

How can the world's fisheries be sustainable?

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According to the most recent report on the status of the world's fisheries by the United Nations Food and Agriculture Organization, fisheries supply at least 15% of the animal protein consumed by humans, provide direct and indirect employment for nearly 200 million people worldwide and generate \$US85 billion annually. This same report indicates that 28% of the world's fisheries stocks are currently being overexploited or have collapsed and 52% are fully exploited.

A new study published in this week's issue of *PLoS Biology* provides the first global evaluation of how management practices influence fisheries' sustainability. The study assessed the effectiveness of the world's fisheries management regimes using evaluations from nearly 1,200 fisheries experts, analyzing these in combination with data on the sustainability of fisheries catches. The results indicate that most fisheries management regimes are lagging far behind standards set by international organizations, and that the conversion of scientific advice into policy, through a participatory and transparent process, plays the most critical role in determining the sustainability of fisheries.

"The world's fisheries are one of the most important natural assets to humankind," says lead author Camilo Mora, a Colombian researcher at Dalhousie University and the University of California San Diego.

"Unfortunately, our use of the world's fisheries has been excessive and has led to the decline or collapse of many stocks."

"The consequences of overexploiting the world's fisheries are a concern not only for food security and socio-economic development but for

[ocean ecosystems](#)," says Boris Worm, a professor at Dalhousie University and co-author of the paper. "We now recognize that overfishing can also lead to the erosion of biodiversity and ecosystem productivity."

"The different socioeconomic and ecological consequences associated with declining [fish stocks](#) are an international concern and several initiatives have been put forward to ensure that countries improve the way they use their marine resources," explains Mora. "Some of these initiatives include the United Nations Code of Conduct for Responsible Fisheries, the Convention on Biological Diversity, and the Millennium Ecosystem Assessment. Although these initiatives have been endorsed by most governments, a global assessment on the extent to which these ideals are actually implemented and effective remains lacking."

Mora and his colleagues analyzed a set of attributes upon which country-level fisheries could be evaluated. They pinpointed six parameters, including the scientific quality of management recommendations, the transparency of converting recommendations into policy, the enforcement of policies, the influence of subsidies, fishing effort, and the extent of fishing by foreign entities.

To quantify those attributes the researchers developed a questionnaire designed to elicit worst- to best-case answers. The survey was translated into five languages and distributed to over 13,000 fisheries experts around the world. Nearly 1,200 evaluations were used in the study. The responses of the surveyed experts were compared to, and found to be in accordance with, empirical data, supporting the validity of the data obtained in the study.

The results of this global survey showed that 7% of all coastal states carry out rigorous scientific assessment for the generation of management policies, 1.4% also have a participatory and transparent

process to convert scientific recommendations into policy, and less than 1% also implement mechanisms to ensure the compliance with regulations. No one country was additionally free of the effects of excess fishing capacity, subsidies or access to foreign fishing.

"Perhaps the most striking result of our survey was that not a single country in the world was consistently good with respect to all these management attributes. So which countries are doing well and which are not is a question whose answer depends on the specific attribute you are looking at," says Mora.

The results of the study show that wealthier countries, though they have predominantly better science and enforcement capabilities, face the negative repercussions of excessive subsidies and larger fishing capacity, which have resulted largely from increased modernization of national fleets. In contrast, poorer countries largely lacked robust science and enforcement capabilities and although these nations have less fishing capacity nationally, they disproportionately sold fishing rights to nations that did. The study showed that in 33% of the coastal states classified as low-income (commonly countries in Africa and Oceania) most fishing is carried out by foreign fleets from either the European Union, South Korea, Japan, China, Taiwan or the United States. The only attribute in which poorer and wealthier countries overlapped significantly was their limited ability to convert scientific recommendations into policy. The mechanism for this pattern, however, was different. Poor countries reportedly struggle with the effects of corruption while wealthier countries often encounter more political or economical pressures.

For the second part of the study, Mora and his colleagues combined the database on management effectiveness with a recently developed index to assess the probability that the catch of a particular country is sustainable or not. This part of the study showed that out of several attributes analysed, the transparency with which scientific

recommendations are turned into policy plays the strongest role in the fate of fisheries sustainability.

"Transparent policy-making is at the centre of the entire process," explains co-author Marta Coll, at the Institut de Ciències del Mar in Spain. "If this is heavily influenced by political pressures or corruption, it is unlikely that good scientific advice will ever be translated into proper regulations. Similarly, authoritarianism in this process is likely to reduce compliance with the resulting policies."

"This study provided us with a look at both sides of the coin," says Andrew Rosenberg at the University of New Hampshire, who was not involved in the study. "On one hand, it reminds us of the difficult challenges facing [fisheries](#) management globally in protecting critical natural resources from overexploitation. On the other hand it delivers a message of hope that when policy-making is transparent, participatory, and based on science, things can improve."

More information: [biology.plosjournals.org/perls...
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