

CHAPTER 6

USE RIGHTS AND RESPONSIBLE FISHERIES: LIMITING ACCESS AND HARVESTING THROUGH RIGHTS-BASED MANAGEMENT

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1. WHAT ARE USE RIGHTS?

Elsewhere in this volume, various forms of fishery regulation are discussed – such as area closures, limited entry and other input controls (effort limitation) and output controls (quotas). These regulations address a range of fishery issues: Who can go fishing? Where is fishing allowed? How much gear can be used? How much fish can be caught? Suppose, however, that we look at these restrictions from a different perspective, namely that of *use rights* – the *rights* held by fishers or fishing communities to *use* the fishery resources.

Whenever a fishery is managed by restricting who can have access to the fishery, how much fishing activity (fishing effort) individual participants are allowed, or how much catch each can

¹ This chapter draws on earlier work appearing in Townsend and Charles (1997) and Charles (2001). I am grateful to Ralph Townsend, Melanie Wiber and Parzival Copes for many helpful discussions, but any errors herein remain my responsibility.

take, those with such entitlements are said to hold use rights. Such use rights are simply 'the rights to use', as recognised or assigned by the relevant management authority (whether formal or informal). For example, limited entry – seen as an 'input control' from the perspective of resource management – can be viewed as an 'access right' from the perspective of fisher management. Certain individuals, groups or communities have the right to 'use' the fishery (i.e., to go fishing) while all others do not have that right. Similarly, limits on the number of traps that are allowed to be used might be seen as a (negative) restriction, or as a (positive) use right – the fisher, group or community has the right to use a certain number of traps.

Naturally, along with rights go responsibilities: as the FAO Code of Conduct for Responsible Fishing (Paragraph 6.1) notes, "The right to fish carries with it the obligation to do so in a responsible manner...". A key aspect in moving toward responsible fisheries thus lies in developing effective and accepted sets of both rights and responsibilities among fishers. To this end, the present chapter focuses on use rights, exploring the various forms of such rights, their advantages and disadvantages, policy issues relating to the choice among alternative use rights systems, and issues concerning how use rights are implemented in practice, and who can or should hold these rights.

Use rights options range widely; for example, each of the following approaches to fishery management involves use rights:

- Customary Marine Tenure (CMT) and Territorial Use Rights in Fishing (TURFs) have long been applied by indigenous communities in determining for each member of the community (whether a fisher or household) the location where that member can access fishery resources;
- limited entry was the initial approach to use rights in modern 'state' management of fisheries, providing a limited number of individual fishers with the right to access the fishery;
- quota allocations made to individual fishers, companies, cooperatives, communities, etc., to catch a specified amount of fish, are numerical (quantitative) use rights, as are allocations of rights to a certain level of fishing effort (e.g., quantity of gear or days fishing).

While there is considerable diversity in use rights systems, they can generally be placed within two major categories:

- (a) access rights, which authorise entry into the fishery or into a specific fishing ground;
- (b) withdrawal (harvest) rights, which typically involve the right to a specific amount of fishing effort (e.g., to fish for a certain amount of time or with a certain amount of gear) or the right to take a specific catch.

Each of these categories can occur at various organisational levels, i.e. rights held by individuals, by communities or regions, or by specific groupings such as fishing vessel or gear sectors. Indeed while use rights are often discussed in terms of individual fisher rights, an important form of use right, both historically and currently, is that held collectively by a community.

Note that use rights arise in a multitude of contexts well beyond the fishery. For example, consider the owner of a home in a setting such as a rural village or an urban condominium (an apartment block in which each unit is privately owned). Such homeowners certainly have the right to 'use' the home. In addition, as will be discussed below, they likely have other rights as well: the right to exclude others from using the home, and perhaps the right to sell the home to someone else. Now consider the common areas surrounding the home, and neighbouring homes, such as the village pasture or the garden outside the condominium building. The group of homeowners may well share the use rights over these common areas, with no single person having the right to exclude others nor to sell the common area. Similar situations arise in a wide

variety of settings in which individuals and families hold various rights within their own households, as well as shared collective rights over community property. Alternatively, in such a situation, the cultural context may be such that collective (group) rights predominate, as in some indigenous/native societies.

2. WHY ARE USE RIGHTS RELEVANT TO FISHERY MANAGEMENT?

The Code of Conduct (Paragraph 10.1.3) makes reference to use rights, not only within fisheries but pertaining to coastal resources in general: “States should develop, as appropriate, institutional and legal frameworks in order to determine the possible uses of coastal resources *and to govern access to them* taking into account the rights of coastal fishing communities...”. Why are use rights so important?

Use rights aid management by specifying and clarifying who the stakeholders are in a certain fishery, while also aiding these stakeholders – whether fishers, fishers’ organisations, fishing companies or fishing communities – by providing some security over access to fishing areas, use of an allowable set of inputs, or harvest of a quantity of fish. If use rights are well established, fishers know who can or cannot access the fishery resources, how much fishing each is allowed to do, and how long these rights are applicable.

Fisheries with clearly-defined use rights may be contrasted with open access fisheries. In their fullest form, open access fisheries are ones in which there is no regulation of the fleet or the catch. In particular, there are no limits to access – anyone can go fishing. Perhaps the most famous cases of open access (and, until recently, its most serious manifestation) have been the high seas fisheries – taking place in ocean spaces located outside any single nation’s jurisdiction.

It has become accepted wisdom, based both in theory and in the experiences of fishery collapses and stock depletion world-wide, that such open access will lead to likely-disastrous conservation and economic problems. Unregulated ‘laissez-faire’ (free enterprise) exploitation of marine resources is among the greatest threats to the long-term sustainability of fisheries. Indeed, the threat posed by such open access fisheries was a major factor leading to efforts to regulate fisheries on the high seas, through the United Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks and the subsequent United Nations Fish Stocks Agreement² implementing the relevant provisions of the UN Law of the Sea.

Note that the term ‘open access’ is also used sometimes to refer to a fishery in which there are no controls over the number of boats or the amount of gear, even though the total catch may be regulated. In such a case, the fish stocks may not necessarily collapse (if regulations work) but the fleet may become excessive (over-capitalised), driven by economic incentives to enter the fishery and to invest in larger boats (in a ‘race for the fish’ in which those who catch the most fish first are the ‘winners’). With more inputs used than necessary to catch the fish, the economic health of the fishery may be threatened even if the resource is safeguarded.

With open access fisheries having a bad name both internationally and within national jurisdictions, the overall need for and desirability of restricting access is usually accepted as a basic premise in fishery management. Indeed, the need for use rights – specifically access restrictions – has long been understood in many parts of the world. Informal and traditional use rights have existed for centuries in a wide variety of fishery jurisdictions. Even in cases where direct government regulation of fisheries dominates, use rights are being implemented with increasing frequency.

² Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks.

Use rights are relevant to the fishery manager not only in resolving open access problems, but also in helping to clarify who is being affected by management. This has the following benefits.

- First, an effective use rights system eliminates (or reduces) the need for fishery management as such to deal with one major element of complexity and uncertainty – that of identifying the set of users and regulating that group. In an already complex and uncertain management system, this can be a major benefit.
- Second, when use rights are clear, fishers and fishing communities can better plan their resource harvesting, with users better able to maximise the value of the output within a conservationist framework, and to adapt to changing conditions. Furthermore, use rights may assist in reducing the magnitude of conflict in fisheries (in keeping with Paragraphs 7.6.5 and 10.1.4 of the Code of Conduct). These factors are helpful in enhancing the fishery's overall resilience – its ability to 'bounce back' from unexpected shocks.
- Third, fishery management can more easily identify use rights holders as those needing to meet certain conservation requirements. For example, the Code of Conduct (Paragraph 6.6) states that "where proper selective and environmentally safe fishing gear and practices exist, they should be recognized and accorded a priority...". This implies the adjustment of use rights to promote (or favour) certain gear types or fishing practices.
- Fourth, with clear-cut use rights, conservation measures to protect 'the future' become more compatible with the fishers' own long-term interests, which may encourage adoption of a conservation ethic and responsible fishing practices, and greater compliance with regulations (Code of Conduct, Paragraph 6.10). As noted earlier, the Code of Conduct (Paragraph 6.1) highlights the necessity of such connections between use rights and conservationist practices. (This also points to the need for care in establishing use rights, since it is possible that certain use rights could be accompanied by anti-conservationist incentives, leading to such actions as high-grading, the discarding of low-valued fish in order to maximise profits.)

3. HOW DO USE RIGHTS RELATE TO OTHER RIGHTS IN FISHERIES?

Use rights are put in place to specify who is to be involved in resource use, thereby making management more effective and conservation more likely. Is there also a need to specify who is to be involved in fishery management? In past times, this question may have seemed quite irrelevant – management was done by the managers, typically government officials within a commercial fishery context. Over time, however, it has become clear that fishery management is rarely successful when practised in a top-down manner, because the manager rarely if ever has the time and finances to fully monitor thousands of fishers at sea. Thus effective management requires the support (or at least acceptance) of fishers, accompanied by some degree of self-regulation.

This has led to the emergence of new co-management arrangements involving joint development of management measures by fishers, government and possibly local communities. Chapter 7 focuses on this topic, which has been the subject of considerable study in recent years. In the language of fishery rights, co-management requires allocation of management rights, the right to be involved in managing the fishery. Note that management rights and use rights can be seen as parallel forms: the former specify the right to participate in fishery management just as the latter specify the right to participate in the fishery itself. Management rights reflect the need, as noted in the Code of Conduct (Paragraph 6.13), to "facilitate consultation and the effective participation of industry, fishworkers, environmental and other interested organizations in decision-making with respect to the development of laws and policies related to fisheries management...".

Who should hold management rights? The above discussion suggests that, if only for pragmatic reasons, fishers (those with use rights) should be among the rights-holders. The government – with responsibility, as is usually the case, to conserve the resource, to produce benefits from that resource, and to suitably distribute those benefits – will hold management rights as well. To what extent should management rights also be held by communities, nongovernmental organisations (NGOs) and the general public? This is an important question, the answer to which may vary depending on the level of management under discussion, and which is discussed further in Chapter 7.

Consider first the operational or tactical level of management – involving measures such as closed areas, closed seasons, and allowable hook or mesh sizes, that affect the fishing process directly. At this level, it is particularly crucial for fishers to hold management rights, so as to encourage compliance at sea. However, there may often be less interest among communities, NGOs and the general public in these detailed operational aspects. (An exception may be cases in which ecosystem protection is an issue.) On the other hand, debates over strategic management – concerning the fishery's overall objectives and policy directions – are typically matters of public interest, in which the general public, and fishing communities in particular, are legitimate interested parties. Thus, a wide spectrum of interested parties will (should) hold management rights in dealing with strategic management issues, and in setting objectives for use of the fish resources and of the ecosystem as whole. This is increasingly the case with small-scale community-based fisheries; for example, recent legislation in the Philippines places management rights over coastal 'municipal fisheries' clearly at the level of the local municipality (Congress of the Philippines, 1998).

Management rights are one of three types of 'collective choice' rights (as identified by Ostrom and Schlager 1996), the other two being exclusion rights (the right to allocate use rights, and thereby determine who can access the fishery) and alienation rights (the right to authorise the transfer or sale of other rights). These collective choice rights may be held by both users and non-users, contrasting with use rights which essentially are held only by fishery users. For example, while a fishing community may not hold use rights *per se*, it may have management rights (as discussed above) as well as exclusion and alienation rights (relating to decisions about allocating and/or selling off use rights). Precisely who should hold management, exclusion and alienation rights, and what institutions are suitable to deal with such rights, are becoming major issues, likely to receive increasing attention in the years ahead. (See Chapter 7, for further discussion of this matter.)

The more of the various types of rights are held, the more complete is the set of rights. For example, a fisher who owns a fishing boat likely has a right to use the boat, as well as an exclusion right (to prevent others from using the boat), and an alienation right (to sell the boat). On the other hand, a fishing license provides a use right to the fish resources, but likely not an exclusion right to prevent others from using the fish stocks. Thus fishers typically have more complete rights over their boats than over their use of the resource.

Furthermore, it is crucial to recognise that a fisher holding use rights has the right to access the fishery, but the fisher does not own the fish *per se* until those fish are actually caught. Thus use rights do not imply ownership of the resource itself. Unfortunately, this crucial distinction has been confused at times, with use rights (such as individual quotas) promoted by suggesting that fishers holding these rights will in fact 'own' fish in the sea, just as one may own their fishing boat. This idea has been at the root of much recent conflict in fisheries, often between users and non-users, but is not at all what is meant by use rights.

Indeed, in this regard, it is useful to compare the fishery with other natural resource sectors, where the difference between resource access (in the form of use rights) and resource ownership is perhaps clearer. Consider the case of forestry. In jurisdictions with significant government-owned forest, it can be standard practice for industrial harvesting companies to hold leases on

specified areas of forest. The companies do not own these forests, but they do have the right to use the resources, often subject to conditions, e.g. that reforestation accompanies harvesting, so as to ensure sustainability. Similarly, in the oil and gas sector, the focus is more on the use right to a particular oil field. The use right *per se* may be 'owned' but ownership of the resources on or in the ground is not in question.

What are 'Property Rights'?

Use rights, management rights and the other types of rights described in this section all fall under the broad heading of property rights. Property rights describe relationships between people over various forms of property. Consider, for example, two such units of property: a fishing boat and a fish stock. With fishing boats, we typically see property rights as being reasonably clear: the 'owner' of the fishing boat can use the boat (use rights), prevent others from using it (exclusion rights), and sell it if desired (alienation rights). Other people have no 'property rights' over the boat. On the other hand, property rights over fish in the sea are typically less clear – as described earlier, different sets of people may hold use rights, management rights and exclusion/alienation rights. This reflects a common focus of property rights analysis on comparing 'bundles' of rights associated with units of property.

Many publications have appeared on property rights in fisheries, from a variety of perspectives. Fishery managers therefore are likely to come across discussions of property rights at some point. However, it should be noted that in most cases, fishery management will focus on issues of access, harvesting and management itself – which involve use rights and management rights specifically, rather than the more nebulous topic of property rights. It seems as well that use of the term 'property' tends to create conflict, with allocations of use rights over fish in the sea misinterpreted as implying 'ownership' of the fish. This conflict arises because, even if fishers hold use rights, the fish in the sea do not belong to those fishers until they are caught. Who owns the fish while they are swimming freely? Property rights theory does provide some help here, by describing four possible 'property regimes' that could apply to fish in the sea.

Non-Property. Traditionally, high seas fish stocks were no one's property. The fish were there for the taking. No one could claim ownership and exclude others. This represented a lack of property rights, a case of 'non-property'. As time has passed, fewer and fewer of the world's fishery resources have been exploited in the absence of property rights.

Private Property. As noted earlier, whenever a fisher catches a fish, once it is brought out of the water into the vessel, that fish became the private property of the fisher. Even when fish are still swimming in the water, they may be private property. In some nations, the fish in a river that passes through private land can be the private property of the land owner. The same could be said for fish in a lake located entirely on someone's private land. In such cases, only the owner of the resource has the right to decide the use of the resource – subject possibly to societal constraints, such as those that may be imposed to preserve biodiversity.

State Property. In many countries, fish in the oceans within the State's EEZ are the property of the nation's citizens, and managed on their behalf by the government. In such cases, the fish are said to be 'state property'. The fish become private property when caught, but remain state property as long as they are in the sea. Typically such resources cannot be privatised without legislation, or perhaps even constitutional change.

Common Property. Suppose that the fish in the sea are 'owned in common' by a certain identifiable group of people – e.g., the set of citizens within a specific local jurisdiction, such as a coastal community, or the members of a native tribe, but not a single private individual or a company. Suppose further that the fishing activity of any one fisher detracts from the welfare of others, and it is difficult for the fishers, as a group, to exclude other potential users. In such circumstances, the fish are referred to as 'common property' – a regime that is pervasive world-wide (although, until recently, little studied relative to the other property regimes above). Note that the common property concept arises in two different modes. In most studies, the relevant group of people holding the common property is relatively small and well-defined (such as a community). On the other hand, in common usage, the fishery resources of an entire nation are often referred to as common property – in which case the 'group' is defined as being so large as to include all citizens of a nation, and common property is equated to state property, as defined above.

Note that use rights can be implemented under any of private property, state property and common property (and to some extent even in the case of non-property, e.g. the United Nations Fish Stocks Agreement (Article 10), provides the capability to prescribe use rights on the high seas). Conversely, a lack of use rights – i.e., open access – lies at the root of most problems with resource depletion, whatever the property rights regime.

The latter point helps to clarify the common confusion between 'common property' (property held in common by a group) and 'open access' (a lack of use rights to limit access to the property). Indeed, this confusion has led to a mistaken belief that common property fisheries are necessarily open access, and therefore destined for over-exploitation – a confusion arising out of a famous 1968 'Tragedy of the Commons' article by Hardin. In reality, a great number of studies have shown that while some 'common property' fisheries are indeed open access, this is by no means the rule. The real issue in a common property fishery is whether the rights holders collectively can develop an effective management institution, something that has in fact occurred in a great number of cases world-wide.

4. WHAT FORMS OF USE RIGHTS ARE THERE?

This section examines in turn the various forms of use rights, fitting within the headings given earlier:

- *access rights*, which permit the holder to take part in a fishery (limited entry) or to fish in a particular location (territorial use rights or 'TURFs');
- *withdrawal rights*, which typically involve quantitative (numerical) limits on resource usage, either through input (effort) rights or output (harvest) rights.

These various forms are depicted diagrammatically in Figure 1.

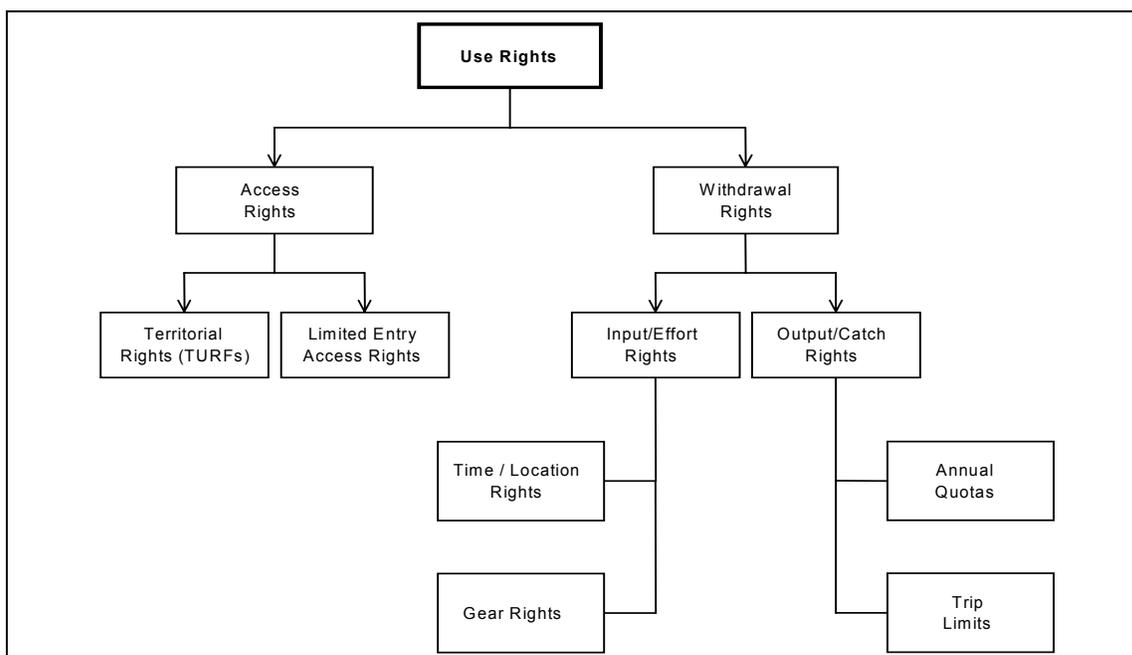


Figure 1. The relationships between the different forms of use right. (See the article by Townsend and Charles (1997) for further details.)

Two points are in order here. First, most of the use rights options to be described here correspond to an input or output control discussed in Chapter 4; they are really the same thing, seen from differing perspectives. For example, limited entry – seen as an ‘input control’ from the perspective of resource management – corresponds to an access right from the perspective of fishers management. Similarly, the fisher might see a control placed on the number of traps he or she is allowed to use in a fishery as a (negative) restriction, or as a (positive) use right. Therefore, there is some overlap between the content of this section and that presented in Chapter 4 - the reader is referred to the latter for more details on the various input and output controls that underlie use rights.

Second, whatever the form of use rights adopted, the following policy issues arise in implementing the use rights.

- The various forms of use rights may operate at the scale of the individual fisher, but equally they could be allocated to fishers’ organisations or fishing communities; in other words, rights can be organised individually or collectively.

- The manner by which rights are distributed initially and over time may be driven by market forces, by a process of strategic planning, or by some other governing force.
- In implementing use rights, it must be decided what individuals or groups should be allowed to hold the rights, how the rights should be allocated initially, what should be their duration, and whether rights should be transferable from one user to another.

For each of these choices, decisions between the alternatives are critical from both a policy and a practical perspective; this matter will be explored in detail within section 5 of this chapter.

4.1 Territorial Use Rights

Among the most important management tools are those dealing with fishing location; these can be considered as arising in two forms. One is the 'closed area' approach, in which an entire fleet is affected equally by a blanket prohibition on fishing in certain locations (Chapter 3). The other, of interest here, is a rights-based approach involving Territorial Use Rights in Fishing (TURFs) and Customary Marine Tenure (CMT). These systems assign rights to individuals and/or groups to fish in certain locations, generally, although not necessarily, based on long-standing tradition ('customary usage').

A classic reference on TURFs is that of Christy (1982), who noted that "As more and more study is given to the culture and organisation of fishing communities, there are indications that some forms of TURFs are more pervasive than previously thought to be the case, in both modern and traditional marine fisheries." This point is echoed by others, who note the long-time and continuing operation of 'traditional sea tenure systems' around the world, and suggest that these systems hold considerable potential to provide relatively stable socially-supported fishery management.

Examples of TURFs are widespread – some examples include lagoon fisheries in the Ivory Coast, beach seine net fisheries along the West African coast, collection of shellfish and seaweed on a coastal village basis in South Korea and Japan, and controls over outsiders by fishing communities in Sri Lanka. Two particularly well-known examples are the long-standing arrangement in coastal Japan, where traditional institutions are incorporated in modern resource management, and the lobster fisheries on the north-eastern coast of North America, where fishers have been able to maintain extra-legal control on entry - exclusion rights. TURFs have a particularly long history in traditional, small-scale/artisanal and indigenous fisheries. Consider two examples, one in the Atlantic region of Canada, where the Mi'Kmaq (aboriginal) people have developed a social process for determining control over fishing territory, and the other in the artisanal fisheries of Chile:

"In the centuries before the arrival of the first Europeans, the Mi'Kmaq... governed themselves through councils based on consensus in accordance with the laws of nature. District Chiefs were responsible... for confirming and reassigning hunting/harvesting territories." (Native Council of Nova Scotia, 1994).

"Today, artisanal fisheries management measures in Chile consider the allocation of Territorial Use Rights in Fisheries (TURFs) among fishing communities traditionally exploiting benthonic resources such as Chilean abalone (*Concholepas concholepas*), sea urchins (*Loxechinus albus*) and macha clams (*Mesodesma donacium*), among others. Chilean fisheries legislation, the General Fisheries and Aquaculture Law (GFAL) enacted in 1991 allows the establishment of areas especially reserved for the use of specific artisanal fishing communities, through their legally constituted organizations (e.g., artisanal fishermens' associations and fishermens' cooperatives, among others)." (Gonzalez, 1996)

A common ingredient in these TURF systems is the local solution of usage issues. For example, Brownstein and Tremblay (1994) reported on the case of a small community in Nova Scotia, Canada faced with a lobster poaching problem in the late 1800s. The problem was resolved by the local church Minister, who decreed marine use rights based on an extension of property lines out to sea. In addition, if a fisher was unable to obtain a reasonable harvest from his or her area in a given year, the fisher would be given temporary access to a fishing 'commons', a reserve area designed to enhance equity in the fishery. Notably, this management system has proven workable and has been maintained by the community to this day.

Despite the many examples of CMT and TURFs, and the potential value of such systems both in their present form and adapted to other fisheries, such systems are generally poorly understood. As with any management mechanism, CMT and TURFs are not suitable in all cases, but depending on the specifics of the fishery, they may provide an efficient means of fishery management. For example, while some TURFs may involve excessive costs for development and maintenance, to make the arrangement work, others may be easily implemented and regulated within the framework of existing social institutions. Even if costly, the costs may be out-weighted by the inherent value of the institution involved. The point is that these options need to be examined and compared with the alternatives, particularly since, as Rowena Lawson (1984) has noted, such territorial management can be "the most effective method of control" especially if it can be "supervised by the fishing community itself or by its elected leaders." (See also Chapter 7.)

It is notable that, while many CMT and TURF systems have declined over time, there are now moves to maintain or re-establish some of these systems. For example, in the fisheries of Oceania, traditional CMT/TURF systems declined as fisheries commercialised, but initiatives in some nations (e.g., Solomon Islands, Fiji and Samoa) seek to re-establish them. Consider the case of Fiji. As noted by Veitayaki (1998), traditionally the principal marine resource management practice has been "the ownership of the customary fishing areas... by different, but closely related social groups" that regulate fishery use. The national government is seeking to reinforce this practice – in particular, it has "recorded, surveyed, and registered customary fishing grounds boundaries that, until now, were based solely on oral claims... and is planning to return to traditional communities the ownership of their traditional fishing grounds which at this time rests with the state...".

4.2 Limited Entry

Limited entry is a common management tool in which the government issues a limited number of licenses to fish (Chapter 4). This creates a use right - the right to participate in the fishery. Limited entry prevents the entry of new fishing boats and/or fishers, with the aim of controlling potential fishing effort (fleet capacity). If limited entry is successful, this limit on effort helps to conserve the resource and also generates higher incomes for the license holders (i.e., those holding the use right). Not surprisingly, this can be expected to be popular with those who actually obtain the use rights, while being opposed by others.

Limited entry has shown reasonable success in a variety of fishery management cases. For example, in a limited entry program for the Alaskan (USA) fishery, the state government reduced the number of active licenses, and license values in many fisheries remained high, indicating a relatively profitable fishery. On the Pacific coast of Costa Rica, the shrimp resources within the Gulf of Nicoya were exhibiting a decline in the 1980s, as the fishing fleet expanded. The introduction of a limited entry licensing program (and a corresponding ban on new boats in the areas) halted the growth in boat numbers; this move, combined with closed seasons, gear restrictions and other measures, led to some improvement in the state of the fishery system (Charles and Herrera, 1994).

The latter example illustrates a key message about limited entry, namely that it cannot be expected to 'solve' all management problems. Limited entry helps to prevent 'outsiders' from taking part in the fishery, but does not deal with managing the existing fleet. In particular, there remains an incentive for each fisher to try to catch the fish first, before the competitors get it (the 'race for the fish') – this, in turn, creates an incentive to over-expand vessel catching power (including both physical capacity and technology) beyond what is needed. As a result, there can be wasteful over-investment in the fleet, resulting in excess capacity, and pressure to over-exploit stocks. Therefore, limited entry, while a reasonable mechanism to assign use rights, must be implemented as part of a 'management portfolio' that also includes use rights applying to the existing fleet, such as rights over allocation of fishing effort or allowable catches (see below). Among the goals of this overall management portfolio should be the prevention or elimination of excess fishing capacity (Code of Conduct, Paragraph 7.1.8). The FAO International Plan of Action (IPOA) for the Management of Fishing Capacity³ requires that States achieve 'world-wide, preferably by 2003 but not later than 2005, an efficient, equitable and transparent management of fishing capacity'. The overall goal of the IPOA is the reduction of fleet capacity world-wide to a level at which it no longer undermines long-term sustainable use of fishery resources.

It should be noted as well that the likelihood of success with limited entry will be much greater if it is put in place before the catching power of the fleet (or the number of participants) in the fishery becomes too large. In cases where this has not occurred, it has proven difficult to effectively reduce the number of licenses once the capacity is already excessive in relation to the productivity of the resource. Limiting entry is still important in such circumstances, but it becomes more of a challenge to bring the catching power in line with desired levels.

4.3 Effort Rights (Quantitative Input Rights)

Suppose that the catching power or capacity of a fleet, if unregulated, is greater than the fish stock can withstand. This implies the need to regulate how that catching power is used in practice, i.e., to limit the total fishing effort on the stocks so as to "ensure that levels of fishing effort are commensurate with the sustainable use of fishery resources..." (Code of Conduct, Paragraph 7.1.8). This can be approached in part through a limited entry scheme, to control the number of vessels fishing, but in addition, it may be desired to limit the amount of fishing by each fisher (or vessel), for example to allow more vessels to fish, for social reasons. To do this, the possible inputs that could be controlled include time fished, vessel size, amount of gear, and gear attributes. Such inputs might be controlled on an aggregate basis for the entire fishery or fishing fleet, e.g. by setting a total allowable number of boat days at sea for the fleet, or by prescribing allowable levels of inputs applying to individual fishers (such as a specific amount of fishing time and gear). The latter approach is one based on individual (input) use rights. (See Chapter 4 for further discussion on this topic.)

A common example of such an effort-based use rights approach arises in trap fisheries, notably those for lobster, crab and other invertebrates, where each fisher has the right to set a specified number of traps. It may be that all fishers have equal quantitative rights (i.e. to the same number of traps), or it may be that the rights vary from one individual to another, perhaps based on location, boat size, or some other criteria. Similar input rights are used with respect to fishing time at sea (e.g., in the USA) and vessel capacity. For example, Malaysia's "vessel replacement procedure" is such that if the owner of a fishing vessel wishes to build a replacement, the 'right' applies only to a new vessel of no greater size than the older one (FAO, 1998).

The key problem for an effort rights program is the incentive that will exist among fishers to thwart the input controls, by locating other uncontrolled inputs to expand (Chapter 4). This implies the need for a multi-dimensional approach to input rights, by implementing rights over

³ The full text of the Plan of Action is available at <http://www.fao.org/fi/ipa/capace.asp>.

not one but a range of inputs. For example, in the lobster fishery of Atlantic Canada, access rights (limited entry) are supplemented with quantitative rights limiting the number of lobster pots per fisher - a relatively effective control for many decades. In recent years, however, changes in trap design as well as more frequent hauling and baiting of the traps have improved the effectiveness of each trap. Thus actual effort is not being held constant, which could lead to over-exploitation. To restore the effectiveness of effort controls, the set of use rights might be broadened to cover not only limited entry and trap limits, but also another dimension, the number of 'trap hauls'. In a similar vein, effective effort rights in a trawl fishery might cover a combination of hold tonnage, vessel horsepower and days fished.

Use rights over fishing effort must also deal with the natural process of technological improvement that gradually increases the effectiveness of any given set of inputs over time. If there is no compensation for this effect, conservation impacts of fishing by a given fleet may be under-estimated, leading to over-exploitation. However, it is possible for an individual input rights program to adjust for improvements in fishing efficiency, either by scaling back the rights over time (to reflect the rate of efficiency increase) or by placing the onus on vessel owners to ensure, and demonstrate, that efficiency increases (e.g., from addition of gear or from construction of new, presumably more efficient vessels) are compensated for by adjustments elsewhere in the fleet, so that overall catching power does not increase. Note as well that if fishers hold effective management rights, reductions in the level of input rights may take place voluntarily, on a collective basis – for example, with fishers in a trap fishery reducing the maximum number of traps allowed per fisher, both for conservation and cost reduction – as has happened in lobster fisheries in parts of Atlantic Canada.

Thus input/effort allocations can be a viable approach to rights-based management if care is taken in defining the rights, if a suitable portfolio of rights is established (cf. Hilborn *et al.* 2001), and if a plan is put in place to deal with fishing efficiency improvements and capacity control – as noted in the Code of Conduct (Paragraph 7.6.3). Note, however, that any quantitative rights system, whether involving effort rights or harvest quotas (see below) inherently requires certain data collection and monitoring schemes to operate; naturally, the cost and feasibility of these must be taken into account.

4.4 Harvest Quotas (Quantitative Output Rights)

A Total Allowable Catch (TAC) is a conservation control but not a use right, since setting a TAC makes no statement about the rights to catch the fish. The situation changes, however, if that TAC is subdivided into quotas allocated to sectors of the fishery, individual fishers, or communities, in which case these shares of the TAC represent quantitative output rights - collective or individual use rights over the corresponding 'shares'. Several variations on this may occur.

- The right may be held collectively by a sector of the fishery, with allocations made for small boats or large boats, for hook-and-line fishers or net fishers, etc., through a suitable institution within that sector.
- Rights may be assigned to communities, as 'community quotas', so that fishers within the community regulate themselves, perhaps with the involvement of their community, establishing suitable fishery management plans and dividing up the quota to suit their local situation and to maximise benefits, explicitly reflecting community values and objectives (Charles, 2001).
- Harvest rights may be allocated to individual fishers as trip limits (providing the right to take a certain catch on each fishing trip) combined with a right to a certain total number of trips per year (thereby ensuring that the TAC is not exceeded).

- Harvest rights may be allocated to individual fishers on an annual basis as individual quotas (IQs), rights to harvest annually a certain portion of the fish resource (a fraction of the TAC). These appear in two main forms: individual transferable quotas (ITQs) are harvest rights that can be permanently bought and sold among fishers in a 'quota market', while individual non-transferable quotas (INTQs) are rights that are not permanently transferable. (The impact of transferability is discussed later in this chapter.)

In contrast to effort/input rights, which have received relatively little research attention or promotion within fishery management, individual quotas have been studied and promoted heavily, particularly by fishery economists and participants in industrial fisheries. For example, a wealth of literature exists on ITQ systems in the best known locations, New Zealand and Iceland, as well as Australia, Canada and the United States. Individual quotas nevertheless remain rare in developing country fisheries, due to their considerable financial and personnel requirements (discussed below). Exceptions occur in some industrial fisheries, as with an INTQ system in Namibia, and ITQs in Chile, Peru and South Africa.

If individual harvest rights are considered certain within a fishing season, the fisher can plan fishing activity as desired, which can (a) potentially provide a better match to available markets, and (b) avoid the 'race for the fish', so that individual harvests can be taken at a lower cost, with less incentive for the over-capitalisation that can occur with limited entry and input allocation programs. This benefit exists both with trip limits and individual quotas, but more so with the latter since the fisher can plan fishing activity over the course of a full year, rather than on a trip-by-trip basis. IQ advocates argue that the above incentives lead to (1) reduction in fishery inputs such as fleet size and number of fishers, in keeping with the Code of Conduct (Paragraph 7.6.3), (2) increased rents in the fishery, and (3) increased product value, either through more attention to quality or through development of higher-valued product forms (e.g., fresh fish instead of frozen). Some evidence has emerged supporting these claims, although there is also some questioning of the extent of the benefits (e.g. Squires and Kirkley, 1996).

Potential benefits of individual harvest rights are accompanied with various possible social and conservation concerns. Social considerations are discussed later in the chapter, while conservation implications include those related to catch controls in general, and those arising due to particular incentives that exist to thwart individual controls (analogous to those discussed above for effort rights). Among the most widely discussed examples of these are the following.

- Inherent incentives exist for fishers to under-report catches, since every unreported fish is one less deduction from the fisher's own quota (and thus one more for catching later in the year) or one less fish for which quota must be purchased, at considerable cost, from other fishers. (This contrast with a competitive fishery, in which there is much less disincentive to report catches.)
- Incentives increase to dump, discard and high-grade fish, since this allows the fishers to directly increase the value of what he or she lands, thereby maximising profits obtained from the corresponding quota.
- In transferable rights systems (including some limited entry licensing approaches), fishers may go far into debt to purchase what may be expensive rights (quota) from others. This can lead to financial pressure on fishers to increase incomes and pay off the debt, and a resulting pressure to increase the TAC that may be difficult for decision-makers to resist.

In addition to conservation and social concerns, the same caveat noted for quantitative input (effort) rights applies here as well, namely that concerning data and monitoring requirements. These can be especially extensive in quota fisheries, since not only is it necessary to monitor the catches of individual fishers, the entire system is based on setting a sustainable Total Allowable Catch annually, which typically requires great scientific resources. (Indeed, such TACs have

frequently been seriously mis-calculated even in cases for which financial and staff resources have been large.)

5. HOW ARE USE RIGHTS IMPLEMENTED?

The preceding discussion has outlined the range of possible use rights options. Here, we turn to the fundamental issue of putting a use rights system into place. This involves addressing the following three key questions.

- Is a system of use rights already in place within the given fishery? (5.1)
- If not, what use rights options, or set of options, are best for the given fishery? (5.2)
- What policy guides how the desired option(s) should be implemented? (5.3)

5.1 Are use rights already in place?

In existing fisheries, particularly those with a long history, it is crucial to understand whether use rights have already developed naturally over time, perhaps put in place by fishers themselves or by their community. This has proven to be the case in a wide variety of fisheries around the world. It is not surprising that use rights would have emerged, since there are clear benefits to defining the group of fishers entitled to fish in a certain locations, both for the fishers themselves and for the well-being of the fishing community. Social scientists have played a major role in documenting not only existing 'indigenous' use rights systems, but also systems that had been in place in the past, but which were displaced by 'modern' central management. In many cases, the process of understanding local use rights accompanies that of accessing local knowledge about the fishery and its environment – so-called traditional ecological knowledge (TEK).

If use rights already exist, the manager's first job may be to develop an understanding of how effective those use rights are, and whether there are available mechanisms to reinforce them. Certainly, it is likely to be more efficient to accept and reinforce existing rights rather than to attempt the development and enforcement of an entirely new regime. Thus, if use rights are currently in place, then only if they are for some reason unsustainable will it be necessary to explore how to implement a new use rights system.

5.2 What is the 'best' set of use rights?

For the remainder of the discussion in this section, we will assume that either no use rights system is in place, or that if use rights do exist, there is a recognised need for substantial changes. Then fishery management is faced with a choice among the many use rights options described in section 4. How do we compare output/harvest rights, input/effort rights, and TURFs (territorial use rights)? Can any one of these provide the 'best' solution? Several factors must be recognised in this regard.

1. Given the biological, economic and social diversity of fisheries, no single use rights approach will be applicable everywhere.
2. Each use rights option has its inherent advantages and limitations, and these will be of varying relevance depending on the specific fishery. Thus what is 'best' will depend on the fishery in question, and it is important to understand how the particular fishery circumstances influence the desirability of certain options over others.
3. Given the above two points, it is unlikely that any single use rights approach will produce optimal results. Thus it may be preferable to pursue a 'portfolio' of rights - a combination that is most acceptable, helps the fishery operate best, and maximises benefits for the given context.

These points highlight the reality that there is no single answer to the question 'what is the best use rights arrangement?'. We must be sceptical of any claim that any single use rights option is

somehow inherently superior to others. Instead, fishery managers and planners, together with interested parties (such as vessel owners, crew members, aspiring fishers, community members and citizens), need to seek out or enhance a set of use rights that will work in practice. To this end, it is important to understand the structure and underlying nature of the fishery:

- what are society's objectives in the fishery;
- what are the relevant structure, history and traditions of the fishery;
- what is the relevant social, cultural and economic environment of the fishery;
- what are the key features of the fish stocks and ecosystem?

While there is neither a clear set of conclusions nor a consensus about which use rights options are most compatible with which fishery features, consider some possible ways in which responses to the above questions might guide our choices...

- Management of sedentary fishery resources may be especially amenable to territorial rights (TURFs).
- Management of stocks for which biomass estimates are unreliable, or for which regular catch monitoring is too expensive, may be best approached through effort rights rather than harvest rights.
- Management of highly migratory or transboundary stocks, for which the allowable catch must be allocated among nations, may focus on harvest rights. Management of fisheries in which the fishing technology is relatively uniform may focus on effort rights, while in fisheries with many different gear types, harvest rights may work better.

Of course, in a given case, the importance of each of the fishery characteristics must be weighed in assessing the pro's and con's of use rights options, before arriving at a desired solution.

5.3 What is the underlying policy framework?

Whether the goal is to enhance and reinforce existing use rights arrangements, or to develop a new set of use rights (as discussed above), we arrive at the matter of determining the specific framework for implementing use rights. Whatever the use rights system being pursued, there are several policy issues that arise concerning the allocation and governance of the rights. How precisely should the desired use rights option(s) be implemented? How are those rights to be 'managed'? What management institutions will be effective for the various combinations of fishery resources, industry structure and political jurisdictions? Who should be involved in establishing and operating a use rights system? Suitable policies are needed to guide these decisions.

It is important to recognise that the matter of use rights is likely to be a controversial and delicate one. After all, use rights define who can and cannot take part in the fishery. In addition, there is likely to be an element of irreversibility to any decision about use rights; once rights are allocated, it may be very difficult to make major changes. The task of implementing use rights will be made easier if clear policy directions are laid out in advance, since such policy should provide guidance in terms of which fishery interested parties are to receive priority in obtaining use rights (e.g., small versus large vessels, community versus corporate participants, etc.). Finally, it is also important to keep in mind that decisions involving use rights can affect not only current fishers but potential participants as well. This implies that despite the broad usefulness of co-management arrangements, in which current fishers take part in management, it may be considered unfair to restrict participation in discussions of use rights to current fishers. The question of who should be allowed to take part in such discussions (and indeed whether a participatory process is feasible at all) needs careful consideration (see Chapter 7).

The sensitive nature of use rights, described above, is particularly relevant when the *status quo* set of use rights is seen as inappropriate in the context of national policy directions. This may arise when a nation is undergoing a major transformation, for whatever reason, as is the case, for example, with some countries in eastern Europe, Central America and southern Africa. In South Africa, for example, the transformation from a period of apartheid into one of democracy means that broadening the right to access the fishery (as with other parts of the economy) is a matter of urgency (Cochrane and Payne, 1998). In such circumstances, national policy goals drive use rights decisions within the fishery sector.

5.3.1 Should use rights be governed by market forces or strategic planning?

A key issue in fishery policy debate over use rights concerns the mechanism by which the holding of rights is itself managed. In many cases, this revolves around the choice between two institutional arrangements for determining who are to be the fishery participants – a market-based approach, and one based on multi-objective planning, often at the community level.

A reliance on market forces has become a popular direction among many governments and international financial institutions. This leads to a market-based approach to fishery policy, as typified by ITQ systems, in which strategic-level issues over use rights - who is to participate in the fishery and who is to receive allocations of allowable catch or effort - are determined through the buying and selling of rights in the marketplace.

Who it is that buys, or sells, the rights will depend on the situation at hand. It may be, as economic theory suggests, that more-efficient stakeholders buy out less-efficient ones, or it could be that the buyers are those with better access to financial capital (a particularly important point in many developing countries), or there may be some other factor that dominates. Furthermore, while market-based rights are typically discussed in the context of individual fishers, there is nothing conceptually to prevent an entity operating at a collective (corporate or community) level from buying or selling on a fishing rights market. However, the actual bundle of rights resulting from such a transaction may differ depending on whether the buyer is an individual, corporation or community - due for example to differing regulatory constraints on the various rights-holders.

Broadly speaking, a market-based rights system can be expected to display the various advantages and disadvantages of the overall market system, and inspire similar debates to those arising with respect to market mechanisms elsewhere in the economy. For example, depending on one's perspective, and the case at hand, markets may (or may not) be the most cost-efficient institutional arrangement to handle transactions between fishers, and may (or may not) increase flexibility in fisher operations. Given a widespread familiarity with markets in many economies, these may be relatively easily-implemented fishery rights systems – but may introduce financial impacts on the pursuit of new policy directions (since, for example, those with market-based rights must be compensated if policies are contrary to the self-interest of rights-holders).

In contrast, a strategic planning approach assigns use rights in a more deliberate manner (whether permanently or periodically) through a decision-making process that (a) is based on recognising multiple societal goals, (b) is carried out by institutions operating at a suitable scale, whether community-based, regional or national, and (c) involves rights specified through a combination of legislation and government decisions, on the one hand, and traditional/informal arrangements on the other. These rights may operate at the individual fisher level, but (as with the market approach) could alternatively be allocated at the group (collective) level, with allocations made through relevant institutions – see below. Such arrangements have a lengthy history in real-world situations – arising frequently, for example, in the context of cooperatives, marketing boards, and indigenous/native communities.

5.3.2 Should use rights be individual rights or community-based rights?

One of the most crucial aspects to consider about use rights is the difference between those instituted at the level of the individual fisher and those at a collective level – e.g., the community or the fishers association. In one fishery, the government fishery authority may have specified a certain group of licensed fishers, and designated each individual's right to fish a certain amount of gear. Thus use rights – a license and an effort right - are at an individual level. In another fishery, use rights may be held by a coastal community or a fishers' association, which then determines which individuals will take part in the fishery at a given time. In such a case, rights may be primarily at the group level, but may be allocated down to an individual level. (Note that relative to individual rights, collective rights are typically less well understood, so particular attention is devoted to such rights in this section.)

The choice between individual and collective rights should depend on both the historical context and the fishery objectives being pursued. For example, in the case of a fishery that has developed relatively recently, and that has an industrial focus, there may be a natural inclination to an individual rights system. Individual rights are often seen as naturally compatible with the entrepreneurial independence of fishers. On the other hand, collective rights are historically of greatest importance in longstanding traditional fisheries – although such rights have not always been properly understood and incorporated into 'modern' management, leading in some cases to severe social and conservation problems.

Collective rights cannot be expected to work in every fishery. It is a challenging question, and indeed a matter of some research attention, to determine conditions conducive to introducing these rights, but it seems likely that factors needing consideration include: the cohesiveness of the community involved, experience in and capacity for local management, geographical clarity of the community, and its overall size and extent (see Section 8, Chapter 7 for further discussion on this topic).

For those cases where such rights already exist, or where the conditions are conducive to their introduction, collective rights have the potential to provide considerable benefits, notably in fisheries for which the community has a strong inherent interest. Through moral pressure on local fishers and by providing suitable management institutions, the community can create a collective incentive for resource stewardship (conservation) as well as increased management efficiency, and implementation of local enforcement tools.

Consider the example of 'community quotas' - fishing quotas (portions of the TAC) allocated to communities rather than to individuals or companies. While suffering some of the inherent flaws of any quota-based scheme, community quotas defined on a geographical basis tend to bring people together in a common purpose, rather than focusing on individualism. Fishers in the community manage themselves, perhaps also with the involvement of their community. The fishers create fishery management plans (Chapter 9) and divide up the quota (or other form of rights), to suit their specific local situation and to maximise overall benefits, rather than leaving it to the market to make choices for them. Note that this involves use rights at both the community level and the individual level. As well as providing many of the benefits of individual quotas, this approach may also enhance community sustainability, allowing each community to decide for itself how to utilise its quota. For example, one community may decide to allocate its quota in a rent-maximising auction, while another may prefer distributing the quota so as to achieve a mix of social objectives, such as community stability, employment and equity. Examples of this approach include Alaska's system of Community Development Quotas (CDQs) and the fixed-gear community management boards in the Scotia-Fundy groundfish fishery of Atlantic Canada.

5.3.3 What should be the duration of use rights?

Within any system of use rights, it is a fundamental matter to decide how long the rights are to last, i.e. for how much time the holders of rights are able to make use of those particular rights.

This revolves largely around the balancing of two factors: management flexibility and conservationist incentives. On the one hand, short-duration rights give the capability to more frequently re-allocate those rights, a flexibility that may allow fishery management to better reflect society's changing objectives over time. On the other hand, longer-duration rights, by providing more security to fishery users, give those users a stake in the well-being of the resource further into the future, and an incentive to better 'plan for the future' in husbanding the resource.

Consider two examples. First, suppose that to operate in a particular fishery, a substantial level of financial investment is needed, and this is held by only a small set of industrial companies. Since these are the only interested parties able to fish, they may be given long-duration use rights. However, if an objective of management is to improve the situation of artisanal fishers, this goal may be thwarted for many years; such fishers may be unable to enter the fishery even if they develop the financial means to do so, e.g. through cooperatives. Shorter-duration rights might have provided management flexibility to facilitate access of artisanal fishers much earlier. (This situation could arise as well if a foreign fleet has dominated in a particular fishery, but the national policy goal is to develop a domestic presence. In such a case, allocating long-duration rights to the foreign fleet may be counter-productive.) Alternatively, suppose that short-duration rights are allocated in a fishery. What happens as the end of the time period approaches? If the rights-holders know that their rights are about to expire, they may have an incentive to harvest intensively, with no regard for the future of the fish stocks. Rights of longer duration (a longer 'time horizon') would mean that incentives to conserve would apply for many more years than would otherwise be the case.

There is no universal 'right answer' in dealing with such trade-offs, and indeed it is important to note that the trade-offs themselves are not as stark as described above. Flexibility can be added to systems of long-duration rights (e.g., by allowing targeted transferability of rights), while incentives to avoid over-exploitation can be provided in the case of short-duration rights (e.g., conservation performance criteria placed on the option to renew the rights).

In many fisheries, use rights tend to be of indefinite duration. This is particularly the case in small-scale/artisanal fisheries, where access rights may be available to all those in the local community, and those rights may be considered essentially permanent. This may be desired if no particular need exists for the flexibility to re-allocate rights, and the idea of limiting access rights to a certain period of time is deemed unacceptable. In particular, it seems unlikely in such a context that a government manager would force a local fisher to leave the fishery after, say, 5 years of fishing, on the basis that the person's time had 'run out'. (However just such an occurrence could be contemplated in the same fishery, if it were managed on a community basis – in some tribal fisheries, for example, the community accesses the resource collectively, and there may be utility in alternating those who actually do the fishing for the community.)

Explicit limitations on the duration of use rights seem more common in commercial or industrial fisheries, in which leases or other agreements may allow harvesting over a limited number of years. This is especially common with coastal states establishing access rights for foreign fleets, on an annual or multi-year basis, but an explicit duration also arises in some domestic fisheries. Examples include the auctioning of periodic harvest rights for inland fisheries in Bangladesh, and Namibia's individual non-transferrable quota system, in which "the term of a right can be 4, 7 or 10 years" depending on the company's levels of investment and of Namibian ownership (Oelofsen 1999). As alluded to above, it is crucial in such situations to develop mechanisms that reduce the incentive users may have to over-exploit the resources when the term of the use right nears an end.

It is clear from the discussion above, and the range of possibilities described, that there is a close linkage between decisions about the duration of rights and the matter of deciding who is to hold the use rights. We turn now to a discussion of the latter issue.

5.3.4 Who should hold use rights?

For any given fishery, some people hold use rights and others do not. In a tribal fishery, it may be the Chief who decides who is to have access to the resource. In a fishery with limited-entry licensing, the government's fisheries authority may designate license holders. Whatever the situation, the issue arises: who should hold use rights? This is largely a policy-level decision, i.e. one that will reflect overall policy in the fishery and beyond. Some guidance is provided, for example, by the Code of Conduct, which notes (Paragraph 6.18): "States should appropriately protect the rights of fishers and fishworkers, particularly those engaged in subsistence, small-scale and artisanal fisheries, to a secure and just livelihood, as well as preferential access, where appropriate, to traditional fishing grounds and resources in the waters under national jurisdiction."

Whatever the chosen form of use rights in a given fishery system, two key issues arise in implementing the use rights.

- Firstly, who should hold the use rights initially, and how should the corresponding initial allocation of rights be carried out?
- Secondly, who should hold use rights in the future, and in particular, should fishery users be permitted to transfer (buy, sell and trade) rights among themselves?

These questions are discussed in the following two sub-sections.

5.3.5 How should use rights be allocated initially?

If a use rights system already exists in a fishery, the distribution of the rights among the various participants (and the exclusion of non-participants) has been already established. But what if a new use rights system is being implemented, or there are to be adjustments to the existing system? Then a critical step in implementation is to determine how to allocate/distribute the rights. To put it another way: who is to receive which rights? This is a highly contentious part of the process, and it is important to realise that there is no universally 'correct' way to allocate rights. Perhaps the challenge involved here can be summarised as that of dividing up the total set of rights in a manner that seeks to minimise conflict. This process must be accompanied by some form of appeals process to manage the special cases that arise. While such processes sometimes resolve conflicts over initial allocations of rights, the debates involved at this stage can be so extensive as to delay implementation of rights systems for years.

Among the allocation mechanisms that might be considered are the following.

Auctions. The theory developed for quantitative fishing rights notes that to maximise economic efficiency, it may be desirable to auction the rights. With such an approach, those willing or able to bid highest will acquire the rights, regardless of historical, social or cultural considerations. Because of this lack of social sensitivity, this approach is often seen as unpalatable, and is little used - although it may be useful in purely industrial fisheries or situations where social factors are considered irrelevant. One example of its use has been the allocation of inland fishery rights in Bangladesh.

Catch History. Political reality in many cases is such that use rights have been allocated to fishers on the basis of the historical participation of those involved. This is usually referred to as a 'catch history' approach, since it most often focuses on allocating rights in proportion to each individual's past catches. This can be problematic, however. What is the best way to define historical participation? Consider the case of individual catch quotas. If only recent catch histories are used in the allocation, then fishers who were temporarily not fishing are penalised. This sends a questionable signal, especially if the period over which the 'history' is calculated was one of over-fishing and stock depletion. Those who receive the lowest quotas are those who contributed least to the over-fishing. On the other hand, those who bent the rules (or fished

illegally without being caught) – perhaps using fine-mesh gear to increase catches, or dumping less desirable fish to fill their holds with higher-valued species - are rewarded, into perpetuity, with a larger quota. While such a situation is unfair, the alternative of avoiding recent history will lead to objections from recent entrants, who may be technologically advanced and politically powerful. In any case, there is a strong possibility that social conflict will arise.

History + Equity. In an effort to deal with such problems, hybrid schemes for initial allocations may be used. For example, there is some experience with formulas in which part of the total is allocated based on catch history and the remainder is allocated equally among fishers.

Allocation Panel/Board. Since the auction mechanism for allocating use rights is inherently affected by differences in levels of wealth among prospective participants, and the catch history approach is dependent on previous performance in the fishery, neither is particularly suitable when public policy involves broadening the base of involvement in the fishery, to include those who were previously excluded. (A dramatic examples of this would be the case of fisheries in South Africa; see Cochrane and Payne, 1998.) In such cases, a special body may be required to determine allocations of rights to specific groups or communities.

Community/Sector/Group Allocations. Note that among the above methods, auctions tend to directly involve individuals (or companies), a catch history approach can be at an individual or collective level, and panels/boards may be best suited to the allocation of use rights at the level of community, sector or grouping. In some cases, it may be advantageous to use a combination of approaches in a 2-step process. Rights could be allocated initially solely on a collective basis, directly to communities, fishing sectors or other identifiable groups. The second step in the process is then devolved to each community or grouping, involving the determination of exactly which individuals are to obtain rights. Of course, this does not eliminate the challenge of how to allocate to the communities or groups, nor does it eliminate problems at the individual level, but for the latter, it does facilitate solutions that are tailored locally. For example, a community may consider it important not just to allocate rights amongst the existing local fishers, but to balance their interests with crew members as well as others who would like to participate, but have been excluded in the past, or have just now reached an age or seniority at which participation is possible.

5.3.6 Should use rights be transferable?

Once use rights are allocated, there remains the key question of whether or not to make rights transferable. In other words, can the rights be bought and sold, or handed down in a family from one generation to the next, or temporarily transferred to another fisher within a fishing season? This question is closely related to the debate discussed above concerning the extent to which the market will govern who holds fishery rights. Several approaches are possible:

1. *completely non-transferable* rights can only be used by the holder, and are no longer valid when that fisher leaves the fishery;
2. *non-divisible transfer* of use rights (whether fishing licenses, input allocations or quota rights) may be allowed between fishers, but only if done as a complete indivisible package - i.e. with all a fisher's use rights transferred together;
3. *divisible transfer* of use rights is the ultimate version of uncontrolled transferability, in which fishers can freely sell all or any portion of their rights;
4. transferability may be allowed only within the fishery sector or community in which the use rights reside, for options 2 and 3 above, thereby providing greater fishery stability within the sector or community; or
5. a hybrid approach could be adopted in which there are differing classes of licenses, some transferable and some not, with defined policy measures determining which fishers have

which form of licenses (for example, there could be two classes of license: transferable ones for full-time fishers, and non-transferable ones for part-timers).

These options have very different implications depending on whether we are considering temporary or permanent transferability. Consider first the case of temporary transferability, in which one fisher is permitted to rent or lease use rights to another fisher within a fishing season. The rights then revert to the original fisher at the end of the season. This mechanism provides important flexibility so that a fisher who happens to become sick or whose vessel breaks down one year can still obtain some income by renting out the use rights. As long as regulations prevent the excessive use of this mechanism, there would seem to be few long-term impacts. On the other hand, with permanent transferability, the implications are more significant. The remainder of this section focuses on this case of permanent transferability, exploring several key issues, relating to efficiency, fishery mobility, social cohesion and concentration of rights.

Efficiency. Transferability is often promoted as a means to improve economic efficiency, using an argument such as the following. To be economically efficient, the participants in a fishing fleet should be those most profitable in harvesting the available fish. In theory, a market-based system (such as an ITQ system), with divisibility and transferability of input or output rights, improves efficiency, as vessel owners who maximise the profits resulting from a given quota will buy up that quota from others - like a commodity on the market. The idea is that with transferability, the more 'efficient' vessel owners remain in the fishery, while others sell their quota and leave, in a 'survival of the fittest' process leading to increasing overall efficiency of individual fishers.

This seems a persuasive argument, but it is useful to highlight some serious potential qualifications to the argument, which lead to the overall conclusion that an appeal to increased efficiency does not universally support transferability, or non-transferability - the outcome will depend on our specific objectives and the specific fishery. First, there is no guarantee that efficiency will increase through the market process. For example, if there is strategic buying of quota to gain greater control of the fishery (not unlike the manner by which financial mergers take place), ownership will still become concentrated and participation reduced in the fishery, but the resulting impacts on efficiency are unclear.

Second, while efficiency - obtaining optimal benefits for a given set of inputs, or 'doing the most with what we have' - is desirable, it must be assessed at a level appropriate to the policy goals. Specifically, while transferability may increase the efficiency of individual vessels (with higher vessel profits), it could actually decrease efficiency for the fishery as a whole, as well as the coastal economy and coastal community. This is because when we consider the bigger picture, we must take into account (a) all stakeholders rather than just the owner of an individual vessel, and (b) all related monetary and non-monetary benefits from catching a fish, not only profits to the boat owner. These related benefits will depend on the specific situation, but would typically include benefits to crew members and on-shore workers, as well as to the on-shore economy and relevant coastal communities. Such considerations are often ignored in looking at the economics of the fishery, but must be taken into account if we are to properly assess the desirability of use rights transferability.

Third, not only must efficiency be seen broadly, in the context of the whole fishery and the coastal economy, it must also be seen as a long-term conservation matter. This has a variety of implications. For example, if use rights are transferred out of a local area, thereby reducing the use of locally-based traditional ecological knowledge in management, we need to be conscious of possible negative conservation impacts (Chapter 7). Also, since we need to regulate the impact on fish stocks, an 'efficient' fishery should be seen as one that produces the greatest net benefits for every fish caught. This implies that it is not a matter of getting large quantities of fish quickly and cheaply out of the sea, but rather getting the most from each fish that is taken. There

is no reason to expect that buying and selling of transferable rights will reflect this broader idea of efficiency.

Fisher Mobility. Transferability increases the ‘mobility’ of individual fishers, allows each to exit the fishery when the revenue to be gained from the sale of the use right exceeds the expected benefits of remaining in the fishery. This provides maximum flexibility for the fisher, and makes it easier for managers to reduce participation in the fishery. However, in the absence of restrictions to keep use rights within the local community, this mobility can reduce stability within the fishing communities. Conversely, non-transferable systems provide better stability, but reduce mobility of the fishers - making it more difficult to reduce fishing power over time (capacity reduction). In particular, incentives exist to keep non-transferable rights in use as long as possible, to maximise actual benefits, and in the hope of a financial windfall should there be a later decision to allow transferability. This may mean that a boat will be used beyond its technological life, which can also create safety problems.

Social Cohesion. Transferability can have a major impact on social well-being. First, since rights are often held solely by the vessel owner, the selling of those rights may leave the most vulnerable in the fishery – crew members – without jobs and without compensation. Second, transferability can lead to a loss of social cohesion in the community as a whole. This is particularly the case when transfers remove fishing rights from the community, resulting in reduced local involvement in the fishery, reduced employment, and a corresponding increase in the proportion of ‘outsiders’ fishing on what had been locally-controlled resources. On the other hand, non-transferable rights may help stabilise the local economy, by ensuring that a certain portion of the rights resides in the local communities. It should be noted, however, that in the case of non-transferable systems, there may be inherent pressure to shift to transferability, with all the implications of that change - it seems that this has occurred in most examples to date.

Concentration of rights. Transferability generally leads to the concentration of fishing rights ownership in fewer hands (and particularly in the hands of processors or dealers). If the goal is to reduce the number of stakeholders with which the manager needs to interact, transferable rights may accomplish the goal. On the other hand, concentration of rights raises social and economic concerns, particularly in relation to potentially detrimental impacts on:

- the traditional organisational arrangements of fishers;
- employment of vessel crew;
- overall equity in the coastal economy;
- the stability of fishing communities.

To prevent concentration, rights might be made non-transferable, or there might be limits on the maximum amount of rights that can be owned by any person or firm, or an owner-operator requirement might be put in place (so only the vessel owner can be its operator). However, there are means to evade these approaches – e.g., through legal contracts or nominal ownership (by family, relatives, and employees). Thus, if concentration of fishing rights is considered undesirable, caution is needed, since even supposedly non-transferable rights might end up being transferable in practice.

6. SYNTHESIS

Many of the major ongoing debates in fishery management relate to use rights – the right to use (access) a fishery – as well as management rights, the right to take part in its management. After discussing the relationship between use rights, management rights and other forms of fishery rights, this chapter presented the range of use rights options, including TURFs, limited entry and individual quantitative input rights (effort) and output rights (quotas). The majority of these use

rights options correspond with specific input and output controls, as described in Chapter 4. Finally, the chapter reviewed a range of policy and operational issues relevant to the choice of use rights, and to their implementation. It should be clear that use rights can be highly controversial, due not only to the conflict inherent in any use rights system (where some are excluded, and some have numerically greater rights than others) but also to the lack of consensus on the 'best' path to follow in establishing such systems.

On the latter point, suppose that we are involved in management of a specific fishery, and we are certain that no (acceptable) use rights system is currently in place. Then we are faced with the challenge of developing and implementing such a system. What policy approaches are most suitable? Consider, for example, the choices described above, (a) between a market-based and a strategic planning mechanism to govern use rights, and (b) between an individual and a collective or community-based orientation for the use rights. There is no consensus on precisely which characteristics of a fishery favour one or the other of these two approaches. However, Berkes (1986) has suggested, in the context of Turkish fishery cases, that community-based strategic planning "provides a relevant and feasible set of institutional arrangements for managing some coastal fisheries", particularly "small-scale fisheries in which the community of users is relatively homogeneous and the group size relatively small". On the other hand, he suggests that individual market-based use rights (perhaps including the "assignment of exclusive and transferable fishing rights") may be appropriate "for offshore fish resources and larger-scale, more mobile fishing fleets". Building on these suggestions and the discussions in the earlier parts of this chapter, we might envision a 'working hypothesis' as follows:

Community-based Rights if:	Market-based Rights if:
<ul style="list-style-type: none"> - structure is small-scale/artisanal with clear fisher-community ties - history and tradition play a major role in fishing activity and fishery management - multiple fishery and non-fishery goals are pursued; fishery management requires the balancing of these objectives 	<ul style="list-style-type: none"> - the fishery has a predominantly industrial, capital-intensive orientation - the fishery does not play a major role in supporting coastal communities - profitability dominates over community and socioeconomic goals (e.g. equity, employment, health of local economy)

This decision framework should not be seen as a recommended one, but merely as a possibility. Even if it has some validity, there are bound to be exceptions, and it is not clear what circumstances will lead to such exceptions. Furthermore, the 'either/or' nature of the above – a completely collective rights systems and a totally market-driven system – fails to incorporate the wide range of intermediate options.

Consider but one example, that of non-transferrable rights. Fisheries in Namibia (Oelofsen, 1999) provide an illustration of how transferability of individual rights (e.g., ITQs) is "not regarded as the ideal system to be implemented" because it would make more difficult the pursuit of national policy goals. Similarly, long-duration rights ("the notion of fixed rights in perpetuity") are seen as unsuitable, since the positive qualities of a fishing company that may have led to it being given a quota could change over time. In Namibian fisheries, therefore, limited-term individual non-transferrable rights (INTQs) were implemented as an intermediate approach.

In certain cases, non-transferrable rights could help to balance the benefits of individual rights with the goals of social and community stability. For example, such a system of use rights might prohibit permanent transfers/sales, but allow the flexibility of rights transfers within a season.

Furthermore, any individual rights might operate subject to community rights and locally-set rules, with fishers in the community having group control over the system of rights.

In considering the range of use rights options, it is important to note that the 'community-based versus market-based' dichotomy must be differentiated from that arising between input/effort and output/catch rights. Unfortunately, these two issues tend to become confused, probably due to the domination of output-based ITQs within the market-based approach. However, we must keep in mind that various combinations, such as community quotas or market-oriented effort controls, may be feasible, depending on the specific fishery context.

The discussion in this final section has focused on just one of the range of policy issues surrounding use rights in fisheries. There is clearly much more on this complex subject than can fit in one chapter. Thus, we have sought here only to introduce the concept of fishery rights, the range of options, and some of the key operational and policy issues. Some key points to be considered in assessing and developing use rights systems are highlighted in Figure 2.

Perhaps four fundamental points should be reiterated in conclusion:

- use rights are crucial in the pursuit of responsible fisheries;
- use rights already exist in many fisheries;
- if use rights do not exist, or current rights are ineffective, an appropriate system must be developed and implemented;
- this task requires considerable care, with no simple 'cook-book' formulas to help.

These realities ensure that use rights will continue to play a major role in fishery management. Indeed, it seems apparent that if both the use rights held by fishers and the responsibilities undertaken by those fishers are clearly identified and widely accepted, success in achieving responsible fisheries will be that much more likely in the future.

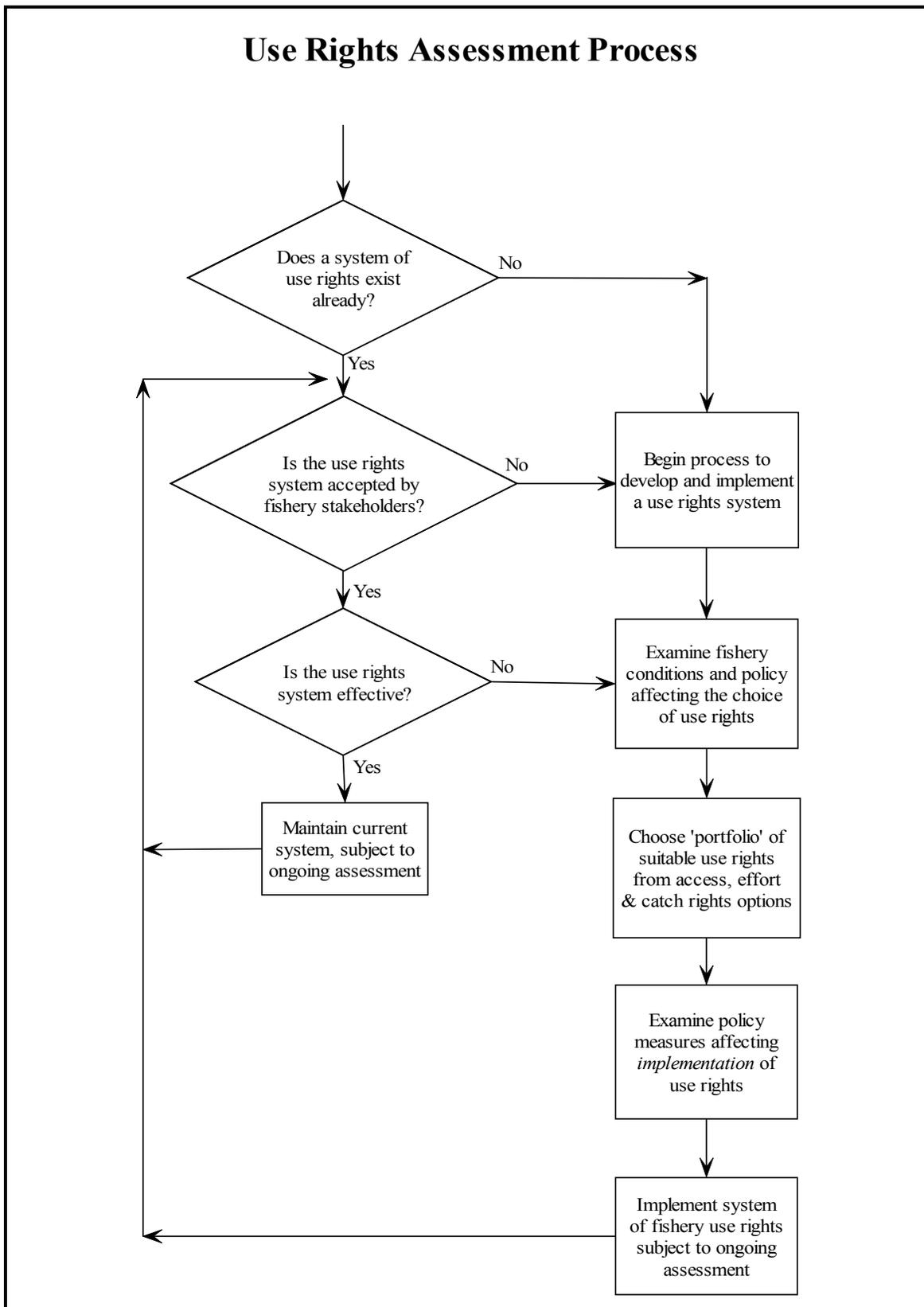


Figure 2. Flowchart for assessing and developing a use rights system.

7. REFERENCES AND RECOMMENDED READING

- Berkes, F. 1986. Local-level management and the commons problem: A comparative study of Turkish coastal fisheries. *Marine Policy*, **10**: 215-229.
- Brownstein, J. and Tremblay, J. 1994. Traditional property rights and cooperative management in the Canadian lobster fishery. *The Lobster Newsletter*, **7**:5.
- Charles, A.T. 1998a. Living with Uncertainty in Fisheries: Analytical Methods, Management Priorities and the Canadian Groundfishery Experience. *Fisheries Research*, **37**: 37-50.
- Charles, A.T. 1998b. *Fisheries in Transition*. Ocean Yearbook 13. Eds. E.M. Borgese, A. Chircop, M. McConnell & J.R. Morgan. University of Chicago Press, Chicago, U.S.A. p.15-37.
- Charles, A.T. 2001. *Sustainable Fishery Systems*. Blackwell Science, Oxford, United Kingdom.
- Charles, A.T. and Herrera, A. 1994. Development and diversification: Sustainability strategies for a Costa Rican fishing cooperative. *Proceedings of the 6th Conference of the International Institute for Fisheries Economics and Trade*. Eds. M. Antona, J. Catanzano, & J.G. Sutinen. IIFET/ORSTOM, Paris, France.
- Christy, F.T. 1982. *Territorial Use Rights in Marine Fisheries: Definitions and Conditions*. FAO Fisheries Technical Paper, **227**. FAO, Rome, Italy.
- Cochrane, K. L. and Payne, A.I.L. 1998. People, purses and power: the role of policy in directing fisheries management as indicated in the debate surrounding a developing fisheries policy for South Africa. In Pitcher, T. J., Hart, P. J. B. and Pauly, D. eds. *Reinventing Fisheries Management*. (Proceedings of Symposium held in Vancouver, Canada, February 20-24, 1996). Kluwer, Dordrecht. p. 73-99.
- Congress of the Philippines. 1998. *An Act providing for the Development, Management, and Conservation of the Fisheries and Aquatic Resources, Integrating all Laws Pertinent thereto, and for other Purposes*. Republic Act No. 8550. Congress of the Philippines, Republic of the Philippines. Metro Manila, Philippines.
- Copes, P. 1997. Social impacts of fisheries management regimes based on individual quotas. *Proceedings of the Workshop on Social Implications of Quota Systems in Fisheries*. Vestman Islands, Iceland, May 1996. Nordic Council of Ministers, Copenhagen, Denmark.
- Deweese, C.M. 1998. Effects of individual quota systems on New Zealand and British Columbia fisheries. *Ecological Applications*, **8** Supplement.: S133-S138.
- Dyer, C.L., and McGoodwin, J.R. 1994. *Folk Management in the World's Fisheries: Lessons for Modern Fisheries Management*. University Press of Colorado, Niwot, U.S.A.
- FAO. 1998. *Report of the FAO Technical Working Group on the Management of Fishing Capacity. La Jolla, United States of America, 15-18 April 1998*. FAO Fisheries Report, **586**. FAO, Rome, Italy.
- Gimbel, K.L. (Editor). 1994. *Limiting Access to Marine Fisheries: Keeping the Focus on Conservation*. Center for Marine Conservation and World Wildlife Fund. Washington, U.S.A.
- Gonzalez, E. 1996. Territorial use rights in Chilean fisheries. *Marine Resource Economics*, **11**: 211-218.

- Hanna, S. and Munasinghe, M. (eds). 1995a. *Property Rights and the Environment: Social and Ecological Issues*. Beijer International Institute of Ecological Economics and the World Bank. Washington, U.S.A.
- Hanna, S. and Munasinghe, M. (eds). 1995b. *Property Rights in a Social and Ecological Context: Case Studies and Design Applications*. Beijer International Institute of Ecological Economics and the World Bank, Washington, U.S.A.
- Hardin, G. 1968. The tragedy of the commons. *Science*, **162**: 1243-47.
- Hilborn, R., Maguire, J.-J., Parma, A.M., and Rosenberg, A.A. 2001. The Precautionary Approach and risk management: Can they increase the probability of success of fishery management? *Canadian Journal of Fisheries and Aquatic Sciences*, **58**: 99-107.
- International Institute for Rural Reconstruction (IIRR). 1998. *Participatory Methods in Community-Based Coastal Resource Management*. International Institute for Rural Reconstruction, Silang, Philippines.
- Lawson, R. 1984. *Economics of Fisheries Development*. Frances Pinter Publishers, London, U.K. 283pp.
- Native Council of Nova Scotia. 1994. *Mi'kmaq Fisheries Netukulimk: Towards a Better Understanding*. Native Council of Nova Scotia, Truro, Canada.
- Neher, P.A., Arnason, R. and Mollett, N. (eds). 1989. *Rights Based Fishing*. Kluwer Academic Publishers, Dordrecht, Netherlands.
- OECD. 1993. *The Use of Individual Quotas in Fisheries Management*. Organisation for Economic Co-operation and Development. Paris, France.
- Oelofsen, B.W. 1999. Fisheries management: the Namibian approach. *ICES Journal of Marine Science*, **56**: 999-1004.
- Ostrom, E., and Schlager, E. 1996. The formation of property rights. In: *Rights to Nature: Ecological, Economic, Cultural and Political Principles of Institutions for the Environment*. Eds. S. Hanna, C. Folke, & K.G. Mäler. Island Press, Washington, U.S.A. p.127-156
- Pinkerton, E., and Weinstein, M. 1995. *Fisheries that work: Sustainability through Community-based Management*. The David Suzuki Foundation, Vancouver, Canada. 199pp.
- Ruddle, K. 1989. The continuity of traditional management practices: The case of Japanese coastal fisheries. In: *Traditional Marine Resource Management in the Pacific Basin: An Anthology*. Eds. K. Ruddle & R.E. Johannes. Contending with Global Change Study No.2, UNESCO/ ROSTSEA, Jakarta, Indonesia. p.263-285
- Ruddle, K., Hviding, E. and Johannes, R.E. 1992. Marine resources management in the context of customary tenure. *Marine Resource Economics*, **7**: 249-73.
- Squires, D. and Kirkley, J. 1996. Individual transferable quotas in a multiproduct common property industry. *Canadian Journal of Economics*, **29**: 318-42.
- Symes, D. (ed.). 1998. *Property Rights and Regulatory Systems in Fisheries*. Fishing News Books (Blackwell Science), Oxford, United Kingdom.
- Symes, D. (ed.). 1999. *Alternative Management Systems for Fisheries*. Fishing News Books (Blackwell Science), Oxford, United Kingdom.
- Townsend, R.E. 1990. Entry restrictions in the fishery: A survey of the evidence. *Land Economics*, **66**: 359-78.

- Townsend, R.E. and Charles, A.T. 1997. User rights in fishing. In: *Northwest Atlantic Groundfish: Perspectives on a Fishery Collapse*. Eds. J. Boreman, B.S. Nakashima, J.A. Wilson & R.L. Kendall. American Fisheries Society, Bethesda, U.S.A. p. 177-84
- Veitayaki, J. 1998. Traditional and community-based marine resources management system in Fiji: An evolving integrated process. *Coastal Management*, **26**: 47-60.

