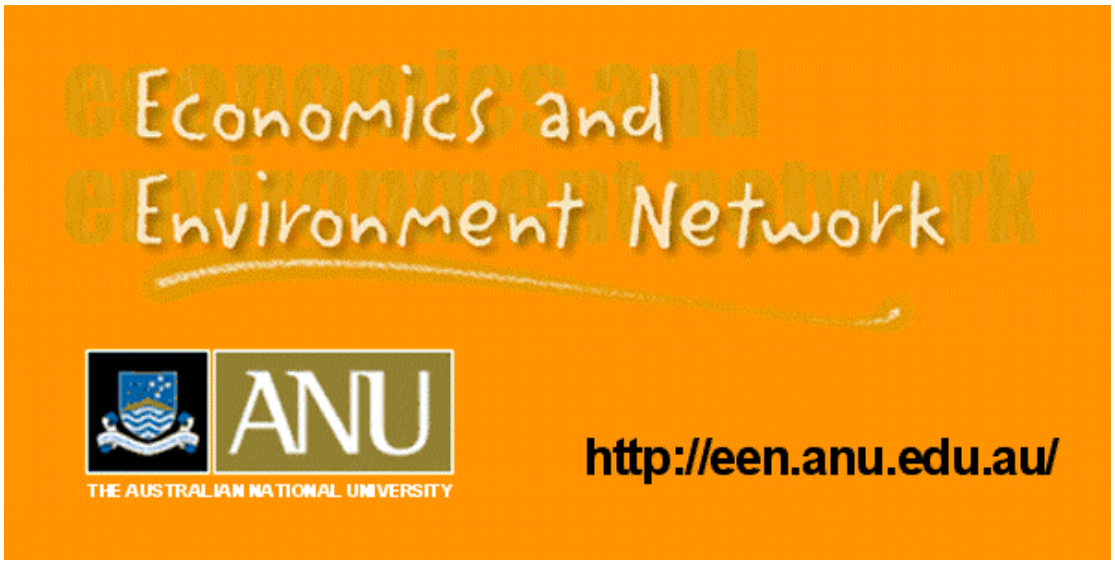

Incentive-Based Approaches to Sustainable Fisheries

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Perspective

Incentive-Based Approaches to Sustainable Fisheries

By

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Abstract

Using examples from more than a dozen fisheries, we highlight the failures of 'command control' management and show that approaches that empower fishers with the incentives and the mandate to be co-custodians of the marine environment can promote sustainability. Evidence is provided that where harvesters share well-defined management responsibilities over fish, and experience both the pain of overexploitation and the gains from conservation, they are much more likely to protect fish stocks and habitat. The key insight is that to maintain marine ecosystems for present and future generations, fishing incentives must be compatible with long-term goals of sustainability.

Perspective

Incentive-Based Approaches to Sustainable Fisheries

Introduction

Marine ecosystems are in global decline (Pauly et al. 1998; Pauly et al. 2002; Schiermeier 2002; Myers and Worm 2003; Pauly et al. 2003). To prevent further overexploitation and degradation many have proposed an ecosystem approach to fisheries (EAF) that gives greater weight to integrated management and emphasizes the importance of maintaining ecosystem health for present and future generations (Ecosystem Principles Advisory Panel 1999; FAO 2002; Garcia et al. 2003; Browman et al. 2004; Pikitch et al. 2004). We strongly endorse the goals of ecosystem-based management, but contend that it will fail to overcome the overharvesting of stocks and damage to habitat unless fisher incentives (Hilborn 2004; Hilborn et al. 2005) are made compatible with long-term goals of sustainability. We argue that what is required are incentive-based approaches to sustainable fisheries (IAF) that empower fishers with the incentives and the mandate to be co-custodians, with other stakeholders, of the marine environment.

Failures of 'command and control'

Many countries use the 'command and control' approach to fisheries that focuses on input restrictions and total catch limits. Such controls frequently fail to limit fishing effort because fishers are able to substitute to unregulated inputs causing 'effort creep'. Input

controls also fail to instil a long-term perspective in fishers, or overcome the short-term motivation to catch more even if it jeopardizes their future livelihood. For example, in the North Sea cod fishery some harvesters oppose reductions in the total allowable catch (TAC) despite the fact that the spawning stock is below a level that demands a harvesting moratorium (European Environment Agency 2004). Such short-term behavior can have catastrophic consequences — Canada's Northern cod fishery, for instance, spectacularly collapsed in the 1990s as a result of excessively high TACs (Grafton et al. 2000a).

The negative consequences of input controls, be they applied in traditional and single-species management or with ecosystem approaches, is illustrated by the recent experience in Australia's federally-managed fisheries. In the past 10 years the Australian federal government has committed US$60 million per year to fisheries research and ecologically sustainable development, undertaken substantial buybacks of fishing effort, implemented detailed scientific fishery management plans that incorporate strong stakeholder involvement, and expanded its National Representative System of Marine Protected Areas (McLoughlin and Findlay 2005). Despite such strategies, fishers have successfully lobbied against recommended reductions in the TACs and other changes that might lead to business failures in the short run. Such lobbying, and effort creep in input-controlled fisheries, contributed to a three-fold increase in the number of Australian Federal fisheries classified as overfished in the past 10 years (Caton and McLoughlin 2004).

Incentives for sustainability

A growing body of evidence shows the benefits of IAF. In Oceania, for example, 'no take' areas, territorial user rights and cooperative management have ensured sustainable fisheries for centuries by allowing clans or families to control, for their benefit, reef and lagoon areas (Johannes 1978). The success of traditional marine tenure systems suggests that when harvesters share well-defined management responsibilities over fish, and experience both the pain of overexploitation and the gains from conservation, they are much more likely to protect fish stocks and their habitats. For instance, in the Tasmanian abalone fishery — a state-managed fishery regulated by individual quotas since 1985 — quota-holders with direct involvement in advising the regulator successfully lobbied for large reductions in the total catch (Tasmanian Abalone Council 2003). The successful rebuilding of the Icelandic herring stocks, through cuts in the TAC, were strongly supported by industry because fishers wanted to protect the asset value of their harvesting rights (Hannesson 1996). In the British Columbia (BC) sablefish fishery — managed by individual harvesting rights since 1990 — fishers initiated and funded research on trap escape rings that dramatically reduced juvenile capture and mortality. Since individual harvesting rights were introduced in BC's halibut fishery, harvesters fully fund dockside monitoring that tags every fish and have modified their behavior so that discards of undersized halibut have been reduced by 50% (Grafton et al. 2000b).

Fishing cooperatives

Incentive-based approaches can reward fishers for sustainable practices and provide motivation to reduce or eliminate overcapacity and overharvesting. This does not

guarantee sustainability, however, as all fisheries are subject to irreducible uncertainties (Ludwig et al. 1993), but numerous examples show that both community and individual harvesting, or territorial rights — coupled with decision-making responsibilities — improve management (Ostrom et al. 1994; Shotton 2001; Dietz et al. 2003; Hannesson 2004). For instance, purse seine fishers recently established a cooperative in Alaska's Chignik salmon fishery and in a 2002 survey of its members, 67% claim it has made them financially better off, 100% state it has improved fish quality, and 87% consider it has been either very or somewhat positive for the management of the fishery (Knapp et al. 2002).

Harvesting rights

The key is to provide harvesters with long-term and secure rights that explicitly account for interactions across stocks, and to also give fishers a participatory mandate in management. Improved tenure, forcing harvesters to pay the full costs of fisheries adjustments and providing fishers with decision-making responsibilities help to align incentives with sustainability goals. Such approaches also reduce the need for micromanagement and encourage more 'bottom-up' and participative processes (Lane and Stephenson 2000). For example, in the New Zealand east-coast rock lobster fishery the introduction of individual harvesting rights prompted commercial stakeholders to initiate a locally focused fishing strategy. The industry successfully requested the regulator to lower the commercial catch and to restrict harvesting to a shorter winter period to make illegal fishing easier to detect (Breen and Kendrick 1997). Similarly, in 2001 the scientist contracted by the Canadian Sablefish Association (CSA), an

organization of commercial fishers with individual harvesting rights, advised of rapid declines in sablefish abundance. Shortly thereafter, the CSA recommended to the regulator that the total catch be immediately reduced as a precautionary measure. Subsequent stock recovery that followed a decline in the TAC by almost 50% has allowed CSA members to benefit from their conservation efforts.

Discards and by-catches

IAF seek to make fisher incentives compatible with long-term sustainability, but this is not easy to achieve. Examples exist where fishers with individual harvesting rights have dumped lower valued fish so as to maximize the value of their trip landings (Arnason 1994; Squires et al. 1998). However, such problems can be mitigated and adaptively managed with appropriate incentives and instruments (Turner 1997). For instance, in the BC groundfish trawl fishery — managed with individual harvesting rights since 1997 — dumping of fish is recorded by observers on all vessels and is counted against individual quotas. This quota reconciliation provides harvesters with the incentive to be much more selective in their fishing practices. As a result, the ratio of at-sea releases to the landed fish weight has greatly declined (Grafton et al. 2004). Recently, fishers have, on their own initiative, undertaken research that halved the fishing mortality of bocaccio rockfish — a by-catch species for which harvesters do not have quota (Fisheries and Oceans Canada 2004). This protects their livelihood because, should the boccacio be identified as a threatened species, groundfish trawl fishing could be prohibited.

Overcapacity: buybacks and marine reserves

The potential payoffs from IAF include better protection of fish stocks and the environment, increased returns to harvesters (Grafton 1996; Dupont and Grafton 2001; Fox et al. 2003; Dupont et al. 2005), and reduced fishing capacity (Grafton et al. 1996; Dupont et al. 2002; Turner and Weninger 2005). These benefits arise because secure and durable rights to fish, individually or communally, reduce 'racing behavior' that leads to excess effort, substitution to unregulated inputs (Squires 1987; Kompas et al. 2004) and lower overall net returns (Dupont 1990). By contrast, 'top down' input controls promote an 'us versus them' attitude with managers (Charles 1995) and frequently fail to limit fishing effort (Townsend 1990). Consequently, 'effort creep' often obliges regulators to implement operational constraints to ensure the TAC is not exceeded. Such controls, such as a shorter fishing season, often aggravate the 'race to fish' and contribute to further overcapacity (Clark 1982).

When overcapacity reaches a critical level regulators frequently resort to buybacks of vessels or associated fishing licences. Often the direct costs of buybacks are borne by the public purse, and not fishers themselves. Buybacks are only a short-term palliative for the underlying incentive problem because, if they are successful in temporarily increasing the returns to harvesters who remain fishing, higher profits encourage further investments and effort creep (Weninger and McConnell 2000). As a result, the ability of buybacks to reduce long-term fishing effort and help stocks recover is very limited (Holland et al. 1999) without a change in fisher incentives. For example, there were five buybacks at a cumulative cost of several hundred million dollars in the BC salmon fishery over the period 1970-2000. Despite such expenditures the average catch per vessel has fallen over

the period and the buybacks have not provided a lasting solution to the chronic problem of overcapacity (Grafton and Nelson 2004).

Alternative management approaches, such as marine reserves, can also be used to protect fish stocks and habitat from overfishing that can arise from excess capacity. Reserves can lead to increased abundance, size and biodiversity (Halpern 2003) and a more fecund population (Palumbi 2004) within 'no take' areas and can potentially increase harvests in exploited areas via fish migration (Roberts et al. 2001; Gell and Roberts 2003). 'No take' areas are particularly helpful in the face uncertainties (Lauck et al. 1998) and can also promote resilience to shocks and raise profitability even when harvesting is optimal (Grafton et al. 2005). Despite these benefits, reserves cannot address all the problems in fisheries (Allison et al. 1998), nor do they provide fishers with incentives to act more responsibly in terms of their harvesting practices.

Returns and subsidies

Transferability of harvesting rights, and the prices that they can command, induces some fishers to exit and remove excess capital while increasing the returns of fishers who remain. Nevertheless, high values for harvesting rights and concentration of quota are viewed with concern by some fishers and managers. The possibility exists, however, to limit the amount of harvesting rights owned by any one individual or company. A share of the increased returns attributable to incentive-based approaches may also be captured to reduce the entry costs for prospective fishers, or to collect revenues for the public purse (Grafton 1995). To help cover management costs in the commercial geoduck fishery, the State of Washington auctions the right to harvest the shellfish in defined areas

for a season. These auctions generate revenues between $5-7 million/year that are used to monitor harvesters, assess and enhance stocks, and to restore aquatic habitats (Washington State Department of Natural Resources 2001).

Higher fisher returns with IAF allow for the possibility of fisher-funded monitoring and additional data collection. Incentive-based approaches also reduce the motivation for price supports, or vessel and gear subsidies that contribute to overfishing (Milazzo 1998; Munro and Sumaila 2002). For example, Iceland and New Zealand have long-term individual harvesting rights in many of their fisheries and their government financial transfers represent less than 5% of the total value of their respective landings (Cox and Schmidt 2002). By contrast, the total government financial transfers to fisheries regulated with input controls are often much higher. For instance, in 1999 such transfers totalled US$6 billion for all OECD countries and represented, on average, 20% of the total value of landings (Cox and Schmidt 2002).

Sustaining ecosystems

By ensuring that individual and community incentives are compatible with broader social values, fishers can promote sustainability. In New Zealand, for example, the fishing industry has recognized the vulnerability to harvesting of the Fiordland environment — listed as a UNESCO World Heritage Site. To address these concerns, an alliance of conservation groups and commercial, recreational and native fishers — called the Fiordland Marine Guardians (FMG) — developed a strategy to preserve environmental quality with sustainable harvesting. It creates eight marine reserves and establishes the FMG as a formal advisory body to the government. Without well-defined harvesting

rights, and the incentives they engender, this successful balancing of interests and responsibilities across stakeholders would have been impossible.

The FMG illustrate how incentive-based approaches provide opportunities to mitigate the adverse consequences of fishing on habitats. Other potential examples include instruments that proxy marginal habitat damage and target a level of habitat quality so as to maintain both fish stocks and habitats for future generations (Holland and Schnier 2004). The key insight is that correct incentives, engendered by appropriate community, harvest or territorial rights, promote more sustainable fishing practices that can help 'turn the tide' in fisheries.

Concluding remarks

Incentive-based approaches will not overcome all the negative trends in the world's oceans, but they will address many of the failures of 'command and control' management that contributes to overfishing and unsustainable fishing practices. A growing body of empirical evidence supports our conclusion that approaches that empower fishers with the incentives, responsibilities, and the mandate to be co-custodians of the marine environment promote good governance, help support healthy marine ecosystems and can improve the economic performance of fisheries.

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