

Fødevareøkonomisk Institut

Alternative Management Systems in EU Fisheries

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Copenhagen 2003

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Preface

This report is a result of a paper that was prepared with the purpose to form the basis for a discussion of alternative management systems in EU fisheries. The discussion took place at a meeting organised by the EU Commission, DG-Fish, in March 2002 in Brussels.

Around 20 specially invited people covering a wide range of expertise and interests took part in the meeting. The attendees were members of the EU Parliament's fisheries committee, experts representing fisheries associations and public administrations with particular experience in the administration of management systems within the EU, Iceland, Norway, and FAO, and representatives of the EU Commission, the Commissioner's cabinet and DG-Fish. The General Director of DG-Fish chaired the meeting.

As part of the preparation for the revision of the EU Common Fisheries Policy from 2003, the purpose of the meeting was to commence a discussion about advantages and drawbacks of alternative management systems in the EU, among those user right systems such as individual transferable quotas. This discussion, however, is supposed to continue in 2003 and onward.

The report has been prepared by senior economic adviser Hans Frost, assigned as consultant to DG-Fish, in cooperation with research fellow Erik Lindebo from the Danish Research Institute of Food Economics (FOI). Elsebeth Vidø, secretary at FOI, has carried out the word processing.

The views expressed in the report are those of the authors and do not necessarily represent those of the European Union

Danish Research Institute of Food Economics, February 2003.

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1. Introduction

Management of the fish resources by use of alternative measures to Total Allowable Catches and quotas such as user rights or property rights, in particular individual transferable quotas (ITQs), have been analysed and debated for more than three decades. Concern about the over-exploitation of fish stocks has been a dominant issues in fisheries biology and economics for more than a century.

A massive literature is available about property rights including ITQs. Most of it addresses the issue from a theoretical economic point of view. Literature on experience with ITQs concerns Iceland and New Zealand, which have introduced ITQs for all their important species. A number of single species (single fisheries) around the world are subject to ITQs, but other fisheries to which different management regimes apply often influence experience from those fisheries.

Within the European Union the Netherlands has used an individual non-transferable (IQ) management system since 1976, and from 1985 the individual quotas were made transferable and the system was changed into an ITQ system. Although not legally adopted, the United Kingdom has in recent years, as an industry initiative, moved toward an ITQ system. Denmark has over the last ten years used a system that effectively could be characterised as an IQ system and from 2002 an ITQ system has been introduced in the pelagic fishery on a five-year trial basis.

Apart from a few necessary references this report does not include references to the extensive literature. However, attention should be drawn to the FishRights conference in Western Australia at the end of 1999, supported by the FAO, that brought over 340 delegates from 50 countries together to discuss the issue of property rights in fisheries. The results are reported in FAO Technical Paper 404/1 and 404/2 (Rome 2000). Attention should also be drawn to the book “Sharing the Fish – Toward a national policy on individual fishing quotas” (National Academy Press, Washington D.C., 1999). The National Research Council was commissioned by the US Congress to assess whether the moratorium on ITQ adopted by the Congress in 1996 should be lifted. “Sharing the Fish” contains evaluations of individual fishing quotas from an American point of view while the FAO reports includes a wide range of contributions from a world-wide perspective. Some of this literature has been reviewed during the preparation of this report.

The views presented in this report mainly draw upon economics. At the end of the report anthropological and sociological arguments are presented. However, legal aspects, such as private ownership of the fish resources, and political aspects in terms of distributional effects are left aside. Concern about changes in income distribution and who will eventually become the owners of the property rights seem to be the issues that have been most strongly debated prior to the decisions about introducing property rights. Whether a certain income distribution is considered just will have to be based on value judgements.

2. What is a property right?

When assessing property rights including ITQs it is important to acknowledge that property rights must be viewed in a context of the fisheries management that has been developed over a number of years. In the assessment, and in particular in the comparison, of the management schemes in different countries it is important to consider the development of the management of the fish resources which for the EU legally goes back to 1983, but effectively with respect to Member States dates further back. Therefore introduction of alternative management systems could not be viewed in a context of a “common property – open access” fishery but rather in a context of strongly regulated fisheries.

The fish resources are normally considered common property resources owned by States at least after 1977 with the extension of Exclusive Economic Zones (EEZ). Common property is not the same as free access fisheries or unregulated fisheries because sovereign States, including those of the EU, have executed fisheries management and limited access to exploit the fish resources within the EEZs for many years. On the high seas the fish resources are also common property and in this case free access is a more relevant characterisation. However, since 1996 with the UN Agreement on migratory species and straddling stocks it has been the aim to reach some sort of agreement on management of high sea fisheries.

From a biological, political and economic point of view an objective of fisheries management has been to reduce fishing mortality with the aim to achieve higher yield from the fish stocks, higher spawning stock biomasses and a reduction in the use of production factors (capital and labour) that could be employed elsewhere in the economy with higher returns. (See Figure 1.) It is argued that the introduction of ITQs will incite fishermen and the fishing industry to reduce costs to the lowest possible required to catch the quota. With reference to Figure 1, a shift from the “equilibrium” point to the left will take place leading to higher catches, lower costs and higher income from fishing.

To elucidate the issue some management reference (target) points are displayed in Figure 1, using a typical demersal species in EU waters (e.g. codfish or flatfish) as an example. These reference points are indicative but show how they are placed relative to one another and what the current level of exploitation is. The figure shows fishing mortality levels on the horizontal axis, with the revenue gained from the species and the costs of producing fishing mortality on the left-hand side vertical axis. The size of

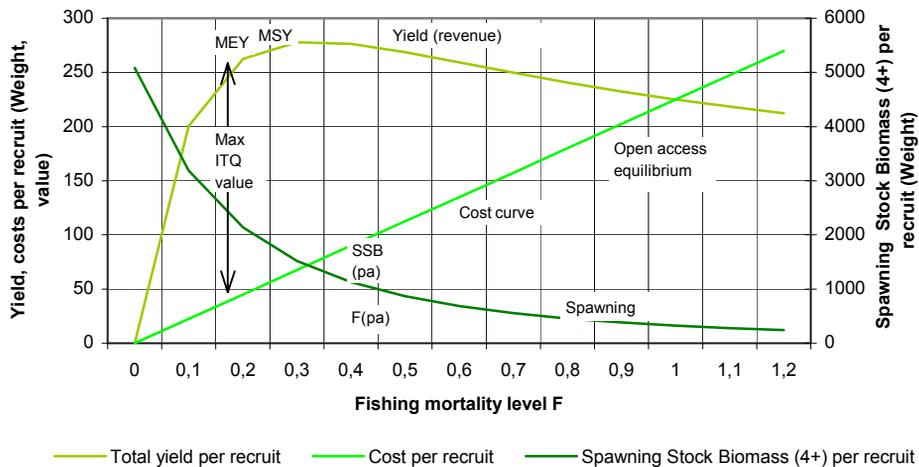
the spawning stock biomass at various fishing mortality levels is shown by the lower curve and is measured against the right-hand side vertical axis. From knowledge of the state of the fishing activity and the fish stock assessments it can be estimated that if the fishery is not managed carefully the fishing mortality level is where revenue equals total costs (here called equilibrium). The fishing mortality is then higher than recommended by biologists and economists. The biological and economic target points are shown to indicate whereto these groups propose to move. The means have been quotas and limitations in fishing effort (that is, the product of the number of vessels, the size of the vessels, and the fishing time that is spent in the fishery).

The individual fishermen will earn normal profit in the equilibrium situation (at $F=1$ in Figure 1), but from society's viewpoint it would be better to reduce fishing mortality by limiting fishing effort even though this would lead to supernormal profits in the fishery. From a socio-economic point of view a good action, at least in theory, with respect to limiting the use of production factors and hence fishing effort and fishing mortality, is to introduce individual transferable quotas. The rationale is that if the fishermen get an individual property right they would have an incentive to maximise the profit from the allocated individual quota, and that would mainly happen by a reduction in the use of capital and labour and a shift toward the MEY point in Figure 1.

The high profits that could be expected together with the increase in the spawning stock biomass and yield represent an improved outcome, both from society's point of view as well as from the viewpoint of those fishermen who stay in business. On the other hand, the fishermen or local communities that are forced out of business in one way or another will not be content with the solutions (see Sections 19 and 20).

An individual transferable or non-transferable quota is a property right to a certain amount of fish and hence income. The right is not tangible in the sense that a property right to one's own house is the house itself and the "income" is how one uses and decorates the house. The property right is rather similar to a property right that is exerted by the bank or the mortgage company that has provided the loans. The property right is a "piece of paper" that entitles the holder to some yield or return. The distinction may seem artificial to some, but it is crucial because in the current fisheries management system the fishermen only have a property right to the fish if they actually catch them. In an individual quota system with property rights the fisherman does not need to catch the fish. This is to many fishermen a crucial distinction.

Figure 1. Reference points for fisheries management



3. Institutional and governance structures

At a first glance it seems obvious that a prerequisite for ITQ is the fixation of Total Allowable Catches (TACs). However, even without TACs and quota allocations it could be argued that a property right to a certain quantity of fish would give fishermen an incentive to reduce fishing costs, and the property right could be used as collateral for bank loans providing the fishermen and other stakeholders with higher economic security. If the fish resource is a common property there is an incentive for the fishermen to catch all they can in the shortest possible time (through a “race to fish” or “Olympic fishing”) and thereby increase the costs of fishing. This incentive would be removed by granting property rights to individual fishermen.

On the other hand, if no information about the state of the stocks is available and no TACs are fixed, it is not possible to get any idea about where the fishery is placed on the spawning stock biomass and yield curves. From society’s viewpoint little is gained by allocating property rights if no information is available about the fish stocks. Neither would it be possible to take into account the strong variation that is usually seen in the individual fish stocks.

Therefore, the introduction of property rights and ITQs would require biological stock assessments that could form the basis for the TAC and hence the allocation of ITQs to the holders of the fishing rights. The scientific basis constituted by ICES is therefore still necessary, and if the ITQ system is expanded to include stocks that are not subject to scientific stock assessments, some sort of assessment would still be a prerequisite to make the ITQ system function.

Fishermen’s actions at sea are often difficult and sometimes impossible to observe. In a TAC/quota system this has entailed difficulties in governance. Catches in excess of the quotas, by-catches and discarding of fish have been associated with TAC/quota systems. In an ITQ system this is not expected to change, although the change in incentives that must be expected from an ITQ system could lead to an improvement with respect to governance.

Introduction of an ITQ system would, basically, still require input from the institutions that provide scientific information about the fish stocks and the institutions that are responsible for monitoring, enforcement and control. Applying and properly enforcing individual quotas in fisheries is believed to assist the optimisation of the eco-

conomic situation of the fishery through capacity adjustment, whilst ensuring the long-term viability of fish stocks.

A number of issues with respect to the institutional framework of the EU arise with the introduction of ITQs:

- ❑ the general principle of free movement of capital and labour within the EU;
- ❑ relative stability in the allocation of fishing quotas on Member States;
- ❑ the responsibility of governance.

The introduction of ITQs fundamentally changes the institutional structure with respect to fisheries. Relative stability secures the Member States' right to capture the value of the quotas allocated to them. With an ITQ system this right is transferred to the individual fishermen (or owners) of the quota. If no institutional restrictions are associated with the ITQs, the owners of the quotas are able to trade across industry borders, across national borders and maybe even outside the borders of the EU. That would change the structure of the industry, and the Member States' vested interest in the fish resource value will be dissipated unless a system to extract the value (resource rent) from the fishermen is introduced, together with the introduction of the ITQ system. The EU fishery policy is distinguished from almost any other country's policy by the number of States it includes and the large number of shared stocks. Therefore, the introduction of ITQs in the EU will challenge the Community law to secure a proper functioning of the system.

Basically, the relative stability principle will be difficult if not impossible to maintain with the introduction of an ITQ system, unless it is introduced separately in each Member State and governed on Member State level subject to the CFP. However, the biggest economic gain from introducing ITQ stems from the simultaneously increasing fish stocks and decreasing fishing effort and costs. A Member State by Member State introduction will not secure the full effect of this. However if several Member States introduce ITQ autonomously a larger fish stock effect could be expected. For example, if the Netherlands, the United Kingdom and Denmark introduce ITQs more than 80% of plaice, sole and cod would be covered. The administrative problems and costs could be higher in a centrally managed system relative to decentralisation. In "Sharing the Fish" it is actually recommended that local authorities be empowered to fix and distribute the ITQ because of their better local knowledge. In the case of a Member State ITQ management, the relative stability could be more easily maintained although effective prevention of "quota-hopping" could only be avoided by

strict enforcement and control of the ownership of the quota rights. It should be pointed out that one of the objectives of relative stability is to secure that the income from the fish resources accrues to the Member States in a way that has been agreed. In a properly functioning ITQ system this will also happen even if the ITQs are traded, because if an ITQ owner in one Member State sells his quota to a person in another Member State, the price of the quota will (at least in theory) be equal to the present value of all future earnings from the quota. Hence, that will accrue to the original owner (Member State).

4. Characteristics of property rights

The definition of property rights presented above could be made operational by using a number of criteria proposed by Professor Anthony Scott (see e.g. FAO Technical Paper 404/1).

With reference to a house (home) it could be disputed who has the property right: the owner who may own only 5% of the value of the house, or the bank/mortgage company, or even the spouse of the owner, or their children. Those people are often the actual users of the house, and what is their position with respect to the execution of the property rights?

Professor Scott mentions 4 criteria to help measure the content of the property right. These criteria could also be specified as the dimensions of the property right:

- Security
- Exclusivity
- Duration
- Transferability

Further the transferability could be subdivided into:

- Divisibility
- Flexibility

Individual quota systems give fishermen or vessels the right to catch a specified amount of fish of a certain species, often in a given area and time period. These quotas are regularly based on an allotted share (percentage) of the annual Total Allowable Catch (TAC) or a fixed, absolute quantity. But since the TAC tends to change from year to year, so should the size of the individual quota. Where the individual quotas are made transferable, quotas may be assigned, traded and exchanged similar to other property rights. The allocation, security, exclusivity, duration, transferability, flexibility, and divisibility of the individual quotas vary across the fisheries where such a management regime is in place. These issues are important in determining the economic and social outcomes of such programmes and will need to be considered when applying individual quota systems to specific fisheries.

Security of a property right is the ability of the owner to withstand the challenges other individuals, institutes, or the Government, may impose on him. For example, rights will be deemed insecure if the Government can interfere with the fisherman without notice and reduce his or her powers or the size of the estate. In other words, the security of the right can also be thought of as the probability of the owner that he holds onto his property right entitlement. This characteristic is valuable as it potentially saves the property holder from the costs of protecting and enforcing his or her right to fish.

Exclusivity refers to the ability of the property rights holder to utilise and manage the property without outside interference. For example, management regulations such as technical measures will tend to interfere with a fisherman's harvesting strategy. The actions of other fishermen, e.g. through crowding on the fishing grounds, leading to reduction of the fish stock size and lower catch rates, may further subtract from this ability and may force a continuation of competitive 'race to fish' behaviour.

The durability characteristic determines how long the holder is entitled to exercise the powers of ownership. Leasing, for example, is traditionally a right of finite duration, whereas ownership is often of indefinite or permanent duration. This characteristic plays an important role as it helps to determine the owner's incentives to accept short-term losses for greater long-term benefits, for example. Furthermore, if durability and security increase together, the holder will be able to justify long-term planning with respect to stock husbandry, investments in durable equipment, and habitat improvement.

Transferability refers to the ability of the holder to transfer the property to someone else. In fisheries, this represents an important economic argument. Where a resource is scarce and valuable, the transfer of property allows for the optimal allocation of the resources. The divisibility of these rights will further allow this optimisation process through the transfer of property sub-divisions. Transferability is valued because it allows the holders to make the best use of their time and capital.

This is further facilitated by the divisibility and flexibility of the property rights. When a fishing right is divisible on small shares, species, and fishing grounds its holder has the opportunity to change the scale of his fishing activity and to buy and sell quotas in the most economical way. Divisibility is increased by adding to the permissible number of joint owners. A right can gain flexibility because typically property rights are constrained by a number of conditions. The more easily these conditions can be relaxed with respect to changes in stock size and migration, or in

ditions can be relaxed with respect to changes in stock size and migration, or in the seasonality of the market, the more flexible the right is. A royalty instead of a fixed price can also make payment obligations more flexible, e.g. when holders may pay for the right by a set rental (when the royalty is based on net revenue instead of on weight of catch). Flexibility transfers risk of unexpected events from the user/holder of the right to the leaser i.e. the Government. An example is that if the user (the fisherman) must pay a predetermined lump sum to the leaser (Government) it could be risky (costly) to him if, for example, weather conditions prevent him from fishing; a flexible system where he pays per unit landed fish reduces the fisherman's risk.

An ITQ system is not self-enforcing and so monitoring and enforcement programmes will be needed to ensure the proper functioning of the system. The transfer of quotas in a well-functioning quota market is another vital factor that is required to ensure that the benefits of a restructured industry are realised. Furthermore, investments in quota are only likely if the rights are made durable and properly enforced.

5. Ownership (security and exclusivity)

The defined ownership criteria will depend on the aims and objectives of fisheries management, and can be expected to play a significant role in determining the distribution of quota. Ownership is often given to the vessel owners (fishermen, companies etc.) who have been issued a national fishing license. The ownership can take many forms, ranging from ownership granted in perpetuity to ownership for only one season. The ownership could further be subject to a number of restrictions that limit the owner's possibility to trade the quota, to use the quota as collateral for loans, and to extract high profits. The group of people among those smaller or larger societies, the professional background, the legal type of company that is eligible to be a quota owner could also be subject to restriction. It is the general view that the more restrictions there are, the more rationalisation is hindered. This may not be entirely true; speculative entry into fisheries from outsiders is greatly facilitated by the introduction of ITQs.

It could be questioned (and is) as to whether the allocation of ITQs to vessel owners is just, bearing in mind that the crew, the processing industry, part-time and recreational fishermen and other stakeholders also have a vested interest in the fish resources. Ownership is a question not only of having the right to a share of the resource but also of having an opportunity to the so-called windfall¹ gain, which is the profit from the resource once it is recovered.

Most nations impose specific restrictions on the eligibility of a person to hold a fishing license and will hence determine their eligibility to own quota. For example, New Zealand has imposed nationality restrictions for fishing companies, ensuring that ownership of each company is at least 75% New Zealand owned, see "holding restrictions" below. Continued ownership of fishing licenses and allocated quota, is in some cases dependant on the annual utilisation of the allocated quota and failure to comply with regulations may result in the revoking of quota ownership. In the EU, however, national authorities also need to abide by the treaties of the EU that may hinder the adoption of certain nationality criteria. The legal issues need to be explored further.

¹ If apples fall off a tree in stormy weather they can be collected from the ground instead of the more cumbersome procedure of climbing up into the tree.

6. Durability

From an economic, financial, and planning perspective it is necessary to send out signals to the quota owners that the applied management system is permanent and that managers are seeking responsible fishing practices that safeguard the future of the fishery. In other words, fishermen will need to acquire a vested interest in the long-term sustainability of stocks. If management sends out the signals that the system will only be in place for a few years, after which currently allocated fishing rights are abolished, then fishermen may have the incentive to overexploit the fishery and reap the benefits whilst they can. If there remains uncertainty in the durability of the ITQ system then fishermen and financial investors will be less prone to make plans for their long-term participation, especially in terms of investments.

The durability of quota issues has sometimes varied, depending on management objectives. Although ITQs in some fisheries have been allocated for a defined ('trial') period, these have often been subsequently continued once the system has been embraced by industry. Quota ownership in two Canadian Atlantic fisheries (herring and groundfish) has been extended indefinitely following such periods. In many cases the system has been given a permanent status at the time of implementation, although minor adjustments to the system may have subsequently been made on an ad hoc basis. For example, the permanent quota durability in New Zealand was disrupted following the redistribution of quota shares to native Maoris. In the Dutch ITQ system, quota ownership is perceived to be assured in the short-term, although long-term ownership is seen to be less secure.

7. Transferability

Allowing quota transferability will lead to fleet restructuring, where the least efficient operators are gradually persuaded out of the fishery, promoting a more optimal allocation of resources and ensuring greater economic efficiency in the fishery overall. However, fleet restructuring will occur even without an ITQ scheme. This is a highly sensitive socio-political issue, as some quota concentration will result from transferability. In fact, quotas on the Norwegian inshore cod fishery have not been made transferable for this very reason, since the fishermen feared that transferability would lead to quota concentration in Southern Norway, whereas the livelihood of smaller fishing communities in the North would be threatened.

At an OECD workshop on individual quota management in 1992 it was generally agreed that there was not a problem with the transferability of quota per se, but the possible concentration or monopolisation of quota following significant quota transfers may lead to undesirable social implications. It is clear, however, that without transferability the management system will not achieve the desirable outcomes of fleet restructuring and enhanced utilisation of quotas in economic terms.

Transferability can be either temporary (through quota leasing) or permanent (sometimes requiring that the selling partner leaves the fishery). Quota leasing in Iceland, for example, has been possible through quota exchange, quota pooling, contract fishing, and direct leasing. Restrictions on transferability can mean that transfers from one vessel to another are only allowed in the same region (Iceland), same fleet segment (Australian Southeast trawl fishery), or between vessels that hold the same kind of species quota (Dutch sole/plaice fisheries). Restrictions on the divisibility of quotas being transferred may also be imposed. For example, quotas are non-divisible in the Dutch sole/plaice fisheries, although the whole quota may be sold to many buyers at the same time. Some fisheries that initially restricted transfers, such as the British Columbia halibut fishery, have gradually allowed limited transferability. In some cases the quota transfer requires the official approval of national authorities.

8. Initial allocation

The majority of property rights systems currently implemented saw the initial allocation of quota as a free allocation, largely favoured in order to receive the acceptance of the system by industry. Auctioning of quota to the highest bidder has only been used in very few fisheries², although New Zealand used a competitive tender scheme during the allocation of further quota in 1986. The initial allocation procedure is very sensitive, as it will determine the social distribution of quota. The mechanism by which managers allocate their quota has varied, with each fishery needing to take specific social, economic, and biological factors into account.

The size of an initial quota allocation often depends on historical vessel participation in a given fishery and historical catches of given species and areas. Quota allocations may also be based on vessel size parameters (e.g. hold capacity, engine size, vessel length) and the level of capital invested in the vessel or enterprise. In some instances quotas have been allocated equally among vessels. It is noticeable that the majority of ITQ systems have based their allocations on a formula comprising a number of these factors. Examples of smaller vessels given preferential treatment also exist. In most cases there has been a time period following the initial allocations where fishermen and vessel owners have been allowed to lodge a protest against his or her allocation.

Allocations have given the quota holder the right to harvest a set amount of fish for a defined period. These amounts have often been in the form of a given percentage of the annual TAC. Hence, if the TAC drops in volume from one year to the next, the volume of the individually allocated quotas will decrease accordingly. This system resembles the relative stability procedure used by the EU. There is limited evidence in the literature of how and in what form quota allocations are actually issued (i.e. legal status and value of documentation). In many cases, however, it seems as though permits and quota holdings are attached to the fishing or vessel license. The majority of quota allocations in the United Kingdom are held by the producer organisations, which then distribute the aggregated "group quota" to individual fishermen, normally for a defined period. Iceland is a clear example where quota holdings have assumed a capital value similar to other public shares on the stock market, and are similarly held and traded as valued documents. The New Zealand authorities register all quota holdings that are allocated, helping to administer the process of trading and leasing of quota, and the eventual tallying of catches.

² For example, the initial ITQ allocation in Chile was based on open bidding in public auction.

One of the arguments against initial allocation based on historic landings or free allocations is the windfall gain that would arise. This is certainly a problem if ITQs are allocated for an unexploited resource. If the resource is exploited and investments are made in fishing vessels much of the windfall gain is already accumulated in the value of the vessel. Without doubt the value of the vessel will decrease once ITQs are introduced because now part of the value of the resource is moved into the ITQ. In fully exploited fisheries it is questionable to what extent windfall gains exist.

9. Holding restrictions

The transferability of quota may lead to the concentration of quota in fewer hands. Several countries have therefore imposed quota restrictions on fishermen and/or vessels (e.g. per species and area), allowing managers to protect the industry from any monopolistic tendencies and social imbalances. In many fisheries where property rights systems are in place, a maximum holding restriction is enforced instead of restricting transferability. However, such restrictions will impair the desirable transferability effect of optimising the fleet structure in economic terms, as the most efficient operators will be unable to acquire further quota beyond a set limit. Imposing holding restrictions will, therefore, be governed by social and political decisions.

Restrictions vary. The Netherlands has not imposed any restrictions at all, and some programmes that restrict transferability have no holding restriction. The New Zealand programme restricts quota owners to hold no more than 35% of the quota for a single offshore species in a given management area. Iceland currently imposes a 10% maximum holding of cod and haddock quota, with 20% for other species. Fleet restructuring has now led to industrial pressure for these restrictions to be eased. The halibut and sablefish fisheries off Alaska restrict quota holdings to between 0.5-1.5% of the TAC, depending on the species and the management area (regional TAC).

Some nations also impose a minimum holding restriction. For example, quota holders in New Zealand need to own at least 5 tonnes of finfish or 1 tonne of invertebrates if they wish to participate in those fisheries, and quota holders in the surf clam and ocean quahog fisheries in the United States need to possess a quota of at least 160 bushels (containers).

10. Quota prices

To assure the most competitive ITQ prices it is important to have many buyers and sellers, low transaction costs, a “market place”, divisibility and relatively uninhibited transferability of quotas. Furthermore, the likely market demand for quota will be derived from the vessel’s harvesting technology, ex-vessel prices for fish, harvesting costs and the economic inputs like fuel, gear and equipment.

If individual quotas are made transferable a public quota market is likely to emerge, such as in Iceland and the Netherlands. The ad hoc quota management system in the United Kingdom has led to an official trade in quota among fishermen and producer organisations. Similarly, the non-transferable quota system in the Norwegian inshore cod fishery has led to a grey market where vessels with and without fishing rights are bought and sold.

In the cases where quota trading has been established, documentation clearly indicates that quota prices tend to steadily increase over time. The majority of fisheries studied have seen a reduction in fleet size and improved profitability of the fisheries following the introduction of ITQs. This has even been the case where TACs and fish landings have decreased. With improved profitability quota will increase in value, and where TACs are reduced (leading to potential scarcity of quota) prices can be expected to increase even further. Rises in quota prices can be seen as an economic development where the improved status of fisheries is captured in the capital value of quotas. This capital value can also be thought of as the resource rent of the fishery, a rent that is dissipated under regulated open access management. Although there is an argument that the rise in capital value of quota will result in a windfall gain for the initial quota holders, there is no reason why management cannot extract these rents from the fishery.

In the Netherlands prices have not increased to any large extent. Quota prices seemed to increase in the beginning of the 1990s, when stricter landing controls were being enforced, but were later eased. The Icelandic fishery has seen gradual increases for most species. The development has been most noticeable in the demersal and flatfish fisheries, especially during the latter half of the 1990s, giving a clear indication of the capitalisation of the national fishery. Furthermore, evidence from the Dutch sole/plaice fisheries suggests that quota prices have been in the order of 3 to 4 times the auction price of landed fish. Quota price developments in the United Kingdom during 1996-2000 also provide supportive evidence for gradual increases in value.

Exceptions to this general trend are fisheries such as the Icelandic shrimp fishery, where reductions in the TAC led to a decrease in the shrimp quota price.

Some price information about ITQs is available for the Netherlands and Iceland. In the Dutch case the ITQs are purchased and sold on a long-term basis (perpetuity) while the traded ITQs in Iceland are mainly leased (one year). The price is higher the longer the holder can keep the ITQ. In a recent Danish study about ITQs a price estimate was calculated based on the contribution to the margin (gross revenue minus variable costs), which is the highest price a vessels owner can pay for an extra quantity of fish without facing a loss. The result of these calculations was in remarkable harmony with prices for comparable Dutch and Icelandic species, i.e. sole and cod. For sole the Dutch recorded prices were in the neighbourhood of 90 NLG/kg (41 Euro/kg), compared to the estimated Danish price at 34 Euro/kg. Icelandic cod was around 1.1 Euro/kg (8 DKK/kg) calculated in round weight (the Icelandic price is normally fixed in gutted weight), compared to a Danish estimated price of around 1 Euro/kg (7 DKK/kg) on a short-term lease basis. The long-term prices are typically 10 times higher than the short-term prices. For further comparison, the consumer prices paid to the fisherman on the market for sole in 1999 were around 8 Euro/kg, and around 3 Euro/kg for cod. The lesson is that the price formation seems to function reasonably well and the fishermen seem to act rationally from an economic perspective.

11. Trade systems and market failures

To achieve the full economic benefits of the ITQ system it is necessary to establish a market place in such a way that trade can be carried out in a smooth and transparent manner. The market place could be a stock exchange, private broker, or public body. The product that is traded is the quota share of a species or a mix of species. The mix could further be composed according to fishing patterns. The ITQ could therefore be homogeneous or heterogeneous. The homogeneous ITQ is easy to identify and relatively easy to determine the price for, contrary to the heterogeneous ITQ. The advantage of the heterogeneous ITQ mix is that the transaction costs associated with the trade could be lowered. It could be considered to separate the fixation of TACs and the ITQs from the biological TAC advice to avoid fluctuations in quota prices determined by fluctuating TACs, and only use the biological stock assessment to monitor the long-term development in the fish stocks.

Price formation and hence the value of the ITQs requires a well-functioning market. But it is unrealistic to expect that this will always be the case. Sub-optimal price setting could be expected, at least for the first few years. A well-functioning market requires many buyers and sellers; homogeneous products; large and constant supply; and transparency on the market. However, a range of factors might contribute to make price formation opaque:

- ❑ buyers and sellers do not maximise their profit (utility);
- ❑ market concentration on the demand and/or supply side (monopoly);
- ❑ high transactions costs;
- ❑ security, exclusivity, and duration of rights cannot be guaranteed;
- ❑ asymmetrical information (the seller knows more than the buyer, or vice versa);
- ❑ lack of information.

The appearance of one or several of these market failures requires public support and monitoring of the trading with the ITQs. Many of the problems with respect to price formation could be addressed if consciousness about the possible market failures and a will to remedy these failures existed. Some public interference is deemed necessary where the means could include:

- ❑ clear objectives about the resource management;

- ❑ active public participation in the defining of the market, the market participants, and the construction of ITQ-bouquets;
- ❑ enforcement and control;
- ❑ a position as to whether society should collect some of the resource rent.

12. Quota concentration

An effective ITQ system will ultimately lead to an economically efficient fishery with fewer vessels and (maybe) fishermen. The marginal (least efficient) operators will leave the fishery and the more efficient operators will be left to harvest a larger percentage share of the quota. Hence, quota concentration will result. Although this may lead to social adjustments the situation is no different to any other management regime that aims to produce long-term balance between capacity and resource availability. For example, under the Multi-annual Guidance Programme (MAGP), which aims to reduce capacity of Member State fishing fleets, a similar evolution can be expected.

Most of the evidence of transferable quota systems given in the literature shows that fleets are reduced in size, leaving fewer vessels to share the overall TAC. The Icelandic fishery has been characterised by an increasing amount of quota transfers throughout the 1990s, with the ten largest quota owners now owning over one-third of the overall national quota. This concentration seems to be greatest within the larger, vertically integrated companies. Although there is limited evidence to support the notion that this concentration of quota has been detrimental to the smaller coastal regions, a recent study suggests that many fisheries companies are now owned by people without a fisheries background, not linked to a particular community, and has led to some communities becoming marginalized as a result of quota loss. Furthermore, small quota owners are now more likely to merge with bigger companies and receive company shares in exchange for their quota. It is further highlighted that during the 1990s, the vulnerability of fishing communities (especially those with few alternative employment opportunities) has become more apparent, as quota owners have sold out or moved to different regions. Although quota owners are compensated from leaving the fishery, crew members, fish workers and other community residents hold no valuable rights, and consequently receive no compensation if the local fishing operation is shut down. However, recovery of rents from the fishery (possibly through the recovery of a certain percentage share of quota from the quota holders) may help the national authority to compensate such communities, in the form of quota or direct payments.

Quota concentration is to be expected unless management imposes specific holding restrictions. In a case where fishermen are initially allocated quota and are able to harvest their quota efficiently without financial support, there are few incentives for them to sell up to another operator. Management may need to restrict ownership to

some extent so smaller operators are not forced out of the fishery due to monopolistic market forces or seemingly irrational behaviour based on uncertain expectations to future development. It will ultimately be a political decision that determines to what extent ownership concentration should be allowed.

13. Cost recovery

As discussed, resource rents will often be captured in quota prices, and if the quotas are made transferable, quotas will become a valuable capital asset that can be sold from person to person. Fisheries managers often decide that some form of cost recovery should offset the windfall benefits accruing to the initial quota owners. It is argued that, after all, the marine resource is a public asset, and from a social perspective it would be unfair that quota owners are given the benefits of fishing rights whilst society covers the incurred management costs (administration, enforcement, research etc.). Cost recovery may therefore be applied, in the form of annual license fees or a specified percentage of catch values.

Due to industrial opposition, cost recovery schemes have remained unpopular. However, with an improvement in the economic status of fisheries, management cost recovery schemes have often been embraced as a part of the overall package. The monitoring and enforcement costs incurred in Icelandic fisheries is covered by landing fees (0.4% of landing values) and extracts further capital through quota and license fees, totalling US\$10 million in 1998/99. The Government has also considered the extraction of resource rents in the form of annual quota cuts. The Alaskan halibut/sablefish fisheries impose a similar license fee scheme and extract 3% of the ex-vessel catch value. Dutch management introduced a scheme in 2001 that aims to recover administrative costs. In Australia there is a national policy in force (not unique to ITQ fisheries) where fishery levies cover 90% of management costs. The New Zealand management system introduced full management recovery in 1994. The Norwegian authorities, however, bear all costs incurred in the inshore cod fishery.

The industrial acceptance of cost recovery programmes and extraction of resource rents will ultimately depend on the relationship with the authorities and the perceived economic status of the fishery concerned. It is evident that an improvement in management collaboration between industry and authorities eases the implementation of such programmes.

14. High-grading and bycatch

Discards at sea occur as a result of undesired catches of a target species or catches of non-targeted (bycatch) species. Discarding a targeted species due to inferior quality or size (effectively inferior market price) is known as high-grading. This topic is one that is often raised as one of the major drawbacks of an individual quota system. It should be noted, however, that discarding has always been a problem in most fisheries. Any form of discarding leads to important catch information being lost that could potentially assist biologists in providing reliable stock assessment estimates. Furthermore, substantial discards of bycatch, misreporting and high-grading practices could also threaten the long-term sustainability of the stocks concerned.

If a vessel has bought or leased quota at a certain price, the holder may be tempted to high-grade the catch to ensure that the value of landings cover the incurred costs. It should also be noted that fishermen might have different time preferences. A fisherman that has just invested in a new vessel and paid a high price for quota would potentially be more inclined to high-grade in order to get a quicker return on his or her investment, and would not regard the longer term status of the fishery as an immediate concern. On the other hand in “Sharing the Fish” it is demonstrated that in many cases high-grading cannot pay, the reason being that every time fish is discarded more fish has to be caught at a cost. The discarded fish represents a value to the market that is lost, and this revenue loss is in many cases of the same magnitude as the revenue from re-captured fish.

Effective monitoring and control, as well as a gradual change in fishermen behaviour that encourages a vested interest in the overall stock status, will help to mitigate this process. If vessels discard fish at sea and the overall quota is still fully utilised, fishermen can expect a reduction in quota in the following years and, furthermore, the value of their quota will be lower since profit expectations will be lower.

The OECD workshop in 1992 discussed the problem of high-grading, where the management system was declared to give clear incentives for fishermen to high-grade their catches. However, the workshop acknowledged that this is not a unique issue of ITQs, as fishermen under any management system wish to maximise their economic return on each fishing trip. Furthermore, it should be considered that ITQs may in fact reduce the levels of bycatch and high-grading since fishing strategies will attempt to avoid catching unwanted fish (‘inferior’ fish or non-target species) in the first place. Bycatch may also be lessened through overall reductions in fishing effort.

The mitigation of ‘race to fish’ under ITQs is expected to have an impact on bycatch and high-grading. Since fishermen will be able to better plan their fishing excursions, in line with seasonality and market demand, it should also be expected that the fisherman will aim to fish during the most productive times of the year, where the fish is also of better size and quality. This would tend to lead to fewer incentives to high-grade, since the fish will be of greater value. Fishermen that may be inclined to high-grade will also be aware that the process of high-grading is not free of costs as further operating costs will be incurred to catch the fish that is meant to substitute the discarded fish. It can therefore be expected that although the landed catch may be more valuable following high-grading practices, the total costs of fishing could exceed the benefits. Also, fears of high-grading in ITQ fisheries have been raised but in the majority of cases problems have subsided through increased monitoring and control, especially through on-board monitoring.

Multi-species fisheries complicate any management system that is based on allowable catches of specific species. It is therefore imperative that the distinction between targeted and non-targeted species is made in order to deal with excessive bycatch. If a vessel fishes in a multi-species fishery the management system will need to ensure that either the vessel possesses the required quota for all species in the fishery or that a mechanism is built into the system that allow fishermen to land bycatch species where they do not possess a quota allocation. If not, the fishermen will have the incentive to either land the fish illegally or discard the fish at sea.

15. Stock levels and sustainability

The effect on stock levels of introducing ITQs is often difficult to determine, given the often complex inter-relationship of fleets, resources and environmental fluctuations. Some argue that an ITQ system is one that simply promotes economic optimality and disregards the sustainability of fish stocks. But fishing activities depend on the continued existence of exploitable stocks. Furthermore, as previously discussed, fishermen are likely to adopt responsible exploitation strategies insofar they attain a vested interest in the long-term sustainability of the fisheries.

It is clear that conservation goals are indirectly incorporated into an ITQ system. However, given the complex nature of fisheries and the existence of other management restrictions alongside TACs (gear restrictions, etc.) it is not possible to attribute any of the stock developments discussed solely to the implementation of ITQs. Biological advice and the setting of appropriate TACs still play the pivotal role in determining future stock recruitment and sustainability.

16. Fleet size/structure

It is argued that property right systems including ITQs usually result in fleet restructuring, as the profit maximising behaviour forces the marginal fishermen and vessels out of the fishery. However, experiences are mixed, in particular comparing the fleet restructuring process for countries with and without ITQs. One explanation for a slow reduction in fleet size is that vessel capital, to a large extent, is non-malleable and non-divisible implying that vessel capital cannot very easily be transferred from the fishing sector to other sectors. Fleet reduction may thus take many years.

The Icelandic herring fleet has seen a reduction from 200 vessels in 1980 to only 30 vessels in 1995, although the vessels in 1995 managed to harvest twice as much as those fishing in 1980. The capelin fleet was reduced by 40% in size during 1980-93. Despite the apparent fleet reduction in terms of vessel number, statistics suggest that during the 1980-98 period there has been a 15% increase in terms of GRT and 23% increase in kW. The number of vessels fell by 8%. The suggested reason for this growth in capacity is the expansion of the factory trawler fleet fishing at more distant fishing grounds. The effect in the Dutch sole/plaice fisheries is varied, with initial significant increases in the 1980s followed by fleet reductions since 1987, which may be attributed to the MAGPs rather than the ITQs. In the Australian bluefin tuna fishery, over two-thirds of vessels left the fleet within the first two years following the introduction of ITQs. The documented Canadian fisheries all saw reductions in number of vessels and employed fishermen. The fisheries in the United States experienced large cuts in vessel numbers, ranging from 40-74% in the 1990s. For the Australian, Canadian, and US single ITQ fisheries it is unclear whether the vessels have left the fishing industry entirely or just moved to other fisheries.

17. Economic indicators

Fleet restructuring can be expected to lead to fewer (more efficient) vessels allocated a larger share of the TAC. Assuming that TAC levels remain relatively stable, fewer vessels will be able to catch more fish. Furthermore, vessels will be able to plan their operations so to avoid market gluts, improve quality and price of landings, and adopt least-cost production. This will lead to an overall improvement in the economic status of the fisheries, as the profits of individual fishermen and vessels can be expected to increase.

With an ITQ system, without doubt, the value composition of the assets will change. The value of the fishing vessels will decrease and the value of the quota rights will increase. Observations from the Netherlands indicate that the value of the quota rights relative to the value of the vessels is around 2:1. In Iceland this ratio is even higher. The reason for this change is that the “resource rent” is embodied in the value of the vessel³ without ITQs, because the value can only be captured by those who own a vessel. This is not the case in an ITQ system. It is not (necessarily) a condition that the quota owner also possesses a fishing vessel, and a vessel owner will have to purchase a fishing right, which leaves him with less profit to remunerate the vessel. Valuation of the total ITQs requires caution, however, because the prices determined on the market are based on trade of small shares of the total ITQs, producing a higher price than could be viewed as the average price of the ITQs.

Figures compiled by the Icelandic National Economic Institute show a rising profitability of the fishing industry in recent years, largely as a result of increasing catches per unit of effort, especially in the herring and capelin fisheries. The rise in quota prices is an indicator of this general improvement.

Costs and earnings data for a number of EU fishing fleets are available in the annual reports of Economic Performance of Selected European Fishing Fleets⁴. Comparable data show no significant improvement in economic performance for the Dutch fleet segments relative to other fleet segments not subject to ITQs. This could be explained by the fact that the Dutch fleet has not yet adjusted fully and that Member States who are not using ITQs, but are subject to TACs and quota regulation, apply restricted entry programmes in association with the MAGP.

³ Requires however that entry is restricted

⁴ Produced by the EC funded project: Promotion of Common Methods for Economic Assessment of EU Fisheries

18. Monitoring and enforcement

The requirements for monitoring and enforcement can be expected to rise under an individual quota system. It will be necessary to monitor the harvest of each participant to ensure that it does not surpass his or her annual harvest right. With transferability, it is also necessary to keep track of the current amount of share rights and annual harvest rights owned by each participant. It is therefore imperative that an extensive and well-structured monitoring programme is applied that ensures that fishermen comply with the regulations in force. Effective property rights can expect to reduce the fleet size and therefore these enforcement programmes will gradually become more straightforward and less extensive. Furthermore, Government may opt for a cost recovery programme in order to deal with the expected rise in overall management and administration costs. Improved enforcement is vital to the successful outcome of an ITQ system and is explicitly linked to the other issues discussed in this report.

The evidence supports the general view that ITQs require more administration and enforcement. In New Zealand there is talk of the establishment of a “paper trail” following the introduction of the new quota system. In most cases enforcement programmes have been implemented that deal with monitoring and surveillance of catches and landings (on-board and in ports), as well as imposing severe fines for non-compliance such as forfeiture of quota, licenses, catches, vessels and gear. The rising need for enforcement has led to increasing costs although in some cases these have almost been fully recovered (e.g. Australia). Initial teething problems have frequently been encountered. In cases of trans-boundary stocks (e.g. Australian bluefin tuna), and multi-species, multiple jurisdiction and inadequately defined user rights (Australian Southeast trawl fishery), enforcement has been further hampered.

Fisheries that have seen a significant reduction in vessel number or fishing effort have led to a decrease in enforcement requirements and costs. This has been most notable in the wreckfish and surf clam/ocean quahog fisheries in the United States. An improvement in collaboration between Government and the industry such as in New Zealand has also led to better compliance.

19. Arguments for and against ITQs

It is often difficult to put exact words, at least in economic terms, on the resistance to ITQs that is frequently heard from fishermen and other stakeholders. Resistance is obviously there and often better explained by anthropological research. A good summary of possible arguments was presented by the anthropologist, Professor Bonnie McCay at the FishRights conference in 1999 (FAO Technical Paper 404/1). Her arguments are reproduced here. Professor McCay served as a member of the US National Research Council committee that undertook the study “Sharing the Fish”. Four general reasons for not adopting ITQs were mentioned:

- ❑ cultural preference for competitive and non-marketable fishing rights;
- ❑ transaction costs of changing to ITQs in relation to perceived benefits;
- ❑ concerns about the intended results of ITQs, particularly the downsizing, efficiency goals;
- ❑ concerns about the intended and unintended consequences of such systems, particularly the displacement of people, the “tragedy of the commoners”.

Because descriptions of attitudes against ITQs are less numerous than economic analyses (mainly) in favour of ITQs, McCay’s list of how changes in property rights can affect the social structure and relations of a fishery and provoke resistance is treated relatively detailed below. These include:

- ❑ the structure of the fleet and larger industry;
- ❑ working relationships on a vessel;
- ❑ power relations between harvesters and buyers;
- ❑ changes in fishing-dependent communities;
- ❑ in the structure and function of the management system;
- ❑ and even in science and policy.

19.1. Changes in the structure of the fleet and industry

The effects of ITQs on the structure of a fishing fleet and industry are widely known and discussed, particularly the consolidation of ownership and control that may attend to downsizing, as ITQ holders economise on their assets. The actual paths and patterns of structural change vary greatly, but the fact and fear of it are virtually universal. Economists refer to this and other issues as “transition costs”, but designers of fishery management regimes and their constituents are increasingly mindful of the

need to take these changes into account and find ways to moderate them according to local standards.

19.2. Changes in working relationships on the vessel

Less well appreciated is that working relationships on a vessel can be affected by ITQs. For example, when the vessel owner also becomes the owner of the right to fish, as has been typical in ITQ systems to date, the traditional co-venturer and semi-egalitarian nature of relationships between owner, skipper, and crew often changes, with a further distancing of the owner from the others. If, as has also been typical, the granting of ITQs creates windfalls for present vessel owners and high entry costs for others, crew and non-owner skippers may find themselves in dead-end jobs. They have little opportunity to work their way up. Even more likely, more and more crew find their jobs in jeopardy where ITQs are a tool for downsizing a fishery. The power structure on the vessel is thus structured in favour of the owners and owner-skippers; incentives for skilled crew to stay on may be reduced, and paradoxically, although jobs may be fewer as owners economise, the quality of crew willing to work may be reduced. A related phenomenon is the possible shift away from the widespread system of payment (part of the co-venturer social structure), whereby owners, skipper, and crew share the proceeds of a fishing voyage according to some locally recognised system. An ITQ-based fishery may become more like a wage labour or piece work system, with concomitant changes in how people evaluate and value their work.

19.3. Change in power relations between harvesters and buyers

An important effect of ITQ regimes where the initial allocation of the ITQ goes to vessel owners is to change, or threaten to change, the distribution of bargaining power between buyers and sellers of marine products. In some ITQ schemes, traditional buyers are excluded from that allocation because of attempts to reserve ITQs for active fishermen, in order to maintain the structure of a fleet. Where this happens, buyers may argue that they are unfairly disadvantaged, given their roles in developing a fishery industry. A recent example is in the Alaska halibut and sablefish fishery where processing companies continue to argue for some kind of “processor ITQ”. However, buyers have other ways to redress the imbalance, including financing the acquisition of ITQs on the part of harvesters, who become beholden to them or, in some cases, “fronts” for ownership by the buyers. In other schemes, buyers too may participate in ownership of ITQs and may be able to shift the power in their direction not only by using their access to capital to finance harvesters, but also by becoming ITQ owners

themselves and providing ITQ to harvesters on a share or other basis. It is this behaviour that leads to the frequently heard complaint or fear that with ITQs fishermen become “sharecroppers”, with the implication of poverty-inducing dependency.

19.4. Changes in fishing-dependent communities

Resistance to ITQs is fierce in many coastal communities that are heavily dependent on owner-operator fishing and the effects of changing bargaining power are of major concern. In some communities the advent of ITQs has created schisms between families that participated in, and benefited from, the initial allocation and subsequent trade, and other families. Moreover, communities in which most fishermen are small-scale are concerned about losing rights of access to the fishery altogether. Another community concern is the transmission of knowledge and culture of fishing, where access is restricted to relatively few.

Fishery-dependent communities are also affected by geographic shifts in fish landings, the location of processing firms, and changes in ancillary industries like welding and ice-making that can be triggered by ITQs. Interestingly, some communities have obtained or wish to obtain ITQs in the name of the community rather than individuals, in order to gain more control over the transfer and distribution of quota and hence opportunities for jobs and income.

Two more “community” issues should be mentioned. The first, recognising that one important community is “the public”, is the issue of how the initial allocation and subsequent transactions appear to equal a “giveaway of public resources.” Management bodies have been forced to find ways to get the fishing industry members to ‘buy in’ to the shift to ITQs, and thus search for ways to preserve something like the status quo in devising the criteria for initial allocation (i.e. using historical participation as the major criterion). Finding methods of allocation such as auctions get short shrift because there is usually little public information about or interest in this process. A second and related issue concerns the claims of other groups, particularly indigenous populations, recreationists, and conservationists. Their interests and claims also seem to have been given short shrift in the initial negotiations and design of ITQ systems, and their responses have sometimes been costly to resolve.

19.5. Changes in the structure and function of the management system

One hoped-for effect of ITQs is to get government agencies out of the business of dealing with the sticky issues of allocating rights to a common resource; that role is relegated to markets. It can be difficult to get there determining the initial allocation and rules of subsequent transfer can nearly overwhelm managing bodies because so much is at stake. However, once the system is developed, the management system should have reduced responsibility, more being taken over by the ITQ holders themselves. Government will, or should, retain some control over important biological conservation parameters because the resource itself is usually construed as a public one because of the bycatch, fish habitat and other side-effects of any fishery.

19.6. Changes in science and policy

There will be pressures for greater involvement of ITQ holders in the scientific domain as well, because of the now direct and measurable way that changes in total allowable catches and other measures affect the value of their assets. Thus, ITQs may lead to an increase in co-management and in their participation in science. This is evident in New Zealand, as attested by many presentations at the FishRights conference concerning the organisations created by ITQ holders to engage in fisheries research. It is also evident in the United States, where ITQ holders in the surf clam and ocean quahog fisheries have created a direct role for themselves, with the government, in scientific research. Another effect of ITQs on the management process is the sharp narrowing of the “community” involved by the definition of ITQ holders. In the extant systems, the initial ITQ holders were vessel owners. Although this can change in some systems after the initial allocation, the general effect is to truncate the participation of the people who have an interest in the process and who therefore are asked and choose to participate. The downsizing and consolidation that often accompanies ITQs further affects the management process: with smaller groups and more narrowly defined interests, developing consensus positions and hence strength in bargaining vis-à-vis government agencies and their decision-making bodies becomes easier.

20. Some lessons learned

Similar to the above section this section is based on Professor McCay's findings.

20.1. Tradeoffs cannot be avoided

It is of importance to look at the tradeoffs and the distribution effects. ITQs do result in increased efficiencies and lowering costs of the "race to fish". Investors can better match capital and labour to the resource itself. On the other hand, the social structure gains new fracture points, co-venturers become owners or labourers, people who thought of themselves as independent fishermen begin to use terms like "sharecroppers" and "tenant farmers", or "businessmen" and "fish lords". Clearly there will be new equilibria.

20.2. Reproducing the structure of the past

Another issue that arises from comparative research on ITQ systems is that the structure of the industry prior to ITQs and the initial allocation and transferability rules make a big difference to the outcomes, at least in the short term (3-10 years). The windfall benefit of the initial allocation reverberates throughout the system for a long while. Consequently, the initial allocation and transferability rules are important. Consequentially, small-scale fishermen became concerned about the fates of themselves, their families, and communities resist ITQs or become involved in efforts to design them in ways that protect those interests.

20.3. Irreversibility of the process

The record suggests that the process to ITQ is difficult to reverse. For example, a decision to impose vessel quotas will often, especially in the context of declining resources, create pressures to allow "stacking" or consolidation of quotas from several vessels onto one. Once something like an ITQ system is created, it is difficult to end it. Although governments often insist that only "revocable privileges," not "property rights", are created with ITQs, the social fact quickly develops that ITQs are thought of, and treated as, property, creating demands for greater security if not compensation when they are threatened. Once again, the message is the importance of examining trade-offs and possible consequences with great care before agreeing upon ITQs. Not only can the consequences be unexpected and undesirable but it also may be difficult to make changes, once the process is well advanced.

20.4. Stakeholder participation

ITQs, IQs, and other more restrictive access rules require full and effective participation of all interested parties. It is necessary to meet objectives such as fairness and equity not to mention the legitimacy of the process and its results. More legitimate processes have higher rates of compliance. In addition, fuller participation brings the knowledge and experience of practitioners, which should result in more effective and enforceable design of the system. A persistent argument for ITQs is that “ownership” will increase the incentives for stewardship over the resources. However, ITQ holders do not own the resource, just access rights to it; ownership remains in the larger collective. ITQ holders, some of whom have invested heavily (others of whom are working with their initial allocations), have a particular interest in what they will be allowed to catch and when, since their individual catches no longer depend on how well they compete with others but rather on what their portion of the TAC amounts to. In addition, in situations increasingly marked by “precautionary” approaches to fisheries management, they, like other fishermen, have strong interests in more accurate fisheries data. It is indeed possible, that ITQs will foster viable systems of self-regulation for sustainable use. Not only are there incentives for more accurate information but there is also the opportunity to measure each individual’s stake, and hence, responsibility. Assuming a public accounting of ITQ ownership, it is possible to assess ITQ owners some fraction of their assets to cover the costs of research and other collective activities. Some ITQ holders remain “free riders” on the actions of others more willing to contribute funds to research initiatives.

20.5. Is the public good served when there is close collaboration?

With ITQs, the actors in management arenas become the ITQ holders. Non-holding fishermen and members of the larger communities affected by the fishery are marginalized and for the most part excluded. A related question is the trade-off between the well-organised management participation of ITQ holders and the interests of the larger community. “Agency capture” is a well-known social fact. Government agencies mandated to serve public goals serve the interests of smaller, better-organised interest groups instead.

20.6. Unexpected consequences and social learning

Creating commodities out of the right to fish might be expected to provoke claims of right where none had existed before, and such has been and will be the case. ITQs

also have provoked counter-forces, especially the “community-based management” movement, through which fishery-dependent coastal communities are claiming the right to shares of either an overall quota or ITQ, to be managed on behalf of the community rather than individuals per se. Consequently, the very notion of ITQ has been greatly expanded. In addition, the question of transferability continues to receive close scrutiny. Although the economic benefits of full transferability are evident, the social benefits of partial, or/no, transferability are reflected in the design of some systems, such that ITQs are really IQs.

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