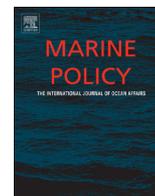




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## Global fisheries subsidies: An updated estimate

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## ABSTRACT

The aim of this paper is to provide an updated estimate of global fisheries subsidies. It builds on earlier estimates and methodologies to re-estimate and discuss the various types of subsidies provided by governments around the world. The results suggest that total subsidies were about USD 35 billion in 2009 dollars, which is close to the earlier estimate of 2003 subsidies once they are adjusted for inflation. Capacity-enhancing subsidies constituted the highest category at over USD 20 billion. For all regions, the amount of capacity-enhancing subsidies is higher than other categories, except for North America, which has higher beneficial subsidies. The analysis reveals that fuel subsidies constitute the greatest part of the total subsidy (22% of the total), followed by subsidies for management (20% of the total) and ports and harbors (10% of the total). Subsidies provided by developed countries are far greater (65% of the total) than those by developing countries (35% of the total) even though the latter lands well above 50% of total global catch. Asia is by far the greatest subsidizing region (43% of total), followed by Europe (25% of total) and North America (16% of total). Japan provides the highest amount of subsidies (19.7% of total), followed by the United States and China at 19.6% of total.

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## 1. Introduction

For the purposes of this paper, fisheries subsidies are defined as financial payments from public entities to the fishing sector, which help the sector make more profit than it would otherwise. In recent decades, subsidies have gained worldwide attention because of their complex relation to trade, ecological sustainability and socioeconomic development. It is widely acknowledged that global fisheries are overcapitalized, resulting in the depletion of fishery resources [1,2].

Subsidies provided by governments have been identified as a driving factor for the build-up of excessive fishing capacity, thereby undermining the sustainability of marine resources and the livelihoods that depend on them [3,4]. Subsidies that enhance revenue and/or reduce cost lead to a marginal increase in profit, thereby increasing incentives for participation and fishing effort [5]. Subsidies that promote fishery resource conservation and management are, however, regarded as beneficial and necessary [5]. Scientist, managers, policy makers and the public are concerned about the former type of fisheries subsidies because they contribute directly or indirectly to overcapacity and overfishing.

The global subsidy debate was prompted by the FAO in the early 1990s in preparation for the May 1992 Conference on Responsible Fishing in Mexico [5]. The FAO [6] made an argument,

based on economic theory, that subsidies are a major causal factor in the creation and perpetuation of excess fishing capacity, with a gross estimate of global fisheries subsidies of about US\$ 54 billion, an estimate which appears to have been on the high-side (even prior to adjusting for inflation). A further review of a wide range of direct and implicit assistance programs that encourage and promote the building, maintenance and modernization, as well as the operations of the world's fishing fleets was undertaken by Milazzo [5], which yielded an estimate of about US\$ 14–20 billion accounting for about 20–25% of landed value. Regional fisheries subsidy estimates by APEC [7], and Munro and Sumaila [8], have shed more light on these issues, as did the studies in Sumaila and Pauly [9], which were the first to employ an explicit methodology including all subsidy types for all maritime countries of the world (see [www.seaaroundus.org/sponsor/feru.aspx](http://www.seaaroundus.org/sponsor/feru.aspx)). The present study build on the methodologies developed in [4,9,10] to provide an updated estimate of global fisheries subsidies.

## 2. Methodology

## 2.1. Types of subsidies

There is no single way to classify fishery subsidies, as their various categories mostly overlap depending on the nature of the subsidy and the purpose of classification [5,7,11]. The complexity of this issue

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is based on the fact that there is no single agreement on what a subsidy is or how its effect can be measured. Subsidies, support programs, financial support, economic assistance, and government financial transfers are just five of the most commonly used names for payments that governments provide to the fisheries sector.

However, the following guidelines were useful in identifying and assessing fisheries subsidies: (i) policy objective of the subsidy; (ii) the subsidy program descriptions; (iii) scope, coverage and duration; (iv) annual US\$ amounts; (v) sources of funding; (vi) administering authority; (vii) subsidy recipients; and (viii) the mechanisms of transfer [12].

Here, we apply the classification used in Sumaila et al. [4], that is, (i) beneficial subsidies, (ii) capacity-enhancing subsidies, and (iii) ambiguous subsidies.

Beneficial subsidies are programs that lead to investment in natural capital assets to a social optimum, which is defined here as the maximum allocation of natural resources to society as a whole, i.e., by maximizing economic rent. Beneficial subsidies enhance the growth of fish stocks through conservation, and the monitoring of catch rates through control and surveillance measures to achieve biological and economic optimal use. Beneficial subsidies are made up of the following two types. A good example here are fisheries management programs and services subsidies, which are subsidy programs to ensure that publicly-owned fisheries resources are appropriately managed and that regulations are enforced [13]. It is worth noting that some economists do not consider government support for management to be subsidies.

Capacity-enhancing subsidies are defined as subsidy programs that lead to disinvestments in natural capital assets once the fishing capacity develops to a point where resource exploitation exceeds the Maximum Economic Yield (MEY). This is equal to the maximum rent obtainable from the fishery, computed as the largest positive difference of total cost and total revenues. As such, MEY corresponds to an effort level lower than the maximum sustainable yield (MSY). Excessive disinvestment can lead in some cases to outright destruction of the natural resources. Capacity-enhancing or harmful subsidies include all forms of capital inputs and infrastructure investments from public sources that reduce cost or enhance revenue and include the following types, e.g., subsidies for boat construction, renewal and modernization programs. Another example here is fuel subsidies.

Ambiguous subsidies are defined as programs that have the potential to lead to either investment or disinvestment in the fishery resource. These subsidy programs can lead to positive impacts such as resource enhancement programs or to negative impacts such as resource overexploitation. Subsidies in this category include controversial ones such as fisher assistance programs, vessel buyback programs and rural fisher community development programs, e.g., vessel buyback programs [3].

### 3. Magnitude of subsidies

Attempts to provide empirical results on the impact of subsidies on fishery resources have been limited both in scope and time. The impact of subsidies on the cost and revenue structure in open-access fisheries has been demonstrated using the Gordon-Schaefer equilibrium model. The underlying theory still holds on the effect of subsidies even though most fisheries are not open-access. However, the data needed in analyzing the impact of contemporary subsidies on fishery sustainability require, among other things, an understanding of the nature and extent of fishery subsidies in different regions. Such comprehensive study can contribute significantly to an understanding of the current nature of fishery subsidies, and provide an estimate of the present magnitude of fishery subsidies worldwide. The results of such an

estimate, for each maritime fishing country, in major geographical regions, would be useful for policy reforms toward the reduction of overcapacity in marine fisheries worldwide and for long term socioeconomic development.

Previous global estimates of fishery subsidies (not adjusted for inflation) have ranged from US\$ 14–20 billion [5], to US\$ 54 billion [6], the former probably too low, and the latter probably too high, while intermediate values, of around US 20–30 billion were presented in [4,9]. Regional estimates have also been provided for the Asia Pacific Rim of about US\$ 12 billion [7] and for the North Atlantic at about US\$ 2.5 billion [8]. Currently, within the OECD, fishery subsidy data are published annually as part of the review of fisheries and country statistic bulletin [13,14]. In other regions, such as the Pacific Island States and the Caribbean Islands, subsidies are reported in the gray literature and usually not quantitatively [15]. Studies and reports done on fishery subsidies and other related issues in the Gulf of Guinea, including Kaczynski and Fluharty [21], are either limited in scope or qualitative in nature. Subsidies provided by donors to developing countries under international aid/bilateral agreements, and domestic subsidies provided within both the small-scale and industrial fisheries sectors in developing countries have been estimated in [4,9]. The numbers presented in the section below update the estimates in [4,9].

#### 3.1. Estimating global fisheries subsidies

The major difference between the studies documented in [9] and subsequent studies based thereon versus their predecessors is that 'subsidy intensity', i.e., the ratio of subsidies over the ex-vessel value of countries' catches were used, in the absence of better information, to assess the likely subsidization rate in similar countries with positive information that a certain type of subsidy was granted, but not its amount. Thus, the subsidies in our databases differentiate between published estimates taken 'as is' (and whose source is given) from estimates that are calculated via subsidy intensity (see [www.seaaroundus.org/sponsor/feru.aspx](http://www.seaaroundus.org/sponsor/feru.aspx)).

The updated figures presented below use the same approach, but with catch data from the *Sea Around Us* and FAO extending to 2009. However, we do not distinguish here between published and calculated data, whose ratios are not likely to differ markedly from those in the above-cited database.

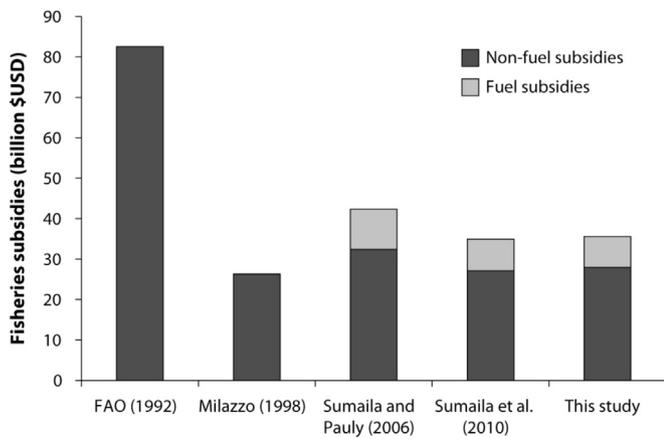
The subsidy data were assigned to each of the 13 categories, which we used in this study and the previous subsidy estimations [4,9], based on their descriptions in the data sources. These categories include management, research and development (R&D), MPAs, fleet modernization, development projects, ports and harbors, marketing and storage, tax exemption, fishing access, fuel subsidies, fisher assistance, vessel buyback and rural communities.

#### 3.2. The results

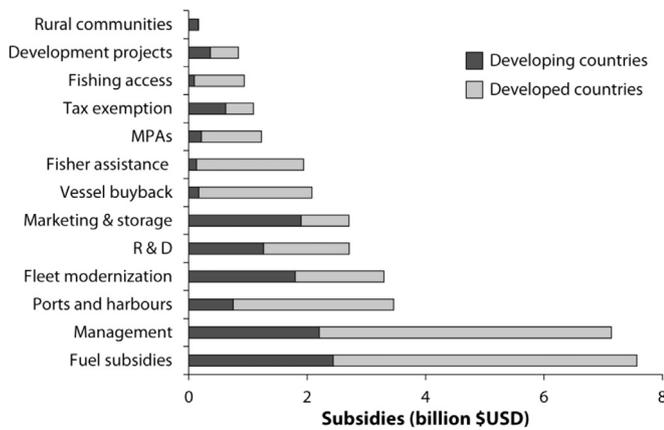
The new global estimate of subsidies in year 2009 is \$US 35 billion, which is similar to two latest estimates, once inflation is taken into account, as shown and compared with previous estimates in Fig. 1. The composition of this total is illustrated in Fig. 2, which shows that fuel subsidies still represent the largest subsidy category. Indeed, capacity-enhancing subsidies still predominate over beneficial and ambiguous subsidies (Fig. 3).

Fig. 2 presents the composition of the subsidy estimates by sectors and it shows that fuel subsidies contribute to the greatest part of the total subsidy (22% of the total), followed by subsidies for management (20% of the total) and ports and harbors (10% of the total). Subsidies contributed by developed countries (65% of the total) are far greater than that contributed by developing countries (35% of the total).

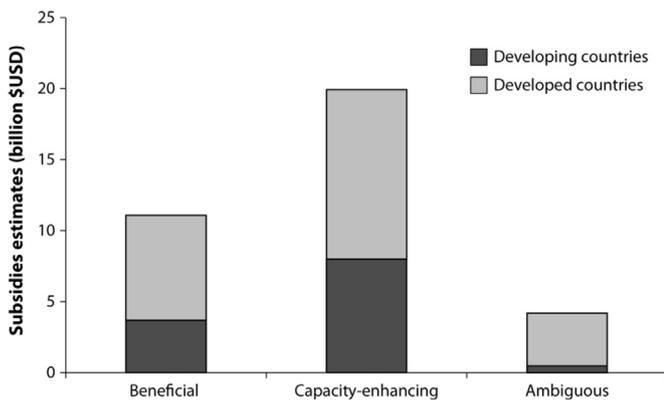
Fig. 3 displays global fisheries subsidy estimates by categories. The figure shows that capacity-enhancing subsidies are far greater than



**Fig. 1.** A comparison of global fishery subsidy estimates. *Source:* adapted from FAO [6], Milazzo [5], Sumaila and Pauly [9], and Sumaila et al. [4]. Note that the numbers in the figure are all in 2009 real USD, in order to make them comparable (subsidy data adjusted to 2009 real value using CPI).

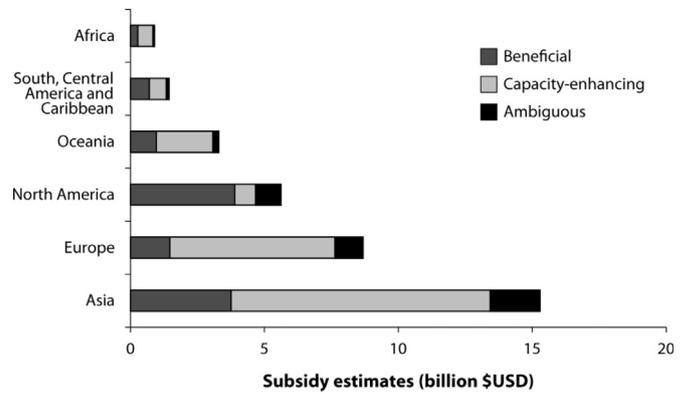


**Fig. 2.** Composition of the subsidy estimates by types. *Source:* adapted from FAO [6], Milazzo [5], Sumaila and Pauly [9], and Sumaila et al. [4].



**Fig. 3.** Global fisheries subsidy estimates by categories. *Source:* adapted from FAO [6], Milazzo [5], Sumaila and Pauly [9], and Sumaila et al. [4].

ambiguous and beneficial subsidies, in both developing and developed countries. The figure also shows that the developed world provides most of the world's subsidies. Since most of the world's small-scale fishers are in the developing world, it can be concluded that small-scale fishers generally receive relatively less subsidies compared to large-scale fishers. Since most of the world's small-scale fishers are in the developing world, this information seems to point to the fact that small-scale fishers generally receive relatively less subsidies compared to large-scale fishers.



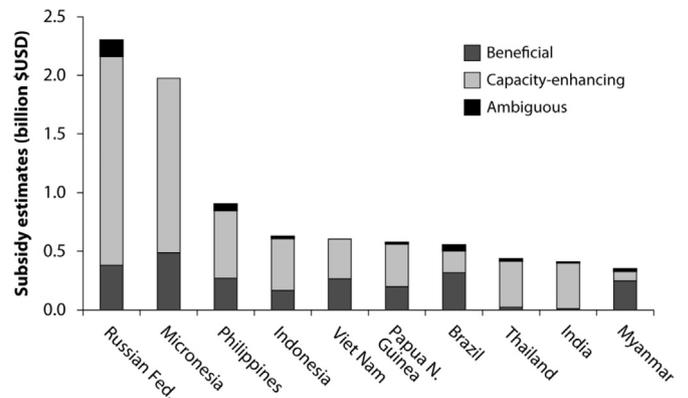
**Fig. 4.** Subsidy estimates by major geographic region. *Source:* adapted from FAO [6], Milazzo [5], Sumaila and Pauly [9], and Sumaila et al. [4].

As in previous studies, Asia, distantly followed by Europe, dominates in term of subsidies provided to marine fisheries, both in them of total and in term of capacity enhancing subsidies (Fig. 4), and this is obviously the reason for the enormous growth of fishing capacity and effort reported in [16] and the observed worldwide decline in catch per effort (i.e., abundance) of fish stock worldwide [17]. The figure further shows that for all regions, the amount of capacity-enhancing subsidies is higher than other categories, except for North and South America.

Fig. 5 shows subsidy estimates for the ten largest subsidizing developing fishing countries. The Russian Federation has the highest amount of subsidies among developing fishing countries (19% of total), followed by the Micronesia (16% of total). For all countries except Brazil and Myanmar, the amount of capacity-enhancing subsidies is higher than any other categories.

Subsidy estimates for the ten largest subsidizing developed fishing countries are presented in Fig. 6. This figure shows that Japan provides the highest amount of subsidies (19.7% of total), followed by China (19.6% of total). For all countries, the amount of capacity-enhancing subsidies is higher than other categories, except for the United States, for which the level of beneficial subsidies is higher, and Canada and Australia, for which the level of ambiguous subsidies is higher.

Fig. 7 displays subsidy estimates by major fishing countries/political entities. This figure shows that Europe has the highest amount among major fishing entities (26% of total), closely followed by Japan (21% of total) and China (20.7% of total). All entities have higher capacity-enhancing subsidies, except the United States, for which the level of beneficial subsidies is higher.



**Fig. 5.** Subsidy estimates for the ten largest subsidizing developing fishing countries. *Source:* adapted from FAO [6], Milazzo [5], Sumaila and Pauly [9], and Sumaila et al. [4].

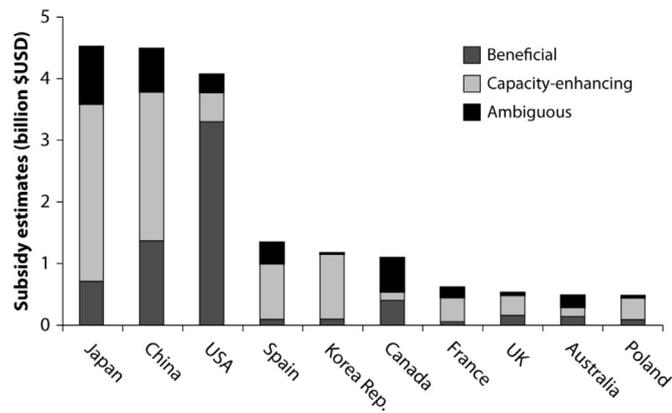


Fig. 6. Subsidy estimates for the ten largest subsidizing developed fishing countries. Source: adapted from FAO [6], Milazzo [5], Sumaila and Pauly [9], and Sumaila et al. [4].

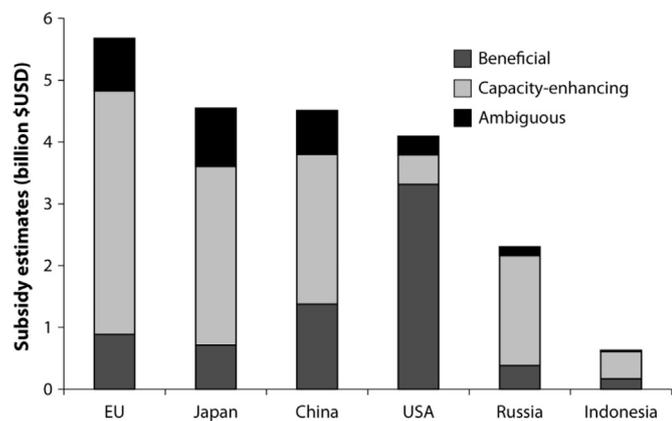


Fig. 7. Subsidy estimates by major fishing countries/political entities. Source: adapted from FAO [6], Milazzo [5], Sumaila and Pauly [9], and Sumaila et al. [4].

#### 4. Discussion and recommendations

Problems related to fishery subsidies and how they can be harmful to fish stocks and therefore fisheries in the medium and long term are now widely recognized worldwide by national agencies; inter-governmental organizations and regional organizations. The roles played by the International Center for Trade and Sustainable Development (ICTSD), and of various NGOs such as the World Wildlife Fund for Nature (WWF), Oceana, BirdLife International, Greenpeace and the Fisheries Secretariat, regarding both public outreach and advocacy on these issues cannot be over-emphasized (see e.g., their numerous communications with the European Commission and Member of Parliaments with regards to the Reform of the Commons Fisheries Policy;) [18].

The issue of subsidies that leads to IUU fishing and fishing overcapacity was addressed by the UN General Assembly in its resolution 59/25 of 17 November 2004 and, more recently, at the sixth meeting of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea. The Millennium Ecosystem Assessment [19] also highlighted the need to eliminate subsidies that promote excessive use of ecosystem services and, where possible, to transfer those subsidies to payments for non-marketed ecosystem services.

The work of the UN agencies, notably the FAO and the UNEP has probably been salient in bringing understanding and dialog on fisheries policy reforms. This has culminated in a multi-stakeholder workshop, reports by UNEP [20] and expert consultations in partnership with international agencies by FAO [12]. These efforts have also brought particular attention to the impacts of

fisheries subsidies on developing countries, notably in relation to fishing agreements and food sufficiency issues. Subsidies towards fishing access agreements and their impact in developing countries have been examined by, for example, [21]. Policy research conducted in collaboration with the Support Unit for International Fishery and Aquatic Research (SIFAR) has improved our understanding of the implication of subsidies and trade liberalization for four countries that is, Guinea, India, Bangladesh and Vietnam.

The following recommendations if implemented will help the world to discipline capacity-enhancing subsidies:

- eliminate capacity-enhancing subsidies, i.e., those that incentivise overfishing;
- increase beneficial subsidies such as financial aid for data collection, control, enforcement, and those that improve fisheries management by reducing fishing capacity and effort, minimizing by-catch and promoting important policy goals;
- improve significantly the transparency and accountability in subsidy reporting; in particular, effective WTO notification requirements are needed;
- require better transparency of the industry's account books in order to better quantify the need for subsidies;
- consider the special concerns of developing countries and small-scale fishers, which need to be taken into account in a way that does not continue to undermine the resource base;
- increase the monitoring of the impact of these subsidies on the sector in order to determine which subsidies are the most beneficial;
- redirect capacity-enhancing subsidies to support sustainable activities, e.g., these subsidies can be used to support 'fishing for plastic' rather than fishing depleted fish stocks, resulting in a win for fishers to keep their subsidy money; a win for the ocean (it is cleaned of plastic), and a win for the fish (they get a break from being targeted by fishing vessels);
- bring education and skill development to coastal communities to increase employment opportunities available to fishers.

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