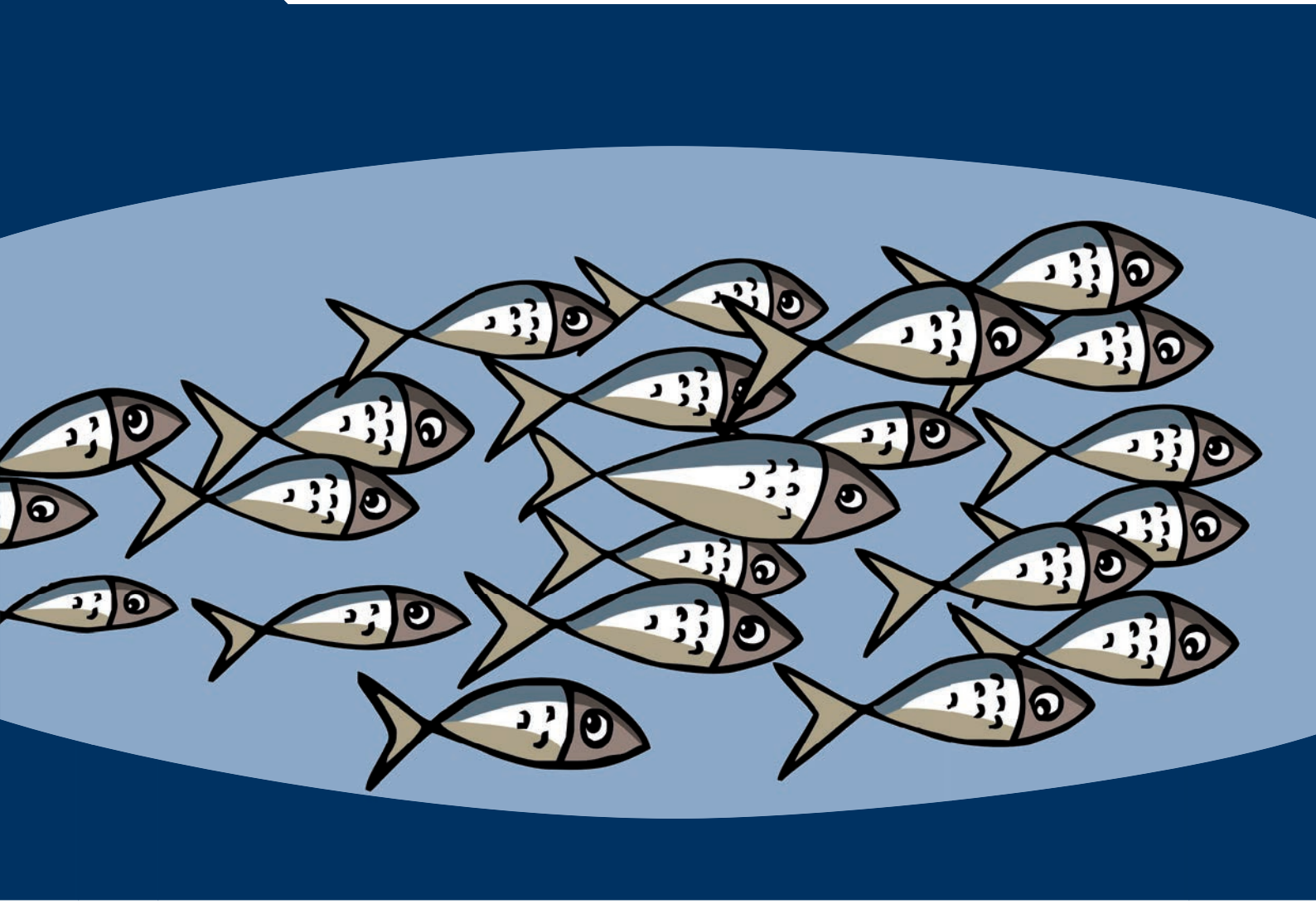
OECD Review of Fisheries 2020



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Foreword

Fisheries play an essential role in feeding the global population and providing jobs and livelihoods to coastal communities. Yet, today, this is coming under threat from unsustainable fishing practices.

Some countries have made progress towards achieving Sustainable Development Goal 14 – which seeks to "conserve and sustainably use the oceans, seas and marine resources for sustainable development" – but this success has not been met globally. Today, almost a quarter of fish stocks, for which information is available, are at risk. Of the remaining three-quarters, only little over half are sufficiently abundant to produce the maximum sustainable volume or value of catch.

This is avoidable. The *OECD Review of Fisheries 2020* shows that a number of current policies are contributing to the overexploitation of stocks. Governments continue to support fisheries through policies that lower the cost of inputs (such as fishing vessels or fuel). This, in-turn, tends to encourage unsustainable fishing when catch is not controlled sufficiently. While not all countries provide the same level or type of support, on average, between 2016 and 2018, countries covered by the OECD Fisheries Support Estimate (FSE) database spent over USD 3 billion annually on support that reduces input costs. Of this, support to fuel was the single largest direct support policy, accounting for 25% of total support to the sector. Such policies not only favour unsustainable fishing practices, but also fail to achieve their primary objective: the effective transfer of income to fishers.

The *OECD Review of Fisheries 2020* makes a powerful case that reforming this support should be a priority for policymakers, especially as they build a robust and sustainable recovery from the COVID-19 crisis. Attaching 'blue strings' and henceforth aligning any support granted with long-term objectives will be key to securing a sustainable, equitable and resilient fisheries sector. Transparency in policy responses is vital to maintain confidence in seafood markets and build legitimacy for reform. Drawing on the latest available data reported by OECD countries and partner economies, this Review analyses how governments are currently managing and supporting their fisheries and puts forward priorities for action, both at the national level and for the international community.

The *Review* also shows that policies to ensure the long-term viability of fisheries and to protect and restore ocean resources and ecosystems can be reconciled with policies to address short-term socio-economic goals. Moreover, economic, equity and environmental priorities include: supporting fishers in need, rather than subsidising fishing inputs or effort; investing in data collection and analysis in order to ensure that evidence-based management is implemented and enforced; and implementing comprehensive and transparent regulation and policies to fight Illegal, Unreported and Unregulated (IUU) fishing. The *Review* includes examples of such policy reforms successfully implemented across various countries. With this policy package, governments can ensure the welfare of fishing sector communities and accelerate the transition to more sustainable and resilient fisheries.

As policy makers tackle the challenges of ensuring a sustainable recovery and forging a path to achieving the SDGs, they can count on the OECD and on the *Review of Fisheries 2020* to support and inform their efforts.

Angel Gurría
Secretary-General
Organisation for Economic Co-operation and Development

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Acronyms

ABNJ	Areas beyond national jurisdictions
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CFP	Common Fisheries Policy of the European Union
CMM	Conservation and management measures
COFI	OECD Fisheries Committee
CSE	Consumer Support Estimate
DSI	Direct support to individuals and companies in the fisheries sector
EEZ	Exclusive economic zone
FAO	Food and Agriculture Organization of the United Nations
FSE	Fisheries support estimate
FTA	Free Trade Agreement
GDP	Gross domestic product
GFCM	General Fisheries Commission for the Mediterranean
GSSE	General Services Support Estimate
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICES	International Council for the Exploration of the Sea
IOTC	Indian Ocean Tuna Commission
INCOPESCA	Instituto Costarricense de Pesca y Acuacultura
IPOA-IUU	International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing
IQ	Individual quota
ITQ	Individual transferable quota
IMO	International Maritime Organization
IUU	Illegal, unreported and unregulated fishing
MCS	Monitoring, control, surveillance
MEY	Maximum economic yield
MFN	Most favoured nation
MLS	Minimum landing size
MPS	Market Price Support
MSY	Maximum sustainable yield
NAFO	Northwest Atlantic Fisheries Organization
NEAFC	North East Atlantic Fisheries Commission
NGO	Non-governmental organisation
NPFC	North Pacific Fisheries Commission
NTM	Non-tariff measure
OECD	Organisation for Economic Co-operation and Development
PMS	Payments made by the fisheries sector

PSE	Producer Support Estimate
PSM	Port State Measures
PSMA	Port State Measures Agreement
RFMO	Regional Fisheries Management Organisation
RSN	Regional Fisheries Bodies Secretariats' Network of the FAO
SEAFO	South East Atlantic Fisheries Organisation
SDG	United Nations Sustainable Development Goal
SIMP	Seafood Import Monitoring Program
SIOFA	Southern Indian Ocean Fisheries Agreement
SPRFMO	South Pacific Regional Fisheries Management Organisation
SPS	Sanitary and phytosanitary
SSS	Support for services to the sector
TAC	Total allowable catch
TSE	Total Support Estimate
UNCLOS	United Nations Convention on the Law of the Sea
UVI	Unique vessel identifier
VGCDS	Voluntary Guidelines for Catch Documentation Schemes
VMS	Vessel Monitoring System
WCPFC	Western and Central Pacific Fisheries Commission
WTO	World Trade Organization

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Executive summary

This edition of the *Review of Fisheries* examines developments in the fisheries policies of countries and emerging economies with major fisheries sectors. Its central message is that policies to ensure the long-term viability of fisheries, and to protect and restore ocean resources and ecosystems, can be reconciled with policies to address short-term socio-economic goals. However, policy reforms need to be accelerated if progress is to be made on Sustainable Development Goal (SDG) 14 of the 2030 Agenda for Sustainable Development, which seeks to "conserve and sustainably use the oceans, seas and marine resources for sustainable development".

An essential target of this goal was to restore all fish stocks "at least to levels that can produce maximum sustainable yield as determined by their biological characteristics" by the end of 2020. This target remains unattained:

- Of the 1 119 stocks for which information was reported by the countries and economies participating in this *Review*, 66% only had a favourable biological status, 23% had an unfavourable biological status, calling for remedial action, while, for the remaining 12%, the status was undetermined, calling for further assessment.
- Within the stocks that had a favourable biological status, 54% were meeting targets based on additional management objectives, such as maximising the volume or the value of catches. Another 13% of these stocks were not meeting such targets; and for the remaining 33%, the status with respect to such targets was undetermined, no such targets were defined or they were not reported.

One reason is that government support remains insufficiently targeted. Governments support their fisheries sectors in order to improve fishers' welfare, to encourage food production, and to ensure their sustainability. However, some forms of government support – in particular those that lower the cost of inputs – distort the economic environment in which fishers operate, thereby creating excess capacity and leading to overfishing and illegal, unreported and unregulated (IUU) fishing when excess fishing is not entirely controlled. In addition, support policies do not always address socio-economic objectives in an efficient or equitable way.

Over 2016-18, the 39 countries reporting government support data to the OECD together provided average annual support of USD 9.4 billion to the fisheries sector. This represented a gross transfer equating to about 10% of the average value of landings over 2016-18, down from 13.8% in 2012-14. The decrease resulted from a significant reduction in direct support to individuals and companies, which totalled USD 4.6 billion per year, on average, in 2016-18, compared with USD 8.6 billion in 2012-14. An important driver of this trend was a reduction in support to fuel for fisheries in the People's Republic of China (hereafter "China") the country with the world's largest fisheries sector.

The evidence shows significant scope to further re-allocate direct support in ways that would improve the sustainability of the fisheries sector and more effectively and equitably transfer income to fishers:

- Across all countries and economies in the fisheries support estimate (FSE) database, over 2016-18, on average, USD 3.2 billion was spent annually on support that reduces the cost of inputs.

Support to fuel was the single largest direct support policy, accounting for 25% of total support to the sector. These policies tend to encourage over-fishing and be the least effective in transferring additional net income to fishers.

- Less than a third of what was spent to reduce the cost of inputs (USD 1.0 billion) was granted through "partially-decoupled" policies, such as income support and special insurance systems that are more effective in raising fishers' incomes and less likely to result in over-fishing than support to inputs.
- Between 2012-14 and 2016-18, spending on management, control and surveillance fell substantially relative to fleet size in several countries and economies. This raises questions as to whether capacity for management and enforcement is sufficient. At the same time, spending on infrastructure, such as on port facilities, has increased significantly in some countries and economies, with potential risks of encouraging overfishing where this creates additional capacity for fishing, landing and processing.

The biological sustainability of stocks, and thus the resilience of fisheries, largely depends on the management of fisheries. For this *Review*, information on the management tools in place was collected for 166 situations where measures apply to specific stocks or groups of stocks:

- About two-thirds of these situations directly controlled catches or landings. Almost a third of countries and economies used total allowable catch limits (TACs) in all management situations reported on, while four countries did not use TACs for any of them.
- Slightly over half of countries and economies (57%) used quotas allocated to individuals or communities, six of which did so in all management situations reported on.
- Input controls were used in most of the situations that involved direct controls on the volume of fish caught or landed, in particular restrictions on fishing gear, areas, and harvest capacity. Additionally, about a third of situations involved sets of input controls only.

Illegal, unregulated and unreported fishing (IUU) undermines the effectiveness of management and threatens the sustainability of stocks. Analysing the policies that countries and economies apply in the fight against IUU fishing across six policy indicators shows that:

- There has been significant progress over the past fifteen years in fighting IUU fishing, particularly on implementation of port state measures, which were not widely used in 2005, and are now the most widespread of all interventions measured.
- Overall, three areas remain insufficiently implemented: transparency over vessel registration and authorisation processes; the stringency of transhipment regulation; and market measures aimed at increasing traceability and closing access to markets and fisheries services to IUU fishing operators.

Enacting policy changes needed to reallocate support, improve the status of stocks, implement good management and fight IUU fishing requires effective governance systems that integrate data and allow stakeholders to be part of the decision-making process. Reviewing governance across countries and economies surveyed shows that:

- Scientific data were generally used in the governance process, however commitment mechanisms to ensure these data directly influence decision-making were not widely used, with only 28% of countries having harvest control rules that are automatically adjusted based on scientific evidence. Socio-economic data is used less frequently than scientific data.
- In recognition of the importance of stakeholder participation and transparency, advisory groups were used in 84% of countries and economies. Commercial fishers (63% of groups) and scientific entities (52% of groups) were the stakeholders most frequently represented on advisory groups.

Recommendations

- Governments should move away from policies that support inputs towards those that help fishers operate their businesses more effectively and increase their profits (e.g. through education and training), or that provide direct income support in a way that does not incentivise unsustainable fishing. This would reduce negative impacts on the biological sustainability of fish resources and inequitable effects across fleet segments, while increasing fisher welfare and the quantity of fish produced.
- When allocating public funding for fisheries, governments should also ensure that there is sufficient capacity for management, control and surveillance to effectively manage fisheries, including in the high seas, and to eradicate illegal fishing. At the same time, they should avoid financing infrastructure that encourages overcapacity and overfishing.
- Governments should more actively manage stocks that have an unfavourable biological status as well as those for which there is no direct control of catches or landings, nor notional total allowable catch limits achieved through input controls.
- Governments should manage fisheries more productively where stocks have a status that is biologically favourable, but not sufficient to maximise catch volume or value.
- Governments should review and simplify management measures where they are particularly complex, potentially difficult to implement and monitor, and – in the case where effective output controls are in place – possibly redundant.
- To fight IUU fishing, individual countries and economies should address the regulatory loopholes and policy gaps that comparison with internationally recognised best practices reveals.
- The automatic sharing and recognition of key information among regional fisheries management organisations would support the fight against IUU fishing, while the harmonisation of standards for collecting scientific data and the sharing of best practices for the implementation of technology would improve regional fisheries management.
- Scientific and socio-economic data should be integrated into fisheries governance systems by embedding its use into decision-making (where possible). Investment in data collection and analysis is also required to build a robust evidence base for policy change.
- Transparent mechanisms for stakeholder participation in the governance process (e.g. advisory groups) should be more widely used to build legitimacy for fisheries policy and policy change. Governments should also carefully review and manage the balance of stakeholders in each group, in accordance with the constituencies affected by policy reforms under consideration.

1 Overview and key results of the *Review of Fisheries 2020*

Fisheries have a fundamental role in feeding the global population, and creating jobs and resilience in coastal communities. However, fish stocks must be managed sustainably in order to meet these socio-economic goals while preserving aquatic and ocean biodiversity and the provision of the ecosystem services on which the “blue economy” relies. Based on the latest available data reported by OECD countries and partner economies, the Review of Fisheries 2020 sheds light on how governments are addressing the key challenges faced by their fisheries and suggests priorities for action both at the national level and for the international community. This chapter discusses its main findings.

Fisheries are fundamental to feeding the global population, and creating jobs and resilience in coastal communities. However, to achieve such socio-economic goals while preserving aquatic and ocean biodiversity and the provision of the ecosystem services on which the "blue economy" relies, fish stocks must be managed sustainably. To ensure fisheries continue to deliver for future generations, in 2015, members of the United Nations (UN) adopted a series of specific targets for fisheries as part of the Sustainable Development Goal (SDG) 14 of the 2030 Agenda for Sustainable Development. SDG 14 seeks to "conserve and sustainably use the oceans, seas and marine resources for sustainable development" and calls for: ending overfishing and illegal, unreported and unregulated (IUU) fishing; restoring fish stocks to sustainable levels and implementing science-based fisheries management; and eliminating subsidies, which contribute to overcapacity, overfishing, and IUU fishing. To reach this last target, members of the World Trade Organization (WTO) are negotiating binding disciplines on fisheries subsidies that would allow countries to collectively prohibit harmful subsidies while taking into consideration appropriate and effective special and differential treatment for developing and least developed countries.

Countries set themselves a deadline of the end of 2020 for achieving these ambitious targets. However, the proportion of fish stocks that are at unsustainable levels has continued to increase globally, albeit at a slower rate than in previous decades. In 2017, about a third of global fish stocks were considered as overfished (FAO, 2020[1]). At the same time, IUU fishing continues in many parts of the world, creating excessive pressure on fish stocks, harming law-abiding fishers through unfair competition and thereby reducing their profitability, in addition to limiting employment opportunities throughout the value chain.

The COVID-19 pandemic is imposing additional challenges. The consequences of this pandemic and the public health measures taken in response are creating risks to jobs, incomes and food security, as well as imposing new demands on governments to mitigate the shock to the seafood sector and ensure the smooth functioning of the food system. The pandemic is also complicating regional and multilateral co-operation. High-level meetings and negotiations are being postponed, such as the *UN Conference to support the implementation of SDG 14*, which was to be held in Lisbon in June 2020. Travel restrictions pose challenges to monitoring and surveillance in both domestic and multilateral fisheries (OECD, forthcoming[2]; OECD, 2020[3]). Beyond the COVID-19 pandemic, climate change continues to have a complex impact on fisheries, increasing the challenges faced by the sector. While not yet fully understood, it is anticipated that climate change will adversely impact fish stocks in many areas, and force changes to fish migration patterns, through impacts on sea-level rise, ocean temperatures, acidification, declining biodiversity and marine ecosystem degradation (Barange et al., 2018[4]; Pörtner et al., 2019[5]; Gaines et al., 2019[6]).

Progress is nevertheless being made in many parts of the world, which is not necessarily captured in global figures. In this context, the *Review of Fisheries 2020* (hereafter, the *Review*) aims to support policy makers and sector stakeholders to accelerate progress towards shared goals and, more generally, guide the transition of global fisheries towards sustainability and resilience. Based on the latest available data reported by OECD countries and partner economies, the *Review* sheds light on how governments are addressing the key challenges faced by their fisheries and suggests priorities for action both at the national level and for the international community.

The key message of the *Review* is that policies to ensure the long-term viability of fisheries, and to protect and restore ocean resources and ecosystems, can be reconciled with policies to address short-term socio-economic goals. Economic, equity and environmental considerations all point to similar best practices: supporting fishers in need rather than subsidising fishing inputs or effort, and ensuring that evidence-based management is implemented and enforced by investing in data collection and analysis, using the evidence in decision-making and fighting IUU fishing with comprehensive and transparent regulations and policies.

To help identify the priorities for action at the level of competent authorities, comparable data on the status of fish stocks for individual countries and economies was assembled (Chapter 2). It shows that 23% of the 1 119 stocks for which information was gathered have an unfavourable biological status, calling for

remedial action through better stock management. The data also show scope to manage fisheries more productively where stocks have a status that is biologically favourable, but not sufficient to maximise catch volume or value (or where no such additional objectives exist). This was the case for about half the stocks that were reported to have a favourable biological status (which, themselves, accounted for 66% of all assessed stocks reported on).

New comparable information on fisheries management was also collected for this *Review*. This information suggests there is opportunity for more active management where there is no direct control of catches or landings, nor notional total allowable catch (TAC) limits achieved through input controls. To facilitate the implementation and monitoring of management measures where these are particularly complicated, managers should consider whether some measures may have become redundant following the introduction of output controls. Progressing towards sustainable fisheries also requires improving the evidence base: assessing the status of all stocks of commercial importance – both in terms of biological sustainability and against additional management objectives – then relating these data to the information on management. This would allow further empirical investigation on the effectiveness of alternative fisheries management practices in different contexts.

The fight against IUU fishing is a key part of sustainable fisheries management and a major issue for international co-operation. Evidence shows that rapid, significant and lasting gains are possible, and the measures needed to reap these gains are often more acceptable to fishing communities and the fish industry than are overall fishing restrictions. The *Review* examines the policies that countries and economies apply in the fight against IUU fishing and evaluates the extent to which internationally-recognised best practices in some of the most important areas for government intervention against IUU fishing have been adopted (Chapter 3).

A key finding is that progress has been made since the mid-2000s, with the adoption of stricter regulations, closer monitoring and control, and greater international co-operation. Most notably, port state measures – by which authorities monitor and control activities at port – are today widely used internationally. This was not the case in 2005. Several market measures have also been adopted. For example, all countries and economies surveyed reported they could reject products originating from IUU fishing at the border in 2018, while only 38% of them could do so in 2005. Although registration and authorisation processes already had a relatively high uptake of best practices in 2005, several measures have seen significant recent progress. For example, while in 2005 only 36% of countries and economies surveyed prohibited parallel registration of vessels in more than one country, 93% did so in 2018. Overall, the information collected shows a high variation in take-up of best practices across countries and economies. This demonstrates scope for peer learning and bilateral co-operation between countries and economies at the forefront of the fight against IUU fishing and those who need to reinforce their regulatory arsenals.

In addition, registration and authorisation processes should generally be made fully transparent to facilitate co-operation between governments, across branches of government, and between stakeholders so that they can join forces to better track IUU activities. Only one in five countries and economies surveyed reported properly publishing lists of vessels identified as engaging in IUU fishing, while over half reported not publishing the lists of vessels they authorise to conduct fishing-related activities in the high seas. G7 and G20 countries, which have expressed a shared ambition to curb IUU fishing following conferences in Charlevoix in 2018 and in Osaka in 2019, respectively, could lead the way by making public their vessel registries, lists of authorised vessels, and those vessels that have been identified as engaging in IUU fishing. The issuing of a unique vessel identifier in the registration process should be adopted and harmonised, making use of International Maritime Organization (IMO) numbers whenever possible. A quarter of surveyed countries and economies reported they did not require an IMO number to register fishing vessels and a third did not require one to register vessels conducting fishing-related activities.

Best practices for gathering information on who ultimately controls and benefits from vessel activities (i.e. the "beneficial owners" of vessels) should be identified and promoted. Many countries and economies have a legal framework to do so, but report practical difficulties. The evidence gathered also suggests that the regulations for transhipment (whereby fish are transferred from fishing boats onto larger refrigerated vessels, which then carry the fish to port) should be made more stringent so that products of IUU fishing do not enter the value chain unnoticed during operations at sea. Wider adoption of market measures should be encouraged internationally to increase the traceability in seafood value chains. Measures should also be adopted to close access to markets and fisheries services to operators that engage in IUU fishing. For example, only about one in three respondents has a legal framework mandating tax authorities to co-operate and share information with fisheries authorities to facilitate the detection of illicit proceeds and the identification of nationals who are the beneficial owners of IUU fishing vessels.

To win the fight against IUU fishing and to facilitate the transition to sustainable fishing more generally, governments should stop disbursing support in ways that encourage unsustainable fishing. Indeed, in the pursuit of objectives such as maintaining coastal employment, improving fishers' welfare, and ensuring the sustainability of an important food sector, some types of support, in particular contexts, can build excess fishing capacity and lead to overfishing and IUU fishing. In addition, some of these support policies do not always address their socio-economic objectives in an efficient or equitable way. For example, support that lowers the cost of fuel can transfer a relatively low proportions of the money to fishers, while reducing the competitiveness of smaller-scale fishers, making them worse off than they would have been without the support (Martini and Innes, 2018[7]).

The *Review* updates the OECD fisheries support estimate (FSE) database and presents the most comprehensive, detailed, and consistent collection of country level data on support to fisheries reported by governments. The nature and potential impacts of this support are analysed in Chapter 4. Over 2016-18, the 39 countries which reported data to the OECD together provided average annual support of USD 9.4 billion to the fisheries sector. This represented a gross transfer equating to about 10% of the average value of landings over 2016-18, down from 13.8% in 2012-14. This decrease resulted from a significant reduction in direct support to individuals and companies, which totalled USD 4.6 billion per year on average in 2016-18, down from USD 8.6 billion in 2012-14. An important driver of this trend was a reduction in support to fuel for fisheries in the People's Republic of China (hereafter "China"), the country with the world's largest fisheries sector.

The evidence shows significant scope to further re-allocate direct support. Over 2016-18, on average USD 3.2 billion was spent annually on support that reduces the cost of inputs. Across all countries and economies in the FSE database, support to fuel was the single largest direct support policy, accounting for 25% of total support to the sector. At the same time, less than a third of what was spent to reduce the cost of inputs (USD 1.0 billion) was granted in support that was partially de-coupled from fishing activities – such as income support and special insurance systems. Moving towards measures that help fishers to operate their businesses more effectively and profitably (e.g. through education and training), or provide direct income support in a way that does not incentivise unsustainable fishing would reduce the negative impacts on fish resources and increase fishers' welfare.

When allocating public funding for fisheries, governments should ensure that there is sufficient capacity for management, control and surveillance to effectively manage fisheries, including on the high seas, and to eradicate illegal fishing. At the same time, they should avoid financing infrastructure that encourages overcapacity and overfishing by creating additional capacity for fishing, landing and processing. Between 2012-14 and 2016-18, spending on management, control, and surveillance fell substantially relative to fleet size in several countries and economies, while spending on infrastructure increased significantly in others (sometimes the same countries). To ensure that adequate resources are available to provide essential management services, and in line with the user pays principle, governments should consider requiring the

fisheries sector to fund a proportion of the cost of these services. In many countries, such costs continue to be borne mostly by the taxpayer.

In addition, increasing transparency in government support to fisheries would help build trust in the sector and in policy responses. This is particularly needed with respect to fuel support and payments to access foreign waters, which remain insufficiently documented. Increased transparency would also enable countries to learn from each other's experiences in order to better prepare for the future.

Finally, the *Review* explores how reforms – where needed – can be facilitated by good fisheries governance (Chapter 5). It finds that developing and adopting mechanisms whereby governments commit to reviewing or changing policies based on scientific data would contribute to more timely and acceptable decision making, for example via rules for adjusting harvest controls depending on stock status assessments. Furthermore, socio-economic data should be more directly integrated into decision making to better anticipate and understand the impact of changes to fisheries policy on broader socio-economic outcomes. Transparent mechanisms for stakeholder participation in the governance process, such as advisory groups, should be more widely used, while governments should carefully review and manage the balance of stakeholders in these groups depending on the policy areas they advise on.

In multilateral fisheries, the decision-making processes of regional fisheries management organisations (RFMOs) should be reviewed to find more efficient pathways than consensus-based decisions. Voting mechanisms, combined with objection processes that are limited in scope and automatic reviews of objections, offer a promising approach to representative and efficient decision-making. In addition, the automatic sharing and recognition of key information among RFMOs would support the fight against IUU fishing. Co-ordination when setting standards for collecting scientific data and the sharing of best practices for the implementation of technology could also improve regional fisheries management.

The international community should continue to develop evidence on the types of institutions and mechanisms used to achieve good fisheries governance globally in order to identify opportunities to reform the governance systems of both national and multilateral fisheries, and thereby achieve equitable and sustainable policy outcomes.

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2 Managing fisheries

Healthy fish stocks are fundamental for maximising sustainable catch, or its value, which itself is key to providing food-security, jobs and incomes in the long-term. Healthy stocks are also vital for maintaining aquatic biodiversity, and the provision of ecosystem services on which several other sectors of the blue economy rely. With Sustainable Development Goal 14, countries collectively agreed to restore all fish stocks at least to levels that can produce maximum sustainable yield by 2020 and to implement science-based management plans. To help fisheries management authorities deliver on these commitments, this chapter provides newly assembled comparable information on the status of fish stocks as well as on how fish stocks of key species are managed, at the level of individual countries and economies.

Key recommendations

- Countries should allocate resources to assessing the status of, at least, the stocks of commercial importance for their fisheries. Data newly-assembled for this chapter shows that, for several OECD countries and emerging economies with large fisheries, stock status determination is only available for relatively limited numbers of stocks.
- Assessments should ideally allow status to be determined with respect to biological sustainability and any additional objectives (such as maximising catch volume or value within sustainable limits).
- Countries should consider revisiting their management approaches for stocks that have an unfavourable biological status, which was the situation for 23% of the 1 119 stocks for which information was reported to the OECD in 2019.
- There is further scope to manage fisheries more productively where stocks have a status that is biologically favourable but which does not allow meeting additional management objectives, such as maximising catch volume or value (or where no such additional objectives exist). This was the case for about half the stocks reported to have a favourable biological status (which, themselves, accounted for 66% of all assessed stocks reported on).
- While not pre-judging what is possible or necessary for particular fisheries, scope for improving management seems to exist where there is no direct control of how much fish can be caught or landed, nor notional total allowable catch (TAC) limits achieved through input controls.
- Scope for improvement similarly seems to exist where sets of management measures are particularly complex, potentially difficult to implement and monitor, and possibly even unnecessary following the introduction of output controls.
- To identify priorities for action more precisely, countries should continue to share detailed information on stock status and on measures used to manage stocks in a comparable framework (such as that used in this chapter). Further analysis of this data is needed to better understand how far stocks with unfavourable biological status are from favourable status, as well as which of these stocks are on positive trajectories thanks to remedial management actions that will allow stock recovery.
- To identify management practices best suited to achieving sustainable fisheries in different situations, the information on stock status will need to be directly related to the information on management to allow further empirical investigation of the effectiveness of fisheries management.

2.1. Realising the benefits of healthy fish stocks today and in the future

Healthy fish stocks are fundamental for maximising sustainable catch, or its value, which itself is key to providing food-security, jobs and incomes today and for future generations. Healthy stocks are also vital for maintaining aquatic biodiversity, and the provision of ecosystem services on which many other sectors of the blue economy rely (OECD, 2020[1]). Well-managed stocks can also increase fisheries' profitability in indirect ways, as consumers increasingly value the protection of ocean ecosystems and resources. Acknowledging and signalling the sustainability of a stock can facilitate market access and generate price premiums (Asche and Bronnmann, 2017[2]; Fernández Sánchez, Fernández Polanco and Llorente García, 2020[3]).

Recognising the benefits of sustainable fisheries management, the international community has included the objective of restoring all fish stocks at least to levels that can produce maximum sustainable yield by 2020 in the Sustainable Development Goal (SDG) 14 (target 14.4), which seeks to "conserve and sustainably use the oceans, seas and marine resources for sustainable development". SDG 14 also explicitly calls for implementing science-based management plans, pointing at the key role that this can play in achieving better stock status and associated societal benefits.

The objective to restore all fish stocks at least to levels that can produce maximum sustainable yield has however not been reached at a global level. In fact, according to the FAO (2020[4]), the overall proportion of fish stocks that are within biologically sustainable levels has deteriorated since the mid-1970s, with a slowdown of that trend over the last decade. About a third of global fish stocks (34.2%) are reported to have been at biologically unsustainable levels in 2017, up from 10% in 1974 (and slightly above the 30% estimation for 2007 in FAO (2008[5]).[1] FAO (2020[4]) also calculated that 21.3% of global landings by volume in 2017 came from stocks at biologically unsustainable levels.

These global figures however hide significant variation in status and in trends across regions and countries. The FAO estimates that 62.5% of stocks in the Mediterranean and Black Sea, 54.5% of stocks in the Southeast Pacific and 53.3% of stocks in the Southwest Atlantic were at unsustainable levels in 2017. At the same time, and in contrast, the Eastern Central Pacific, Southwest Pacific, Northeast Pacific, and Western Central Pacific had the lowest proportions of stocks at biologically unsustainable levels (ranging between 13 and 22%). Similar levels of variation are to be expected in terms of the proportion of landings coming from stocks at unsustainable levels.

The regional figures, themselves, do not do justice to the fact that significant resources have been invested to improve stock assessment and fisheries management in some countries and this has led to many stocks being successfully rebuilt.[2] Overall, where fisheries are actively managed, and assessed, the stock status appears to be overwhelmingly better, despite the influence of environmental factors (including climate change). Hilborn et al. (2020[6]) recently concluded that, "compared with regions that are intensively managed, regions with less-developed fisheries management have, on average, three-fold greater harvest rates and half the abundance (i.e. biomass) as assessed stocks". The evidence they collected also suggests "that the regions without assessments of abundance have little fisheries management, and stocks are in poor shape."

To help identify the priorities for action at the level of competent authorities, this chapter presents newly assembled comparable data on the status of fish stocks for individual countries and economies.[3] It also presents similarly structured information on fisheries management itself (for stocks of a smaller number of key species). In the absence of information on stock status, evidence of insufficient fisheries management can potentially be seen as a proxy for stock health being at greater risk. Where management appears to be overwhelmingly successful, management approaches can be a source of inspiration for fisheries managers in other parts of the world.[4]

The detailed information collected in this chapter is also a necessary input in better understanding the effectiveness of specific management approaches. Given the complexity of fish stock management, and the multitude of stocks being harvested and managed globally, empirical work trying to establish a causal impact of management on stock status (e.g. Hilborn et al (2020[12]) has often relied on estimations and overall indicators of management intensity. Linking data on assessed stock status to detailed information on measures being used to manage specific stocks would help the evidence base needed to concretely advise fisheries managers on approaches best suited to achieving sustainable fisheries in different situations.[5]

Box 2.1. Countries and economies reporting information on stock status and management to the OECD

The countries and economies contributing information on stock status and management to the OECD are: Argentina, Australia, Belgium, Canada, Chile, Chinese Taipei, Colombia, Costa Rica, Denmark, Estonia, France, Germany, Greece, Iceland, Italy, Japan, Korea, Latvia, Lithuania, the Netherlands, New Zealand, Norway, the People's Republic of China (hereafter China), Poland, Slovenia, Sweden, Thailand, Turkey, the United States, and Viet Nam.

These countries and economies accounted for 51% of global catches in 2018.

Note: Iceland did not report information on fish stock management. China, Indonesia and Viet Nam did not report information on stock status. For EU countries, information on stock status was reported with a single entry for the European Union.

2.2. The status of assessed fish stocks

Regularly assessing the status of individual fish stocks is essential to sustainable management. Determining where stocks sit with respect to key limit or target reference points – which may be quantified in terms of instantaneous fishing mortality (F) or stock biomass (B) – allows management performance to be evaluated.[6] Limit reference points identify sustainability thresholds that should not be crossed, as, beyond these the long-term biological viability of a stock is likely to be threatened. Target reference points, on the other hand, are optimal levels to be reached, determined by the management objective for the stock. Indeed, good fisheries management can deliver even greater benefits, along with fewer environmental impacts, when it ensures stocks are not only biologically sustainable, but also abundant enough to allow catch volume or value to be maximised. A commonly used objective to define target reference points is maximum sustainable yield (MSY), that is, to produce the largest long-term average (sustainable) level of catch. Maximum economic yield (MEY) is another possible objective, which aims to maximise economic productivity as opposed to the quantity of fish being produced.

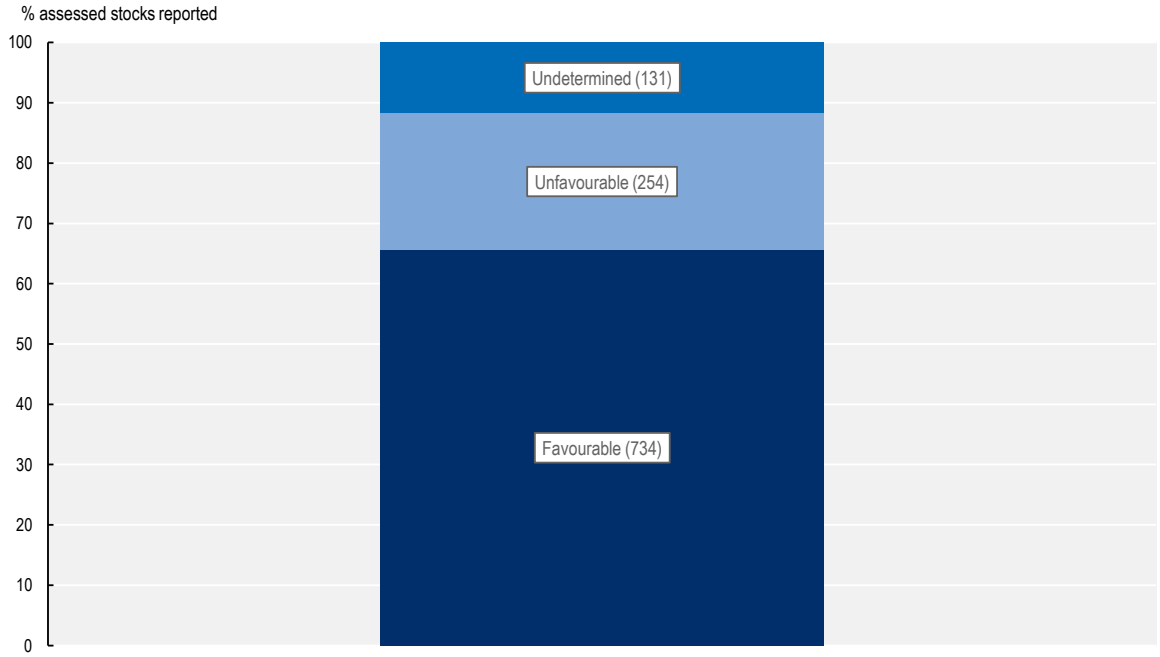
To meet the need for more accessible and comparable information on the status of fish stocks worldwide, the OECD has brought together information on the status of fish stocks that is otherwise only available in a number of different forms and locations, making it both difficult to access for the non-technical policy maker and difficult to compare across countries.

A questionnaire was sent out to collate data from participating countries and economies on the targets and thresholds[7] (that is, the key management reference points) used to manage individual stocks, and where each stock is assessed to sit with respect to these (that is, its status).[8] Data were collected at the end of 2019, and reflects the most up to date understanding of stock status in reporting countries and economies at that point in time. This, in turn, was used to produce country-level indicators on the status of fish stocks and the success of management at achieving sustainable fisheries:

- The **total number of stocks reported on**. And, of those:
- The number of **stocks with a favourable biological status** (that is, stocks within all limit reference points)
- The number of **stocks with a favourable biological status** that also meet additional management objectives (such as MSY)
- The number of **stocks with an unfavourable biological status** (that is, stocks outside one or more limit reference points)
- The number of stocks with **undetermined status** (where an assessment was attempted but uncertainty in the results prevented a determination being made).

Altogether, information on the status of assessed stocks was reported for 1 119 individual stocks.[9] Of these, 66% (734) had a favourable biological status, 23% (254) had an unfavourable biological status, while, for the remaining 12% (131), the status was undetermined (Figure 2.1). [10]

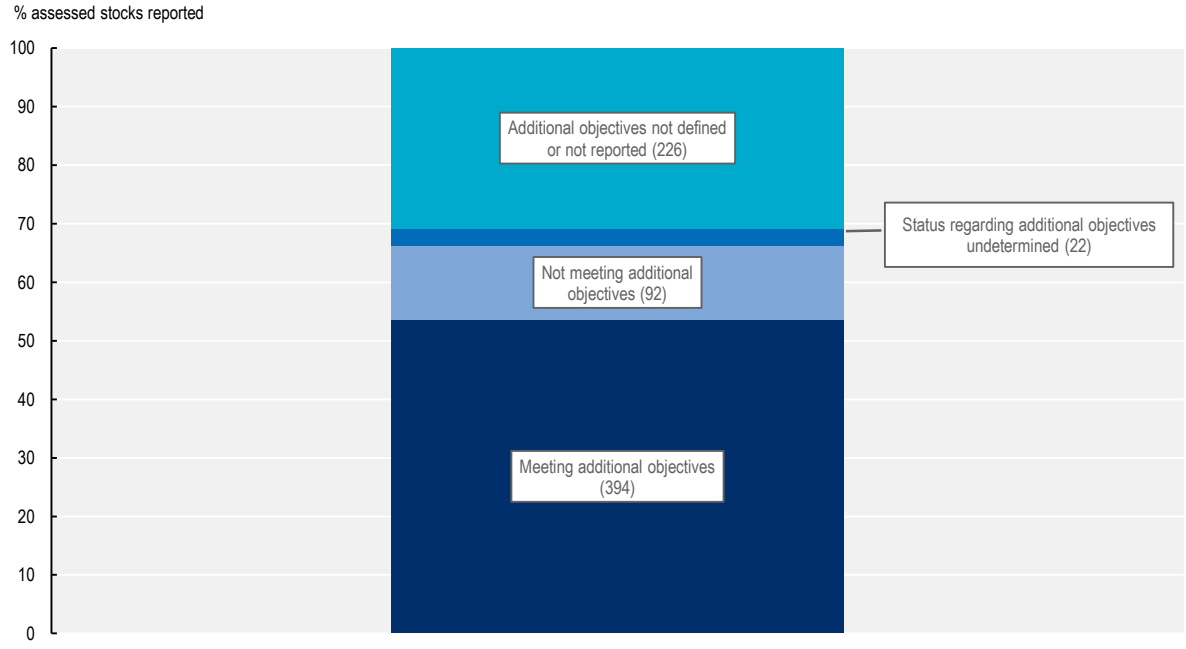
Figure 2.1. Reported biological status of all assessed fish stocks



Note: This figure displays summary information for the 1 119 individual stocks for which data were reported to the OECD. Biological status is considered favourable when a stock was found to be within all limit reference points and unfavourable when stocks were found to be outside one or more limit reference point. The status of stocks for which assessment was not conclusive, is reported as undetermined.

Within the stocks that have a favourable biological status, 54% (394) were meeting targets based on additional management objectives such as having fishing mortality and biomass at the levels required to result in MSY or MEY; 13% (92) were not meeting such targets; and 31% (226) either did not have other targets defined or they were not reported (Figure 2.2). The status with respect to such targets was undetermined in 22 cases.[11]

Figure 2.2. Reported status with respect to additional management objectives for stocks with favourable biological status



Note: This figure provides information for the 734 stocks where biological status was reported to be favourable. It reports status with regards to additional management objectives such as maximising catch volume or value.

At the level of individual countries and economies, the situation varies widely along all dimensions of the data. The number of recently assessed stocks reported by individual countries and economies varies from zero – no stock had been recently assessed by Costa Rica at the time of data collection – to 281 recently assessed stocks reported by Australia (Figure 2.3).

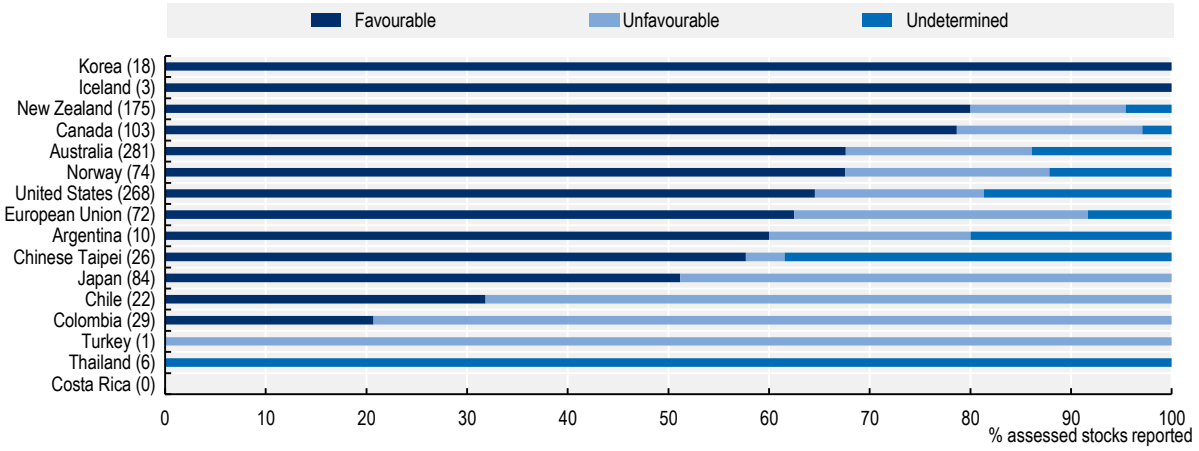
Multiple factors can influence the number of stocks a country formally assesses, including the number of species of commercial significance – which depends to some extent on the location and size of the exclusive economic zone (EEZ). For example, the contribution of key species to individual countries and economies' total landings value varies from over 90% in Argentina and Poland, to less than 20% in Colombia (Annex Figure 2.A.1). The capacity to assess stock status (including data collection) is also a key factor in explaining the total number of stocks assessed. The financial and technical resources of managing authorities varies across countries and economies, as does the extent to which assessing stock status is mandated by law (which, in turn, can influence the resources that are made available to do so).[12] The costs and benefits associated with assessing stock status in different contexts can also be a factor. For example, it can be more difficult (and it may not be either possible or pragmatic) to assess the status of all stocks in mixed fisheries that harvest large numbers of different species. While it is hard to evaluate how many stocks each country and economy should ideally assess, the large variation in the total number of stocks assessed across countries certainly points at room for improvement where numbers are low.

The proportion of recently assessed stocks that have a favourable biological status also varies widely across countries. It ranges from 100% for the three stocks reported by Iceland and the 18 reported by Korea, to less than 60% in Chinese Taipei, Chile, Colombia, Japan, and Turkey. The six stocks reported on by Thailand have an undetermined status (Figure 2.3). These contrasting results need to be considered in a country-specific context, particularly, in the context of the total number of stocks reported on. Only

11 countries and economies reported stock status with respect to additional management objectives such as MSY or MEY.

Finally, it should be noted that stock status as reported here does not account for any corrective action that may have subsequently taken place. For example, it would be expected that in countries with strong management, stocks that were found to have an unfavourable biological status have been subjected to rebuilding plans that should have put stocks on a trajectory allowing a return to a favourable biological status.

Figure 2.3. Reported biological status of all assessed fish stocks: National level



Note: This figure presents the status of assessed stocks as reported to the OECD by individual countries and economies (the total number of which is provided in parentheses). Favourable and unfavourable status refer to the stock's biological situation (signalling a stock was found to be within all limit reference points or outside one or more limit reference point). The status of stocks for which the assessment was not conclusive is reported as undetermined. The degree to which harvested stocks are assessed (and reported upon) was not reported by countries and varies significantly.

2.3. Stock management of most valuable species

At the most fundamental level, sustainable fisheries management aims to control the impact fishing has on the abundance of a stock or set of stocks to avoid threatening their long-term biological viability and, ideally, to ensure biomass is high enough to allow maximising catch volume or value. In practice, management measures aim to control either how fish are caught (with input controls) or what is caught and retained (with output controls). Input controls regulate fleet and gear characteristics (e.g. vessel size and power, gear type and configuration), along with how that can be applied (with spatial or temporal restrictions). Output controls most obviously take the form of quotas, typically through total allowable catch limits (TACs), which cap the total quantity of an individual stock that can be harvested. They are sometimes complemented by individual or community quotas, which allocate shares of the TAC to individuals or communities and define the terms under which these shares can (or cannot) been exchanged or sold. Output controls can also include measures such as minimum landing sizes (MLS), which aim to prohibit the catch of juveniles. Managers often use combinations of both input and output controls.

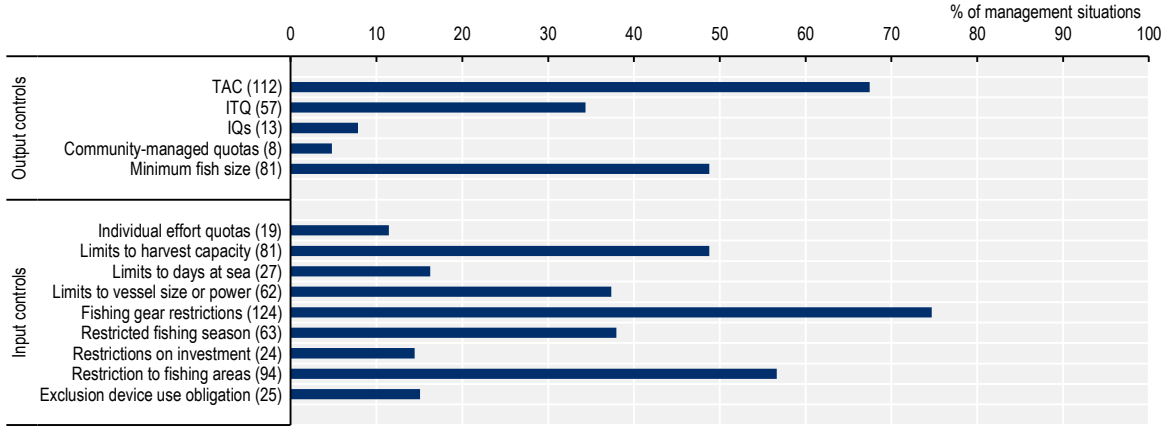
In many cases, an ecosystem-based approach to fisheries management has been formally adopted by national entities: 21 countries and economies reported having it as an objective in the OECD survey on fisheries management. This, in theory, implies a more comprehensive approach to fisheries management, where, in addition to the abundance of target species, a broader set of objectives must be accounted for.

These include minimising the impact of fishing on biodiversity and ecosystems more generally (on other species and on habitats in particular). In practice, the implementation of an ecosystem-based approach is complicated by the need to account for trade-offs when balancing multiple objectives – something that further complicates decision making while also being more data intensive. Only six countries and economies reported fully implementing ecosystem-based management. Additional social and economic objectives – such as the distribution of access to fishing resources across individual fishers or groups of fishers, or the concentration of the fleet – are also important factors when choosing management measures. Any associated trade-offs or impacts are however beyond the focus of this chapter.

To gain a clearer understanding of the management measures currently being utilised in different contexts, the OECD sent out a questionnaire to collate data on the measures countries and economies use to manage the harvested stocks of their five most valuable species at the time the questionnaire was designed.[13] While these represent a smaller subset than all the assessed stocks for which status was reported, on average, stocks of these key species accounted for 57% of the value of all landings of the reporting countries and economies. In three-quarters of reporting countries and economies, they account for more than 40% of landings by value and this proportion reaches over 90% in Argentina, Poland and Viet Nam (Annex Figure 2.A.1).

In some cases, more than one stock of a particular species was harvested and not all of them were managed with the same measures. In these cases, authorities were invited to report management measures for each stock or group of stocks managed with a common set of measures. For each management situation (that is, sets of measures applying to a stock or a group of stocks), respondents were invited to report which measures were used, as well as any relevant details regarding their implementation. Altogether, information was reported for 166 management situations. The total occurrences of use of the different measures considered in all situations are summarised in Figure 2.4.

Figure 2.4. Total occurrences of specific measures in the 166 management situations reported



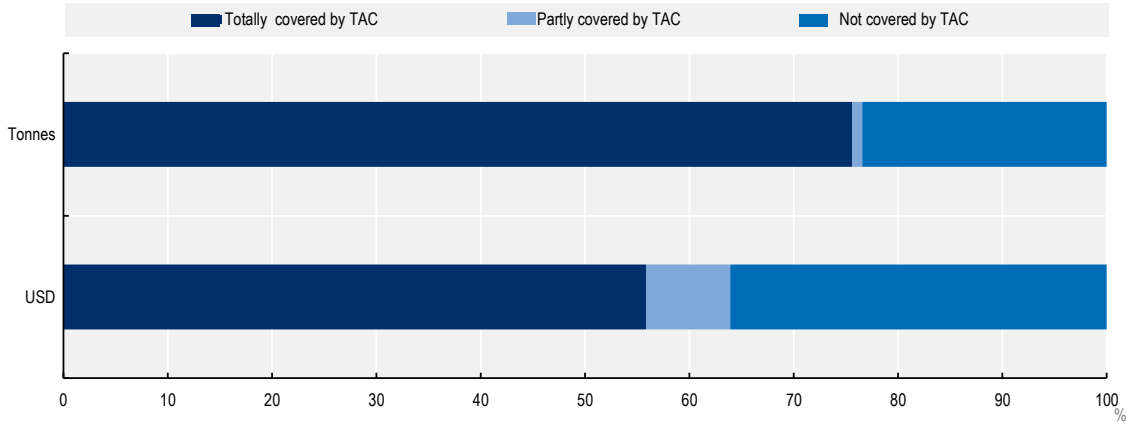
Note: The number of times each specific measure occurs is provided in parentheses. As a single stock, or group of stocks, can be managed using multiple input and/or output controls at the same time, this graph displays "occurrences" of use of particular control measures rather than percentages of stocks, or groups of stocks, managed using one or another.

Two-thirds of the management situations directly control how much fish can be caught or landed

Output-based measures typically set time-bound limits on the quantity of fish that can be caught or landed by the fishery. They are primarily implemented in the form of TAC limits. Setting and enforcing scientifically established TACs for the main species of commercial interest, at a minimum, is generally recognised as a transparent and effective way of controlling fishing impact on the species being managed.[14]

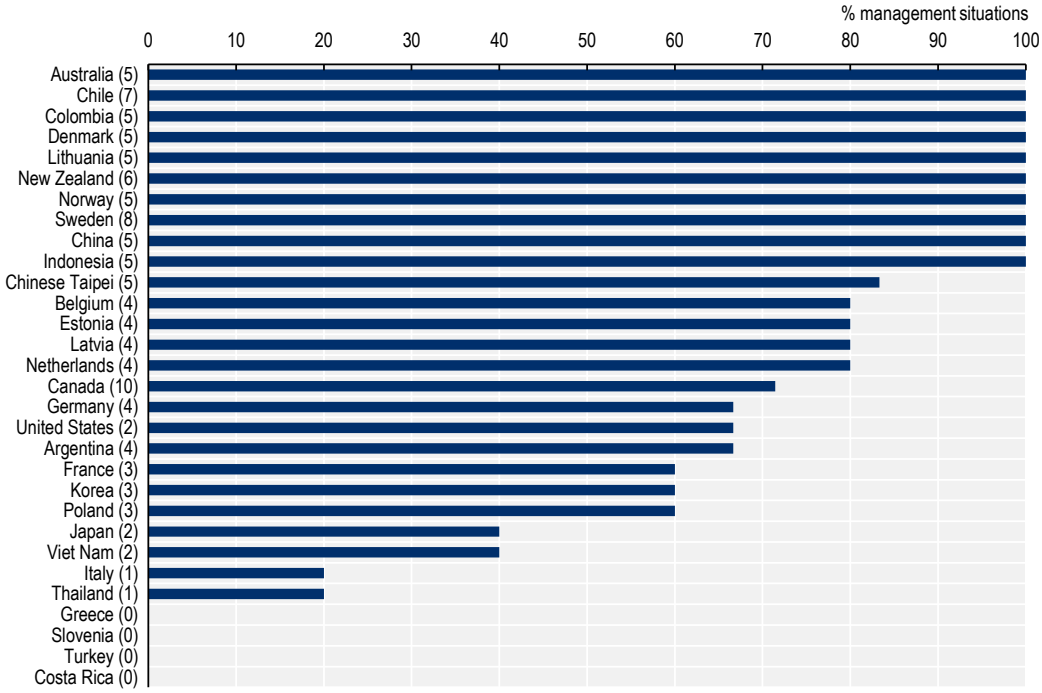
Catch was controlled with the use of TACs in 67% (112) of the management situations countries reported on.[15] For countries and economies reporting value of landings at the species level, in 2018, this means that key species under TACs produced landings worth USD 9.8 billion (56% of total key species landings value). In addition, key species partially covered by TACs produced landings worth USD 1.4 billion (8% of total key species landings value) (Figure 2.5). Partial coverage of a species for a specific management measure occurs when more than two stocks or groups of stocks exist for the same species and at least one, but not all, are managed using that measure (here a TAC). Overall, TAC-covered species accounted for 15.3 million tonnes of fish (76% of the total volume of the key species caught by reporting countries) with an additional 0.2 million tonnes (1%) produced by species partially covered by TACs. Almost a third of countries and economies reported using TACs in all management situations reported on (Figure 2.6). Conversely, four countries did not report the use of TAC for any management situation.

Figure 2.5. Use of total allowable catch (TAC) limits in managing the key species reported



Note: This figure displays the share of key species originating from species totally covered by TAC limits, partly covered by TAC limits and not covered by TAC limits, in the catch volume all key species (top) and in the value of landings of all key species.
The bottom figure (in USD) does not include China, Indonesia and Viet Nam as value of landings data were unavailable at the level required.
Source: OECD dataset 'Marine landings' (OECD.Stat), FAO dataset 'Global Fishery and Aquaculture Production Statistics' (FishStatJ).

Figure 2.6. Use of total allowable catch (TAC) limits in management situations reported: National level

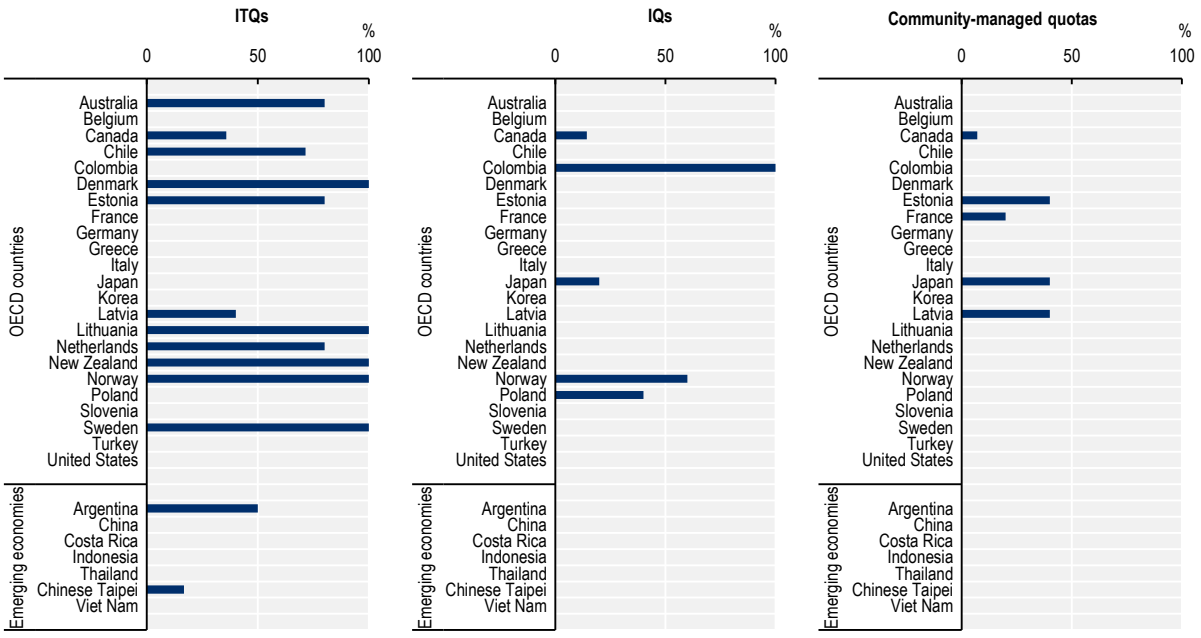


Note: The total number of management situations reported on in each case is provided in parentheses. Some countries and economies that did not report the use of TACs for any stocks of the key species considered in this Figure did report using TACs to manage other stocks.

Quotas are used in 68 (41%) situations

Individual quota allocations (IQs, ITQs) create incentives for increased economic efficiency, and improving economic performance is a common objective in the application of these measures. Sixty-eight management situations were reported to utilise quotas: ITQs were applied in 57 cases, IQs in 13 cases, and community managed quotas in eight cases. In most of these cases, TACs were also in place, and sometimes, more than one type of quota was used.[16] For example in the 57 situations managed using ITQs, in five cases, IQs were also in place. In another four cases community quotas were also in place; and, in one case, both IQs and community-managed quotas were also in place. Over half of countries and economies (57%) reported using quotas allocated to individuals or communities; six of whom did so in all management situations reported on (Figure 2.7).

Figure 2.7. Use of quotas in management situations reported: National level



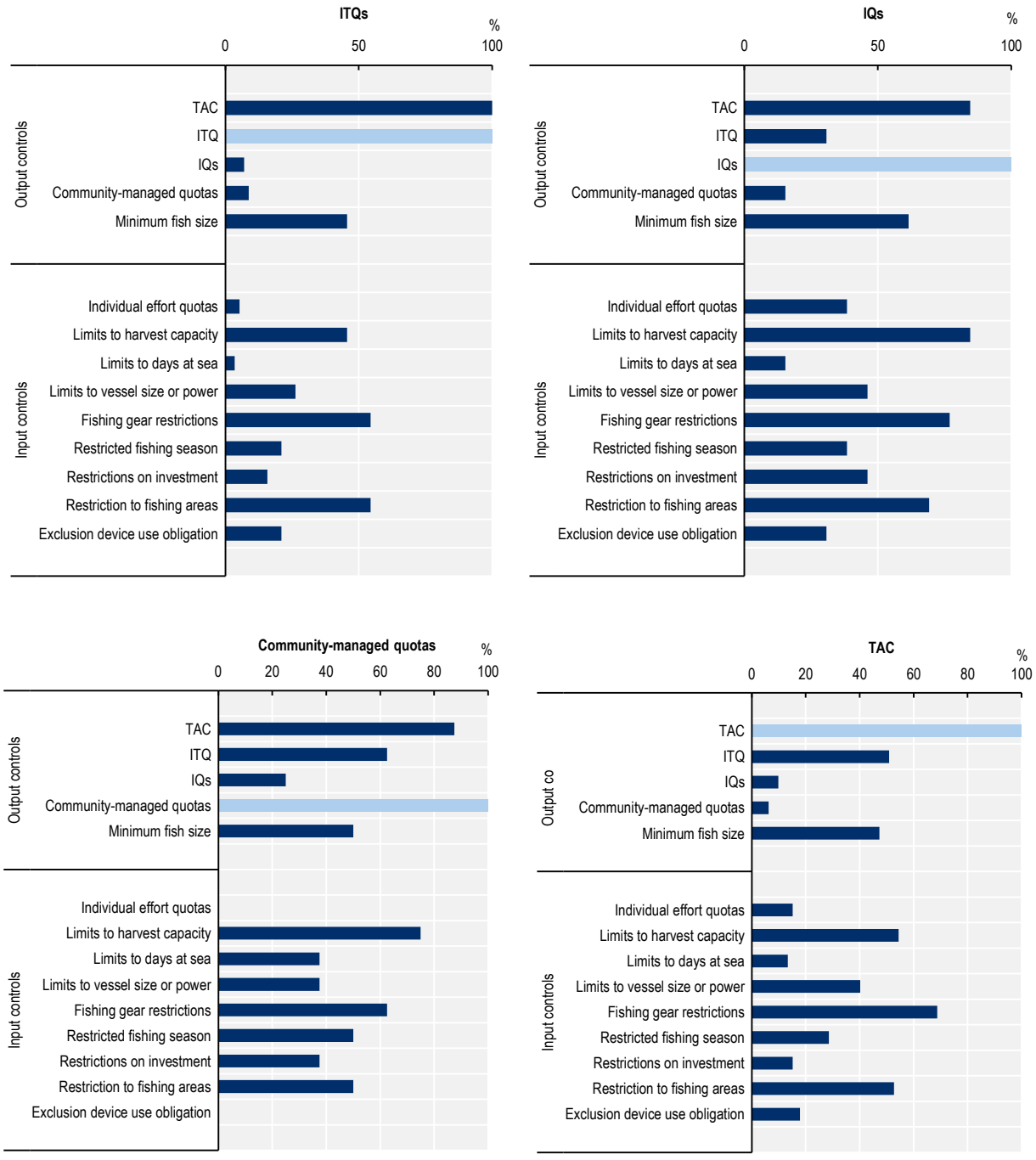
Input controls are also used in most management situations where output is directly controlled

Direct controls on how much fish can be caught or landed, whether through TACs, quotas or combinations of these measures, are combined with input controls in most cases, notably restrictions on the use of gear and limits to harvest capacity (Figure 2.8). The absence of specific input controls was reported in only five instances of ITQ use, one of which also utilised community-managed quotas. Of the stocks managed via output controls only, four are pelagic stocks (mackerel, herring, and sprat twice) and one is a demersal stock (plaice).

Where TACs are used without quotas (28% of situations), the use of input controls is even more frequent (in particular restrictions on gear, power and fishing season) when compared to situations that combine TACs with quotas (Annex Figure 2.A.2). The most frequently applied input measures in all cases (not always in the same order) were restrictions to fishing gear or areas, and limits to harvest capacity. Most countries and economies tend to mainly use combinations of both input and output controls (Annex Figure 2.A.3). Denmark and the Netherlands stand out as exceptions, with four of the five reported management situations making use of output controls only.

Simplicity of rules and reducing any unnecessary regulatory burden are key components of effective fisheries management (Belschner et al., 2019[7]).[17] An excessive regulatory burden can impede the ability of fishers to operate efficiently and complicate monitoring, control, surveillance (MCS) and enforcement. While the most appropriate set of measures tends to be context specific, a generally less frequent application of additional input controls may reflect they are unnecessary in the given context. Where ITQs are in place, an average of 2.5 types of input controls are also reported. For IQs this average is 4.5; for community-managed quotas, it is 3.5; and for situations with TACs, but no quota, it is 3.5.

Figure 2.8. Occurrence of management measures in reported situations that directly control output, by type of output control in place



Fishing gear restrictions are used in over half of situations where output is directly controlled (Figure 2.8). Such restrictions typically regulate the types and configurations of fishing gear that fishers are permitted to use when targeting the species in question and may be applied to control factors such as fishing power (to control catches), selectivity (e.g. to avoid catching target species below minimum size), or environmental impacts (e.g. to avoid damage to habitat). When their sole purpose is to control fishing power, regulation may be directly imposing inefficiencies on fishers, and thereby reduce economic performance. Limits to vessel size and power, and days at sea (generally less frequently used in combination with direct output controls) can have similar applications and impacts. Managers should review these policies on a case-by-case basis to determine whether these regulations are actually needed to address specific outstanding issues.

Controls on harvest capacity, such as a limited number of licenses or decommissioning schemes, are generally used to constrain or reduce fishing capacity and were applied in over half of all situations where output is directly controlled. Their use was less prevalent in ITQ fisheries (46% of cases) but far higher in IQ fisheries (85%). A lack of additional information makes interpreting the latter finding difficult. In all cases where additional detail was provided on controls to harvest capacity, measures were reported to be limited licensing, while one industry funded buy-back scheme was also reported to be in operation.

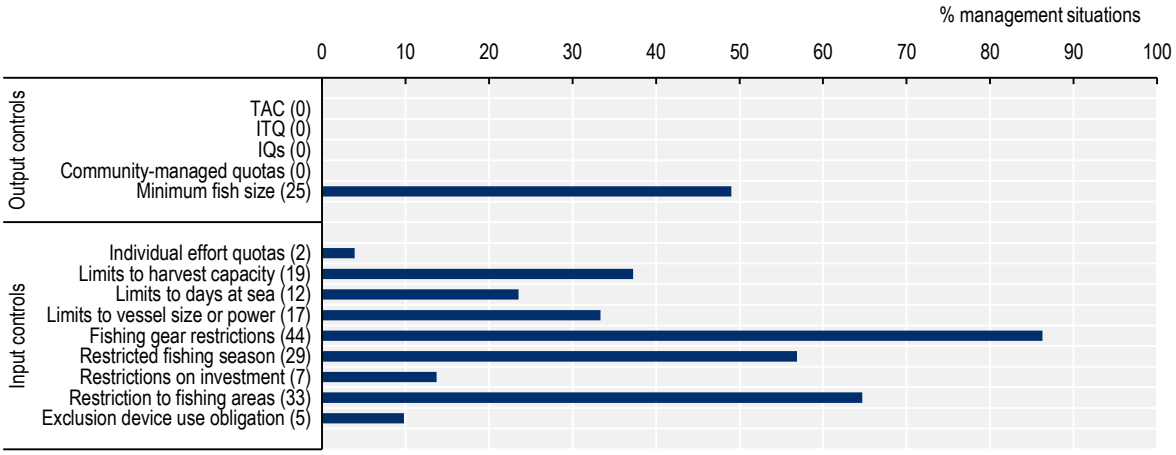
Management measures that limit the areas where vessels are permitted to operate, or the length of fishing seasons, tend to be conservation oriented. These can directly limit fishing impacts on spawning or habitats. In the absence of individual quotas (ITQ, IQ or community), limitations on fishing season length are also applied to control total fishing effort, and their use was reported in 47% of such cases (25% when individual quotas were in place). When used in this specific context, inefficiencies can arise if fishers are unable to adequately spread their fishing effort, and may induce price volatility if short seasons result in markets being flooded (over supply causing price reductions or necessitating preservation through freezing for example).

Excluder devices are conservation-specific technical measures that aim to prevent non-target species (and potentially undersized target species) being retained and killed, reducing the impact on the target or associated stocks. The use of such devices is mandated in 15% (25) of the situations reported. Their use is more prevalent in the management of benthic (predominantly prawns) and demersal species (Annex Table 2.A.2), reflecting the tendency for these fisheries to be associated with higher levels of bycatch.

Fifty-one situations (or 31%) involve combinations of input controls only

In some situations, the use of TACs and quotas can be impractical, due to factors such as the inability to adequately monitor catches and landings. In such cases, input controls, which can be easier to monitor, are used to limit catches. However, even in these situations, the measures implemented will ideally be specified with the objective of limiting catches to at least a notional total level. In 51 management situations, output was not directly controlled (other than with minimum fish sizes in 25 situations). Instead, a range of input controls are used, with an average of 3.3 input-based measures are reported (Figure 2.9). These situations mainly controlled how fishing could take place, with gear restrictions involved in 86% of situations, fishing areas in 65% of cases, fishing seasons in 57%, and minimum fish sizes in 49%. Limits on harvest capacity, days at sea or individual effort quotas were used in less than 40% of cases. When days at sea were used in the absence of TAC or quotas there was a proportionally higher use of every other form of input control (Annex Figure 2.A.4).

Figure 2.9. Occurrence of management measures in situations reported where the only output control is minimum fish sizes



Note: The number of times each specific measure occurs is provided in parentheses.

2.4. Conclusion

Stock status data was reported for 1 119 assessed stocks. It shows that almost a quarter of these stocks (23%) were found to have an unfavourable biological status. Furthermore, for just under half of the 66% of stocks assessed to have a favourable biological status, additional management objectives such as maximising catch volume within sustainable limits were either not met or not defined. Notably, some of the stocks that generate the most valuable landings for OECD countries were assessed to have an unfavourable biological status; and for others status in unknown. At the level of individual countries and economies, situations vary widely.

Information on management was reported for 166 situations, that is, sets of measures applying to a stock (or group of stocks with similar management), drawn from within the key species harvested in reporting countries and economies.[18] About two-thirds of these management situations involve direct controls on how much fish can be caught or landed. Almost a third of countries and economies reported using TAC limits in all management situations reported on, while four did not report the use of a TAC for any management situation. Slightly over half of countries and economies (57%) reported using quotas allocated to individuals or communities; six of whom did so in all management situations reported on.

In most of the situations that involve direct controls on how much fish can be caught or landed, a number of input controls are used in addition, particularly restrictions on fishing gear, areas, and harvest capacity as well as minimum fish sizes. In contrast, about a third of situations involve mixes of input controls only.

Survey results indicate that many potential priorities for action exist where fish stock have an unfavourable biological status, as well as where commercially important stocks are not conclusively assessed. Assessing the status of all stocks of commercial importance – both in terms of biological sustainability and against additional objectives such as maximising catch volume or value within sustainable limits – should be considered as a key step towards achieving sustainable fisheries.

There is further scope to manage fisheries more productively, where stocks have a status that is biologically favourable but that does not allow meeting additional management objectives such as maximising catch volume or value (or where no such additional objectives exist).

While not pre-judging what is possible or necessary for particular fisheries, scope for improving management also seems to exist where there is no direct control of how much fish can be caught or landed, nor notional total allowable catch (TAC) limits achieved through input controls. Scope for improvement similarly seems to exist where sets of management measures are particularly complex, potentially difficult to implement and monitor and even possibly unnecessary following the introduction of output controls.

To identify priorities for action more precisely, countries should continue to share detailed information on stock status as well as on measures used to manage stocks in a comparable framework (such as that used in this chapter). Further analysis of this data is needed to better understand how far stocks with unfavourable biological status are from favourable status, as well as which of these stocks are on positive trajectories thanks to remedial management actions that will allow stock recovery.

To identify management practices best suited to achieving sustainable fisheries in different situations, the information on stock status will need to be related to the information on management to allow further empirical investigation of the effectiveness of fisheries management.

Box 2.2. COVID-19 driven changes to fish stock management

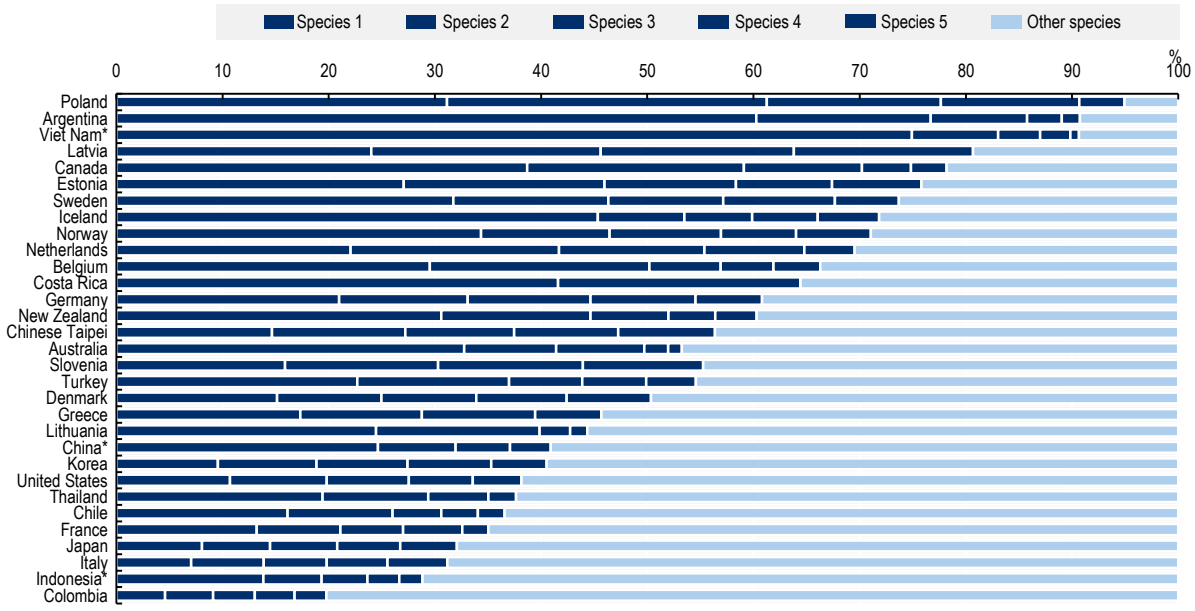
In response to the consequences of the COVID-19 pandemic, governments have adopted a series of support measures that generally aim to mitigate its impacts on seafood production, employment and the welfare of those depending on the sector (Chapter 4). While it is important to make wise use of public resources to support the fisheries sector through the crisis is only part of the story for fisheries, the sustainability of the sector – environmental, economic and social – depends on maintaining and enforcing appropriate fish stock management. This may be challenging as policy makers will face pressure to make up for losses incurred from the crisis during the recovery period and are likely to be looking for low-cost options to lessen hardship. Relaxing constraints on fishing, rather than having to disburse cash, could be seen as one such option.

Management changes have already been implemented in a number of countries. These include the extension of fishing areas and seasons as well as quota deferrals or transfers. By the end of August 2020, 16 measures that adjusted previous fisheries management rules had been identified across eight countries and economies. Shortening the fishing ban season or rearranging the period of fishing season are the most common adjustments among those measures (six measures), followed by quota deferrals or transfers (five measures) reflecting decreased market demand and the difficulty in maintaining the normal level of fishing.

Changes to management rules can be undesirable, however, if they compromise the sustainability considerations of their initial design and ultimately increase the pressure on stocks, especially where that pressure is already too high. Given the complexity of the relationship between fishing effort and the status of fish stocks, and increased pressures on fisheries from climate change, countries should adopt a cautious and evidence-based approach to management changes. This approach will become even more important as monitoring, control and surveillance capacities (in particular, observer programmes) are weakened by the need for social distancing and travel restrictions (Chapter 5).

Annex 2.A. Additional data and information

Annex Figure 2.A.1. Key species' relative importance, 2018



Note: The figure displays the contribution of key species' to countries and economies' total value of landings (or catch volume where indicated by *). The list of key species and how they were determined is detailed in Annex Table 2.A.1.
Source: OECD dataset 'Marine landings' (OECD.Stat), FAO dataset 'Global Fishery and Aquaculture Production Statistics' (FishStatJ).

Annex Table 2.A.1. List of key species: National level

Countries and economies	Key species (1)	Key species (2)	Key species (3)	Key species (4)	Key species (5)
Argentina	Argentine red shrimp (LAA)	Argentine hake (HKP)	Argentine shortfin squid (SQA)	Patagonian toothfish (TOP)	Patagonian scallop (ZYP)
Australia	Australian spiny lobster (LOA)	Southern rock lobster (JSN)	Abalones nei (ABX)	Snappers, jobfishes nei (SNX)	Flatheads nei (FLH)
Belgium	Common sole (SOL)	European plaice (PLE)	Common shrimp (CSH)	Norway lobster (NEP)	Anglerfishes nei (ANF)
Canada	American lobster (LBA)	Queen crab (CRQ)	Pandalus shrimps nei (PAN)	Scallops nei (SCX)	Clams, etc. nei (CLX)
Chile	Anchoveta(=Peruvian anchovy) (VET)	Chilean jack mackerel (CJM)	Araucanian herring (CKI)	Jumbo flying squid (GIS)	Chilean kelp (LJX)
China	Marine fishes nei (MZZ)	Largehead hairtail (LHT)	Japanese anchovy (JAN)	Scads nei (SDX)	Gazami crab (GAZ)
Chinese Taipei	Bigeye tuna (BET)	Yellowfin tuna (YFT)	Pacific saury (SAP)	Skipjack tuna (SKJ)	Albacore (ALB)
Colombia	Marine fishes nei (MZZ)	Spotted rose snapper (LJS)	Pacific sierra (SIE)	Pacific seabob (TIT)	[Brotula clarki] (OBK)
Costa Rica	Sharks, rays, skates, etc. nei (SKX)	Swordfish (SWO)	Croakers, drums nei (CDX)	Yellowfin tuna (YFT)	Crystal shrimp (CSP)
Denmark	Atlantic herring (HER)	European sprat (SPR)	Atlantic cod (COD)	European plaice (PLE)	Atlantic mackerel (MAC)
Estonia	Northern prawn (PRA)	Atlantic herring (HER)	Atlantic redfishes nei (RED)	European sprat (SPR)	Greenland halibut (GHL)
France	Yellowfin tuna (YFT)	Great Atlantic scallop (SCE)	Monkfishes nei (MNZ)	Common sole (SOL)	Norway lobster (NEP)
Germany	Common shrimp (CSH)	Blue whiting(=Poutassou) (WHB)	Atlantic herring (HER)	Atlantic cod (COD)	Blue mussel (MUS)
Greece	European hake (HKE)	European anchovy (ANE)	European pilchard(=Sardine) (PIL)	Red mullet (MUT)	Clams, etc. nei (CLX)
Iceland	Atlantic cod (COD)	Atlantic mackerel (MAC)	Golden redfish (REG)	Haddock (HAD)	Saithe(=Pollock) (POK)
Indonesia	Marine fishes nei (MZZ)	Skipjack tuna (SKJ)	Short mackerel (RAB)	Kawakawa (KAW)	Stolephorus anchovies nei (STO)
Italy	European hake (HKE)	European anchovy (ANE)	Deep-water rose shrimp (DPS)	Common cuttlefish (CTC)	Giant red shrimp (ARS)
Japan	Marine fishes nei (MZZ)	Salmonids nei (SLZ)	Skipjack tuna (SKJ)	Yesso scallop (JSC)	Scomber mackerels nei (MAZ)
Korea	Japanese flying squid (SQJ)	Octopuses, etc. nei (OCT)	Largehead hairtail (LHT)	Japanese anchovy (JAN)	Yellow croaker (CRY)
Latvia	Queen crab (CRQ)	Jack and horse mackerels nei (JAX)	European sprat (SPR)	Atlantic herring (HER)	Pacific chub mackerel (MAS)
Lithuania	Atlantic horse mackerel (HOM)	Pacific chub mackerel (MAS)	Round sardinella (SAA)	Jack and horse mackerels nei (JAX)	Beaked redfish (REB)
Netherlands	Common shrimp (CSH)	Common sole (SOL)	European plaice (PLE)	Atlantic herring (HER)	Atlantic mackerel (MAC)
New Zealand	Red rock lobster (LOR)	Blue grenadier (GRN)	Nototodarus flying squids nei (QND)	Pink cusk-eel (CUS)	Silver seabream (GSU)
Norway	Atlantic cod (COD)	Atlantic herring (HER)	Atlantic mackerel (MAC)	Saithe(=Pollock) (POK)	Haddock (HAD)
Poland	Atlantic herring (HER)	European sprat (SPR)	Atlantic cod (COD)	European flounder (FLE)	Sea trout (TRS)
Slovenia	Common sole (SOL)	Gilthead seabream (SBG)	European squid (SQR)	Caramote prawn (TGS)	Whiting (WHG)

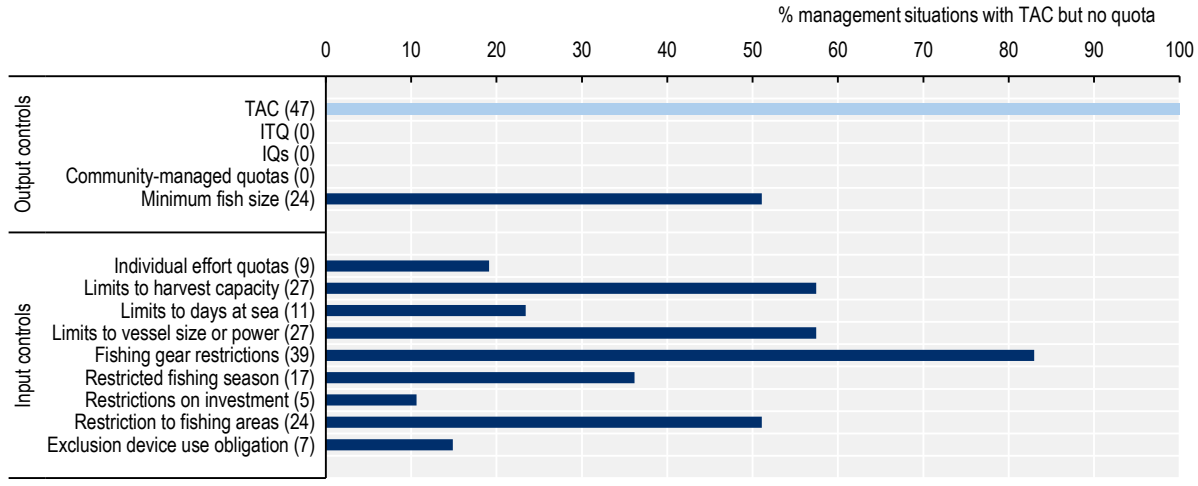
Countries and economies	Key species (1)	Key species (2)	Key species (3)	Key species (4)	Key species (5)
Sweden	Atlantic herring (HER)	Norway lobster (NEP)	Northern prawn (PRA)	European sprat (SPR)	Atlantic cod (COD)
Thailand	Marine fishes nei (MZZ)	Anchovies, etc. nei (ANX)	Common squids nei (SQC)	Sardinellas nei (SIX)	Carangids nei (CGX)
Turkey	European anchovy (ANE)	Atlantic bonito (BON)	Bluefish (BLU)	Whiting (WHG)	Mediterranean horse mackerel (HMM)
United States	American lobster (LBA)	American sea scallop (SCA)	Alaska pollock (=Walleye poll.) (ALK)	Sockeye(=Red) salmon (SOC)	Skipjack tuna (SKJ)
Viet Nam	Marine fishes nei (MZZ)	Tuna-like fishes nei (TUX)	Cephalopods nei (CEP)	Natantian decapods nei (DCP)	Skipjack tuna (SKJ)

Note: The five key species were determined based on their contribution to the value of landings reported for 2016, which was the most recent available data at the time the OECD questionnaire was designed. When the value of landings was not available, key species were determined based on their respective contribution to the 2016 catch volume (for Chile, China, Indonesia, Thailand and Viet Nam).

Annex Table 2.A.2. Occurrence of management measure use in management situations for different species categories

	Species categories				
	Pelagic	Demersal	Benthic	Other	Total
Total management situations by species category Of which the following numbers are using:	68	48	35	15	166
Output controls					
TAC	51	36	18	7	112
ITQ	24	22	10	1	57
IQs	2	6	3	2	13
Community-managed quotas	6	0	2	0	8
Minimum fish size	26	34	17	4	81
None	4	4	7	3	18
Input controls					
Individual effort quotas	4	9	4	2	19
Limits to harvest capacity	35	21	19	6	81
Limits to days at sea	7	6	11	3	27
Limits to vessel size or power	29	15	13	5	62
Fishing gear restrictions	42	40	31	11	124
Exclusion device use obligation	3	7	13	2	25
Restricted fishing season	24	15	15	9	63
Restriction to fishing areas	33	30	25	6	94
Restrictions on investment	8	8	6	2	24
None	4	1	1	0	6

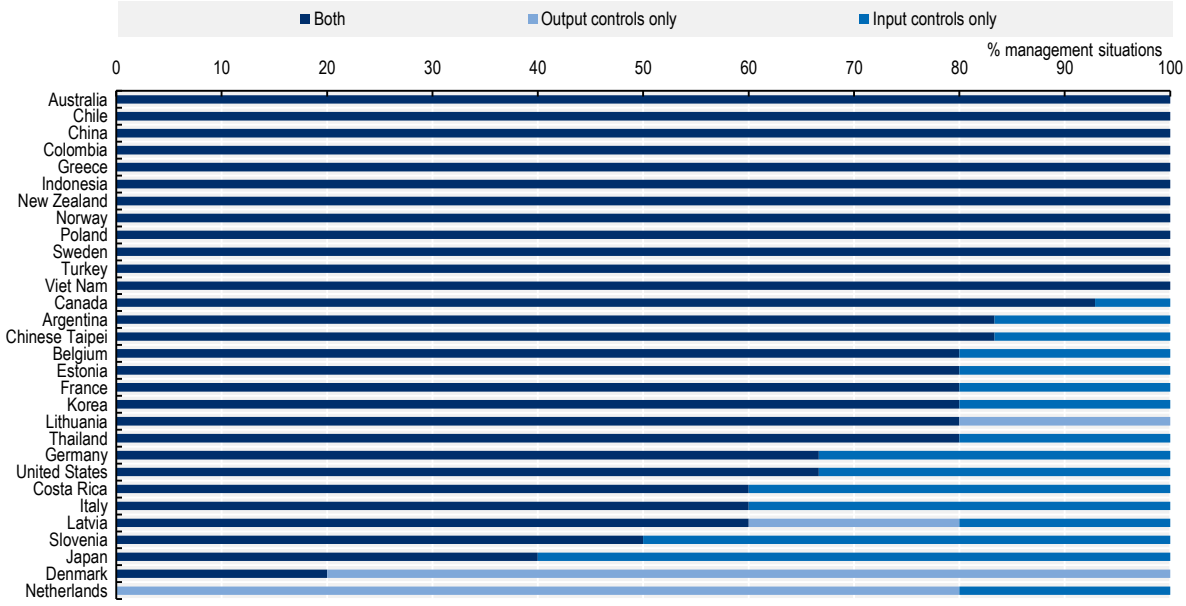
Annex Figure 2.A.2. Occurrence of management measures in management situations with TAC limits but no quota



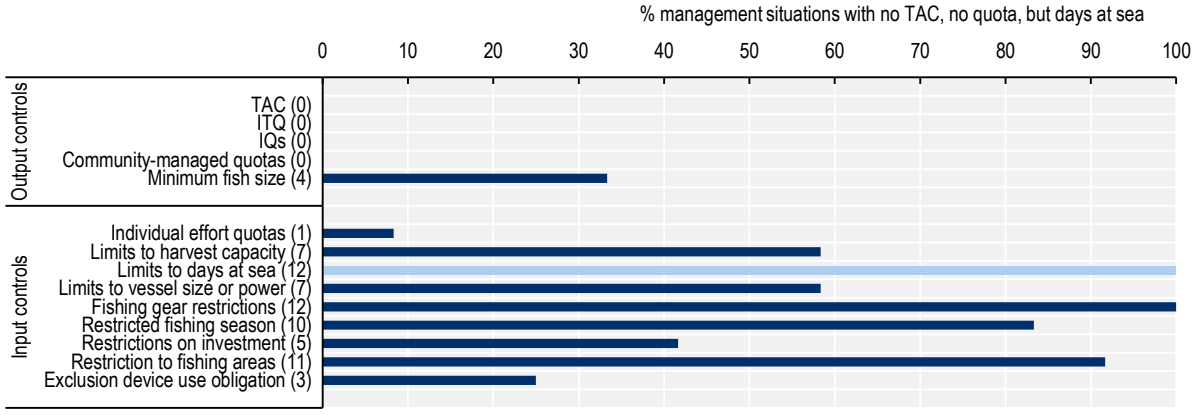
Note: The number of times each specific measure occurs is provided in parentheses.

Annex Figure 2.A.3. Sets of management measures used

Output based only, input based only, and both



Annex Figure 2.A.4. Occurrence of management measures in situations with no TAC and no quota, but with limits to days at sea



Note: The number of times each specific measure occurs is provided in parentheses.

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Notes

[1] FAO defines stocks that are not "within biologically sustainable levels" as "stocks less abundant than the level needed to produce MSY" ((FAO, 2018[8])) – such stocks are also sometimes referred to as being "overfished" or "fished at biologically unsustainable levels" (FAO, 2020[4]). Determining status with respect to biological sustainability on the basis that a stock is not abundant enough to produce MSY is potentially conservative given that failure to meet such a target does not necessarily mean that long-term biological viability is at risk. The calculation of the global proportions of stocks within biologically sustainable levels (and at biologically unsustainable levels) treats all fish stocks equally regardless of their biomass and catch." (FAO, 2020[4]).

[2] Examples of successfully rebuilt stocks include Norwegian spring spawning herring (OECD, 2010[9]), Atlantic scallops (OECD, 2013[10]), Georges Bank haddock (Brodziak, Traver and Col, 2008[11]).

[3] This reflects the fact that the primary actors of fisheries management are national entities, even when they implement decisions taken in co-operation with other countries as in the case of countries of the European Union or decisions taken by regional bodies such and in the case of fisheries managed by regional fisheries management organisations.

[4] While SDG target 14.6 explicitly refers to the need to implement science-based management, the extent to which this is done is not yet assessed in SDG progress tracking.

[5] The question is particularly acute where first-best options are not possible or difficult to implement, such as in data-poor fisheries and in fisheries that target a multitude of species, notably in tropical waters (Hilborn et al., 2020[6]). Much work to date indeed naturally focuses on areas where information is relatively more available, on both management measures and stock status, and these tend to be the places where there is also the capacity to manage.

[6] In advocating a precautionary approach to fisheries management, the FAO Code of Conduct for Responsible Fisheries (http://www.fao.org/3/v9878e/v9878e00.htm#7) recommends "[…] on the basis of the best scientific evidence available, inter alia, determin[ing]: a) stock specific target reference points, and, at the same time, the action to be taken if they are exceeded; and b) stock-specific limit reference points, and, at the same time, the action to be taken if they are exceeded; when a limit reference point is approached, measures should be taken to ensure that it will not be exceeded."

[7] As different types of reference points can be used (limits, targets and combinations of these; possibly based on both B – stock biomass – and F – instantaneous fishing mortality); respondents were asked for the types of reference points currently in use, for each stock, as well as for links to the full stock assessment reports. The data reveal a large degree of commonality in approaches across countries. While there are some variations in preferred metrics of success, the underlying principles are in many cases the same.

[8] The questionnaire asked respondents to provide information on every stock for which they had defined quantitative targets or thresholds and stock status with respect to those had recently been assessed. The criteria here was that only assessments completed recently enough to still be considered valid should be reported, but what that constituted in each instance was left for the reporting authority to determine. In practice, most assessments are less than three years old but may be as old as ten in some cases.

[9] Some stocks are harvested by more than one country or economy and were consequently reported against more than once. The total numbers presented in the chapter were thus adjusted to avoid double counting.

[10] Insufficient information on the contribution reported stocks make to total landings at the country level currently prevents reporting the proportion of landings from stocks assessed to be in a sustainable situation (and meeting additional management objectives). To date, value of landings is reported to the OECD at the level of individual species, not stocks. Improving the evidence base to link data on stocks status and on landings is something the OECD will be working on in the future.

[11] The data collected indicates that, in some cases, management objectives can be considered as met despite the biomass of a stock being unknown or at a level that is low enough to be of concern. For example, this can be the case where management objectives are based solely on the relative level of F, such that management objective could be considered as met where, for example, F/FMSY<1 but B/BMSY<1 or unknown. These cases are not considered in Figure 2.2.

[12] Where stocks are shared, assessments may be mandated and undertaken by regional fisheries management organisations (RFMOs) or organisations such as the International Council for the Exploration of the Sea (ICES).

[13] The determination of key species was based on 2016 landings value. When the value of landings by species was not available, the key species were determined based on their relative contribution to 2016 total catch volume (this was the case for Chile, China, Indonesia, Thailand and Viet Nam). The list of key species is detailed in Annex Table 2.A.1.

[14] http://www.fao.org/3/w7292e/w7292e05.htm.

[15] TACs have proportionally higher representation in situations managing pelagic and demersal species. IQs and ITQs are most frequently applied in the context of demersal species management (Annex Table 2.A.2).

[16] The use of quotas, without that of a TAC was reported in two instances involving IQs and one involving community-managed quotas. *De facto*, however, if the sum of individual quotas is controlled, it can be considered that output is being capped (and that an implicit TAC is consequently in place).

[17] While some level of regulation is likely always necessary, e.g. to ensure the use of conservation measures or to achieve distributional management objectives, it is not uncommon for new regulations to be introduced on top of existing ones. This can be especially relevant when output based measures are introduced to control catches, as in some cases this can result in existing input controls becoming redundant and imposing unnecessary constraints on fishers.

[18] The management survey information characterises a non-randomly sampled subset of reporters' fisheries. While these fisheries accounted for 57% of the value of landings in the reporting countries and economies at the time the questionnaire was designed, it cannot be assumed that the reported frequency of use of specific measures (e.g. TACs) is representative of overall management.

3 Fighting illegal, unreported and unregulated fishing

Illegal, unreported and unregulated (IUU) fishing is a serious threat to fisheries and fisheries-dependent communities that impairs the development of a sustainable ocean economy. Eradicating IUU fishing requires closing waters and markets to IUU operators and the products they harvest globally. Based on a survey conducted in 2019, this chapter reviews the policies that countries and economies apply in the fight against IUU fishing and evaluates the extent to which internationally-recognised best practices in some of the most important areas for government intervention against IUU fishing have been adopted. It identifies the regulatory loopholes and policy gaps that need to be addressed and provides information on effective measures that could be adapted and replicated across countries and economies.

Key recommendations

- To consolidate the benefits of the recent progress made in fighting IUU fishing through stricter regulation, closer monitoring and control and greater international co-operation, extra steps need to be taken to firmly close waters and markets to IUU operators and the products they harvest globally.
- Registration and authorisation processes should be made fully transparent to facilitate co-operation between governments, across branches of government and between stakeholders so that they can join forces to better track IUU activities. G7 and G20 countries, which have expressed a shared ambition to curb IUU fishing following conferences in Charlevoix in 2018 and in Osaka in 2019, respectively, could lead the way by making public their vessel registries as well the lists of authorised vessels and those that have been identified as engaging in IUU fishing. Results of the survey conducted in this chapter show that only one in five responding countries and economies properly published lists of vessels identified as engaging in IUU fishing while over half of them did not publish the lists of vessels they authorised to conduct fishing-related activities in the high seas.
- The issuing of a unique vessel identifier in the registration process should be adopted and harmonised, making use of International Maritime Organization (IMO) numbers whenever possible. A quarter of surveyed countries and economies reported they did not require an IMO number to register fishing vessels and a third did not require one to register vessels conducting fishing-related activities.
- Transhipment (whereby fish are transferred from fishing boats onto larger refrigerated vessels, which then carry the fish to port while fishing vessels continue fishing) should be regulated more stringently and resources should be allocated to enforcement and monitoring. This is needed to ensure that products of IUU fishing do not enter the value chain unnoticed during transhipments. Evidence suggests that regulations of transhipment lag behind equivalent regulations of fishing. Better definitions and regulations of other fishing-related activities – such as the transfer of fuel, food and crew from “mother ships” to fishing vessels – would also improve control of fleets.
- Best practices so as to gather information on who ultimately controls and benefits from vessel activities (i.e. the “beneficial owners” of vessels) should be identified and promoted. Indeed, many countries and economies have a legal framework to do so, but report practical difficulties.
- Wider adoption of market measures should be encouraged internationally so as to increase the traceability in seafood value chains. This would also contribute to closing markets and access to support and services to operators that engage in IUU fishing. A third of the countries and economies surveyed for this chapter reported having issues in implementing their legal provisions to restrict support for operators convicted of IUU fishing (or not having any). Current negotiations on fisheries subsidies at the World Trade Organization (WTO) offer a unique opportunity to prohibit subsidies contributing to IUU fishing.
- The effectiveness of country actions against IUU fishing should be measured so as to help fine-tune priorities and motivate on-going reforms.

3.1. Monitoring progress and identifying priorities for reforms to eliminate IUU fishing

A shared ambition to deter and eliminate IUU fishing

Illegal, unreported and unregulated (IUU) fishing is a serious threat to fisheries and fisheries-dependent communities, the ocean ecosystem, and society (Agnew et al., 2009[1]; Sumaila et al., 2020[2]; Konar et al., 2019[3]). The pressure on fish stocks resulting from IUU fishing harms law-abiding fishers by creating unfair competition, reducing their profitability and employment opportunities throughout the value chain. It can also affect revenues from other activities that depend on fish resources, such as tourism activities related to recreational fishing or marine wildlife watching. When replacing legal activities, IUU fishing also deprives countries of the associated fiscal revenues (Galaz et al., 2018[4]; Sumaila et al., 2020[2]).

IUU fishing weakens the capacity of governments to manage fisheries sustainably by adding fishing pressure that is difficult to quantify and account for when setting catch limits (Österblom, 2014[5]). It harms marine ecosystems and fish stocks when damaging fishing techniques are used and protected endangered species are targeted. By impacting the sustainability of resources and ecosystems, IUU fishing also risks worsening the implications of climate change on fish resources, most notably in the tropics (Gaines et al., 2018[6]; Gaines et al., 2019[7]; Pörtner et al., 2019[8]).

Ultimately, all the benefits to society associated with healthy and resilient fisheries are compromised by IUU fishing; including fisheries' contribution to global food security today and in the future (Costello et al., 2020[9]). In countries and communities that depend on local seafood, IUU fishing threatens food security by diverting fish away from local markets, and putting food safety at risk when illegal seafood reaches consumers without having been handled, controlled and labelled correctly (Reilly, 2018[10]).[1] IUU fishing vessels and operators are sometimes involved in transnational crimes, such as human rights abuses, drug or weapon smuggling, corruption and tax evasion (Witbooi et al., 2020[11]; UNODC, 2011[12]; Urbina, 2019[13]; Tickler et al., 2018[14]; Telesetsky, 2014[15]; Sumaila and Bawumia, 2014[16]).[2] In some parts of the world, IUU fishing also exacerbates conflicts over scarce resources and disputed waters (Widjaja et al., 2019[17]; Spijkers et al., 2019[18]).

For these reasons, the fight against IUU fishing has become central to fisheries management and a key issue for international co-operation given its trans-boundary nature (High Seas Task Force, 2006[19]; Global Ocean Commission, 2014[20]). Evidence has shown that rapid, significant and lasting gains are at stake (Costello et al., 2020[9]; World Bank, 2017[21]) and the reforms needed to reap these gains are often more acceptable by fishing communities and the fish industry than are overall fishing restrictions (Cabral et al., 2018[22]).

The OECD report *Closing gaps in national regulations against IUU fishing* (Hutniczak, Delpeuch and Leroy, 2019[23]) showed that countries had made significant progress between 2005 and 2016 in adopting and implementing best practices against IUU fishing in line with international instruments developed by the Food and Agriculture Organization of the United Nations (FAO). These instruments include the 2001 International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA-IUU) (FAO, 2001[24]), the 2016 Agreement on Port State Measures (PSMA) (FAO, 2009[25]) and the 2017 Voluntary Guidelines for Catch Documentation Schemes (VGCDS) (FAO, 2017[26]).

The effectiveness of recent reforms in the fight against IUU fishing has been demonstrated at local and regional scales (Cabral et al., 2018[22]). Less is known about their combined impact on the incidence of IUU fishing at a global scale.[3] Yet, as the 2020 deadline for achieving the Sustainable Development Goal (SDG) 14 objective of ending IUU fishing approaches, IUU fishing continues to restrict the development of a sustainable ocean economy (Widjaja et al., 2019[17]).

Identifying where to focus reform

IUU fishing frequently occurs in areas where regulations and enforcement are weaker or absent, adapting to changes in regulation and surveillance technologies (OECD, 2005[27]). Reaping the benefits of the progress to date in the fight against IUU fishing will therefore depend on undertaking the necessary extra steps collectively to close waters and markets to IUU fishers and the products they harvest globally. This requires long-term efforts by the international community, backed by fishing communities, industry, and non-governmental organisations (NGOs), to push for concerted action, especially in domains that affect competition between countries. The negotiations at the World Trade Organization (WTO), which seek agreement on disciplines to prohibit subsidies that contribute to IUU fishing are of utmost importance in this regard. Regional Fisheries Management Organisations also have a key role to play as the primary mechanism for co-operation between fishing countries and coastal states to ensure sustainable fishing globally (Box 3.1).

Box 3.1. The role of RFMOs in the fight against IUU fishing and the impact of COVID-19

Regional Fisheries Management Organisations (RFMOs) can take a number of measures to prevent illegal, unreported and unregulated (IUU) fishing in the areas or the fisheries they manage. These include: issuing of lists of vessels permitted to fish within the RFMO area as well as IUU vessel lists; promoting the adoption of catch and activity reporting systems as well as catch and trade documentation schemes; imposing trade embargoes on seafood products from non-compliant countries; mandating or undertaking on-board observer programmes as well as at-sea and in-port inspections; setting minimum standards for registration and authorisation procedures as well as port state controls; and establishing provisions to exclude or reduce the benefits of RFMO membership to flag states of vessels involved in illegal activities (OECD, 2005[27]). Hutniczak, Delpeuch and Leroy (2019[28]) show that recent conservation and management measures introduced by RFMOs mandate their members to adopt more comprehensive minimum standards for MCS and as well as more rigorous IUU vessel-listing mechanisms. Most RFMOs were found to review more regularly and with greater transparency the compliance with membership obligations, and to better co-operate and exchange information.

However, the report also noted there were important discrepancies in the implementation of best practices against IUU fishing remained across RFMOs, suggesting scope for improvement by learning from best performers. Furthermore, the report pointed to the need for improved governance of RFMOs so as to facilitate their decision-making processes (Chapter 5).

Impacts of the COVID-19 pandemic

Travel and other restrictions adopted in response to the COVID-19 pandemic have made in-person on-board observation, at-sea inspections and other forms of surveillance more challenging in multilateral fisheries. Consequently, in-person observation requirements were waived by several RFMOs, potentially increasing the opportunity for IUU fishing in some fisheries. There is a widespread expectation among RFMO secretariats that the reduced compliance monitoring will lead to increased IUU fishing, but currently the extent to which and where this is happening is unknown. The impacts of the pandemic on IUU fishing will depend on the type and the stringency of the observer requirements waived as well as on how fisheries are responding to the changes in prices and costs generated by this crisis. For example, the waiving of 100% observer coverage in Pacific purse seine tuna fisheries, a high-value industrial fisheries, could have significant impacts on IUU.

As the pandemic continues, finding pathways to restart international observer programmes and reinstate compliance monitoring to agreed-upon levels will become more urgent. Further, with in-person observation reduced, the role of countries in preventing IUU fishing through other means – e.g. by

denying access to fish value chains and introducing market and port state measures – becomes increasingly important. In the longer term, increasing capacity for real-time monitoring and control of activities at sea and in ports (i.e. through accelerated uptake of remote sense technology) and harmonising data collection (i.e. through observer programmes and scientific research) between regions could make RFMO monitoring processes more timely and effective. As many authorities lack the capability to use remote sensing technologies to conduct MCS, the sharing of data relating to activities in the high seas between authorities with and without such capacity could benefit the monitoring of IUU.

Source: (OECD, 2020[29]; OECD, forthcoming[30]; Hutniczak, Delpeuch and Leroy, 2019[28])

The continuous evaluation of country regulations and policies against the frontier of best practices in the fight of IUU fishing is key to generalise their adoption. To win the battle against IUU fishing operators, authorities will need to regularly identify the regulatory loopholes and policy gaps that need to be addressed, share information on effective measures and technologies that can be adapted and replicated across countries, and co-operate to facilitate the transfer of technologies and capacity building (Widjaja et al., 2019[17]).[4]

This chapter aims to contribute to these goals by revisiting and updating the analysis undertaken by Hutniczak, Delpeuch and Leroy (2019[23]).[5] Based on a survey conducted in 2019, and in light of the latest internationally-recognized best practices, it re-evaluates the progress made by countries and economies in some of the most important domains of government intervention against IUU fishing:

- *Vessel registration*, by which countries collect and publicise information on vessels operating in their exclusive economic zone (EEZ) or flying their flag
- *Authorisation to operate in the EEZ*, by which countries, as coastal states, regulate fishing and fishing-related operations in their EEZ
- *Authorisation to operate outside the EEZ*, by which countries, as flag states, regulate the operations of vessels flying their flag in areas beyond national jurisdictions (ABNJ – that is, in the high seas) and in foreign EEZs
- *Port state measures*, by which countries monitor and control access to and activities at port
- *Market measures*, by which countries regulate how products enter the market and flow through the supply chain and economically discourage IUU fishing
- *International co-operation*, by which countries engage in regional and global information sharing and joint activities against IUU fishing.

For each of these domains, information was sought through the survey on the legal and policy frameworks in place to deter, identify and punish IUU fishing, and the degree to which they were implemented in 2018 (Annex Table 3.A.1).[6] A total of 33 countries and economies participated, including 26 OECD countries, as well as Argentina, the People's Republic of China (hereafter "China"), Costa Rica, Indonesia, Chinese Taipei, Thailand and Viet Nam – together referred to as "emerging economies".

To identify patterns and trends in performance, answers were scored between 0 and 1, with increasing scores indicating higher levels of adoption and implementation of the regulation and measures at stake in each question. A score of 0 indicates no regulation was in place; 0.2 there was a regulation but it was reported as not implemented; 0.5 the regulation was reported to be partially implemented; and 1 refers to full implementation.[7] Scores were then aggregated into six indicators at the level of the most important domains of government intervention against IUU fishing and indicators were averaged over all respondents – or OECD countries and emerging economies (Figure 3.1).[8] As the survey included a series of questions which had already been submitted to countries and economies participating in the work of the OECD

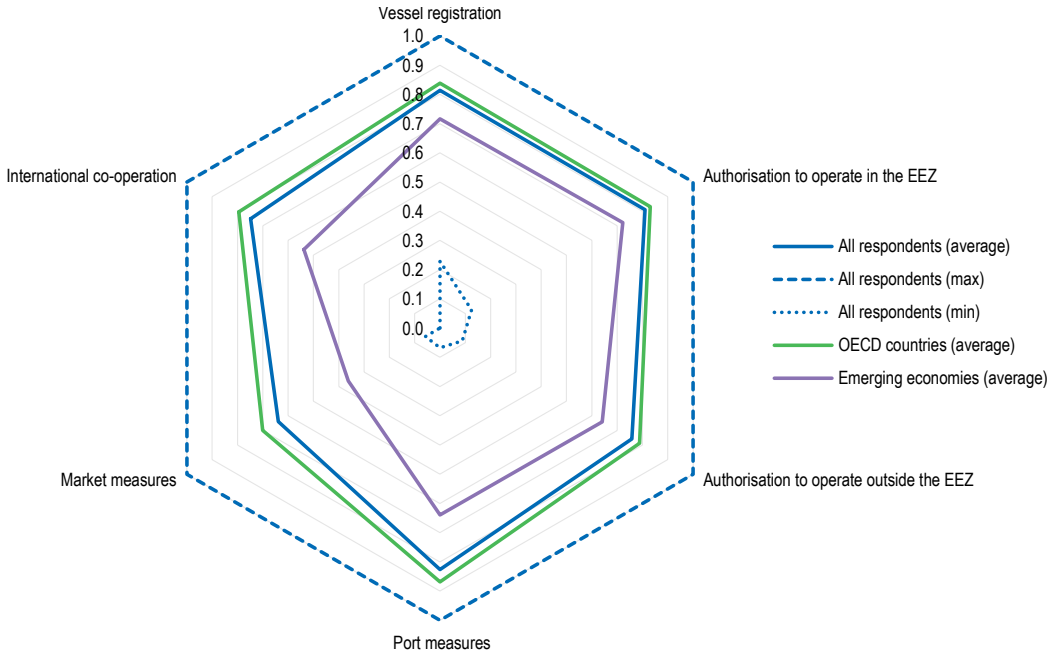
Fisheries Committee (COFI) in 2006 (with reference to their situation in 2005) and in 2017 (with reference to their situation in 2016), evidence of progress is also presented in relation to issues for which comparative data existed.[9]

3.2. Key findings

Overall, evidence shows that the average up-take of best practices is highest for port state measures (the average indicator scores 0.83 for all respondents) and for vessel registration and authorisation to operate in the EEZ (average scores are 0.81 for both) (Figure 3.1). At the other end of the spectrum, market measures are the least widely used across respondents (with an average score of 0.64). For example, only 55% of respondents fully implement restrictions on imports from countries identified as insufficiently fighting IUU fishing. Only one in three respondents has a legal framework mandating tax authorities to co-operate and share information with fisheries authorities so as to ease identification of the beneficial owners of vessels engaging in IUU fishing, and only one in six respondent fully implement it.

Figure 3.1. Uptake of best policies and practices against IUU fishing, 2018

Indicator scores range between 0 and 1, with increasing scores indicating higher levels of adoption and implementation of the measures covered by each indicator



Note: The method used to compute these indicators is described in Annex 3.A.

There has nevertheless been progress since 2005 in all areas of government intervention against IUU fishing. The most notable area of progress is port state measures, which were not widely used in 2005 but which in 2018 received the highest score on average for all respondents (Section 3.4). Much progress has also been made on several market measures. In particular, all respondents to both the 2016 and the 2019 surveys reported they could reject products originating from IUU fishing at the border in 2018, while only 38% of them could do so in 2005.

Registration and authorisation processes already had a relatively high uptake of best practices in 2005. However, several measures have seen significant recent progress. For example, while in 2005, only 36% of respondents prohibited parallel registration of vessels in more than one country, 93% did so in 2018.

Figure 3.1 shows a high variation in scores across countries and economies, whereby some fully implement all the measures listed under some indicators, while others implement very few.[10] This demonstrates scope for peer learning and bilateral co-operation between countries and economies at the forefront of the fight against IUU fishing and those who need to reinforce their regulatory arsenals.

Evidence also shows that particular attention should be given to improving transparency and co-operation in all domains, including in areas for which overall scores are high. For example, only 19% of respondents fully implement legal provisions that mandate the publication of the lists of vessels identified as engaging in IUU fishing and about 40% of respondents still do not publish their national list of domestic vessels authorised to fish in the domestic EEZs.

The information collected suggests that oversight on and regulation of transhipments (whereby fish are transferred from fishing boats onto larger refrigerated vessels, which then carry the fish to port, while fishing vessels continue fishing) are much less sophisticated than the oversight and regulation of fishing activities themselves. Given how extensive transhipment has become (Widjaja et al., 2019[17]), it is crucial to strengthen dedicated registration and authorisation processes to avoid unscrupulous operators using them to enter their products into the value chain.

3.3. Making registration and authorisation more comprehensive and fully transparent

Making public detailed information on vessels is key in the fight against IUU fishing

Governments have three main areas of responsibilities in regulating fishing before vessels actually start operating. First, vessels should be registered, that is documented and assigned a country's flag. This allows the vessel to travel internationally and implies it is subject to that flag state's laws. The more detailed and verified the information is included in the vessel registration processes, the easier it is to track vessel activities and to prevent and sanction illegal activities (FAO, 2001[24]).

Vessels then need authorisations to operate. Coastal states can deliver authorisations to operate in their economic exclusive zone (EEZ) to both their domestic fleet and to foreign vessels.[11] In addition, vessels typically also need an authorisation from their flag state to operate in areas beyond national jurisdiction (ABNJ) and in the EEZs of foreign countries.

Authorisation regimes are a key tool for coastal states to combat IUU fishing and for the sustainable management of resources in their EEZ as it allows control over the total size of the fleet, its distribution over fishing areas, seasons, and target species, and the gear that can be used. Well-designed authorisation regimes contribute to limiting over-capacity and incentives to fish beyond sustainable limits. They also provide key information on actual fishing capacity, which allows to better estimate the requirements for MCS, as well as the impact of exerted fishing pressure on resources and ecosystems in domestic waters.

Authorisation regimes are a key tool for flag states as regulating domestically-flagged vessels in ABNJ and in the EEZs of other countries is key to ensuring they behave responsibly outside the EEZ, even where regulation, MCS, and governance are weaker. To ensure vessels operate in ways and in areas that are consistent with the authorisations they have been granted, authorities need to collect information on their

operations. Fighting IUU fishing therefore requires authorisation regimes to be conditional on comprehensive and timely information-sharing by vessels.

Registration and authorisation have become more comprehensive but chasing IUU operators requires even more transparent information

Registration

Overall, surveyed countries and economies register vessels more comprehensively and with regulations that are more stringent for granting authorisations for fishing activities then was the case 15 years ago (Hutniczak, Delpeuch and Leroy, 2019[23]).[12]

In 2018, all respondents required fishing vessels to be registered (while only 57% of the subset of countries and economies surveyed in 2005 and 2018 did so in 2005). Comprehensiveness of the information collected through registration has improved: all respondents required information on vessels' characteristics[13] and details on the natural or legal persons in whose names vessels are registered. In addition, all respondents, except Costa Rica, also asked for details on the natural or legal persons responsible for managing the operations of the vessel.

There remains scope for improvement to chase illegal activities through registration by looking into a vessel's history and beyond vessel owners and operators. The frontier of good registration practice now lies in the use of unique vessel identifiers (UVI) and the collection of information on the beneficial owners of vessels; that is, the natural persons who ultimately control vessel activities and benefits from them. Assigning vessels a unique, verified and permanent identifier such as an IMO number facilitates MCS by avoiding cases whereby vessels change flags or names in order to escape global oversight, or to quickly register in another jurisdiction when their illegal activities are discovered (Environmental Justice Foundation (EJF), 2013[31]). Yet, in 2018, a quarter of respondents did not require an IMO number to register fishing vessels and a third did not require one to register vessels conducting fishing-related activities.

Including information on the beneficial owners of vessels is essential in order to sanction those who ultimately benefit from criminal activities and change their risk/benefit prospects (Hutniczak, Delpeuch and Leroy, 2019[23]; FATF/OECD, 2014[32]). Yet, ensuring the availability of information on the beneficial owner of fishing activities is nevertheless challenging for authorities due to the complex and multi-jurisdictional legal arrangements that often characterise the fisheries sector. Partly as a result, only 64% of respondents report that they request information on beneficial owners when registering fishing vessels, while less than half do so for vessels that conduct fishing-related activities.

Authorisation

There is generally good uptake of best practices for authorisation regimes, with progress seen since 2005 and 2016. As coastal states, all respondents legally require that both domestic and foreign vessels fishing in their EEZs request authorisation and they all make it mandatory to report the catch in order to obtain and maintain the authorisation to fish. This increases product traceability, and reduces the scope to land illegal catch such as, for example, fish originating from a marine protected area, fish having been caught in excess of allowed quotas or protected species. Most respondents also make authorisation conditional on position reporting via the Vessel Monitoring System (VMS). This allows to verify that a vessel is not fishing in a prohibited area and to monitor suspicious movements such as a speed that is inconsistent with the declared gear, suggesting that another gear is being used fraudulently. Use of VMS for fishing vessels in the EEZ was reported as mandatory by all respondents except Viet Nam (while Colombia mandates it for domestic vessels only and not foreign ones).

As Flag states, all respondents permitting their fleet to fish in ABNJ legally require domestic fishing vessels to obtain a specific authorisation (only 86% of countries surveyed in both 2019 and 2006 requested this in 2005). All respondents, with the exception of Thailand and Viet Nam, can withdraw their authorisations to fish in ABNJ if vessels are found engaging in IUU fishing. The regulation of access to foreign EEZs through bilateral or chartering agreements has also improved. In 2018, all European Union countries surveyed reported implementing such regulation and publicising the lists of vessels authorised to fish in foreign EEZs in the "Who fishes far" database.[14]

Progress is needed, however, regarding participation in observer programmes, which allow independent specialists employed (or mandated) by governments to monitor vessels in order to ensure compliance with regulations and to better understand at-sea operations, such as where vessels are fishing, which species are being caught and how (e.g. the use of fish aggregating devices), transhipment activities, and catch or by-catch are discarded. About one in five respondents still do not have in place regulations that make observer programmes compulsory.

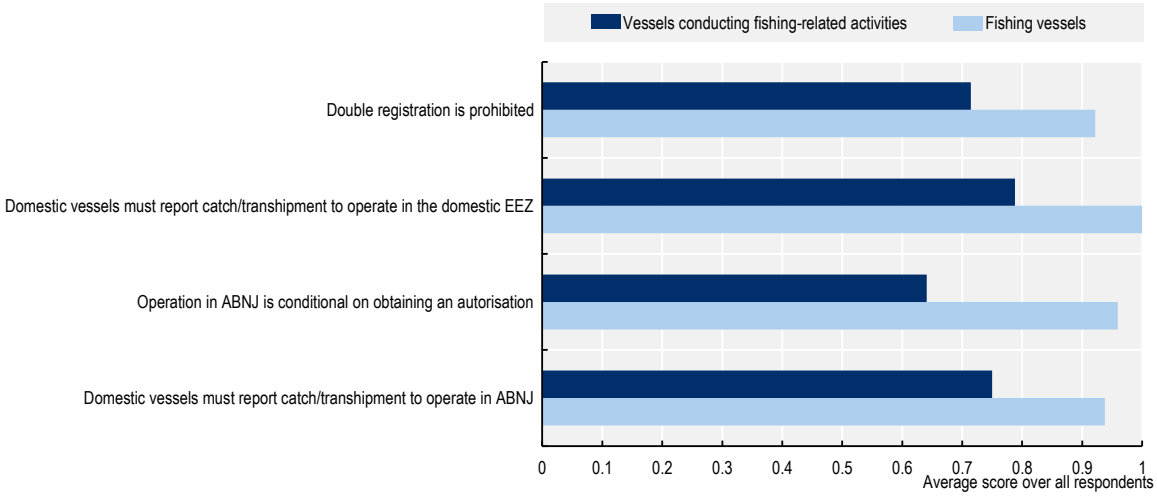
Aligning processes for vessels conducting fishing-related activities with those for fishing vessels is urgent

Transhipment of fish from fishing vessels onto larger refrigerated cargo vessels has become a widespread phenomenon (Global Fishing Watch, 2017[33]). This can facilitate and reduce the cost of delivering fish to ports while allowing fishing vessels to continue fishing without going back to port to land their catch. Such practice is particularly pervasive in high seas fisheries. In the process, some of the operations that normally happen at port happen at sea; and controlling these requires specific procedures to avoid co-mingling of IUU and non-IUU caught fish prior to landing and further muddying the traceability of supply chains. Monitoring of transhipments is also key to allowing effective estimation of fishing pressure as it allows fishing vessels to remain at sea longer and exert a continuous fishing effort. It can also help identify fishing vessels that remain at sea full-time, thus escaping port inspections. Finally, unmonitored transhipment is a blind spot of choice for all kinds of trafficking and criminal activities (UNODC, 2011[12]; Witbooi et al., 2020[11]).

While progress has been made since 2005, registration and authorisation processes for fishing-related activities remain more lax than for fishing vessels (Figure 3.2). In fact, there has been little progress since 2016 when this issue was raised in Hutniczak, Delpeuch and Leroy (2019[23]). For example, while all respondents give authorisations to fish in their EEZ conditional on catch reporting, over 20% do not require domestic vessels conducting fishing-related activities in their EEZ to report transhipments of fish. Regulation of fisheries-related activities outside the EEZ is even more lax as over a fifth of respondents allow vessels to conduct such activities in ABNJ without any authorisation (43% of respondents having replied to earlier surveys did so in 2005). Costa Rica, France, and Viet Nam reported no or minimal oversight of fisheries-related activities.

More generally, laxer regulation of fisheries-related activities may in part result from the difficulty in defining these activities and putting in place an appropriate regulatory framework. Transhipment of fish from a fishing vessel to a refrigerated cargo vessel is the classic example of a fishing-related activity which implies physical movements of fish. However, the transfer of fuel, food and crewmembers from "mother ships" to fishing vessels are often included in this category of activities even though regulation needs are potentially different. International discussions to clarify the stakes and to identify best practices in the regulation of these activities would contribute to improving their regulation, monitoring and control.

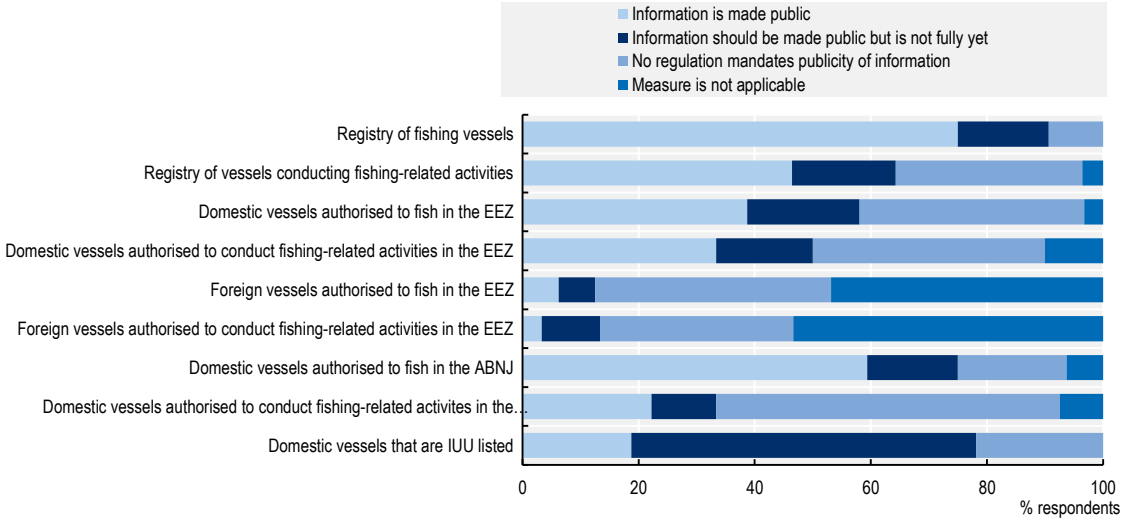
Figure 3.2. Selected gaps in the regulation of fishing-related activities vs. fishing, 2018



Increased transparency is needed to improve control

A need for more transparency stands out as an important area for needed progress with respect to the registration and authorisation processes. Information on registered and authorised vessels are still not made public by several countries and economies (Figure 3.3). For example, only a handful of respondents reported publishing the lists of foreign vessels authorised to fish and conduct fishing-related activities in the EEZ. In addition, only one in five respondents reported properly publishing lists of vessels identified as engaging in IUU fishing.

Figure 3.3. Transparency in registration, authorisation and IUU vessel listing, 2018



Note: Some measures have been reported as not applicable to some respondents, when certain fishing or fishing-related practices were banned or when no vessel requested registration or authorisation to operate certain activities.

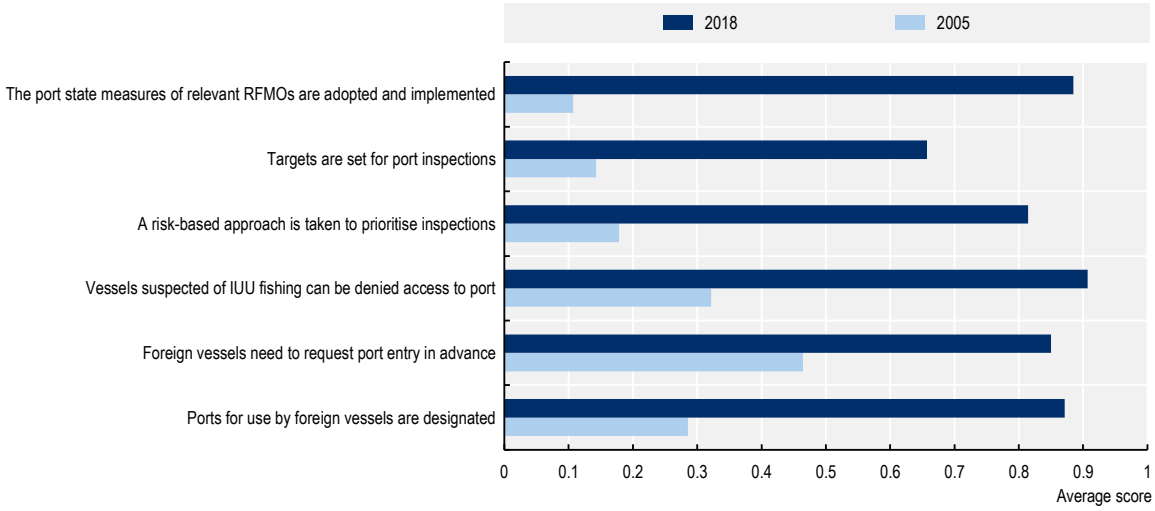
Publicity of information is particularly important regarding activities happening in ABNJ as these areas are more difficult to monitor (Berkes, 2006[34]). Yet 59% of respondents do not publish the list of vessels authorised to conduct fishing-related activities in ABNJ (Figure 3.3).[15] This is a missed opportunity to improve the fight against IUU fishing at a low cost. Easy access to details on vessels would facilitate MCS at sea and in ports. In addition, public availability, and regular updates of IUU vessels lists allow coastal, flag and port States to crosscheck information on vessels and, accordingly, deny licenses, re-flagging or port entry. It could also serve as a basis for insurers and other service providers to exclude these vessels from their services and help all stakeholders involved in the sector (including fishers, NGOs and researchers) to detect illegal activities, alert competent authorities, and sometimes even stop illegal activities (Cavalcanti and Leibbrandt, 2017[35]).

3.4. Significant progress has been made on port state measures

Since monitoring and inspecting vessels at sea is expensive and sometimes difficult, authorities have increasingly turned to Port State Measures (PSMs), as an additional, often less expensive and safer tool to fight IUU fishing (Kopela, 2016[36]; Doulman and Swan, 2012[37]). Average scores over all respondents displayed in Figure 3.4 show that many PSMs are now widely implemented across countries and economies. These include: designating a list of ports for use by foreign-flagged vessels to better direct available control capacity; demanding advance requests from foreign vessels to use ports (with a view to allow coastal states to verify information with the vessel's flag state), and the possibility to deny port entry to vessels suspected of IUU fishing. As inspecting all vessels entering ports is not possible due to time and economic constraints, authorities have increasingly adopted risk-based approaches to inspection and have set quantitative targets for the number of port inspections. Together these measures can limit the scope for illegally caught products to enter the market. They also increase costs for operators engaging in IUU fishing by forcing them to consume fuel and to spend time in search of weakly-governed ports where to land their illegal catch (Petrossian, Marteache and Viollaz, 2014[38]).

The average score for the indicator aggregating all questions related to PSMs is of 0.83 for 2018, the highest score of all indicators.[16] For countries and economies having responded to both to the 2019 and 2006 surveys, this score increased from 0.25 in 2005 to 0.83 in 2018. This progress correlates with the development of the FAO Port State Measure Agreement (PSMA) (FAO, 2009[25]), which sets out universal minimum standards to prevent IUU fishing products from being landed in ports by foreign-flagged vessels. Adopted in 2009, it came into force in 2016 and has since then been ratified, accepted or approved by 85% of respondents (and all OECD countries surveyed, with the exceptions of Colombia and Mexico). It is hard to identify the exact role played by the PSMA in the progress observed, as this observed progress could also indicate the reverse causality with the agreement being the result of the growing realisation that some measures were needed and wanted by governments. However, this seems to suggest that international discussions on best practices are associated with widespread adoption. It is interesting to note that the PSMA process seems to have had positive spill-over effects as some measures that are part of the Agreement, such as the designation of ports for use by foreign vessels, have been adopted even by States which are not yet signatories. Similar initiatives could usefully be launched in areas that are less universal, such as markets measures.

Figure 3.4. Progress in implementing port state measures, 2005-2018



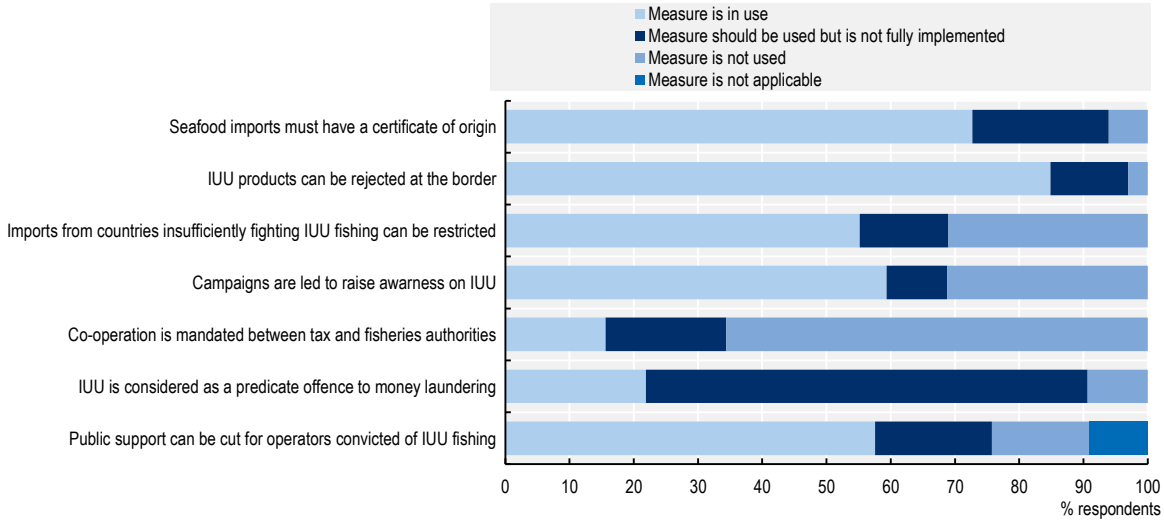
3.5. Market measures should be used more widely

Illicit trade in seafood products is a global business through which operators make high profits at often comparatively low financial risk (Sumaila et al., 2020[2]). Market measures are thus precious tools in the fight against IUU fishing that lower associated benefits and increase financial risk by closing markets to products that originate from IUU fishing. Market measures generally involve improving seafood traceability, raising consumer awareness of IUU fishing as well as restricting public support for operators engaging in IUU fishing and restricting market access for IUU-caught fish (without creating unnecessary barriers to trade seafood products) (FAO, 2001[24]).

Some measures have become almost universal among survey respondents. For example, they all report that regulation requires imported seafood to be accompanied by a certificate of origin confirming their legal sourcing, with the exceptions of Australia and Chile.[17] Overall, however, the indicator on markets measures has the lowest average score of all indicators computed for 2018 (0.64). Indeed, despite growing evidence of their effectiveness (Ma, 2020[39]), a number of market measures remain sparsely used (Figure 3.5).

Measures by seafood-importing countries to close their markets to products originating from IUU fishing have been designed to not only affect IUU fishing benefit prospects, but also to encourage exporting countries to intensify their fight against IUU fishing, in co-operation with importing countries. Such measures are used by EU countries and the United States. The EU scheme is based on a colour-coded warning scheme, which informs third countries if problems are detected in their fulfilling of international and regional rules related to the prevention of IUU fishing. This can then lead to the introduction of provisions for embargoes on fish products originating from countries identified as non-cooperating (Hutniczak, Delpeuch and Leroy, 2019[23]). In the United States, the Seafood Import Monitoring Program (SIMP), establishes reporting and recordkeeping requirements for imports of selected seafood products on the basis of a risk-based traceability programme. Importing firms of such designated products are required to report key data from the point of harvest to the point of entry into the market. This can potentially affect the competitiveness of exporting countries and sourcing choices of importing firms, hence creating incentives for improved policies against IUU fishing in exporting countries. Other OECD countries are considering similar measures.

Figure 3.5. Uptake of market measures, 2018



Note: The restriction of public support to operators convicted of IUU fishing was reported as "not applicable" by some respondents who signalled not providing any support to their fishing fleet.

Measures that should be much easier to set up, such as campaigns to raise consumer awareness and create demand, and potentially a premium, for certified and legally sourced products, are also not universally used by respondents (Petrossian, Weis and Pires, 2015[40]).

Only about one in three respondents has a legal framework mandating tax authorities to co-operate and share information with fisheries authorities to facilitate the detection of illicit proceeds and the identification of nationals who are the beneficial owners of IUU fishing vessels and only 16% of respondents reported fully implementing this legal framework. Increasing co-operation between government departments and agencies is key to identifying and prosecuting criminals at all levels of the fishing industry (Witbooi et al., 2020[11]).

In addition, it is important to trace the financial flows generated by IUU fishing to identify the complex networks of related criminal activities. Considering IUU as a predicate offence for money laundering would allow for more in-depth investigations and the use of adequate sanctions. Yet, while 91% of respondents legally consider IUU as a predicate offense for money laundering, only 22% reported fully implementing this regulation.

Progress remains to be made in cutting government support to operators engaging in IUU fishing. This is a key target of SDG 14, and one area of focus for negotiations on fisheries subsidies at the World Trade Organization (Chapter 4). However, 15% of respondents still do not have legal provisions in place to restrict support for operators convicted of IUU fishing and only 58% of respondents reported properly implementing the restrictions.

3.6. Conclusion

Recent progress has been made in fighting IUU fishing through stricter regulation, closer monitoring and control and greater international co-operation. Most notably, port state measures – by which authorities monitor and control activities at port – are today widely used internationally. Progress has also been made in aligning vessel registration and authorisation processes with international recommendations. Consolidating the

benefits of such progress however requires taking extra steps to firmly close waters and markets to IUU operators and the products they harvest globally, while investing in measuring the effectiveness of country actions against IUU fishing would help fine-tune priorities and motivate on-going reforms.

In particular, vessel registration and authorisation processes need to become fully transparent in order to facilitate co-operation between governments, across branches of government and between stakeholders so they can join forces to better track IUU activities. G7 and G20 countries, which have voiced a shared ambition to curb IUU fishing following conferences in Charlevoix (2018) and in Osaka (2019), could lead the way by making public their vessel registries as well the lists of authorised vessels and those that have been identified as engaging in IUU fishing. The issuing of a unique vessel identifier in the registration process should be adopted and harmonised, making use of International Maritime Organization (IMO) numbers whenever possible. The international community should also collectively decide on best practices so as to gather information on who ultimately controls and benefits from vessel activities (i.e. the “beneficial owners” of vessels); indeed, many countries and economies have a legal framework to do so, but report practical difficulties.

International co-operation is necessary to strengthen the regulation of transhipments, whereby fish are transferred from fishing boats onto larger refrigerated vessels, which then carry the fish to port (while fishing vessels continue fishing), so that products of IUU fishing do not enter the value chain unnoticed during these operations at sea. Better definitions and regulations of other fishing-related activities – such as the transfer of fuel, food and crew from “mother ships” to fishing vessels – would also improve control of fleets.

Wider adoption of market measures internationally would increase traceability in seafood value chains and close markets and access to support and services to operators that engage in IUU fishing. Current negotiations on fisheries subsidies at the World Trade Organization (WTO) offer a unique opportunity to prohibit subsidies that contribute to IUU fishing.

Annex 3.A. Survey-based data collection

This chapter builds on the analysis of answers to a survey run in 2019 by the OECD Secretariat inquiring about the legal framework that was in place to deter, identify and punish IUU fishing, and the extent to which it was implemented, in 2018, in individual countries and economies.

A total of 33 countries and economies replied to the survey, including 26 OECD countries (Australia, Belgium, Canada, Chile, Colombia, Denmark, Estonia, France, Germany, Greece, Ireland, Italy, Japan, Korea, Latvia, Lithuania, Mexico, the Netherlands, New Zealand, Norway, Poland, Slovenia, Sweden, Turkey, the United Kingdom and the United States), as well as Argentina, China, Costa Rica, Indonesia, Chinese Taipei, Thailand and Viet Nam – together referred to as "emerging economies".

The survey followed the methodology used in Hutniczak, Delpeuch and Leroy (2019[23]), with the addition of a few new questions that were included following suggestions from respondents to the previous survey. Questions were defined to reflect the best practices and established standards from the relevant literature, in particular international agreements and guidelines related to the fight against IUU fishing adopted by the FAO.

Questions were organised into six sections, at the level of the most important domains of government intervention against IUU fishing:

- Vessel registry
- Authorisation to operate and access resources in the domestic EEZ
- Authorisation to operate and access resources outside the domestic EEZ
- Responsibility as a Port State
- Responsibility as a Market
- International co-operation

To identify patterns and trends in performance, each answer was scored between 0 and 1, with increasing scores indicating higher levels of adoption and implementation of the regulation and measures at stake in each question. Specifically: a score of 0 indicates no regulation was in place; 0.2 indicates there was a regulation but reported not to be implemented; 0.5 indicates the regulation was reported to be partially implemented; and 1 refers to full implementation. Scores were then aggregated into six indicators, at the level of the most important domains of government intervention against IUU fishing. Indicator scores were also averaged over all respondents – or OECD countries and emerging economies.

As the survey included a series of questions which had been submitted to countries participating in the 2005 survey, evidence of progress was computed in relation to issues for which comparative data existed. A subset of 14 of the respondents to the present survey also replied to the 2005 survey: Belgium, Germany, Ireland, Italy, the Netherlands, Slovenia, Australia, Canada, Japan, Korea, New Zealand, Norway, Turkey, and the United States. The countries surveyed in 2019 were also surveyed in 2016.

Annex Table 3.A.1 lists all questions; the weights attributed to individual questions within each indicator; additional information regarding the information gathered through the question, including, where relevant, the criteria on which partial and full implementation of the measure at stake would be based as well as the references on which the questions were based.

Annex Table 3.A.1. Survey questions and indicators

This table lists all questions contained in the survey, and specifies the weights attributed each question to compute the six policy indicators considered in this chapter, provides additional information as to the information collected with each question and references on which the questions are based

Question number	Question	Weight in indicator	Additional information on information collected	References
INIDCATOR A - VESSEL REGISTRY				
FISHING VESSELS				
A.1	National fishing vessels need to be registered and a registry is maintained	1	> *Answer "no legal framework" implies score 0 for all questions conditional on A.1* < There is a regulation requiring registration (i.e. flag granting) of national vessels to fish. Full implementation also implies maintenance of the registry of fishing vessels and its regular updating.	(FAO, 2015[41])
A.2	Please indicate which pieces of information are required when registering a fishing vessel, and specify in the 'Comments' column how each selected piece is defined in the legal framework:		> *Questions conditional on A.1* <	(FAO, 2015[41]; FAO, 2001[24])
A.2.a	Characteristics of the vessel	1/6	e.g. length, tonnage, engine power, fishing methods, construction year	
A.2.b	An International Maritime Organization (IMO) number	1/6		
A.2.c	Details on the natural or legal person in whose name the vessel is registered	1/6	e.g. name, address and nationality	
A.2.d	Details on the natural or legal persons responsible for managing the operations of the vessel	1/6	e.g. name, address and nationality	
A.2.e	Details on the natural or legal persons with beneficial ownership of the vessel	1/6	e.g. name, address and nationality	
A.2.f	History of the vessel (for example, renaming and reflagging)	1/6	including the history of renaming and reflagging the vessel, facilitating detection of previous non-compliance with regulations	
A.3	The registry of fishing vessels is publicly available	1	> *Question conditional on A.1* <	(FAO, 2015[41])
	[if so, please provide a link in the 'Comments' column]		Up-to-date registry of vessels involved in fishing and flying the national flag is easily accessible to the public. The register should contain basic information allowing vessel identification, e.g. name, IMO number, etc. If available, providing a link is requested in the 'Comments' column of the survey. Alternatively, this can include data published at supra-national level (e.g. EU's fleet registry) or data submitted to the FAO's *Global Record of Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels*.	
	[if no such vessels are currently registered, please select 'Not applicable']			
A.4	Registration of fishing vessels already registered by another state (that is, parallel registration) is prohibited (possibly with exceptions on a temporary basis)	1	> *Question conditional on A.1* <	(FAO, 2015[41])
A.5	Registration of vessels with a history of IUU fishing is prohibited (possibly with the exception that		> *Question conditional on A.1* <	(FAO, 2001[24]) (FAO, 2015[41])
		1	There is a legislation in place allowing the country to refuse	

	new owner and operator demonstrate no links to IUU fishing owner and operator)		registration of a vessel based on the record of non-compliance with conservation and management measures or provisions adopted at a national, regional or global level (e.g. vessel appearing on a list of IUU fishing vessels established by a country or an RFMO). Some exceptions may include registration of a vessel that changed the ownership, if the new owner has provided sufficient evidence demonstrating that the previous owner or operator has no further legal, beneficial or financial interest in, or control of, the vessel.	
A.6	Pending IUU fishing-related sanctions need to be settled before deregistration is possible		> *Question conditional on A.1* <	(FAO, 2001[24]) (FAO, 2015[41])
		1	There is a legislation in place indicating that a vessel needs to clear any sanction related to IUU fishing with the country it was registered in before it may be deregistered.	
VESSELS CONDUCTING FISHING-RELATED ACTIVITIES				
A.7	National vessels conducting fishing-related activities need to be registered and a registry is maintained	1	> *Answer "no legal framework" implies score 0 for all questions conditional on A.7* < There is a regulation requiring registration (i.e. flag granting) of national vessels to conduct fishing-related activities. Full implementation implies also maintenance of the registry of vessels conducting fishing-related activities and its regular updating.	(FAO, 2015[41])
A.8	Please indicate which pieces of information are required when registering a vessel conducting fishing-related activities, and specify in the 'Comments' column how each selected piece is defined in the legal framework:		> *Questions conditional on A.7* <	
A.8.a	Characteristics of the vessel	1/6	e.g. length, tonnage, engine power, fishing methods, construction year	
A.8.b	The International Maritime Organization (IMO) number	1/6		
A.8.c	Details on the natural or legal person in whose name the vessel is registered	1/6	e.g. name, address and nationality	
A.8.d	Details on the natural or legal persons responsible for managing the operations of the vessel	1/6	e.g. name, address and nationality	
A.8.e	Details on the natural or legal persons with beneficial ownership of the vessel	1/6	e.g. name, address and nationality	
A.8.f	History of the vessel (for example, renaming and reflagging)	1/6	Including the history of renaming and reflagging the vessel, facilitating detection of previous non-compliance with regulations	(FAO, 2001[24]) (FAO, 2015[41])
A.9	The registry of vessels conducting fishing-related activities is publicly available		> *Question conditional on A.7* <	(FAO, 2015[41])
[NEW]	*[if so, please provide a link in the 'Comments' column]*	*1*	Up-to-date registry of vessels involved in fishing-related activities and flying the national flag is easily accessible to the public. The registry should contain basic information allowing vessel identification, e.g. name, IMO number, etc. If available, providing a link is requested in the 'Comments' column of the survey. Alternatively, this can include data published at supra-national level or data submitted to the FAO's *Global Record of Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels*.	
	[if no such vessels are currently registered, select 'Not applicable']			
A.10	Registration of vessels conducting fishing-related activities already registered by		> *Question conditional on A.7* <	(FAO, 2015[41])
[NEW]		1		

	another state (that is, parallel registration) is prohibited (possibly with temporary exceptions)			
INDICATOR B - AUTHORISATION TO OPERATE AND ACCESS RESOURCES IN THE DOMESTIC EEZ				
NATIONAL VESSELS IN THE DOMESTIC EEZ				
B.1	Are all national vessels operating in the domestic EEZ small-scale?	0	> *Answer 'Yes' indicates non-applicability of questions B.2-B.9.* <	
B.2	National vessels require an authorisation to fish in the domestic EEZ		> *Question conditional on B.1; Answer "no legal framework" implies score 0 for all questions conditional on B.2* <	(FAO, 2001[24])
		1	There is a regulation requiring authorisation of national vessels to fish in the domestic EEZ.	
B.3	Obtaining and maintaining an authorisation to fish in the domestic EEZ by national vessels is conditional on:		> *Questions conditional on B.1 and B.2* <	(FAO, 2001[24])
B.3.a	Position transmission through vessel monitoring system (VMS)	1/2		
B.3.b	Reporting of catch	1/2	Reporting required details regarding catch, including discards	
B.4	The list of national vessels authorised to fish in the domestic EEZ is publicly available.	1	> *Question conditional on B.1 and B.2* <	
[NEW]	*[if so, please provide a link in the 'Comments' column]*		The list is up-to-date and easily accessible. If available, providing a link is requested in the 'Comments' column of the questionnaire. Option 'Not applicable' is available if there is no such vessels authorised at this time.	
	[if no such vessels are currently authorised, please select 'Not applicable']			
B.5	National vessels can have their authorisation to fish in the domestic EEZ withdrawn for IUU fishing.	1	> *Question conditional on B.1and B.2* <	
			There is a legislation allowing the country to withdraw authorisation from a national vessel for not complying with regulations it is subject to in the domestic EEZ.	
B.6	Legal framework provides clear rules for chartering arrangements (that is, for how foreign companies can charter national vessels to access domestic EEZ resources).	1	> *Question conditional on B.1* <	(FAO, 2001[24])
			There is a specific legal framework governing how foreign companies/enterprises can charter national vessels to access marine resources in the domestic EEZ. Policy options include bans on foreign chartering agreements in the domestic EEZ.	
B.7	National vessels require an authorisation to conduct fishing-related activities in the domestic EEZ.		> *Question conditional on B.1;* Answer "no legal framework" implies score 0 for all questions conditional on B.7 <	(FAO, 2001[24])
[NEW]		1	There is a regulation requiring authorisation of national vessels to conduct fishing-related activities in the domestic EEZ.	
B.8	Obtaining and maintaining an authorisation to conduct fishing-related activities in the domestic EEZ by national vessels is conditional on:		> *Questions conditional on B.1 and B.7* <	
B.8.a [NEW]	Position transmission through vessel monitoring system (VMS)	1/2		
B.8.b	Reporting of transhipment	1/2	When permitted	(FAO, 2001[24])
B.9	The list of national vessels authorised to conduct fishing-related activities in the domestic EEZ is publicly available	1	> *Question conditional on B.1 and B.7* <	
[NEW]	*[if so, please provide a link in the column 'Comments']*		The list is up-to-date and easily accessible. If available, providing a link is requested in the 'Comments' column of the	

			questionnaire. Option 'Not applicable' is available if there is no such vessels authorised at this time.	
	[if no such vessels are currently authorised, please select 'Not applicable']			
B.10	National small-scale fishing vessels need to be registered	1	Whether through a specific registration process or through the standard registration process	
B.11	National small-scale vessels require an authorisation to fish	1	Whether through a specific authorisation process or through the standard authorisation process	
B.12	National small-scale fishing vessels need to report their catch	1	Whether through a specific reporting process or through the standard reporting process	
[NEW]				
B.13	Please provide a definition of what is considered a small-scale fishing vessel in your country in the 'Comments' column	0		
B.14	Is there a ban on fishing by foreign vessels in the domestic EEZ?	0	> *Answer 'Yes' indicates non-applicability of questions B.16-B.19* <	
[NEW]			> *Answer 'No' indicates non-applicability of questions B.15* <	
B.15	How is the ban on fishing by foreign vessels implemented?	4	> *Question conditional on B.14* <	
[NEW]			Questions whether the ban is effectively enforced and sanction apply for non-compliance with the regulations establishing the ban.	
B.16	Foreign vessels require an authorisation to fish in the domestic EEZ	1	> *Question conditional on B.14, Answer "no legal framework" implies score 0 for all questions conditional on B.16* <	
			There is a regulation requiring authorisation of foreign vessels to fish in the domestic EEZ.	
B.17	Obtaining and maintaining an authorisation to fish in the domestic EEZ by foreign vessels is conditional on:		> *Questions conditional on B.14 and B.16* <	
[NEW]				
B.17.a	Position transmission through vessel monitoring system (VMS)	1/2		
B.17.b	Reporting of catch	1/2	Reporting required details regarding catch, including discards	
B.18	The list of foreign vessels authorised to fish in the domestic EEZ is publicly available	1	> *Question conditional on B.14 and B.16* <	
	[if so, please provide a link in the 'Comments' column]		The list is up-to-date and easily accessible. If available, providing a link is requested in the 'Comments' column of the questionnaire. Option 'Not applicable' is available if there is no such vessels authorised at this time.	
	[if no such vessels are currently authorised, please select 'Not applicable']			
B.19	Foreign vessels can have their authorisation to fish in the domestic EEZ withdrawn for IUU fishing	1	> *Question conditional on B.14and B.16* <	
[NEW]			There is a legislation allowing the country to withdraw authorisation from a foreign vessel for not complying with regulations it is subject to in the domestic EEZ.	
B.20	Is there a ban on fishing-related activities by foreign vessels in the domestic EEZ?	0	> *Answer 'Yes' indicates non-applicability of questions B.22-B.24* <	
[NEW]			> *Answer 'No' indicates non-applicability of questions B.21* <	
B.21	How is the ban on fishing-related activities by foreign vessels implemented?	3	> *Question conditional on B.20* <	
[NEW]			Questions whether the ban is effectively enforced and sanction apply for non-compliance with the regulations establishing the ban.	

B.22	Foreign vessels require an authorisation to conduct fishing-related activities in the domestic EEZ	1	> *Question conditional on B.20; answer "no legal framework" implies score 0 for all questions conditional on B.22*<	
[NEW]			There is a regulation requiring authorisation of foreign vessels to conduct fishing-related activities in the domestic EEZ.	
B.23	Obtaining and maintaining an authorisation to conduct fishing-related activities in the domestic EEZ by foreign vessels is conditional on:		> *Questions conditional on B.20* and B.22 <	
[NEW]				
B.23.a	Position ttransmission on through vessel monitoring system (VMS)	1/2		
[NEW]				
B.23.b	Reporting of transhipment	1/2	When permitted	
[NEW]				
B.24	The list of foreign vessels authorised to conduct fishing-related activities in the domestic EEZ is publicly available	1	> *Question conditional on B.20 and B.22* <	
[NEW]	*[if so, please provide a link in the 'Comments' column]*		The list is up-to-date and easily accessible. If available, providing a link is requested in the 'Comments' column of the questionnaire. Option 'Not applicable' is available if there is no such vessels authorised at this time.	
	[if no such vessels are currently authorised, please select 'Not applicable']			
C.1	Are all national vessels of insufficient capacity to operate in the ABNJ?	0	Questions whether the country has no long-distance fleet.	
			> *Answer 'Yes' indicates non-applicability of questions C.2-C.7 and C.10-C.14* <	
C.2	Is there a ban on fishing in the ABNJ by national vessels?	0	> *Question conditional on C.1* <	
			> *Answer 'Yes' indicates non-applicability of questions C.4-C.7* <	
			> *Answer 'No' indicates non-applicability of questions C.3* <	
C.3	How is the ban on fishing in the ABNJ by national vessels implemented?	4	> *Question conditional on C.1 and C.2* <	
			Questions whether the ban is effectively enforced and sanction apply for non-compliance with the regulations establishing the ban.	
C.4	National vessels require an authorisation to fish in the ABNJ	1	> *Question conditional on C.1 and C.2 , answer "no legal framework" implies score 0 for all questions conditional on C.4*<	(FAO, 2001[24])(FAO, 2015[41])
			There is a regulation requiring authorisation of national vessels to fish in the ABNJ.	
C.5	Obtaining and maintaining an authorisation to fish in the ABNJ by national vessels is conditional on:		> *Questions conditional on C.1 and C.2 and C.4* <	(FAO, 2001[24])(FAO, 2015[41])
C.5.a	Position transmission through vessel monitoring system (VMS)	1/3		
C.5.b	Reporting of catch	1/3	Reporting required details regarding catch, including discards	
C.5.c	Participation in observer programmes	1/3		
C.6	The list of national vessels authorised to fish in the ABNJ is publicly available	1	> *Question conditional on C.1 and C.2 and C.4* <	(FAO, 2001[24])
	[if so, please provide a link in the 'Comments' column]		The list is up-to-date and easily accessible. If available, providing a link is requested in the 'Comments' column of the questionnaire. Sufficient implementation includes relevant data submitted to the FAO's *Global Record of Fishing Vessels,*	

			Refrigerated Transport Vessels and Supply Vessels. Option 'Not applicable' is available if there is no such vessels authorised at this time.	
	[if no such vessels are currently authorised, please select 'Not applicable']			
C.7	National vessels can have their authorisation to fish in the ABNJ withdrawn for IUU fishing.	1	> *Question conditional on C.1 and C.2 and C.4* <	(FAO, 2015[41])
			There is a legislation allowing the country to withdraw authorisation from a national vessel for not complying with regulations it is subject to in the ABNJ.	
C.8	Access to foreign EEZs through bilateral agreements is regulated and lists of vessels authorised to fish under such agreements are public	1	Bilateral agreements refer to agreements with foreign countries on fishing in the areas under their jurisdiction. Lists of vessels authorised to fish under such agreements are public implies that there is a full disclosure of capacity authorised under such agreements. Full implementation also implies full disclosure of agreements conditions (e.g. financial compensations). If relevant pieces of information are disclosed, providing a link is requested in the 'Comments' column of the questionnaire. Option 'Not applicable' is available if no such agreements are in place at this time.	
	[if so, please provide a link in the 'Comments' column]			
	[if no such agreements are currently in place, please select 'Not applicable']			
C.9	Access to foreign EEZs through private or chartering agreements is either banned or regulated and if regulated, lists of vessels authorised to fish under such agreements are public	1	Lists of vessels authorised to fish under such agreements being public implies that there is a full disclosure of capacity authorised under such agreements. If available, providing a link is requested in the 'Comments' column of the questionnaire.	
	[if regulated, please provide a link to the list of authorised vessels in the 'Comments' column]			

C.10	Is there a ban on fishing-related activities by national vessels in the ABNJ?	0	> *Question conditional on C.1* <	
			> *Answer 'Yes' indicates non-applicability of questions C.12-C.14* <	
			> *Answer 'No' indicates non-applicability of questions C.11* <	
C.11	How is the ban on fishing-related activities by national vessels in the ABNJ implemented?	3	> *Question conditional on C.1 and C.10* <	
			Questions whether the ban is effectively enforced and sanctions apply for non-compliance with the regulations establishing the ban.	
C.12	National vessels require an authorisation to conduct fishing-related activities in the ABNJ.	1	> *Question conditional on C.1 and C.10; answer "no legal framework" implies score 0 for all questions conditional on C.12*<	(FAO, 2001[24]) (FAO, 2015[41])
			There is a regulation requiring authorisation of national vessels to conduct fishing-related activities in the ABNJ.	
C.13	Obtaining and maintaining an authorisation to conduct fishing-related activities in the ABNJ by national vessels is conditional on:		> *Questions conditional on C.1 and C.10 and C.12* <	(FAO, 2001[24])
C.13.a	Position transmission through vessel monitoring system (VMS)	1/3		
C.13.b	Reporting of transhipment	1/3	When permitted	
C.13.c	Participation in observer programmes	1/3		
C.14	The list of national vessels authorised to conduct fishing-related activities in the ABNJ is publicly available	1	> *Question conditional on C.1 and C.10 and C.12* <	
	[if so, please provide a link in the 'Comments' column]		The list of national vessels authorised to conduct fishing-related activities in the ABNJ being publicly available implies that the list is up-to-date and easily accessible. If available, providing a link is requested in the 'Comments' column of the questionnaire.	

			Sufficient implementation include relevant data submitted to the FAO's *Global Record of Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels*. Option 'Not applicable' is available if there is no such vessels authorised at this time.	
	[if no such vessels are currently authorised, please select 'Not applicable']			
D.1	Ports for use by foreign vessels are designated	1	Ports with sufficient capacity to conduct inspections are designated for use by foreign-flagged vessels and the list of designated port is published. If available, providing a link is requested in the 'Comments' column of the questionnaire. Alternatively, this can include data submitted to the FAO's *Global Record*. Policy option also include a ban on landings by foreign vessels.	(FAO, 2001[24]) (FAO, 2009[25])
	[if so, please provide a link to the list of designated ports in the 'Comments' column]			
D.2	Foreign vessels need to request port entry in advance	1	Regulation exists that foreign-flagged vessels (fishing vessels and vessels involved in fishing-related activities) seek permission to enter the port in advance and receive confirmation from port state. Policy option also includes a ban on landings by foreign vessels.	(FAO, 2001[24]) (FAO, 2009[25])
D.3	Vessels suspected of IUU fishing can be denied port entry or use	1	Regulation exists allowing denial of port entry or use (including landing, transhipments and access to other port services or inspection) to vessels suspected of IUU fishing. Excludes emergency situations.	(FAO, 2001[24]) (FAO, 2009[25])
D.4	A risk-based approach is taken to prioritise port inspections	1	A system is in place to prioritise which vessels to inspect on the basis of probability of their involvement of IUU fishing and the extent of severity of potential IUU fishing activity.	(FAO, 2009[25])
D.5	Targets are set for the number of port inspections	1		(FAO, 2009[25])
D.6	The port state measures of relevant RFMOs are adopted and implemented		Port state measures contributing to the reduction of IUU fishing mandated in the CMMs of relevant RFMOs are adopted and implemented. Option 'Not applicable' is available if the country does not have vessels operating in the areas under jurisdiction of any RFMO, i.e. it is forbidden or the country has no capacity to conduct such activities.	(FAO, 2001[24]) (FAO, 2009[25])
	[if no vessel is operating in areas under the jurisdiction of RFMOs, please select 'Not applicable']	*1*		
E.1	Import and export controls allow rejection of products originating from IUU fishing (for example, catch landed by IUU fishing vessels, or containing illegal species)	1	There is a system in place to control seafood import and export, that is, a specific control framework adopted for customs clearance, allowing the rejection of products identified as originating from IUU fishing.	(FAO, 2001[24])
E.2	Imported seafood products need to be accompanied by a certificate of origin confirming its legal sourcing	1	There is a regulation establishing the requirement for imported fish to be accompanied by a certificate of its origin, confirming its legal sourcing.	(FAO, 2001[24])(FAO, 2015[41])
E.3 [NEW]	Government can impose restrictions on imports from countries identified as insufficiently fighting IUU fishing	1		(FAO, 2001[24])
E.4	Campaigns are conducted to raise consumer awareness of the threat posed by IUU fishing	1	The country organises information campaigns directed at consumers about the threat posed by IUU fishing to the sustainability of marine resources and the health of marine ecosystem. If available, providing examples of specific campaigns run since the last iteration of the questionnaire is requested in the 'Comments' column of the questionnaire.	(FAO, 2001[24])
	[if so, please provide examples of specific campaigns run since 2017 in the 'Comments' column]			
E.5	Access to public support (such as subsidies to individual fishers or companies) can be restricted for operators convicted for IUU fishing	1		(FAO, 2001[24])

	[if the country does not offer such support, please select 'Not applicable']			
E.6	IUU fishing is considered as a predicate offence to money laundering	1	Generating proceeds from illegal fishing is considered a predicate offence for money laundering, that is, there are regulations in place allowing authorities to seize proceeds from illegal fishing and prosecute fishers under anti-money laundering law. Option 'partly implemented' is advised if IUU fishing can be considered a predicate offence in principle, but is not specifically considered as such in the legal framework.	(FATF, 2012[42])
	[please indicate 'Legal framework, partial implementation' if IUU fishing can be considered a predicate offence in principle, but is not specifically considered as such in the legal framework]			
E.7	The legal framework mandates tax authorities to co-operate and share information with fisheries authorities to facilitate the detection of illicit proceeds and identification of nationals who are the beneficial owners of IUU fishing vessels	1		
F.1	Standardised processes for sharing information on IUU fishing activities with other countries are in place	1	For example, standardized forms or communication channels to inform other countries on detected or suspected IUU fishing activities.	(FAO, 2001[24])(FAO, 2015[41])
F.2	A focal point is designated for sharing information on IUU fishing activities (such as the results of controls at sea or in ports) with other countries	1		(FAO, 2001[24])
F.3	Country publishes a list of national vessels recognized as IUU fishing vessels that is available to other countries	1		(FAO, 2001[24])
F.4	Country participates in multi-country initiatives to combat IUU fishing that facilitate joint monitoring, control, surveillance, and enforcement *[if so, please provide the names of initiatives in the 'Comments' column]*	1		(FAO, 2001[24])(FAO, 2015[41])

Note: The questions marked as '[NEW]' below the question number were introduced in the questionnaire after the last round of information collection for the preparation of the report *Closing gaps in national regulations against IUU fishing* (Hutniczak, Delpeuch and Leroy, 2019[23]).

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Notes

[1] While the impact of IUU fishing has not been estimated at a global scale, the contribution of sustainable fisheries to global food security today and in the future is discussed in Costello et al. (2020[9]). IUU compromises this contribution by diverting seafood products to illegal markets that are not always accessible to consumers – and who cannot easily find alternative nutritious food – and by affecting the sustainability of resources and thus their food production potential.

[2] What is categorised as a crime varies across jurisdictions.

[3] The most recent estimate of the global illegal and unreported annual catch dates back to 2009 (Agnew et al., 2009[1]).

[4] There are other useful ways to fight IUU fishing which are outside the scope of the present paper but deserve attention and work. They include both public measures such as increasing sanctions for IUU activities, and actions by the fisheries sector and civil society that contribute to greater transparency and traceability of seafood products (Widjaja et al., 2019[17]).

[5] This chapter complements work done by the FAO to track progress made by countries in reaching SDG target 14.6 with indicator 14.6.1 "Progress by countries in the degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing". Aggregate scores obtained by countries can be accessed at: http://www.fao.org/sustainable-development-goals/indicators/1461/en/. This chapter investigates similar issues with a greater level of detail to identify where reforms are needed in relation with precise policies and regulations.

[6] Typically, for each element of regulation or policy recognised to be necessary to fight IUU fishing, countries were asked whether a legal framework or policy provisions exists and, if so, whether it is fully, partially or not implemented (however, there was no attempt to measure countries' respective effectiveness in fighting IUU through the measures adopted and implemented). Countries were also invited to share references to the relevant legal frameworks and policy provisions as well as links to publically available information in questions related to transparency of information. The OECD revised the information provided by national authorities to the extent possible, and exchanged with national authorities to clarify and amend the information provided when necessary. Information was included in the database pending final validation by national authorities.

[7] The scoring key for each question is detailed in Annex Table 3.A.1.

[8] Scores are averaged over countries, counting all countries equally. The weights given to the different questions within indicators are reported in Annex Table 3.A.1. Indicators are built on the assumption that all the measures included under each indicator are complementary and that the best-case scenario for countries is to implement them all. It is, however, recognised that this may not be the case and that countries may have different priorities and portfolios of policies and practices to fight IUU fishing due to the particular situation of their fisheries.

[9] Evidence of progress since 2005 is based on the responses to the subset of questions, which were already included in the 2006 survey referring to 2005. A subset of 14 of the respondents to the 2019 survey also replied to the 2006 survey: Australia, Belgium, Canada, Germany, Ireland, Italy, Japan, Korea, the Netherlands, New Zealand, Norway, Slovenia, Turkey, and the United States. The countries surveyed in

2019 were also surveyed in 2017, and the set of questions was very similar. Progress since 2016 is reported only where it is notable.

[10] In line with the findings in (Hutniczak, Delpeuch and Leroy, 2019[23]) that the degree of implementation of best practices against IUU fishing appears to be often closely related to gross domestic product (GDP) per capita, average indicators for responding OECD countries score higher than those recorded for non-OECD emerging economies. The difference is however limited for vessel registration and authorisation to operate in the EEZ.

[11] Under the United Nations Convention on the Law of the Sea (UNCLOS), in force since 1994, coastal states, including island nations, have sovereign rights to the natural resources of the waters stretching up to 200 nautical miles from their coasts. Rights over this area, defined as their exclusive economic zone (EEZ), also come with the responsibility to monitor and control fishing and fishing-related activities.

[12] FAO has developed the Global Record of Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels (Global Record), an online comprehensive and updated repository of vessels involved in fishing operations compiled by State authorities and RFMOs, http://www.fao.org/global-record/background/about/en/.

[13] Vessels' characteristics include information such as length, tonnage, fishing method, engine power, and date of construction.

[14] www.whofishesfar.org.

[15] For example, researchers who use AIS data to analyse transhipment could double check whether the transhipments spotted using satellite data were legally authorised or not and accordingly alert authorities (Global Fishing Watch, 2017[43]).

[16] While high scores are seen overall for Port State Measures, some respondents reported issues in implementing them. This suggests room for improvement even in countries participating in the PSMA.

[17] The Voluntary Guidelines for Catch Documentation Schemes released on 5 April 2017 (FAO, 2017[26]) constitute a valuable source of guidance for the design of a CDS.

4 Government support to fisheries

This chapter describes government support policies to fisheries: the mix of policies being used, their magnitude, the contexts in which they are applied, and their potential impacts in terms of different policy objectives. It does so using the OECD Fisheries Support Estimate (FSE) database – the most comprehensive, detailed, and consistent collection of country level data on support to fisheries reported by governments – and by building on the OECD's most recent analysis of the relative impact of different types of support policies. The analysis aims to help countries deliver on their commitments to Sustainable Development Goal 14, which seeks to "conserve and sustainably use the oceans, seas and marine resources for sustainable development" and calls for reforming support to fisheries such that, at a minimum, it should not compromise the sustainable use of resources. It also seeks to inform World Trade Organization (WTO) negotiations on fisheries subsidies.

Key recommendations

- To reduce negative impacts on the biological sustainability of fish resources, and inequitable effects across fleet segments, while increasing fisher welfare and the quantity of fish produced, governments should move away from policies that support inputs towards those that help fishers operate their businesses more effectively and increase their profitability. Scope for reform is significant: over 2016-18, USD 3.2 billion was annually spent on policies that reduce the cost of inputs. Support to fuel, alone, was the single largest direct support policy, accounting for 25% of total support to the sector. Conversely, less than a third of that amount (USD 1.0 billion) was granted in support that is partially de-coupled from fishing activities – such as income support and special insurance systems.
- Governments should ensure capacity for management, control and surveillance is sufficient to effectively manage fisheries, including in the high seas, and to eradicate illegal fishing. Between 2012-14 and 2016-18, spending on management, control and surveillance fell substantially relative to fleet size in several countries and economies. Ensuring this is not at the detriment of effective management and enforcement is indispensable to preserve the benefits of fishing for future generations in line with Sustainable Development Goal (SDG) 14, which seeks to "conserve and sustainably use the oceans, seas and marine resources for sustainable development". It is also essential to ensure support achieves its socio-economic goals without encouraging overfishing and other unsustainable practices.
- Governments should avoid financing infrastructure that will encourage overcapacity and overfishing. In some countries, spending on infrastructure has increased significantly relative to fleet size since between 2012-14 and 2016-18.
- To ensure adequate resources are available to provide essential management services, and in line with the user pays principle, governments should consider requiring the fisheries sector to fund a reasonable proportion of the cost of essential management services. Taxpayers continue to pay most, if not all, of fisheries management costs in many places.
- In line with general policy advice from the OECD for government support, policies should be time-limited and targeted.
- Increasing transparency in government support to fisheries to allow public scrutiny, would help build trust in the sector and in policy responses. This would also enable countries to learn from each other's experiences in order to better prepare for the future. Increased transparency is particularly needed on support to fuel and on payments to access foreign waters.
- Reforms to fisheries support policies – in common with agricultural support reforms – have the potential to contribute to wider objectives for food systems, which include providing food security and nutrition, generating economic opportunities along the food chain, and limiting the environmental footprint of food production. They are key components of policy efforts to improve well-being in coastal areas (in similar ways as agricultural policy reform is key to improve well-being in rural areas) and have the potential to contribute SDGs beyond SDG14, in particular those relating to climate, poverty and food.

4.1. Understanding fisheries support policies to achieve sustainability, welfare gains and enhance equity

International agreement on the need to reform fisheries support policies

While the fishing sector typically only makes a relatively modest contribution to national GDP in many countries around the world, it can be a regionally important source of economic activity, employment and food, and also holds significant cultural and social value in many countries (FAO, 2020[1]).[1] Accordingly, most governments support their fisheries sectors in an attempt to achieve objectives such as maintaining coastal employment, improving fishers' welfare, ensuring the sustainability of the sector, encouraging food production and establishing sovereignty over disputed waters.

In pursuit of these objectives, government support can in some cases result in undesirable outcomes, by distorting the economic environment fishers operate in.[2] These negative effects include the build-up of excess fishing capacity, too much fishing taking place (that is, overfishing), and incentives to engage in illegal, unreported and unregulated (IUU) fishing, all of which are detrimental to the sustainability of fish resources and ecosystems. Policies that end up harming stocks are ultimately economically detrimental to those they aim to help as lower stock abundance results in both lower sustainable yields and higher costs of harvesting, thus affecting the resilience of the fishing sector. Such policies are also detrimental to society and the environment. They result in a sub-optimal contribution to food security and ecosystem services (such as food provisioning to other elements of the ecosystem), as well as in higher fishing impacts on non-target species, ecosystem habitats and global warming when more fishing than necessary is taking place (Hilborn et al., 2020[2]).

With the United Nations (UN) Sustainable Development Goal (SDG) 14, the international community has recognised the need to reform support to fisheries such that, at a minimum, it should not compromise the sustainability of resource use.[3] Target 14.6 calls for prohibiting certain forms of fisheries subsidies, which contribute to overcapacity, and overfishing, and eliminating subsidies that contribute to IUU fishing by 2020. To reach this objective, members of the World Trade Organization (WTO) are negotiating binding disciplines on fisheries subsidies that would allow countries to collectively prohibit harmful subsidies while taking into consideration appropriate and effective special and differential treatment for developing and least developed countries.

In addition to resulting in environmentally detrimental outcomes, some support measures are also inefficient at achieving their socio-economic objectives. For example, support that lowers the cost of fuel can transfer relatively low proportions of the money to fishers while also reducing the competitiveness of smaller-scale fishers, making the latter worse off than they would have been without the support. This can happen as a consequence of smaller-scale fishing operations being displaced by more fuel-intensive industrial fishing operations, which attract most of the support and increase effort in response (Martini and Innes, 2018[3]).

Thus, in addition to pursuing sustainability objectives agreed on at the international level (SDGs, WTO), individual countries may also seek to reform their fisheries support policies to improve their effectiveness, their efficiency, and their distributional equity. This should be an even greater priority in the aftermath of the crisis generated by the COVID-19 pandemic, which has increased both the need for support and demands on public resources (OECD, 2020[4]).

Building the evidence base to guide reform

This chapter aims to support the process of fisheries reform by shedding light on the current support policy mixes being used, the contexts and their potential impacts in terms of different policy objectives.

First is a summary of the guiding principles that have emerged from the literature, which should help individual countries evaluate their support policies against their own sets of policy objectives.

A comprehensive overview of the state of fisheries support policies is then presented, including trends over recent years. This makes use of the OECD FSE database against the backdrop of the guiding principles set out above. In doing so, it first examines support for services to the sector (SSS) and then direct support to individuals and companies in the fisheries sector (DSI).

The last section of the chapter sheds some light on how support to fisheries and agriculture compare. Policy makers often face similar objectives and constraints when designing support policy packages for these industries, especially in relation to food production, and the comparison is undertaken with a view to improving policy coherence, and helping identify possible spill-overs and synergies in designing the best policy mixes in favour of sustainable and resilient food systems.

4.2. Some general principles to guide fisheries policy reform

Redirecting support has the potential to improve sustainability, welfare and equity

Categorically identifying support measures as strictly "positive" or "negative" along a matrix of socio-economic and environmental objectives is not straightforward.[4] Modelling work by the OECD[5] shows that the relative effects of support, in each of these areas, can vary significantly depending on a combination of factors (Martini and Innes, 2018[3]) :

- The type of support policy in question
- The implementation criteria, such as who can receive support, under what conditions, and for how long
- The management framework in which fisheries benefitting from support operate – in particular, whether catch is capped at a level that prevents overfishing, and whether IUU fishing is effectively prevented
- The current health of fish stocks targeted by fisheries receiving support.

These findings provide some general insights and guiding principles to consider when looking at policy sets currently in use, their likely outcomes, and scope for redirecting support to more effectively achieve fisheries sustainability and other objectives.

The first and most important lesson from economic analysis of fisheries support policies is that there is scope to redirect public money towards measures that can improve outcomes on multiple fronts. For direct support in particular, moving away from policies that support inputs towards those that help fishers operate their businesses more effectively and increase their capacity to profit from the fishery, would reduce negative impacts on the biological sustainability of fish resources, increase fisher welfare and the quantity of fish produced, as well as avoid distortionary effects on equity across fleet segments.

Policies lowering the direct costs of fishing are the most likely to encourage unsustainable fishing. Specifically, payments reducing the relative cost of variable inputs (in particular fuel) increase demand for them and can result in increased fishing effort and more fishing taking place, with potential sustainability implications (unless regulation completely prevents overcapacity and overfishing, see Section 4.2). This type of support is also the most likely to increase IUU fishing, as some of the increase in effort can take the form of IUU fishing, further contributing to the risk of stock depletion. In some cases, support policies can provide benefits to IUU fishing at the expense of legal fishing activities. Payments for vessel purchase or modernisation, on the other hand, are the most likely to promote overcapacity because reducing the relative cost of vessel capital increases demand for it. Once this additional capacity has entered the fishery, the relatively durable and immalleable nature of vessels can create pressures for it to be utilised, potentially

beyond sustainable levels – creating overfishing – and potentially via IUU fishing. Overcapacity also has the potential to create political pressure for further support, such as payments for access to foreign waters. In addition, by lowering the relative cost of fuel or vessel power, input support can result in unnecessary CO_2 emissions (Parker et al., 2018[5]) as well as larger levels of bycatch (Burgess et al., 2018[6]).

Furthermore, input support can be inequitable when it allows larger vessels and companies, which typically consume the largest portion of inputs and hence input-support, to outcompete smaller ones in chasing limited renewable fish resources. Fuel subsidies, which still account for the majority of direct support to individual fishers and companies (as described in Section 4.3), are also the least effective means of transferring income to fishers. Under some management contexts, fuel subsidies have been estimated to deliver less than 10% of their value in benefits to fishers, the remainder being lost to increased effort and less abundant fish stocks or accruing with the providers of fuel (Martini and Innes, 2018[3]).

In contrast, payments designed to support efficient business operations and develop human capital have the lowest negative impacts on sustainability of all direct support, while also performing well in terms of transfer efficiency. These include support such as upskilling, marketing training and assistance, along with concessional loans, special tax treatment on investment or returns on investment other than for capital in fishing vessels. Payments directly targeting fishers' incomes also deliver significant benefits to all participants in the fishing sector. Finally, support to services such as management, control and surveillance are also generally regarded as being good and necessary investments, even though – in line with the user-pays principle – these costs should ideally be recovered from the industry.

Effective fisheries management is a pre-requisite to effective support

The second key lesson to consider when reflecting on fisheries support policy choice is that effective fisheries management is a necessary, but not entirely sufficient, pre-requisite for effective support policies. Indeed, all the direct support policies considered by OECD modelling work can result in stocks being overfished to some extent, due to the varying potentials to increase fleet capacity, lead to overfishing and encourage IUU fishing. An effective fisheries management system is, however, seen to mitigate, although not entirely eliminate, this effect.[6] Limiting the total quantity of fish caught to a sustainable level is thus necessary to mitigate the impacts of support policies on the sustainability of fish stocks. What is more, all direct support policies, and most services to the sector, provide a much greater level of benefit to fishers when excess fishing is prevented, as the benefits are not lost to inefficiently high consumption of inputs and the reduced catches and revenues that result from overfished stocks.

However, it is important to recognise that no country has a perfect management system. At the global level, just over 34% of global fish stocks are considered to be in an unsustainable situation (FAO SOFIA 2020), and, in some regions (the Mediterranean and Black Sea, the Southeast Pacific, and the Southwest Atlantic), more than half are estimated to be fished at unsustainable levels. When considered at the country or economy level, data gathered in Chapter 2 of this review indicates that a significant proportion of the assessed stocks reported to the OECD are also not in a biologically sustainable situation, including some of the most valuable in terms of value of landings. What is more, IUU fishing continues to pervade global fisheries (Chapter 3).

Even greater caution is thus required in supporting fisheries that target stocks that are overfished and those for which countries are not in a position to adequately assess their status. Particular restraint should also be applied when supporting unmanaged fisheries, as well as fisheries that are particularly subject to IUU fishing. In practice these tend to overlap, as, for many of the fisheries where stocks' health is poor or unknown, it is likely that the ability (or efforts) to manage stocks properly and undertake effective MCS is also limited (Hilborn et al., 2020[2]). Such fisheries are notably, but not only, to be found in the high seas. In some circumstances, the only socially, environmentally, and economically sustainable option may be to

reallocate some of the budget typically used to support fisheries to offer viable alternatives in other parts of the economy, including aquaculture.

Finally, actively disincentivising unsustainable behaviour across all supported fisheries is essential. SDG 14 recognises the urgent need to cut support to operators engaging in IUU fishing, and this is an area on which negotiations on fisheries subsidies at the WTO have focused. However, data on policies to fight IUU fishing collected by the OECD in 2019 show that less than 55% of the 33 countries surveyed reported fully restricting support for operators convicted of IUU fishing while 18% of them do not even have a legal framework to do so (Chapter 3).

4.3. State and trends in support to fisheries

The FSE database (Box 4.1) attempts to capture the total monetary value of government support to their fishing industries by providing an inventory of all policies that generate a transfer from taxpayers to fishers. The database records information on the attributes of policies, including their implementation criteria, along with their annual value to the industry in both USD and the national currency of the reporting country. All discussion in this chapter is undertaken in USD. To analyse trends in fisheries support in recent years, 2016-18 and 2012-14 are used as reference periods.

Box 4.1. The OECD Fisheries Support Estimate (FSE) database

Based on information submitted by national authorities, the FSE database measures, describes and classifies fisheries support policies in a consistent and transparent way that facilitates their evaluation against defined objectives.

The FSE contains three main categories of policies, each of which are subdivided further based on factors that include implementation criteria and policy intent:

- **Support for services to the sector** (SSS) comprises support to infrastructure; management, control and surveillance; research and development; education and training; marketing and promotion; fishing communities; access to foreign waters; and other services to the sector.
- **Direct support to individuals and companies in the fisheries sector** (DSI) comprises support to income; insurance; fixed inputs (in particular vessels and gear); fuel[1]; other variable inputs; capacity reduction; and other direct support.
- **Payments made by the fisheries sector** (PMS) – that is, fees paid by service users, such as for port access or management, and taxes or fees on resource use and associated profits, which reduce the extent to which taxpayers finance support to fisheries.

The FSE database covers all OECD countries as well as ten key non-OECD economies with significant marine fisheries (referred to as “emerging economies” in what follows). Together, the 39 FSE countries and economies included in the database represented just over 69% of capture fisheries production by volume in 2016-18.

The OECD countries in the FSE database are Australia, Belgium, Canada, Chile, Colombia, Denmark, Estonia, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Korea, Latvia, Lithuania, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Turkey, United Kingdom, and the United States.

The emerging economies in the FSE database are Argentina, Brazil, the People's Republic of China (hereafter "China"), Costa Rica, Indonesia, Malaysia, Peru, Philippines, Chinese Taipei, and Viet Nam.

1. In the OECD dataset 'Fisheries Support Estimate (FSE)' (OECD.Stat), support to fuel is reported under two separate headings depending on the mechanism: fuel tax concessions are reported under 'tax exemptions' while direct transfers to reduce the cost of fuel are reported under 'transfers based on input use'. Since impacts are similar, they are jointly considered as support to fuel in this chapter.
2. The FSE database also includes data for India for 2018. However, it was not considered in this chapter to ensure data consistency over the period studied (2012-14 versus 2016-18).

Total government support

Over 2016-18, the 39 countries and economies that reported their support to fisheries to the OECD Fisheries Support Estimate (FSE) database (Box 2.1) together transferred a gross annual average of USD 9.4 billion to fisheries. The net total FSE amounted to USD 9.1 billion, when payments made by the fisheries sector (PMS) to access and use resources or in payment for services are accounted for. Both total FSE and net total FSE decreased since 2012-14 (from a total FSE of USD 13.1 billion and net FSE of USD 12.8 billion). Total support equated to 10% of the average value of landings over 2016-18, down from 13.8% in 2012-14.[7]

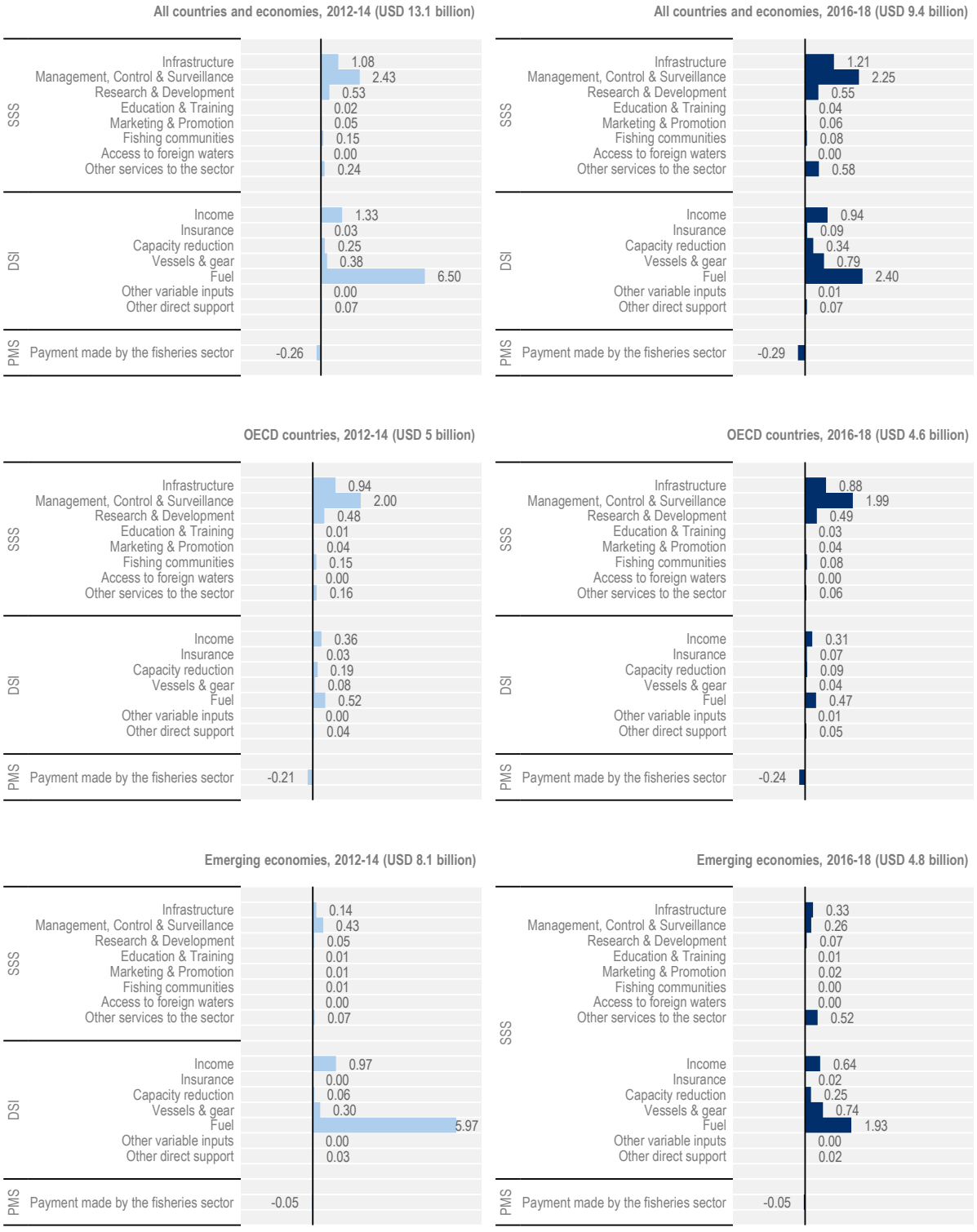
OECD countries together provided a total of USD 4.6 billion per year in support, on average, over the period 2016-18 (net FSE USD 4.4 billion), down slightly from USD 5 billion in 2012-14 (net FSE USD 4.8 billion). This equates to 12.3% of the average value of landings in 2016-18, slightly down from 12.6% in 2012-14, as the reduction in total support outpaced the small (5.9%) reduction in value of landings over the same period.

Non-OECD emerging economies (henceforth referred to as "emerging economies"), on the other hand, together provided a total of USD 4.8 billion per year in support, on average, over the period 2016-18 (net FSE USD 4.7 billion), having almost halved from USD 8.1 billion in 2012-14 (net FSE USD 8.0 billion). For emerging economies where the value of landings was also available, the 2016-18 average FSE equates to 8.3% of the average value of landings over the same period, a decrease from 15.0% in 2012-14, which was driven by a combination of the substantial reduction in FSE and a concurrent 15.2% increase in the value of landings.[8]

At the global level, a relatively small number of countries account for the majority of catch, fleet and employment.[9] A given rate of support in these countries will, of course, imply a higher value of support in absolute terms. In 2016-18, 78% of all support was reported by five countries (China – 41%, Japan – 13%, United States – 10%, Canada – 8% and Brazil – 7%), all of which rank in the top-5 countries and economies reporting to the FSE database in terms of country share of either global capture fisheries production volume, fleet or employment. Norway, Poland, Korea, Turkey, and Australia also individually accounted for between 2% and 3% of total reported support, while the remaining countries and economies in the database each accounted for 1% or less.

These total amounts of support recorded in the FSE database should however be viewed with caution. The database includes a variety of support policies, which can have different relative impacts on both the sustainability of biological resources and socio-economic variables. The composition of support therefore needs to be understood and contextualised before any comparison across countries can be made. When discussing particular types of support (in Section 4.3 for services to the sector and Section 4.3 for direct support), and as appropriate, country-level data is therefore also considered in the context of the value of landings (per USD), fleet size (per gross tonne, gt), and employment (per fisher).

Figure 4.1. Recent changes in support to fisheries (FSE) disaggregated into its subcomponents



Source: OECD dataset 'Fisheries Support Estimate (FSE)' (OECD.Stat).

Despite these caveats, looking at aggregate trends and comparing the relative weights of different types of policy in the totals (at the level of all countries and economies in the FSE database, OECD countries, or emerging economies) gives useful policy insights. The constituent categories and sub-categories of the FSE, and how they contribute to the totals in the reference periods, are reported in Figure 4.1.

One initial result already stands out in Figure 4.1 from a policy perspective. Support to fuel remains the single largest direct support policy at the level of both OECD countries and emerging economies. This is despite reported support to fuel in the FSE database being an underestimate of the true picture.[10] Fuel support is known to be both ineffective at achieving socio-economic objectives while also incentivising overfishing (as discussed above). Major scope for reform is thus to be found in reallocating such support to more sustainable and more effective policies.

Box 4.2. Support to fisheries in response to the COVID-19 pandemic

The COVID-19 pandemic continues to be a major source of disruption and uncertainty for the entire seafood sector. It has impacted every level of the supply chain and consequently governments have acted, providing specific support, with the objective of mitigating impacts on food production, employment, and the welfare of those depending on the sector.

While support in this context is generally necessary and important, the policy actions taken should be carefully considered, to avoid detrimental outcomes either now or in the future. The latest general policy advice from the OECD for government support policies in response to the COVID-19 pandemic recommends any actions should be time-limited, targeted, cash-based, and consistent with longer-term sustainability objectives (OECD, 2020[7]). For fisheries in particular (OECD, 2020[4]), support policies should be designed so that they do not encourage unsustainable fishing now or in the future, following the general principles described in Section 4.2. In addition, it is essential fisheries management remains effective and evidence-based. This will mean resisting growing pressures to make up for losses (caused by restrictions to fishing and lost market opportunities due to the crisis) by changing regulation (such as on fishing seasons, days at sea or total catch limits). It will also mean resolving practical challenges to the monitoring of fishing activities and enforcement of regulation (Chapter 5).

The OECD has been tracking the measures to support the seafood sector adopted in response to the COVID-19 pandemic. By the end of August 2020, 89 such government support measures had been identified across 27 countries and economies (including some measures adopted at the level of the European Union).[1] Associated support amounts were found for 40 of these measures, totalling USD 5.4 billion. However, many of these support policies –together worth USD 4.7 billion– are packages of measures that target the sector as a whole, including aquaculture producers, seafood processors and seafood distributors in addition to the fishing industry. The 28 support policies targeting fisheries only, that would normally fall under the scope FSE, total USD 404 million (and additional USD 61.8 million and USD 211.3 million were identified as, respectively, benefitting only aquaculture and distributors and processors).

Among the 49 support measures for which associated support value could not be established, 15 are concessional loans, totalling USD 1.9 billion. It is still unclear how these loans will benefit the sector and their implications for the total level of support provided, since the difference in interest rates between market and the proposed preferential rate (essential for calculating the value of support) is difficult to measure.

Therefore, the extent to which the envelope associated with COVID-19 support policies for the seafood sector will ultimately benefit fisheries, and how this support will materialise, remains uncertain. Increasing transparency in policy responses to allow public scrutiny would help build trust in the sector

and in policy responses, and enable countries to learn from each other's experiences in order to better prepare for the future. Information on responses to the crisis may also be an opportunity to accelerate transformations in the fisheries and aquaculture sector to build its resilience to future shocks. Any opportunities to attach 'blue strings' to support policies where appropriate should be taken.

Information on those policies that directly target fisheries is however encouraging. Most of these measures seem to have been designed to support fishers and fishing companies' revenues, not to lower the cost of inputs. Fee waivers have also been adopted, as well as marketing and promotion measures to make seafood products more accessible to consumers. In particular, governments seem to have supported the emergence of various services connecting directly individual fisheries to consumers (OECD, 2020[4]), in response to consumers' preferences for contactless deliveries. Such marketing approaches could be an opportunity to reinforce the resilience of fisheries markets to future disruption.

On the other hand, investment in education and training was not seen as being the focus of the policy packages reviewed. Directing some of the funds available in relief packages that have not been disbursed yet to such measures could be an opportunity to support fishers in adapting to a changing market environment beyond the crisis (as well as to other major sources of possible disruptions to seafood production such as environmental hazards related to climate change). Spending on improving capacity for management and monitoring, control and surveillance (MCS), and resilience of such essential services for the sustainability of the sector and its resource base in the face of severe shocks would also be welcome in many countries and at the regional level.

1. The 27 countries and economies for which were identified support measures for the seafood sector adopted in response to the crisis generated by the COVID-19 pandemic are: Australia, Canada, Chile, China, Chinese Taipei, Colombia, Costa Rica, Iceland, India, Indonesia, Ireland, Italy, Japan, Korea, Latvia, Mexico, New Zealand, Norway, Peru, Portugal, the Russian Federation, Sweden, Thailand, Turkey, United Kingdom, United States, and Viet Nam.

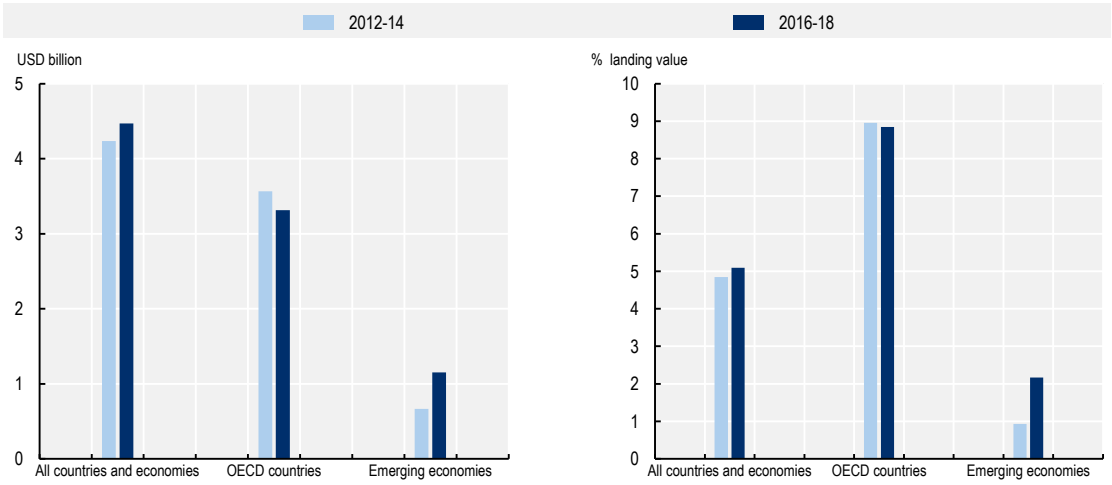
Support for services to the fisheries sector (SSS)

Overall support for services remains significantly higher in OECD countries than in emerging economies despite growing in the latter

A combined total of USD 4.8 billion was spent annually, on average, by all countries and economies in the FSE database, on financing services to the fisheries sector (SSS) in 2016-18 (Figure 4.2 left panel). An average of USD 0.29 billion was recouped across all countries via PMS over the same period. The annual average public cost of services to the fisheries sector – this being SSS once any PMS is accounted for (net SSS), was thus USD 4.5 billion, a 5.5% increase when compared to 2012-14 and one driven by SSS increasing more than PMS in absolute terms. Net SSS amounted to 49% of net total support in 2016-18, a marked increase from 33% in 2012-14.

Both the growth in net SSS and in the contribution of net SSS in net total support at the level of all countries and economies in the FSE database were driven by change in emerging economies. Emerging economies spent a total annual average of USD 1.2 billion financing SSS in 2016-18, while an average of USD 0.05 billion was recouped via PMS, making net SSS USD 1.15 billion. This is an almost USD 0.5 billion increase in SSS, from USD 0.7 billion in 2012-14. PMS changed little, from USD 0.05 billion in 2012-14 (so with such low levels of PMS in the periods considered, net SSS was almost the same as SSS. In absolute terms, the increase in SSS (and net SSS) in emerging economies was driven by China's increased spending, from USD 0.35 billion in 2012-14 to USD 0.97 billion in 2016-18; however spending also increased in all but two of the other emerging economies in the database. Changes to PMS were mixed, falling in two cases while increasing in three. Overall, at the level of emerging economies, net SSS jumped from 8% to 24% of net total support.

Figure 4.2. Net support for services to the sector (SSS) in recent years in absolute terms (left) and as a proportion of the value of landings (right)



Source: OECD datasets 'Fisheries Support Estimate (FSE)', 'Marine landings' (OECD.Stat).

OECD countries annually spent a total of USD 3.6 billion financing SSS, on average, in 2016-18, while an average of USD 0.24 billion was recouped via PMS over the same period. The annual average public cost of services to the fisheries sector, net SSS, was consequently USD 3.3 billion in 2016-18, down when compared to USD 3.6 billion in 2012-14 and driven predominantly by reduced spending on SSS rather than increased PMS. SSS fell in the majority of OECD countries while changes were mixed in terms of PMS. Overall, at the OECD level, net SSS increased from 74% to 76% of net total support.

As governments provide SSS to support the fishing sector as a whole, and needs for services are likely partly dependent on the size of each country's fleet, it is informative to consider the intensity of fisheries services financing relative to fleet size.[11] When all countries and economies in the FSE database are considered, USD 232 in SSS were granted for each gross tonne of fleet capacity in 2016-18, up from USD 213 per gt in 2012-14. Services financing relative to fleet size is generally higher (but decreasing) among OECD countries, at USD 521 per gt in 2016-18, per year on average, down from USD 569 per gt in 2012-14.[12] While both net spending on SSS and the overall size of the fleet fell at the OECD level over the period under consideration, net SSS fell by the greatest extent. A contrasting situation is observed for emerging economies, where annual spending was USD 107 per gt of fleet capacity in 2016-18, having more than doubled from USD 43 per gt in 2012-14 (driven by increased spending on SSS, as described above, outpacing growth in gt, which increased by 5.3%). Similar trends were observed at the level of individual emerging economies, where levels of services financing relative to fleet size were amongst the lowest but increasing in all cases.

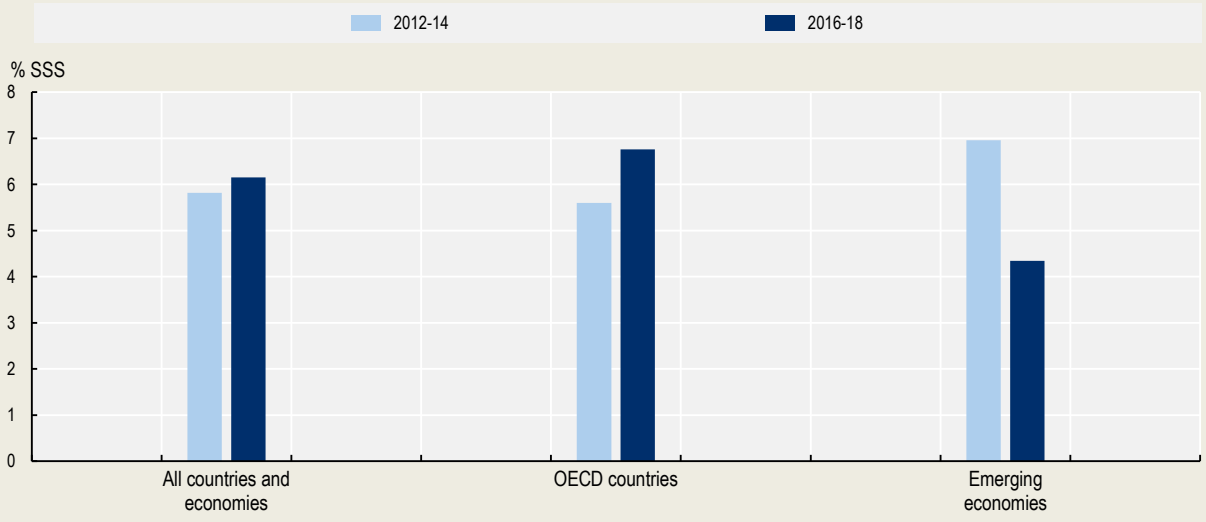
Spending on SSS also increased relative to the value of landings across all countries and economies in the FSE database, amounting to 5.1% of it in 2016-18, a slight increase from 4.8% in 2012-14 (Figure 4.2 right panel).[13] In absolute terms, and despite a small increase in the value of landings, this was again predominantly driven by net SSS increasing in emerging economies, where net SSS amounted to 2.2% of the value of landings in 2016-18, up from 0.9% in 2012-14. In OECD countries, net SSS generally fell and, at the aggregate level, this was in line with a reduction in the value of landings, resulting in the value of net SSS relative to landings changing little (8.8% in 2016-18, down from 9.0% in 2012-14).

Box 4.3. Payments made by the fisheries sector (PMS)

The fisheries' sector contributes in general only modestly to funding services to the sector

As certain activities or services are generally either best provided by governments, such as MCS, or potentially in partnership with industry, such as management, payments made by the fisheries sector (PMS) have an important role in ensuring the user pays, in reducing the extent to which taxpayers fund the fishing sector, but also in creating pressure for the cost-effective provision management services (Kauffman, 1997[8]). The sector's ability to fund a reasonable proportion of the costs of management also provides some indication of its economic performance.

Figure 4.3. Payments made by the fisheries sector as a proportion of spending on services to the sector (SSS) in recent years



Source: OECD dataset 'Fisheries Support Estimate (FSE)' (OECD.Stat).

Payments can be made by the fisheries sector to access and use resources or directly to pay for some services. While the absolute value of these PMS has increased at the level of both OECD countries and emerging economies, it has actually fallen in emerging economies when assessed as a proportion of SSS, from 7.0% in 2012-14 to 4.3% in 2016-18. At the OECD country level, PMS increased modestly from 5.6% of SSS in 2012-14 to 6.8% in 2016-18. A perhaps more intuitive way to think of this is that in 2016-18 the public was still funding 93% of services provided to the fishing industry in OECD countries and 96% in the emerging economies. Of all the countries and economies reporting PMS to the FSE database, Iceland is the only one where, once PMS are accounted for, net total support is completely offset (and actually negative); Costa Rica completely offset SSS in 2012 and 2013, while Viet Nam reports doing the same in 2016 (Annex Figure 4.A.1).

These trends should however be viewed with caution. Relatively few countries and economies reported PMS to the FSE database in 2016-18 (only 17 out of the 39, of which 11 OECD countries and 6 emerging economies). While payments by the sector are not undertaken in all countries, PMS are also believed to typically be less comprehensively reported in the FSE database than support policies. What is more, in

some countries, the need for PMS may be limited if the industry directly bears some or all of the cost of services (including those required by governments) rather than reimbursing government through PMS.[1]

1. For example, dockside monitoring and at-sea observers are funded privately by industry in Canada, and, while required by government, these costs are not tracked by government nor reported in the FSE. Where such services are publicly funded in the first place, with participation from industry, they would appear both in SSS and in PMS.

OECD countries report spending proportionally more (and increasingly) on management, control and surveillance than emerging economies, where spending on services was redirected to infrastructure

Some SSS aims to ensure the sustainability of the sector or improve fishing communities' well-being, while only indirectly supporting the intensity of fishing activities. For all countries and economies in the FSE database, such services, including management, control, and surveillance, accounted for an annual average of 48.9% of gross spending on SSS in 2016-18 (USD 2.3 billion), down from 57.4% (USD 2.6 billion) in 2012-14.

At the aggregate OECD level, support to these services accounted for 58.1% of gross spending on SSS in 2016-18 (USD 2.1 billion), up from 56.7% in 2012-14 (USD 2.1 billion) as a consequence of reduced overall spending on SSS. Support for management, control, and surveillance was the single largest form of support reported at the OECD level in 2016-18 (43.3% of total support), far ahead of support to infrastructure and fuel, which, respectively accounted for 19.1% and 10.1% of the reported total (Figure 4.1). In individual OECD countries (Annex Figure 4.A.2), support to management, control, and surveillance increased in most cases (and by large proportions in a few countries, notably France, Italy, Belgium, and the United Kingdom, but all from relatively low bases). A large proportional increase in support indirectly supporting the intensity of fishing activities was also seen in Lithuania, but this was predominantly driven by increased spending on fishing communities.

In emerging economies, the same services accounted for an average of 21.8% of gross spending on SSS in 2016-18 (USD 0.26 billion), down substantially from 61.2% in 2012-14 (USD 0.44 billion). The decrease was driven by reductions in reported spending on management, control, and surveillance by China (42%) and Brazil (94%) over the period considered as spending in this area increased in all but one of the remaining emerging economies (Annex Figure 4.A.2). Despite these reductions, support for management, control, and surveillance as a proportion of total support remained relatively unchanged at the emerging economy level, at 5.4% in 2016-18 compared to 5.3% in 2012-14, due to more general reductions in overall (absolute) levels of support in countries such as China, Brazil and Malaysia.

However, it is important to note that reporting amounts spent on management, control, and surveillance can be a challenging task as a number of authorities are typically involved. The contrast in the relative contribution of management, control, and surveillance to total support between OECD countries and emerging economies, probably partly reflects this. In addition, what represents an adequate level of public spending to ensure effective management and enforcement is highly context-specific and an area that would benefit from further investigation, especially as, in some settings, components of management, control, and surveillance may be directly funded by industry (and hence not captured in the FSE – see Box 4.3). Nevertheless, given the importance of ensuring such spending is sufficient to ensure it achieves its sustainability goals, and in the absence of other information, large reductions on spending over relatively short periods – and starting from already relatively low levels – raises concern.

Other SSS policies target fishers' ability to operate their businesses more efficiently or more sustainably, such as investment in education and training, marketing and promotion or research and development. These services accounted for an annual average of 13.6% of gross spending on SSS in 2016-18

(USD 0.65 billion), when all countries and economies in the FSE database are considered, almost unchanged from 13.2% in 2012-14 (USD 0.59 billion). At the OECD level, these services accounted for an average of 15.6% of gross spending on SSS in 2016-18 (USD 0.56 billion), up slightly from 14.1% in 2012-14 (USD 0.53 billion). For emerging economies, these services accounted for an average of 7.6% of gross spending on SSS in 2016-18 (USD 0.09 billion), down in terms of relative importance from 8.6% in 2012-14 (USD 0.06 billion) but up in absolute terms as SSS also increased. At the individual country level, one area where a number of OECD countries (notably Norway, the Netherlands, Iceland, New Zealand and Australia), along with Malaysia and Brazil, reported relatively high and stable allocations within SSS was in spending on research and development (Annex Figure 4.A.3).

Finally, some forms of support can have a more direct relationship with production capacity, such as investment in or subsidised access to infrastructure like ports. When infrastructure is publicly funded and costs are not recovered from the industry, the costs of fishing are reduced, and profits increased. Where management is not entirely effective at limiting fishing to sustainable levels, this can increase pressure on stocks by making fishing more attractive and drawing resources into the sector (OECD, 2006[9]). For all countries and economies in the FSE database, services of this type accounted for a total of 25.4% of gross spending on SSS in 2016-18 (USD 1.21 billion), up from 24.1% in 2012-14 (USD 1.08 billion). The increase resulted from a doubling in average annual spending on such services in emerging economies (from USD 0.14 billion in 2012-14 to 0.33 billion in 2016-18; which also led to an increase in their relative share of gross SSS from 19.8% to 27.5%). This was predominantly driven by absolute spending in this area by China increasing by USD 0.26 billion (completely offsetting a USD 68.5 million reduction by Brazil over the same time period). In OECD countries, spending on these services remained relatively stable at the aggregate level: they accounted for a total of 24.7% of financing of gross SSS in 2016-18 (USD 0.88 billion), down slightly in relative terms from 24.9% in 2012-14 (USD 0.94 billion). However, when country level changes are considered, the majority of OECD countries reported substantial reductions in support to infrastructure, which were largely offset by a combination of lower spending on SSS in general and increased allocations (in absolute terms) in this area by some countries – predominantly Canada, Mexico, Chile and Ireland (Annex Figure 4.A.4).

In theory, SSS should also include payments for access to foreign waters. However, such payments were not reported at all. This suggests total SSS figures are an underestimate and more transparency on payments for access to foreign waters should be encouraged.

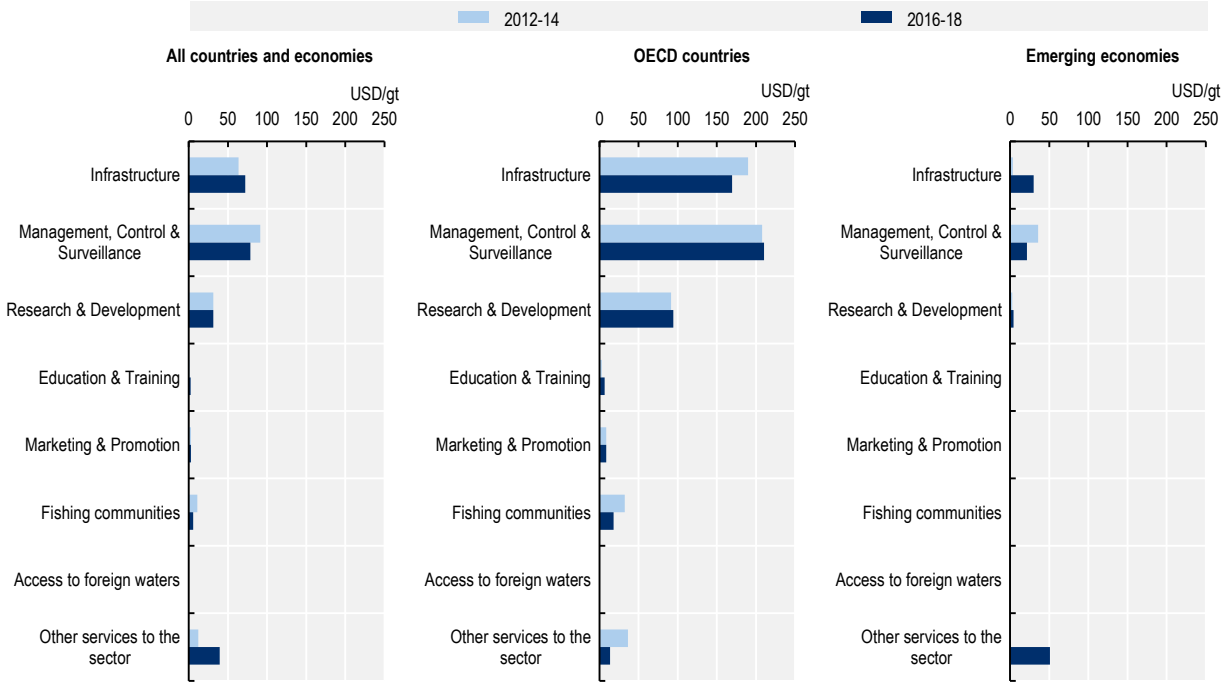
When the individual components of SSS are considered relative to the size of the fleet (Figure 4.4), higher intensity of spending at the OECD level compared to emerging economies occurs in all areas other than other services to the sector, and especially with respect to spending on management, control, and surveillance, infrastructure, and research and development. This pattern is more mixed but generally holds at the individual country level, some notable exceptions being relatively intensive spending (per gt) on management, control, and surveillance by Costa Rica and on research and development by Argentina. While partially a reflection of the relative consolidation of fishing fleets in many OECD countries, the general pattern of more intensive spending remains when these forms of support are considered as a proportion of the value of landings, suggesting a more widespread and intensive application of management, enforcement, and research programmes.

Trends are mixed at the OECD level. The intensity of spending on infrastructure, support to fishing communities and other services to the sector fell, while it remained stable or increased slightly for management, control, and surveillance, marketing and promotion, education and training, and research and development) (Figure 4.4).

When the components of emerging economies SSS are looked at in relation to fleet size, the greatest increases were in the intensity of support to other services to the sector and to infrastructure (Figure 4.4). At the same time, the intensity of support to management, control, and surveillance was reduced by 40%,

suggesting again that sustainability issues may be at stake in these countries (and worth considering in future policy choices). At the country level, these changes are again dominated by China, where support to other services grew from nothing in 2012-14 to USD 55 per gt in 2016-18, an intensity exceeded by only Poland at USD 76.2 per gt, following widespread reductions in this form of support by OECD countries. The intensity of support to infrastructure in China also increased, from USD 3.8 per gt in 2012-14 to USD 32.4 per gt in 2016-18 (Annex Figure 4.A.4). The intensity of support to management, control, and surveillance actually increased in all emerging countries other than China (Annex Figure 4.A.2).

Figure 4.4. Intensity of spending on services to the fisheries sector relative to fleet size in recent years



Note: For OECD countries, Canada and the United States are not included as no data was available on fleet size in gt for the period 2012-14. The figure for the emerging economies is based on data for Argentina, China, Costa Rica and Chinese Taipei.
Source: OECD datasets 'Fisheries Support Estimate (FSE)', 'Fishing fleet' (OECD.Stat).

Direct support to the fisheries sector (DSI)

Direct support to individual fishers and companies has fallen significantly following a steep downward trend in emerging economies (driven by China)

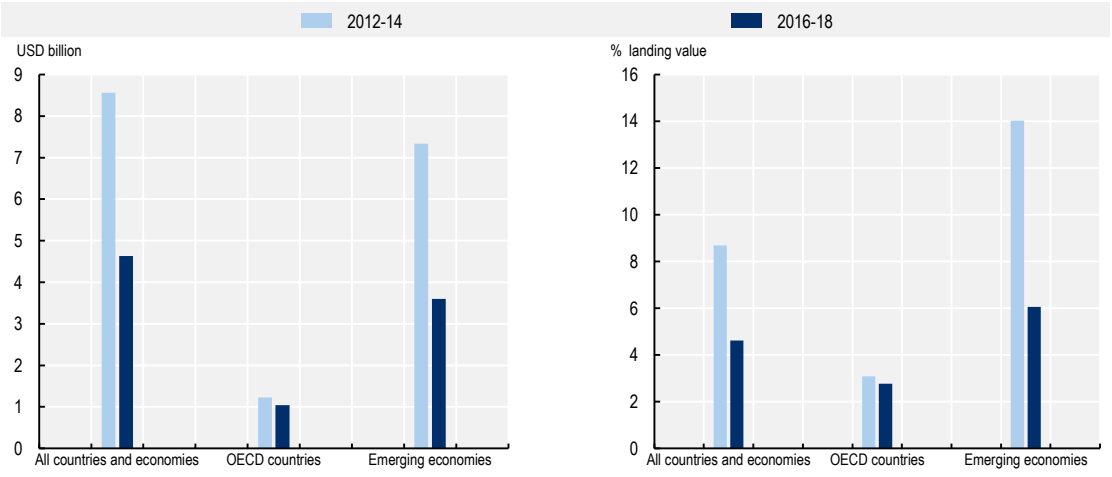
Direct support to individuals and companies in the fisheries sector (DSI) for all countries and economies in the FSE database totalled USD 4.6 billion per year, on average, in 2016-18 (Figure 4.5), a 46% reduction from the USD 8.6 billion reported in 2012-14. DSI amounted to 4.6% of the value of landings in 2016-18 (equating to just under 5 cents in every dollar of revenue the sector generated), approximately half the 8.7% reported in 2012-14.

This overall fall in direct support to fisheries is a result of a significant drop in emerging economies where DSI totalled USD 3.6 billion per year, on average, in 2016-18, half the USD 7.3 billion reported in 2012-14. This amounted to 6.0% of the value of landings in 2016-18, a substantial decrease from the 14.0% seen

in 2012-14. This was a consequence of the value of landings by emerging economies increasing by 15% and a reduction in their absolute spending on DSI, predominantly through a reduction in spending on fuel support in China.

At the OECD country level, DSI totalled USD 1.0 billion per year, on average, in 2016-18, down from USD 1.2 billion in 2012-14. This equated to 2.8% of the value of landings in 2016-18, a slight decrease from 3.1% in 2012-14 and an indication that DSI fell faster than the value of landings. At the individual country level, the intensity of DSI relative to value of landings fell in almost all OECD countries and generally increased only slightly when it did not, one exception being Poland which had the highest intensity of all countries and economies in the FSE database and this increased over the period considered.

Figure 4.5. Direct support to individuals and companies in the fisheries sector in recent years in absolute terms (left) and as a proportion of the value of landings (right)



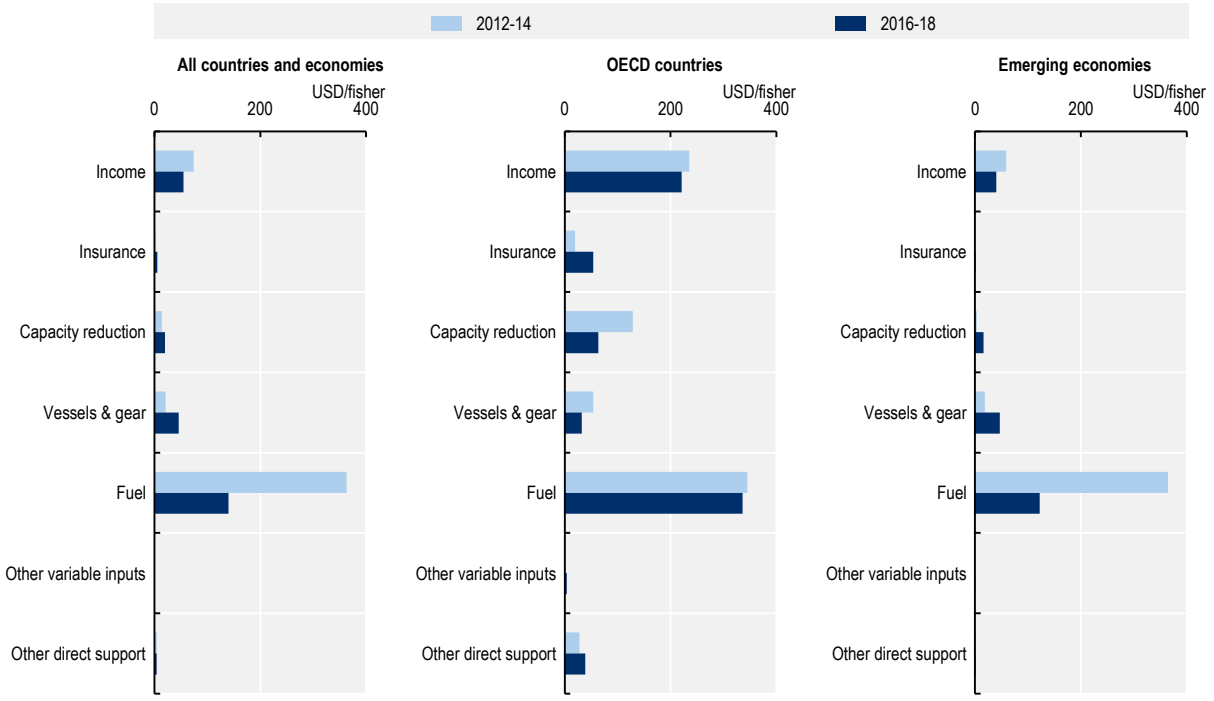
Source: OECD datasets 'Fisheries Support Estimate (FSE)', 'Marine landings' (OECD.Stat).

A common objective of direct support is to maintain or increase the incomes of fishers, both to support individual livelihoods as well as the economies of communities in which fishing income plays a significant role. The intensity of direct support at the level of all countries and economies in the FSE database was USD 270 per fisher in 2016-18, a reduction from USD 478 per fisher in 2012-14; a consequence of the general reductions in absolute spending on DSI by countries exceeding the concurrent reductions in employment at all levels.

While in absolute terms, OECD countries' DSI is less than a third of the DSI reported by emerging economies, the average level of support per fisher is much higher at the OECD level than in emerging economies (Figure 4.6). At the OECD level, USD 750 of support was granted, per fisher, in 2016-18, a relatively small reduction from USD 811 per fisher in 2012-14. Notable exceptions to this were Poland, the Netherlands, Sweden and Denmark, which had intensities of USD 25 000 or more per fisher, and, in all instances, this was predominantly support lowering the cost of inputs. DSI per fisher fell in most emerging economies, where, as a group USD 228 of support was granted, per fisher, in 2016-18, a substantial decrease from USD 447 per fisher in 2012-14. The large difference in average levels of DSI/fisher between OECD countries and emerging economies partly reflects relatively lower levels of employment in the fishing industry.[14] In 2016-18, the ratio of number of fishers per gt of fleet of fleet capacity was 0.3 at the OECD level, on average, while it was 0.9 at the level of emerging economies. Country-specific exceptions to these overall figures were Colombia (23.1), and to a lesser extent Mexico (1.0) and Chile (0.5) in the OECD,

where employment per gt was higher than the majority, and, Argentina (0.1), where it was considerably lower than in other emerging economies (Annex Figure 4.A.5).

Figure 4.6. Intensity of direct support to individuals and companies in the fisheries sector relative to the number of jobs in the sector in recent years



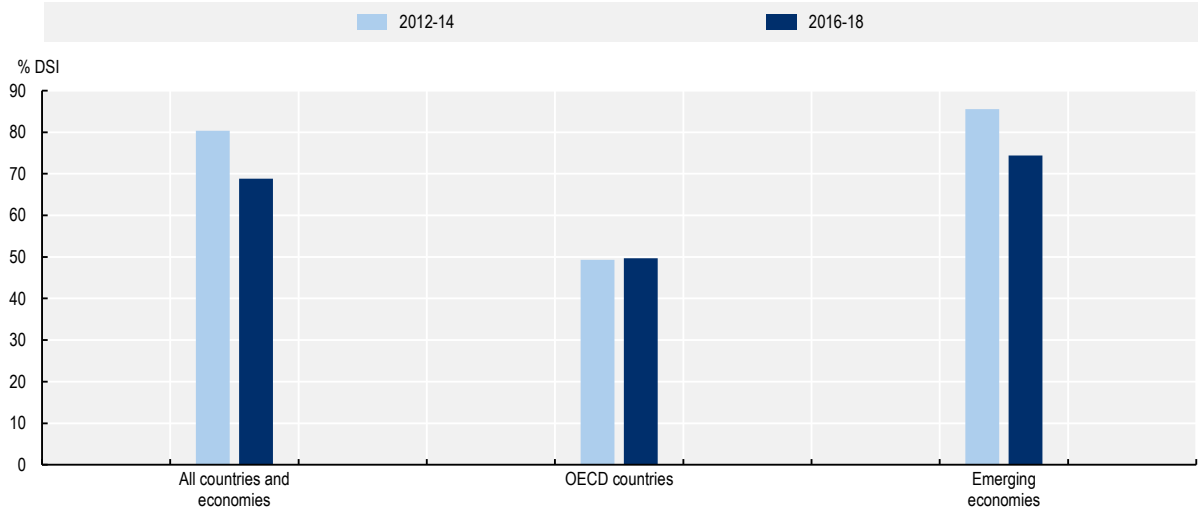
Source: OECD datasets 'Fisheries Support Estimate (FSE)', 'Employment' (OECD.Stat).

Direct support to fuel continues to account for the majority of direct support

DSI originates in a variety of policies. Some payments can be partially decoupled from fishing activities, such as income support and special insurance systems. Benefits can also be given in exchange for capacity reduction, such as through decommissioning schemes or payments for early retirement. Other policies are directed at lowering the cost of inputs. They include support for fuel, for other variable inputs (like payments to reduce the cost of ice or bait) and for fixed inputs (like payments for vessel construction and modernisation or the purchase of gear).

At the level of all countries and economies included in the FSE database, support directed at lowering the cost of inputs totalled USD 3.2 billion in 2016-18, accounting for 68.8% of reported DSI and 34% of total support. Support to fuel, alone, remains the single largest direct support policy both at the level of OECD countries and emerging economies. At the level of all countries and economies reporting to the FSE database, almost as much support is being provided to reducing the cost of fuel as is spent on management, control and surveillance (Figure 4.1).[15] Furthermore, this may represent an underestimate, as some countries have fuel support policies that apply equally to fisheries and other sectors such as agriculture, and these countries and economies may not report these amounts to the FSE database considering that they are not fisheries-specific support policies.

Figure 4.7. Proportion of direct support to individuals and companies in the fisheries sector (DSI) that lowers the cost of inputs in recent years



Note: Support to fuel often being non-specific to fisheries, as the same policy sometimes also apply to other sectors such as agriculture, a number of countries and economies reporting to the FSE database do not include it in their reporting, which affects the relative total support to inputs.
Source: OECD dataset 'Fisheries Support Estimate (FSE)' (OECD.Stat).

The trend is however downwards, with the relative share of input support having fallen from 80.4% of DSI in 2012-14 (USD 6.9 billion) (Figure 4.7). This positive trend resulted from a reduction in the share of input support in DSI in emerging economies; where, however, this share remains much higher than in OECD countries on average. In emerging economies, the proportion of DSI lowering the cost of inputs was 74.4% in 2016-18 (USD 2.7 billion), having fallen from 85.6% in 2012-14 (USD 6.3 billion). This 11.2% reduction in relative contribution was despite absolute spending on DSI in the emerging economies having halved over the same period (Figure 4.5), and reflects a general shift away from policies to decrease fuel costs fuel in these countries. The magnitude of China's fisheries support means it dominates these reductions in absolute terms, as it accounts for just under 98% of the emerging economies' total for policies directed at lowering the cost of inputs. However, as shown in Annex Figure 4.A.7, comparable reductions are also observed in most other emerging economies that report this form of support (Brazil, Costa Rica, Malaysia).

Nonetheless, support for fuel remained the single largest form of support reported at the emerging economy level in 2016-18, making up 40.2% of total support (SSS + DSI), followed by support to vessels and gear and income support, which respectively account for 15.5% and 13.2% of the total. The increase in support to vessels and gear, albeit to a far smaller level, is potentially a cause of concern (Figure 4.1). Again, China's policies dominate the trend, with increasing support in this area of almost USD 0.5 billion between 2012-14 and 2016-18, while most other emerging economies reduced spending on vessels and gear (Indonesia by USD 46 million).

In OECD countries, altogether, the relative contribution of support to inputs remained stable, at 49.7% of DSI in 2016-18 (USD 0.5 billion) compared to 49.3% in 2012-14 (USD 0.6 billion), as spending in this area fell in-line with a relatively modest reduction in DSI more generally (Figure 4.5). The picture is far more mixed at the individual country level. About half of OECD countries reported that support to inputs comprised over 70% of total DSI. In most cases, these were the countries that reported support to fuel.

When considering support to fuel in terms of the value of landings, the picture is similar to that observed in absolute terms. In 2016-18, support to fuel as a proportion of landings value was lower and relatively stable for OECD countries (at 1.2%, compared to 1.3% in 2012-14) whereas it was higher but in decline for the emerging economies (at 4.0%, substantially down from 13.2% in 2012-14 – this change being entirely the result of China reducing the level of support to fuel). In those OECD countries that do not report zero for fuel support, support to fuel as a proportion of landings value was generally in excess of 10% (Annex Figure 4.A.7).

Conversely, annual support to inputs per fisher is, on average, significantly higher in OECD countries (USD 336) than in emerging economies (USD 122) (Figure 4.6).[16] Support to fuel again dominates the picture, and, in some OECD countries, tens of thousands of USD per fisher are reported (Annex Figure 4.A.7). Given the unequal nature of reporting support to fuel, extreme care should be taken in interpreting differences across countries.

Partially decoupled payments on average account for just under a quarter of spending on DSI

For all countries and economies in the FSE database, partially decoupled payments (income support and special insurance systems), accounted for an average of 22.3% of spending on DSI, per year, in 2016-18 (USD 1.0 billion). This is an increase in terms of its relative contribution, from 15.9% (USD 1.4 billion) in 2012-14, despite a reduction in actual levels of spending.

At the OECD level, partially de-coupled payments accounted for 36.7% of spending on DSI in 2016-18 (USD 0.4 billion), also up in relative terms from 31.4% (USD 0.4 billion) in 2012-14, but unchanged in terms of absolute spending. The picture was mixed at the country level, with some countries reporting notably higher proportions of de-coupled payments in their DSI in 2016-18: Canada (100% stemming from support to income), the United States (97%, stemming from support to insurance) and Germany (63%, stemming from support to income) (Annex Figure 4.A.6). In contrast, seven countries did not report any de-coupled payments, and, in others, this form of support accounted for no more than 27% of DSI in all but one case (Portugal 41%).

For the emerging economies, partially de-coupled payments represented 18.1% of spending on DSI, per year, in 2016-18 (USD 0.7 billion), again up in relative contribution, from 13.3% (USD 1.0 billion) in 2012-14, but down in absolute terms. Country level data is somewhat mixed, with Viet Nam, Indonesia and Brazil all reporting proportions at or close to 100%.

Support that is partially decoupled from fishing activities is potentially the least harmful DSI for sustainability and the most directly beneficial to fishers. Upwards trends in their proportional contributions to DSI at the level of both the OECD and emerging economies are thus encouraging. However, while there are exceptions, predominantly in the individual countries identified above, the amounts reported are generally relatively low in absolute terms. In most cases they are also second to support lowering the cost of inputs, which are, conversely, those that are most likely harmful to sustainability and the least effective at supporting individual fishers.

Finally, payments to reduce fishing capacity, such as decommissioning schemes or payments for early retirement, accounted for an average of 7.3% of spending on DSI by all countries and economies in the FSE database in 2016-18 (USD 0.3 billion), up from 2.9% in 2012-14 (USD 0.3 billion). This overall trend reflects contrasting developments in the OECD and in emerging economies. At the OECD level, payments aiming to reduce capacity accounted for an average of 8.5% of spending on DSI in 2016-18 (USD 0.1 billion), down from the 15.9% observed in 2012-14 (USD 0.2 billion). In emerging economies, they accounted for an average of 7.0% of DSI in 2016-18 (USD 0.3 billion), an increase from 0.8% in 2012-14 (USD 0.1 billion) that was driven by an almost USD 0.2 billion increase in spending on capacity reduction by China (offsetting a USD 1.5 million reduction in Chinese Taipei). Such support fell in absolute

terms in most other countries and economies in the FSE database, but continues to represent the majority of DSI in a number of them (Greece, Australia, Italy, Spain, Japan). Policies such as decommissioning schemes have been found to be ineffective in reducing capacity in many instances. If not carefully planned and implemented, as a component of comprehensive policy reform, there is a significant risk of the capital re-entering the industry and ultimately increasing capacity (Parker et al., 2018[5]; OECD, 2009[10]). Increases in these forms of support consequently represent potential risks to sustainability.

4.4. Support to fisheries and agriculture

Policy makers face a number of similar objectives and constraints when designing support policy packages for fisheries and for agriculture, given that both sectors combine labour, capital and natural resources to deliver food. Reflecting these common challenges, 60% of countries that replied to a recent survey on governance of the fisheries sector reported that both agriculture and fisheries are led by the same authority (Chapter 5).[17]

Recent OECD work has formulated objectives and constraints as a "triple challenge for the global food system": to ensure food security and nutrition for all; provide livelihoods to food producers; and to do all this while using natural resources sustainably, limiting ecosystem and biodiversity impact as well as greenhouse gas emissions as much as possible and meeting other societal expectations such as animal welfare or cultural preferences (OECD, 2020[11]). The agricultural sector is therefore also faced with the challenge of re-directing support to least environmentally harmful and economically less-distorting policies (Henderson and Lankoski, 2019[12]) while accompanying such support policy re-orientation with environmental regulation to tackle the negative environmental externalities and maximise the societal benefits of the food system (OECD, 2020[13]). A comparison of the level and structure of support across the two sectors sheds some light on differences in the way in which these common challenges are being addressed.

Support for services to fisheries and agriculture

The OECD uses a Total Support Estimate (TSE) framework for measuring and classifying support to agriculture. On this basis, the OECD agricultural policy monitoring and evaluation (most recently reported in (OECD, 2020[14])) provides insights into the complex nature of agricultural support policy.

In this framework, the General Services Support Estimate (GSSE) is akin to the SSS in the FSE database. It covers payments to eligible private or public services provided to agriculture generally, where primary agriculture is the main beneficiary. They notably include payments to finance agricultural knowledge and innovation, training, food inspection and control, infrastructure, marketing and promotion, as well as public stockholding of food reserves. Just like SSS, the GSSE contains some elements of what economists would identify as investments in public goods and common resources – notably in relation to knowledge building and preserving biodiversity, resources and eco-systems, but there is heterogeneity within both GSSE and SSS and not all expenditures in these categories meet these definitions.

For comparability, indicators of support to services to fisheries and agriculture are considered relative to the value of production (value of landings for fisheries), whereby:

- GSSE/prod value = GSSE / value of agricultural production
- SSS/prod value = SSS / value of landings

Box 4.4. The OECD database on support to agriculture

The OECD has developed agriculture support indicators that express agricultural policy measures with numbers in a comparable way across time and between countries. Agricultural support is defined as the annual monetary value of gross transfers to agriculture from consumers and taxpayers, arising from governments' policies that support agriculture, regardless of their objectives and their economic impacts.

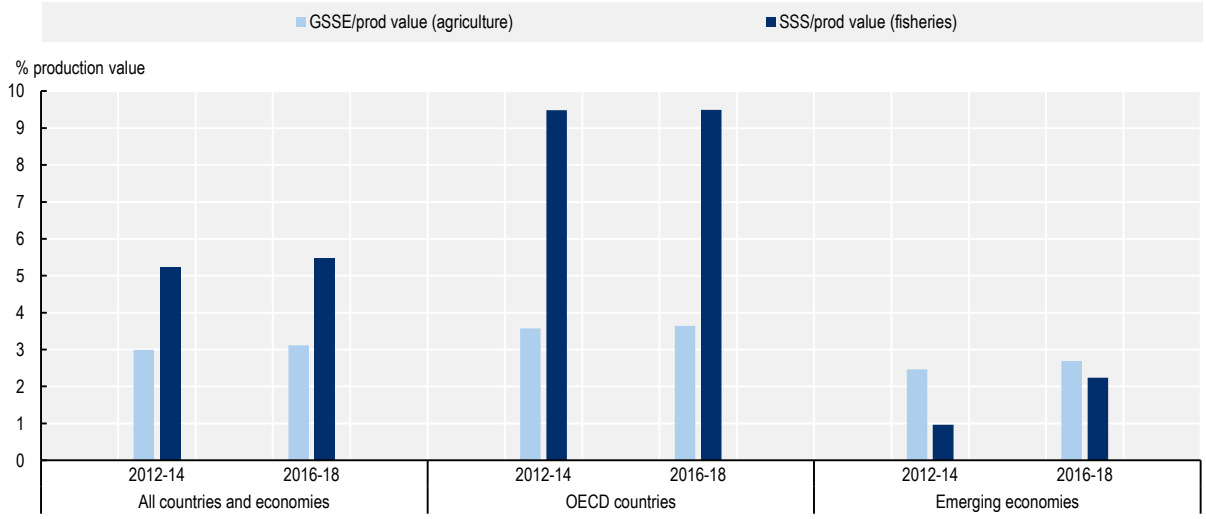
- **Total Support Estimate** (TSE) transfers consist of:
  - Transfers to agricultural producers measured by the **Producer Support Estimate** (PSE), which include, market price support, budgetary payments and the cost of revenue foregone by the government and other economic agents.
  - Transfers to consumers of agricultural goods measured by the **Consumer Support Estimate** (CSE)
  - Support to general services to agricultural sector measured by the **General Services Support Estimate** (GSSE).
- The **Percentage Total Support Estimate indicator** (%TSE) represents the total of policy transfers to agricultural sector expressed as a share of GDP.
- The **Percentage Producer Support Estimate** (%PSE) represents policy transfers to agricultural producers, measured at the farm gate and expressed as a share of gross farm receipts.
- The OECD database of agricultural support covers 37 OECD countries and the five non-OECD EU Member States, as well as twelve emerging economies: Argentina, Brazil, China, Costa Rica, India, Indonesia, Kazakhstan, the Philippines, the Russian Federation, South Africa, Ukraine, and Viet Nam

Source: (OECD, 2020[14]).

At the level of the 33 countries and economies included both in the FSE and PSE databases,[18] for fisheries, the SSS/prod value was 5.5% in 2016-18, essentially unchanged from 2012-14. For agriculture, the GSSE/prod value was 3.1% in 2016-18, slightly up from 3.0% in 2012-14. For both fisheries and agriculture, support for services as a share of production value is, on average, greater at the level of OECD countries than at the level of emerging economies over the period assessed, but that difference is much more pronounced for fisheries than for agriculture (Figure 4.8).

While the SSS/prod value is considerably higher than the GSSE/prod value for the OECD countries as a whole in all periods considered, at the level of emerging economies, on average, GSSE/prod is moderately higher. In fact, the pattern for emerging economies is the result of a large differential between GSSE/prod and SSS/prod in Indonesia, compensating for relatively greater SSS/prod in other emerging economies (Annex Figure 4.A.9). Among OECD countries, Korea is a notable exception, as the GSSE/prod largely outpaces SSS/prod. Furthermore, while support for services as a share of production value at the level of emerging economies has increased for both fisheries and agriculture, the rate of increase in the SSS/prod value has outpaced that of the GSSE/prod value, resulting in the convergence in the two figures in 2016-18 (Figure 4.8).

Figure 4.8. Support for services to agriculture and fisheries as a share of their respective production value in recent years

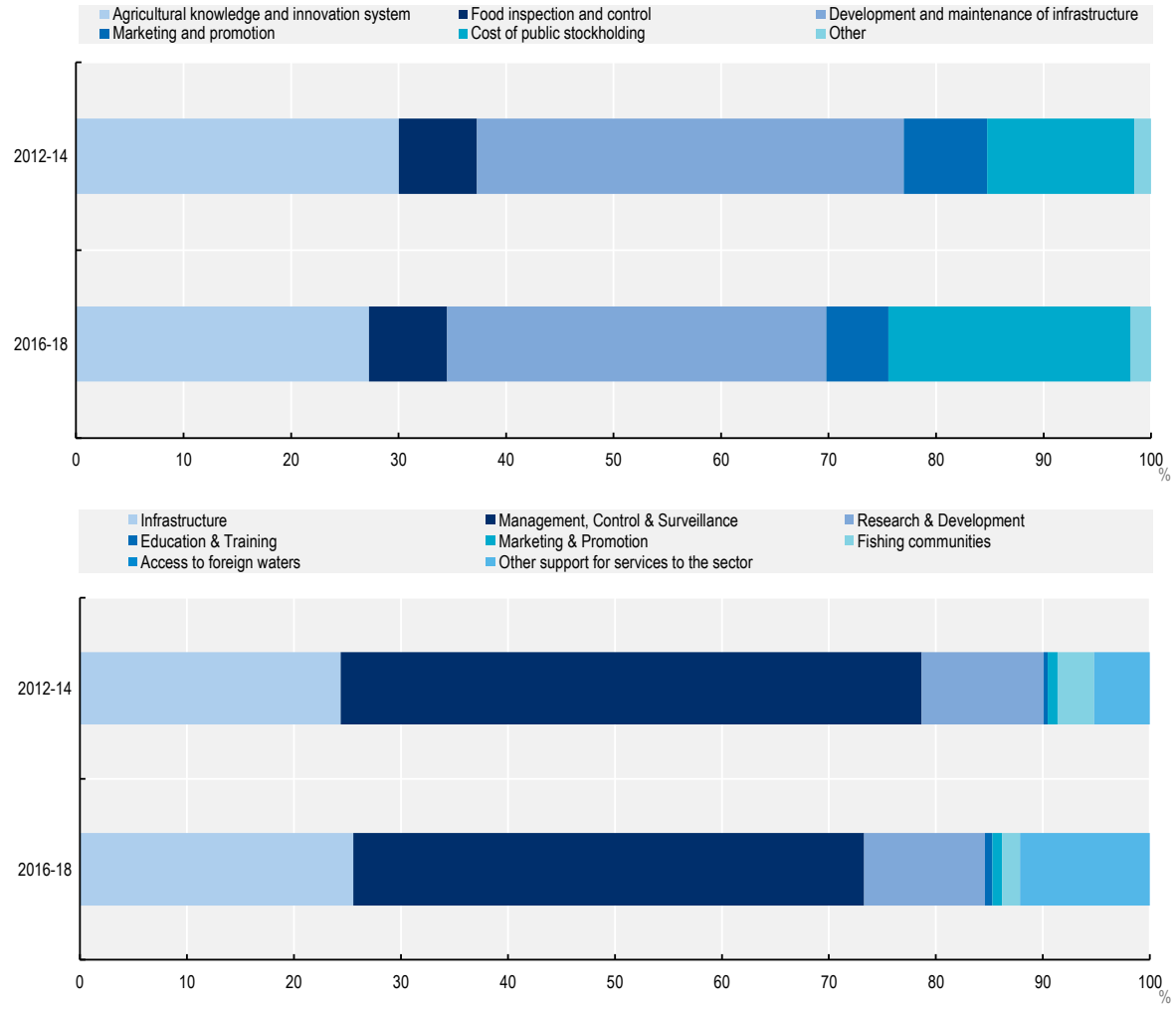


Note: For fisheries, production value corresponds to the value of landings
Source: OECD dataset 'Fisheries Support Estimate (FSE)', 'Marine landings, 'Producer and Consumer Estimates' (OECD.Stat).

For agriculture, the areas of biggest spending on services are infrastructure and research and development (labelled 'agricultural knowledge and innovation system' in the PSE classification), which respectively account for 35.3% and 27.3% of GSSE in 2016-18 on average. The share of spending on research and development has however decreased since 2012-14, while spending on public stockholding increased significantly to make up 22.6% of GSSE in 2016-18 (Figure 4.9).

For fisheries, as described in Section 4.3.2, nearly half of SSS in fisheries went to management, control, and surveillance in 2016-18. This reflects the costly nature of tracking what is happening at sea, something that is key to fisheries and ocean sustainability. On the other hand, spending on infrastructure and research and development is constantly lower than GSSE, even if support to education and training is added to the latter in an analogy with how support is classified in the GSSE. Moreover, on average, the share of services support to marketing and promotion is much larger for agriculture[19] – 13.5% in all periods considered, compared with only 0.9% for fisheries.

Figure 4.9. The composition of support for services to agriculture (top) and fisheries (bottom) in recent years



Source: OECD datasets 'Fisheries Support Estimate (FSE)', 'Producer and Consumer Estimates' (OECD.Stat).

Budgetary direct support to fisheries and agriculture

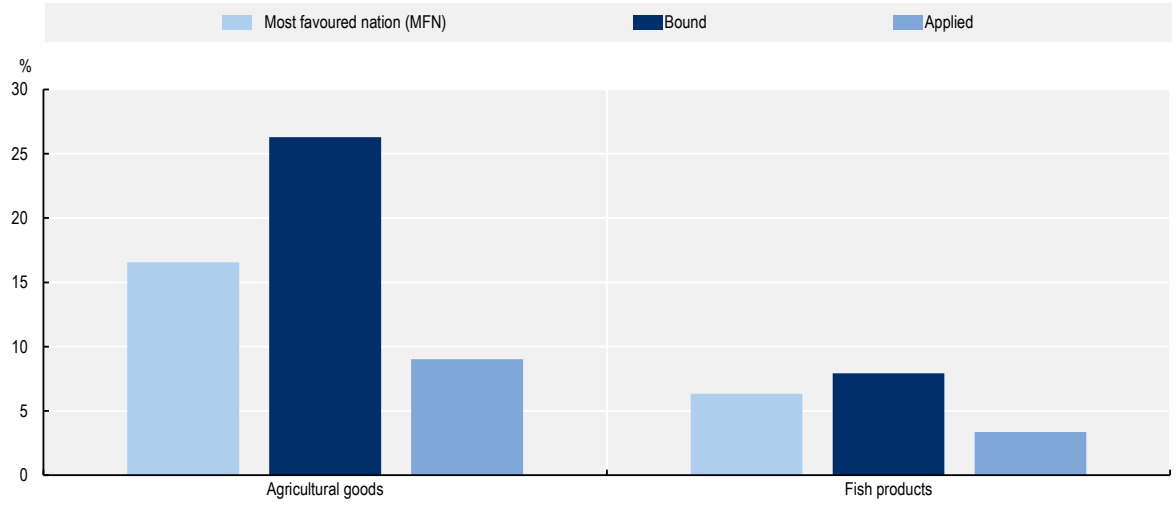
The PSE component of the TSE framework reports government support that accrues directly to individuals or businesses in agriculture, equivalent to the fisheries DSI. One key difference is however that the PSE also accounts for market price support (MPS), which is the monetary value of support stemming from a range of trade and domestic policies that materialize in price differentials at the border. Trade policies generating MPS include tariffs, but also non-tariff measures (NTMs), which affect the price of traded products and the quantities traded, including regulations related to sanitary and phytosanitary (SPS) requirements and technical barriers to trade (TBT), which set specific requirements for products to be sold in a given market.[20] Domestic policies generating MPS include those that affect industry organisation and competition, as well as marketing and price regulations. The FSE database currently does not include an MPS component because comparing "like with like", in terms of prices, is particularly difficult for fish products – in particular because of their variety and the price implications of certain product characteristics

(for example whether the fish were caught or raised on an aquaculture farm), which are not easily tractable in trade data at present.[21]

When all countries and economies included both in the FSE and PSE databases are considered, MPS accounted for about 56% of direct support to agriculture in 2016-18 (stable compared to 2012-14). On average, tariffs imposed on fish products are lower than those imposed on agricultural products – whether most favoured nation (MFN), bound or applied tariffs are considered (Figure 4.10). This suggests that MPS is likely to be of lower magnitude for fish products.

However, as stated above, MPS also depends on NTMs, on domestic policies that generate price gaps, and on the extent to which products are tradable. The relevance of NTMs to trade in agricultural and food products was recently investigated by the OECD (OECD, 2020[15]). For animal products (including fish products), it was found that SPS and TBT requirements, as well as quantity control measures have the greatest impact on traded prices, and the impact of these types of NTMs are, on average, higher than for other agricultural products (vegetables and fruits, fats and oils, and processes foods). Available data however does not allow comparing the effect of NTMs on fish products and other animal products (such as live animal, meats, dairy products, eggs and honey). To our knowledge, there is also no evidence of the extent to which domestic policies might imply induced price support for fisheries products. Further work is thus needed to investigate the extent to which MPS is an issue for fish value chains, and how it compares between land-based and water-based food products.

Figure 4.10. Tariffs on agricultural goods and fish products, 2018



Note: The 'MFN tariff' is the non-discriminatory tariff charged on imports from other members of the WTO, excluding preferential tariffs under free trade agreements (FTAs). The 'bound tariff' represents specific levels beyond which WTO members committed not to increase the MFN tariffs. The 'applied tariff' accounts for preferential tariffs under FTAs.
Agricultural goods refer to the WTO definition, and fish products include all products in chapter 03 of the HS classification (this includes both products from fisheries and from aquaculture, which are not distinguished). Tariffs are weighted according to products' share in the total imports of all countries. Tariffs also include ad valorem equivalents of non-*ad valorem* import duties.
Source: Tariff dataset (WITS - World Integrated Trade Solution).

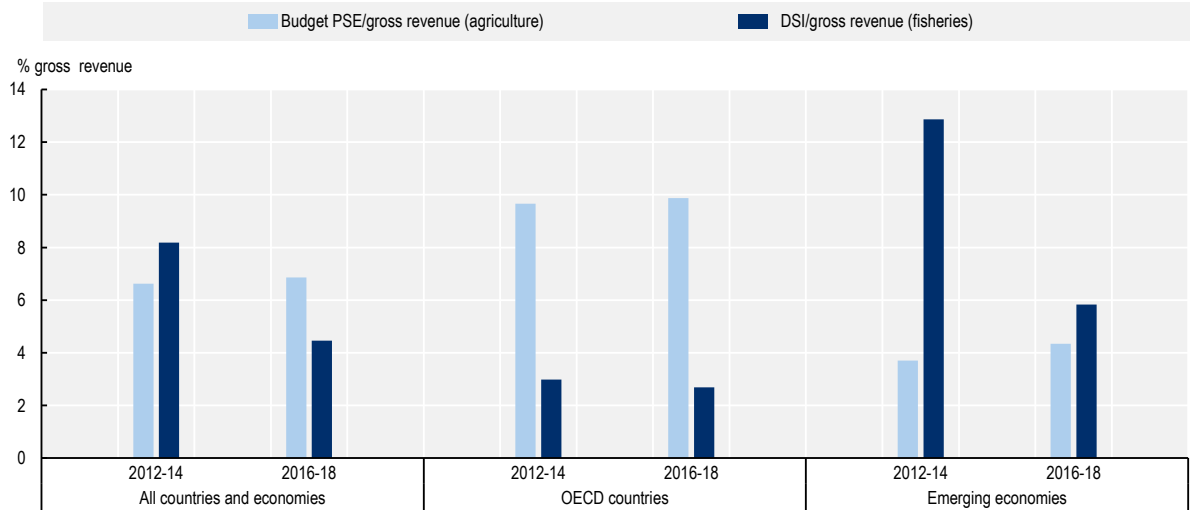
In what follows, for comparability, the MPS component of the PSE is not considered. The comparison between direct support to fisheries and agriculture focuses on budgetary support (including tax exemptions). The indicators are also considered relative to each sector's gross revenue, whereby

- Budget PSE/gross revenue = PSE net of MPS / (value of agricultural production + PSE net of MPS)
- DSI/gross revenue = DSI / (value of landings + DSI).

At the level of all countries, for fisheries the DSI/gross revenue was 4.5% in 2016-18, having almost halved from 8.2% in 2012-14. In agriculture, the budget PSE/gross revenue was 6.9% in 2016-18, up from 6.6% in 2012-14.

For the OECD countries as whole, the budget PSE/gross revenue exceeds the DSI/gross revenue in all periods considered, while the opposite picture is seen at the level of emerging economies, where the DSI/gross revenue is consistently highest. Furthermore, DSI/gross revenue has been trending down in both country groups over the period assessed, but the reverse is observed for agriculture, where budget PSE/gross revenue has increased at both the OECD and emerging economies levels, reflecting a decoupling of support in several countries. Among OECD countries, Canada, Colombia, and Turkey stand as exceptions, with DSI/gross revenue largely outpacing budget PSE/gross revenue. Among the emerging economies, Indonesia is also an exception, with PSE/gross revenue largely outpacing DSI/gross revenue.

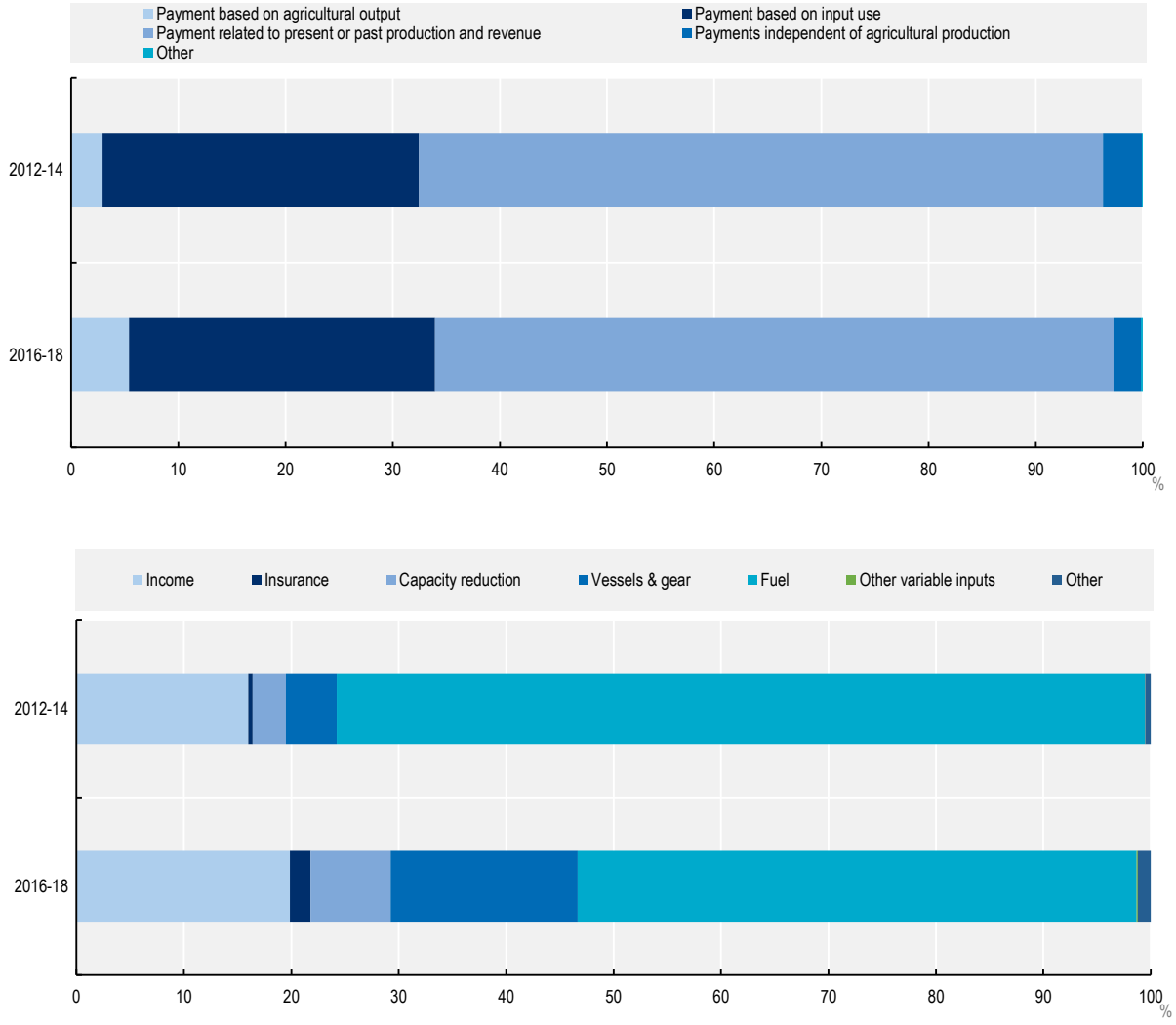
Figure 4.11. Direct budgetary support to agriculture and fisheries as a share of their respective gross revenue in recent years



Source: OECD datasets 'Fisheries Support Estimate (FSE)', 'Marine landings', 'Producer and Consumer Estimates' (OECD.Stat).

As discussed in Section 4.3.3, for fisheries, direct support has seen a move away from policy support to fuel, particularly in China and other emerging economies as well as an upwards trend in the relative rate of transfers that are partially de-coupled from fishing activities, such as income support and special insurance systems, at the level of all countries and economies in the FSE database. Conversely, the composition of budgetary direct support to agriculture has remained relatively unchanged over the period assessed (Figure 4.12), suggesting a slowdown in agricultural support policy reforms that is also confirmed by data covering the past decade, especially in OECD countries (OECD, 2020[14]).

Figure 4.12. The composition of budgetary support to agriculture (top) and fisheries (bottom) in recent years



Note: For agriculture, the budgetary support shown is budget PSE (net of MPS)
Source: OECD datasets 'Fisheries Support Estimate (FSE)', 'Producer and Consumer Estimates' (OECD.Stat).

4.5. Conclusion

Government support to the fisheries sector seeks to pursue a range of objectives, which include maintaining coastal employment, improving fishers' welfare and ensuring the sustainability of an important food sector. In pursuit of these objectives, some types of government support to fisheries, in particular contexts, can also build excess fishing capacity, lead to unsustainable fishing and ultimately harm fish resources and their ecosystems. When this happens, support becomes detrimental to the resilience of the very sector government is trying to help. In addition, some policies do not always address their socio-economic objectives in an efficient or equitable way.

Analysing the current support policy mixes being used, their magnitude, the context in which they are being applied, and their potential impacts in terms of different policy objectives, this chapter has identified priorities to reform fisheries support policies such that, at a minimum, they should not compromise the sustainable use of resources, in line with SDG 14 objectives. It has also found room for redirecting support to achieve greater effectiveness and equity in supporting those in need in the fisheries sector.

Between 2012-14 and 2016-18, the total average annual support reported to the OECD FSE database has decreased to about 10% of the average value of landings (down from 13.8%). This resulted from a significant reduction in direct support to individuals and companies, which almost halved in US dollar terms between 2012-14 and 2016-18. The share of this direct support that reduces the cost of inputs, which generally has the worst potential impact in terms of sustainability and the lowest efficiency in transferring income to fishers, fell from 80% to 69%. An important driver of these trends was a reduction in support to fuel for fisheries in China, the country with the world's largest fisheries sector. Similar trends were seen in a number of other countries and economies.

Over 2016-18, however, on average, USD 3.2 billion was still spent annually to lower the cost of inputs (in particular fuel and vessels). Support to fuel, alone, on average remains the single largest direct support policy, accounting for 25% of total support to the sector. Conversely, less than a third of that amount (USD 1.0 billion) was granted in support that is partially de-coupled from fishing activities – such as income support and special insurance systems – which are potentially less harmful for sustainability and the most directly beneficial to fishers.

Moving support policies away from those that support inputs towards those that help fishers operate their businesses more effectively and increase their profitability, would reduce negative impacts on the biological sustainability of fish resources, increase fisher welfare and the quantity of fish produced, and reduce inequitable effects across fleet segments.

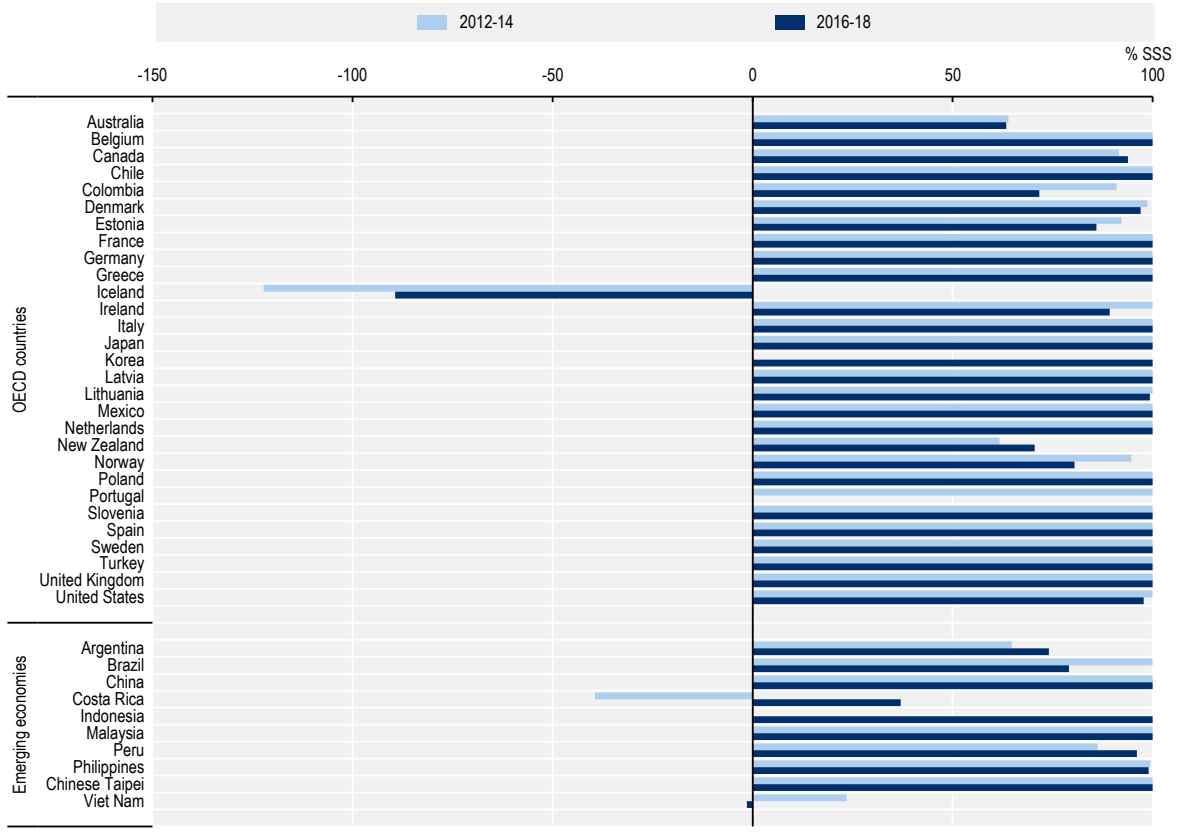
Another key area of concern is how the intensity of spending on services to the fisheries sector, relative to fleet size, has evolved in some countries. Between 2012-14 and 2016-18, the intensity of support to infrastructure – which can encourage overcapacity and fishing – has increased in some countries. At the same time, the intensity of spending on management, control and surveillance – which is essential to enforce sustainable fishing practices and prevent illegal fishing from taking place – has fallen substantially in a number of countries.

Effectively managing fisheries that remain uncontrolled, including in the high seas, and eradicating illegal fishing is essential if support policy reforms are to effectively contribute to domestic and shared international goals. Support is better at achieving its socio-economic goals under effective systems of fisheries management while weak management compounds the negative effects of policies that encourage overfishing and other unsustainable practices.

Finally, reforms to fisheries support policies – in common with agricultural support reforms – also have the potential to contribute to wider objectives for food systems, which include providing food security and nutrition, generating economic opportunities along the food chain, and limiting the environmental footprint of food production. They are key components of policy efforts to improve well-being in coastal areas (in similar ways as agricultural policy reform is key to improve well-being in rural areas) and have the potential to contribute SDGs beyond SDG14, in particular those relating to climate, poverty and food.

Annex 4.A. Country-level support data on selected types of support policies

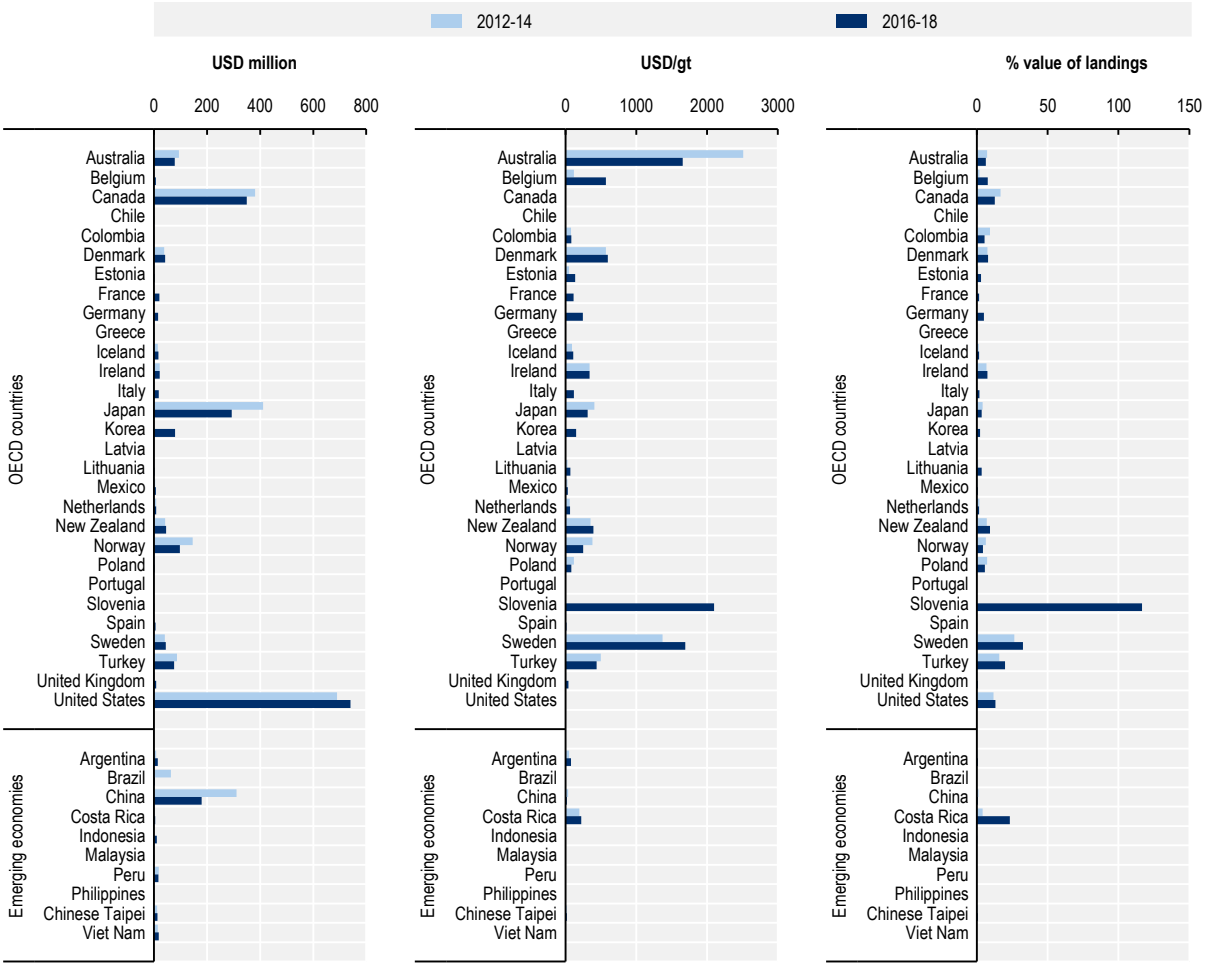
Annex Figure 4.A.1. Proportion of spending on services to the fisheries sector (SSS) funded by public money in recent years



Note: The spending on SSS funded by public money are those that are not offset by payments made by the sector.
Source: OECD dataset 'Fisheries Support Estimate (FSE)' (OECD.Stat).

Annex Figure 4.A.2. Support to management, control and surveillance in recent years

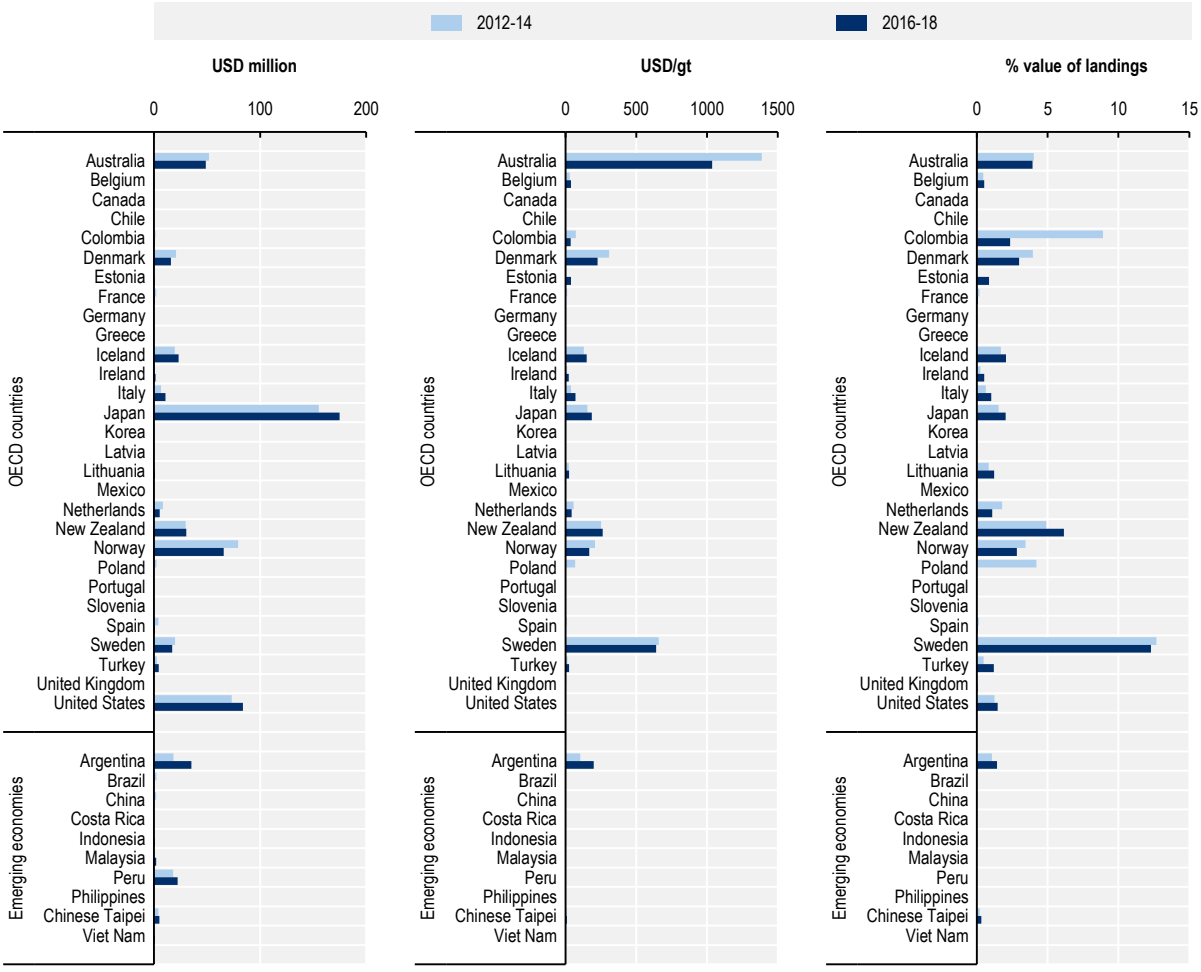
Absolute terms (left), by gross ton of fleet capacity (middle) and in proportion of the value of landings (right)



Source: OECD datasets 'Fisheries Support Estimate (FSE)', 'Fishing fleet', 'Marine landings' (OECD.Stat).

Annex Figure 4.A.3. Support to research and development in recent years

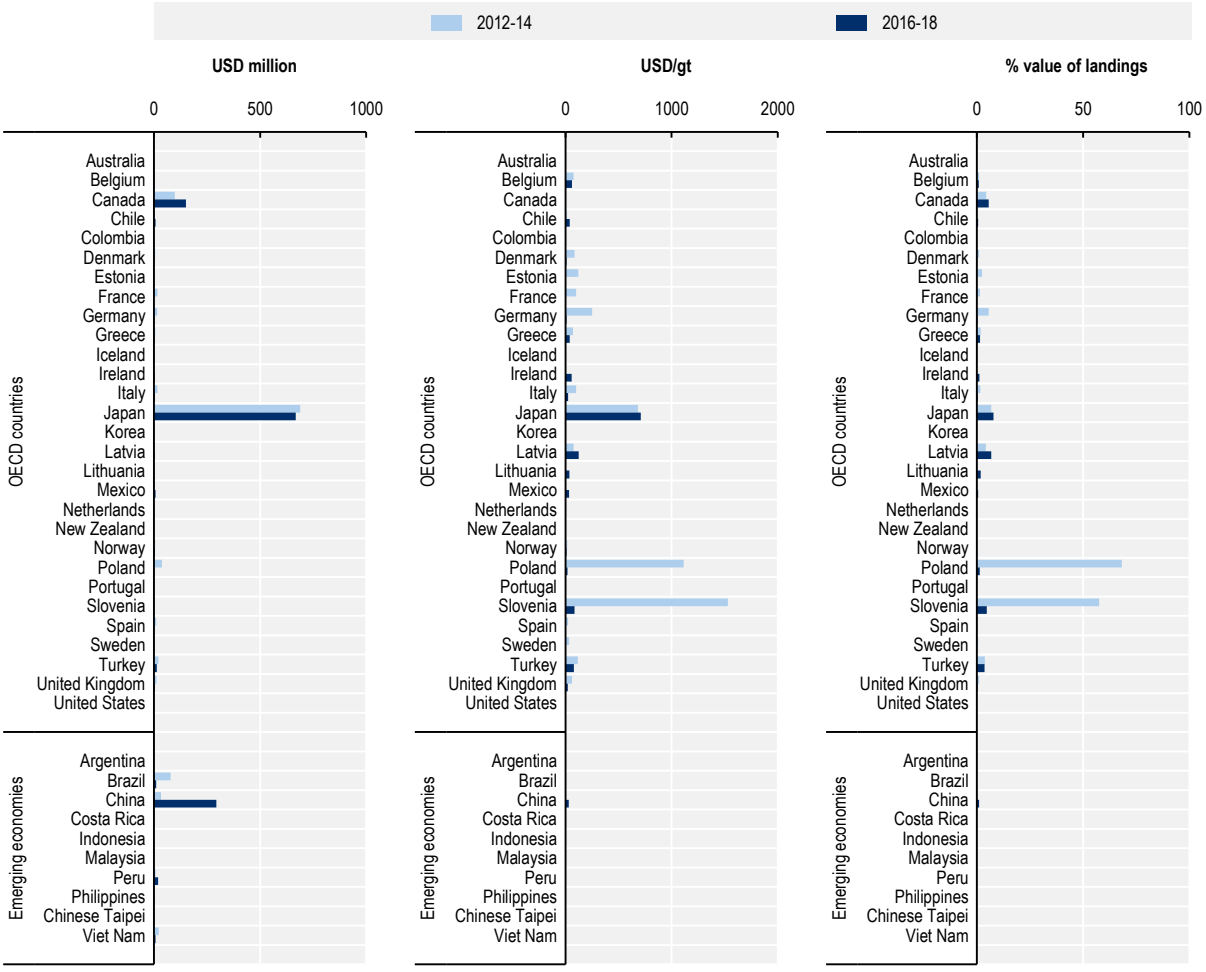
Absolute terms (left), by gross ton of fleet capacity (middle) and in proportion of the value of landings (right)



Source: OECD datasets 'Fisheries Support Estimate (FSE)', 'Fishing fleet', 'Marine landings' (OECD.Stat).

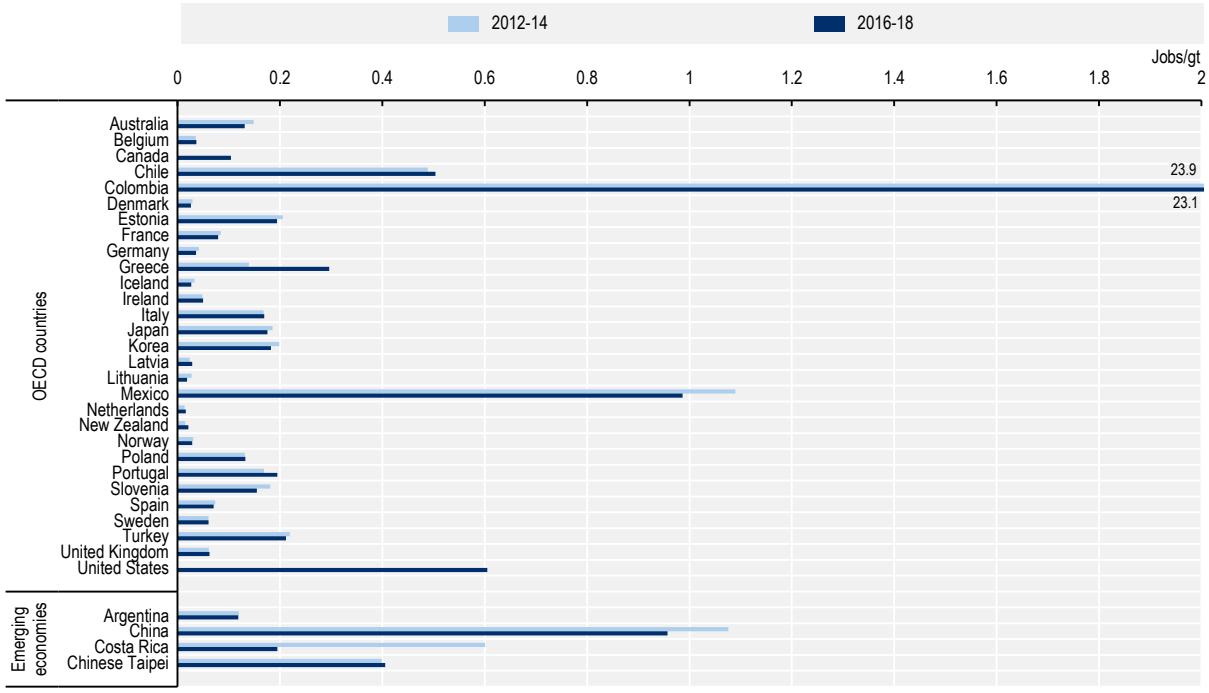
Annex Figure 4.A.4. Support to infrastructure in recent years

Absolute terms (left), by gross ton of fleet capacity (middle) and in proportion of the value of landings (right)



Source: OECD datasets 'Fisheries Support Estimate (FSE)', 'Fishing fleet', 'Marine landings' (OECD.Stat).

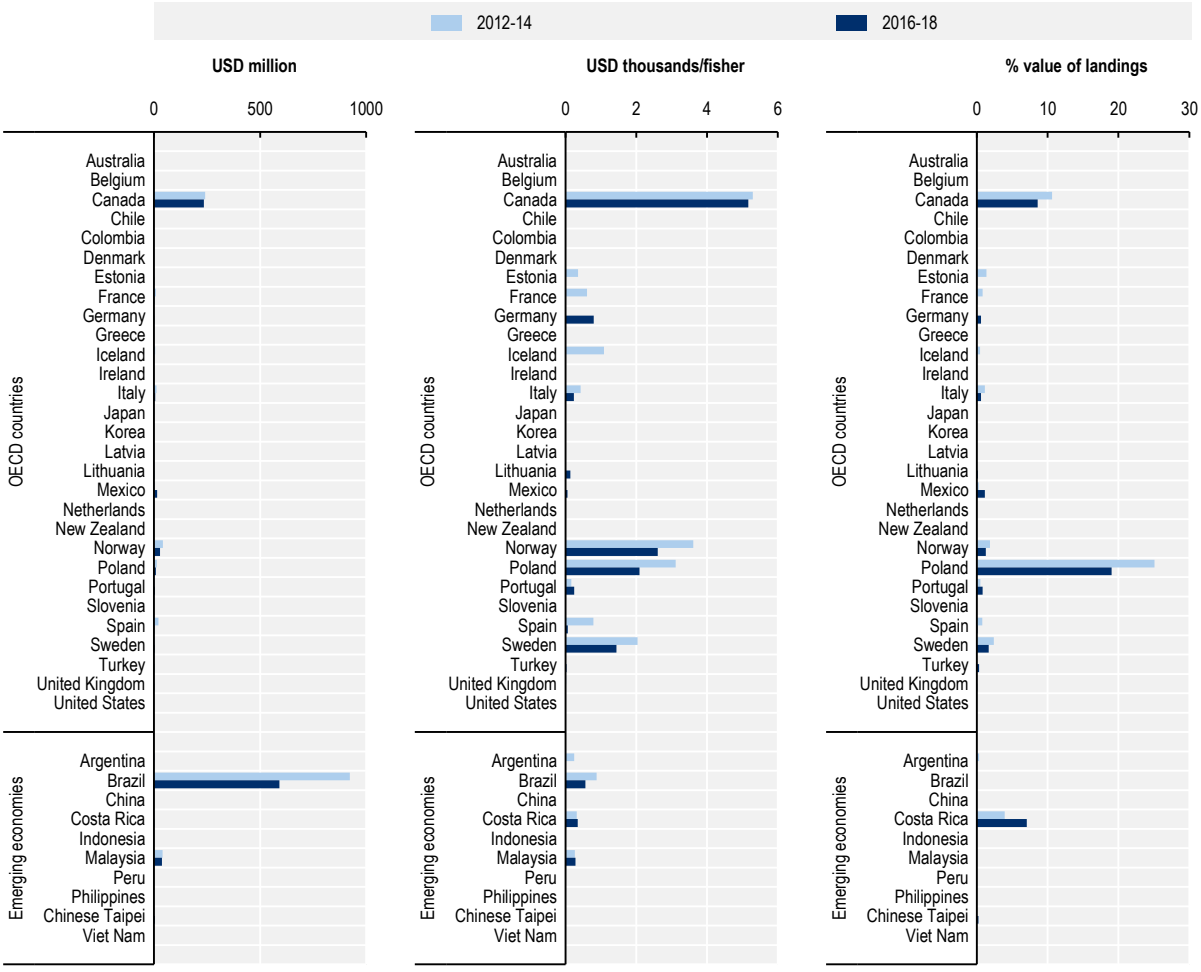
Annex Figure 4.A.5. Ratio of labour to capital in fisheries in recent years



Source: OECD datasets 'Fishing fleet', 'Employment' (OECD.Stat).

Annex Figure 4.A.6. Support to income in recent years

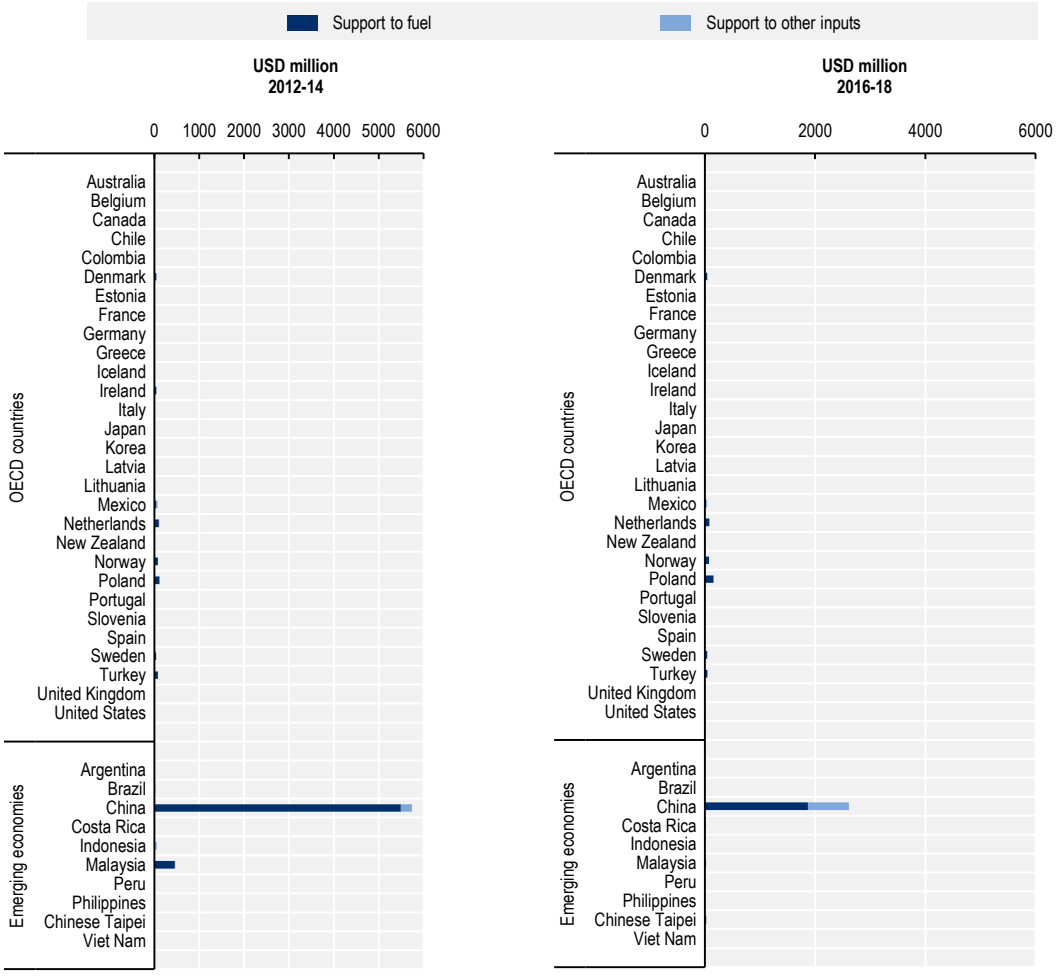
Absolute terms (left), relative to the number of fishers (middle) and in proportion of the value of landings (right)



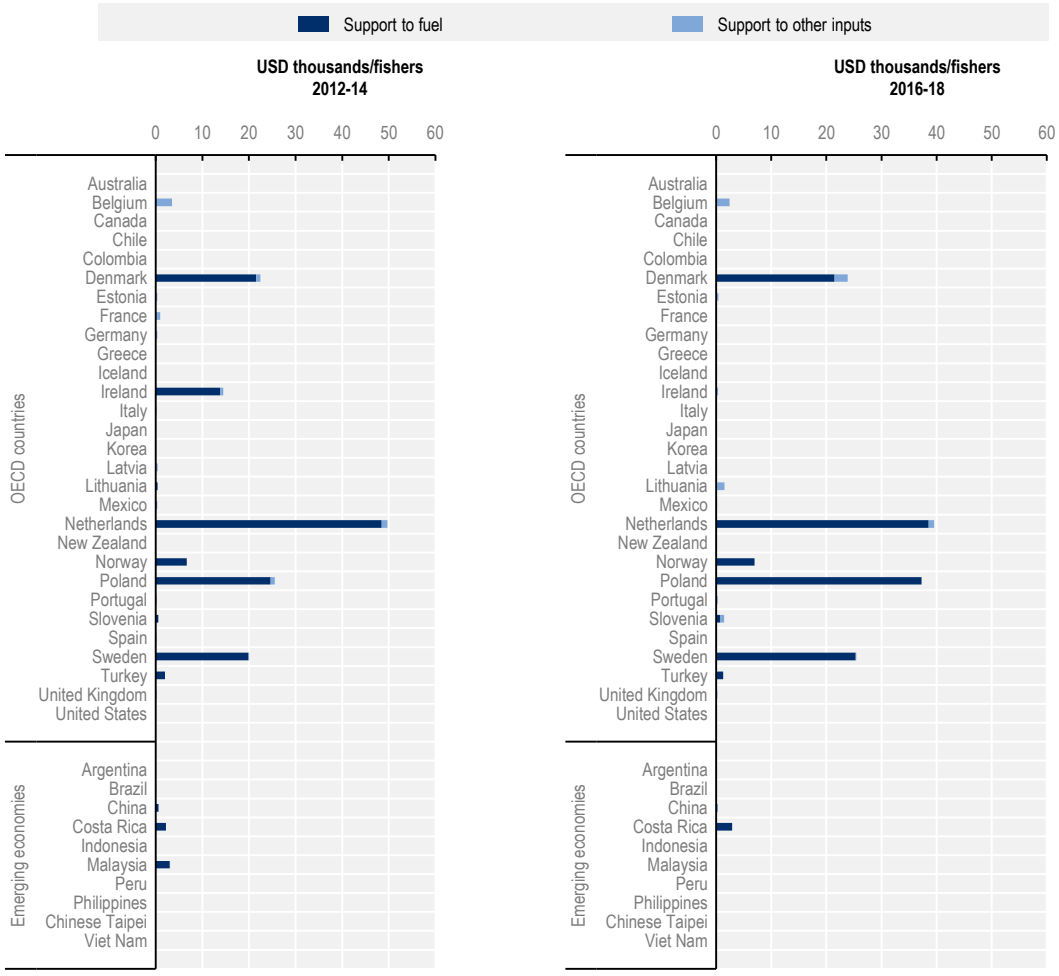
Source: OECD datasets 'Fisheries Support Estimate (FSE)', 'Employment, 'Marine landings' (OECD.Stat).

Annex Figure 4.A.7. Support to fuel and other (fixed and variable) inputs

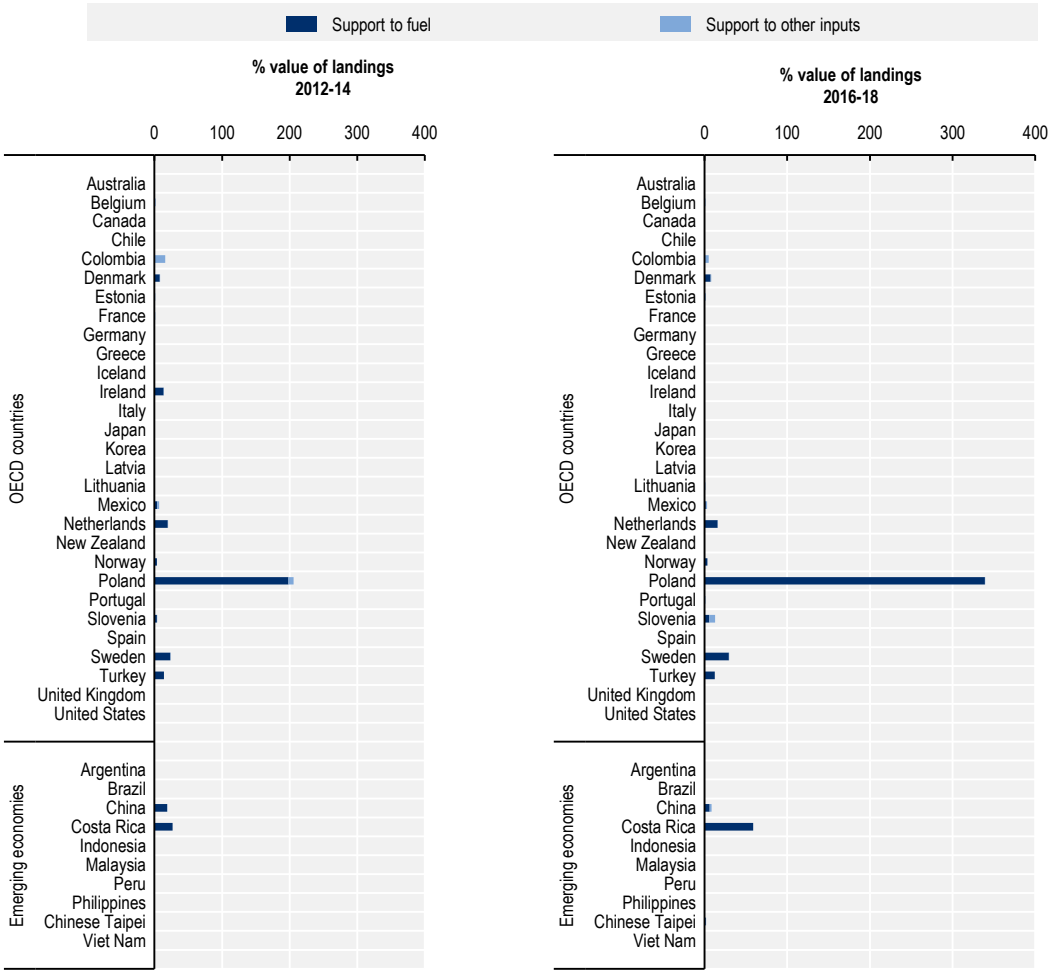
In absolute terms



By number of fishers



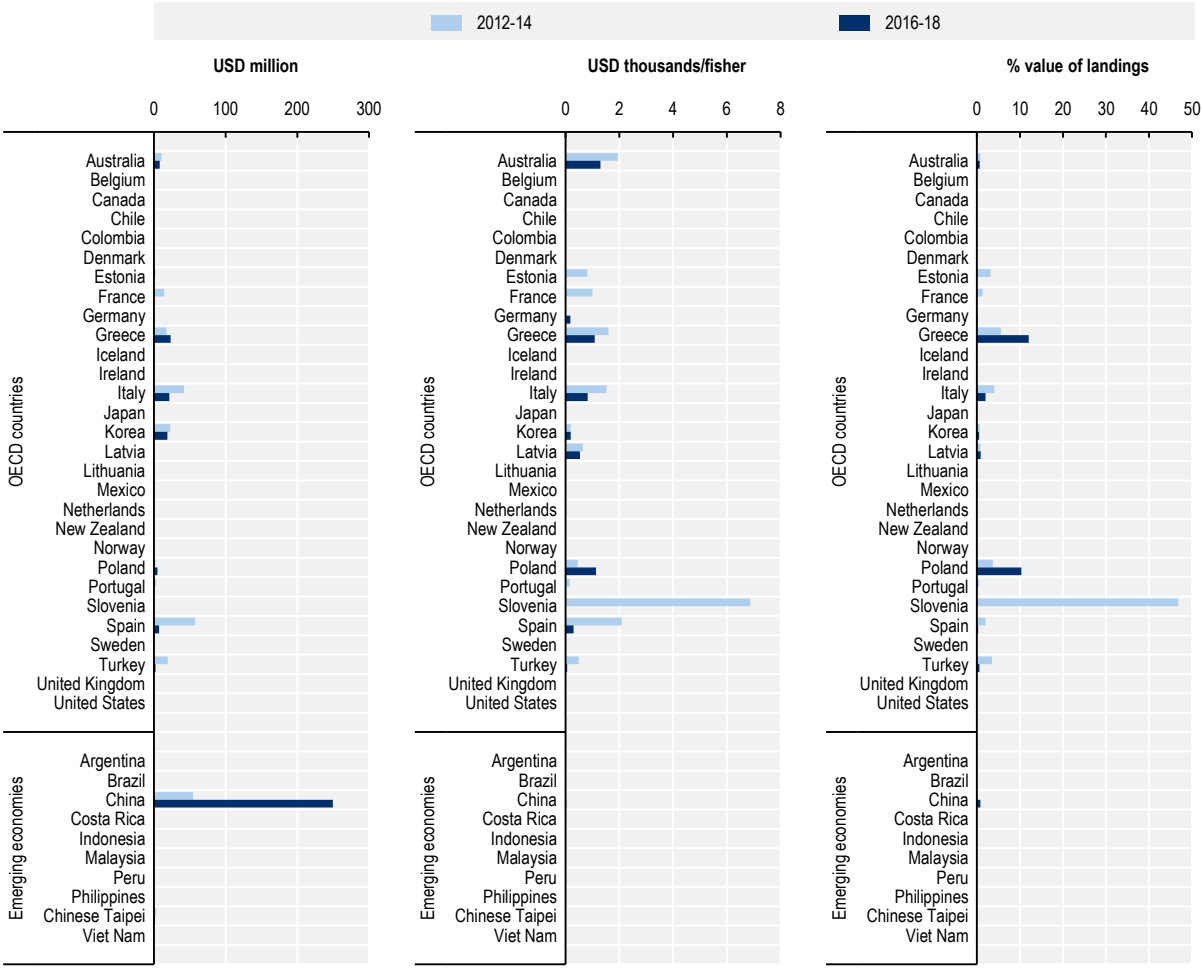
In proportion of the value of landings



Note: Support to fuel often being non-specific to fisheries, as the same policy sometimes also apply to other sectors such as agriculture, a number of countries and economies reporting to the FSE database do not include it in their reporting.
Source: OECD datasets 'Fisheries Support Estimate (FSE)', 'Employment, 'Marine landings' (OECD.Stat).

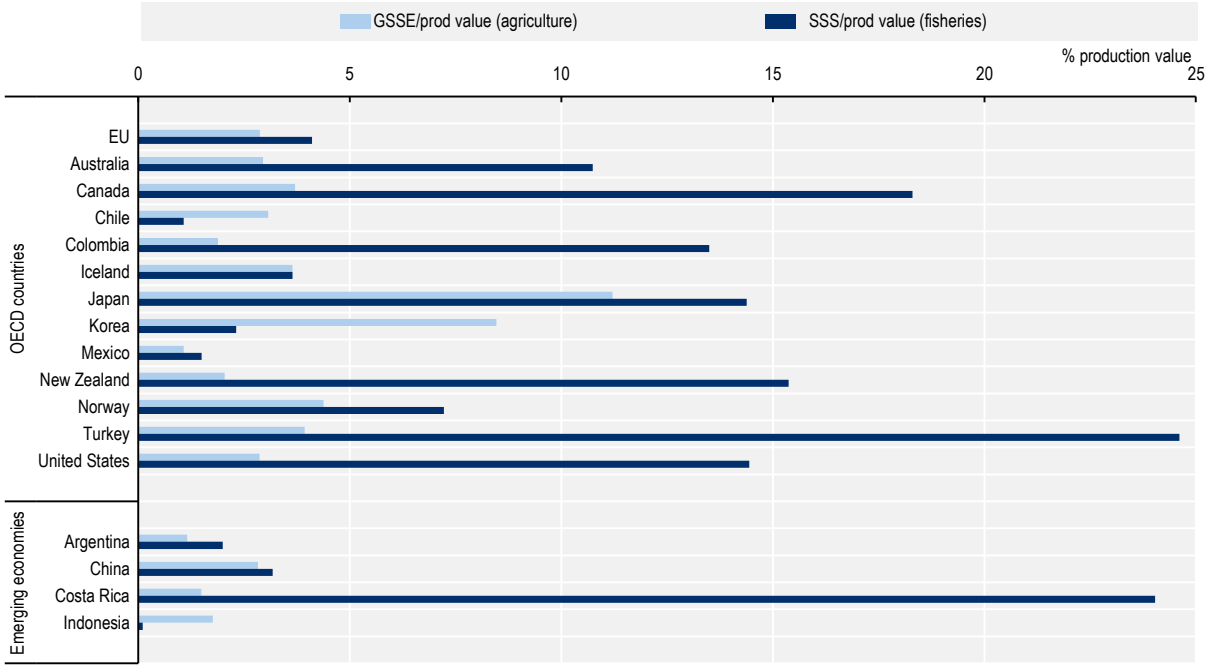
Annex Figure 4.A.8. Support for capacity reduction in recent years

Absolute terms (left), relative to the number of fishers (middle) and in proportion of the value of landings (right)



Source: OECD datasets 'Fisheries Support Estimate (FSE)', 'Employment', 'Marine landings' (OECD.Stat).

Annex Figure 4.A.9. Support for services in agriculture and fisheries as a proportion of the value of production, 2016-18



Note: Following what is done in the PSE database, a single figure is computed for countries of the European Union. For fisheries, the value of production corresponds to the value of landings.
Source: OECD datasets 'Fisheries Support Estimate (FSE)', 'Marine landings', 'Producer and Consumer Estimates' (OECD.Stat).

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Notes

[1] In developing countries, particularly in South-East Asia, the share of GDP, and contribution fish makes to food security, can be much higher. Fisheries products in some of these countries also account for an important share of trade.

[2] That is, by reducing marginal costs, or increasing the marginal benefits of operating.

[3] SDG 14: Conserve and sustainably use the oceans, seas and marine resources.

[4] It is recognised, however, that attempts at identifying harmful subsidies (Sumaila et al., 2010[16]) has undoubtedly helped provoke discussion and maintain attention in this area.

[5] To go beyond first-principles analysis of effects, a bio-economic model of the global fishery based in economic theory of production was developed allowing the effects of six common forms of fisheries support on capacity, effort and stock size to be determined under different management conditions (Martini and Innes, 2018[3]). Income effects were quantified by calculating transfer efficiency. Forthcoming work by the OECD, building upon just described, will provide additional insights in this area by modelling and assessing the impacts of different support policies from the perspective of trade between regions.

[6] Six main categories of policies that provide direct support to individuals and companies were analysed: payments based on fishers' income, own capita (i.e. return to fishing operations), vessels, variable input use (i.e. gear), fuel and output (i.e. catch volume).

[7] Landings value data were unavailable for Brazil, Malaysia, Peru, Philippines and Viet Nam, which are thus excluded from this calculation.

[8] This is based on a subset of countries, where data on both support and the value of landings were available (Argentina, China, Costa Rica, Indonesia, Chinese Taipei).

[9] Support, catch volume, fleet gross tonnage (gt) and employment are to some extent all correlated. Large fleets may need more money in absolute terms, but more support can also mean a larger fleet, employment and catches.

[10] Support to fuel is often non-specific to fisheries, as the same policy may also apply to other sectors such as agriculture, and is thus not reported by some countries and economies included in the FSE database. The figures for support to fuel, as reported throughout this paper, are consequently believed to not reflect the full extent of this form of support at aggregate levels (all countries and economies in the FSE database, OECD countries and emerging economies).

[11] Some services will also depend on the size of the EEZ, as large bodies of waters are more expensive to control; on the diversity of fishing activities, and on various country-specific characteristics such as the

geographical context or governance. In short, it is unlikely that a clear and direct relationship exists between any single factor and the appropriate level of SSS.

[12] Canada and the United States are not included in this calculation as gross tonnage data (gt) was unavailable.

[13] This indicator does not include data for some of the Emerging countries (Brazil, Malaysia, Peru, Philippines and Viet Nam), as value of landings was not available.

[14] Other potential reasons for this large difference include differences in the capacity to grant budgetary support which may constrain the total DSI. Differences in purchasing power at the level of different countries or economies may also mean that the relative level of support per dollar is not the same in all cases.

[15] At the level of OECD countries, support to fuel is around a quarter of that to management, control, and surveillance, the single largest form of support in this group. The opposite picture is true for emerging economies, where support to fuel is the largest single policy overall and exceeds support to management, control, and surveillance almost sevenfold.

[16] Once again, this is predominantly driven by China reducing the level of support it provided to fuel over this period.

[17] Anecdotal evidence suggests that policy silos can exist even within authorities. At the same time, co-operation between authorities can work well and there should be scope for improving policy coherence in relation with food policies even where agriculture and fisheries are managed by different authorities (Delpeuch and Hutniczak, 2019[19]).

[18] That is, all countries in the FSE database, with the exceptions of Brazil, Chinese Taipei, Malaysia, Peru, the Philippines, and Viet Nam.

[19] While support to marketing and promotion in GSSE includes expenditure in processing, countries typically do not report support measures associated with processing and distribution sectors in the FSE (SSS).

[20] "Generally, [SPS and TBT] measures aim to overcome or reduce the impacts of perceived market imperfections, such as those related to negative externalities, risks for human, animal or plant health, or information asymmetries (van Tongeren, Beghin and Marette, 2009[18]; Beghin et al., 2012[17]). However, they also tend to increase production and trade costs and can affect, positively or negatively, the development of new technologies or production methods.

[21] Performing like with like price comparisons requires information on marketing margins in relation with processing costs, transportation costs, quality characteristics and weight conversions across the supply chain, in addition to information on the domestic and trade policies that apply for a specific commodity.

5 Governing fisheries

Good governance is fundamental to ensuring the equitable and sustainable management of global fisheries and to facilitate policy change. This chapter presents the results of two OECD surveys which collected data on key elements of governance systems for national and multilateral fisheries. It examines decision-making processes, the use of data for evidence-based policymaking, the role of advisory groups to facilitate stakeholder participation and to increase transparency of fisheries governance, and the role of primary institutions in charge of fisheries policy with a view to increasing policy coherence between different sectors of the blue economy.

Key recommendations

- Better scientific and socio-economic data should be integrated into fisheries governance systems by embedding the use of data into policy-making processes (where possible) and investing in data collection.
  - In national fisheries, increasing the use of evidence to make policy can help to avoid negative outcomes from policy change and increase legitimacy. The use of commitment mechanisms, where governments commit to review or change policies (such as using data to automatically adjust harvest controls), can facilitate the integration of data into the governance process.
  - In multilateral fisheries, the automatic sharing and recognition of data on IUU fishing, such as vessels lists, can reduce opportunities for products of IUU fishing to enter fisheries value chains. The harmonisation of standards for collecting scientific data and the sharing of best practice for the implementation of technology are important for improving fisheries management.
- Transparent mechanisms for stakeholder participation in the governance process (e.g. advisory groups) should be more widely used. These mechanisms are crucial for building legitimacy for fisheries policy and policy change. Governments should also carefully review and manage the balance of stakeholders in each group, which depends on the policy areas it is advising on.
- The decision-making processes in RFMOs should be reviewed to find more efficient pathways than consensus-based decisions. Voting mechanisms combined with objection processes that are limited in scope and automatic reviews of objections offer a promising approach to representative and efficient decision making in RFMOs.
- To improve fisheries governance, further analysis of institutional arrangement of fisheries governance is needed to better understand how different structures impact policymaking. In particular, it would be interesting to investigate how institutions can facilitate increased co-ordination and coherence between policies for all the sectors using marine resources.

5.1. Governance systems are fundamental to fisheries policy and policy change

Creating and implementing fisheries policy is complicated because governments need to balance multiple social, economic and environmental objectives which may not be mutually compatible. For example, economic objectives such as increasing food production or employment may not be compatible with the goal of improving the environmental sustainability of fisheries if achieving them requires increased harvesting of stocks resulting in overfishing. Policies to address these multiple objectives and to achieve SDG 14 include reducing potentially harmful support (Chapter 4), improving science-based fish stock management (Chapter 2) and fighting IUU fishing (Chapter 3). However, the complex interactions between the ecosystems, communities and businesses that comprise fisheries also mean the impacts of policy changes are hard to predict. Moreover, the nature of the resources mean where policy changes have been made, their impacts are challenging and expensive to observe. For effective policy creation, change, and implementation, countries require a governance process that integrates information on the impacts of existing policies and the views of a wide range of stakeholders marshalled by institutions that can respond to the specific context of individual fisheries (Delpeuch and Hutniczak, 2019[1]).

Fisheries "governance" covers the full set of institutions and rules which govern the design, adoption and implementation of fisheries policy. Effective systems of governance are, therefore, central to equitable and sustainable fisheries management and fisheries policy change. Given the need for governance systems to respond to specific local contexts there is a wide variety of systems in place for fisheries policy and it is important to identify general rules on what constitutes a good governance system. However, measuring the effectiveness of governance systems for policy change is challenging as the variety of different national approaches makes it difficult to identify comparable metrics. Further, the complexity of governance systems and the mediating impacts of the policies themselves mean it is difficult to link specific aspects of the policy-making process to measurable outcomes in the socio-economic or environmental dimensions of fisheries. Delpeuch and Hutniczak (2019[1]) identify some of the components required in fisheries governance systems for effective policy change. These include:

- Create a robust evidence base to better motivate, design and implement policy change through investment in the collection of socio-economic and biological data
- Make greater use of commitment mechanisms, such as adaptive policies, which build in rationale and mechanisms for automatic policy change in the face of possible evolutions. They may prove particularly helpful in contexts of uncertainty, such as data-poor fisheries or fisheries deemed to be most affected by climate change
- Implement a whole-of-government approach to fisheries policymaking, which engages multiple ministries and agencies to increase the legitimacy of policy changes for fisheries and help to address their socio-economic impacts (including through policy domains other than fisheries)
- Engage in inclusive and transparent dialogues with stakeholders involved in the policymaking process, including through the creation of inclusive and representative advisory groups, inter-governmental co-operation groups and adherence to the OECD's key principles on transparency and integrity in lobbying.

Similarly, research into the properties of effective fisheries governance systems identify the importance of transparency, participation and coherence (Belschner et al., 2019[2]). Many fisheries policies involve the distribution of resources, and changes to those policies, which often occur on an annual basis (e.g. TAC limits and the allocation of quotas), will have both positive and negative consequences for multiple stakeholders. Transparent and inclusive processes that integrate the best available scientific data for making these kind of decisions are essential for their legitimacy with stakeholders, especially if there are negative impacts. It is important that information on how decisions are taken, by whom and based on what data is publically available. Further, transparency on the influence of external lobby groups on the policy-making process is needed to ensure the influences of different stakeholders are appropriately balanced when taking decisions. An inclusive process, which incorporates data and views from the full range of impacted stakeholders both within and outside government, is essential to ensure policies and policy changes are accepted and upheld by fisheries actors. Failure to do this can cause important stakeholders to become marginalised (or feel marginalised) (EC, 2001[3]).

The results of an OECD survey presented in this chapter are used to make inferences about some of the institutions and the mechanisms for the policy-making process in 31 OECD countries and key partner economies in 2019. It also uses the survey results presented in Hutniczak, Delpeuch and Leroy (2019[4]) to examine several important aspects of governance in multilateral fisheries.[1] The analysis aims to understand some aspects of evidence-based policymaking and participation, as well as transparency in national and multilateral governance processes. It presents information on the institutions in charge of fisheries policy across the survey respondents. While it is not possible to link these components of governance systems to fisheries policy outcomes, a better understanding of these aspects of governance is important to improve the effectiveness of fisheries policy and policy change.

Key findings and recommendations

The importance of basing fisheries policies on sound scientific evidence is universally recognised and all the countries and economies surveyed use scientific data at some stage of the fisheries policy-making process. The widespread use of both scientific and socio-economic data in fisheries management decisions is positive insomuch as it facilitates evidence-based policymaking. However, while data are used to some extent across all the survey respondents, understanding how that translates into evidence-based policymaking is challenging. For example, while all survey respondents used scientific data in some capacity, the use of commitment mechanisms is not widespread. Only 28% of respondents have systems where harvest limits are specifically tied to changes in those data, indicating there are still opportunities to further integrate data into the fisheries governance process. Secondly, the use of socio-economic data is less frequent than scientific data despite the importance of understanding the impacts of fisheries policy change on broader socio-economic systems. Finally, systems for integrating data into the fisheries governance process are only as good as the data they are integrating and – as highlighted elsewhere – there are still significant gaps in the data on fisheries.

At the international level (i.e. in multilateral fisheries), there are mechanisms for co-operation on the listing of IUU vessels which could be a cost effective mechanism to prevent products of IUU fishing from entering fisheries value chains. However, these policies are applied inconsistently and often allow for objections from member countries, which has limited their utility for fighting IUU fishing so far. Further, increased co-operation and the sharing of experience between RFMOs on the implementation of new remote monitoring technologies and governance reforms could be a valuable pathway for improving compliance monitoring and the management of multilateral fisheries.

Participation by stakeholders in fisheries governance has been highlighted as an essential component for success (Pita, Pierce and Theodossiou, 2010[5]; EC, 2001[3]; Kaplan, 2004[6]). In recognition of this, 81% of the survey respondents have at least one advisory group for fisheries policy, with the majority having more than one. Advisory groups are a promising mechanism for facilitating a transparent dialogue between stakeholders and policy makers and can allow a broad range of stakeholders to have a direct influence on policy areas that may impact them. Across all advisory groups, commercial fishing interests were the most frequently represented group, followed by scientific entities. These were the only two interest groups represented in the majority of advisory groups. Downstream industry was the third most frequently represented group. The prominent role played by the fishing industry (commercial fishers and downstream processing) in advisory groups is unsurprising given the direct impact fisheries policy changes could have on their operations. Further, the frequent representation of scientific bodies, particularly on advisory groups related to identifying technical parameters and the creation of management plans, is a promising indication for the use of data and expertise in fisheries management. More generally, the transparency provided by the advisory group process can have positive impacts on the legitimacy of policy change and ensure that the views of important stakeholders who are not part of industry groups are included.

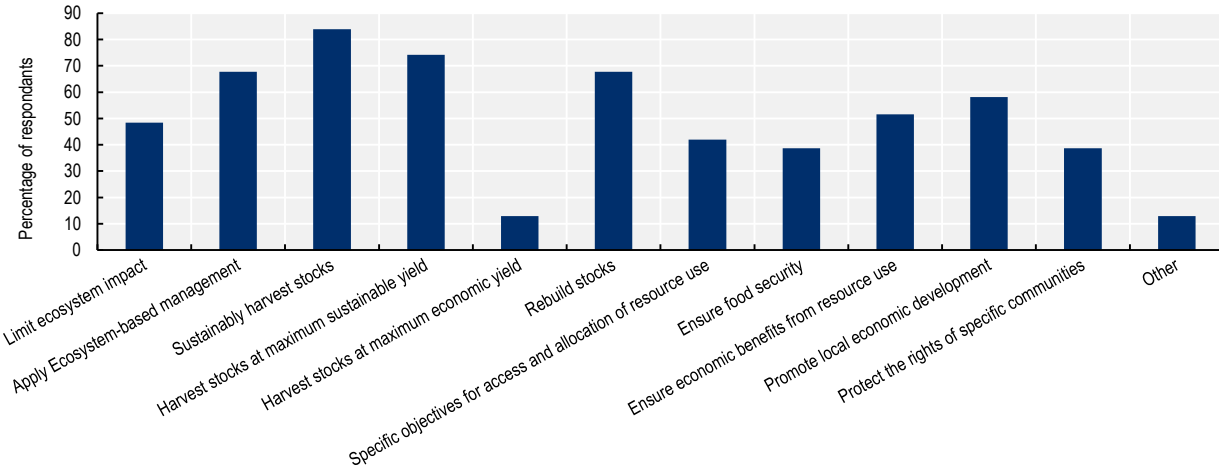
Multilateral fisheries face different challenges concerning stakeholder participation and transparency in decision making. While many RFMOs allow for majority voting in decision making, the desire to find a consensus among members is still widespread. The desire to find a consensus likely stems from a desire within RFMOs to create a sense of shared ownership over resources among members, which is thought to increase compliance. This, in turn, is important as the enforcement capacity of RFMOs is generally low. In RFMOs which allow voting, mechanisms for objections can hamper decision making if the conditions under which members can object are not limited in scope. In all cases bar one, RFMOs do not have mechanisms for automatically reviewing objections by member states. The need to examine decision-making processes within RFMOs to facilitate decision-making has been highlighted by the COVID-19 pandemic, which has resulted in delays and deferrals of decisions with the switch to virtual meetings.

The entity in charge of creating fisheries policy is the foundational component of governance systems. Ensuring coherence between fisheries and other related sectors, particularly those that use ocean resources, is key for the sustainable use of marine resources. Housing several related policy areas within the same ministry can aid with policy co-ordination, and in recognition of the unique challenges faced by sectors that use marine resources, several countries have created ministries related to the ocean or ocean economy. Across all survey respondents, the entity in charge of fisheries policy was also in charge of other policy areas, most commonly aquaculture (90%) and agriculture (65%). However, despite the fundamental role institutions play in fisheries governance, the impacts of different institutional arrangement remain largely unknown.

5.2. Effective and transparent use of data is key for achieving multiple policy goals

The importance of basing fisheries policies on sound scientific evidence is universally recognised. Robust scientific and socio-economic data is key for designing effective policies and building legitimacy amongst stakeholders (Delpeuch and Hutniczak, 2019[1]). Effective use of data can also help fisheries managers and policy makers to identify where existing policies may not be achieving their stated goals and avoid unforeseen negative impacts on economic, environmental or social sustainability. This is particularly important as fisheries policies need to balance multiple objectives, which are not necessarily compatible in all contexts (Figure 5.1).

Figure 5.1. Overall objectives of fisheries policies amongst survey respondents



Scientific and socio-economic data allow policy makers and fisheries managers to identify trade-offs and synergies between different policy objectives. Careful use of data can increase the efficiency and efficacy of fisheries policy and facilitate policy change. Further, when combined with commitment mechanisms, such as harvest controls, that are adjusted automatically based on scientific data, evidence-based policymaking can be embedded into fisheries governance. Understanding how and where scientific and socio-economic data are used is key to improving fisheries governance systems.

In national fisheries the use of scientific and socio-economic data is widespread, but how data are used in the governance process varies

All the countries and economies surveyed use scientific data at some stage of the fisheries policy-making process. However, fisheries are embedded in wider socio-economic systems, and understanding the impacts of fisheries policies on these systems is crucial for equitable and sustainable fisheries management. In recognition of this, nearly all the survey respondents (97%) use socioeconomic data in some capacity in the decision-making process. For effective evidence-based policymaking, a range of different data sources are needed to understand why existing policies may have adverse impacts and what (if any) changes are needed to address these. Globally, there are significant gaps in fisheries data, for example no data are available on the biological status of stocks that account for 22% of global fish catch (Costello et al., 2016[7]).

The use of scientific data is binding or consultative in 26% and 55% of countries and economies, which is more frequent than for socio-economic data which is binding or consultative in 10% and 45% of cases. The binding use of data indicates the entity in charge of fisheries is legally bound to follow scientific or socioeconomic advice and consultative means the same entity is legally bound to request the advice. The extent to which fisheries policy decisions are evidence-based varies across respondents is, at least partially, a factor of data quality, coverage, and mechanisms for integrating different data sources into the fisheries governance process. The survey results highlight important differences in how scientific and socio-economic data are used across the respondents.

Correspondingly, the optional use of socio-economic data is more prevalent (48% of respondents) than the optional use of scientific data (26% of respondents), indicating that scientific data are more regularly used than socio-economic data for fisheries policymaking as scientific data are more likely to be binding or consultative than optional. The three countries to require the binding use of socio-economic data are Costa Rica, Estonia, and Thailand. In Estonia, the binding use of socio-economic data happens through the formation of an advisory fisheries council, which among other responsibilities is responsible for analysing the economic activity of the fisheries and provides recommendations concerning the production and the preferred direction of development over the following year.

Table 5.1. The role of scientific and socio-economic data in the fisheries policy process

	Scientific (%)	Socio-economic (%)
Binding	26	10
Consultative	55	45
Embedded	29	NA
Optional	26	48

Note: The categories are not mutually exclusive so percentages will not sum to 100.
The categories are defined as follows:
Binding: The main entity in charge of fisheries management is legally bound to follow scientific or socio-economic advice when making some management decisions.
Consultative: The main entity in charge of fisheries management is legally bound to request scientific or socio-economic advice when making some management decisions.
Embedded: Harvest control rules are in place, which lead to automatic adjustment of management tools on the basis of stock assessments.
Optional: The main entity in charge of fisheries management does not have an obligation to request scientific or socioeconomic advice to make some management decisions.

A more detailed look at the use of data reveals further variations between how data are used by different countries and economies. For example, even when the use of scientific data is binding, the requirement might be to consider rather than strictly follow, as is the case for EU countries under the common fisheries

policy. In Korea, the use of scientific data is binding if the stock in question is subject to a TAC, or if a TAC is being developed to aid the recovery of the stock. If the stock is not subject to a TAC, the use of scientific data for fisheries management is optional. In addition, the use of scientific data is also binding when developing the Master Plan for the Management of Fishery Resources and when protected or management waters are designated. In Chile, scientific data are used to assess the status of the fishery, determine the biological reference points, and determine the range within which the overall catch quota may be set, which shall maintain or lead the fishery to the maximum sustainable yield.

An important use of scientific data for fisheries management is to provide reference points for setting harvest control rules (such as TACs, quotas and effort controls). Harvest controls that are adjusted automatically based on scientific data are present in 29% of survey respondents. In New Zealand, the Harvest Strategy Standard in place since 2008 provides targets and limits for all inshore fisheries based on four measures of performance. Several countries and economies have tools in place to control the impacts of fisheries and help ensure sustainability (Chapter 2), but this is not reflected in binding commitments to use data to set the limits for these tools. This suggests that the limits set by many of the management tools may not be based on scientific evidence, which could lead to over harvesting of stocks.

Despite the universal use of scientific data, less than half (45%) of the countries and economies surveyed used scientific data to regularly evaluate the impact of management measures. Regular impact assessments of existing policies are vital for linking management decisions to outcomes in fish stocks, and without these assessments it can be difficult to identify where sub-optimal management may be having a negative impact on fish stocks. Regular impact assessments can also provide evidence in support of policy change, which is essential for building consensus among stakeholders.

Where policy changes are necessary, understanding the impact of proposed management changes, where possible, is a key component of evidence-based policymaking for fisheries. Just over half (55%) of the survey respondents require impact assessments when regulatory or policy changes are envisioned. While it may not be possible (or even desirable) to assess the impacts of every policy or management change, having processes in place to facilitate regular impact assessment is important to avoid negative biological impacts from policy changes and ensure understanding any potential distributional impacts.

The widespread use of both scientific and socio-economic data in fisheries management decisions is positive insomuch as it facilitates evidence-based policymaking. However, while data are used to some extent across all the survey respondents, understanding how that translates into evidence-based policymaking is challenging. For example, while all survey respondents used scientific data in some capacity, only 28% have systems where harvest limits are specifically tied to changes in those data, suggesting there are opportunities to further integrate data into the fisheries governance process. Secondly, the use of socio-economic data is less frequent than scientific data. Finally, systems for integrating data into the fisheries governance process are only as good as the data they are integrating and as highlighted elsewhere, there are significant gaps in the data on fisheries. In particular, detailed data and evidence on the socio-economic impacts of fisheries management and policy changes are missing in many parts of the world.

Co-operation and data sharing are vital for the effective governance of multilateral fisheries

The sharing of information, and more generally co-operation, between Regional fisheries management organisations (RFMOs) is important for effective management. Collecting, aggregating and analysing data on the health of fish stocks and catch effort in their areas of competence is an important part of an RFMO's role (Box 5.1). The sharing of some data and co-operation in data collection can help to enhance the governance of multilateral fisheries by facilitating the monitoring of compliance and scientific variables.

Box 5.1. Regional Fisheries Management Organisations

Many fish stocks straddle the exclusive economic zones of several countries (EEZ), or occur predominantly in areas beyond national jurisdiction (ABNJ). Effective management of these fish stocks and the fisheries that exploit them, so-called "multilateral fisheries", generally requires the co-operation of several countries and in many cases regional fisheries management organisations (RFMOs) have been formed to co-ordinate their management. The first RFMOs were established in 1949 (International Commission for the Northwest Atlantic Fisheries and the Inter-American Tropical Tuna Commission) and have since increased to 16 established RMFOs in 2020 worldwide, 13 of which have been surveyed as part of this chapter (Annex Table 5.A.1). By bringing together countries that have a common interest in the sustainable management of high seas and migratory stocks, RFMOs are a key part of global fisheries governance and an essential tool for meeting SDG 14.

An example is the exchange of information between RFMOs on vessels which have been listed as engaged in IUU fishing. The use of IUU vessel lists has been highlighted as a cost effective way of preventing IUU fishing by stopping vessels which have been sanctioned from continuing to fish in an RFMOs areas of competence. Making these lists available to the public would increase the transparency of RFMO management action and sharing data and information between RFMOs on these lists could act as a cost efficient way of preventing IUU fishing in their areas of competence. However, despite the advantages of mutual IUU vessel list recognition, only the South Pacific RFMO automatically recognises the vessels list of all other RFMOs. To date, cross-listing of vessels is inconsistent across RFMOs; several allow for conditional cross-listing,[2] whereby vessels listed by other RFMOs are only included in their own lists if there is no objection from their members, and others[3] do not practice cross-listing at all. In practice, this places significant constraints on the listing of vessels, which hampers the prevention of IUU fishing. Therefore, there is opportunity to reform the sharing of data on IUU vessel lists to improve the governance of multilateral fisheries.

Greater co-operation and the sharing of best practices between RFMOs could also benefit other areas of RFMO functioning and multilateral fisheries governance. As mentioned above, while the SPRFO implements many best-practices for decision making, other RFMOs have less innovative decision models; understanding how to implement reforms to decision making and sharing experiences with different mechanisms around voting and objection procedures would be beneficial. Further, the harmonisation of protocols for the collection of scientific data could improve the evidence base for management decisions within RFMOs. In particular, the implementation of new technologies, such as satellite monitoring and on-board cameras, is a challenge that many RFMOs are facing or will face. The importance of integrating new technologies into existing MCS systems has been highlighted by the COVID-19 pandemic, which has disrupted in-person on-board observation in many RFMOs.

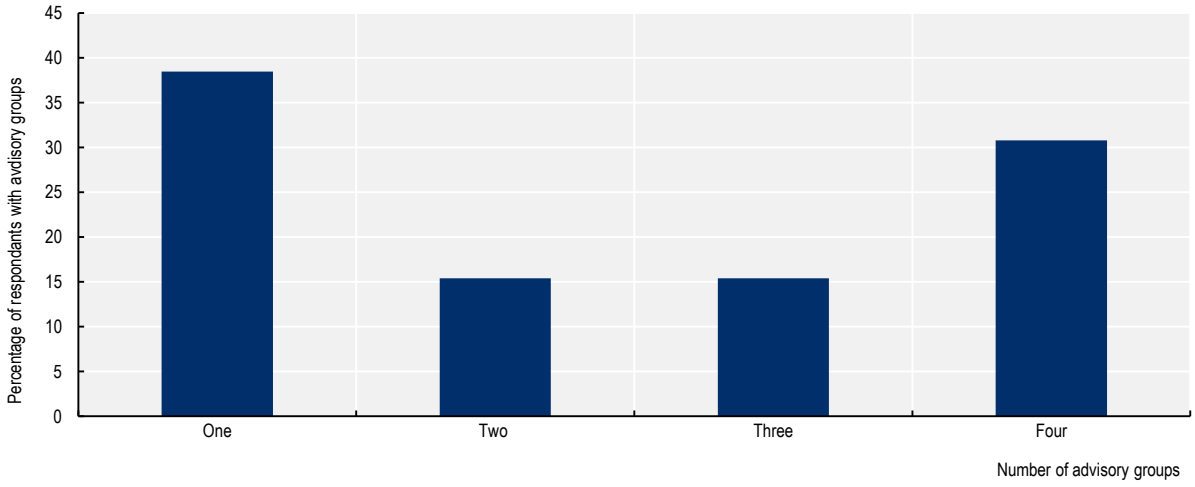
5.3. Stakeholder participation is needed to build legitimacy for fisheries policies

Stakeholder advisory groups are a popular tool for facilitating transparent participation in national fisheries governance.

In recognition of the importance of transparency to good fisheries governance, 84% of the survey respondents have at least one advisory group for fisheries policy. Advisory groups are a promising mechanism for facilitating a transparent dialogue between stakeholders and policy makers and can allow a broad range of stakeholders to have a direct influence on policy areas that may impact them. As the rules around participation and decision making are agreed in advance, advisory groups can allow for more

transparent and inclusive governance than more traditional forms of lobbying, where the influence exerted by individual stakeholders can be difficult to understand. The multi-stakeholder nature of advisory groups offers an opportunity for dialogue between interest groups with opposing views. Advisory groups are flexible and are often created for specific instances of policy change; hence the creation of several different advisory groups for specific aspects of the governance process is possible and the majority of respondents using advisory groups have more than one (Figure 5.2).

Figure 5.2. Number of advisory groups per survey respondents



Note: The survey was limited to four advisory groups per respondent; the final bar therefore depicts the countries or economies with at least four advisory groups, and not necessarily exactly four.

In general, integrating stakeholders into fisheries governance systems is thought to have several important benefits, including: the resolution and avoidance of conflicts; increased trust; facilitating a common understanding between stakeholders and policy makers; and improved legitimacy and acceptance of reforms (Pita, Pierce and Theodossiou, 2010[5]). For these reasons, the participation of stakeholders can lead to increased compliance and improved efficiency of management tools such as TACs, input-output controls and discard bans. The increased participation of stakeholders in fisheries governance is generally considered a positive policy development, e.g. reforms to the EU's Common Fisheries Policy (CFP) in 2002 and 2012 included guidance on the creation and role of Advisory Councils partly in response to criticisms that the CFP had excluded stakeholders in the past. However, understanding the actual impact of stakeholder participation on fisheries governance and management outcomes is challenging due to the complex interplay of elements in governance systems. Crucially, stakeholder participation involves the redistribution of decision-making power amongst stakeholders and consequently, the impacts of mechanisms for participation such as advisory groups depends on the extent to which and where these powers are redistributed (Arnstein, 1969[8]). Information on the composition of advisory groups and where they are used in the policy process is, therefore, a prerequisite for understanding their impact.

Transparency regarding the composition and role of advisory groups is key for understanding the different roles stakeholders play in fisheries policy creation, but can be a sensitive issue for fisheries. The composition of advisory groups can raise questions of balance if a particular group of stakeholders is (or is perceived to be) favoured over others, or questions of legitimacy if they include non-sectoral stakeholders, most notably NGOs (Linke and Jentoft, 2016[9]). While the inclusion of NGOs in advisory groups has been controversial in some cases, their participation can help avoid future conflicts over issues

such as environmental sustainability. Information on the make-up of advisory groups is, therefore, important for understanding the fisheries governance process. It is important to note that the composition of advisory groups will vary depending on the socio-economic and environmental context of the fisheries and the particular area of policy on which it is giving advice. The information presented here cannot be used to make normative judgements on what the composition of advisory groups should be, but instead describe the situation as it is currently reported.

In the survey, a total of 62 advisory groups were reported across 26 countries and economies. Across all advisory groups, commercial fishers were the most frequently represented group, present in 63% of groups, followed by scientific entities which were present on 52% (Figure 5.2). By contrast, civil society organisation were represented on 31% of advisory groups and sub-national bodies 27%. However, many respondents have more than one advisory group, so frequency of representation across all groups does not necessarily reflect participation in the policymaking process across survey respondents.

Table 5.2. Representation of different stakeholders across all advisory groups reported

Stakeholder	Number of groups in which they are represented	% of groups in which they are represented
Commercial fishers	39	63
Scientific entities	32	52
Downstream industry	26	42
Other commercial activity	21	34
Entities in charge of other policy	20	32
Other	20	32
Civil society	19	31
Artisanal fishers	18	29
Sub-national bodies	17	27
Recreational fisher	14	23

Note: Advisory groups contain multiple stakeholders, therefore percentages will not sum to 100.
"Other" stakeholders includes a variety of groups, such as the coast guard in Turkey, fisheries managers and fisheries economists in Australia, labour unions in Belgium and First Nations governments in Canada.

Given the presence of multiple advisory groups in many countries and economies, averaging across all groups could hide important trends on the frequency with which stakeholders are included in national governance processes. Another way to consider the data is in terms of what proportion of countries and economies include a specific group of stakeholders in at least one advisory group. From this perspective, scientific entities and commercial fishers are the most frequently represented, being included in advisory groups in 85% of respondents (Table 5.3). Comparing the frequency of representation by group to by respondent suggests that commercial fishers are more likely to be represented across multiple advisory groups in countries and economies.

Inclusion in advisory groups (both across all groups and by respondent) highlights that scientific entities and commercial producers are the most frequently represented stakeholders. While this is indicative of the important role these groups play in the formulation of fisheries policies, understanding where in the policy process this influence is exerted is critical for transparency. The first step is to understand what advisory groups are being used for; all respondents which reported advisory groups used them for general questions of fisheries management. After general questions on fisheries management, advisory groups on identifying technical parameters are the second most common, followed by groups for the management of specific stocks and the preparation of management or rebuilding plans (Table 5.4).

Table 5.3. Frequency of representation of different stakeholders in at least one advisory group of individual countries and economies

Stakeholder	% of respondents including each stakeholder in at least one advisory group
Commercial fishers	85
Scientific entities	85
Downstream industry	54
Entities in charge of other policy	54
Other commercial activity	46
Sub-national bodies	46
Artisanal fishers	42
Recreational fisher	42
Civil society	42
Other	42

Note: Advisory groups contain multiple Stakeholder therefore percentages will not sum to 100.
"Other" stakeholders includes a variety of groups such as the coast guard in Turkey, fisheries managers and fisheries economists in Australia, labour unions in Belgium and First Nations governments in Canada.

Table 5.4. Policy areas addressed by advisory groups

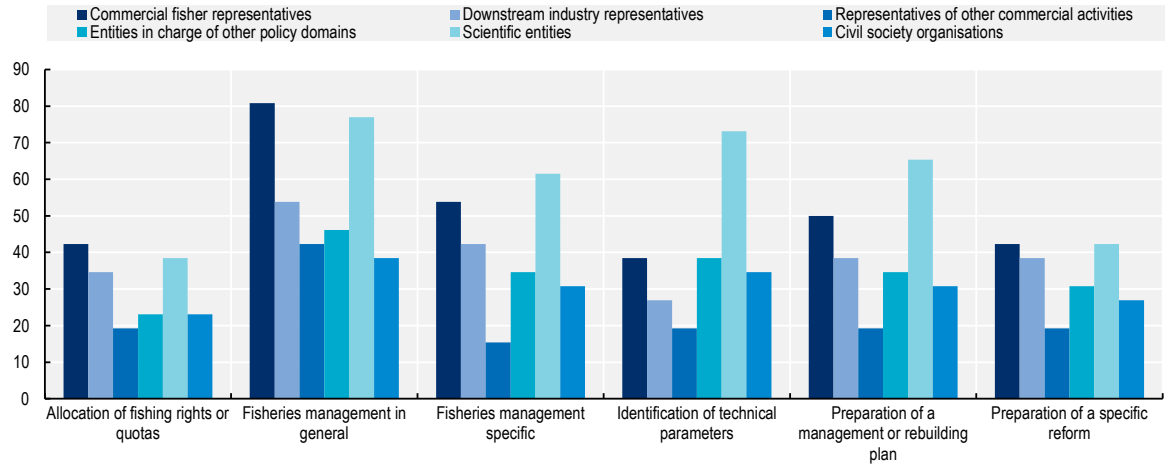
Policy area	% of respondents with advisory groups
Fisheries management in general	100
Identification of technical parameters	73
Fisheries management specific	69
Preparation of management or rebuilding plan	69
Preparation of specific reform	57
Allocation of fishing rights or quotas	54
Other	42

Knowledge of the policy areas that specific stakeholders are advising on is an important component of transparent fisheries governance. For example, 81% of respondents with advisory groups included commercial fishers in advisory bodies related to fisheries management (Figure 5.3). In contrast, 38% of respondents with advisory groups included civil-society organisations in advisory bodies related to fisheries management. Downstream industry was represented in the same groups in 54% of respondents, suggesting, in terms of frequency, the fishing industry are more represented than civil society in fisheries management decision (Annex Table 5.A.2). Looking across all policy areas in the survey (Figure 5.3), scientific entities were the most frequently represented stakeholder in advisory groups related to the identification of technical parameters and the preparation of management plans (73% and 65% of respondents with advisory groups, respectively), indicating respondents are adapting the members of advisory groups to the questions being asked. Scientific entities and commercial fishers are the two most frequently represented groups in every policy area, showing these two stakeholders have the most input into fisheries policymaking processes.

Translating the frequency of representation in advisory groups to actual influence on policy decisions is challenging as the nature of how and where advisory groups are used varies across respondents. Consequently, it is difficult to understand the impact of these groups and the extent to which they conform to best practice, since the best practice will vary with how and where the groups' advice is being used. For example, advisory groups can become lobbying channels for vested interests if certain groups are over represented. While the transparency afforded by advisory groups is positive, it does not preclude the existence of more opaque lobbying channels that can give individual stakeholders a disproportionate influence on the policy process. In cases where respondents do not use advisory groups (five countries in

the case of this survey), this does not necessarily mean there are no mechanisms for representing various stakeholders; such mechanisms may be in place, but simply not captured by the survey. In the cases of countries and economies with no advisory groups, it is not possible to make inferences on the representativeness or inclusivity of the fisheries policy process.

Figure 5.3. Frequency of representation of different stakeholders in at least one group by policy area



Note: The lowest represented stakeholders have been omitted from the chart for readability, these are representatives of recreational and artisinal fishers, sub-national bodies and other. The category of 'Other' policy areas has also been omitted.

Consensus-based decisions are common in Regional Fisheries Management Organisations

Decisions on the management of multilateral fisheries are often taken at the RFMO level. For example, the adoption of conservation and management measures (CMM), MCS procedures, the validation of IUU vessels list and the allocation of catch quotas generally need to be agreed by RFMO members. The decision-making processes at RFMOs are therefore, a vital component of global fisheries governance and understanding the strengths and weaknesses of these processes is important. The risks associated with different decision models, voting systems, and objection processes all have important implications for the management of fisheries.

Of the 13 RFMOs surveyed by Hutniczak, Delpeuch and Leroy (2019[4]) (Annex Table 5.A.1), five rely on consensus-based decision making while eight allow for some form of majority voting (Table 5.5). Consensus decision making, where all parties need to be in agreement before a decision is made, is one of the most co-operative forms of decision-making. Consensus decisions ensure that the interests of minority parties are protected in RFMOs and should, in theory, foster a sense of ownership among the members of the shared resource and its management. This sense of ownership should increase compliance as all the resource users have understood and agreed with the rationale for any management actions taken (Leroy and Morin, 2018[10]). This sense of ownership is of particular importance for multilateral fisheries and RFMOs as their ability to enforce regulations can be limited, meaning they rely on members to ensure their own compliance. Where there are conflicting interests, however, consensus decisions tend to support the status quo, hampering decision-making and the adoption of changes to management regimes. Further, the need to find a position on which all parties agree can require a

substantial amount of negotiation and lead to recommendations or changes based on a consensus that are watered down and not fully aligned with the scientific advice that was the basis of the negotiations. The drawbacks of making decisions by consensus has been highlighted by COVID-19 and the need for RFMO meetings to take place online, significantly reducing negotiating time.

In majority voting all members are equally powerful, thus individual members are not able to impede decisions on management measures they may disagree with. However, while many RFMOs allow for majority voting in principle, in practice they often try to find a consensus (Leroy and Morin, 2018[10]). This preference is likely linked to objection procedures, which can allow RFMOs members to opt out of decisions with which they disagree. These procedures, which are part of the voting processes in many RFMOs, can undermine decisions made by voting, and if they relate to the allocation of fishing opportunity can complicate the goal of achieving sustainable catches in the area of competence.

Table 5.5. Decision-making processes in Regional Fisheries Management Organisations

RFMO	Procedure	Objection	Justification of the objection	Specific framework for the objection	Objection review process	Comments
CCSBT	Consensus	-	-	-	-	Rules of procedure updated in 2017.
GFCM	Majority vote	Allowed	Required	Not specified	Not specified	Agreement amended in 2014.
IATTC	Consensus	-	-	-	-	Performance Review from 2016 highlights the limitations of the IATTC's model of governance (Moss Adams LPP, 2016[11]).
ICCAT	Majority vote	Allowed	Required	Specified	Not specified	However, decisions are normally reached by consensus (e.g. to date voting has not been required for IUU list).
IOTC	Majority vote	Allowed	Not specified	Not specified	Not specified	
NAFO	Majority vote	Allowed	Required	Specified	Established (at the request of a CP)	However, decisions are normally reached by consensus. The NAFO Convention was amended in 2017.
NEAFC	Majority vote	Allowed	Not specified	Not specified	Not specified	Amendment on required justification of objection proposed in 2003 but not adopted to date.
NPFC	Majority vote	Allowed	Required	Specified	Established (at the request of a CP)	Some decisions require consensus, e.g. on terms and conditions for any new fisheries in the Convention Area (including allocation of fishing opportunities). Commission invites minimum two non-member experts for a requested review.
SEAFO	Consensus	-	-	-	-	Decisions on matters of substance are taken by consensus and default to consensus in case of lack of agreement on the importance of the decision.
SIOFA	Consensus	-	-	-	-	Decisions on matters of substance are taken by consensus and default to consensus in case of lack of agreement on the importance of the decision.
SPRFMO	Majority vote	Allowed	Required	Specified	Established (automatic)	However, decisions are normally reached by consensus.
WCPFC	Majority vote	Allowed	Required	Specified	Established (at the request of a CP)	However, decisions are normally reached by consensus.
CCAMLR	Consensus	-	-	-	-	

Note: Text in bold indicates best practice.
Source: Hutniczak, Delpeuch and Leroy, (2019[4]), *Intensifying the Fight Against IUU at the Regional Level.*

All RFMOs surveyed by Hutniczak, Delpeuch and Leroy (2019[4]) allow for objections as part of the voting process; however, in two cases (IOTC and NEAFC) the objection process is unconditional and no formal justification is required. The lack of transparency in unconditional objection processes does not contribute to building a common understanding nor increases trust between members required to manage stocks jointly. Mandating justification for objections in RFMOs voting processes can increase transparency and in theory improve the management of stocks in their areas of competence. For this reason, the majority of RFMOs that use voting processes require objections to be justified (e.g. GFCM, ICCAT, NAFO, NPFC, SPRFMO and WCPFC).

Specifying the grounds on which objections can be made can further facilitate decision making by RFMOs. Several RFMOs, for example, only allow objections on the grounds of discrimination against the member or inconsistency with the convention (ICCAT, NAFO, NPFC, SPRFMO and WCPFC). Further, four RFMOs (ICCAT, NAFO, NPFC and SPRFMO) require the objecting parties to present an alternative which is consistent with the CMM being discussed. Another best practice for transparent objection processes is the establishment of a panel to review the objection. Several RFMOs allow for the formation of a review panel, if requested by the member, but only the SPRFMO has a process to form a panel and review the objection automatically. The SPRFMO is the only RFMO reviewed with an automatic review process, majority voting and a limited scope for objections.

Finding a consensus continues to be a common approach for decision-making in RFMOs, even when the mechanisms for majority voting are in place. For example, ICCAT has never used the option to vote on the validation of IUU lists (Hutniczak, Delpeuch and Leroy, 2019[4]). The weaknesses in some voting processes likely explain this continued reliance, as RFMOs try to manage the risks of members opting out of individual CMMs. Nonetheless, the example of the SPRFMO highlights a promising mechanism for ensuring a voting process can represent the views of all members while ensuring timely decisions. The inherent challenges with respect to decision making and the opportunities for reform to facilitate the process are also highlighted by the COVID-19 pandemic. The cessation of in-person meetings has led to the deferral of important but non-urgent decisions as virtual meetings face technological, temporal, and social constraints (Box 5.2). The longer in-person meetings remain impossible, the more important it will be for RFMO to review their decision-making processes to ensure they can continue to manage stocks in their areas of competence effectively.

Box 5.2. Impact of COVID-19 on decision-making in Regional Fisheries Management Organisations

A recent survey of 13 RFMOs by the OECD has shown that the COVID-19 pandemic has had significant impacts on decision making in RFMOs (Annex Table 5.A.1). Notably, travel restrictions implemented in response to the spread of COVID-19 have prevented many RFMOs from holding planned in-person meetings. As of July 2020, nearly all RFMOs (92%) had experienced disturbances to their scheduled meetings. As travel restrictions continue into 2021, understanding how to use virtual meetings effectively for all decisions, and not just a subset of the most urgent issues, will become increasingly important. Countries and RFMOs need to co-operate and communicate regularly to identify and resolve potential disagreements, and to advance policy development and implementation, outside of the scheduled meeting times. The sharing of best practices between RFMOs (and with their members) on the most effective tools and methods to facilitate negotiations in a virtual setting is also important.

The switch to virtual meetings has exacerbated existing issues around RFMO decision making, with 85% of surveyed RFMOs reporting disruptions in their decision-making processes. For example, virtual meetings have usually had reduced agendas, which has limited discussion of important but not urgent issues. For example, discussion of scientific work on the basis of research surveys (i.e. CCBST, NPFC

and IOTC), the agreement on new conservation and management measures (CMMs) or quotas (i.e. NEAFC and WCPFC), and strategic discussions (i.e. GFCM) have been deferred by various RFMOs. Delaying decisions on topics not considered urgent could undermine the management of multilateral fisheries if this leads to delays in the adoption of new CMMs and to changes of existing management where necessary.

Decisions on what items to include on truncated meeting agendas, and which to defer, can have important consequences for fisheries management. For example, some RFMOs have been under pressure to allocate time to particular topics of interest to some parties, such as expanding catch quotas, but which may crowd out other important issues. Transparency in the setting of agendas is crucial to ensure the interests of all parties are considered and there is broad agreement among members on the topics to be covered.

In general, virtual meetings have limitations beyond reduced agendas, which may have important impacts for decision making and the governance of multilateral fisheries. The participation of countries in virtual meeting can suffer from technological constraints. Internet connections can be unreliable, particularly in developing countries and regions such as the Pacific or West Africa, limiting the ability of certain members to participate in discussions. For example, WCPFC and ICCAT have experienced disrupted online communication with members from those regions. If some parties are unable to partake in the discussions, this could reduce the chance of reaching consensus and delay decisions, or undermine equality by leading to better connected countries achieving more favourable decisions.

Secondly, the switch from in-person to virtual meetings has social impacts that are difficult to measure. The richness of the communication medium impacts the speed and outcomes of negotiations, and electronic negotiations can lead to reduced levels of trust, less co-operation, and lower levels of satisfaction with results compared to face-to-face negotiations. Several RFMOs and countries also noted how the switch to virtual meetings means informal conversations and side meetings are no longer possible, or considerably more complicated to arrange. The loss of these communication channels can make negotiations of contentious issues more challenging and additional efforts are required by members to address these issues through other communication channels. Equally important, the longer face-to-face meetings continue to remain impossible, the more likely it is that members become alienated from decisions. This could lead to tensions that would undermine the legitimacy of any decisions taken (if majority decisions are allowed), with consequences for the organisation and fisheries in question.

The sharing of best practices between RFMOs for negotiating CMMs and other issues in a virtual setting is vital to help overcome these issues. Understanding why some RFMOs have been more effective at using the virtual tools than others, which tools are most effective and how to facilitate virtual negotiations is key. Initiatives such as the FAO's Regional Fisheries Bodies Secretariats' Network (RSN) could act as an important forum for discussion and sharing of best practices. Further, the review of intersessional decision-making processes (rarely used at present) to make decisions on topics which cannot be covered in virtual meetings would help ensure issues are negotiated and implemented in a timely manner. For example, integrating new technology, and reviewing decision timelines could help RFMOs adapt to the rapidly evolving situation. Formalising an extraordinary process, such as introducing special clauses or frameworks for similar events in the future, would help increase RFMO's resilience to shocks.

Source: OECD (forthcoming[12]) *COVID-19 and Multilateral Fisheries Management*.

5.4. Institutional arrangements for coherent and effective fisheries governance

Institutions are central to fisheries governance. However, linking institutional arrangements to measureable policy outcomes is challenging given the wide range of other factors involved and the difficulties in understanding how institutions differ across countries and economies. A first step is to collect data on the types of institutions involved in fisheries policy and the role they play in fisheries governance. These data are key to understanding how different institutional arrangement influence fisheries policy outcomes.

In the majority of survey respondents (94%), the main entity in charge of fisheries policy is part of the government, i.e. a ministry or sub-ministerial agency. However, in Sweden and Costa Rica, fisheries are under the responsibility of public independent agencies, the Swedish Agency for Marine and Water Management (*Havs- Och Vattenmyndigheten*) and INCOPESCA (*Instituto Costarricense de Pesca y Acuacultura*) respectively. These agencies are bodies which implement government policies but do not have a vertically integrated hierarchical relationship with a parent ministry or department (Laking, 2006[13]). The use of such agencies is thought to lead to better management as organisations with clear and specific objectives will out-perform those with unclear or multiple objectives. Secondly, independent agencies also lead to increased legitimacy, as the decisions made should (in theory) be free from direct political interference. However, this legitimacy depends on the ability of these agencies to balance stakeholder influences effectively (see above). Also, the formation of an agency in the first place is a strong signal of the regard in which a particular issue is held by the government (Laking, 2006[13]).

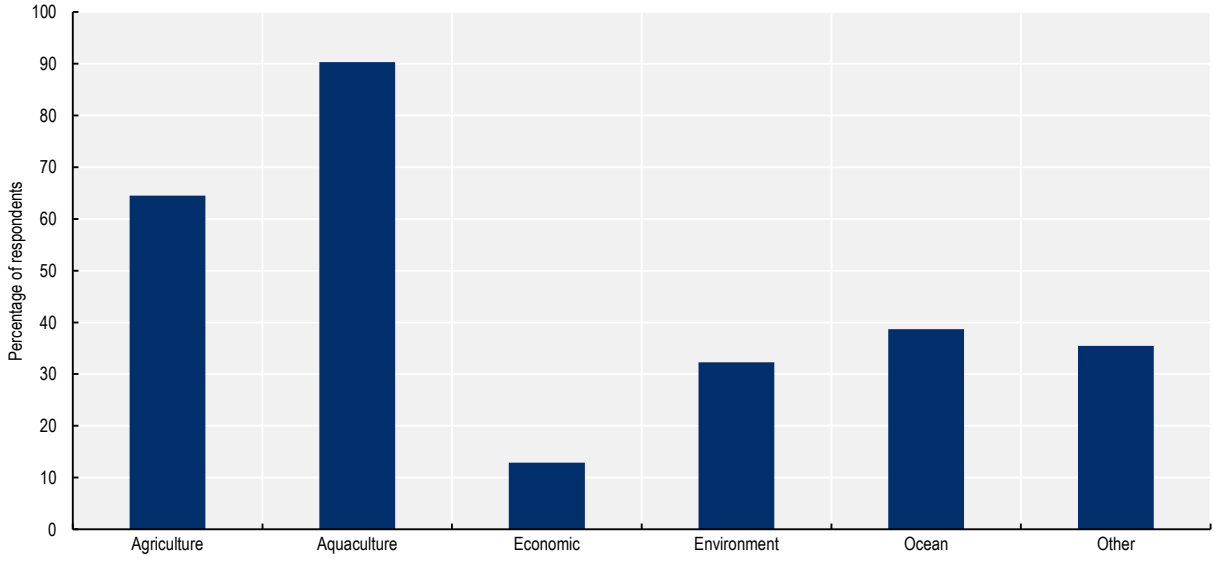
In general, the main entities in charge of fisheries are national entities. The exception is Belgium, where the main fisheries body is the *Vlaamse overhead – Departement Landbouw en Visserij* (Flemish authorities — Department for agriculture and fisheries). The overwhelming preference for national-level entities is a reflection of the geographic spread of marine resources and the societal (and sometimes strategic) importance of fisheries. Belgium is an exception – most likely the result of decentralisation and geography – as its entire coastline is part of the Flemish region.

For 55% of the survey respondents, responsibility for fisheries management was shared with sub-national entities. The decentralisation of responsibility for fisheries management can allow for a more nuanced approach to policy creation and implementation with the adoption of context appropriate solutions to management challenges. However, the high mobility of marine resources and the legal complexities related to managing coastal and marine areas mean the responsibility for managing fisheries can be shared (and sometimes overlap) between regional, national, provincial, and municipal agencies. Complicated institutional structures can create issues of policy coherence, especially if the different institutions have divergent policy objectives. National level entities can play an important co-ordinating role in the formation and implementation of fisheries policies and ensure the consistent application of norms and regulations. Moreover, given that the collection of fisheries data often occurs locally, the harmonisation of data standards and the aggregation of local data by national entities is vital for evidence-based policymaking (see above). Effective co-ordination of local implementation and data collection are essential to ensuring management decisions in one area do not have negative impacts in another.

Coherence with other policy domains is important for effective fisheries governance. All of the entities in charge of fisheries are also responsible for other policy portfolios, the most common area being aquaculture (90%) (Figure 5.4). For 65% of survey respondents, the entity in charge of fisheries was also in charge of agriculture, reflecting a general grouping of sectors which relate to food production. Multiple sectors use marine resources (e.g. fisheries, maritime transport, extractive industries), and while each individual industry may not have a major detrimental impact on marine resources if considered individually, this could change if considered collectively as the impact of each sector can either act additively or synergistically on marine resources. Indeed, the impacts of all the sectors using marine resources may be greater than the sum of the individual sectors, highlighting the importance of managing the impacts of the economy on marine resources in a coherent way.

Differences between ocean and land based sectors of the economy result in different sets of challenges for policy makers. In particular, the intrinsic connection between ocean-based sectors and their dependence on the environment can complicate policymaking (OECD, 2016[14]). In recognition of the unique governance challenges faced by marine areas, several countries have ministries dedicated to the ocean, the most recent of which is the *Ministère de la Mer* (Ministry of the Sea) created by France in 2020.[4] The grouping of sectors under the same ministerial portfolio should allow for greater coherence between the various sectors relating to the use of marine resources, as well as help governments to ensure the combined impact of these sectors does not negatively impact marine resources.

Figure 5.4. Additional areas of responsibility for the main entity in charge of fisheries



Note: "Other" policy areas listed are broad and include rural development in Viet Nam, forestry in Argentina, and Turkey and trade in Norway.

For 32% of the survey respondents, the entity in charge of fisheries is also in charge of environmental policy, and in 13% that entity is also responsible for economic policy. For 39% of respondents, the main fisheries entity is in charge of other policy areas, beyond agriculture, aquaculture, economy, environment and ocean. These other areas are broad and include rural development in Viet Nam, forestry in Argentina, New Zealand and Turkey and trade in Norway.

Having multiple policy portfolios in a single ministry can help co-ordinate policy actions, particularly if the areas have shared features; for example, entities for marine (and ocean) policy are present in Korea, Poland, Sweden, Canada and France. However, ministerial portfolios change frequently and the movement of fisheries between different ministries is relatively common (Delpeuch and Hutniczak, 2019[1]). A good example of this is Korea, where the Ministry of Maritime affairs and fisheries was established in 1996, then merged with the Ministry of Construction and Transportation in 2008 to form the Ministry of Land, Transport and Maritime Affairs, with the fisheries portfolio instead being merged with the Ministry of Agriculture and Forestry. In 2013, it was re-established as the Ministry of Oceans and Fisheries. Irrespective of the institution in which related policy areas are housed, specific mechanisms for co-ordinating policymaking, such as inter-agency groups, are required for effective co-ordination of fisheries policies with other areas. Co-ordination mechanisms can be created at all levels of government involved

in fisheries policy (national, provincial, municipal) to help keep local implementation of fisheries policy consistent with national norms and regulations.

5.5. Conclusion

Good governance is fundamental to good fisheries management. The importance of basing fisheries policies on sound scientific evidence is universally recognised. In particular, SDG target 14.4 calls for the implementation of science-based management plans. There is a need to integrate better scientific and socio-economic data into fisheries governance systems by embedding the use of data into policy-making processes (where possible) and investing in data collection. Increasing the use of evidence to make policy can also help avoid negative outcomes from policy change and increase legitimacy. All the countries and economies surveyed use scientific data at some stage of the fisheries policy-making process.

The widespread use of both scientific and socio-economic data in fisheries management decisions is positive insomuch as it facilitates evidence-based policymaking. However, while data are used to some extent across all the countries and economies responding to the survey, understanding how that translates into evidence-based policymaking is challenging. Secondly, the use of socio-economic data is less frequent than scientific data despite the importance of understanding the impacts of fisheries policy change on broader socio-economic systems.

Transparent mechanisms for stakeholder participation in the governance process are crucial for building legitimacy for fisheries policy and policy change. Advisory groups are a promising mechanism for facilitating an open dialogue between stakeholders and policy makers, and can allow a broad range of stakeholders to have a direct influence on policy areas that may impact them. In recognition of the important role stakeholder participation plays in fisheries governance, 81% of the survey respondents have at least one advisory group for fisheries policy and the majority of these respondents have more than one advisory group. Governments must also carefully manage the balance of stakeholders in each group, which depends on policy area(s) it is advising on. Across all advisory groups, commercial fishing interests were the most frequently represented group, followed by scientific entities. These were the only two interest groups represented in the majority of advisory groups. More inclusive and transparent mechanisms for participation in governance could improve the legitimacy of reforms.

The entity in charge of creating fisheries policy is a foundational component of governance systems. Institutional structures can be complicated, and a better understanding of how different structures impact policymaking is crucial to improving fisheries governance, in particular how institutions can facilitate increased co-ordination and coherence between policies for all the sectors using marine resources. Housing several related policy areas within the same ministry can aid with policy co-ordination, and across all survey respondents the entity in charge of fisheries policy was in charge of other policy areas, most commonly aquaculture (90%) and agriculture (65%). However, despite the fundamental role institutions play in fisheries governance, the impact of different institutional arrangements remains largely unknown.

Multilateral fisheries governance, in particular by regional fisheries management organisations (RFMOs), faces different challenges around the use of data, transparency, and stakeholder participation in decision making. Many RFMOs, for example, have mechanisms for co-operation on the listing of IUU vessels (i.e. cross listing) which can be a cost effective mechanism to prevent the products of IUU fishing from entering fisheries value chains. However, listing practices tend to be applied inconsistently and often allow for objections from RFMO member countries, and thus limits their utility for fighting IUU fishing. Further, while RFMOs increasingly allow for majority voting in decision making, the desire to find a consensus among member is still widespread, potentially hampering and slowing the adoption of policy change. Such issues have become more apparent with the COVID-19 pandemic, which has resulted in delays and deferrals of decisions with the switch to virtual meetings and increased opportunities for IUU fishing in

multilateral fisheries. RFMOs could examine data-sharing and decision-making processes to facilitate decision making and fight IUU fishing.

Creating governance systems that allow for a data-driven, transparent, and inclusive process of policy change, while carefully balancing the inputs of interested stakeholders is a challenging task for governments and RFMOs. Building an evidence base of the types of institutions and mechanisms used to achieve good governance globally is key for identifying opportunities to reform the governance systems of both national and multilateral fisheries to achieve equitable and sustainable policy outcomes. The survey evidence provided in this chapter represents a first step in this direction.

Annex 5.A. Additional data and information

Annex Table 5.A.1. Regional Fisheries Management Organisations included in the OECD survey

Acronym	Organisation name	Type of mandate
CCAMLR	The Commission for the Conservation of Antarctic Marine Living Resources	Generic
CCSBT	The Commission for the Conservation of Southern Bluefin Tuna	Tuna
GFCM	The General Fisheries Commission for the Mediterranean	Generic
IATTC	The Inter-American Tropical Tuna Commission	Tuna
ICCAT	The International Commission for the Conservation of Atlantic Tunas	Tuna
IOTC	The Indian Ocean Tuna Commission	Tuna
NAFO	The Northwest Atlantic Fisheries Organization	Generic
NEAFC	The North East Atlantic Fisheries Commission	Generic
NPFC	The North Pacific Fisheries Commission	Generic
SEAFO	The South East Atlantic Fisheries Organisation	Generic
SIOFA	The Southern Indian Ocean Fisheries Agreement	Generic
SPRFMO	The South Pacific Regional Fisheries Management Organisation	Generic
WCPFC	The Western and Central Pacific Fisheries Commission	Tuna

Annex Table 5.A.2. Representation of stakeholders on advisory groups for a specific policy area across survey respondents, %

	Allocation of fishing rights or quotas	Fisheries management in general	Fisheries management specific	Identification of technical parameters	Preparation of a management or rebuilding plan	Preparation of a specific reform	Other policy
Artisanal fisher representatives	23.1	42.3	26.9	15.4	23.1	11.5	3.8
Civil society organisations	23.1	38.5	30.8	34.6	30.8	26.9	19.2
Commercial fisher representatives	42.3	80.8	53.8	38.5	50.0	42.3	26.9
Downstream industry representatives	34.6	53.8	42.3	26.9	38.5	38.5	11.5
Entities in charge of other policy domains	23.1	46.2	34.6	38.5	34.6	30.8	23.1
Recreational fisher representatives	26.9	38.5	26.9	26.9	30.8	19.2	7.7
Representatives of other commercial activities	19.2	42.3	15.4	19.2	19.2	19.2	11.5
Scientific entities	38.5	76.9	61.5	73.1	65.4	42.3	26.9
Sub-national bodies	26.9	42.3	38.5	26.9	34.6	30.8	15.4
Other	11.5	34.6	30.8	23.1	26.9	26.9	23.1

Note: Each cell shows the percentage of survey respondents with an advisory group for a policy area that contains a specific stakeholder. The percentage is based on the number of respondents that use advisory groups (26), and excludes those that do not (5).

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Notes

[1] While the survey data provide insights into some crucial elements of the fisheries governance system (institutions, transparency, participation and the use of evidence), there are other important aspects that are not covered. The level of coherence of fisheries policy with other policy areas (e.g. environmental and social policies) and mechanisms for accountability of policy creators to stakeholders were not measured by the survey despite being important components of fisheries governance. Neither did the survey collect data on the simplicity of fisheries' rules (the ease with which they can be understood and complied with by fisheries actors) nor the mechanisms for compliance, both of which are crucial for effective policy implementation and change. So while the data highlighted below are a good basis on which to understand the fisheries governance systems across a range of countries and economies, more data are required to make concrete links between these systems and fisheries policy outcomes.

[2] The Commission for the Conservation of Southern Bluefin Tuna, The General Fisheries Commission for the Mediterranean, The International Commission for the Conservation of Atlantic Tunas, The Indian Ocean Tuna Commission, The Northwest Atlantic Fisheries Organization, The South East Atlantic Fisheries Organisation, and The Southern Indian Ocean Fisheries Agreement.

[3] The Commission for the Conservation of Antarctic Marine Living Resources and The Western and Central Pacific Fisheries Commission.

[4] This ministry existed from 1981 to 1991.

OECD Review of Fisheries 2020

The *OECD Review of Fisheries 2020* aims to support policy makers and sector stakeholders in their efforts to deliver sustainable and resilient fisheries that can provide jobs, food, and livelihoods for future generations. The *Review* updates and analyses the OECD fisheries support estimate (FSE) database, the most comprehensive, detailed, and consistent collection of country level data on governments support to fisheries. It also presents and analyses newly-assembled data on the health of fish stocks; on the management of key stocks of commercial interest; and on the governance of fisheries across OECD countries and emerging economies with large fishing sectors. The report sheds light on how governments are managing fisheries to minimise detrimental impacts on resources and ecosystems, eliminate illegal, unregulated and unreported (IUU) fishing, while increasing the socio-economic benefits from fishing. It suggests priorities for action both at the national level and for the international community.

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