POTENTIAL WELFARE IMPACT OF FISHERY SUBSIDY REMOVAL

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ABSTRACT

The main objective of this paper is to analyze the potential economic impact of fisheries subsidies removal in case of applying the World Trade Organization's (hereinafter "WTO") agreement on fisheries subsidies. The existence of substantial annual global amounts of fisheries subsidies contributes to unsustainable levels of fishing capacity. It is estimated that more than one-third of the world's fish stocks are overexploited. Although an initial WTO subsidy agreement was reached at the twelfth ministerial conference on 17 June 2022, up to date twenty percent of additional WTO members are needed to submit acceptance for the agreement on fisheries subsidy to come into effect.

Analytically, the final effects of subsidy removal will depend on time horizon, spatial scale, and social and political context. The potential dynamic impact of fishery subsidy removal is a complex issue with a wide range of potential outcomes. Some of the most likely impacts include increased fish stocks, increased competition, improved fish welfare, increased food security, decreased illegal fishing, temporary Job losses, and Increased prices.

Based on the partial economic analysis adopted in this study, the potential net welfare impact of fishery subsidy removal is expected to be positive for both exporting and importing countries. Furthermore, the study provided many economically rational justifications for

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countries to abandon fisheries subsidies. In light of the study findings, policymakers in all countries are strongly recommended to take the necessary steps needed to finalize the WTO's fisheries agreement.

KEYWORDS: *fisheries subsidies, WTO, economic welfare, unsustainable fishing capacity*

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I. ECONOMIC BACKGROUND

Basic economic theory tells us that perfectly competitive markets will produce an efficient allocation of resources. Hence any government policy intervention that affects price signals of free competitive markets will produce less efficient resource allocation. The efficiency of competitive markets theory is taken as a major argument by classical economists in support of a free market economy with virtually no economic role for government. The classical economic view came about as an alternative to the protectionist and mercantilist view which was dominant in Europe before the eighteenth century. Nearly all classical economists rejected government interference with market exchanges, preferring a looser market strategy known as laissez-faire.[1] Accordingly, all forms of government policies such as taxes, subsidies, price control, tariffs, and, quotas are not economically justified since all lead to certain market distortion. For example, fisheries subsidies contribute to overcapacity and overfishing and are inefficient. However, there are many ways in which markets can fail (market failures). Popular types of market failures include imperfect competition, externalities, market uncertainty, and public goods. Governments generally intervene to remedy these shortcomings by antitrust legislation, the regulation of markets, and/ or the internalization of externalities through taxes and the provision of public goods or the establishment of property rights and providing timely

[1] Classical economic theory was developed shortly after the birth of Western capitalism. It refers to the dominant school of thought for economics in the 18th and 19th centuries. It helped countries to migrate from monarchic rule to capitalistic democracies with self-regulation. Adam Smith's 1776 release of the Wealth of Nations highlights some of the most prominent developments in classical economics.

market information. However, the classical economic view was challenged twice by Marxist and Keynesian views. The first called for full control by government of markets and the means of production and did not leave a lasting contribution to economic theory. The second and more significant challenge to the classical economic view emerged in the 1930s and 1940s, through the writings of British mathematician John Maynard Keynes who believed that free-market economies tended toward underspending and would not produce fair income distribution. He called this a crucial economic problem and used it to criticize high interest rates and individual preferences for saving and less consumption. Keynesian economists called for a more active economic role of government in economic affairs. They emphasized the important role of government fiscal policy in promoting economic growth and stability. After the Great Depression and World War II, the Keynesianism view had replaced classical and neoclassical economics as the dominant model among world governments.[2]

II. DEFINITION OF FISHERIES SUBSIDIES

A fisheries subsidy is a government policy intended to supplement producers' income or lower their costs to give an advantage either to consumers or extractors of fish. The term "*fisheries industry*" refers to all productive subsectors of the fisheries and aquaculture sector, i.e., all types of input industry—including transport and other support services—capture fisheries, aquaculture, processing, and marketing. It covers all producers and operators, both small and large-scale, engaged in recreational, subsistence, and commercial activities.[3]

According to World Trade Organization (hereinafter "WTO"), a subsidy exists if "there is a financial contribution by a government or any public body within the territory of a member," and this contribution fulfills certain specified conditions, or if "there is any form of income or price support in the sense of Article XVI of GATT 1994." Moreover, benefits have to be conferred. For the subsidy to be offensive, it also has to be "specific", "prohibited" or "actionable" and cause an "adverse effect".[4] However, a more general definition of subsidy does not require the fulfillment of all these conditions; an action or inaction is considered a subsidy if it is outside of normal practices and it affects the profits of the fisheries industry.[5]

[2] Keynesian economics is sometimes referred to as "depression economics," as Keynes' General Theory was written during the time of the world's great depression—not only in his native United Kingdom but worldwide.

[3] LENA WESTLUND, GUIDE FOR IDENTIFYING, ASSESSING AND REPORTING ON SUBSIDIES IN THE FISHERIES SECTOR 7 (2004).

[4] Agreement on Subsidies and Countervailing Measures, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1, 1869 U.N.T.S. 14.

[5] *See* WESTLUND, *supra* note 3, at 8 (Box 1).

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According to the Organisation for Economic Cooperation and Development (OECD), "the concept of assistance to the fishing industry in a country should be defined as government intervention or lack of government intervention which distorts the allocation of resources in that country relative to an efficient allocation."[6]

For this particular study, the concept of fisheries subsidies is limited to the aggregate industry or country level and refers to public action that affects the cost/price and hence the profit of the industry.

III. ASSESSING FISHERY SUBSIDY AT THE COUNTRY LEVEL

To estimate the size of fishery subsidy at a country level with a reasonable degree of accuracy, one needs to identify all forms of fisheries subsidies covered in the above definition. First, the focus should be on the review of the fisheries sector itself to identify and investigate all fisheries-specific policies and regulations including public market interventions in the fisheries sector, fisheries management and access right regimes, water and land use regulations for aquaculture, fish safety and hygiene regulations, capital markets and credit schemes relevant to the fisheries industry, tax regulations for the fisheries industry, social security policies and regulations about labor in the fisheries industry, trade regulations and border measures regarding fish, fishery products and input goods.

Secondly, all stakeholders of the fisheries industry should be identified including all government agencies and organizations that are involved in the fisheries sector and that may provide subsidies—in one form or another—to the sector: the relevant bodies may be fisheries-specific agencies—such as a fisheries ministry or department—or non-fisheries, e.g., a research institute or a health authority, international organizations or foreign donor governments, semi-public and interest groups in the form of, for example, trade unions or producer organizations, which should also be identified. Also, all actors in the fisheries industry like the companies and individual operators that are active in fishing, aquaculture, production of inputs, processing, marketing, and trade, etc. should be identified too.

In addition to the fisheries sector, the overall economic and institutional frameworks within which subsidies are to be defined need to be carefully understood. In particular, macro-economic and institutional frameworks to be used for identifying and assessing fisheries subsidies could include the following:

1. **Policy and legal framework:** The overall political framework regarding the role of the public sector needs to be understood to encompass all related government policies toward cost recovery of public services,

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[6] *See id.* at 11 (Box 2).

types of market interventions, the role of state-owned enterprises, and types of support programs for businesses. Also, when needed to identify ministries or government departments responsible for these policies and programs and how they are organized. Other more specific policy and legal matters have to be explored, particularly in areas that are likely to be relevant to the fisheries sector, e.g., environmental policies and general pollution control measures, food safety and sanitation standards, labor and employment laws, and practices regarding user right policies in the natural resources sector.

2. **Monetary policies and interest rates:** Information on the various instruments of monetary policy particularly on interest rates is needed for determining whether the fisheries industry benefits from loans on favorable terms and for assessing other possible subsidies related to investments. Other information on other general loan and credit conditions, as well as information on credit systems and institutional set-up of the financial and credit sector, will be useful.
3. **Tax and social security policies:** Information on the overall public revenue and tax system that might be relevant includes Value-Added Tax rates, for different goods and services if differentiated, and corporate tax rates including general rules for, among other things, depreciation allowances for fixed assets and tax deference possibilities. Concerning employment and labor costs, the main features of the tax systems for individuals need to be covered as well as the general social security structure, including rules for obligatory contributions and common benefits.
4. **Trade policy and border measures:** Tariff and non-tariff border measures should be studied giving details on differences between different types of goods and services. Border restrictions on direct investments, ownership, or the exertion of certain professions or commercial activities also need to be considered as well as regulations concerning immigration and labor movements. Depending on the scope of our study, we may also want to know what relevant international trade agreements there are and what regulations are applied by our main trading partners.
5. **Exchange rates policy:** any capital movement or foreign currency restrictions should be looked at, especially if they apply in different ways to different sectors of the economy. Official and unofficial exchange rates of importance to the business community should also be looked at.

IV. ESTIMATES OF THE SIZE OF FISHERY SUBSIDY

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The estimates on the global amounts of fisheries subsidies vary and range

from US$15-54 billion annually.[7] Sumaila et al. (2019) provided an updated estimate of global fisheries subsidies at US$35.4 billion in 2018, of which capacity-enhancing subsidies are US$22.2 billion. The top five subsidizing political entities (China, the European Union, the USA, the Republic of Korea, and Japan) contribute 58% (US$20.5 billion) of the total estimated subsidy.[8] Fisheries subsidies organized by category and according to their importance are capacity-enhancing subsidies (fuel subsidies and boat construction and renovation programs), beneficial subsidies (management subsidies to the fishing sectors), and ambiguous subsidies (mainly in the form of fisher assistance programs), respectively. The three categories of subsidies are mostly provided in developed countries. The capacity-building category of fisheries subsidies is the one contributing most to unsustainable levels of fishing capacity.

The wide range of estimates is partially because fisheries subsidies come in many shapes and forms. Fisheries subsidies include direct transfers of funds, income or price support measures, tax credits, exemptions and rebates, low-interest loans and guarantees, preferential treatment, and the use of regulatory support mechanisms. Not all estimates include all forms of support to the industry, for example, some estimates neglect funding for fisheries management, such as data collection and control and enforcement, or the possible absence of access fees. In addition, the estimate depends on available information on subsidized lending such as (i) the subsidization rate; (ii) the amount of reduced interest rate; (iii) the time of maturities associated with government-guaranteed loans; and (iv) the amount of forgiven loans. According to Milazzo (1998), in the absence of such information, 10% of the principal amount is a reasonable measure of benefits for all subsidized lending.[9]

V. JUSTIFICATIONS FOR THE REMOVAL OF FISHERIES SUBSIDIES

The growth and expansion of the fisheries sector is vital for the economic development of small and developing economies. Trade in fish and fish products increases fish consumption and connects producers to distant markets for which local supply may be insufficient and hence supports global food security. The sector also provides employment and generates income for millions of people. On the other hand, overfishing is a real threat to nearly

[7] U.N. ENV'T PROGRAMME, FISHERIES SUBSIDIES: A CRITICAL ISSUE FOR TRADE AND SUSTAINABLE DEVELOPMENT AT THE WTO: AN INTRODUCTORY GUIDE 2 (2008), https://wedocs.unep.org/bitstream/handle/20.500.11822/23020/Fisheries_Subsidies_Intro.pdf?sequence=1&isAllowed=y.

[8] U. Rashid Sumaila et. al., *Global Fisheries Subsidies: An Updated Estimate*, 69 MARINE POL'Y 189, 191-92 (2016).

[9] Matteo Milazzo, *Subsidies in World Fisheries: A Reexamination* 47 (World Bank, Technical Paper No. 406, 1998), https://documents1.worldbank.org/curated/en/133031468776403491/pdf/multi-page.pdf.

80% of all fish stocks and coastal ecosystems. To illustrate key terms used commonly in fishing research we use Figure 1 adapted from Hanah Ritchie (2021):[10]

Treating fish as a scarce economic resource, F* is the optimal rate of fishing at which the maximum possible level of fishing is achieved without depleting fish stock further. A lower rate of fishing than F* means catch is low and can be increased negatively affecting fish stock. Higher rates than F* mean that the catch is too high and should be lowered to avoid overfishing.

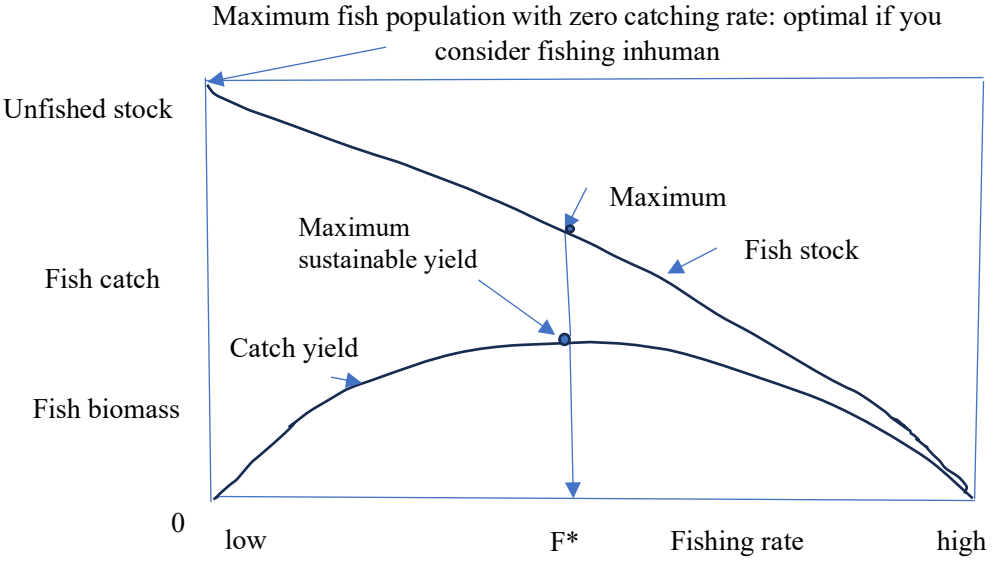


FIGURE 1: Illustration of Sustainable Fishing

Overfished or overexploited: this happens when the rate of fish catch is higher than the populations of fish can reproduce. As a result, populations decline and stocks become depleted to levels lower than the most productive level. In this case, fishing activity is unsustainable.

Maximally sustainably fished or fully exploited: This is the preferred situation when the maximal sustainable yield is achieved (at F*), where the rate of catch is as maximum as possible without reducing fish populations below the most productive level.

Underfished: in this case the rate of fish catch is less than the reproduction rate of fish populations. We could catch more fish without facing fish population decline. From a resource point-of-view, this is

[10] Hannah Ritchie & Max Roser, *Fish and Overfishing*, OUR WORLD IN DATA (Oct., 2021), https://ourworldindata.org/fish-and-overfishing.

underutilization and suboptimal, because the society is missing out on a key food source and income from available fishing communities.

According to Hannah and Roser (2021), more than one-third of the world's fish stocks were overexploited in 2017. Combined, underfished and maximally fished would be considered to be sustainable because fish stocks are not declining. One-third (34%) of global fish stocks were overfished in 2017. Two-thirds were biologically sustainable, where 60% were maximally fished, and 6% were underfished.[11] In addition, overfishing is an increasing trend and has tripled over the last three decades. Eggert and Greaker (2009) attributed unsustainable fishing practices to the following factors: (i) poverty; (ii) inadequate knowledge; (iii) ineffective governance; (iv) high demand for limited resources; and (v) interactions between the fishery sector and other aspects of the environment. They highlight the detrimental impact of trade liberalization and poor property rights on sustainable fisheries.[12] Moreover, nearly 90% of the world's marine fish stocks are now fully exploited, overexploited, or depleted, and there is no doubt that fisheries subsidies play a big role. In light of the clear and empirically proven link between fisheries subsidies and the depleting ocean resources it is important to have a multilateral agreement to gradually cut down fisheries subsidies for the following reasons:[13]

1. Without such subsidies, we could slow the overexploitation of fish stocks, deal with the overcapacity of fishing fleets, and tackle the problem of illegal, unreported, and unregulated fishing. This is important because fish accounts for 17% of all animal protein consumed in the world; at 26%, this share is even higher in the poorest and least developed countries, the ocean is also an important source of income, about 60 million people work in fisheries and aquaculture, and it is estimated that 200 million jobs are directly or indirectly connected with the fisheries sector.[14]
2. Abandoning fisheries subsidies will redirect public money from harm to recovery, rather than continuing support for harmful fishing and overexploitation: to bring fishing levels back in line with a healthy ocean, harmful fisheries subsidies that encourage overexploitation must come to an end.

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[11] *See id.* at 31.

[12] Håkan Eggert & Mads Greaker, *Effects of Global Fisheries on Developing Countries Possibilities for Income and Threat of Depletion* 2 (Univ. of Gothenburg, Working Papers in Economics No. 393, 2009), https://gupea.ub.gu.se/bitstream/handle/2077/21492/gupea_2077_21492_1.pdf?sequence=1&IsAllowed=y.

[13] *See, e.g.*, Vania Andreoli et al., *Fisheries Subsidies Exacerbate Inequities in Accessing Seafood Nutrients in the Indian Ocean*, 2 NPJ OCEAN SUSTAINIBILITY 1, 6-8 (2023); Rémi Parmentier, *Trade and Environment Review: Tackling Harmful Incentives and Unsustainable Fisheries Practices*, *in* TRADE AND ENVIRONMENT REVIEW 2016; FISH TRADE 63, 63-64 (2016).

[14] Mukhisa Kituyi, *90% of Fish Stocks Are Used Up – Fisheries Subsidies Must Stop*, UNCTAD (July 13, 2018), https://unctad.org/news/90-fish-stocks-are-used-fisheries-subsidies-must-stop.

3. Moreover, wealthy developed countries account for about 68% of global fisheries subsidies, leaving many other fishing-dependent communities struggling to compete with subsidized rivals, often risking their lives for smaller and smaller catches.[15] Experts estimate that 81% of governments' fisheries subsidies go to large industrial fishing vessels, which means that they are biased against small-scale fishers.[16] Environmental groups estimate that subsidies in some countries could account for half of the income of large industrial vessels.[17] This distorts access to marine resources at the expense of the many artisanal fishers for whom fishing is both a matter of survival and the heart of a rich cultural identity. Ending these harmful subsidies will help safeguard the many who rely on thriving fish stocks for survival and nutrition.
4. Wealthy countries have been directly funding wasteful overfishing and illegal fishing at the expense of small-scale fishing communities. "Overfishing has close ties to bycatch, the collateral catch of other marine life by fishing vessels targeting different species. Bycatch is a threat to ocean life and is especially damaging to endangered species like dolphins and sea turtles."[18]
5. As becomes clear, "an ever-increasing number of fish stocks are being exploited beyond sustainable levels, rather than funding more fishing in a way that harms lives and livelihoods, these resources could make a positive difference by supporting sustainable fisheries, aquaculture, and coastal livelihoods."[19]
6. Harmful fisheries subsidies can fuel illegal fishing using public funds. This negatively affects many coastal communities and the fishers who sustain them. Illegal fishing also costs governments money: estimates place the total value of illegal and unreported fishing losses worldwide at between US$19-45 billion. Illegal fishing is concentrated in regional waters in the Eastern Pacific, the Northwest Pacific, West Africa, Southeast Asia, and the Pacific Islands.[20] According to Arnason et al. (2009) and Arthur et al. (2019), the money devoted by governments to

[15] U. Rashid Sumaila et al., *A Bottom-Up Re-Estimation of Global Fisheries Subsidies*, 12 J. BIOECONOMICS 201, 214 (2010).
[16] Steve Trent, *WTO Agreement Boosts Efforts for a Sustainable Ocean*, THE REVELATOR (July 15, 2022), https://therevelator.org/wto-fishing-subsidies/.
[17] *World Trade Organization Bans Harmful Fisheries Subsidies*, EUROFISH MAG., Oct. 14, 2022, at 34.
[18] Alice Tipping & Tristan Irschlinger, *25 Reasons Why the WTO Must End Subsidies That Drive Overfishing*, INT'L INST. SUSTAINABLE DEV. (Nov. 2, 2020), https://www.iisd.org/articles/25-reasons-wto-stop-funding-overfishing.
[19] *Id.*
[20] *See* David J. Agnew et al., *Estimating the Worldwide Extent of Illegal Fishing*, 4(2) PLOS ONE 1, 2-3 (2009); Kevin Bray, *A Global Review of Illegal, Unreported and Unregulated (IUU) Fishing*, *in* EXPERT CONSULTATION ON ILLEGAL, UNREPORTED AND UNREGULATED FISHING 88, 93 (2001).

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fisheries subsidies is wasted money, and hence reform of existing fisheries policy is needed.[21]

7. In 2017, the World Bank estimated that unsustainable fishing has led to global fisheries that deliver US$83 billion per year less in benefits than they could. The only way that fisheries will be able to reach their full economic potential is to put an end to today's overexploitation of marine resources. Scientists have found that eliminating all harmful fisheries subsidies could result in an increase of 12.5% in global fish biomass by 2050. Hence, an ambitious WTO agreement will support a sustainable blue economy, providing livelihoods and jobs for billions of people who rely on fishing, tourism, shipping, and other ocean sectors.[22]
8. A truly sustainable and equitable seafood supply will help preserve ocean biodiversity and productivity for future generations and hence will contribute positively to sustainable economic growth worldwide, a first step along the path toward a better future laid out by the Sustainable Development Goals (SDGs). Very few benefit from harmful fishing subsidies, but everyone pays and everyone suffers from the consequences of an ocean in trouble. It's really simple: subsidies foster overfishing. Overfishing causes the collapse of vital ocean systems, from coastal coral reefs to the high seas.
9. A WTO deal on fisheries subsidies would contribute significantly to enhancing the mutual supportiveness of trade and the environment. Furthermore, the elimination, phase-out, or reform of incentives, including fisheries subsidies, that are harmful to biodiversity will contribute to protecting, and restoring ocean biodiversity and a WTO deal on harmful fisheries subsidies is a crucial step toward living in harmony with nature. Disciplining harmful fisheries subsidies would be a clear, concrete, and visible step in WTO history toward integrating trade and environmental protection to the benefit of both areas.
10. A healthy ocean is essential for the natural systems we rely on for the water we drink, the air we breathe, the food we eat, and, ultimately, the lives we live. By agreeing to end subsidies that drive overfishing, the WTO can move to protect our planet, kicking off a new and better era of action for climate, economies, and people. Instead of paying large industrial fleets to chase a growing number of fish stocks in decline, public funding can be used in a rational way that serves sustainable fishing activities.

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[21] *See generally* RAGNAR ARNASON ET AL., THE SUNKEN BILLIONS: THE ECONOMIC JUSTIFICATION FOR FISHERIES REFORM (2013); Robert Arthur et al., *The Cost of Harmful Fishing Subsidies* (iied, Working Paper, Mar., 2019), https://www.iied.org/sites/default/files/pdfs/migrate/16654IIED.pdf.

[22] WORLD BANK, THE SUNKEN BILLIONS REVISITED: PROGRESS AND CHALLENGES IN GLOBAL MARINE FISHERIES OVERVIEW 3 (2017), https://openknowledge.worldbank.org/server/api/core/bitstreams/26e62ec7-d867-5363-acda-bdee2ef38b34/content.

In conclusion, it becomes obvious that fishing is vital for the nutrition and livelihoods of billions of people, so we must make sure that marine resources and habitats are monitored, regulated, and managed in a way that guarantees a reliable fish supply for current and future generations. This means that fishing operations and policies must be designed with long-term sustainability at the core. The best suitable multilateral framework to remove such distorting fisheries subsidies and help nations to move gradually toward the objectives of sustainable development is through ratifying the WTO agreement on fisheries subsidies.

VI. WTO AGREEMENT ON FISHERIES SUBSIDIES

If WTO members agree to eliminate all harmful subsidies, by 2050, it could result in increases of up to + 12.5% in global fish biomass + 3.5% in global fish catch per year. This would mean 35 million more tons of fish in the water, and 3 million more tons of fish being caught every year.[23]

> The WTO Agreement on Fisheries Subsidies, adopted at the 12th Ministerial Conference (MC12) on 17 June 2022, marks a major step forward for ocean sustainability by prohibiting harmful fisheries subsidies, which are a key factor in the widespread depletion of the world's fish stocks. The Agreement represents a historic achievement for the membership as the first Sustainable Development Goal (hereinafter "SDG") target to be fully met, the first SDG target met through a multilateral agreement, the first WTO agreement to focus on the environment, the first broad, binding, multilateral agreement on ocean sustainability, and only the second agreement reached at the WTO since its inception.[24]

Fisheries Funding Mechanism: As part of the Agreement on Fisheries Subsidies, members endorsed the establishment of a new funding mechanism to accept voluntary contributions, and to provide technical assistance to developing country members to help them implement the Agreement.

For the Agreement to become operational, two-thirds of members have to deposit their "instruments of acceptance" with the WTO. Members also agreed at 12th Ministerial Conference (MC12) to continue negotiations on outstanding issues and to make recommendations by 13th Ministerial Conference (MC13) for additional provisions that would further enhance the

[23] *How the WTO Can Save Fish for the Future*, PEW (Nov. 9, 2021), https://www.pewtrusts.org/en/research-and-analysis/fact-sheets/2021/11/how-the-wto-can-save-fish-for-the-future.
[24] *Agreement on Fisheries Subsidies*, WORLD TRADE ORGANIZATION [hereinafter WTO], https://www.wto.org/english/tratop_e/rulesneg_e/fish _e/fish_e.htm (last visited Feb. 11, 2024).

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disciplines of the Agreement.[25]

As of October 2023, the total number of WTO members that have formally accepted the Agreement is 51, which constitutes 46% of what is needed for the Agreement to come into effect (two-thirds of the WTO membership). It is in their interest that members of the WTO, particularly from developing countries, should quickly accept this agreement to finalize it. Although finalizing the agreement serves the interest of all members, it is particularly useful for small developing countries.

VII. POTENTIAL WELFARE IMPACT OF FISHERIES SUBSIDY REMOVAL

Measuring the effects of fishery subsidy removal is a complex and challenging task. Several factors can make it difficult to isolate the effects of subsidy removal from other factors that may be affecting fish stocks and the fishing industry. One of the main challenges is that fishery subsidies are often given for multiple purposes. For example, a subsidy may be given to support a fishing fleet, to help fishers comply with regulations, or to promote research and development. It can be difficult to determine which of these purposes is having the biggest impact on fish stocks. Another challenge is that fishery subsidies can vary widely in their design and implementation. Some subsidies are direct payments to fishers, while others provide tax breaks or other forms of financial assistance. The effects of subsidy removal will also depend on the specific fishery and the broader economic and political context. In particular, the following factors matter when analyzing the subsidy effects:

1. **The time horizon:** The effects of subsidy removal may not be immediately apparent. It may take several years for the full impact to be realized.
2. **The spatial scale:** The effects of subsidy removal may vary depending on the location of the fishery.
3. **The social and political context:** The effects of subsidy removal may be influenced by the social and political context in which it occurs.

By taking all of these factors into account, it is possible to get a more accurate picture of the effects of fishery subsidy removal. This information can be used to inform policy decisions and to help ensure that fishery subsidies are used sustainably and responsibly. Economists agree that "harmful fisheries subsidies distort seafood markets, hinder international fisheries cooperation, exacerbate inequality by undermining the economic viability of small-scale fisheries, lead to higher CO_2 emissions, and act as a

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[25] WTO, THE WTO AGREEMENT ON FISHERIES SUBSIDIES: WHAT IT DOES AND WHAT COMES NEXT (2024).

driver for Illegal, Unreported, and Unregulated (hereinafter "IUU") fishing and distant-water fishing."[26] "Previous research shows that distant-water fishing, including that within the high seas, is almost exclusively conducted by a handful of rich countries and that the majority of their activity occurs within the Exclusive Economic Zones (EEZs) of low-income developing countries."[27] In the absence of market failures, economic theory tells us that government intervention in free markets is distortionary and will reduce net world welfare. Therefore, removing the fishery production subsidy and regulating the fisher market is expected to enhance overall world welfare. However, it should be noted that even if governments were compelled to reduce fishery subsidies, there may be no spillover benefits to trading partners because of policy substitution; governments would be motivated to weaken other regulations targeting the fish sector.[28] So, in the following analysis, we assume the absence of such policy substitution. To demonstrate the net welfare effects of fishery subsidy removal, we use standard microeconomic analysis in the cases of small importing and exporting countries, and in the case of large exporting countries, respectively.

A. Subsidy in the Case of a Small Importing Country

As shown in Figure 2 the removal of the production subsidy shifts the supply curve back from S2 to S1. At constant world price at PW (small country case), consumer surplus remains constant since the consumption point is unaffected at c. as a result of subsidy removal producer surplus decreases by area (a), and the government saves the money paid for the production subsidy which is an equal area (pw pp f b), which leaves area (w) as a net welfare gain for this country. As expected, subsidy removal is welfare-enhancing for a small importing country.

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[26] Sebastian Villasante et al., *Strengthening European Union Fisheries by Removing Harmful Subsidies*, 136 MARINE POL'Y 1, 1 (2022).
[27] *Id.*
[28] Basak Bayramoglu et al., *Trade and Fisheries Subsidies*, 112 J. INT'L ECON. 13, 13 (2018).

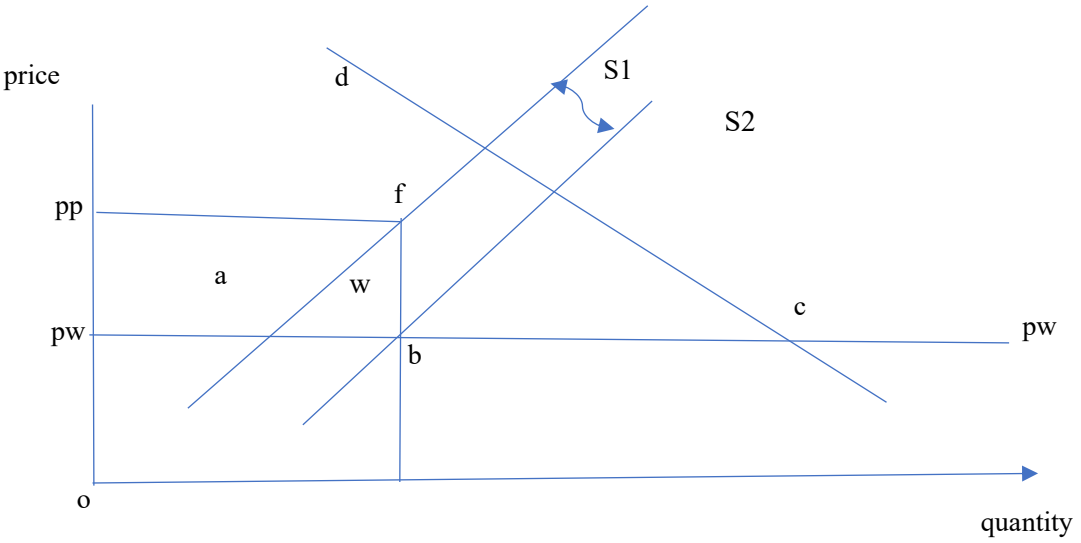


FIGURE 2: Effects of Removing the Production Subsidy in the Case of an Importing Country

B. Subsidy in the Case of a Small Exporting Country

Assume now that the government grants domestic firms a per unit production subsidy equal to s regardless of where the product is sold. As shown in Figure 3 this will again shift the supply curve from S1 to S2 and increase domestic production to point a. Export volume increases and the total cost of the subsidy for the government will be equal to s times the quantity produced.

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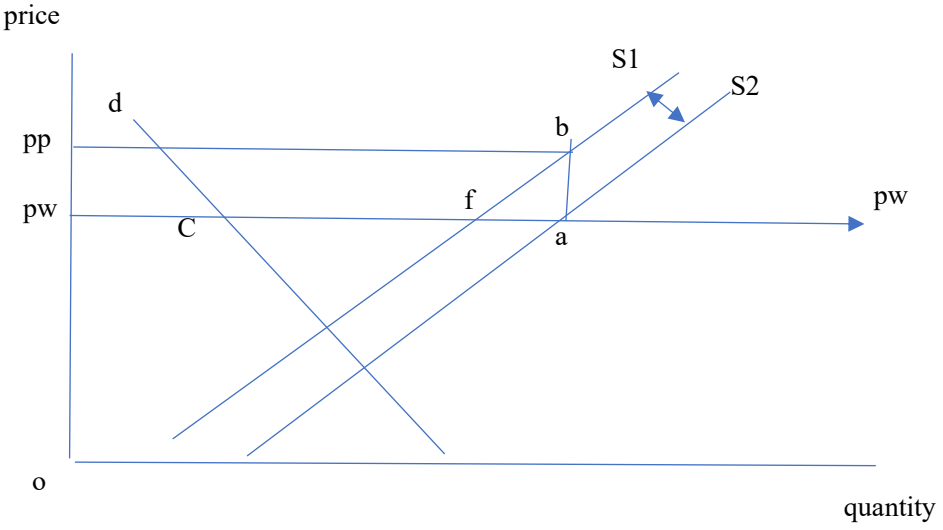


FIGURE 3: Effects of Removing the Production Subsidy in the Case of a Small Exporting Country

Now if the government decides to remove such subsidy the consumer will not be affected since competitive price remains fixed at PW and hence consumption level remains at point c. However, producer surplus will decrease by the area PW PP b f, and the government will save the amount of the subsidy which equals the area PW PP b a. The net effect on the country's welfare is positive and equal to the area abf. Hence subsidy removal is also welfare enhancing for the case of small exporting countries.

C. Subsidy in the Case of a Large Exporting Country

Under the fishery production subsidy imposed by the exporting country, the domestic supply of the industry shifts from S1 to S2 (Figure 4a). The world fish market clears at the free world price pw, where exports equal imports of the rest of the world at (ab). The removal of production subsidy by exporting country shifts back the supply curve to S1, some of the reduction in the domestic supply of fish will be compensated for by exports causing domestic price to drop to PE, and in addition, the resulting scarcity of fish at the market will increase the price in the importing country to PI. The world market is back to equilibrium again where exports equal imports at (cd). However, prices are not the same in the two markets, as subsidy creates a price gap

equal to (s). The large country has the power to influence world price increasing it from PW to PI. However, the size of trade has contracted from ab to cd.

Removing this production subsidy (s) will cause the opposite production, consumption, and trade effects. To demonstrate the welfare impact of the subsidy in the case of a large country, consumer and producer surplus will be used again as above.

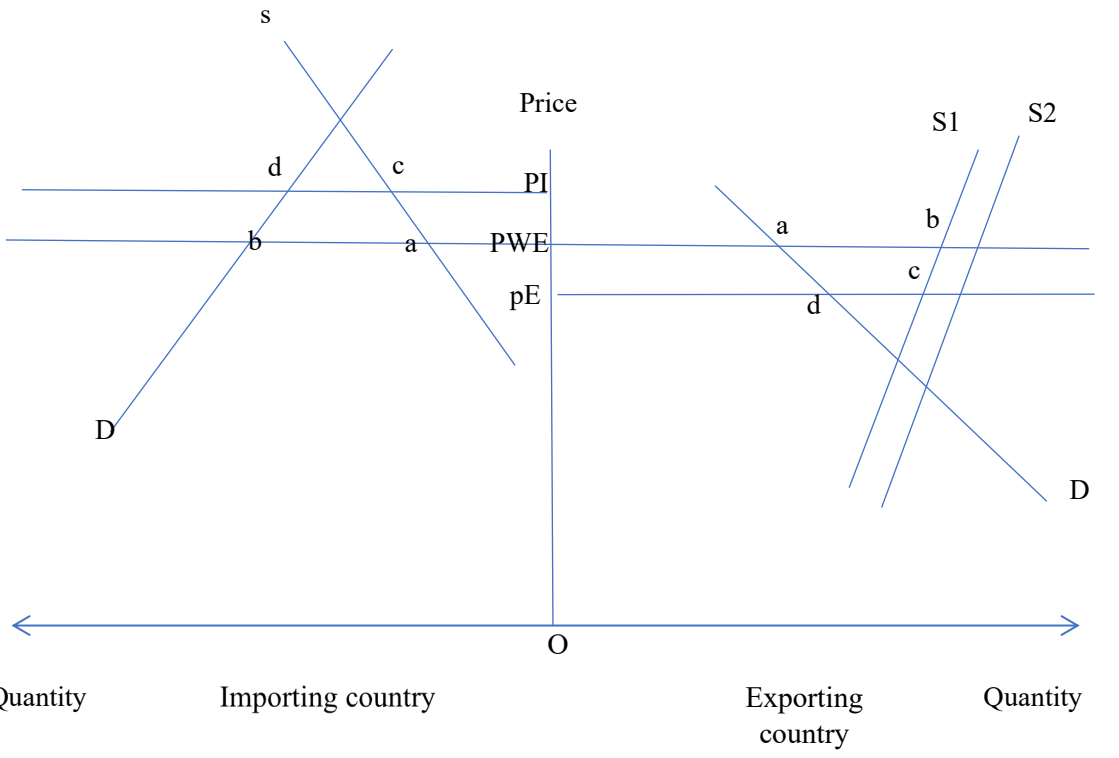


FIGURE 4A: Effects of Removing the Production Subsidy in the Case of a Large Exporting Country

Figure 4b is similar to Figure 4a with a separate graph for exporting and importing countries and emphasis now on areas representing surpluses and subsidy revenue. Production subsidy will create an excess supply of fish in the world market in the case of the large exporting country and hence dropping world price from PW to PW', expanding both domestic consumption and production with an indeterminate effect on the size of exports. The government subsidy creates a gap between the new world price

PW' and the price received by producers equal to the size of per unit subsidy (s=PP−PW'). Now if the government decides to remove such production subsidy, domestic supply contracts back from S2 to S1 and the world market restores the free market equilibrium to what it was before the subsidy at PW. As a result, producer surplus decreases by area (a+b), consumer surplus also decreases by (d+e), and the government saves the value of the production subsidy (a+b+c+d+e+f+g+h). Therefore, removing the production subsidy results in a country's net gain equal to (c+f+g+h). Hence, the removal of the production subsidy is welfare enhancing for large exporting countries as the case was for a small exporting country; however, the amount of gain is larger in this case.

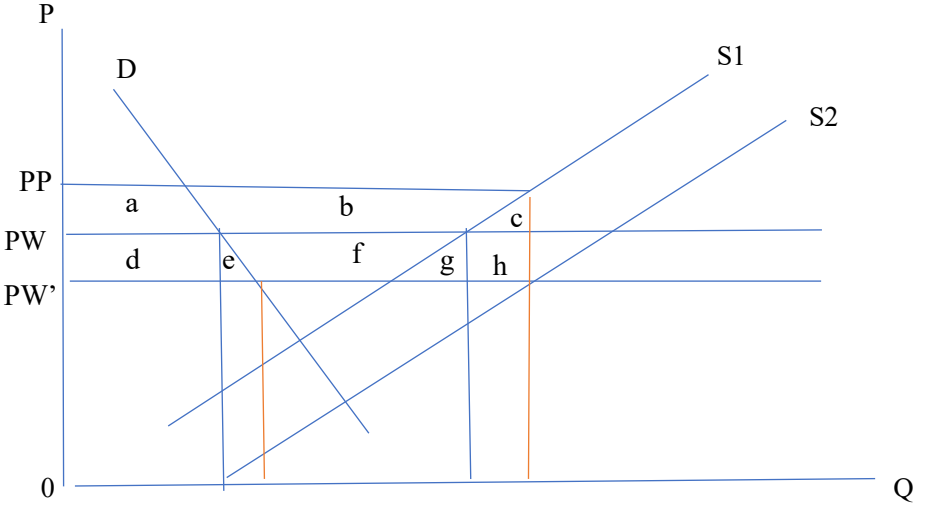


FIGURE 4B: Welfare Effects of Removing Production Subsidy in the Case of a Large Exporting Country

We have demonstrated that the removal of harmful fishery subsidies is beneficial for both exporting and importing countries, as it restores market efficiency and increases the net economic welfare of a nation. However, given that over one billion people depend on producing, processing, and trading fish for their livelihood,[29] removing harmful fisheries subsidies can have both positive and negative economic consequences. Here are some potential economic consequences of removing fisheries subsidies:

[29] Christopher Golden et al., *Fall in Fish Catch Threatens Human Health*, 534 NATURE 317, 318 (2016).

1. Positive Consequences —

(a) Increased welfare — Removing subsidies may reduce the total catch and revenue, but it increases the overall welfare of the fishery.

(b) Higher yields for local fishers — Reforming harmful fisheries subsidies could lead to higher yields for local fishers, which in turn could help provide more stable jobs, raise fishers' incomes, reduce poverty, and improve food security in local communities.

(c) Improved economic viability of small-scale fisheries — Studies have shown that subsidies can affect the economic viability of small-scale fisheries. Removing harmful subsidies could improve the economic viability of small-scale fisheries.

(d) Improved ocean health — Studies show that subsidy reform would improve ocean health and help fishing fleets operate sustainably far into the future.

2. Negative Consequences —

(a) Reduced revenue — Removing subsidies might reduce the total catch and revenue.

(b) Higher prices — Open access fishery supply curves are backward bending and so if fisheries are depleted, subsidies raise prices (by reducing sustainable harvesting)

(c) Job losses — Removing subsidies could lead to job losses in the fishing industry.

D. Potential Distributional Effects of Fishery Subsidy Removal

The above analysis shows that although removing the production fishery subsidy results in a net welfare gain for both exporting and importing countries in the long run, it also shows that there will be short-run distributional effects on consumers, producers, and government budget. It should be noted that the above economic analysis of subsidy removal is static since it ignores the effect of subsidy removal on the stock buildup of the ocean's wealth. For example, José-María Da-Rocha et al. (2017) showed that any impact of a fuel subsidy drop will depend on the stock effect. If that effect is large, fishing firms and industrial shrimp fisheries in Mexico will benefit from the stock recovery and the elimination of the subsidy will increase future returns on investment. They further showed that the complete elimination of a subsidy increases biomass, capitalization, marginal productivity, and consumption, and reduces inequality when the effect of the induced increase in the stock is considered.[30]

In the short term, removing subsidies could decrease the supply of fish

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[30] José-María Da-Rocha et al., *The Social Cost of Fishery Subsidy Reforms*, 83 MARINE POL'Y 236, 236 (2017).

and associated employment. For example, Kaiwen Wang et al. (2023) quantitatively evaluated the effect of subsidy reduction in China, the world's largest seafood producer and provider, they found that a one-percent reduction in fuel subsidy payments is associated with a 0.158% increase in the probability of firm exiting on an annual basis.[31]

To mitigate short-term negative impacts, governments should ensure that when they remove subsidies, they also roll out programs for income diversification and support for vocational training and education. In the medium to long term, if stocks recover, fisheries-related job opportunities could increase. governments need to couple fish subsidy reform with a comprehensive recovery strategy that includes reducing illegal unreported and unregulated fishing activity and illicit trade in fishery resources (Sumaila 2018), re-evaluating fishing agreements with foreign countries (Kaczynski and Fluharty 2002; Alder and Sumaila 2004) and adapting to climate change (Miller et al. 2018). Mitigating the social impacts of subsidy reforms should include requirements to promote social equality, gender equality, and the empowerment of women, with funds redirected or earmarked for social programs and targeted support for groups such as small-scale fishers, women, and youth.

VIII. CONCLUSIONS

Although all kinds of production subsidies are distortionary and hence removing them is net welfare enhancing for all, the potential dynamic impact of fishery subsidy removal is a complex issue with a wide range of potential outcomes. Some of the most likely impacts include:

1. **Increased fish stocks:** Removing subsidies that encourage overfishing could lead to increased fish stocks. This would benefit both commercial fishers and recreational anglers, as well as the marine ecosystem as a whole.
2. **Increased competition:** Subsidies often give an unfair advantage to larger, more well-funded fishing fleets. Removing these subsidies would level the playing field and give smaller operators a better chance to compete.
3. **Improved fish welfare:** Subsidies can lead to fishing practices that are harmful to fish welfare. For example, subsidies can be used to support the use of nets that catch unwanted fish or to fish in areas where fish are spawning. Removing these subsidies could help to improve fish welfare.
4. **Increased food security:** Fish is a major source of food for millions of people around the world. Removing subsidies that lead to overfishing

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[31] Kaiwen Wang et al., *Fisheries Subsidies Reform in China*, 120(26) SUSTAINABILITY SCI. 1, 5 (2023).

could help to ensure that fish stocks are sustainable and available for future generations.

5. **Economic benefits:** The removal of fishery subsidies could have several positive economic impacts. For example, it could create jobs in the fishing industry, boost the tourism industry, and reduce the cost of food.
6. **Decreased illegal fishing:** These subsidies contribute to IUU fishing, mostly by foreign vessels. Removing subsidies could lead to decreased illegal fishing.

However, there are also some potential negative impacts of fishery subsidy removal in the short run. These include:

1. **Job losses:** In some cases, removing subsidies could lead to job losses in the fishing industry. This is because some fishing fleets may be forced to close or reduce their operations.
2. **Increased prices:** The removal of subsidies could lead to increased prices for fish. This is because the cost of fishing would be higher without subsidies.

Overall, the potential impact of fishery subsidy removal is expected to be positive, at least based on economic theory; however, as seen above, subsidy removal will have both positive and negative potential outcomes. The actual net impact will depend on several factors, including the specific subsidies that are removed, how they are removed, and the broader economic and political context. More empirical research is needed to understand the full impact of fishery subsidy removal.

In light of the positive net welfare impact of subsidy removal for both net exporting and net importing countries demonstrated in this study, policymakers in all countries are recommended to take the necessary steps needed to finalize the WTO's fisheries agreement.

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