

Mongabay Series: [Sea Change](#)

Sea Around Us: Global fisheries data and the goose that laid the golden egg (commentary)

Commentary by Daniel Pauly on 13 August 2019



- *How did we get into a situation where fisheries are allowed to destroy the fish populations from which, given prudent management, high catches could be extracted on a sustainable basis?*
- *Having more boats in the water doesn't produce more fish, and neither do subsidies, which enable fishing operations to break even as they overexploit the populations upon which they depend. It is as if we encouraged hunters to kill more geese and replaced their golden eggs with a subsidy (a.k.a. tax money diverted from the funding of our schools and hospitals).*
- *Many of the major trends in fisheries, notably the massive increase of their capacity and their geographic expansion, which for a long time compensated for the international, subsidy-driven competition for the fish that are left, can be seen only when fisheries are studied globally. With the Sea Around Us data set, it becomes possible for fisheries scientists working in developing countries to perform stock assessments of their major exploited species, and thus for fisheries departments throughout the world to meet the requirements that politicians have with regard to fisheries.*
- *This post is a commentary. The views expressed are those of the author, not necessarily Mongabay.*

The end of the 2010s will be remembered as the time when the world realized that we are in the midst of a global biodiversity crisis, as illustrated by the [widespread collapse of insect populations](#).

A similar realization occurred about two decades earlier, when it became obvious to anyone with a passing interest in the matter that fish populations were collapsing all over the world under the onslaught of out-of-control fisheries. The generality of this pattern had long been contested: fish population collapse had long been seen as isolated events, each with its own cause, usually attributed to environmental fluctuations.

However, the 1980s had also seen a slowing down of the global catch increases, which, since the post-WWII period, had masked localized fisheries collapses. Later, this stagnation of global catches — occasionally if optimistically described as “stabilization” — turned into a continuous decline now known to have started following 1996, the year of peak catches.

For global marine catches to decline in spite of the massive increase in the size and power of international fishing fleets implies that we are essentially everywhere past the amount of fishing that generates Maximum Sustainable Yield (MSY). Thus, the biomass (or abundance) of fish everywhere is well below that which can generate MSY.

This is confirmed by multiple single species “stock assessments,” i.e., the estimation of time series of abundance of fish “stocks” based on their catch, ancillary information, and mathematical models representing the growth and decline of fish populations.

Government subsidies and fisheries collapse

How did we get into a situation where fisheries are allowed to destroy the fish populations from which, given prudent management, high catches could be extracted on a sustainable basis?

As in the case of the proverbial goose that laid the golden egg, this destruction was driven by short-term greed. But this alone is not a sufficient explanation. Another driver was (and still is) government subsidies. These subsidies are given to fisheries for two reasons:

1. Because politicians can, on the short term, buy votes and/or social peace when subsidies are given to the fisheries sector (e.g., Spain, Japan, France, China); and
2. Because politicians and many high-ranking civil servants, many of whom are trained engineers or agronomists, appear to sincerely believe, all evidence to the contrary, that subsidies should enable fisheries to increase declining catches.

The latter belief stems from a misunderstanding due to the fact that, in most economic sectors (e.g., manufacturing, agriculture), more “input” (investments, machinery, fertilizer, and other factors of production) lead to more “output.” This is

not so in fisheries: Past a certain point (MSY, see above), more fishing boats reduce the catch from an exploited fish population.

The solution to what seems like a riddle is that boats are not a factor of fish production — wild fish are produced by nature in functioning ecosystems. Boats are only the means by which the fish produced by nature are collected.

Thus, having more boats in the water doesn't produce more fish, and neither do subsidies, which enable fishing operations to break even as they overexploit the populations upon which they depend. It is as if we encouraged hunters to kill more geese and replaced their golden eggs with a subsidy (a.k.a. tax money diverted from the funding of our schools and hospitals). These and other problematic issues are covered in a book I recently published through Greystone Books, *Vanishing Fish: Shifting Baselines and the Future of Global Fisheries*.

There is always some data to work with

Many of the major trends in fisheries, notably the massive increase of their capacity and their geographic expansion, which for a long time compensated for the international, subsidy-driven competition for the fish that are left, can be seen only when fisheries are studied globally. However, decidedly global studies of fisheries were rare in most of the 20th century, and became common only in the 1990s.

Before that, most fishery scientists were content to study and write about a single fishery for decades, detailing their ups and (mostly) downs in isolation from other fisheries. In the 1990s, contributions began to appear that demonstrated a massive impact of fisheries on their underlying ecosystem on a global basis, and these inquiries became a flood in the early 2000s.

Many of these global analyses were based in part or completely on the database of “catches” (actually “landings”) supplied annually since 1950 to the Food and Agricultural Organization (FAO) of the United Nations, which then harmonized and disseminated them. This was, at the time, the only global database on fisheries statistics.

Increased use of the FAO database, however, made its various shortcomings more visible than they had been previously. One example of this was the non-consideration of millions of tons of discarded fish. Another was the widespread omission in most countries' contributions to the FAO database of the catches of artisanal subsistence and recreational fisheries, wrongly assumed to be negligible.

Combined with the lack of geographical resolution (the FAO marine fisheries statistics are allocated to 19 giant FAO statistical areas, with, for example, the Eastern Indian Ocean reaching from Bangladesh to the Antarctic convergence),

these shortcomings made it necessary to correct for the incomplete coverage of the FAO data and the coarseness of their spatial allocation. With these corrections, it would be possible to make reasonable assessments to the state of the world's oceans.

The task of implementing these corrections was undertaken by the Sea Around Us, a research project that I have led since mid-1999, which was funded for many years by the Pew Charitable Trusts (and currently by a variety of philanthropic foundations).

[Sea Around Us](#) and its hundreds of collaborators throughout the world “reconstructed” the marine fisheries catch of all maritime countries of the world (including their overseas territories), an activity that took almost 15 years to complete.

The initial reconstructions covered the years 1950 to 2010; this work was subsequently updated to 2014, and is currently being updated to 2016 (i.e., it remains about two years behind the FAO's database, which produces its statistics with a lag time of about two years). On our side, the delay is due to having to verify the official landing data country by country and territory by territory, add the fish that were discarded, and allocate the complemented catch data to various fisheries sectors and gear. Also, we allocate the catch data to smaller spatial entities such as the Exclusive Economic Zone of the various countries and territories, Large Marine Ecosystems, or other geographic entities.

The Sea Around Us dataset subdivides marine catch data by, for example, species, fishing gear, fishing country, and end use (direct human consumption, fish meal, etc.). This information is provided both as tonnage and in dollar terms, i.e., as weight times the dockside prices of the landed fish. These various dimensions are the reasons why this dataset is increasingly used by the scientific community and by civil society, as intended.

Indeed, this wide use of the Sea Around Us dataset was the main point of emphasis at the celebration of its 20th anniversary at the University of British Columbia on June 20, 2019. With the Sea Around Us dataset, it becomes possible for fisheries scientists working in developing countries to perform stock assessments of their major exploited species, and thus for fisheries departments throughout the world to meet the requirements that politicians have with regard to fisheries.

This will not solve all fisheries problems. However, being able to provide the advice that they can be expected to give, fisheries scientists will be empowered to do their work and politicians will not be able to claim that they have no basis for making decisions to reduce fishing effort in order to rebuild fish populations. The ball will be in their court, along with multiple golden-egg-laying geese waiting to be resuscitated.

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Dr. Daniel Pauly, who is both French and Canadian, studied fisheries science in Germany and spent much of his career in the tropics, notably in Philippines. Since 1994, he is a Professor of Fisheries at the University of British Columbia, Vancouver Canada, where he direct the Sea Around Us project. The Sea Around Us, initially funded by the Pew Charitable Trusts, and since 2014 by a variety of philanthropic foundations, is devoted to studying, documenting and mitigating the impact of fisheries on the world's marine ecosystems. The concepts, methods and software Daniel Pauly developed are documented in over 1000 widely-cited publications, and have led to his receiving multiple scientific awards.

Link: <https://news.mongabay.com/2019/08/sea-around-us-global-fisheries-data-and-the-goose-that-laid-the-golden-egg-commentary/>