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Effectiveness of Global Marine Fisheries Management

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Abstract

Global fisheries' ongoing output decreases might have detrimental ecological and social effects. As a result, a number of worldwide initiatives have worked to enhance management and prevent overexploitation while supporting the preservation of biodiversity and a sustainable food supply. Although these programmes have gained widespread support, it is still unclear how well remedial actions have been implemented and are working. We evaluated the current effectiveness of fisheries management regimes around the world using a survey approach, validated with empirical data, and inquiries to over 13,000 fisheries experts (of which 1,188 responded). For each of those regimes, we also calculated the probable sustainability of reported catches to determine how management affects fisheries sustainability. Our survey reveals that only 7% of coastal states subject management policies to rigorous scientific evaluation; 1.4% also has participatory and transparent processes for translating scientific recommendations into policy; and 0.95% also have strong mechanisms for ensuring that regulations are followed. None of these states are also free from the effects of overfishing, subsidies, or access to foreign fishing. The conversion of scientific advice into policy through a participatory and transparent process is at the core of achieving fisheries sustainability, regardless of other attributes of the fisheries, according to a comparison of fisheries management attributes with the sustainability of reported fisheries catches. Our findings highlight the extreme fragility of the world's fisheries and the pressing need to adhere to established standards for sustainable management. They also serve as a benchmark for measuring future developments.

Keywords: Detrimental ecological and social effects; Overexploitation; Biodiversity; Fisheries sustainability

Introduction

A significant portion of the animal protein consumed by humans-at least 15% comes from fishing, and the aquaculture and cattle sectors also benefit indirectly from fishing for food. Given rising need for animal protein in developing nations and the world's constantly expanding population, fish consumption is predicted to rise. Although at least 28% of the world's fish stocks are overexploited or depleted, and 52% are completely exploited by 2008, recorded worldwide marine fisheries landings have decreased by roughly 0.7 million tonnes year since the late 1980s [1]. Severe declines in abundance have the potential to alter population genetics, impair the ability of stocks to recover, and cause wider ecological changes. They can also affect livelihoods, jeopardise food security, and jeopardise attempts to eradicate hunger. Numerous worldwide initiatives have worked to enhance management in the goal of achieving sustainable marine fisheries in light of the various ecological and socioeconomic effects of a global fisheries crisis. The Millennium Ecosystem Assessment, the Convention on Biological Diversity, and the United Nations Code of Conduct for Responsible Fisheries are a few of these programmes that included, in varied degrees, the development of marine fisheries management. Despite the fact that these programmes have gained widespread support, little is known about how effectively and to what degree remedial actions are used [2]. We measured the state of fisheries management in each country with an exclusive economic zone using a survey technique, which was confirmed using empirical data and inquiries to fisheries specialists. In addition, we compared our management effectiveness assessments to a recently created indicator of fisheries sustainability. These findings, to the best of our knowledge, provide a baseline against which future changes may be measured while also representing the first worldwide study of how sustainability is influenced by different aspects of fisheries management.

Results and Discussion

We measured how well-known conditions for sustainable fisheries were met by national fisheries management regimes, including: (1) a solid scientific foundation for management recommendations, (2) transparency in translating recommendations into policy, (3) ability to enforce and ensure compliance with regulations, and (4) minimising the extent of subsidies, (5) fishing overcapacity, and (6) foreign fishing in the f A collection of normative questions created via an Internet poll and systematically sent to fisheries specialists globally were used to quantify the degree to which specific nations fulfilled or were impacted by these parameters [3]. In the course of conducting this poll, more than 13,000 experts were contacted, and 1,188 of them answered, one from each ocean-bordering nation. The majority of the experts were university professors, government and non-profit academics, and fishery managers. Despite these varied backgrounds, responses within each nation were remarkably consistent (i.e., when many answers were provided, 67% of experts selected the same answer to any given question, and 27% selected the next closest response, in agreement with independent empirical evidence) [4]. An explanation, further findings, and a discussion of the accuracy and validity of the expert data are provided. In order to include score uncertainty estimations in the results, we additionally employed a Monte Carlo simulation technique.

Theoretical reliability

The scientific foundation upon which management suggestions are built is essential to the accomplishment of fisheries management. Scientific guidance that uses competent staff, models that contain not

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just the dynamics of fished stocks but also their embedded ecosystems, and high-quality and current data is necessary to prevent the collapse of fisheries and ecosystem-wide repercussions (such that reliable recommendations can be adapted as conditions and stocks fluctuate) [5]. Alternately, by using preventive measures in the face of insufficient information, the impacts of uncertainty can be reduced. Of the 209 EEZs around the world analysed, 87% have scientific staff who are qualified to perform fisheries assessments and provide science-based management advice (e.g., with Ph.D. or Masters-level education, or have participated in training courses or relevant conferences); 7% use holistic models as the foundation for management recommendations; 61% conduct frequent assessments to ensure the effectiveness of existing management measures; and 17% implement precautionary measures [6]. We used multidimensional scaling to synthesise all comments about "scientific robustness" on a linear scale. (Multiple regression is an ordination technique that employs the similarities and differences between answers to cut down on the number of variables examined. By combining many dimensions' worth of patterns into one, this makes it easier to evaluate and visualise them. This may be explained quite simply by averaging the various ratings for each nation [7]. The final scale was split into four halves and ranged from 0 to 1. We discovered that 7% of all EEZs, which represent around 9% of global fisheries catches and 7% of global fished stocks, place themselves in the top quarter of this scale. We discovered that high-income nations fared much better on a measure of scientific robustness used to distinguish between high- and low-income nations based on per capita Gross Domestic Product.

Federal transparency

The best available scientific information should be used as the foundation for choices, and a transparent and inclusive process should be followed, according to guidelines to increase the acceptability and compliance with fishing rules [8]. Regrettably, strong political pressures-possibly even corruption-can be applied to the decision process. According to our poll, 92% of the EEZs' management authority take scientific suggestions into account when forming policy, and 87% consult with all stakeholders or consider their viewpoints. A startling 83% of EEZs are seen to be vulnerable to corruption or bribery, while in 91% of all EEZs, regulations frequently face economic or political pressures to raise permissible catches or to enact laws that err on the side of risk rather than prudence. A scale of "policymaking transparency" that synthesises, through multidimensional scaling, the traits of considering scientific advice, involvement, pressures, and corruption, places 26% of EEZs in the top quarter of the scale [9]. On the combined scales of scientific rigour and policymaking openness, just 1.4% of all EEZs rank in the top quarter, accounting for 0.85% of global fisheries catch and 1.1% of global fished stocks. Regarding policy transparency, there were no appreciable variations between low- and high-income nations. However, the underlying process was different, with high-income nations experiencing a little bit more political pressure and low-income countries dealing with greater corruption and less frequent incorporation of scientific advice.

Capability for execution

Implementing and enforcing laws is one of the largest problems in fisheries management. The availability of infrastructure for surveillance and control, the severity of punishments for infractions, and involvement in policymaking are all factors that may have an impact on how well rules are followed [10]. In 17% of all EEZs, proper enforcement is carried out through (1) sufficient resources and tools for the managing authorities, (2) patrolling of fishing grounds, and (3) severe penalties for infractions (Figure S1K; note that only 6% of all EEZs impose penalties that are severe enough to deter violators). Unsurprisingly, poaching had an impact on every EEZ [11]. Only around 5% of all EEZs are in the top quarter of a scale called "implementation capability," which, through multidimensional scaling, aggregates poaching and the many enforcement-related variables. Only two relatively small EEZs, those of the Faeroe and Falkland Islands, which together accounted for 0.80% of global fisheries catch and 0.48% of global fished stocks, were in the top quarter for all three indicators of scientific robustness, policymaking transparency, and implementation capability [12]. High-income nations generally have stronger "implementation capability" than low-income countries, which is mostly due to better enforcement and less poaching in the former.

Materials and Methods

Analysis of the situation

We considered elements widely acknowledged as essential for the sustainable management of fish stocks (by sustainability, we mean sustainable catches and not social, economic, or institutional sustainability and the like, which at times are also associated with fisheries management and often dominate policy decisions) [13]. The variables considered in this analysis were divided into those that had to do with how reliable scientific recommendations were, how transparent the process was for turning recommendations into actual policy, how well regulations could be enforced and ensured to be followed, and how much fishing capacity, subsidies, and access to foreign fishing there was [14]. Each of these characteristics was assessed using a series of questions whose responses could be arranged in a hierarchy of worst-to-best case scenarios. We used multidimensional scaling to condense all replies into a single scale when several questions pertained to the same property. Multidimensional scaling is an ordination technique that divides variables into a predetermined number of dimensions based on similarities and differences between them. Here, we applied Pitcher and Preikshot's anchored multidimensional scaling technique [15, 16]. The worst- and best-case scenarios for each issue are utilised to create hypothetical countries, which are then used as the normative extremes of a scale on which real countries are graded. Using a Monte Carlo simulation tool based on the maximum and lowest feasible for each score, the method additionally accounts for uncertainty. On request, a copy of the programme is made accessible.

Analysis of fishery management regulations

We concentrated our evaluation on the fisheries management circumstances for all ocean domains governed by a specific coastal region. The 200 nautical mile Exclusive Economic Zone of each coastal state is where coastal resource preservation and harvesting are governed by the United Nations Convention on the Law of the Sea [17]. There are, however, certain exceptions, such as the European Union, whose member states are responsible for enforcing its fisheries laws, which are mandated by the Common Fisheries Policy notwithstanding member state differences in fishing capacity. Similar to this, many nations have overseas territories that may or may not be autonomously in charge of managing their fisheries [18, 19]. As a result, the efficacy of their management regimes may vary. Zones managed by the same organisation or zones in various regions of the world with the same sovereignty were separately examined to consider these variations in fishery management regimes. We also included areas that might not officially fall under the United Nations' definition of an EEZ or be recognised as such (e.g., division among coastal states of the Baltic Sea and Black Sea) [20]. Out of the 245 zones, we were unable to collect data for remote islands controlled by France and the United Kingdom (Ascension, Pit-

cairn, Saint Helena, South Georgia, and the South Sandwich Islands, as well as Tristan da Cunha), for which there were no contacts or information accessible [21]. Additionally, Monaco and Singapore were left out because, according to respondents at municipal authorities in both of these nations, marine fishing happens there but is judged insufficient to warrant official control. Complete data for 236 zones were present in the final database.

Conclusion

Despite the fact that all data are reported, the statistics in the text were based on 209 inhabited zones for which there are per capita Gross Domestic Product data. Uninhabited and isolated atolls were excluded to avoid biases caused by the fact that we were unable to obtain data for all such areas.

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Conflict of Interest

None

References

1. Pinstrup-Andersen P, Pandya-Lorch R, Rosegrant MW (1997) The world food situation: recent developments, emerging issues, and long-term prospects. CGIAR Food Policy Report Washington (D. C.): International Food Policy Research Institute 36.
2. Watson R, Pauly D (2001) Systematic distortion in world fisheries catch trends. Nature 424: 534–536.
3. Hutchings JA (2000) Collapse and recovery of marine fishes. Nature 406: 882–885.
4. Worm B, Barbier EB, Beaumont N, Duffy JE, Folke C, et al. (2006) Impacts of biodiversity loss on ocean ecosystem services. Science 314: 787–790.
5. Pauly D, Watson R, Alder J (2005) Global trends in world fisheries: impacts on marine ecosystems and food security. Phil Trans R Soc B 360: 5–12.
6. Pauly D, Christensen V, Guenette S, Pitcher TJ, Sumaila UR, et al. (2002) Towards sustainability in world fisheries. Nature 418: 689–695.
7. Pitcher TJ, Kalikoski D, Pramod G, Short K (2009) Not honouring the code. Nature 457: 658–659.
8. Rosenberg AA, Swasey JH, Bowman M (2006) Rebuilding US fisheries: progress and problems. Front Ecol Environ 4: 303–308.
9. Walters CJ, Martell SD (2004) Fisheries ecology and management. Princeton (New Jersey): Princeton University Press 399.
10. Costello C, Gaines SD, Lyham J (2008) Can catch shares prevent fisheries collapse? Science 321: 1678–1680.
11. Rosenberg A (2007) Fishing for certainty. Nature 449: 989.
12. Mwikya SM (2006) Fisheries access agreements: trade and development issues. Geneva (Switzerland): International Centre for Trade and Sustainable Development 58.
13. Sumaila UR, Teh L, Watson R, Tyedmers P, Pauly D (2008) Fuel price increase, subsidies, overcapacity, and resource sustainability. ICES J Mar Sci 65: 832–840.
14. Zeller D, Booth S, Davis G, Pauly D (2007) Re-estimation of small-scale fisheries catches for U.S. flag island areas in the Western Pacific: the last 50 years. Fish Bull 105: 266–277.
15. Libralato S, Coll M, Tudela S, Palomera I, Pranovi F (2008) Novel index for quantification of ecosystem effects of fisheries as removal of secondary production. Mar Ecol Prog Ser 355: 107–129.
16. Hilborn R, Branch TA, Ernst B, Magnusson A, Minte-Veera C, et al. (2003) Status of the world's fisheries. Annu Rev Environ Resour 28: 359–399.
17. Newton K, Cote I, Pilling G, Jennings S, Dulvy N (2007) Current and future sustainability of island coral reef fisheries. Curr Biol 17: 655- 658.
18. Pitcher TJ, Preikshot DB (2001) RAPFISH: a rapid appraisal technique to evaluate the sustainability status of fisheries. Fish Res 49: 255–270.
19. UNCLOS (1982) United Nations Convention on the Law of the Sea of 10 December 1982: Overview and full text.
20. Fleiss JL (1981) Statistical methods for rates and proportions. 2nd edition. New York (New York): John Wiley.
21. Sullivan PJ, Acheson JM, Angermeier PL, Fasst T, Flemma J, et al. (2006) Defining and implementing best available science for fisheries and environmental science, policy, and management. Fisheries 31: 460–467.