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Biological System based Fisheries Administration Destinations

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Abstract

In accordance with the concepts of ecosystem-based fisheries management, this study looked at how to employ individual transferable quotas to regulate fishing's effects on all ecosystem components. As a result of switching from input controls to output-based management, the regulatory authority's control tends to be lessened, which may have an impact on the outcomes for ecosystem management. In 18 ITQ fisheries that have been independently accredited as ecologically sustainable by the Marine Stewardship Council or in accordance with Australian environmental law for Wildlife Trade Operation, six fishing techniques were examined in this study's usage of input controls. A variety of ITQ fisheries maintained input controls, with non-selective fisheries like trawl, gillnet, and line using more of them than selective fisheries like purse-seine, pot/trap, and dredge. Additional case studies supported the recent and extensive usage of input controls to manage fishing's effects on the ecosystem. The retention of input restrictions, especially closures, has an impact on the fishing use right's security feature and the potential for fishermen to manage their right for future benefit. Closures decrease the security attribute by denying access, which reduces industry confidence and the motivation for long-term decision-making. One of the main motivations for implementing ITQ management was to prevent individual fisher incentives and behaviour from diverging from societal sustainability objectives.

Keywords: Ecosystem components; Fisheries; Environmental law; Trawl; Gillnet

Introduction

The open access character of the resource, the inherent biological variability and uncertainty within marine ecosystems, and/or poor governance and compliance are blamed for the well-documented challenges in managing marine fisheries. In a "race to fish," when overcapitalized fishing fleets of growing size and dominance are under the direction of "economically reasonable" people, the goal is to maximise harvests up until the point where average revenue is equal to average cost. Because the advantages from resources left behind for conservation do not immediately benefit that individual, this is frequently economically sensible but collectively destructive [1].

The conventional method of managing fisheries entailed lowering the volume of harvest by limiting fishing inputs like the maximum length of gear. Because harvesters can regularly switch out controlled inputs for unregulated ones, creating an incremental increase in effort, these top-down controls "frequently failed in their purpose to limit fishing effort." Traditional top-down management exacerbates the race to fish and its perverse incentives by resulting in shortened fishing seasons, excessive harvests, depleted populations, and an increase in destructive and risky fishing methods [2]. The United States North Pacific Halibut Fishery serves as a prime illustration. Due to ineffective effort control under top-down regulation, the fishing season was steadily cut from 47 to 4 days, resulting in gear conflicts, risky fishing techniques, greater discard rates, and decreased market value due to excess fishing costs and supply.

The promotion of a change in fisheries management style from top-down to bottom-up resulted from the realisation that many fisheries were overcapitalized, commercially inefficient, and biologically unsustainable. An attempt is made to match individual fisher behaviour with the wider societal goals for the fishery, such as ecological sustainability, through incentive-based approaches to management. This is accomplished by granting stable, enduring, and transferable harvesting or ownership rights to fishermen, communities, or cooperatives. By decreasing levels of overcapitalization and enhancing economic efficiency and profitability, such rights end the competitive "race to fish." They are sometimes referred to as specialised access privileges or catch shares, although they are actually usage rights that grant access to the fishery and a portion of the Total Allowable Catch for a certain species rather than full private property rights [3].

Fishing usage rights come in a number of shapes and sizes. These include the quotas given to individual fishermen, the quotas given to individual fishing boats, and the quotas given to fishing corporations known as enterprise allocations. When rights are given to communities or groups, they are known as community development quotas, and when they are given to an entire territory, they are known as territorial user rights to fish [4]. These are also referred to as rights-based management systems collectively.

The most widely used fishing use right is an ITQ, which allots a portion of the TAC for a specific species in advance, typically for a specific fishing season, to individual fishermen, businesses, or vessels as quota units. Holders of ITQs can maximise their profit during each season by fishing within their quota and/or trading.

Theoretically, giving fishermen a guaranteed, tradeable part of the TAC encourages them to protect the resource and advance its sustainability because they are rewarded monetarily for successful stock management. This incentive is based on how strong the fishing use right's durability, exclusivity, transferability, security, divisibility, and flexibility2 features are. The incentive structure of fishermen will be better matched to available capacity, fishing opportunities, and fishing

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desires when these are strong [5]. The advantages of incentive-based methods to fisheries management could, however, are eroded if one or more of the qualities were to decline. For instance, if a fishing use right has a limited durability; fishermen may be less motivated to reduce their catches in the short term due to the higher possibility that they won't reap future benefits. Despite the fact that few ITQ management systems are strong in all of these areas, they are designed to manage resources practically and to serve other socioeconomic and political goals outside maximising harvests' economic yields.

Even though ITQs have been implemented in more than 121 fisheries in at least 18 nations, less than 2.7% of the value of the world's total fish catch is currently caught using such systems.

Discussion

A growing group of scientists, governmental agencies, and non-governmental organisations promoted ecosystem-based fisheries management and ecosystem approaches to fisheries paradigms around the same time those fisheries economists began to promote rights-based management as a practical remedy to the widespread failures in fisheries management.

The depletion of target fish stocks, collateral effects on non-target and threatened endangered and protected species, and direct and indirect consequences on ecosystem habitat, structure, and function are among the effects of marine fisheries that have drawn the most attention. By recognising all ecosystem components, their relationships, and the significance of ecosystem health in resource utilisation, the ecosystem approach adopts a more expansive viewpoint than conventional management [6]. A comprehensive management framework that aims to balance the numerous aspirations and frequently conflicting interests of all stakeholders with environmental standards includes fishing. The EAF is innately preventative, adaptive, and it works to strengthen ecosystem resilience so that future generations can benefit from ecosystem goods and services.

A variety of legislative instruments pertaining to sustainable development were taken into account and adopted on a global scale as a result of the growing support for EBFM [7]. Since the UNFSA, many nations have incorporated elements of the EBFM and the EAF into their fisheries legislation and policy, notably Canada, Australia, and the United States. Networks of marine protected areas and comprehensive ocean plans have tended to be the most common forms of these. For instance, in Australia, a crucial element of the 1998 Oceans Policy was to create "Marine Bioregional Plans" with the aim of establishing a "Nationally Representative System of Marine Protected Areas," which were enacted through the Environment, Protection and Biodiversity Conservation Act 1999 [8].

Fisheries scientists have talked about the expansion (and/or replacement) of single-species performance measures and reference points to include ecosystem considerations, such as non-target (bycatch) species and predator-prey relationships, while national governments have responded to the international commitment to address EBFM [9]. Despite ongoing discussion, new literature assessments show that there is currently no definite assessment approach that would allow the replacement of single-species indicators with ecosystem measurements. This is because ecosystem dynamics are complex, and there isn't enough supporting theory or data to explain how these ecosystem measures behave. As a result, it has been determined that ecosystem management approaches should be implemented gradually by expanding single-species performance measurements and reference points while taking into account broader ecosystem issues [10]. Lower and more cautious TACs for target species with adaptive management strategies to take into account interactions with non-target species and ecosystem uncertainties is the expected outcome.

This "evolutionary rather than revolutionary" strategy to broaden successful single-species indicators to include ecosystem issues is supported by rights-based management proponents. This is a result of their opinion that ineffective governance (political will) to set adequate fishing mortality limits and a failure to recognise and manage humans were to blame for the failure of single-species management to address ecological principles. They contend that EBFM or any other overarching management plan will also fall short of its goals if the "primary drivers of unsustainable outcomes," which are unsuitable incentives and poor governance, are not addressed.

ITQ systems are largely made to boost the financial gain from the harvest of particular (target) species. The increased focus on EBFM has led to increased scrutiny of ITQ systems' capacity to successfully include ecosystem components such bycatch species.

Results

Despite the fact that ITQs are meant to help improve a number of important economic and ecological outcomes of fisheries management, new research by Essington, Chu, Branch, and Costello et al. highlights that results are inconsistent. Costello et al. found that only 9% of fisheries would have collapsed by 2003 if all non-ITQ fisheries had transitioned to ITQs in 1970 after assessing the effectiveness of catch sharing in averting stock failure (defined as the catch falling below 10% of the historic maximum) [11]. Chu discovered variable variations, with 8 out of 20 stock biomasses under analysis continuing to fall after the implementation of ITQs, while analysing the biomass levels of harvested populations. These results led to the assumption that other and supplementary measures to ITQs are necessary to ensure sustainability in some stocks, even if it was not possible to distinguish between the influence of the TAC and the influence of ITQs on stock status. When tested using measures like higher population levels or reduced exploitation intensity, Essington discovered that catch shares did not lead to improved ecological stewardship and the status of exploited populations. Instead, their main impact was to lessen the inter-annual variability of indicators, making fish populations and fishing fleet behaviour more predictable [12]. This could mean that ITQ management systems are more reliable than alternatives. If the TAC is set at an adequate level and implemented, Branch found that ITQs have a favourable impact on target species, but the impact on habitat and non-target species might be either positive or negative.

Fishing methods that harm other ecosystem elements have no impact on the value of a harvesting right for a specific target species or the financial gain to quota holders. Due to the fact that these "negative externalities" of fishing do not directly affect the asset value of individual fishermen, they are not financially related to their decisions. At the same time, fishermen are unable to collect enough money from customers to support the preservation of maritime biodiversity. Fishing use rights proponents have previously cautioned that they are unable to eliminate negative externalities since it is hard to provide economic incentives for every element of the ecosystem [13]. The idea that management systems that primarily use fishing use rights, particularly ITQs, are unable to achieve EBFM outcomes is supported by an increasing body of literature.

These variables may make it difficult for a single ITQ system to achieve ecosystem-based objectives and may force fisheries managers to keep in place or reintroduce input limitations that limit effort

otherwise eliminated by the transition from top-down to bottom-up management. Our presumption served as the basis for this analysis of ITQ fisheries and a comparison of the degree to which various types of input controls are used across fishing techniques to satisfy EBFM criteria [14]. There will also be discussion of the effects of input control usage. Although the focus of this study is on ITQ systems, non-transferable individual quota systems are just as affected by many of the challenges related to using input controls to meet EBFM requirements.

Conclusion

It is well acknowledged that the implementation of ITQ management contributes to the reduction of fleet overcapitalization and the encouragement of an increase in economic rent. It is less clear, though, whether ITQs help achieve progressive EBFM aims. Fishers do not have a direct motivation to change their behaviour to prevent negative interactions with ecosystem components like bycatch species when they are not included in the ITQ system because it does not directly influence their asset value.

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Conflict of Interest

None

References

1. Helson J, Leslie S, Clement G, Wells R, Wood R (2010) Private rights, public benefits: industry-driven seabed protection. Marine Policy 34: 557-566.
2. Goyert W, Sagarin R, Annala J (2010) The promise and pitfalls of Marine Stewardship Council certification: maine lobster as a case study. Marine Policy 34: 1103-1109.
3. Gulbrandsen LH (2009) The emergence and effectiveness of the Marine Stewardship Council. Marine Policy 33: 654-660.
4. Degnbol P, Gislason H, Hanna S, Jentoft S, Nielsen JR, et al. (2006) Painting the floor with a hammer: technical fixes in fisheries management. Marine Policy 30: 534-543.
5. Reiss H, Greenstreet SPR, Robinson L, Ehrich S, Jørgensen LL, et al. (2010) Unsuitability of TAC management within an ecosystem approach to fisheries: An ecological perspective. J Sea Res 63: 85-92.
6. Gibbs MT (2010) Why ITQs on target species are inefficient at achieving ecosystem based fisheries management outcomes. Marine Policy 34: 708-709.
7. Brady M, Waldo S (2009) Fixing problems in fisheries-integrating ITQs, CBM and MPAs in management. Marine Policy 33: 258-263.
8. Jennings S, Kaiser MJ (1998) The Effects of Fishing on Marine Ecosystems Advances in Marine Biology. Adv Mar Biol 34: 201-212, 212e, 213-352.
9. Bearzi G, Politi E, Agazzi S, Azzellino A (2006) Prey depletion caused by overfishing and the decline of marine megafauna in eastern Ionian Sea coastal waters (central Mediterranean). Biol Conserv 127: 373-382.
10. Lewison RL, Crowder LB, Read AJ, Freeman SA (2004) Understanding impacts of fisheries bycatch on marine megafauna. TREE 19: 598-604.
11. Diekert FK, Eikeset AM, Stenseth NC (2010) Where could catch shares prevent stock collapse? Marine Policy 34: 710-712.
12. McCay BJ (1995) Serial and ecological implications of ITQs: An overview. Ocean Coast Manag 28: 3-22.
13. Symes D, Crean K (1995) Privatisation of the commons: the introduction of individual transferable quotas in developed fisheries. Geoforum 26: 175-185.
14. Gordon HS (1954) The economic theory of a common-property resource: The fishery. J Polit Econ 178–203.