>
<td>171</td>
<td>161</td>
<td>140</td>
<td>117</td>
<td>116</td>
<td>120</td>
<td>4%</td>
</tr>
<tr>
<td>Molluscs</td>
<td></td>
<td>414</td>
<td>470</td>
<td>573</td>
<td>616</td>
<td>639</td>
<td>586</td>
<td>557</td>
<td>510</td>
<td>454</td>
<td>510</td>
<td>14%</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>11</td>
<td>13</td>
<td>12</td>
<td>10</td>
<td>9</td>
<td>9</td>
<td>8</td>
<td>6</td>
<td>6</td>
<td></td>
<td>0%</td>
</tr>
<tr>
<td>Value-added fish</td>
<td></td>
<td>504</td>
<td>568</td>
<td>612</td>
<td>644</td>
<td>662</td>
<td>703</td>
<td>794</td>
<td>869</td>
<td>977</td>
<td>1,058</td>
<td>19%</td>
</tr>
<tr>
<td>Value-added shellfish</td>
<td></td>
<td>392</td>
<td>400</td>
<td>366</td>
<td>324</td>
<td>348</td>
<td>392</td>
<td>416</td>
<td>375</td>
<td>341</td>
<td>437</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>3,685</td>
<td>3,839</td>
<td>4,026</td>
<td>3,907</td>
<td>4,086</td>
<td>4,211</td>
<td>4,189</td>
<td>4,125</td>
<td>3,676</td>
<td>3,667</td>
<td>100%</td>
</tr>
<tr>
<td>WFE</td>
<td></td>
<td>7,847</td>
<td>8,261</td>
<td>8,674</td>
<td>8,426</td>
<td>8,754</td>
<td>8,906</td>
<td>8,829</td>
<td>8,581</td>
<td>7,619</td>
<td>7,745</td>
<td></td>
</tr>
<tr>
<td>Value $billion</td>
<td></td>
<td>$18.1</td>
<td>$19.4</td>
<td>$20.9</td>
<td>$19.6</td>
<td>$20.0</td>
<td>$20.4</td>
<td>$21.5</td>
<td>$19.9</td>
<td>$18.3</td>
<td>$21.1</td>
<td></td>
</tr>
</tbody>
</table>

Source: ITC TradeMap *WFE whole fish equivalent or live weight
In terms of quantity, Chinese seafood exports have been static over the past decade at 3.6 million tonnes, but did rise during the middle of the decade, peaking at 4.2 million tonnes in 2017. However when translated into WFE, the figures are much higher (at 7.8 and almost 9 million tonnes respectively) – as would be expected given that processing leads to the discarding of as much as two thirds of the fish concerned. Seen this way, China is a net exporter of seafood, ostensibly demonstrating a substantial contribution to exports from domestic production (by capture and culture).

**Figure 12: Chinese seafood exports: tonnes ‘000s & % of total 2012-2021**

The overall rise and demise pattern apply similarly to most categories of exports. The outlier is highly processed (value-added) seafood which has shown continuous rapid growth (6% pa), especially for fish per se, as opposed to shellfish. The overall outcome has then been a reduction of most of the primarily processed products exported, following a peak in 2017-18, largely offset by a rapid rise in their secondarily processed (value-added) alternatives. China’s seafood processing sector has apparently been upping its game.

**Trade balance**

What explains this import/export pattern is China’s well established role in the global seafood sector as a specialist processor rather than a primary producer. Whole frozen fish are imported and processed fish – usually fillet – is exported, sometimes back to the original country of origin of the raw fish. It is within this basic processing segment that the change mentioned above has become evident over the past 3-4 years. In short China is processing less fish for export, but adding more value to what it does process and export, indicated by a move away from fillet and towards value-added products.

But something else is also happening. The graph below, which shows average unit border prices, demonstrates that exports have seen little change in prices (except in 2021 which may be erroneous as the data is provisional). In contrast, import prices have been rising steadily and it appears that China is trading up when importing. The combined impact of higher unit values and the increase in shellfish imports – which are invariably high ticket items - appears to be the cause.
The final graph in this series, shown below, looks at the net trade position. The lines above the horizontal axis (which is in the middle of the graph) represent net imports, those below this axis, being the net exports. The way these have evolved over the past decade is instructive:

- Whilst declining in relative terms as an import, net trade in whole frozen fish has remained largely steady until just recently
- And shellfish trade has switched from net Chinese deficit to net surplus – i.e. more shellfish is being consumed in China. For crustacea, which is dominated by shrimp, the transition occurred between 2014 and 2015 – a period when commentators on the shrimp farming industry had suggested that China was indeed moving from being a net exporter to net consumer of shrimp. The same has recently happened to molluscs (dominated by squid).
- But perhaps the most striking aspect to emerge from the graph is the clarity regarding the trend in net exports moving away from primary processed fillet towards secondary value-added products.

Source: ITC TradeMap
**Fishmeal**

One key element of the Chinese fish and seafood trade balance is missing from the preceding analysis. This is fishmeal – a non-human food item that can be overlooked. This would be a mistake as fishmeal probably represents the area where China has the largest impact upon global aquatic bio-resources through trade. China imports fishmeal – the product of rendering cheap small fish into a dry protein-rich powder as an important ingredient of fish and animal feeds - in large quantities (as well as also producing fishmeal domestically itself, also in quantity). What tends to disguise the importance of fishmeal is the apparently relatively modest quantity in product weight terms (at least in comparison with China’s total aquatic product trade – fishmeal imports were just 1.3 million tonnes p.a. vs 3.6 million tonnes p.a. of food fish over the past decade).

But when the volume of fish consumed in fishmeal’s production is considered, the impact is very much more significant. It takes 4.4 kg of whole fish to produce one kg of fishmeal, so when viewed in WFE terms, fishmeal now constitutes a majority import category at 8 million live weight tonnes - as the graph below demonstrates. China’s fishmeal exports are on the other hand minimal at 2,000 tonnes p.a or less, i.e., below 0.2% of imports, so this is in effect an inwards-only trade - and a very large one.

**Figure 15: Chinese fishmeal imports 2012-21: tonnes ’000s &% of total**

The implications of this are certainly significant. If the data is correct, China is not just the dominant player in the global fishmeal trade (now accounting for 50% of the global import) but when its domestic fishmeal production is included, China’s total consumption possibly equates to over 60% of all global fishmeal production. China’s massive terrestrial farming industry (pork and chicken) no doubt accounts for much of this, but a huge aquaculture industry is also a key factor driving China’s clear dominance in use of this important global protein feedstock.

The graph above shows the quantity of low value or trash fish implied in China’s consumption of fishmeal. It also notes China’s consumption of fish oil, showing this to be around 5% of fishmeal imports. For reasons discussed below, this indicates that fish meal (as opposed to fish oil) is the key determinant of China’s impact upon the global “trash” fish resource.
Overview conclusions

Clearly fishmeal is a major part of the story and needs to be included in the analysis. At the same time, the general significance of whole fish equivalent (WFE) is clear and so restating import data in WFE terms is instructive. The table and figure below do this, clearly demonstrating the degree to which fishmeal has dominated China’s 2012-21 aquatic product imports, when converted to WFE.

Table 7: Average Chinese fish and fish product imports 2012-21 product & WFE weights

<table>
<thead>
<tr>
<th>Category</th>
<th>Product weight</th>
<th>Category</th>
<th>Live weight</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tonnnes ‘000s</td>
<td></td>
<td>Tonnnes ‘000s</td>
<td></td>
</tr>
<tr>
<td>Fishmeal</td>
<td>1,308 29%</td>
<td>Fishmeal</td>
<td>5,806 59%</td>
<td>4%</td>
</tr>
<tr>
<td>Frozen fish</td>
<td>2,059 46%</td>
<td>Frozen fish</td>
<td>2,265 23%</td>
<td>-3%</td>
</tr>
<tr>
<td>Molluscs</td>
<td>403 9%</td>
<td>Molluscs</td>
<td>604 6%</td>
<td>8%</td>
</tr>
<tr>
<td>Crustacea</td>
<td>377 8%</td>
<td>Crustacea</td>
<td>479 5%</td>
<td>23%</td>
</tr>
<tr>
<td>Fillets</td>
<td>121 3%</td>
<td>Fillets</td>
<td>364 4%</td>
<td>19%</td>
</tr>
<tr>
<td>Value-added shellfish</td>
<td>52 1%</td>
<td>Value-added shellfish</td>
<td>112 1%</td>
<td>-4%</td>
</tr>
<tr>
<td>Fresh fish</td>
<td>58 1%</td>
<td>Fresh fish</td>
<td>64 1%</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>76 2%</td>
<td>Other</td>
<td>156 2%</td>
<td>24%</td>
</tr>
<tr>
<td></td>
<td><strong>4,454 100%</strong></td>
<td></td>
<td><strong>9,850 100%</strong></td>
<td><strong>5%</strong></td>
</tr>
</tbody>
</table>

Source: ITC TradeMap, FAO Handbook of Fisheries Statistics & Torrey study

When looked at this way, fishmeal clearly has resource implications that exceed those of the conventional seafood imports (although the latter is substantially more important economically of course). The diagram below makes the point with visual clarity.

So, although China is a net exporter of seafood, it is no such thing for aquatic resources overall when fishmeal is included. Indeed, there is now an annual WFE Chinese quantitative trade deficit of 1-2 million tonnes overall.
Taken together, these findings point to China having retained its role as “seafood processor to the world” but one that is increasingly switching from filleting to more sophisticated value-adding. This is overlain by a move upmarket as the country has increased its imports of high-end shellfish. The latter trade is apparently aimed at domestic consumption, presumably funded by China’s increasing wealth.

Specifically, key observable trends are:

**Imports** The majority of Chinese fish and shellfish imports are raw or semi-processed materials with four product categories accounting for the great majority (90%) of the total – these being

- Whole frozen fish
- Molluscs (mostly squid)
- Crustacea (mostly shrimp) and
- Fish fillet.

Some other products are exhibiting very rapid import growth (e.g. fresh fish, cured fish and “others” – including jellyfish and echinoderms) but from such tiny base volumes that current quantities are relatively minimal (though given the vast scale of the China economy – hardly insignificant). But most important of all is the very high level of fishmeal imports

**Exports** are more diverse from a product viewpoint – with 6 significant categories (i.e. contributing more than 2% to quantities) but with the top four contributing over 80% of the total. The key categories over the past decade, in order of importance, are:

- Fish fillet
- Secondarily processed (value-added) fish (was top of the list by 2020)
- Frozen whole fish
- Molluscs
- Secondarily processed (value-added) shellfish
- Crustacea

**The Geographic Dimension**

China sources seafood globally and exports it very widely – for example the key raw material, whole frozen fish arrived from 97 countries whilst key exports (fillets) were dispatched to 140 countries over the past decade. However, a far narrower range of partners accounted for the great majority of the trade, especially where imports are concerned. This section starts by assessing imports, concentrating on the top three origins for each key product category. In most cases, these three origins collectively accounted for more than half of the trade last year.

**Imports by origin**

Sourcing patterns are instructive - the origin of the fish can be telling regarding the species involved. The principal providers to China are set out in the table below for the major imported product categories. Four such categories account for the great majority of the imports and so analysis is restricted to these where the top three contributors are listed in each case alongside the quantities they supply. These are shown in tonnes ‘000s (product weight, not WFE) alongside their market share. The table also covers the full 10-year review period, showing the position at the 2012 start and for the most recent data point in 2021.

**Table 8: Chinese fish & seafood imports by origin in tonnes ‘000s & % composition**

<table>
<thead>
<tr>
<th>Units: tonnes ‘000s product wt</th>
<th>2012</th>
<th>2021</th>
<th>Units: tonnes ‘000s product wt</th>
<th>2012</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frozen whole fish (product wt)</strong></td>
<td></td>
<td></td>
<td><strong>Fish fillet (product wt)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Origin (exporter)</strong></td>
<td>2012</td>
<td>2021</td>
<td><strong>Origin (exporter)</strong></td>
<td>2012</td>
<td>2021</td>
</tr>
<tr>
<td>Russia</td>
<td>897</td>
<td>46%</td>
<td>519</td>
<td>36%</td>
<td>Viet Nam</td>
</tr>
<tr>
<td>USA</td>
<td>342</td>
<td>18%</td>
<td>160</td>
<td>11%</td>
<td>USA</td>
</tr>
<tr>
<td>Norway</td>
<td>153</td>
<td>8%</td>
<td>139</td>
<td>10%</td>
<td>Russia</td>
</tr>
<tr>
<td>Others*</td>
<td>558</td>
<td>29%</td>
<td>615</td>
<td>43%</td>
<td>Others*</td>
</tr>
<tr>
<td><strong>Crustacea (eg shrimp, crabs, lobster)</strong></td>
<td></td>
<td></td>
<td><strong>Molluscs (eg squid, bivalves)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Origin (exporter)</strong></td>
<td>2012</td>
<td>2021</td>
<td><strong>Origin (exporter)</strong></td>
<td>2012</td>
<td>2021</td>
</tr>
<tr>
<td>Ecuador</td>
<td>6</td>
<td>5%</td>
<td>379</td>
<td>48%</td>
<td>Japan</td>
</tr>
<tr>
<td>India</td>
<td>5</td>
<td>4%</td>
<td>122</td>
<td>15%</td>
<td>Indonesia</td>
</tr>
<tr>
<td>Canada</td>
<td>35</td>
<td>28%</td>
<td>51</td>
<td>6%</td>
<td>Peru</td>
</tr>
<tr>
<td>Others*</td>
<td>81</td>
<td>64%</td>
<td>242</td>
<td>30%</td>
<td>Others*</td>
</tr>
</tbody>
</table>

Source: ITC TradeMap  * the import from all other suppliers

The dominance of the leading suppliers is evident, as is the degree to which these leaders have tended to increase that dominance over the decade (whole frozen fish being the only exception to this). Other trends noted regarding sourcing are as follows:

- In general, the top three sources provide more than 50% of the total supply within each category – confirming that sourcing tends to rely upon a narrow supply base
• This is certainly the case for frozen raw material – where 60-70% arrives from the top three: Russia, USA and Norway, although latterly there has been some broadening of the supply base, so reducing Russian and US dominance

• Primary processed fish imports (fillet) have grown rapidly whilst being very narrowly sourced - now with 82% sourced from a single supplier – Vietnam. This reinforces Vietnam’s emerging role as a key fish “contract” processor, able to challenge China on the basis of cost effectiveness. Although the great bulk of Vietnam’s fillet exports are pangasius, rising exports of cold-water fish (gadoids and salmon) confirms Vietnam’s progress in this direction

• For prime shellfish (essentially shrimp & squid), sourcing is more diverse but has latterly narrowed down to a more limited range of key suppliers, especially for shrimp. China’s transition from net exporter to net importer of shrimp may partially account for this (perhaps favouring bulk low cost suppliers as this becomes more of a commodity market)

Chinese exports by destination

The same exercise, structured in a similar manner has been applied to China’s seafood export trade (and again is based upon product weight). Again the market leaders take substantial market share, but for exports this concentration is much less marked and Chinese exports reach a wide range of markets.

Table 9: Chinese fish & seafood exports by destination in tonnes ‘000s & % distribution

<table>
<thead>
<tr>
<th>Units: tonnes ‘000s</th>
<th>2012</th>
<th>2021</th>
<th>Destination (importer)</th>
<th>2012</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole frozen fish product wt</td>
<td></td>
<td></td>
<td>S Korea</td>
<td>145</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Philippines</td>
<td>117</td>
<td>16%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Thailand</td>
<td>92</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Others*</td>
<td>613</td>
<td>63%</td>
</tr>
<tr>
<td>Crustacea (eg shrimp, crabs, lobster)</td>
<td></td>
<td></td>
<td>S Korea</td>
<td>37</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Japan</td>
<td>36</td>
<td>19%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Spain</td>
<td>16</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Others*</td>
<td>100</td>
<td>53%</td>
</tr>
<tr>
<td>Molluscs (eg squid, bivalves)</td>
<td></td>
<td></td>
<td>S Korea</td>
<td>127</td>
<td>31%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Japan</td>
<td>81</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Philippines</td>
<td>4</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Others*</td>
<td>201</td>
<td>49%</td>
</tr>
</tbody>
</table>

Source: ITC TradeMap* the import from all other suppliers

<table>
<thead>
<tr>
<th>Destination (importer)</th>
<th>2012</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value-added fish (eg canned pelagics)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>89</td>
<td>18%</td>
</tr>
<tr>
<td>Japan</td>
<td>131</td>
<td>26%</td>
</tr>
<tr>
<td>Mexico</td>
<td>14</td>
<td>3%</td>
</tr>
<tr>
<td>Others*</td>
<td>270</td>
<td>54%</td>
</tr>
</tbody>
</table>

Source: ITC TradeMap* the import from all other suppliers
Again the Chinese trade pattern for key products is informative, with that for exports characterised as follows:

- As Chinese exports are far less concentrated upon a few countries than its sourcing, the top three recipients tend to account for a much lower proportion of this more widely dispersed trade – mostly less than 50%.

- Primarily processed fish mostly goes to western markets with the EU still a major destination (with the EU taking 31% of the total over the past decade, rising to over 35% recently, with Germany the largest importer).

- But secondary processed (value-added) fish is more widely exported, destinations including many emerging markets as well as western markets (and with the EU, in contrast, only accounting for 4% of the total for this category).

- Shellfish exports mostly go to wealthier Asian and western markets. However, the EU as a destination for Chinese crustacea is diminishing by 8% pa having dropped to around 5% of the total. In contrast for Chinese molluscs, EU demand has been rising by 2% pa and now accounts for 11% of the total Chinese mollusc export.

**The key species and species groups involved**

For the purposes of this study it is the species and species groups involved rather than the product categories that are of key interest. Understanding this is central to identifying the impact that China’s fish trade is likely to be having upon wild stocks. It also provides pointers regarding the likelihood that EU interests might be affected, as well as helping to interpret the involvement of the 6 target third countries.

**Chinese imports**

Trade data provides species and species group data, and whilst this is not necessarily consistent and is subject to misclassification, it is probably the best data available. The following tables list the more important species where they are identified (much of the trade is undifferentiated species-wise). All quantities have been converted to WFE to highlight the impact upon the respective resource (conversion factors are shown in Appendix 2 below) The range shown is limited to the most important items, but still collectively represents 72% of the total import.

**Table 10: Chinese seafood imports by species or species groups – main species/products WFE**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fresh fish</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atlantic salmon</td>
<td></td>
<td>22.1</td>
<td>17.7</td>
<td>32.0</td>
<td>44.5</td>
<td>36.1</td>
<td>41.6</td>
<td>71.3</td>
<td>81.7</td>
<td>44.7</td>
<td>58.6</td>
</tr>
<tr>
<td><strong>Frozen fish</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alaskan pollock</td>
<td></td>
<td>713.</td>
<td>728.</td>
<td>672.</td>
<td>687.</td>
<td>687.</td>
<td>731.</td>
<td>626.</td>
<td>754.</td>
<td>667.</td>
<td>420.</td>
</tr>
<tr>
<td>Flatfish</td>
<td></td>
<td>90.1</td>
<td>167.</td>
<td>171.</td>
<td>140.</td>
<td>148.</td>
<td>160.</td>
<td>172.</td>
<td>163.</td>
<td>178.</td>
<td>120.</td>
</tr>
<tr>
<td>Mackerel</td>
<td></td>
<td>76.5</td>
<td>79.1</td>
<td>123.</td>
<td>106.</td>
<td>96.1</td>
<td>136.</td>
<td>124.</td>
<td>130.</td>
<td>99.9</td>
<td>81.3</td>
</tr>
<tr>
<td>Pacific salmon</td>
<td></td>
<td>118.</td>
<td>203.</td>
<td>163.</td>
<td>150.</td>
<td>175.</td>
<td>169.</td>
<td>242.</td>
<td>170.</td>
<td>78.3</td>
<td>91.6</td>
</tr>
</tbody>
</table>
The table identifies the 19 species/species groups that represent the key contributors to China’s seafood imports (where these have been differentiated). Taken in turn, these are:

- **Salmon imports**: Atlantic salmon imports now dominate whole fresh fish imports, accounting for nearly 70% of the category. These must be air-flown (because fresh fish (unlike frozen) cannot be sent by land or sea from producer countries (Norway mostly) to China as they are too perishable and the journey time is overly long. They are thus expensive ($11/kg), and so their use as raw material for exported products is unlikely, and the high-end domestic market is the likely end use. Pacific salmon is also imported in quantity but in this case it is a whole frozen product at $3/kg making reprocessing a practical option.

- **Whole frozen whitefish imports**: Alaskan Pollock continues to dominate the category despite the decline in its import (by -6%pa), and together with cod like fish and flatfish still constitutes 44% of the category’s import. Arriving at $1.1-$1.3/kg, this is clearly a commodity product, priced for reprocessing.

- **Pangasius fillet imports**: China’s fillet imports are dominated by a single product from a single source – farmed pangasius catfish from Vietnam which now accounts for 64% of the category after very rapid growth. A landed price of $2/kg for a fillet product helps to explain its rise in popularity.

- **Crustacea– shrimp imports**: China’s crustacean imports have been rising across the species range, but it is shrimp where the growth has been exceptional. China’s pivot from net exporter to net importer must have played a part here and it has been Ecuador that has been a major beneficiary (61% of the total). Much of the warm water shrimp imported could then only be farmed *Penaeus*

---

### Fillets

<table>
<thead>
<tr>
<th>Species</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catfish pangasius</td>
<td>10.1</td>
</tr>
<tr>
<td>20.5</td>
<td></td>
</tr>
<tr>
<td>21.4</td>
<td></td>
</tr>
<tr>
<td>36.0</td>
<td></td>
</tr>
<tr>
<td>67.5</td>
<td></td>
</tr>
<tr>
<td>105.3</td>
<td></td>
</tr>
<tr>
<td>256.5</td>
<td></td>
</tr>
<tr>
<td>549.8</td>
<td></td>
</tr>
<tr>
<td>551.8</td>
<td></td>
</tr>
</tbody>
</table>

### Cured fish

No leading species identified

### Crustacea

<table>
<thead>
<tr>
<th>Species</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shrimp</td>
<td>41.7</td>
</tr>
<tr>
<td>Coldwater shrimp</td>
<td>21.5</td>
</tr>
<tr>
<td>Crabs</td>
<td>60.9</td>
</tr>
<tr>
<td>Lobster</td>
<td>16.3</td>
</tr>
</tbody>
</table>

### Molluscs

<table>
<thead>
<tr>
<th>Species</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Squid &amp; cuttlefish</td>
<td>409.4</td>
</tr>
<tr>
<td>Scallops</td>
<td>92.5</td>
</tr>
<tr>
<td>Octopus</td>
<td>6.6</td>
</tr>
</tbody>
</table>

### Other

<table>
<thead>
<tr>
<th>Species</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jellyfish</td>
<td>25.4</td>
</tr>
<tr>
<td>Sea cucumbers</td>
<td>4.1</td>
</tr>
</tbody>
</table>

### Value-added

<table>
<thead>
<tr>
<th>Species</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuna</td>
<td>3.0</td>
</tr>
<tr>
<td>Sardines</td>
<td>0.6</td>
</tr>
<tr>
<td>Squid &amp; cuttlefish</td>
<td>96.0</td>
</tr>
<tr>
<td>Shrimp</td>
<td>1.0</td>
</tr>
</tbody>
</table>

### Source

ITC TradeMap, FAO Handbook of Fisheries Statistics & Torrey study. * fishmeal imports are discussed in detail below.
vannamei, especially as the other major supplier, India, also now farms P vannamei. The other clearly differentiated type of shrimp imported is cold water shrimp which mostly comes from Canada, but some is supplied by the EU – from Greenland and Denmark in particular. This is almost all imported in frozen form (at an average price of US$5/kg) which would make it potentially economic for reprocessing or it could supply domestic demand.

- **Molluscs – squid & scallop imports**: Squid has been a major Chinese import and has continued growing at 6% pa over the past decade. The more surprising trade has been that in scallops growing at 25% pa to reach 670,000 tonnes although this is perhaps overstated as it is assessed as shell-on (WFE) for a product believed to be mainly traded as detached meats. Both species present potential market opportunity for the EU, but this is a market where Spain is the only EU member to have made much of an impression recently (and that at only a modest 6-7,000 tonnes pa).

- **Other product imports**: Jellyfish is the only other product category to make a significant contribution, but as with scallops the WFE estimate probably exaggerates the product – mostly believed to be traded as in dried form. Even so the 44,000 tonnes imported latterly represents the result of 27%pa growth, so is not inconsequential.

### Chinese exports

As with imports, Chinese exports are analysed in terms of their species composition in the table below. As before the quantities shown are all whole fish equivalent (WFE), and the range shown is limited to the most important items, but still collectively represents almost 70% of the total export

**Table 11: Chinese exports by species or species groups – main species/products WFE**

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Live fish</strong></td>
<td><strong>Carp, eels, other</strong></td>
<td>87.8</td>
<td>375.1</td>
<td>320.7</td>
<td>287.8</td>
<td>278.1</td>
<td>264.7</td>
<td>264.1</td>
<td>292.3</td>
<td>210.7</td>
<td>192.1</td>
</tr>
<tr>
<td><strong>Frozen fish</strong></td>
<td>Mackerel</td>
<td>196.6</td>
<td>168.4</td>
<td>177.7</td>
<td>182.8</td>
<td>288.7</td>
<td>354.1</td>
<td>316.7</td>
<td>313.7</td>
<td>179.3</td>
<td>173.6</td>
</tr>
<tr>
<td></td>
<td>Anchovies&amp;sardines</td>
<td>132.1</td>
<td>123.6</td>
<td>106.8</td>
<td>73.4</td>
<td>67.2</td>
<td>86.3</td>
<td>113.6</td>
<td>211.6</td>
<td>175.6</td>
<td>153.7</td>
</tr>
<tr>
<td></td>
<td>Tilapia</td>
<td>122.3</td>
<td>148.0</td>
<td>134.5</td>
<td>145.9</td>
<td>146.6</td>
<td>143.9</td>
<td>148.7</td>
<td>120.2</td>
<td>101.6</td>
<td>86.7</td>
</tr>
<tr>
<td></td>
<td>YF tuna</td>
<td>10.4</td>
<td>12.4</td>
<td>25.0</td>
<td>29.0</td>
<td>30.6</td>
<td>33.3</td>
<td>16.7</td>
<td>24.2</td>
<td>38.8</td>
<td>25.3</td>
</tr>
<tr>
<td><strong>Fillets</strong></td>
<td>Alaska Pollock</td>
<td>897.5</td>
<td>948.0</td>
<td>810.6</td>
<td>727.3</td>
<td>702.8</td>
<td>667.4</td>
<td>668.1</td>
<td>737.9</td>
<td>532.6</td>
<td>485.6</td>
</tr>
<tr>
<td></td>
<td>Cod</td>
<td>310.6</td>
<td>370.2</td>
<td>433.6</td>
<td>397.6</td>
<td>412.6</td>
<td>415.4</td>
<td>379.4</td>
<td>381.4</td>
<td>313.6</td>
<td>296.1</td>
</tr>
<tr>
<td></td>
<td>Other northern whitefish</td>
<td>402.7</td>
<td>396.0</td>
<td>421.7</td>
<td>400.8</td>
<td>409.6</td>
<td>428.6</td>
<td>439.6</td>
<td>414.3</td>
<td>373.5</td>
<td>330.5</td>
</tr>
<tr>
<td></td>
<td>Tilapia</td>
<td>493.2</td>
<td>500.1</td>
<td>468.5</td>
<td>421.4</td>
<td>421.6</td>
<td>375.7</td>
<td>310.0</td>
<td>211.9</td>
<td>80.0</td>
<td>71.7</td>
</tr>
<tr>
<td></td>
<td>Pacific salmon</td>
<td>147.6</td>
<td>161.1</td>
<td>205.5</td>
<td>158.1</td>
<td>176.0</td>
<td>187.4</td>
<td>178.2</td>
<td>170.7</td>
<td>171.5</td>
<td>119.3</td>
</tr>
</tbody>
</table>

**Cured fish**

| **Crustacea** | Shrimp | 185.3 | 187.1 | 180.4 | 151.9 | 156.2 | 140.7 | 115.0 | 85.8 | 95.6 | 99.8 |

126
Coldwater shrimp & 7.4 & 4.9 & 4.3 & 4.0 & 3.7 & 4.6 & 4.6 & 4.1 & 3.5 & 3.8 
Crabs & 34.7 & 40.7 & 45.5 & 50.5 & 42.6 & 41.9 & 42.0 & 43.1 & 35.3 & 36.5 
Lobster & 1.2 & 1.1 & 1.0 & 1.1 & 0.6 & 0.5 & 0.4 & 0.4 & 0.3 & 0.3 

<table>
<thead>
<tr>
<th>Molluscs</th>
<th>Value-added</th>
<th>Tuna</th>
<th>Squid &amp; cuttlefish</th>
<th>Scallop</th>
<th>Octopus</th>
<th>Clams</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>108. 0</td>
<td>139. 5</td>
<td>160. 2</td>
<td>158. 3</td>
<td>169. 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>106. 9</td>
<td>108. 1</td>
<td>115. 8</td>
<td>141. 5</td>
<td>127. 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>34.5 4</td>
<td>44.7 3</td>
<td>43.7 38.6</td>
<td>53.8 63.2</td>
<td>52.2 77.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>127. 9</td>
<td>146. 0</td>
<td>131. 7</td>
<td>124. 5</td>
<td>122. 9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>337. 6</td>
<td>329. 0</td>
<td>243. 4</td>
<td>191. 3</td>
<td>220. 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>186. 5</td>
<td>202. 8</td>
<td>203. 1</td>
<td>208. 8</td>
<td>231. 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21.9 2</td>
<td>22.6 2</td>
<td>28.5 27.3</td>
<td>28.9 30.1</td>
<td>30.9 27.9</td>
</tr>
</tbody>
</table>

Source: ITC TradeMap, FAO Handbook of Fisheries Statistics & Torrey study

- **Whitefish fillet exports**: Fillet exports have declined as already noted, but still remain sizable. Alaska pollock fillet exports averaged 0.72 million tonnes (WFE) set against imports of raw whole pollock of 0.67million tonnes– values close enough to confirm that reprocessing for export is China’s main use of pollock*. This is a product category that has particular relevance for the EU which received 220,000 tonnes in 2021, although the quantity has been declining slowly.

- **Pacific salmon fillet exports**: the comparison made for Alaskan pollock applies similarly to Pacific salmon. An import of 160,000 tonnes (WFE) of whole salmon can be linked to a fillet export of 170,000 tonnes (WFE) signalling another reprocessing trade.60

**Tilapia exports**: China is the world largest farmer of tilapia, with an industry closely tied to exports. These exports mostly go to the USA (fillets) and Africa (fish too small to fillet so exported whole) all frozen. This trade seems to have declined rapidly, especially since 2018 with the overall disruption to US/China trade likely to have been a determining factor.

- **Value added fish exports**: EU imports of these secondary processed products increased (in direct contrast to the declining trend for primary fillet products) rising from 17,000 tonnes in 2012 to

60 In the authors’ experience, these discrepancies between the Chinese imported quantity and the reciprocal export of between 4% and 6% are not unusual for trade data and within the norm for errors rather than signalling unexplained quantities (e.g. undeclared landings).
40,000 tonnes in 2021 (44,000 tonnes in 2020) showing growth of 10%pa. This is ahead of global growth of these Chinese exports of 9% pa. However, they still remain small in relation to primary processed fillet imports by the EU.

- **Tuna value-added exports**: China now exports 260,000 tonnes pa (WFE) of presumably mostly canned tuna, up from around 100,000 tonnes in 2012. If this does signal China’s intention to expand in the canned fish sector it will have implications for island states – especially the case study countries such as the Solomon Islands, Mauritius and Madagascar as well as Senegal and Ecuador. All are current or former players in the canned tuna industry, as well of course is the EU tuna industry.

- **Shellfish exports**: Chinese shellfish exports essentially reflect imports, with shrimp, squid and scallops prominent but with the addition of clams – and with the latter two categories’ contributions probably inflated by conversion to WFE. Shrimp has shown the most change as raw shrimp exports declined by 7%pa whilst value added exports were steadier – suggesting that domestic consumption was rising whilst secondary processing for export continued to expand.

**Conclusions**

The overall situation of the Chinese fish and seafood sector is, from an international trade perspective, one of transition. This transition is from a leading processor of fish raw material for re-export as primary products (fillet) increasingly towards one of sourcing aquatic products – many of them prime items and some processed – for domestic consumption. The other key trend is the steady replacement of primary by secondary processed products in the Chinese export offer as this sector appears to be becoming more sophisticated and value-adding. This is a process in motion rather than a completed pivot to domestic consumption, but the trends are clear:

- Growing imports of prime whole fresh fish (Atlantic salmon).
- Reducing imports of raw whole fish (northern gadoid white fish).
- Increased imports of prime shellfish (shrimp, squid).
- Reduced exports of primary fillet products.
- But increased exports of secondary value-added products.
- But massive non-food import of fishmeal is the most important factor from a resource impact viewpoint (for reasons given in the first case study below).

It was perhaps inevitable that rising national wealth (especially amongst China’s fast expanding middle class – put by some as 0.6 million) would prompt such a transition, and indeed the rise in demand is already evident. However, such is the scale of the Chinese economy that even though some segments of the trade may be diminishing, they are still likely to generate substantial impact globally. Investigating this as it relates to the case study countries, to the EU and to the world more widely, is the objective of the brief case studies that follow. These try to take a more nuanced approach, focusing upon the likely significant impacts.

**The Case Studies**

This section concerns the third and final analytical stage of this assessment of the trade-related implications of China’s impact upon global seafood and aquatic bio-resources. The preceding sections
provide the basis for this specific, detailed and relevant analysis of a number of key topics, chosen on the basis of being:

- Relevant to the six case study third countries
- Having potential for providing insights regarding the two key TOR requirements (TORs #7 and #8) i.e. implications for the EU, and especially the protection of EU interests
- Having significant wider global environmental, socio-economical and geopolitical implications

This has been resolved through proving a number of brief case studies which are set out below

**Case study 1: Fishmeal – China’s largest trade-related impact on global aquatic bio-resources.**

China’s massive impact upon the global supply of fishmeal has already been broadly described, and so this case study looks into this in more detail. The analysis starts with assessing which of the products of the rendering of fish (fishmeal or fish oil) is the key determinant of China’s impact.

A graph in the text above (Figure 16) shows the quantity of low value (or “trash”) fish implied in China’s consumption of fishmeal, setting the scene for the analysis that follows. The graph also notes China’s consumption of fish oil. This is relevant here because, when fish is rendered, the outcome is two products - fishmeal and fish oil (i.e. the protein & lipid fractions). Production of the latter is generally in the ratio of 20:100, oil to fishmeal. I.e., for each 100kg of fishmeal, 20kg of oil is produced. If the ratio of national imports shows oil to exceed 20% of meal then it is oil that determines how much raw fish can be related to that country’s import. If the converse is true, then it is fishmeal that is the key indicator.

In this case oil is only around 5% of meal imports and so it is fishmeal that is the key determinant of China’s impact upon the global “trash” fish resource – and so this is the commodity focused upon here.

Chinese dominance of trade is evident in the table below – where China accounts for nearly 40% over the past decade (and nearly 50% by 2021). This is over six times larger than the next largest importer, Japan.

**Table 12: Global trade in fishmeal & China’s sourcing pattern within the global marketplace (product wt)**

<table>
<thead>
<tr>
<th>Units tonnes ‘000s, product wt</th>
<th>2012-21 average</th>
<th>2012-21 average</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>World total import</strong></td>
<td>3,450</td>
<td>100%</td>
</tr>
<tr>
<td>China</td>
<td>1,308</td>
<td>38%</td>
</tr>
<tr>
<td>Japan</td>
<td>205</td>
<td>6%</td>
</tr>
<tr>
<td>Norway</td>
<td>186</td>
<td>5%</td>
</tr>
<tr>
<td>Taiwan</td>
<td>147</td>
<td>4%</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>128</td>
<td>4%</td>
</tr>
<tr>
<td>Turkey</td>
<td>114</td>
<td>3%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>91</td>
<td>3%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>85</td>
<td>2%</td>
</tr>
<tr>
<td>Greece</td>
<td>79</td>
<td>2%</td>
</tr>
<tr>
<td><strong>China total import</strong></td>
<td>1,308</td>
<td>100%</td>
</tr>
<tr>
<td>Peru</td>
<td>677</td>
<td>52%</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>108</td>
<td>8%</td>
</tr>
<tr>
<td>USA</td>
<td>98</td>
<td>7%</td>
</tr>
<tr>
<td>Chile</td>
<td>87</td>
<td>7%</td>
</tr>
<tr>
<td>Russia</td>
<td>62</td>
<td>5%</td>
</tr>
<tr>
<td>Thailand</td>
<td>58</td>
<td>4%</td>
</tr>
<tr>
<td>Mauritania</td>
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<td>4%</td>
</tr>
<tr>
<td>Mexico</td>
<td>40</td>
<td>3%</td>
</tr>
<tr>
<td>Ecuador</td>
<td>33</td>
<td>3%</td>
</tr>
</tbody>
</table>

Source: ITC TradeMap
China’s sourcing of fishmeal is similarly highly skewed, as the majority of Chinese fishmeal imports come from Peru (52% over the past decade, 56% in 2021) alongside Chile (7%) and study target country, Ecuador (3%). This means that when Chilean and Ecuadorian contributions are included, the total supply from the SE Pacific is 61-62% of the total Chinese import. The implication is that the bulk of this will be anchoveta (*Engraulis ringens*), perhaps alongside some other small pelagics from Chile.

Looked at from the Andean countries perspective, this means that China accounts for the great majority of their fishmeal export. Indeed, if this data is accepted, it suggests that China could account for the great majority of consumption of one of the world’s most abundant fish resources – 78% over the past decade, rising to 90% latterly – and all through trade.

**Table 13: China’s demand for small pelagics based fishmeal. Units: tonnes ‘000s WFE**

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</thead>
<tbody>
<tr>
<td><strong>Andean Region, WE Pacific (anchoveta, <em>Engraulis</em>) WFE</strong></td>
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<tr>
<td>Global anchoveta catch</td>
<td>4,693</td>
<td>5,674</td>
<td>3,140</td>
<td>4,310</td>
<td>3,192</td>
<td>3,923</td>
<td>7,045</td>
<td>4,249</td>
<td>4,954*</td>
<td>5,712*</td>
</tr>
<tr>
<td>China’s anchoveta import†</td>
<td>3,792</td>
<td>2,742</td>
<td>2,785</td>
<td>2,785</td>
<td>2,397</td>
<td>4,503</td>
<td>3,996</td>
<td>3,797</td>
<td>3,495</td>
<td>5,077</td>
</tr>
<tr>
<td>Chinese % of the total</td>
<td>81%</td>
<td>48%</td>
<td>89%</td>
<td>65%</td>
<td>75%</td>
<td>115%</td>
<td>57%</td>
<td>89%</td>
<td>71%</td>
<td>89%</td>
</tr>
</tbody>
</table>

| **Mauritania (Sardinella) WFE** | | | | | | |
| Total fishmeal export | 139 | 153 | 297 | 295 | 331 | 532 | 568 | 490 | 571 | 422 |
| Export to China | 0 | 0 | 0 | 0 | 31 | 195 | 224 | 292 | 375 | 337 |
| Chinese % of the total | 0% | 0% | 0% | 0% | 9% | 37% | 39% | 60% | 66% | 80% |

Source: ITC TradeMap * projections† implied import in WFE terms if all fishmeal is anchoveta-based

Mauritania presents a comparable case, but perhaps one more directly relevant for this study, Mauritania being a case study country. The resource in question is another small pelagic, *Sardinella spp* in this case. What makes this particularly relevant is the involvement of China in this relatively recent expansion of the Mauritanian fishmeal industry, importing 80% of Mauritania’s exports. Moreover, press reports suggest Chinese companies (Fujian Poly Hong Dong& Sunrise) are major investors in the plants, working with Turkish vessels in the fishery.

**Relevant implications:**

Such is China’s domination of this trade that its impact is global, affecting all countries with livestock industries (pork, chicken and especially, aquaculture) in that a key feed ingredient is likely to get more expensive and perhaps less available. This obviously includes the EU, and some peripheral European countries with large salmon farming industries that depend upon fishmeal in their feed.

More specifically case study countries that are suppliers to China are directly affected – Ecuador as a long term supplier to China (100-200,000 tonnes pa) and Mauritania (an increasingly important source for China, rising from 30,000 tonnes to 340,000 tonnes since 2016). What adds particular EU interest in the latter case, is the recently concluded fisheries agreement with Mauritania (www.europarl.europa.eu/news/8/6/22), which provides EU vessels with fishing opportunities in Mauritanian waters, including access to the *sardinella* stock. This stock has already been the subject of concerns about overfishing as well as its conversion to meal rather than human food, and the EU agreement specifically addresses these concerns.

**Case study 2: Prime Whitefish fillet exports:** China has traditionally played a leading role in the fish “re-processing” industry – where raw material (whole frozen fish) is imported, primarily processed as
fillet and then exported, indeed sometimes back to the country of origin of the raw material. Within the EU the primarily processed fillet was frequently further secondarily processed into retail products (fish fingers, breaded fillet, ready meal packs). This relationship appears to be changing, as already noted above.

Chinese prime whitefish fillet exports have declined generally (4% pa overall), but still remain sizable. The headline product is Alaskan pollock, arguably the world’s most abundant cold water medium quality white fish (3.4 million tonnes pa). Alaska pollock fillet exports averaged 0.72 million tonnes (WFE) set against imports of whole pollock of 0.70 million tonnes. For instance, exports exceeded imports by 3% but that is well within the tolerances that can realistically be expected for trade data. It does though tie in with FAO data showing China is no longer landing Alaskan pollock and tends to confirm that China’s pollock trade is primarily based upon import, processing and export. As a result, China’s impact upon global Alaskan pollock landings through trade is considerable – accounting for 20-23% of the total.

For higher quality exports (cod, flatfish) the numbers do not tie up so neatly, with fillet exports exceeding raw imports by 50-80% when expressed in WFE terms. The possibility that some fillet exports are mislabelled as better quality products might be suspected, but that might be over-interpreting the data (i.e. crediting it with greater precision than is reasonable to expect).

Table 14: China’s trade in whitefish: raw imports and processed exports (WFE)

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</thead>
<tbody>
<tr>
<td><strong>Chinese whole frozen fish imports</strong></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alaskan pollock</td>
<td>746</td>
<td>762</td>
<td>703</td>
<td>719</td>
<td>718</td>
<td>764</td>
<td>654</td>
<td>789</td>
<td>698</td>
<td>440</td>
<td>-6%</td>
</tr>
<tr>
<td>Cod</td>
<td>177</td>
<td>207</td>
<td>229</td>
<td>206</td>
<td>231</td>
<td>238</td>
<td>219</td>
<td>201</td>
<td>177</td>
<td>165</td>
<td>-1%</td>
</tr>
<tr>
<td>Flatfish</td>
<td>94</td>
<td>175</td>
<td>179</td>
<td>147</td>
<td>155</td>
<td>168</td>
<td>181</td>
<td>171</td>
<td>186</td>
<td>126</td>
<td>3%</td>
</tr>
<tr>
<td>Haddock</td>
<td>58</td>
<td>48</td>
<td>49</td>
<td>39</td>
<td>57</td>
<td>56</td>
<td>55</td>
<td>48</td>
<td>53</td>
<td>55</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,07</td>
<td>1,19</td>
<td>1,16</td>
<td>1,11</td>
<td>1,16</td>
<td>1,22</td>
<td>1,10</td>
<td>1,20</td>
<td>1,11</td>
<td>786</td>
<td>-3%</td>
</tr>
<tr>
<td><strong>Chinese frozen fish fillet exports</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alaskan pollock fillets</td>
<td>897</td>
<td>948</td>
<td>811</td>
<td>727</td>
<td>703</td>
<td>667</td>
<td>668</td>
<td>738</td>
<td>533</td>
<td>486</td>
<td>-7%</td>
</tr>
<tr>
<td>Cod fillets</td>
<td>311</td>
<td>370</td>
<td>434</td>
<td>397</td>
<td>413</td>
<td>416</td>
<td>379</td>
<td>381</td>
<td>314</td>
<td>296</td>
<td>-1%</td>
</tr>
<tr>
<td>Flatfish fillets</td>
<td>200</td>
<td>215</td>
<td>243</td>
<td>236</td>
<td>217</td>
<td>207</td>
<td>208</td>
<td>188</td>
<td>164</td>
<td>146</td>
<td>-3%</td>
</tr>
<tr>
<td>Haddock fillets</td>
<td>96</td>
<td>86</td>
<td>71</td>
<td>58</td>
<td>79</td>
<td>85</td>
<td>80</td>
<td>74</td>
<td>70</td>
<td>71</td>
<td>-3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,50</td>
<td>1,61</td>
<td>1,55</td>
<td>1,41</td>
<td>1,41</td>
<td>1,37</td>
<td>1,33</td>
<td>1,38</td>
<td>1,08</td>
<td>998</td>
<td>-4%</td>
</tr>
<tr>
<td>Tilapia fillets</td>
<td>493</td>
<td>500</td>
<td>469</td>
<td>421</td>
<td>403</td>
<td>376</td>
<td>310</td>
<td>212</td>
<td>80</td>
<td>72</td>
<td>-19%</td>
</tr>
</tbody>
</table>

Source: ITC TradeMap

There is another aspect that may have an indirect impact upon EU ACP partners. Another historically important whitefish export is tilapia. Unlike the other white fish in question, the raw material is produced in China — China is the global leader in tilapia farming (1.2 million tonnes of a global total of 4.5 million). Most is filleted and exported, with USA as the principal market. This trade has been in decline, with the 25% tariffs imposed by the USA (partially lifted in March 2020) no doubt part of the explanation. There was a side trade to this – fish too small to fillet were exported to developing countries – principally in Africa – at low prices. The latter trade has been declining, possibly in concert
with the US fillet trade decline (leading to an overall drop in production), reducing both the availability of material and the incentive to supply developing countries.

**Relevant implications:** This is a product category that has had particular relevance for the EU which received 297,000 tonnes of Chinese mostly whitefish fillet in 2012 (about 10% was Pacific salmon). This has subsequently declined by 3%pa to 220,000 tonnes by 2021, but China’s total global fillet export has declined faster - by 5%pa. The implication is that the EU can probably expect reducing scope for “contract processing” of prime cold-water prime fish by China, with alternatives (e.g., Vietnam, N Africa) taking on this labour-intensive role in the value chain. Germany, where Alaskan pollock is popular, is the Member State most likely to be impacted.

**Case study 3: Value-added tuna exports:** The coastal zone south of Shanghai has been adding tuna processing to its suite of aquatic food industries with cities of Ningbo and Zhoushan as key foci. China now exports 260,000 tonnes pa (WFE) of presumably mostly canned tuna, up from around 100,000 tonnes in 2012 (The relevant HS code is 160414, which signifies canned tuna but includes frozen cleaned fillets or “loins”). However, the raw material supply to generate this export poses some questions. This supply is partly provided through imports (whole frozen skipjack and yellowfin tuna), which averaged 73,000 tonnes but has dropped to 20-40,000 tonnes recently. This pattern was matched by landings of 60-80,000 tonnes that have declined to around 20,000 tonnes latterly as the table below demonstrates.

### Table 15: China’s supply and export of skipjack and yellowfin tuna, Units: Tonnes 000s WFE

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</tr>
</thead>
<tbody>
<tr>
<td>Frozen whole tuna imports</td>
<td>51</td>
<td>72</td>
<td>76</td>
<td>72</td>
<td>68</td>
<td>52</td>
<td>95</td>
<td>79</td>
<td>36</td>
<td>18</td>
</tr>
<tr>
<td>Chinese tuna landings</td>
<td>57</td>
<td>88</td>
<td>70</td>
<td>53</td>
<td>27</td>
<td>29</td>
<td>20</td>
<td>20</td>
<td>21*</td>
<td>22*</td>
</tr>
<tr>
<td>Total raw tuna supply</td>
<td>108</td>
<td>161</td>
<td>145</td>
<td>124</td>
<td>95</td>
<td>81</td>
<td>116</td>
<td>100</td>
<td>57</td>
<td>41</td>
</tr>
<tr>
<td>Processed tuna exports</td>
<td>108</td>
<td>139</td>
<td>160</td>
<td>158</td>
<td>169</td>
<td>173</td>
<td>201</td>
<td>235</td>
<td>259</td>
<td>257</td>
</tr>
<tr>
<td>Apparent deficit</td>
<td>0</td>
<td>22</td>
<td>-15</td>
<td>-34</td>
<td>-75</td>
<td>-92</td>
<td>-85</td>
<td>-135</td>
<td>-202</td>
<td>-217</td>
</tr>
</tbody>
</table>

Source: ITC TradeMap, FAO FishStat * projections

This shows that there was a balance between imports and exports at the beginning of the decade, but this rapidly changed to a substantial deficit by 2021. In short, the raw material input was far too small to match the level of exports (let alone to supply any additional domestic demand). The implication is that China must now be importing at least some 200,000 tonnes of raw tuna more than that declared, or alternatively landing an equivalent amount from its fishery, again in addition to the level of catch reported by FAO.

**Relevant implications.** If this does herald China’s intention to continue its expansion within the canned tuna sector it will have implications for island states – especially case study countries such as the Solomon Islands, Mauritius and Madagascar as well as possibly Senegal and Ecuador (and other ACP states) – i.e. all current or former players in the canned tuna industry. It could also impact the EU Spanish and French tuna fleet who could meet increasing competition for access to EEZs – especially in the Western Pacific - that they formerly fished. The apparent Chinese deficit in the raw material supply is an obvious cause for concern. Moreover, the increasing Chinese influence in the Western Pacific adds to the concern. The much-reported pivot by the Solomon Islands through switching alignment from Taiwan to China, is clearly a case in point. China’s averred aim to increase participation in the Solomons’ tuna industry does perhaps signal a substantial change.
Case study 4 - Ecuador, Vietnam & China - warm water shrimp (*Penaeus vannamei*). A curious triangular relationship was noted by shrimp industry commentators in 2016. Ecuador had begun to export shrimp in quantity to Vietnam according to Ecuadorian export statistics. Vietnam did not acknowledge any such imports, and indeed as the table below shows has been consistently a major net exporter (exports exceeding imports by 4.5 times over the past decade). One possibility is that this was a re-processing trade where Ecuador was providing cost-effective value-adding to Ecuadorean raw material for re-export – but the trade data shows no concomitant surge in Vietnamese exports of secondarily processed shrimp.

The conclusion reached at the time was that this substantial quantity of shrimp (43% of Ecuadorian output and 4.4% of the 5 million tonnes of shrimp farmed globally at the time) was entering the grey market or informal trade into China, possibly for tax-related reasons. Subsequent data shows rapidly rising Ecuadorean/China trade in shrimp from 2018-19, an outcome consistent with the regularisation of what was suspected to have been a previously informal trade relationship.

This occurred at a significant point in time, because it followed a pivot in China's role in the global shrimp sector from net exporter to net importer. However more significantly, it demonstrates how - despite both recipient countries being members of the WTO (China since 2001, Vietnam since 2007) - large volumes of high value seafood trade can apparently escape formal documentation.

### Table 16: Shrimp trade between Ecuador, Vietnam & China (product weight)

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<tbody>
<tr>
<td><strong>Ecuador production &amp; export</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Total Ecuador production</td>
<td>281</td>
<td>304</td>
<td>340</td>
<td>403</td>
<td>422</td>
<td>460</td>
<td>560</td>
<td>680</td>
<td>685*</td>
<td>754*</td>
</tr>
<tr>
<td>Total Ecuador export</td>
<td>209</td>
<td>223</td>
<td>297</td>
<td>342</td>
<td>371</td>
<td>442</td>
<td>512</td>
<td>645</td>
<td>689</td>
<td>848</td>
</tr>
<tr>
<td>Ecuador exports to Vietnam</td>
<td>17</td>
<td>38</td>
<td>73</td>
<td>118</td>
<td>226</td>
<td>204</td>
<td>61</td>
<td>6</td>
<td>6</td>
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<tr>
<td>Ecuador exports to China</td>
<td>7</td>
<td>8</td>
<td>15</td>
<td>28</td>
<td>11</td>
<td>16</td>
<td>99</td>
<td>352</td>
<td>361</td>
<td>391</td>
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<tr>
<td><strong>Chinese crustacean imports</strong></td>
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<tr>
<td>Total Chinese import</td>
<td>128</td>
<td>144</td>
<td>153</td>
<td>175</td>
<td>195</td>
<td>223</td>
<td>381</td>
<td>842</td>
<td>739</td>
<td>794</td>
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<td>Chinese imports from Vietnam</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>13</td>
<td>39</td>
<td>44</td>
<td>27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chinese imports from Ecuador</td>
<td>6</td>
<td>7</td>
<td>17</td>
<td>27</td>
<td>14</td>
<td>15</td>
<td>77</td>
<td>323</td>
<td>319</td>
<td>379</td>
</tr>
<tr>
<td><strong>Vietnamese crustacean trade</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Imports</td>
<td>29</td>
<td>333</td>
<td>41</td>
<td>42</td>
<td>53</td>
<td>46</td>
<td>39</td>
<td>40</td>
<td>41*</td>
<td></td>
</tr>
<tr>
<td>Exports: 1y processed shrimp</td>
<td>141</td>
<td>291</td>
<td>40</td>
<td>234</td>
<td>281</td>
<td>208</td>
<td>249</td>
<td>258</td>
<td>265*</td>
<td></td>
</tr>
<tr>
<td>Exports: 2y processed shrimp</td>
<td>104</td>
<td>127</td>
<td>94</td>
<td>110</td>
<td>123</td>
<td>111</td>
<td>111</td>
<td>139</td>
<td>125</td>
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<tr>
<td><strong>Ecuador EU trade</strong></td>
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<tr>
<td>Exports to Major EU markets</td>
<td>72</td>
<td>73</td>
<td>81</td>
<td>80</td>
<td>87</td>
<td>82</td>
<td>87</td>
<td>91</td>
<td>106</td>
<td>129</td>
</tr>
</tbody>
</table>

Source ITC TradeMap. * projections

**Relevant implications:** this is clearly highly important for Ecuador as it has become closely tied to the Chinese market. For the EU the challenge is more the potential eventual narrowing of warm water shrimp sourcing options as Ecuador becomes increasingly China orientated. Spain, France and Italy could be most impacted as they now collectively import more than 100,000 tonnes/year of frozen raw
shrimp from Ecuador, as the table shows. Furthermore, this event also has generic implications in the way it has undermined confidence in the accuracy of seafood trade data.

**Case study 5 Salmon, Pacific and Atlantic.** Salmon exemplifies some of the key themes that have emerged from this analysis – responding to both the move towards higher value imports and China’s role as a bulk fish processor. Two categories of raw material are involved – fresh whole farmed Atlantic salmon and frozen whole Pacific salmon. The former is imported apparently mostly for high-end domestic consumption and the import has been growing rapidly (11%pa). Continued growth at this rate would suggest that consumption could rise to 170,000 tonnes pa. However, in the context of the current 2.6 million tonnes now farmed globally (including 1.4 million tonnes from Norway) this seems unlikely to disturb the EU market

**Table 17: Chinese trade in Atlantic and pacific salmon. Units: Tonnes’000s WFE**

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<tbody>
<tr>
<td><strong>Chinese salmon imports</strong></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fresh whole Atlantic salmon</td>
<td>22</td>
<td>18</td>
<td>32</td>
<td>44</td>
<td>36</td>
<td>42</td>
<td>71</td>
<td>82</td>
<td>45</td>
<td>59</td>
<td>11%</td>
</tr>
<tr>
<td>Frozen whole Atlantic salmon</td>
<td>6</td>
<td>8</td>
<td>9</td>
<td>14</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>5</td>
<td>-1%</td>
<td></td>
</tr>
<tr>
<td>Frozen whole Pacific salmon</td>
<td>117</td>
<td>202</td>
<td>162</td>
<td>149</td>
<td>174</td>
<td>168</td>
<td>241</td>
<td>169</td>
<td>78</td>
<td>91</td>
<td>-3%</td>
</tr>
<tr>
<td><strong>Chinese salmon imports</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Frozen fillets of Pacific salmon</td>
<td>148</td>
<td>161</td>
<td>206</td>
<td>158</td>
<td>176</td>
<td>187</td>
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<td>172</td>
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<td>Import/export balance, Pac. salmon</td>
<td>126%</td>
<td>80%</td>
<td>127%</td>
<td>106%</td>
<td>101%</td>
<td>112%</td>
<td>74%</td>
<td>101%</td>
<td>221%</td>
<td>131%</td>
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</table>

Source: ITC TradeMap

In contrast the Pacific salmon trade reflects China’s role as a contract processor as this is, like prime commodity whitefish, clearly mostly imported for reprocessing and export. Imports that averaged 155,000 tonnes (WFE)over the decade can be linked to a fillet export equivalent to 167,000 tonnes (also WFE). There is then an 8% disparity between these figures, which is of course well within the tolerances that reflect the errors inherent in trade data.

**Relevant implications:** This trade would affect EU member states rather than third countries, and the potential impact could be mixed – (i) China could take larger quantities of Atlantic salmon from the EU’s major supplier, Norway, prompting price increases for a product that has become widely popular, especially in France, and is no longer produced in quantity in the EU since UK’s departure. (ii) Pacific salmon is exported as processed products to the EU who benefit from the reduced processing costs. In both cases, the impact is seen as likely to be limited for reasons noted already.

**Case study 6: Shellfish.** China is increasingly becoming an importer of prime shellfish, unsurprising in view of the long standing popularity of seafood, rising national wealth and the predilection for extravagant entertaining that aims to impress. The rising dominance of warm water shrimp, particularly from Ecuador has been noted already in a previous case study. But there are some other relevant aspects of the shellfish trade, discussed below:

**Crustacea – cold water shrimp imports:** alongside warm water shrimp, another clearly differentiated type of shrimp is imported by China - cold water shrimp which mostly comes from Canada, but is also supplied by the EU. This *Pandalus* shrimp differs from water shrimp (*penaeids*) in various ways – it is captured rather than cultured, is small in size and is sold whole or as peeled tails. Whilst it has been imports of the warm water segment that has grown so rapidly, cold water shrimp has more than maintained its position, growing at 6%pa since 2012 to rise from 22,000 to 43,000 tonnes pa. Its share
of the segment fell from 40% of the import to 5% but that has been due to the exceptional growth in warm water shrimp supplies to China.

**Relevant implications**: Canada is the leading supplier but the EU is a major contributor, with Greenland and Denmark the major players along with the Baltic countries. Although increasingly becoming a relatively niche component of the Chinese market, it has in fact grown and clearly retained its role as a valuable niche product.

**Shellfish exports overall.** In terms of quantity, Chinese shellfish imports essentially mean shrimp, squid and scallops with the latter’s contribution inflated by WFE (i.e. being traded as shucked meats, but adjusted by adding back in the weight of the heavy shell). Crabs and lobster are significant high-value niche contributors. Exports ostensibly reflect this pattern, but not when looked at more closely. Squid exports mirrored imports and net trade would seem to have been minimal at the beginning and end of the decade but there has been (i) strong growth in value-adding at 8% pa and (ii) a surge in exports from 2016 to 2018. Scallop exports are large, but only two thirds of reciprocal imports overall, and have been falling rapidly (to 30%) pointing to growing domestic consumption – a pattern magnified within the trade in shrimp. Clams are new entrants to the export market, again with a possibly exaggerated showing when assessed in WFE terms (for reasons already described - due to the high shell weight).

**Table 18: Export-to-import ratios (by quantity WFE) for key shellfish categories**

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<td>Squid export/import</td>
<td>90%</td>
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<td>Scallop export/import</td>
<td>154%</td>
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<td>100%</td>
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<tr>
<td>Shrimp export/import</td>
<td>825%</td>
<td>646%</td>
<td>473%</td>
<td>285%</td>
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<td>302%</td>
<td>145%</td>
<td>39%</td>
<td>42%</td>
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</table>

Source: ITC TradeMap

The underlying trend over the decade has been for the balance of exports to imports to increasingly swing towards imports. And wherever the number in the table drops below 100% it signals that imports exceed exports (with all values converted to WFE terms). All major shellfish categories reflect this trend, but it has been shrimp where change is clearest. In 2012, shrimp exports exceeded imports eight fold but by 2018 had dropped to a mere 40-45% of imports (i.e. imports were over twice as large as exports). China’s underlying pivot from net exporter to net importer of shrimp no doubt is part of the explanation, but the rapidity of the change suggests that domestic demand was rising very quickly. Underlying this was a marked decline in raw shrimp exports (-7% pa) whilst value added exports have largely marked time.

**Relevant implications.** As already mentioned, the implications are mixed, with China’s domestic demand for high-end shellfish likely to add increasing competition within the market – with benefits for producers (Ecuador, some EU countries for cold water shrimp) but possible price escalation for EU Mediterranean shrimp consumers.
### Appendix 1: Chinese imports by main species groups, Units: tonnes ‘000s Product weight

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<td>0.4</td>
<td>0.3</td>
<td>0.6</td>
<td>1.0</td>
<td>1.2</td>
<td>2.2</td>
<td>2.3</td>
<td>2.1</td>
<td>2.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sea cucumbers</td>
<td>0.0</td>
<td>0.1</td>
<td>0.1</td>
<td>0.5</td>
<td>0.1</td>
<td>0.1</td>
<td>0.4</td>
<td>0.8</td>
<td>2.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other*</td>
<td>1.1</td>
<td>1.2</td>
<td>1.6</td>
<td>36.8</td>
<td>17.9</td>
<td>7.5</td>
<td>2.2</td>
<td>4.3</td>
<td>1.9</td>
<td>6.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1,91</td>
<td>2,18</td>
<td>2,24</td>
<td>2,17</td>
<td>2,04</td>
<td>2,27</td>
<td>2,58</td>
<td>3,60</td>
<td>3,15</td>
<td>2,95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of full total</td>
<td>75%</td>
<td>79%</td>
<td>78%</td>
<td>80%</td>
<td>77%</td>
<td>77%</td>
<td>81%</td>
<td>82%</td>
<td>85%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: ITC Source ITC TradeMap - *"other* is undifferentiated products where species is undisclosed
**Appendix 2: Conversion factors applied to fish products in this study to convert them from product weight to whole weight equivalents (WFE) or live weight**

<table>
<thead>
<tr>
<th>Category</th>
<th>Factor applied</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fresh fish</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atlantic salmon</td>
<td>1.10</td>
<td>gutted</td>
</tr>
<tr>
<td><strong>Frozen whole fish</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White fish inc Alaska Pollock</td>
<td>1.10</td>
<td>Gutted</td>
</tr>
<tr>
<td>Mackerel</td>
<td>1.00</td>
<td>frozen whole</td>
</tr>
<tr>
<td>Pacific salmon</td>
<td>1.13</td>
<td>gutted</td>
</tr>
<tr>
<td><strong>Fillets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catfish pangasius</td>
<td>2.63</td>
<td>fillets, skin off</td>
</tr>
<tr>
<td>Alaskan Pollock</td>
<td>2.78</td>
<td>fillets, skin off</td>
</tr>
<tr>
<td>Other northern whitefish</td>
<td>2.74</td>
<td>average skin off</td>
</tr>
<tr>
<td>Tilapia</td>
<td>2.75</td>
<td>fillets, skin off</td>
</tr>
<tr>
<td>Cod</td>
<td>3.23</td>
<td>fillets, skin off</td>
</tr>
<tr>
<td>Haddock</td>
<td>2.86</td>
<td>fillets, skin off</td>
</tr>
<tr>
<td>Pacific salmon</td>
<td>2.00</td>
<td>fillets, skin off</td>
</tr>
<tr>
<td><strong>Crustacea</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shrimp</td>
<td>1.27</td>
<td>whole &amp; tails mix</td>
</tr>
<tr>
<td>Coldwater shrimp</td>
<td>1.00</td>
<td>frozen whole</td>
</tr>
<tr>
<td>Crabs</td>
<td>1.00</td>
<td>whole</td>
</tr>
<tr>
<td>Lobster</td>
<td>1.58</td>
<td>whole &amp; tails mix</td>
</tr>
<tr>
<td><strong>Molluscs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Squid &amp; cuttlefish</td>
<td>1.50</td>
<td></td>
</tr>
<tr>
<td>Scallops</td>
<td>6.80</td>
<td>assuming meat only</td>
</tr>
<tr>
<td>Octopus</td>
<td>1.30</td>
<td></td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jellyfish</td>
<td>5.00</td>
<td>assume all dried</td>
</tr>
<tr>
<td>Sea cucumbers</td>
<td>2.45</td>
<td>assume all dried</td>
</tr>
<tr>
<td><strong>Value-added fish (Canned)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuna</td>
<td>1.90</td>
<td></td>
</tr>
<tr>
<td>Mackerel</td>
<td>1.95</td>
<td></td>
</tr>
<tr>
<td>Sardines</td>
<td>2.00</td>
<td></td>
</tr>
<tr>
<td><strong>Processed shellfish</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Squid &amp; cuttlefish</td>
<td>1.45</td>
<td></td>
</tr>
<tr>
<td>Shrimp</td>
<td>2.80</td>
<td></td>
</tr>
<tr>
<td>Octopus</td>
<td>1.30</td>
<td></td>
</tr>
<tr>
<td>Crabs</td>
<td>4.50</td>
<td></td>
</tr>
<tr>
<td>Clams</td>
<td>6.00</td>
<td></td>
</tr>
<tr>
<td><strong>Fishmeal</strong></td>
<td>4.44</td>
<td>IFFO &amp; FAO</td>
</tr>
</tbody>
</table>

Sources: FAO Handbook of Fisheries Statistics (Coordinating Working Party on Fishery Statistics (CWP)) and Yield and nutritional value of the commercially more important fish species Torrey Research Station, UK, ISBN 92-5-102870-2
ANNEX 5 - LIST OF REGIONAL FISHERIES BODIES AND THE LINK TO THEIR LISTS OF IUU REPORTED VESSELS

This table includes a list of Regional Fisheries Bodies and the link to their lists of IUU reported vessels hosted by the FAO’s Global Record of Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels (see [https://www.fao.org/global-record/information-system/rfb-iuu-vessels-lists/en/](https://www.fao.org/global-record/information-system/rfb-iuu-vessels-lists/en/)).

Table 19: List of Regional Fisheries Bodies and the link to their lists of IUU reported vessels

<table>
<thead>
<tr>
<th>RFBs</th>
<th>Abbreviation</th>
<th>Link to IUU Vessel List</th>
</tr>
</thead>
</table>

Source: FAO
ANNEX 6 - BLUE PARTNERSHIP PRINCIPLES

The below table presents the titles, descriptions, and objectives of the 16 Blue Partnership Principles that were established to align with the “blue” outcomes of joint marine conservation, scientific marine development, enhanced marine wellbeing, blue prosperity, and the construction of a world-wide “blue homeland” (see section 5.1 on EU-China cooperation at bilateral level for further details).

Table 20: Blue Partnership principles

<table>
<thead>
<tr>
<th>N.</th>
<th>Principle title</th>
<th>Description/Measures</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Conserve the Marine Ecosystems</td>
<td>• Share objectives of marine ecosystem conservation &lt;br&gt;• Prevention and reversal of ecosystem degradation&lt;br&gt;• Joint marine ecosystems monitoring&lt;br&gt;• Support of nature-based solutions&lt;br&gt;• Conversation and restoration of marine ecosystems&lt;br&gt;• Establish and manage marine protected areas&lt;br&gt;• Restore and maintain health&lt;br&gt;• Service functions and biodiversity value of marine ecosystems</td>
<td>“To promote the health and resilience of the marine ecosystems” (p. 2)</td>
</tr>
<tr>
<td>2</td>
<td>Tackle Climate Change</td>
<td>• Promote cooperation on climate change actions in ocean field &lt;br&gt;• Strengthen academic research cooperation on topics such as sea level change, deoxygenation, acidification, ocean warming and heatwaves, melting of polar ice and snow, and blue carbon sink&lt;br&gt;• Promote marine climate adaptation and mitigation&lt;br&gt;• Information technology cooperation, sharing on marine observation and monitoring, disaster prediction, prevention and mitigation&lt;br&gt;• Provide jointly public service products&lt;br&gt;• Achieve “Ocean Carbon Neutrality”</td>
<td>“To enhance the capacity of our partners on coping with disasters and climate change in ocean field, and to safeguard the blue homeland of human beings.” (p. 3)</td>
</tr>
<tr>
<td>3</td>
<td>Reduce Marine pollution</td>
<td>• Minimize use of non-essential disposable plastic products&lt;br&gt;• Enhance management of marine litter and microplastics&lt;br&gt;• Control and decrease dumping&lt;br&gt;• Reduce marine pollution caused by land activities and ships&lt;br&gt;• Limit damage of underwater noise to marine life</td>
<td>“To keep the ocean healthy and clean” (p. 3)</td>
</tr>
<tr>
<td>4</td>
<td>Sustainable Use of Marine Resources</td>
<td>• Support conservation and sustainable marine biological resources and their genetic resources&lt;br&gt;• Function and value evaluations of marine ecosystem services&lt;br&gt;• Promotion of the value realization of ecological products</td>
<td>To promote the sustainable development and use of marine resources under the</td>
</tr>
<tr>
<td>No.</td>
<td>Role and Impact</td>
<td>Key Actions</td>
<td>Premise/Quote</td>
</tr>
<tr>
<td>-----</td>
<td>----------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| 1   | Encourage development of green and sustainable marine aquaculture     | • Support the end of overfishing, illegal, unreported, and unregulated fishing and destructive fishing practices  
|     |                 | • Maintain the sustainable production and safety of the oceans              | (p. 4)                                                                                            |
|     |                 | • Incentivize development of clean renewable energy                         |                                                                                                  |
| 2   | Support the end of overfishing, illegal, unreported, and unregulated   | • Encourage development of green and sustainable marine aquaculture           | (p. 4)                                                                                            |
|     | fishing and destructive fishing practices                              |                                                                                             |                                                                                                  |
| 3   | Maintain the sustainable production and safety of the oceans           | • Support the end of overfishing, illegal, unreported, and unregulated fishing and destructive fishing practices  
|     |                 | • Incentivize development of clean renewable energy                         | (p. 4)                                                                                            |
| 4   |                 | Premise of giving priority to protection. (p. 4)                             |                                                                                                  |
| 5   | Thrive Blue Economy | • Promote marine industries in a “technologically innovative and environmentally friendly way”  
|     |                 | • Upgrade existing marine industries based on clean production, green technologies, circular economy, and best practices  
|     |                 | • Promote formation of new blue industries                                  | (p. 4-5)                                                                                        |
|     |                 | • Create new financial platforms, products, standards, and service systems under the framework of Green Financial System and “Sustainable Blue Economy Finance Principles”  
|     |                 | • Explore healthy coastal tourism community models                           |                                                                                                  |
|     |                 | • Create ocean friendly spaces                                              |                                                                                                  |
|     |                 | • Realize coordinated sustainable development of both land and sea areas    |                                                                                                  |
| 6   | Strengthen Guidance of Technological Innovation | • Support foundation research in ocean field  
|     |                 | • Take part in and contribute to the United Nations Decade of Ocean Science for Sustainable Development (2021-2030)  
|     |                 | • Enrich knowledge necessary for sustainable development                      | (p. 5)                                                                                            |
|     |                 | • Strengthen the comprehensive cognition and understanding of ocean          |                                                                                                  |
|     |                 | • Facilitate the transformation of marine scientific and technological achievements  
|     |                 | • Promote widespread use of marine knowledge                                  |                                                                                                  |
| 7   | Implement Integrated Management | • Advocate the implementation of integrated ecosystem-based marine management through the following measures:  
|     |                 | • Supporting the implementation of the global maritime spatial planning project  
|     |                 | • Reducing and avoiding the adverse impacts of human activities on coastal zones and oceans  
|     |                 | • Encouraging the exchange of best practices and implementation and evaluation studies  
|     |                 | “To enhance the cognition of ocean and strengthen the leading role of knowledge to sustainable development” (p. 5)  
| 8   | Contribute Solutions | • Encourage actions to support sustainable ocean development through nature-based solutions  
|     |                 | • Make efforts to conduct the cooperation into solutions contributing to achieve the 2030 Agenda for Sustainable Development Goals (particularly SDG14 and SDG17)  
|     |                 | • Bring positive impact on the health of marine ecosystems and the promotion of blue growth  
|     |                 | “To increase the efficiency of maritime cooperation and the pertinence of solutions.” (p. 6)  
| 9   | Reinforce Capacity Building | • Support small island states, low- and middle-income countries and the least developed countries through human resources training, technical assistance, and formulation of marine development planning  
|     |                 | • Encourage the development of localized blue industries  
|     |                 | • Create employment opportunities  
|     |                 | • Increase incomes  
|     |                 | • Improve livelihoods  
|     |                 | • Enhance their abilities to produce benefits through sustainable use of marine resources  
|     |                 | “To enhance the capacity for sustainable development of small island states, low- and middle-income countries and the least developed countries.” (p. 7)  
| 10  | Adhere to Openness and Inclusiveness | • Promote the establishment of an open and inclusive global blue partnership  
|     |                 | • Adhere to the principle of seeking common ground while reserving differences  
|     |                 | “To promote the formation of a more open, inclusive and |
| 11 | Welcome Multi-party Participation | • Recognize the wide participation of multi-stakeholders is the key to advancing global maritime cooperation | “To promote broad, democratic and scientific solutions to problems in ocean field.” (p. 7) |
| 12 | Encourage Voluntary Commitments | • Encourage partners to make voluntary commitments for the Blue Partnership within their respective capabilities, based on their own circumstances | “To enhance the initiative and enthusiasm of blue partners to deliver on their commitments.” (p. 8) |
| 13 | Take Collective Actions | • Willingness to work together with all governments and stakeholders | “To strengthen partner cooperative relations, and engage in collective actions in various forms.” (p. 9) |
| 14 | Promote Legislative Governance | • Advocate activities among partners in accordance with international, regional, national laws and other relevant institutional frameworks, centered on the United Nations Convention on the Law of the Sea | “To promote marine governance mechanism more legislative and equitable.” (p. 10) |
| 15 | Share Development Outcomes | • Commit to sharing the outcomes of blue development | “To ensure the openness and transparency of the Blue Partnership, make the outcomes of blue development benefit more people around the world.” (p. 10) |
| 16 | Safeguard Intergenerational Equity | • Take full consideration to the rights and opportunities of future generations to use marine resources and enjoy marine space | “To promote the intergenerational equity in marine 11 sustainable development” (p. 10-11) |
## ANNEX 7 - LIST OF FISHERIES-RELATED AGREEMENTS SIGNED BETWEEN THE SIX COUNTRIES OF FOCUS AND OTHER COUNTRIES, INCLUDING THE EU AND CHINA

This annex presents the list of agreements discussed in section 5.4.

Table 21: List of fisheries-related agreements signed between the six countries of focus and other countries, including the EU and China

<table>
<thead>
<tr>
<th>Item #</th>
<th>Countries/Regions/Organization(s) involved</th>
<th>Year</th>
<th>Description of the fishing access-related agreement or practice</th>
<th>Type of Agreement</th>
<th>Overlapping Interests</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ecuador - China</td>
<td>1970s-2000s</td>
<td>There have been records showing China encouraging joint ventures between Chinese fishing companies and Ecuador and also establishing cooperation with Ecuador and 37 other states.</td>
<td>Joint Venture</td>
<td></td>
<td>Xue (2006)</td>
</tr>
<tr>
<td>2</td>
<td>Ecuador - IFAD</td>
<td>1978 - 1983</td>
<td>A total of $280,000 USD financial aid was provided by International Fund for Agricultural Development (IFAD) to Ecuador through FAD’s “Fisheries Development Project”.</td>
<td>International Assistance</td>
<td>d-portal (2002a)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Ecuador - Spain</td>
<td>2017</td>
<td>Ecuador and Spain signed an agreement in which Spain agreed to provide training and assistance to Ecuador’s fishing sector in order to strengthen Ecuadorian fisheries products in the international market.</td>
<td>Bilateral agreement</td>
<td>d-portal (2017)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Ecuador - Japan</td>
<td>2012 - 2013</td>
<td>Through the “Project for the rehabilitation of fisheries facilities for fisheries development”, the Japan International Cooperation Agency (JICA) so far invested nearly $400,000 USD in the rehabilitation and maintenance of fisheries-related facilities and equipment that have been damaged by natural disaster or other causes in Ecuador.</td>
<td>Bilateral agreement</td>
<td>d-portal (2022b)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Ecuador - Japan</td>
<td>2014</td>
<td>Undescribed small financial aid was provided to Ecuador by Japan. A total of $6,741 USD was offered in 2014.</td>
<td>International Assistance</td>
<td>d-portal (2022c)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Ecuador-China</td>
<td>2018</td>
<td>Ecuador joins China’s Belt and Road Initiative. The EU issued a warning (“yellow card”) to Ecuador due to the poor management of their IUU fishing problem. Ecuador is working towards getting the “yellow card” revoked through improving its fisheries practice.</td>
<td>Bilateral agreement</td>
<td>Sacks (2022)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Ecuador - EU</td>
<td>2019</td>
<td>MERCOSUR, which Ecuador is part of, signed an agreement with China Ocean Group, and both parties will collaborate on building a new distant fishing base in Ecuador.</td>
<td>Bilateral agreement</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Ecuador - China</td>
<td>2020</td>
<td>Through the “Ecuador 2019 Pesca CISP” project, the Spanish Agency for International Development Cooperation (AECID) so far invested €475,000 in Ecuador, as a means of improving the artisan fisheries sector of the country and facilitating capacity-building among local fishers.</td>
<td>Joint Venture</td>
<td>OEweek (2020)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Ecuador - Spain</td>
<td>2020 - 2023</td>
<td>Through the “Ecuador 2019 Pesca CISP” project, the Spanish Agency for International Development Cooperation (AECID) so far invested €475,000 in Ecuador, as a means of improving the artisan fisheries sector of the country and facilitating capacity-building among local fishers.</td>
<td>Bilateral agreement</td>
<td>d-portal (2022d), AECID (2021)</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Ecuador - Italy</td>
<td>2021 - 2024</td>
<td>Through the “Innovation and sustainability strengthening the artisanal fishing sector at Manabi (Su.S.A.Fi.se.M)” project, the Italian Agency for Cooperation and Development (AICS) so far invested around $1.6 million USD in Ecuador, as a means of reducing the effects of climate change and promoting the employment of women and young people in the fishing sector in the Province of Manabi, Ecuador.</td>
<td>Bilateral agreement</td>
<td>d-portal (2022e)</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Country</td>
<td>Year</td>
<td>Summary</td>
<td>Source(s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----</td>
<td>----------------</td>
<td>------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Ecuador</td>
<td>2022</td>
<td>Ecuador joined the Fisheries Transparency Initiative, under which Ecuador will be committed to improving the transparency of their information about the fisheries sector. Ecuador's Ministry of Production, Foreign Trade, Investment, and Fishing has made available the details of registered fishing vessels, fishermen, companies, and regulations online. However, details on how many of these vessels or companies are under joint ventures with foreign companies and what the agreements are between the companies are still largely unknown to the public.</td>
<td>Transparency agreement - Fishery Transparency Initiative (2022a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Ecuador - China</td>
<td>2022</td>
<td>China and Ecuador released a joint statement, in which both countries are committed to deepening the partnership between the two countries in the fisheries sector.</td>
<td>Bilateral agreement - XinHua News Agency (2022)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Madagascar - EU</td>
<td>1986</td>
<td>First fisheries agreement with the EU</td>
<td>Bilateral agreement - European Commission (2022a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Madagascar - ADF</td>
<td>2006 - 2014</td>
<td>The African Development Fund (ADF) supported the development of the Tuléar Fishing Communities Support Project (Projet d'Appui aux Communautés de pêcheurs (PACP) de Tuléar), which aimed to halt the current dwindling production in traditional fishing areas threatened by overfishing, consolidate fishermen's organisations and state services, and provide fishermen with credit. Moreover, the project would produce an additional annual yield of 800 tonnes of octopus and 3,000 tonnes of fish, help fishermen to procure new fishing means and gain access to credit while engaging in sustainable management of fishery resources.</td>
<td>International Assistance - ADF (2022f)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Madagascar - EU</td>
<td>2007 - 2018</td>
<td>EU and Madagascar had a 6-year (2007-2012 and renewed in 2013-2018) tuna fishery agreement (an SFPA) which allowed vessels from Spain, Portugal, Italy, and France to fish in Malagasy waters.</td>
<td>Bilateral agreement - European Commission (2022a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Madagascar - China; Madagascar - France</td>
<td>Starting from 2009</td>
<td>CNFC Overseas Fisheries gained majority control over Somapeche, a member of the Groupement des Aquaculteurs et Pêcheurs de Crevettes à Madagascar (GAPCM). The GAPCM is a local group of eight large fishing companies that possess substantial fishing access in Madagascar. Many other companies in the GAPCM are backed by French investors.</td>
<td>Joint Ventures - Carver (2021)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Madagascar - China</td>
<td>2009</td>
<td>CNFC Overseas Fisheries purchased 77% of a Malagasy fishing company as a means to gain the right to fish in Madagascar.</td>
<td>Joint Ventures - CNFC Overseas Fisheries (2014)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Madagascar - Netherlands</td>
<td>2009 - 2021</td>
<td>The Dutch government initiated the &quot;Private Sector Investment Programme&quot;, which is available for Dutch and foreign companies entering into long-term cooperation with local fisheries partners in Madagascar. The programme would boost the investment in significantly innovative projects in the private sector in developing countries.</td>
<td>Joint Ventures - d-portal (2022g)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Madagascar - Netherlands</td>
<td>2011 - 2017</td>
<td>The Dutch government invested around $980,000 USD in a bilateral project that aimed to establish the first community-based commercial sea cucumber cultivation and processing facility to produce 5 tonnes of organic trepang annually.</td>
<td>Bilateral agreement - d-portal (2022h)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Madagascar - Japan</td>
<td>2013 - 2014</td>
<td>The Japanese government invested a total amount of $2.85 million USD in Madagascar's fishing sectors. Details of the investments are not provided online.</td>
<td>Bilateral agreement - d-portal (2022i-n)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Madagascar - Netherlands</td>
<td>2014 - 2021</td>
<td>The Dutch government committed nearly $50,000 USD to a bilateral project that aimed to establish two farms at the coast and a transfer-site near the airport for live crab (annual production of about 180,000 live crabs from own farms and the community-based farms) and a farm with an annual production of 36,000 soft shell crab.</td>
<td>Bilateral agreement - d-portal (2022o)</td>
<td></td>
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<tr>
<td>No.</td>
<td>Country 1 - Country 2</td>
<td>Years</td>
<td>Project Details</td>
<td>Type of Agreement</td>
<td>Document Details</td>
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<tr>
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</tr>
<tr>
<td>23</td>
<td>Madagascar - Australia</td>
<td>2015 - 2018</td>
<td>The Australian government invested $2.1 million USD in the bilateral project “Innovation in the Blue Economy (Indian Ocean)”, which sought to reengineer aquaculture to improve economic productivity and environmental sustainability with a particular focus on developing countries in the Indian Ocean region, and funded a joint workshop with the Commonwealth Scientific and Industrial Research Organisation (CSIRO) to identify challenges and opportunities for economic growth and environmental sustainability in the Indian Ocean.</td>
<td>Bilateral agreement</td>
<td>d-portal (2022p)</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Madagascar - EU</td>
<td>2015 - 2021</td>
<td>The EU committed around $1.9 million USD to a bilateral project that focuses on supporting small-scale farms to master the conduct of profitable and sustainable fish farming within the framework of an organised sector.</td>
<td>Bilateral agreement</td>
<td>21, 24, 40, d-portal (2022q)</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Madagascar - Norway</td>
<td>2016</td>
<td>The Norwegian government committed nearly $1.4 million USD to a bilateral project that focuses on fish farming development and structuring of a producers' organisation for commercialisation of production for national markets.</td>
<td>Bilateral agreement</td>
<td>21, 23, 40, d-portal (2022r)</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Madagascar - Norway</td>
<td>2016</td>
<td>The Norwegian government committed around $740,000 USD to a bilateral project that focuses on strengthening sea cucumber production, commercialisation, and the development of a producers' organisation to promote producers' interests and development.</td>
<td>Bilateral agreement</td>
<td>19, d-portal (2022s)</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Madagascar - UK</td>
<td>2016</td>
<td>The United Kingdom's government committed $2.1 million USD to a bilateral project that focuses on equipping fishing boats with location trackers, which can also transmit SOS signal to authorities when fishers press the provided SOS buttons.</td>
<td>Bilateral agreement</td>
<td>d-portal (2022t)</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Madagascar - China</td>
<td>2017</td>
<td>RUSHUN, a company with vessels registered in China, started fishing in Malagasy waters under a joint venture with the local company, Maprosud.</td>
<td>Joint Venture</td>
<td>Gorez (2020)</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Madagascar - China</td>
<td>2017</td>
<td>Madagascar joined China's Belt and Road Initiative, and both countries agreed to strengthen fisheries cooperation between the two countries. The details of how both countries would cooperate were not disclosed.</td>
<td>Bilateral agreement</td>
<td>Ma (2017)</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Madagascar - Germany</td>
<td>2017 - 2022</td>
<td>The German federal government initiated a coastal protection project in collaboration with the Malagasy government, in which Germany committed €11,844,754 USD to the sustainable management of natural resources in the coastal areas of Madagascar. The project facilitates the development and implementation of resource management agreements such as the designation of protection zones and times, restrictions on fishing instruments, the promotion of alternative sources of income in the areas of aquaculture and agriculture and the afforestation of mangrove forests.</td>
<td>Bilateral agreement</td>
<td>d-portal (2022u)</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Madagascar - China</td>
<td>2018</td>
<td>A fishing access agreement worth $2.7 billion USD was signed between China and Madagascar, which would allow China to operate 330 vessels in the country. Nonetheless, there is no sign that the agreement was later fulfilled.</td>
<td>Bilateral agreement</td>
<td>Carver (2018), Gorez (2020)</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Madagascar - China</td>
<td>2018</td>
<td>The Malagasy company with a majority of Chinese investors, Côte d'Or, signed 2 fishing access agreements with the Malagasy government to gain fishing access for 28 vessels for various fishing types.</td>
<td>Joint venture</td>
<td>Gorez (2020)</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Madagascar - EU</td>
<td>2018 - 2022</td>
<td>The EU committed around $6.8 million USD to the promotion of value chains adapted to climate change in Madagascar's fishing sector.</td>
<td>Bilateral agreement</td>
<td>d-portal (2022v)</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Madagascar - Sweden</td>
<td>2018 - 2022</td>
<td>The Swedish International Development Cooperation Agency (Sida), under the Swedish government, committed nearly $330,000 USD to strengthening and empowering civic society in Madagascar so that they can actively influence marine governance, law and policymaking, and reform processes across the Northern Mozambique Channel.</td>
<td>Bilateral agreement</td>
<td>d-portal (2022w)</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Madagascar - Sweden</td>
<td>2019 - 2024</td>
<td>Sida initiated a project in Madagascar that aims to enhance the economic benefits of the country from the sustainable use of marine resources, including through the sustainable management of fisheries, aquaculture and tourism.</td>
<td>Bilateral agreement</td>
<td>d-portal (2022x)</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Country - Country</td>
<td>Date</td>
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<tr>
<td>36</td>
<td>Madagascar - Norway</td>
<td>2020</td>
<td>The Norwegian government committed around $1.7 million USD to a bilateral project that focuses on improving food security in Tamatave and Antananarivo in Madagascar, which will be achieved by increased healthy fish proteins in the form of fresh tilapia on ice, sold by Tilapia de l'Est (TDE) and their contractors at market outlets and by resellers, wholesalers and others who will increase their income from tilapia sales due to increased production by TDE. Bilateral agreement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Madagascar - EU</td>
<td>2020 - 2022</td>
<td>The EU committed nearly $14 million USD to a bilateral project that focused on the sustainable development of rural household incomes and their food and nutritional security, in particular, that of women and children, and the preservation of the natural environment in the peri-urban area of Antananarivo, Madagascar. Fisheries development is one of the programme’s targets. Bilateral agreement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Madagascar - Germany</td>
<td>2020 - 2029</td>
<td>Germany committed around $8.6 million USD to the “Protection and Sustainable Use of Natural Resources” (Schutz und nachhaltige Nutzung natürlicher Ressourcen) programme in Madagascar. It aims for the sustainable management of mangroves and other natural marine resources by local communities, thereby improving their socio-economic livelihoods. Bilateral agreement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>Madagascar</td>
<td>2021</td>
<td>Publicly committed to implementing the Fisheries Transparency Initiative (FTI). Transparency agreement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Madagascar - China</td>
<td>2021</td>
<td>A local company with Chinese ties gained rights for eight fishing vessels to fish in Madagascar till 2025. Joint Venture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Madagascar - EU</td>
<td>2021 - 2025</td>
<td>The EU committed $300,000 USD to developing a network of family farms, integrating rice-fish farming agro-ecological practices into their operating system, and to promote sustainable development of the sector. This project is part of the programme described in item 34. Bilateral agreement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>Mauritania - Spain</td>
<td>1964</td>
<td>An agreement signed between the two countries allowed Spanish fleets to fish in the 6 miles of Mauritania territorial waters, with financial compensation, supported by the owners of the boats, and a transfer of skills from the Spanish fishermen to local fishermen. Bilateral agreement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>Mauritania - EU</td>
<td>1987 - 2027</td>
<td>The EU and Mauritania have a long partnership in the fisheries sector. The first fisheries agreement was signed in 1987 and was in place until 2006. It was then replaced by a Fisheries Partnership Agreement, and in 2021, it was replaced by the current SFPA. Under the current SFPA, EU fishing vessels can choose from 8 different categories of marine species for their applications for fishing access. The EU pays €57.5 million of access fees per year plus €16.5 million over the course of the agreement to support local fishing communities and improve fisheries governance. Bilateral agreement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Mauritania - ADF</td>
<td>1989 - 2009</td>
<td>Through the artisanal fisheries development project, the African Development Bank (ADF) has provided funding for the development of a training centre to train new artisanal fishermen and provided them with vessels and appropriate tools for fishing. International assistance</td>
<td></td>
<td></td>
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<tr>
<td>45</td>
<td>Mauritania - EU</td>
<td>1990-2004</td>
<td>The EU had a subsidy scheme for European shipowners to permanently transfer the vessel and set up a joint venture with local operators in a third country. Through the programme, 8 joint ventures were set up and 9 vessels were transferred to Mauritania. The programme was abolished at the end of 2004 due to pressure from civil society. Joint Venture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>Mauritania - Germany</td>
<td>1990-2022</td>
<td>Germany has been supporting Mauritania’s effort to monitor fishery activities in its waters and promote responsible management of important fisheries resources through funding and engaging in dialogues in fisheries policies. The funding has aided in the implementation of policies, acquisition and construction of surveillance vessels, introduction of satellite-based monitoring system, and continual support to the Mauritian coast guards in technical equipment and training. Bilateral agreement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>Mauritania - China</td>
<td>1991</td>
<td>The first bilateral agreement was signed between the two countries, allowing Chinese vessels to fish in Mauritania waters. Bilateral agreement</td>
<td></td>
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</tbody>
</table>

**Note:** The date ranges in the table indicate the duration of agreements or projects, unless specified otherwise.
<table>
<thead>
<tr>
<th></th>
<th>Country 1</th>
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<th>Year(s)</th>
<th>Type of Assistance</th>
<th>Reference</th>
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<tbody>
<tr>
<td>48</td>
<td>Mauritania - Spain; Mauritania - the Netherlands</td>
<td></td>
<td>1991</td>
<td>Private agreement</td>
<td>Cherif (2009)</td>
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<tr>
<td>49</td>
<td>Mauritania - ADF</td>
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<td>1999 - 2000</td>
<td>International assistance</td>
<td>d-portal (2021b)</td>
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<tr>
<td>50</td>
<td>Mauritania - Netherlands</td>
<td></td>
<td>2007-2010</td>
<td>Bilateral agreement</td>
<td>d-portal (2021b)</td>
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<tr>
<td>51</td>
<td>Mauritania - China</td>
<td></td>
<td>2010</td>
<td>Private agreement</td>
<td>d-portal (2021b)</td>
</tr>
<tr>
<td>52</td>
<td>Mauritania - China</td>
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<td>2010</td>
<td>Private agreement</td>
<td>d-portal (2021b)</td>
</tr>
<tr>
<td>53</td>
<td>Mauritania - Canada</td>
<td></td>
<td>2010-2012</td>
<td>International assistance</td>
<td>d-portal (2021b)</td>
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<tr>
<td>54</td>
<td>Mauritania - China</td>
<td></td>
<td>2012</td>
<td>Bilateral agreement</td>
<td>d-portal (2021b)</td>
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<tr>
<td>55</td>
<td>Mauritania - Japan</td>
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<td>2012</td>
<td>Bilateral agreement</td>
<td>d-portal (2021b)</td>
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<td>56</td>
<td>Mauritania - Japan</td>
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<td>2013-2014</td>
<td>International assistance</td>
<td>d-portal (2021b)</td>
</tr>
<tr>
<td>57</td>
<td>Mauritania - China</td>
<td></td>
<td>2016</td>
<td>Investment</td>
<td>d-portal (2021b)</td>
</tr>
<tr>
<td>58</td>
<td>Mauritania - Japan</td>
<td></td>
<td>2016</td>
<td>Bilateral agreement</td>
<td>d-portal (2021b)</td>
</tr>
<tr>
<td>59</td>
<td>Mauritania - FAO</td>
<td></td>
<td>2016-2017</td>
<td>International assistance</td>
<td>d-portal (2021b)</td>
</tr>
<tr>
<td>60</td>
<td>Mauritania - World Bank</td>
<td></td>
<td>2016-2021</td>
<td>International assistance</td>
<td>d-portal (2021b)</td>
</tr>
</tbody>
</table>

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Role and impact of China on world fisheries and aquaculture

A private agreement signed between the two countries allowed Spain to catch cephalopod again after Mauritania originally banned all foreign fleets from cephalopod fisheries in the 1980s. In the same period, 10 Dutch pelagic trawlers were given private fishing licences.

The African Development bank provided funding for the construction of the Nouakchott fishing wharf to aid in the development of artisanal and semi-industrial fisheries.

The Netherlands supplied over €200,000 for the improvement of shrimp culture fisheries and research in Mauritania.

Poly Hong Dong Pelagic Fishery signed a 25-year agreement with the Mauritanian government, which allowed the company to be spared from all import customs, be exempt from paying taxes on profits for the first 5 years, and hire 30% of foreigners.

The Mauritanian government signed a 50-year long-term fishing agreement with the Chinese distant water company FuZhou Hong Dong Fisheries Company. The agreement allows the Chinese company to fish in its waters and its annual fishing quota reaches 100,000 tonnes.

Canada provided funding to 6 West African to improve their fishing practices and policies in the face of climate change. The project involved bringing together stakeholders for bi-annual meetings to explore possible scenarios and develop different adaptation strategies.

Mauritania, along with a number of other African countries, joined the China-Africa Fishery Union, one of China’s international fisheries initiatives. The goal of this group is to promote the development of China’s and Africa’s fisheries resources, facilitate fish trading, and strengthen their cooperation in the fisheries industry. Under the union, China was to provide loans to joint ventures for fishing vessels and the African party were to contribute by providing fishing licences. The loans for the vessels were to be repaid in instalments by the joint venture company.

Japan funded a project to expand the fishing port in Nouadhibou.

Japan has provided Official Development Assistance (ODA) funds to support Mauritania’s fisheries development and fishing policy and administrative management. The assistance also included scholarships for training in Japan.

In 2016, the China Poly Group invested in the construction of a comprehensive fishing port in Ndiago, which consists of commercial quay, fishing port, naval base, and shipyard.

Mauritania and Japan Tuna fisheries Cooperative association signed access agreement to allow Japanese long-line vessels access to Mauritania waters.

To further the development of the economic, social, nutritional, and environmental benefits of the fisheries sector, the FAO provided dose to $200,000 USD to promote youth employment and food security in the sector through the Blue Growth Initiative.

In order to encourage the development of seafood clusters in Nouadhibou with sustainable management of fisheries and generate value for the community (EcoSeafood), the World Bank has provided €16.5 million over 5 years, which includes a loan of €10.5 million, under the West Africa Regional Fisheries Programme (WARFP). The fund is used in planning and implementation of fisheries policy, fisheries-related education and training, and fishing harbours, markets, and logistics.
<table>
<thead>
<tr>
<th>Number</th>
<th>Country</th>
<th>Year</th>
<th>Action</th>
<th>Agreement Type</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>61</td>
<td>Mauritania - China</td>
<td>2017</td>
<td>Mauritania reached a fisheries investment agreement with China Ocean Group and China Road and Bridge Corporation, in which the two companies will build a new fishing base in the country and the government of Mauritania will grant fishing access, provide tax concessions and subsidies, and help lay out infrastructures such as utilities.</td>
<td>Bilateral agreement</td>
<td>Funded 20% of the construction and equipment of the fishing port of Nouadhibou. This involves constructing an auction hall, 680 storage sheds, a sewage system, 7-km long paved roads, and a perimeter wall for the fisheries port.</td>
</tr>
<tr>
<td>62</td>
<td>Mauritania</td>
<td>2017</td>
<td>Mauritania joined the Fisheries Transparency Initiative.</td>
<td>Transparency agreement</td>
<td>-</td>
</tr>
<tr>
<td>63</td>
<td>Mauritania - China</td>
<td>2017</td>
<td>Mauritania and China revised the fisheries agreement signed in 1991 and signed the amendment of that. The details of the amendment were not disclosed.</td>
<td>Bilateral agreement</td>
<td>-</td>
</tr>
<tr>
<td>64</td>
<td>Mauritania - FAO</td>
<td>2017 - 2019</td>
<td>The FAO provided about $200,000 USD in support of ecological labelling of octopus products through finalising and validating the octopus labelling system and develop an action plan for its implementation, also through improving knowledge of impacts of octopus fishing on its habitat and ecosystem.</td>
<td>International assistance</td>
<td>-</td>
</tr>
<tr>
<td>65</td>
<td>Mauritania - China</td>
<td>2018</td>
<td>Mauritania joined China’s Belt and Road Initiative and Maritime Silk Road.</td>
<td>Bilateral agreement</td>
<td>-</td>
</tr>
<tr>
<td>66</td>
<td>Mauritania - Spain</td>
<td>2018 - 2022</td>
<td>Spain funds and supports “Promotion of employment and improvement of the living conditions of artisanal fishermen, young people and women of the surroundings of the protected natural areas of northern Mauritania (Promo ción del empleo y mejora de las condiciones de vida de los pescadores artesanales, jóvenes y mujeres de los aldeedores de los espacios naturales protegidos de norte de Mauritania)” programme. The first phase focuses on supporting artisanal fishing and facilitates professional training of young people and fishermen, and the second phase focuses on raising the environmental awareness of artisanal fishing. Spain has committed a total of $1.7 million USD to the two phases.</td>
<td>Bilateral agreement</td>
<td>-</td>
</tr>
<tr>
<td>67</td>
<td>Mauritania - Germany</td>
<td>2018 - 2027</td>
<td>Germany committed $11.3 million USD to modernising small-scale fishing ports in Nouadhibou. This involves constructing an auction hall, 680 storage sheds, a sewage system, 7-km long paved roads, and a perimeter wall for the fisheries port.</td>
<td>Bilateral agreement</td>
<td>-</td>
</tr>
<tr>
<td>68</td>
<td>Mauritania - EU</td>
<td>2018</td>
<td>The EU co-financed 20% of the construction and equipment of the fishing port of Nouadhibou.</td>
<td>Bilateral agreement</td>
<td>-</td>
</tr>
<tr>
<td>69</td>
<td>Mauritania - Japan</td>
<td>2019</td>
<td>Japan invested $13 million USD in building inspection and analysis laboratories for the National Office of Sanitary Inspection of Fishery and Aquaculture Products (ONISPA) in Nouadhibou, Mauritania.</td>
<td>Bilateral agreement</td>
<td>-</td>
</tr>
<tr>
<td>70</td>
<td>Mauritania - FAO</td>
<td>2019-2020</td>
<td>The FAO has provided over $100,000 USD in funding for updating and developing inland fisheries and fish farming.</td>
<td>International assistance</td>
<td>-</td>
</tr>
<tr>
<td>71</td>
<td>Mauritania - China</td>
<td>2020</td>
<td>China provided a $87 million USD low-interest loan to Mauritania for building a fishing port 25 km north of the capital of Mauritania. It was expected that the port would process 400,000 tonnes of catch every year.</td>
<td>Bilateral agreement</td>
<td>-</td>
</tr>
<tr>
<td>72</td>
<td>Mauritania - FAO</td>
<td>2020 - 2022</td>
<td>FAO committed $356,000 USD to a project that will support small producers and processors of fishery products in the face of the COVID-19 pandemic and the establishment of the necessary infrastructure for the development of inland fishing and fish farming.</td>
<td>International assistance</td>
<td>-</td>
</tr>
<tr>
<td>73</td>
<td>Mauritania - EU</td>
<td>2020 - 2023</td>
<td>The EU funded a project in Mauritania that aims to strengthen the role of civil society in the governance and the development of artisanal fishing in Mauritania.</td>
<td>Bilateral agreement</td>
<td>-</td>
</tr>
<tr>
<td>74</td>
<td>Mauritania - Germany</td>
<td>2022</td>
<td>Germany provided a small fund for supporting women in artisanal fishing and fish processing and distribution in Port Tanit.</td>
<td>Bilateral agreement</td>
<td>-</td>
</tr>
</tbody>
</table>
### Role and impact of China on world fisheries and aquaculture

<table>
<thead>
<tr>
<th>No.</th>
<th>Participants</th>
<th>Time (Year(s))</th>
<th>Description</th>
<th>Agreement Type</th>
<th>Source(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>Mauritania - Germany</td>
<td>2022 - 2031</td>
<td>Germany funded the installation of two permanent fisheries management institutions, the Mauritian Coast Guard (GCM) and the Mauritian Institute for Oceanographic Research and Fisheries (IMROP), to facilitate research on fisheries stocks and development. GCM also serves to fight IUU in the country.</td>
<td>Bilateral agreement</td>
<td>52, 55, 59, d-portal (2022be)</td>
</tr>
<tr>
<td>76</td>
<td>Mauritania - Senegal</td>
<td>(Undated)</td>
<td>A fishing agreement with Senegal was signed, allowing a number of seiners targeting small pelagic fisheries to fish in Mauritian waters.</td>
<td>Bilateral agreement</td>
<td>FAO (2022)</td>
</tr>
<tr>
<td>77</td>
<td>Mauritius - EU</td>
<td>1987</td>
<td>The first fisheries agreement was signed between the two countries.</td>
<td>Bilateral agreement</td>
<td>European Commission (2022c)</td>
</tr>
<tr>
<td>78</td>
<td>Mauritius - EU</td>
<td>2002 - 2017</td>
<td>Mauritius was one of the beneficiary countries of the EU’s project “STRENGTHENING FISHERY PRODUCTS HEALTH CONDITIONS IN ACP/OCT COUNTRIES”, which aimed to optimise use of targeted countries’ fishery resources in order to gain improvements in the production and trading capacity, thus improving the access of fisheries products to the world market.</td>
<td>Bilateral agreement</td>
<td>d-portal (2022bf)</td>
</tr>
<tr>
<td>79</td>
<td>Mauritius - China</td>
<td>2003-2011</td>
<td>70% of the foreign fishing licences that Mauritius issues for foreign vessels without fisheries agreements is to Taiwan owned vessels, and only 2-3 vessels are owned by the People’s Republic of China per year.</td>
<td>Direct licensing</td>
<td>-</td>
</tr>
<tr>
<td>80</td>
<td>Mauritius - Australia</td>
<td>2008 - 2013</td>
<td>Australia committed $86 million USD to improving the sustainability of Mauritius fisheries through the provision of technical cooperation and capacity building in marine and fisheries management.</td>
<td>Bilateral agreement</td>
<td>d-portal (2022bg)</td>
</tr>
<tr>
<td>81</td>
<td>Mauritius - EU</td>
<td>Starting from 2014</td>
<td>The European Commission currently has a sustainable fisheries partnership agreement in place with Mauritius that began in 2014 to last for 6 years with it being renewable for a period of 3 years. Under the agreement, the EU contributes €375,000 to Mauritius, with €220,000 aimed at the development of the fisheries sector and €135,000 aimed at the development of maritime policy and ocean economy. In exchange, licences for 40 tuna seiners and 45 surface longliners per year are provided to vessels from Spain, France, Italy, and Portugal.</td>
<td>Bilateral agreement</td>
<td>79, 83, 85, European Commission (2022c)</td>
</tr>
<tr>
<td>82</td>
<td>Mauritius - EU</td>
<td>2017</td>
<td>Through the EU Emergency Trust Fund for Africa, the EU committed €14 million to promoting job creation in the fisheries sector to increase the economic opportunities of young and potential migrants and stabilise the population at the local level in Mauritius.</td>
<td>International assistance</td>
<td>European Commission (n.d.)</td>
</tr>
<tr>
<td>83</td>
<td>Mauritius - EU</td>
<td>2018</td>
<td>The EU committed nearly €30 million to a sustainable fisheries project that aimed to support sustainable fisheries governance, management and development in Mauritius and nearby countries, addressing climate change resilience and enhancing marine biodiversity, and combating IUU in Eastern Africa, Southern Africa and Indian Ocean region.</td>
<td>Bilateral agreement</td>
<td>79, 83, 85, d-portal (2022bh), European Commission (2018)</td>
</tr>
<tr>
<td>84</td>
<td>Mauritius - New Zealand</td>
<td>2018 - 2019</td>
<td>New Zealand contributed $65,793 USD to support a small team of consultants (two from New Zealand, one from the EU) seconded to Mauritius to assist with the management, implementation and delivery of its aquaculture and stock assessment management plan.</td>
<td>Bilateral agreement</td>
<td>79, 80, 82, 85, d-portal (2022bi)</td>
</tr>
<tr>
<td>85</td>
<td>Mauritius - China</td>
<td>2019</td>
<td>A free trade agreement was signed between Mauritius and China to strengthen their economic cooperation. Some of the focuses of the agreement include cooperation in the fisheries sector, capacity-building in fishing practices, and investment in fisheries infrastructures. Nonetheless, the agreement does not outline what specific actions will be taken.</td>
<td>Bilateral agreement</td>
<td>Mauritius Chamber of Commerce and Industry (2019)</td>
</tr>
<tr>
<td>86</td>
<td>Mauritius - FAO</td>
<td>2021 - 2023</td>
<td>FAO committed $261,000 USD to supporting the government of Mauritius for implementing a participatory policy formulation process, accompanied by capacity building related to the policy.</td>
<td>International assistance</td>
<td>79, 80, 82, 83, d-portal (2022bj)</td>
</tr>
<tr>
<td>#</td>
<td>Country</td>
<td>Year</td>
<td>Description</td>
<td>Funding</td>
<td>Source</td>
</tr>
<tr>
<td>----</td>
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</tr>
<tr>
<td>87</td>
<td>Senegal - EU</td>
<td>1980</td>
<td>The first bilateral fisheries agreement was signed between the EU and Senegal.</td>
<td>Bilateral agreement</td>
<td>Council of the European Union (1980)</td>
</tr>
<tr>
<td>88</td>
<td>Senegal - ADF</td>
<td>1986</td>
<td>Senegal benefited from a project that promoted the development of small-scale fishing on the small coast and aimed to supply the Senegalese internal market with sea fish accessible to all social strata of the population. The project was funded by ADF, which invested nearly $10 million USD in the project.</td>
<td>International assistance</td>
<td>d-portal (2022bk)</td>
</tr>
<tr>
<td>89</td>
<td>Senegal - ADF</td>
<td>1989 - 1997</td>
<td>ADF invested $690,000 USD in assessing the restructuring needs of the industrial fishing sector of Senegal, with the focus on the development of equipment for coastal and deep demersal fishing, the restructuring of the industrial processing sector, and the financing of the industrial fishing sector.</td>
<td>International assistance</td>
<td>d-portal (2022bl)</td>
</tr>
<tr>
<td>90</td>
<td>Senegal - EU</td>
<td>1990-2004</td>
<td>The EU had a subsidy scheme for European shipowners to permanently transfer the vessel and set up a joint venture with local operators in a third country. Through the programme, 27 joint ventures were set up and 41 vessels were transferred to Senegal. The programme was abolished at the end of 2004 due to pressure from civil society.</td>
<td>Joint Venture</td>
<td>CCFA and COAPA (2015)</td>
</tr>
<tr>
<td>91</td>
<td>Senegal - EU</td>
<td>2000 - 2012</td>
<td>Within the 13-year period, the EU committed a total of $4.6 million USD to supporting artisanal fisheries in Senegal.</td>
<td>Bilateral agreement</td>
<td>d-portal (2022bm)</td>
</tr>
<tr>
<td>92</td>
<td>Senegal - EU</td>
<td>2006 - 2010</td>
<td>The EU committed around $551,000 USD to a bilateral project that aimed to support women entrepreneurs in the city of Ziguinchor, Senegal and target Senegal’s fishing sector.</td>
<td>Bilateral agreement</td>
<td>d-portal (2022bn)</td>
</tr>
<tr>
<td>93</td>
<td>Senegal</td>
<td>2006, 2012</td>
<td>The government of Senegal revoked a number of fishing licences of foreign fleets in both years, in face of public rage over the problem of overfishing caused by foreign fleets.</td>
<td>-</td>
<td>Vidal (2012)</td>
</tr>
<tr>
<td>94</td>
<td>Senegal - Canada and UK</td>
<td>2008 - 2012</td>
<td>Canada and the UK funded a project in Senegal that aimed to help the country better adapt its fishing practices and policies to climate change through scientific knowledge sharing at local, regional, and national level.</td>
<td>Bilateral agreement</td>
<td>d-portal (2022bo)</td>
</tr>
<tr>
<td>95</td>
<td>Senegal - Germany</td>
<td>2009 - 2013</td>
<td>Germany invested $670,000 USD in a bilateral project “Setting an Example for Marine Protected Area Effectiveness in the West African Marine Ecoregion”.</td>
<td>Bilateral agreement</td>
<td>d-portal (2022bp)</td>
</tr>
<tr>
<td>96</td>
<td>Senegal - Italy</td>
<td>2010 - 2018</td>
<td>Italy committed $28,000 USD to a project in Senegal that aimed to empower women who work with fish products and push for more funding for fishing activities from the Senegalese government.</td>
<td>Bilateral agreement</td>
<td>d-portal (2022bq)</td>
</tr>
<tr>
<td>97</td>
<td>Senegal - EU</td>
<td>2011</td>
<td>The EU committed around $115,000 USD to the formulation and the preparation of a fisheries project in Senegal. Details about that fisheries project were not provided by the EU.</td>
<td>Bilateral project</td>
<td>d-portal (2022bd)</td>
</tr>
<tr>
<td>98</td>
<td>Senegal - EU</td>
<td>2012 - 2020</td>
<td>The EU committed $2.9 million USD to a project, Aménagement Durable des Pêcheries du Sénégal (ADuPeS), that aimed to support the sustainable development of fisheries in Senegal. The funding was used to set up a sustainable management system for certain fisheries (including octopus and deep-sea shrimp management plans) and a system of evaluation and scientific advice on all demersal fisheries in Senegal.</td>
<td>Bilateral agreement</td>
<td>d-portal (2022br)</td>
</tr>
<tr>
<td>99</td>
<td>Senegal - Spain</td>
<td>2010</td>
<td>Records show there were 11 joint ventures with Spain in 2010 with 29 vessels engaging in deep-sea trawling and demersal trawling.</td>
<td>Joint venture</td>
<td>Niass and Seck (2011)</td>
</tr>
<tr>
<td>100</td>
<td>Senegal - France</td>
<td>2010</td>
<td>Records show there were 3 joint venture companies with France in 2010 with 24 trawlers</td>
<td>Joint venture</td>
<td>Niass and Seck (2011)</td>
</tr>
<tr>
<td>101</td>
<td>Senegal - Italy</td>
<td>2010</td>
<td>Records show there were 2 joint venture companies with Italy in 2010 with 7 trawlers</td>
<td>Joint venture</td>
<td>Niass and Seck (2011)</td>
</tr>
<tr>
<td>102</td>
<td>Senegal - Greece</td>
<td>2010</td>
<td>Records show there was 1 joint venture company with Greece in 2010 with 2 trawlers</td>
<td>Joint venture</td>
<td>Niass and Seck (2011)</td>
</tr>
<tr>
<td>103</td>
<td>Senegal - China</td>
<td>2010</td>
<td>Records show there was 1 joint venture company with China in 2010 with 26 trawlers</td>
<td>Joint venture</td>
<td>Niass and Seck (2011)</td>
</tr>
<tr>
<td>#</td>
<td>Country/Region</td>
<td>Year</td>
<td>Project Summary</td>
<td>Contribution/Agreement</td>
<td>Source</td>
</tr>
<tr>
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</tr>
<tr>
<td>104</td>
<td>Senegal-Canada</td>
<td>2013-2014</td>
<td>Canada committed $2.8 million USD, under the Canada Fund for African Climate Resilience Call for Proposals, to a bilateral project that aimed to promote the sustainable use and marketing of shellfish and fish stocks in villages of Dioneur, Niodor, and Falia in Senegal. Under the project, local communities are given opportunity to improve their economy, ensure members have access to sufficient, safe, and nutritious food, and enhance the role and position of women in their local communities.</td>
<td>Bilateral agreement</td>
<td>WorldFish portal (2022bd)</td>
</tr>
<tr>
<td>105</td>
<td>Senegal-Japan</td>
<td>2013-2014</td>
<td>A range of financial aid was provided to Senegal’s fisheries sector by Japan. A total of $2 million USD was offered in the two years. Details of the aid are not provided.</td>
<td>Bilateral agreement</td>
<td>Portal (2022bu)</td>
</tr>
<tr>
<td>106</td>
<td>Senegal-Australia</td>
<td>2014-2015</td>
<td>Australia provided a $130,000 USD grant to Senegal as a form of local-level assistance, targeting Senegal’s fishing sector.</td>
<td>Bilateral agreement</td>
<td>Portal (2022bv)</td>
</tr>
<tr>
<td>107</td>
<td>Senegal-EU</td>
<td>2014-2024</td>
<td>The EU and Senegal signed a new SFPA that will last till 2024 and is renewable afterwards. Currently, 28 tuna seiners, 10 pole and liners, 5 longliners, and 2 trawlers from Spain and France are allowed to fish in Senegal waters under the SFPA. Under the SFPA, the EU will also pay Senegal €1.7 million per year, with €900,000 dedicated to supporting the implementation of Senegal’s sectoral fisheries policy, and an estimated maximum of €1.3 million will be paid to Senegal by vessel owners for fishing licences.</td>
<td>Bilateral agreement</td>
<td>European Commission portal (2019c)</td>
</tr>
<tr>
<td>108</td>
<td>Senegal-FAO</td>
<td>2015-2016</td>
<td>FAO provided funding of around $10,000 USD for a mullet fish farming project.</td>
<td>International assistance</td>
<td>Portal (2022bw)</td>
</tr>
<tr>
<td>109</td>
<td>Senegal-Italy</td>
<td>2015-2020</td>
<td>Italy committed around $991,000 USD to a project in Ziguinchor, Senegal which aimed at improving the working conditions and the skills of the actors working in the fishing industry, and strengthening the capacity of fishers’ groups, fish processors, small fishmongers and fresh fish wholesalers, through actions oriented to improve safety and first aid at sea, conservation, processing and marketing of fish products, and environmental sustainability of fishing activities.</td>
<td>Bilateral agreement</td>
<td>Portal (2022bx)</td>
</tr>
<tr>
<td>110</td>
<td>Senegal</td>
<td>2016</td>
<td>Publicly committed to implementing the Fisheries Transparency Initiative</td>
<td>Transparency agreement</td>
<td>Fisheries Transparency Initiative portal (2022d)</td>
</tr>
<tr>
<td>111</td>
<td>Senegal-South Korea</td>
<td>2017</td>
<td>South Korea invested nearly $1.8 million USD in the construction of one refrigerated warehouse, training (operation and maintenance) by dispatched experts, and warranty service and inspection.</td>
<td>Bilateral agreement</td>
<td>Portal (2022by)</td>
</tr>
<tr>
<td>112</td>
<td>Senegal-South Korea</td>
<td>2017-2018</td>
<td>South Korea committed $106,000,000 KRW to a multilateral project that would supply refrigerated trucks, transfer refrigeration technology related to refrigerated trucks, provide training and education, and support inspection.</td>
<td>Multilateral agreement</td>
<td>Portal (2022bz)</td>
</tr>
<tr>
<td>113</td>
<td>Senegal-New Zealand</td>
<td>2017-2018</td>
<td>New Zealand committed $12,616 USD to a funding scheme, “Senegal Illegal, Unregulated and Unreported Fisheries Cooperation”, which supported one-off, small-scale international development activities within the fishing sector of Senegal.</td>
<td>Bilateral agreement</td>
<td>Portal (2022ca)</td>
</tr>
<tr>
<td>114</td>
<td>Senegal-China</td>
<td>2018</td>
<td>Senegal joined China’s Belt and Road Initiative</td>
<td>Bilateral agreement</td>
<td>Portal (2022b)</td>
</tr>
<tr>
<td>115</td>
<td>Senegal-China</td>
<td>2018</td>
<td>112 vessels from China’s distant water fleet were registered in Senegal in 2018.</td>
<td>Direct licensing</td>
<td>Portal (2022c)</td>
</tr>
<tr>
<td>116</td>
<td>Senegal-Japan</td>
<td>2018-2023</td>
<td>Japan committed $11.6 million USD to a project in M’bour Department, Senegal which aimed to improve its advanced fishing landing facilities for adding value to fishery products.</td>
<td>Bilateral agreement</td>
<td>Portal (2022d)</td>
</tr>
<tr>
<td>117</td>
<td>Senegal-Netherlands</td>
<td>2019-2023</td>
<td>The Netherlands committed $201,377 USD to a bilateral project, “Senegal Fish”, which aims to bring the fish exporting sector of Senegal together to improve the sustainability of the value chain with a focus on fish exported to Europe. The programme will focus on increasing the value of each captured product including less waste and improving working conditions in the chain.</td>
<td>Bilateral agreement</td>
<td>Portal (2022e)</td>
</tr>
<tr>
<td>No.</td>
<td>Description</td>
<td>Year</td>
<td>Project Description</td>
<td>Agreement Type</td>
<td>Participation Period</td>
</tr>
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</tr>
<tr>
<td>118</td>
<td>Senegal - Canada</td>
<td>2020</td>
<td>Canada committed $1.5 million USD to a bilateral project that aims to enhance the economic, social and environmental development of three Senegal local villages in a sustainable way and to improve the living, working and health conditions of the inhabitants. The two main areas of focus of the project are: 1) the governance of the shellfish resources processing units, a more inclusive access to the units, the creation of micro-businesses, and sustainability, and 2) innovative product commercialisation, sustainable use of resources and competencies reinforcement.</td>
<td>Bilateral agreement</td>
<td>98, 99, 100, 101, 102, 106</td>
</tr>
<tr>
<td>119</td>
<td>Senegal - China</td>
<td>2020</td>
<td>Senegal issued 54 foreign fishing licences with a majority of them being Chinese vessels. The licensing of these fishing licences caused a lot of backlash from the local community as the vessels that were given licences had records of IUU fishing. This has resulted in the Ministry publicly stating the rejection of the licences. However, it was later found that some of the vessels involved were still secretly given licences afterwards.</td>
<td>Direct licensing</td>
<td>98, 99, 100, 101, 102, 106</td>
</tr>
<tr>
<td>120</td>
<td>Senegal - FAO</td>
<td>2021-2022</td>
<td>FAO invested $46,000 USD in a project that aimed to identify innovative and sustainable mechanisms for financing fisheries management.</td>
<td>International assistance</td>
<td></td>
</tr>
<tr>
<td>121</td>
<td>Senegal - Netherlands</td>
<td>2022</td>
<td>The Netherlands committed to contributing $654,628 USD to Senegal for developing a business plan for a fingerling production facility in Senegal.</td>
<td>Bilateral agreement</td>
<td></td>
</tr>
<tr>
<td>122</td>
<td>Solomon Islands - Micronesia, Kiribati, Marshall Islands, Nauru, Palau, Papua New Guinea (and Tokelau later)</td>
<td>Starting from 1982</td>
<td>The Solomon Islands and several other Pacific Island countries co-created and joined the Nauru Agreement, which is a regional effort among those countries to conserve fisheries resources, especially tuna. Later, all countries in the agreement co-adopted the “Vessel Day Scheme”, which limits the maximum amount of catch through the countries selling “number of days” when fishing is allowed to foreign fleets. The number of days each country can sell is determined by all of the countries together.</td>
<td>Multilateral agreement</td>
<td></td>
</tr>
<tr>
<td>123</td>
<td>Solomon Islands - EU</td>
<td>2009-2015</td>
<td>The EU signed a fisheries partnership agreement covering tuna fisheries with the Solomon Islands in 2009 and was renewed in 2012 for another 3 years.</td>
<td>Bilateral agreement</td>
<td></td>
</tr>
<tr>
<td>124</td>
<td>Solomon Islands - Australia</td>
<td>2009-2011</td>
<td>The Australian government provided close to $900,000 AUD to Solomon Islands over the course of 3 years to fund research to improve resilience and adaptive capacity of fisheries-dependent communities in the country.</td>
<td>Bilateral agreement</td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>Solomon Islands - Australia</td>
<td>2009-2011</td>
<td>Australia provided just over $24,000 AUD to Solomon Islands as assistance for sustainable fisheries aiming to decrease poverty and strengthen food security, also to provide better monitoring, control and surveillance of fisheries resource.</td>
<td>Bilateral agreement</td>
<td></td>
</tr>
<tr>
<td>126</td>
<td>Solomon Islands - Australia</td>
<td>2009-2018</td>
<td>As part of the AusAID - Non-Government Organisations Cooperation Programme (ANCOP), over $26 million AUD was provided to 10 different sectors in Solomon Islands through Australian NGOs. In total, 5% of that funding went to fishery development and fishing policy and administrative management sector.</td>
<td>Bilateral agreement</td>
<td></td>
</tr>
<tr>
<td>127</td>
<td>Solomon Islands - Australia</td>
<td>2010-2016</td>
<td>Through the Direct Aid Programme (DAP) of the Department of Foreign Affairs and Trade of Australia, over $160,000 AUD were provided to Solomon Islands for the development of 9 different sectors. Within the sectors, fishery education/training, and fishery services, which include fishing harbours, fish markets, fishery transport, and cold storage, was one of the focus sectors.</td>
<td>Bilateral agreement</td>
<td>129</td>
</tr>
<tr>
<td>128</td>
<td>Solomon Islands - Australia</td>
<td>2010-Now</td>
<td>Australia has provided fisheries development assistance in funding, technical support, and scientific advice to Solomon Islands through funding organisations like Forum Fisheries Agency (FFA), Secretariat of the Pacific Community’s (SPC) Fisheries Division, and the Australian Centre for International Agricultural Research (ACIAR). The assistance aims to promote sustainable fisheries development and reducing poverty. The funding has aided in the increase of fisheries productivity in the area, development of mariculture and aquaculture, and enhancing the monitoring of tuna stocks in the area.</td>
<td>Bilateral agreement</td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>No.</th>
<th>Countries</th>
<th>Year</th>
<th>内容简介</th>
<th>Agreement Type</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>129</td>
<td>Solomon Islands- New Zealand</td>
<td>2010-Now</td>
<td>New Zealand's Ministry of Foreign affairs and Trade has provided over $20 million NZD in funding and technical support since 2010 to Solomon Islands for the development of fisheries and marine resource, fishery policy, and fishery education/training through its Solomon Islands Fisheries Development initiative and implementing programmes like the &quot;Solomon Islands fisheries programme&quot; and the &quot;Mekem Strong Solomon Islands Fisheries programme&quot;</td>
<td>Bilateral</td>
<td>d-portal (2022cp, 2022cq, 2022cr, 2022cs)</td>
</tr>
<tr>
<td>130</td>
<td>Solomon Islands - Australia</td>
<td>2011-2015</td>
<td>Through the Community-Based Marine Resource Governance project, Australia has provided aid to the Government of Solomon Islands for their initiative in improving fishing policy and administrative management for sustainable inshore fisheries.</td>
<td>Bilateral agreement</td>
<td>-</td>
</tr>
<tr>
<td>131</td>
<td>Solomon Islands - China</td>
<td>2012</td>
<td>The Chinese state-owned company CNFC Overseas Fisheries and Shanghai Fisheries obtained fishing rights and operated around 20 and 6 vessels in the Solomon Islands water respectively.</td>
<td>Direct licensing</td>
<td>Shanghai Fisheries Group Co Ltd. (2012)</td>
</tr>
<tr>
<td>132</td>
<td>Solomon Islands - Japan</td>
<td>2012-2013</td>
<td>Through the support of the Fisheries Development Assistance for Pacific Islands Nations by the Japan International Cooperation Agency (JICA), the Overseas Fisheries Cooperation Foundation (OFCF) of Japan sends fisheries technical experts with equipment and materials to transfer technology of repair and maintenance of fisheries related facilities and other experts for fisheries related organisation to improve management.</td>
<td>Bilateral agreement</td>
<td>-</td>
</tr>
<tr>
<td>133</td>
<td>Solomon Islands - Japan</td>
<td>2012-2013</td>
<td>Japan sends experts to give technical advice to Pacific Island Forum Fisheries Agency (FFA) countries regarding the Tuna industry.</td>
<td>Bilateral agreement</td>
<td>-</td>
</tr>
<tr>
<td>134</td>
<td>Solomon Islands - Australia</td>
<td>2013-2018</td>
<td>Through the government partnership for development programme (GPFD), the Australian government has provided funding and support for the Solomon Islands in fishing policy and administrative management.</td>
<td>Bilateral agreement</td>
<td>-</td>
</tr>
<tr>
<td>135</td>
<td>Solomon Islands-World Bank</td>
<td>2014 - 2021</td>
<td>Solomon Islands has received over $4 million USD through the Pacific Islands Regional Oceanscape Programme from the World Bank. The programme aims to strengthen the joint management of specific Pacific Island oceanic and coastal fisheries and the habitat it relies on.</td>
<td>Bilateral agreement</td>
<td>-</td>
</tr>
<tr>
<td>136</td>
<td>Solomon Islands - China</td>
<td>2019</td>
<td>The Solomon Islands joined China’s Belt and Road Initiative and the Maritime Silk Road. Both countries agreed to strengthen cooperation in the fisheries sector.</td>
<td>Bilateral agreement</td>
<td>-</td>
</tr>
<tr>
<td>137</td>
<td>Solomon Islands- New Zealand</td>
<td>2020 - Now</td>
<td>New Zealand’s Ministry of Foreign Affairs and Trade provides funding for establishing and continual operation of Bina Harbour and Cannery project at the request of the Solomon Islands government. This includes support for the operation of harbours and docks, fish stock protection, aquaculture, and integrated fishery projects.</td>
<td>Bilateral agreement</td>
<td>138</td>
</tr>
<tr>
<td>138</td>
<td>Solomon Islands - Japan, Korea, the Philippines, Taiwan, Vanuatu, Fiji, Kiribati, and China</td>
<td>As of 2021</td>
<td>It was known that Japan, Korea, the Philippines, Taiwan, Vanuatu, Fiji, Kiribati, and China have made some types of arrangements or agreements with the Solomon Islands that have allowed those countries to gain fishing access to its waters.</td>
<td>Bilateral agreement</td>
<td>-</td>
</tr>
<tr>
<td>139</td>
<td>Solomon Islands - China</td>
<td>2022</td>
<td>The Solomon Islands signed an undisclosed agreement with China on strengthening their cooperation in the fisheries sector. In particular, both countries agreed to cooperate on building a deep-sea fishing base and a “blue economy cooperation base”, as well as new fishing vessels and shipyards</td>
<td>Bilateral agreement</td>
<td>136</td>
</tr>
</tbody>
</table>
This study reviews China’s mariculture and marine fisheries with emphasis on the operations of its Distant Water Fleets (DWF). China’s DWF are analysed with some emphasis on the subsidies they receive from their government, their Illegal, Unreported and Unregulated catches and practices, the challenges they represent to international agreements, and to competing fleets from the EU, particularly in six focal countries, i.e., Mauritania, Senegal, Madagascar, Mauritius, Ecuador and the Solomon Islands. Finally, the trade of Chinese fishery and mariculture products is reviewed with some emphasis on the import of fish feed by China, which may increasingly impact some food-deficient countries.