



The role of government and industry in resolving assignment problems in fisheries with individual transferable quotas



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ABSTRACT

Fisheries managers often face the challenge of addressing multiple, conflicting objectives. Historically, the focus has been on biological objectives but there has been an increasing appreciation of the importance of economic and social objectives. A desire to address economic objectives has partly driven the increasing use of individual transferable quotas (ITQs). However, ITQs are insufficient to achieve the economic objectives as a suite of other decisions and regulations affect outcomes. Assignment problems are common in ITQ fisheries and can reduce economic yield. They occur through misallocation of fishing effort, particularly when there is spatial and temporal heterogeneity in the stock, leading to inefficient timing of supply and overexploitation and congestion in parts of the fishing grounds. Clubs in the form of fishing cooperatives have the capacity to resolve these problems through coordinating the fishing effort of their members. The likelihood of a single fishing cooperative forming and uniting to resolve assignment problems however, may be diminished under ITQ management due to the increasing heterogeneity in business structures, incentives and motivations among fishers generated by market-based mechanisms. This heterogeneity can also have ramifications for fishers trying to reach an agreed industry position that can be presented to government when negotiating on management changes that deal with assignment problems. In this situation, the absence of an agreed industry position should not act as an impediment to government in prioritising, articulating and taking the lead in implementing measures that reduce assignment problems and concurrently meet their overarching economic objectives.

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1. Introduction

There is a need to set explicit, measurable and attainable objectives that support overarching goals to ensure effective fisheries management [1–3]. The presence of clear objectives helps managers to make decisions, resolve conflicts and provide a means for them to review and evaluate fishery performance [1]. These outcomes can be diminished when management objectives are too broad and lack specificity, or where they are countervailing with no accompanying strategy or time frame for their attainment or method of prioritisation [3,4]. In this instance decision-making becomes highly politicised and reactive, with a resulting failure to appropriately consider or understand long-term outcomes for the fishery [3]. Lackey [5] considered that many of the historical and contemporary failures of fisheries management stemmed from a

failure to consider the needs and desires of all stakeholders in the initial development of management objectives. This has led to disagreement and conflict over decisions due to the varying importance placed on biological, economic, social and political objectives by various stakeholder groups [6,7] and the inability to balance them [4].

While fisheries management is characterised by multiple objectives [8], managers have historically focused on attaining biological objectives in relation to maximising fisheries production [1,9]. There are examples where this had a formal basis, such as Article 61 of the Law of the Sea Convention (LOSC) in 1982, which specified the aim to “maintain or restore populations of harvested species at levels which can produce the maximum sustainable yield” (MSY) and Article 7.2 of the Food and Agricultural Organisation (FAO) Code of Conduct for Responsible Fisheries, which states that measures should be adopted that are “capable of producing maximum sustainable yield.” While there is growing recognition of the importance of economic and social objectives, indicators and measures [10,11], managers continue to frame issues and responses as biological, rather than economic or social

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[12]. Barber and Taylor [1] speculate that this could be due to managers' personal values, which are a reflection of their educational background being predominately in biological or natural sciences [13].

In Australia, some fisheries are managed by State governments, whilst others are managed by the Federal government. The importance of economic and social objectives are recognised in overarching Federal and State fisheries legislation, however objectives within accompanying fisheries management plans and policies are often framed implicitly, which impedes their implementation and measurement [9,14]. Consequently, decision-making has primarily focused on biological objectives, even to the extent of prescribing the institution of individual transferable quotas (ITQs) – an economic instrument – on the basis of stock rebuilding [15,16]. For example, Gardner, Hartmann [15] highlight that ITQs were introduced in the Tasmanian southern rock lobster fishery in 1998 due to the biological concern of needing to “constrain the catch to a sustainable level” [17]. Similarly, in the Commonwealth southern shark fishery, ITQs were introduced in 2001 due to stock assessment findings that indicated the biomass was between 15% and 46% of unfished levels in 1995 and a high probability that current effort would lead to further reductions in population size [16]. A report commission by the Australian Fisheries Management Authority (AFMA) concluded ITQs were the most appropriate management tool to reduce school shark catches [18]. Again there was little explicit consideration given to the economic benefits and in the words of Hoydal [19], biological advice was “twisted and kneaded by management to underpin essentially economic arguments.”

The institution of ITQ management in Australian fisheries could be seen as a reflection of the need to respond to pressing biological issues; however, their adoption allows managers to concurrently meet economic objectives through their initial design and implementation. Introduced in over 121 different fisheries in 22 countries [20,21], ITQs allocate to an individual or firm the right to harvest a proportion of the total allowable commercial catch (TACC) for a given fish stock in a particular area over a specified time period. While strictly speaking more a use right than a property right [22], they do involve a partial shift in ownership of the resource to private firms in attempt to provide incentives to reduce overcapitalisation, increase fleet efficiency and develop markets [23–25].

Enhancing the profitability of wild capture fisheries is an economic objective of both Australian State and Federal governments and can increase the resilience of a fishery to cost increases (especially fuel and labour), price pressure (especially from aquaculture supply) and market fluctuations (such as from exchange rates). ITQs can increase the economic profitability of fishing fleets through reducing overcapitalisation, however any outstanding assignment problems will negatively impact economic rent and prevent the achievement of the economic objective. Assignment problems occur through misallocation of fishing effort, particularly when there is spatial and temporal stock heterogeneity [26–28]. This creates an incentive for fishers to expend effort to take their quota units in areas that are more productive (e.g. spawning grounds) or at times when the stock density is greater (e.g. start of the season after a closure). In an absence of coordination among fishers this results in overexploitation and congestion on localised fishing grounds, dissipating economic rent through increased costs of fishing and inefficient timing of product supply [29].

It has been asserted that assignment problems could be resolved through clubs in the form of fishing cooperatives [20]. According to Basurto, Bennett [30] a fishing cooperative is “an autonomous association of persons united voluntarily to meet their common, economic, social and cultural needs and aspirations though a jointly owned and democratically controlled enterprise.”

In effect they a producer club, which economic models have shown to maximise the welfare of the group by coordinating the actions of individual members [31,32]. Consequently, a fishing cooperative has the potential to reduce assignment problems by coordinating the fishing effort of their members, such that the harvest in each area is timed to maximise profit, thereby removing the competitive behaviour among individual harvesters that increases the total costs of fishing [33]. Under an ITQ system of management this would allow governments to meet overarching economic objectives for the fishery without having to re-allocate ITQs spatially or temporally or by using concomitant input controls, which would have high management costs. There are various historical and contemporary examples of fishing cooperatives (inside or outside an ITQ management system) that have been successful at devising and enforcing (often through social pressure) self-imposed regulations on members; these include, Japanese and Turkish fisheries, New Zealand Challenger scallop enhancement company as well as the United States (U.S.) Gulf of Maine lobster fishery, Pacific whiting, Pacific halibut and Chignik Lake salmon fisheries [20,28,34,35].

This article examines the ability of clubs or fishing cooperatives to resolve assignment problems and questions whether this is made more challenging under an ITQ system of management. While the institution of property rights in the form of ITQs may create a compatible governance framework for collective action in principle [36], it is argued that ITQs may concurrently generate some impediments through market-based mechanisms that increase heterogeneity in business structures, incentives and motivations among fishers. This can then increase the transaction costs associated with negotiation among industry and also with government to resolve assignment problems, generating inertia and reducing incentives for revolutionary change. In this situation, the absence of an agreed industry position should not act as an impediment to government in prioritising, articulating and taking the lead in implementing measures that reduce assignment problems and concurrently meet their overarching economic objectives.

2. Discussion

2.1. The nature of ITQs and residual externalities

Individual transferable quotas define a set of users and allocate them rights to harvest from a shared resource [37]. ITQs are thus a use right, which allows owners to decide when and how to use their quota units but do not include full rights to the resource or the ability to decide how much of the resource can be harvested in its entirety [22,38]. While there is a perception among fishers that ITQs are de facto property rights [39,40] this varies among fisheries based on the strength of the property right characteristics [41].

ITQs influence individual economic decisions; however, they do not always support collective economic rationality. Individual fishing behaviour and decision-making that does not consider the cost structure of the entire fleet creates externalities, such as assignment problems. Assignment problems are caused by heterogeneity in the productivity of the stock, such that the economic yield from of a single quota unit varies based on location, time and market preference [28,29]. For example, inshore areas close to ports and market facilities or spawning aggregations with high stock densities would have reduced costs of fishing relative to other areas and consequently quota units deployed in these areas will have a higher economic yield. Fishers will race each other to overexploit more productive areas, times or higher priced fish sizes first, increasing associated costs of fishing through depleting the stock (or sub-stocks) and congesting fishing grounds

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