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Strategies and rationale for fishery subsidy reform

Andrés M. Cisneros-Montemayor [a,b,*], Enrique Sanjurjo [c], Gordon R. Munro [b], Victor Hernández-Trejo [d], U. Rashid Sumaila [b]

[a] Nereus Program & OceanCanada, The University of British Columbia, 2202 Main Mall, Fisheries Centre, Vancouver, Canada V6K1J5
[b] Fisheries Economics Research Unit, The University of British Columbia, 2202 Main Mall, Fisheries Centre, Vancouver, Canada V6K1J5
[c] Gulf of California Program, WWF Mexico, World Wildlife Fund, Inc., Álvaro Obregón 1665, La Paz, BCS 23000, Mexico
[d] Enviromental Economics Research Center, Universidad Autónoma de Baja California Sur, Carretera al Sur km 5.5, La Paz, BCS 23080, Mexico

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ABSTRACT

Subsidies can directly support unsustainable fishing practices that harm both ecosystems and long-term social and economic benefits. Global fishery subsidies are substantial, yet their impacts on fishing dynamics are specific to given regions or fisheries at local scales. Subsidies thus have markedly different effects when applied to artisanal versus industrial, or managed versus open-access conditions, as shown for Mexican fisheries. Subsidy reform strategies are critically assessed, drawing on a review of over 30 case studies worldwide to determine patterns in their usefulness and conditions for implementation. Strategies with best relative results are reorienting subsidies away from capacity-enhancement, and/or conditioning them on specific sustainable performance metrics. Decoupling subsidies from fishing (e.g. providing direct aid to fishers) has unpredictable and unclear results, whereas buyback programs tend to have poor outcomes. Eliminating subsidies is perhaps the simplest strategy, but is the most difficult to implement from a social and political perspective. Key factors for any policy to succeed are clear short- and long-term goals; creative design; transparent implementation; and strong socio-political will.

1. Introduction

A fishery subsidy, according to the World Bank definition, is a "financial contribution from the public sector that grants private benefits to the fishery sector" [1]. Subsidies can thus be used to fund various programs and activities, such as management, research, regulation, infrastructure, tax exemptions, fuel, vessel purchases or direct supplements to income. Globally, an estimated US$38 billion (2014 USD) in subsidies are granted to the fishery sector [2]. Of this total, around 60% are capacity-enhancing ("bad"), 30% beneficial ("good") and 10% ambiguous ("ugly") [3]. It is thus widely accepted that global subsidies mostly contribute to overfishing, resulting in an annual loss of US$55 (2014 USD) billion in potential benefits if fisheries operated at economically-optimal levels [1].

The public sector has limited resources, so conferring subsidies to fisheries (or other private sectors) should form part of a plan toward final goals. Traditionally, there are two reasons for introducing a subsidy [4]. The first is to provide incentives for a sector to take actions that may not otherwise have occurred in the same way. For example, when large-scale fishery subsidies were introduced in many developing countries during the 1970s, a main goal was to accelerate industry growth, which was undoubtedly achieved [5,6]. The second motivation for introducing a subsidy is to address distributional and social equity issues. In this case, the nation adopts subsidies that artificially increase income for workers in a sector to raise their living conditions to an 'acceptable' level. More recently, strategies aimed at environmental conservation are increasingly funded by governments (i.e. beneficial subsidies) at various scales, and funding from non-government organizations—though not subsidies in the strict definition—has become a crucial form of support [7].

Given that most global fisheries reached their ecological limits to production some years ago [5], it would seem that the only defensible reason, aside from purely political motivations, to continue capacity-enhancing fishery subsidies is poverty reduction. However, economic benefits from fishing—unlike, for example, the manufacturing sector—depend directly on ecosystem quality, and fishing, by definition, has (however slight) negative consequences on the ecosystem. Therefore, continuing to subsidize fishing effort on an already overexploited ecosystem will only damage it more, continually diminishing its long-term productivity (e.g., [4,8,9]). In this way, attempts to reduce current

* Corresponding author at: Nereus Program & OceanCanada, The University of British Columbia, 2202 Main Mall, Fisheries Centre, Vancouver, Canada V6K1J5.
E-mail addresses: a.cisneros@oceans.ubc.ca (A.M. Cisneros-Montemayor), esanjurjo@wwfmex.org (E. Sanjurjo), gordon.munro@ubc.ca (G.R. Munro), victorh@uabcs.mx (V. Hernández-Trejo), r.sumaila@oceans.ubc.ca (U. Rashid Sumaila).

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poverty levels through effort-enhancing subsidies will only ensure that there is even more serious poverty in the not too distant future. In anticipating these impacts, it is useful to first contextualize the economic performance of key fisheries to better appreciate their current ecological status and socioeconomic benefits, including public investments.

This study aims to inform discussion on subsidy reforms for applied fishery management, and offers a critical review of potential strategies that have been proposed or applied to address this issue [10]. Each is discussed at length below, and include (i) eliminating subsidies; (ii) decoupling subsidies (direct supplements to income instead of fishing effort); (iii) reorienting subsidies towards better management and technology; (iv) conditioning subsidies on fishery performance; and (v) substituting subsidies for vessel buybacks. To provide a more applied context to this review, we present Mexico as a typical developing country with an array of distinct fisheries. There is a clear need to rethink and reshape the goals and strategies for fishery subsidies in many settings [11], yet changes require a recognition of specific contexts for particular fisheries. Although the following analysis is certainly critical, the intent is to present the benefits and limitations of each strategy objectively and with the final goal of informing stakeholders to promote constructive dialogue. This framework can help provide a more objective picture of fishery performance, and identify priority issues of concern.

2. Providing context to fishery subsidies: Mexico

Just as fishery subsidy dynamics vary across global regions and countries [3], within-country fisheries can be impacted by subsidies in different ways. Mexico is a medium development Latin American country with temperate and tropical coasts on the Pacific and Atlantic Oceans. In 2012, Mexican fishery landings were reported at 1.2 million tonnes (*t*) [12] (though recent estimates suggest the total including unreported and illegal catch could be almost double the official reports [6]). Total landed value is reported at US$829 million [12], with an economic impact of close to US$1.4 billion [13]. Total fisheries employment is difficult to assess, as in many developing countries, but is estimated at between 155–750 thousand people [6,14,15].

Currently, Mexico allocates a budget of around US$254 million per year on the fishery and aquaculture sector [14,16]. Aside from funding for research and management, most expenditure (65%) is on capacity-enhancing subsidies [17], including fuel (US$73 million), infrastructure development (US$60 million) and fishing equipment (US$33 million) [12]. Despite an incomplete estimate of total subsidies, which should include the tax breaks conferred to national fishing fleets, the percentage of bad subsidies out of total fisheries investment in Mexico ranks as the worst in Latin America (based on data in Ref. [3]).

Below are very brief summaries of key Mexican fisheries selected as examples of differing economic dynamics (sardine, abalone-lobster, shrimp, squid, and artisanal finfish fisheries; tuna fisheries are also important but we focus primarily on coastal water fishing). An outlook of revenue, costs and subsidies are provided to emphasize these fisheries' status in economic terms (Table 1). Due to available data, these statistics were usually derived from representative production units (vessels) as reported in the literature.

2.1. Sardine

The largest fishery in Mexico by catch volume, sardine (and associated small pelagic fishes) is mainly fished inside the Gulf of California (where it is MSC certified) and the Pacific coast of the Baja California Peninsula. Abundance is highly variable, though ecological mechanisms are relatively well-understood and provide some room for predictions [18,19]. This fishery is fully industrialized, with relatively small purse-seine vessels feeding parent processing plants. Firms are mostly vertically-integrated, with most catch turned into low-price fishmeal for animal feed, and a much smaller portion canned for human consumption (domestic and export) [20]. Fuel subsidies are a small source of revenue compared to landed value of the catch, though this seems to be the end of a period of historically-high abundance.

Table 1
Economic performance indicators by fishery in Mexico. All values are in 2014 USD millions. Catch, revenue and employment are from official statistics [12,14]. Cost, profit, and subsidies are calculated based on representative production units (as cited). Economic impact calculated assuming a 1.72 multiplier on revenue [13]. NA= Data not available.

Fishery	Catch (t '000)	USD millions					Jobs
		Revenue	Cost	Profit	Subsidies	Economic impact	
Abalone-Lobster[a]	2.7	31	28	3	0.4	53	2200
Sardine[a]	721	46	32	14	3.5	79	730
Shrimp[b]	39	145	170	−25	41	250	7350
Squid[c]	23	7	5	3	4.5	12	3000
Tuna	96	72	NA	NA	9.1[d]	124	1970
Artisanal finfish[e]	313	452	NA	NA	13.4[d]	781	144,500

[a] [27].
[b] [25].
[c] [30].
[d] [32].
[e] [6].

2.2. Abalone–lobster

Abalone and lobster fisheries in Mexico take place mainly on the Pacific coast of the Baja California Peninsula, where well-established territorial use rights fishing (TURF) schemes grant fishing access to specific communities. Fishing methods are artisanal (small boats and divers with hand-held gear), yet post-harvest processing and marketing are advanced and well-organized (including MSC certification), with most products exported to high-price markets [21,22]. These are limited-access fisheries, and though illegal catch occurs [23], this arguably is less of an issue relative to other Mexican fisheries. Fuel subsidies represent a small fraction of revenue for this economically-efficient fishery, raising the question of why they are conferred at all.

2.3. Shrimp

The most valuable fishery in Mexico in terms of revenue, several species of shrimp are fished along both Pacific and Atlantic coasts, though data for this exercise is for the industrial shrimp fisheries in the Gulf of California. There are legal limits on fleet size and gear types, as well as spatial and temporal closures; however, there are significant issues with monitoring and enforcement [6]. Industrial vessels in the Mexican Pacific use either single or paired bottom-trawl gear, with well-documented bycatch issues [24]. Most landings are chilled and packaged for export; prices can be variable, particularly with the current growth of shrimp aquaculture in the region and globally [25,26]. This fleet is known to be overcapitalized, with many individual vessels operating at a loss, mitigated into a net profit only after factoring in fuel and tax subsidies [25,27].

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