

Tradable Rights between Coastal User Groups

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Abstract

The possible application of a tradable rights regime for marine and coastal natural resources that allow trade of rights between user groups is discussed. Marine-related tradable rights exist already. Some are directly resource based, as in fisheries, but some are also area-based, with user limitations, like aquaculture-location licenses. I consider both resource-based tradable rights and more complex, compounded resource rights, in the form of area-rights. Design issues on how to deal with external effects between users in different areas and on different spatial scales is also considered, as well as how such an instrument could affect institutional efficiency through its possible effects on power relations and rent-seeking.

Key words

Area-rights, externalities, interactions, power, property rights, administrative efficiency, rent-seeking, lobbying.

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Introduction

There is continuous demand for coastal and marine resources to be used more efficiently to provide food, goods and services to a growing global population, and also as firms face tougher competition in the marketplace (Crowder et al. 2006). These resources are contested by a multitude of user-groups and stakeholders (Cicin-Sain et al. 1998).³ New stakeholders enter the coastal zone continuously (e.g. Buanes et al. 2004). In addition there is increasing focus on sustaining ecosystem services despite intense and growing resource use (Pikitch et al. 2004; Douvère and Ehler 2007). Together this presents great challenges to ocean and coastal management systems.

The management system must be able to allocate resources to the use which gives the highest benefits, independent of sector. As technology, prices and preferences change the management system must allow a proper assessment of benefits if new stakeholders get resources access, including positive or negative effects on other users and interests, and make reallocations possible when they are sensible.

At the same time existing users must feel their resource access secure enough to make investments for efficient resource use possible, be it in capital, knowledge or the resource itself (Grafton et al. 2006). With rapid changes in markets and technology, the management system should also have a speedy operation (Grafton 2000).

³ These include i.a. fisheries, aquaculture, tourism, energy production, recreation, transport, nature conservation, military, settlement

Marine renewable resources are declining in many parts of the world, despite stronger efforts to manage them (Pauly et al. 2002; Reid et al. 2005). Part of the reason is that perverse incentives prevail, e.g. in fisheries, subsidies give harvesting overcapacity (Grafton et al. 2006), resource users make a profit by finding ways around input controls, and output controls lead to high grading and destructive fishing practices. The broader use of economic instruments, particularly the creation of individual property rights, have been proposed to align individual incentives with common interests, and resolve these problems in fisheries (Grafton et al. 2006; Wilen 2006). However, fisheries are only a part of the use of marine resources, and accounts for only a small part of the values from oceans and coasts (Greiner et al. 2000).

This paper considers two main issues. First, how a system of tradable rights between user-groups can be designed, so that marine and coastal resources be allocated to their most beneficial use, and at the same time the interests of different user groups, stakeholders and also public goods like ecosystem services be safeguarded. Secondly, it considers how the introduction of tradable rights can affect power relations between resource users, stakeholders and managers, and consequently levels of lobbying and rent seeking as well as efficiency of resource use.⁴

⁴ Defining "efficient resource use" may be done theoretically, for example by welfare economists who consider pareto improvements and an (abstract) welfare function. Defining it in practice is usually harder, but typically involves a compromise between competing uses. There may also be intrinsic values related to management systems themselves, like the democratic right of those that will be affected by a decision to be heard in the decision process.

In section 2 I briefly present tradable rights in a marine and coastal setting, and discuss design issues for tradable rights between user groups when their use is similar, including in particular how to deal with spatial concerns that may arise in that setting. In section 3 tradable area-rights are discussed, including ways to deal with externalities at different spatial scales. Section 4 considers how such tradable rights schemes can affect power relations, rent-seeking and hence the institutional efficiency of marine and coastal management regimes. In section 5 I sum up.

Tradable rights between user-groups

Rights to marine and coastal resources

Marine and coastal resources are of many types. Some are tied to a limited geographical area, like a site for aquaculture production or some other production, a place for harvesting seaweed or a hotel with a scenic view, as well as transportation pathways. Other resources are not so locally bound, e.g. migratory fish stocks.

Figure 1: Resources/activities in a coastal area, with arrows showing possible external effects of activities/resource use.

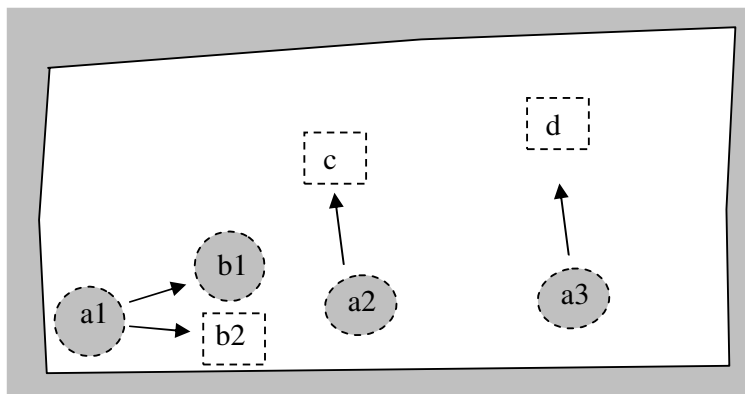


Figure 1 illustrates a typical situation of activities and resource use in the coastal zone. Activity/resource use a1-a3 each affects other activities b1, b2, c and d, or just the benefits/welfare of resources in these locations. The activities may either all be commercial and industrial, or some may be recreational or related to public goods. Likewise, the resources in the different locations may be necessary for industrial or recreational activities, or they may be of primarily public interest. The resources in d could for example be a population or habitat valuable for biodiversity conservation. What is not well illustrated in the figure is the spatial-temporal variation of some resources. A fish-stock may be evenly spread over the whole area all the time. It is more common that spawning occurs in some part(s) of the area, while other parts are for nursing and harvesting.

Some rights to coastal or marine resources are for ecosystem services like purification of emissions. Ownership of real estate with shoreline often gives right to do specific activities adjacent to the property, or in a larger area in the vicinity. Local fishing rights are but one example. Rights with direct access to marine fisheries resources include individual or vessel catch quotas (IQ, IVQ), community quotas (CQ), and territorial user rights in fisheries (TURFs) (OECD 2006). IQs, IVQs and CQs typically give the right to catch a certain fraction of the total allowable catch (TAC) in a given time period, not ownership to the stock of fish as such (Hannesson 2005). Rights giving indirect access to resources include limited entry licences (LL), and individual fishing effort quotas (IE). In addition there are rights to other marine resources in areas (TURFs and marine tenure), as well as licences to do aquaculture, mining, oil exploration, diving operations and more in specific localities or larger areas (e.g. Davis and Gartside 2001).

What are tradable rights?

Many environmental and resource depletion problems can be seen as problems of incomplete, inconsistent or unenforced property rights to natural resources (Hanna et al. 1995; Wilen 2006). Transferability is one important dimension of property rights (Scott 1989), even though not all rights are transferable or tradable.⁵

Tradable marine resource rights

Several of the types of rights above are tradable, by trade of the commodity to which the right adheres, be it seaside estates, vessels with fishing licences or quotas, or companies with aquaculture licenses. Several countries have also made specific licenses or rights tradable. For coastal and marine resources particularly quotas in fisheries is relevant (National Research Council 1999; Huppert 2005; Grafton et al. 2006; OECD 2006). It is also used in several other branches of environmental and natural resource management, including for emission to air or water, and for land use (OECD 1999; Tietenberg 2002), as well as for freshwater (Thobanl 1997).

For many types of trades this will imply a transfer of use rights between different user groups, while some trades are restricted to be within the same user group, and often need approval by authorities.⁶ Sometimes site-specific licences are tradable, even when a new type of activity will take place there; in Canada, licences to traditional herring weir sites have been sold for conversion to aquaculture sites (Marshall 2001).

⁵ Other dimensions of rights are, according to Scott (1989), the quality of the right (how secure it is), exclusivity, duration, divisibility and flexibility.

⁶ E.g. formally the Norwegian Ministry of Fisheries and Coastal Affairs must approve transfers of fishing vessel licences and aquaculture site licences, but in practise they have not rejected such transfers.

An important example of rights tradable within the same user group is individual tradable quotas in fisheries (ITQs).⁷ In particular economists advocate introducing and widening their use (Grafton et al. 2006; Wilen 2006).

The most important arguments for tradability are the elimination of the race to fish, leading to a product that is caught and treated to give higher market prices, and harvested at low cost, as well as giving a long term interest in the value of the stock, reducing destructive fishing practices and facilitating investments in rebuilding the stock. With tradability of rights the decision of entry and exit are decentralized to the fishers themselves, through buying and selling of fishing rights. Fishers usually know their individual cost and benefits of fishing better than the authorities, and as fishers respond to changes in technology, resources or markets, adjusting their quotas as well as harvest patterns and technology, leading also to dynamic maximisation of net benefits.⁸ Similar mechanisms work also for other resources, e.g. locations or, non-renewables like minerals. ITQs have been implemented successfully also for multi-species fisheries, both in relation to profits and sustainability (Sanchirico et al. 2006). Some think owning a share of a resource (or of the stream of benefits from it) gives a sense of stewardship towards the resource, but this is a debated issue. In Atlantic Canada, fishermen meant that the introduction of ITQs lead to higher compliance with regulations, at least in part due to fishers seeing the link between overexploitation and destructive fishing practices with their own quota value (Apostle et al. 2002;Ch 8).

⁷ One could claim with some sense that fishers with vessels of different size using different types of gear are different user groups, but I choose to reserve this term for more radically different user groups.

⁸ Thorough examination of both advantages and pitfalls of using tradable rights in fisheries is found many places (Copes (1986), National Research Council (1999); Steelman & Wallace (2001)).

Why tradable rights – and what is difficult?

Major concerns with tradable rights schemes in general include the functioning of rights-markets (avoiding market power), the distributional effects of such schemes (including how the initial allocation of rights is done), monitoring, compliance and enforcement, as well as spatial and temporal issues (e.g. avoiding hot-spots of pollution or over-fishing) (OECD 1999; Tietenberg 1999; Tietenberg 2002).⁹ The theoretical work underlying this, as well as the lessons drawn from practical use of tradable rights, generally assumes that the resource is used in exactly the same manner by any possible user who may buy the right to use it. This goes for rights to emit pollution to air or water, and for the right to catch fish.

Distributional effects are also important. The financial burden of having to buy use rights, rather than getting them for free, is clearly illustrated in fisheries by Flaaten *et al.*(1995). They show how “second generation” rights owners have significant lower profitability than the first generation, which were grandfathered the rights. In addition, if those who lose their rights have difficulties finding alternative sources of income, they will clearly lose out.

Imagine TRS for “same resource”

I ask in this paper, how could and should the design of a system of tradable rights *between different user groups* be, in order to maximise welfare? Fishing vessels of different length, or using different gear, are sometimes coined to be different user groups. This is not what I mean by different user groups here. Rather I distinguish between commercial and recreational fishers, between tourism enterprises and marine farmers, between transport and oil sectors, etc. Then I am assuming that either the same resource right, like a fish quota, is used in

⁹ See Copes (1986), Helgason and Palsson (1998) and Steelman and Wallace (2001) for critical reviews related to the use of individually tradable rights in fisheries.

different manners by different user groups, or the resource used associated with a right may differ between groups, like how an area is used, or which resources in an area are used.

The tradable rights scheme easiest to envisage is for a single resource used by different groups in basically the same manner. If the markets for rights work well, the allocation could be efficient, but not necessarily so. Consider as an example a specific and relatively narrowly defined tradable right, like Individual Transferable Quotas (ITQs) for fish.

Even if all the groups are fishing vessels, but with different characteristics (e.g. different harvest cost functions), it is well known from bioeconomic models of fisheries, that the optimal steady state stock size is likely different for the groups (Munro 1991). Because of this, and since they probably have different catch composition, they are likely to have different management objectives. Benefit- and cost-functions in fishing should be included when setting total allowable catch (TAC) and its age/size/sex-composition.

If different groups of commercial fishers can target harvest differently and thus have different objectives for stock management, changing harvest rights between commercial fishers and other groups, like marine fishing tourists, is also likely to affect management objectives and catch composition. Although motivation among fishing tourists vary considerably (Borch 2004), many want larger fish than the size that maximises economic profit given only biomass consideration.

This means that even this “simplest” type of tradability of rights between user groups implies challenges, and requires some sort of regulatory oversight. The more similar the use of the

natural resource is, the less is the need for oversight, and more straightforward is tradability without restrictions.

Marine living resources, like fish, are in most cases managed with other objectives than economic yield as critical. Typical is maximum sustainable yield, and with over fishing very common, minimum stock biomass is also a very common objective, at least in the shorter term. With such criteria for management, the different uses of different user groups would not matter much. Ecosystem and genetic effects of fishing by different groups may give very different long term effects, though.

Dealing with spatial concerns in this setting

Several spatial issues may arise due to trade of rights. Let us stick to the example of fisheries. If a fishing right is sold from one fisher to another, for a particular amount of a particular species, this could change the spatial pattern of fishing effort.¹⁰ Often several fish stocks are under a joint TAC (Total Allowable Catch). This might create “hot spots” of over-fishing for some stocks, particularly those that have very limited geographical spread (Sanchirico and Wilen 2005). Technical advances have improved the possibilities and lowered the costs of monitoring fish stocks, as well as conditions in their habitat, on a relatively fine spatial scale (Wilen 2003). Fishermen are starting to utilise this technology and hence increase their catching efficiency. This will for many fisheries put pressure on managers to also manage stocks on a finer spatial scale. A quota system encompassing a large region with several stocks may have to be divided into several quota systems to protect individual stocks.

¹⁰ Temporal harvest pattern may also change, as well as composition and amount of bycatch, or other external effects. We will return to externalities later.

If one tries to account for spatial heterogeneity, it might seem limiting on the usefulness of TR. The sale of a right from one user to another may change either type or location of use, creating new external effects. The information requirement for optimal management increases with these complicating factors, both under direct regulation and with tradable rights. A radical way of dealing with such complications is to ignore them (Tietenberg 1995).¹¹ It is often the implemented solution, due to high costs of gathering information and regulating on a fine scale. An example of such, dealing with spatial heterogeneity in fisheries, is having a joint quota when fishing on multiple stocks of a species that gather seasonally. Losses associated with ignoring the spatial aspects are due to over-control, making all actors adhere to the same (strict) regulations, or by under-control in some areas, creating some kind of hot spots (Tietenberg 2002). The latter means that some local stocks may go extinct.

Different “second-best” schemes associated with tradable rights do try to account for this. They attempt to deal with the spatial issues through relatively simple administrative rules, limiting or controlling the variation in the external effects that may arise due to sales of rights. Although clearly not fully efficient, tradable rights can give efficiency improvements compared to direct regulation (Tietenberg 1995).

Regulatory tiering implies that trades as such are not restricted, but use of a right must also meet local regulations to safeguard other interest (Tietenberg 1995). This has been used for pollution permits. Anyone may then buy an emission right, but to emit from a specific location, one must get permission also by local authorities. This ensures that the total local load is not too large, avoiding hotspots. Regulatory tiering could also be used for a fish species

¹¹ Most of the theoretical literature and practical examples of dealing with this is for tradable permits for air emissions.

where several local stocks were under the same quota. Then anyone could buy a quota to catch some of that particular species, but where to fish it would have to be decided in concert with the authorities, to avoid creating local hotspots of overfishing. One can also imagine that how to use a quota, say catching small or large fish, may have to be decided in cooperation with authorities, depending on how the quota is defined, by numbers or biomass or specific sizes. Similar regulation is possible also for other extractive activities (sea-weed etc).

With *zonal permit systems*, trade of rights are either only allowed within a zone, or limited between zones. This is a compromise between the excessive simplification of ignoring location, and considering impacts individually. There are losses due to the difference in demands between actors in different zones, and due to the equal demand being placed on all actors within a zone. The size of the loss will depend on zone size. Smaller zones give less trading opportunities meaning that marginal benefits may differ, while larger zones increase the chances for local hot-spots (Tietenberg 2002). Another alternative is to rule out some classes of trades.

Concluding comments

As we see, there are ways of dealing with spatial concerns arising from tradability of rights between user groups, but they must be applied to specific contexts.

Economic incentives can work both for and against management objectives. Some management systems consciously and explicitly leave out tradability of rights, trying to safeguard other interests, and to avoid market power determining resource use. Sometimes tradability of rights nevertheless evolves through rights-holders' practices. When limited licenses or quotas cannot be lawfully traded, the entities with associated rights (like for example vessels or companies) are traded at prices that clearly indicate a high value on the

right itself. This has been the case in fisheries in Norway (Hersoug et al. 2000). The same is seen with Norwegian aquaculture licenses and localities; companies are traded, rather than pure licenses.

If tradability is the present de-facto situation, it might be better to consciously set up a system of tradable rights to get maximum efficiency out of the practice. Then the scheme can be designed to avoid as many as possible of the pitfalls discussed here. Limitations on transferability, ownership and use of the right can be set to achieve or approach sustainability and economic efficiency, as well as avoiding negative external and distributional effects. If prices of rights are made public they also provide an additional benefit in giving information relevant for investment decisions (Tietenberg 1999).

If use of resources change more profoundly after trade than we have described so far, externalities may arise on different geographical levels. We will now consider a tradable rights system that takes this into account.

Area-based tradable rights

Externalities, resource mgt and zoning

External effects can be between resource-users within the same group, like a catch externality in fisheries, between different groups of users located in the same area, like fish-farmers and tourism enterprises, or between users of an explicitly regulated resource and someone who does not use that resource at all, or is outside of the regulated area, like nature conservationists or victims of long transported pollutants.

To deal with the spatial and temporal aspects and externalities of marine and coastal resources, they are typically managed through interplay between traditional natural resource management and spatial planning. The former focuses on the pressure on a resource, like the total catch on a fish stock or the level of pollution, while the latter focuses on managing conflicts between different classes of activities. The most common instruments for traditional resource management are licenses, quotas, legislation and direct regulation. Spatial and temporal regulations have been part of these. The main instrument in area planning is zoning, putting restrictions on classes of activities. Marine spatial planning, ocean zoning and marine protected areas are key terms of increasing “popularity” in policy contexts (Norse 2006; Douvère and Ehler 2007).

The biggest differences between management systems are often how management decisions are made, and who gets to take part in decision making. Decisions can be made by single individuals (bureaucrats, politicians or tribal chiefs), by committees, by users, stakeholders and authorities together in co-management (Jentoft 1989), or in centralized negotiations (Mikalsen and Jentoft 2003; Christensen et al. 2007), or by users and stakeholders alone (self-management). Combinations of all these at different geographical levels are possible, e.g. from state management at the highest level to co-management or self-management at the lowest level. Where several individuals together make decisions, these can be made by unanimity, or by some sort of majority vote. Of the attempts of holistic management, considering all possible uses and interactions at the same time, integrated coastal zone management (ICZM) is perhaps the most widespread and successful so far.

Assume the tradable resource we consider is “aquaculture locations”. They could be for the farming of a particular species, or for any species. Due to increased scarcity of localities

suited for marine farming, co-production of different species in the same area is being investigated in many countries (Holdt et al.; Parsons et al. 2002; Troell et al. 2003; Robinson et al. 2006; Sanderson et al. 2006). Tradability of aquaculture licenses could make an optimal use of the total area available very difficult. The authorities could try to regulate at which locations co-production of different species should be allowed, including which species that actually would be. Alternatively they could sell or otherwise allocate the right to perform aquaculture in a geographical area large enough for several production units. Then it could be up to the initial buyer/receiver of that area to lease or sell the right to produce other species within the area. It would be in the interest of the owner of the initial right to accommodate other users, but the revenues from leasing would have to be considered against the possible adverse effects on the owner's own activities. External effects from different types of aquaculture production within the area would be internalised through the process between the owner of the initial right and leaser/buyer of subsequent aquaculture production licence. However, on the border of the area the problem would persist.

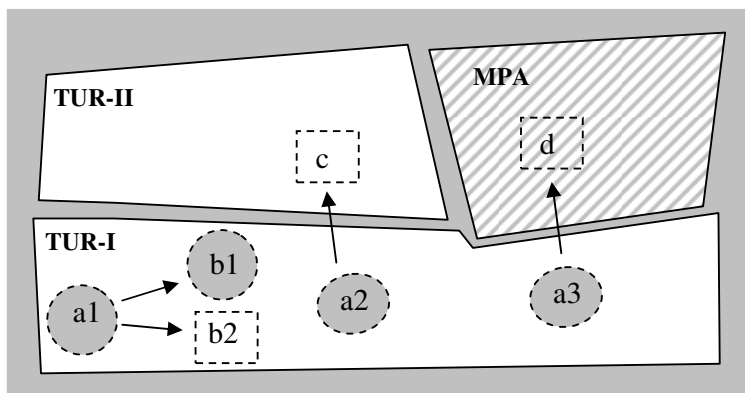
Another contentious issue is who should be given the initial primary right to an area. It will affect welfare distribution and may affect power in the market for rights (Tietenberg 2002). If no-one has or gets power in the market for "aquaculture licences" the initial allocation of licenses does not affect the (theoretical) efficiency properties of tradable rights (Montgomery 1972). Hence the initial allocation of licenses can be used for distributional purposes, without sacrificing efficiency (Tietenberg 2002). An alternative than can give revenue to the authorities is allocation by auctioning. This is the preferred mechanism in the theoretical literature (Koutstaal 1999), but has so far only has limited use for natural resources.

Area-based TR, including divisibility, externalities...

An even more complex type of area-based tradable right can also be considered. An area of the coast may contain fish and other marine species for harvesting, minerals, as well as other natural assets like a scenic view or a coral reef attractive for divers. Marine territorial user rights exist in many parts of the world, including many parts of Oceania (Aswani 2005), Japan (Murai 1992; Makino and Matsuda 2005), Chile (Gonz et al. 2006). Then families, clans, villages, cooperatives or communities have the right to use either all or most types of natural resources within a specified area. Some of these territorial user rights shares many characteristics with modern rights-based fisheries regimes (Aswani 2005), but they are typically owned by groups, and the rights are not transferable to others.

Figure 2 illustrates a system of territorial user rights (TURs – not limited to fisheries as is common with TURFs). In the figure there are two territorial user right areas (TUR-I and -II), and a marine protected area (MPA), with activities a1-a3 in TUR-I affecting either only activities within TUR-I (b1-b2) or affecting activities in other areas also (c,d). The activities and externalities are the same as in figure 1.

Figure 2: A system of area-based resource rights, with resources/activities and external effects.



For temporal efficiency, reallocations must be possible, either changed resource use or resourceuser. Where a sole owner or a community has the right over all resources in an area, this should be possible and in principle simply done. Any external effects of changed use patterns of resources in an area should then automatically be internalised, with the best available knowledge over local conditions. In figure 2 this means for instance that the external effect from activity a1 on b1 and b2 would be internalised, given that TUR-I had only a sole owner.

For optimal use of resources, it must also be allowed to divide up rights, where this is natural. If the necessary know-how on new types of resource use is not available to the local rights holders, to give access to someone from the outside against compensation (leasing) (Mikkelsen forthcoming) can give both efficient resource use and added income for the rights holders. If someone considers leasing or selling out a part of their right, they will to the best of their ability consider possible externalities from the new activities coming there.

Conversely, someone considering renting will consider external effects of the original use on their planned use of the area and/or resource. However, uses may change over time, and with it external effects. Contractual clauses of either prohibited uses for rights, or of mutual consent before changing uses, could ensure that users avoid unpleasant surprises. To ensure that both local control remains, and provide the leasers with a necessary time-horizon for appropriate investments, a system of time-limited but renewable access rights could be used (Townsend and Young 2005).

Where one user group is given the right to resources, but tradability between user groups is not opened up for, this may bar otherwise sensible reallocations. An example from New

Zealand can illustrate this. Fishermen in New Zealand want to have both ITQs *and* right to the necessary ocean space to catch their quotas (Grey and Sullivan 2001; Bess and Rallapudi 2007). If granted, they then could bar any kind of resource use that hindered their fishing. Gibbs and Woods (2003) describe the reform on how to get an area for marine farming in New Zealand.¹² Regional planning authorities consider possible conflicts between aquaculture and all other activities or interests, apart from commercial fishing; If the conflict-level is acceptably low the marine farming applicant can then negotiate with the commercial fishers over the right to farm in “their” area. Whether fishermen expect to be compensated for letting aquaculture access to their areas is not clear to me. According to newspaper reports designated Aquaculture Management Areas (AMAs) have, since the reform entered into force in January 2005, only been created in areas where marine farming were under way before the reform.¹³

Dealing with external effects outside of the tradable area

In addition to considering possible externalities on users within the area where rights are nested, externalities on stakeholders outside of that area, as well as safeguarding of ecological and social objectives, must be considered. These are the effects of activity a2 on c and a3 on d in figure 2.

Various external effects can impact on resource users or stakeholders not part of a tradable right’s primary sphere of concern. Bycatch is a large problem in many multi-species fisheries, and one example of such an externality (Squires et al. 1998). Another is fishing on migratory

¹² Implemented from 1/1-2005.

¹³ Marlborough Express, 17/6-2007 (www.stuff.co.nz/stuff/4093750a6008.html); Scoop, 14/6-2007 (www.scoop.co.nz/stories/PA0706/S00277.htm)

stocks. If some phase of the growth, development or harvest of a migratory fish stock takes place within the area, this will cause the use of the area to be limited if the fish is valuable. Pollution is a classic externality example.

If it is easy to verify causal links between activities and damages, the externalities can be internalized by introducing liability for damages. In one sense this gives tradability of rights, in a similar way Coase (1960) described it. If the liable person starts an activity that gives larger benefits than the damages it creates on another person, the first one can just pay damages and continue his activity. Then he is in effect paying for a use right, even though it is damaging. For efficiency it does not matter who is given the right to undisturbed activities Coase (1960). For cases where it will be difficult to assess who causes what damages, the valuation of them, many persons are affected a little bit each by an activity, or the damages are very uncertain in type or magnitude, liability will not function well as a mitigating mechanism.

Regulatory tiering or zoning as described earlier may work. When the right to use resources in an area is traded, and this is under a regulatory tiering scheme, it resembles the management system we have in Norway today for terrestrial areas. Properties may be traded, but one can not do what one wants on one's own property. Some types of activities requires additional permits, and some types of activities may be prohibited in an area altogether. The former is like regulatory tiering, and the latter is zoning. Buying an area with the intent to use it in a manner which also requires additional permits may be risky. While applying for a permit the capital is tied up, and there is a chance one will not get the permit. The administrative dealing with permit applications should ideally be swift, but this is not always possible. Switching the burden of proof, making every activity legal unless the authorities prove that it will harm

other interests significantly, will make the rights-market work smoother, but increases the risks of negative externalities. Zoning is already in extensive use for both land and sea areas. When several classes of activities are allowed in a zone, or in overlapping zones, a system of trade of sea area rights could work well both in terms of having an effective market, and in safeguarding other interests and avoiding unexpected externalities.

Whether there will be external effects, and their magnitude, depend both on the way a right is used and what kind of other activities are taking place in the “vicinity”.¹⁴ Tradability of rights will then constitute a dynamic system of externalities. The dynamics can be caused by trade of rights changing their use and hence the external effects of use. It can also be caused by activities in the vicinity changing. Tradability of rights can thus both be a source of externalities and a tool to internalise them.

Changes in the use of an area frequently occur, e.g. due to technological progress. If area rights are tradable, and also divisible, it opens up for buying rights to use resources also in neighbouring areas, and thus a potential way of internalising externalities, albeit without the polluter paying.

For an efficient market in the right to perform different types of activities, one should also make it possible to buy a right and *not* use it. This goes both for traditional users of resources, and for other types of stakeholders. Environmental groups in the US have bought emission-quotas and left them unused to lower sulphur-emissions (Colby 2000). A coastal example could be a tourism enterprise which fears that the establishment of a marine farm will make

¹⁴ “Vicinity” would be defined as anywhere possibly affected by resource use, and could thus be geographically far away.

their own site less attractive as a tourist resort. The tourism enterprise wants to buy the aquaculture license/company and close it down. In Norway today, the authorities would reject their purchase, unless they entered the aquaculture-industry. If they moved the farm, another company could be allowed to use the aquaculture-site near them after the original farm had been removed.

Dealing with many “small” stakeholders

A challenge with a TUR-system would be to assure that a single stakeholder, with medium willingness to pay, are not allowed to outbid a large number of stakeholders with a larger collective, but individually lower willingness to pay. It may then be necessary to organise the “small” stakeholders to keep transaction costs down and get a well-functioning market.

Perhaps a new role for the state can be to organize clubs to represent in a rights-market a large number of stakeholders with an individually low willingness to pay, in a similar way to Grafton’s (2000) suggestion of the state as a facilitator for resource user’s participation in management. Of course, private organisation of clubs is also possible. It is however unlikely that all clubs that from efficiency considerations should have been formed have been formed. The state should, both for efficiency and fairness, ensure that the interests of large groups of “small” individual stakeholders are voiced, and that it is not dependent on more or less incidental actions by those stakeholders. Sutinen’s (1997) proposal of a “club” to represent New Zealand’s recreational fishers in the quota management system (where quotas are initially allocated freely to recreational fishermen) is an example of such an arrangement. We then, however, have the problem of stakeholders having to be accepted as users by the authorities, just like in traditional management regimes.

Community rights

Community owned area-based rights, TURs, combined with a paid lease and possible sub-lease system, could thus fulfil objectives related to efficient resource use and equitable distribution of benefits from that use to quite some degree.

Allowing long term leases of resource or area access from community to individuals, with possible renewal well ahead of the time they expire (Townsend and Young 2005), mean that investments can still be made to use the resource effectively, but also recognize that conditions of use must reflect changes in the world. Opening up for sub-letting of area use-rights and parts thereof could give some of the benefits of a tradable rights system described earlier in the paper. Specifically, it would open up for reallocations if the new use gives higher private benefits than the current one. If rights are auctioned out, or otherwise paid for, local communities would get some income from the resources in the territory. That local communities sometimes do not get much in return for use of resources within their territory is well known. An example is aquaculture location licenses in Norway. These are handed out to individual firms by the state's regional fisheries authority, but communities do not receive any direct compensation. When firms were local, providing local tax revenue, as well as jobs to local people, the community received indirect compensation. As the aquaculture industry has consolidated to a very large degree in Norway, firms are rarely local. Much of the work is mechanised, so not much labour is needed. In addition, many of the workers are commuters, living far from the farm and paying taxes to other communities.

Jentoft (2005b) argues that community property rights can also improve the functioning of local (community-level) co-management institutions, as the further distribution of rights to individual community members becomes a powerful tool to instigate behaviour in accordance

with rules set by the co-management institution. First, the incentive for individuals in the community to participate in co-management is strengthened if their individual resource access is determined in that very co-management process. Second, breach of rules set under co-management could more easily imply losing resource access. This line of argument is of course not limited to fish resources owned by a community.

Concluding comments

As demonstrated there can be ways to internalise local external effects through tradable area rights. Externalities outside of the area can be dealt with through other mechanisms, like regulatory tiering and zoning. For complex and highly uncertain situations this may be difficult to use. Tietenberg (2002) thinks that for such contexts co-management is likely the best solution. There are however problems also with co-management, as we shall explore in the next section.

In political and bureaucratic management systems, like central planning, co-management, or those led by sectoral authorities at different geographical levels, new user groups must usually be “allowed in” to the management system and to the resources controlled through it, by those in power. If anyone can buy area-rights, resources are not barred from being used where they give the largest private benefits. If the system of considering and dealing with external effects works well, such a free entry of user groups may also give the biggest overall benefits.

In times prior to reforms, when individual privileges are expected to be handed out for free based on “historical rights”, overexploitation of resources occurred, as users grow in numbers and in individual exploitation levels, in order to secure such historic rights. Thus, the process of implementing individual tradable rights can worsen the overexploitation they are set to deal with, for example in fisheries (Macinko and Bromley 2002). Making clear early that rights to

public resources will be auctioned out will avoid such behaviour, and can also give income to those that are often acknowledged as the owners of marine resources, namely the people of a country (Macinko and Bromley 2002).

Beddington *et al.* (2007; 1715) in their review of fisheries management conclude that “the most successful approaches are likely to combine rights-based systems [...] with [...] pre-agreed harvest strategies and decision rules that are triggered and adhered to as reference points are passed”. They also write that unless such a pre-agreed and binding harvest strategy is in place, most management authorities will delay taking actions to recover dwindling stocks. Partly this may arise from uncertainty in the science of stock assessments, “but mostly it arises from an unwillingness to take decisions that will create hardship for fishers” (p.1715). Other authors also find that delay to take actions when stocks are falling is due to the political nature of fisheries management, and since reduced quotas involve short term economic loss, they are unpopular (Rosenberg 2003; Wilen 2006; Shertzer and Prager 2007). As a management system hesitates to make unpopular decisions, stocks continue to decline, making the necessary cutbacks in quotas even larger, spurring resistance even further, “in a destructive positive-feedback cycle” (Shertzer and Prager 2007;156). A possible interpretation of this practice of hesitation and resistance to necessary actions is that the wrong people are in management, or some resource users have too much influence, too much power, over them. Power is a crucial element in the way management systems (dis-)function, but who has power, and to what extent, is not independent of the design of the management system.

Whether rights should be valid indefinitely or timelimited is a much debated issue. Longer durability and larger security of a right increases the willingness to make investments in the resource itself, as well as in capital and knowledge to use it efficiently, but there are also

arguments for limiting durability and security. If, or when, major reforms in the management system again are necessary in the future, dismantling a system of very strong rights of long durability may be very difficult (Symes 1999).

Power and institutional efficiency

What is power?

Power is a very important concept in social science. Bertrand Russell (1938) famously meant that power is as fundamental in social science as energy is in physics. Consequently, there is a “massive body of literature” in the social sciences on power, but not very much is explicitly with regard to fisheries and coastal management (Davis and Bailey 1996; Christie 2005; Jentoft 2007).¹⁵

Here I ask how the introduction of tradable rights can affect power relations relevant for the allocation and use of coastal resources, and also institutional efficiency, through affecting lobbying and rent-seeking.

Power is about having abilities, about being able to cause an effect of some sort.¹⁶ With this single starting point two opposing views on power have dominated social science. Weber (1920) and Dahl (1957) focus on power in relation to conflicts of interest, and how some have “power over” someone else, being able to make them do things they otherwise would not do. Parsons (1951) focuses more on the enabling aspects of power. Power can be used to direct

¹⁵ Jentoft (2007) presents a survey of power issues in fisheries and coastal management, and how general social science literature on power is relevant for fisheries and coastal management.

¹⁶ Merriam-Webster online dictionary; www.m-w.com/dictionary/power

the energy and abilities of individuals and organisations in ways that make them fulfil socially desired objectives. Power can clearly be used both for good and bad depending on context.

Being highly contextual, power can have many different bases, or origins. Galbraith (1984) distinguishes between power achieved with force, material resources or persuasion, while Toffler (1990) writes on how violence, wealth and knowledge successively have been the dominating power base through history. French & Raven (1959) divide the bases of power into five categories: (1) legitimate power (due to formal position in an organisation); (2) referent power (due to persuasive abilities); (3) expert power (due to skill and expertise that others need); (4) reward power (due to ability to decide who gets rewards); (5) coercive power (due to actual or potential use of physical force). More finely divided lists of bases of power may include also delegated authority, social class, personal or group charisma, ascribed power, knowledge, money, moral persuasion (e.g. religious), operation of group dynamics, and traditions.¹⁷

While coercion tend to increase the resistance of the follower to the powerful, reward power tends to result in increased attraction between the two and low resistance. The more legitimate the coercion feels, the less it will produce resistance to the powerful's command.

Studies of power should also consider the means or instruments with which the base is used to exercise power, the scope of power, and the amount or extent of power (Dahl 1957). To get power, actors must threat or promise to use the power base, and sometimes actually use it. The scope refers to what kind of actions, in what kind of realm, the powerful are able to make others do. To represent the extent to which someone has power, Dahl conceptually suggests

¹⁷ From [http://en.wikipedia.org/wiki/Power_\(sociology\)](http://en.wikipedia.org/wiki/Power_(sociology)), 29 June 2007

using probability statements, noting that this can only be done in conjunction with particular means and scope: Chances are 9 out of 10 that if A threatens to do x unless B does y, B will do y.

Descriptions of power often focus on someone's ability to make decisions in a conflict situation. Lukes (2005) emphasises also the power to manipulate (political) agendas, avoiding that issues arise and become subject to formal decision making. On an even "higher" level, power can come from an ability to manipulate the way people think, so that opposition does not arise at all, Lukes also points out.

In a rational choice framework actors have a choice set of possible actions to take, to try to achieve desired outcomes. The actors' incentive structures depend on (their belief of) costs of actions and the likelihood that different actions lead to desired outcomes. In such a setting Dowding (1996) defines *outcome power* as an actor's ability to (help) bring about outcomes, and *social power* as his ability to change other actors' incentive structures.

Clearly, choice of or change in management institutions may affect power relations. This is "through the positions that they define, the mandates they give, and the resources they allocate..." (Jentoft 2007). Jentoft adds that "Power would, from this perspective, be a property of institutions rather than of individuals". Different institutions open up for establishing or using power that stems from different bases, or at least they shift the relative ease with which these bases can be employed to gain power.

According to Dahl (1957), comparisons of power can be done by looking at five factors. These are the bases of power, the means, the scope, the number of comparable respondents,

and the amounts of power. Dahl (1957) thinks it makes little sense to make statements about relative power in general. There must be “power comparability” in the study, but what this means will vary from study to study. We will restrict ourselves to discuss power over resource allocation and rules of use.

Power is process, something that is exercised and played out among interested stakeholders at various scales (Jentoft 2007), and power relations will change with technological, organisational and cultural development. For those in power, it is important to try to affect development so that they do not lose their power, either by ensuring that their power base is relevant, or by expanding and developing new power bases. Insofar as management reforms imply reducing someone’s power, or streams of benefits of someone with power, the reforms will be opposed.

Power in fisheries and coastal management

As we have seen there is a multitude of settings and different institutions for the use and management of marine and coastal resources. This also means there is large variability in bases for power, as well as power relations and power structures.

Individuals can have considerable power through their formal position in a management system. The power of their formal position is strengthened by any reward powers in it. The more users are dependent on allocation of rights and rules for use, the higher is the power of the manager(s).

If a committee is responsible for managing resource use and allocation, rather than single individuals, the power of individual committee members over resource users is less, the higher the number of members in the committee. Of course, committee members are not all

equal. Committees usually have a leader, with more formal power than the rest. The power of ordinary committee members may also vary, even if decisions are made through majority vote. This can be due to their importance in other decision making arenas, as well as their persuasive powers.

In most management systems there are both legitimate and illegitimate powers present (Jentoft 2007). Management regimes for marine resources are sometimes plagued with power abuse and skewed representation of stakeholders, even in fairly well-developed democracies like the US (Turner and Weninger 2005), Japan (Makino and Matsuda 2005), Canada (Parsons 1993) and Norway (Bennett 2000; Mikalsen and Jentoft 2001; Mikalsen and Jentoft 2003). In Canada, for example, long-term conservation of fish stocks have been sacrificed for short term economic gains in some cases (Parsons 1993). Wilen (2006) notes how decisions in command-and-control fisheries management systems often are politically charged in a negative way; other objectives than those important for sustainable resource management and efficient resource use are given priority.

Co-management arrangements in fisheries are generally thought to increase legitimacy and equitable sharing of resources (Jentoft 2005a), but they too can be prone to power abuse, leading to rent-seeking and inefficiency (Grafton et al. 2006). This can hinder reforms that increase net benefits to society, as the resource winners, which usually also are the ones in power (Jentoft 2007), are unwilling to alter management if they will lose on it.

Economists and power

Economists are among the strongest proponents of tradable rights schemes, focusing on the positive properties of such systems once they are in place. The functioning depends on the

implementation, which in turn depends on power structures present before a management system is reformed. Have economists been concerned with power in their discipline?

Mainstream neo-classical economics have not dealt with social power to any degree (Bartlett 1989; Schutz 2005). Power is usually related to market power, bargaining power in bargaining games, or purchasing power (Bowles and Gintis forthcoming 2008). I argue that economic analyses can be useful to understand power in coastal management and in tradable rights schemes, but also that economists should be more aware of the issue of power when they recommend management reforms. The economic approach to studying power clearly supplements the approach by other social science subjects, and vice versa.

An actor with large market power is able to affect the price on a product or service to a large degree. This is achieved by controlling the amounts of that product, and related products, which are offered in the market, and also through effective marketing. There is an extensive literature, and practice, on reducing the market power of individual actors, to make markets work more efficient. Most developed countries have competition laws and competition authorities to ensure that actors' market power is not too large.

To have large bargaining power is to have “the ability to get a large share of the possible joint benefits to be derived from any agreement”.¹⁸ Bargaining power depends on the relative size

¹⁸ A Dictionary of Economics. John Black. Oxford University Press, 2002. Oxford Reference Online. Oxford University Press. Tromsø University. 29 June

2007 <<http://www.oxfordreference.com/views/ENTRY.html?subview=Main&entry=t19.e185>>

of players' loss if they do not reach agreement in a negotiation, how long a party can afford to carry on negotiating, but also the reputation for toughness (Muthoo 1999).¹⁹

Economics studies of collective decision making, political behaviour, the role of institutions, and how special interest groups' try to affect policies all fall within the realm of *political economy*. It is a major field of economics. Power is obviously an important issue, but it is operationalised to a limited degree, at least in neo-classical economics (Bartlett 1989).

Grossman and Helpman (2002) e.g., in their book "Special Interest Politics", aim to answer "From what features of the political landscape do special interest groups derive their power and influence?" (p. 4). Yet, power itself is not even a keyword in the index of the book. The focus is on how actors spend resources (money, effort) to "buy" influence somehow. This can be by giving campaign contributions to politicians, assuming they get influence on policies directly or indirectly that way. It can be by lobbying, viewed as spending resources to find information or create new knowledge, revealing only what furthers their interest. It is usually assumed that more resources spent increases the probability of getting own interests furthered.

Links between political influence achieved in the ways studied in political economy and market or bargaining power may well exist. For example if a firm's market power is secured by contributions or lobbying for a policy that bars new firms from entering markets. Likewise, a firm's outside option, its situation if agreement is not reached in bargaining, may depend on public policies it in turn has lobbied to affect.

¹⁹ Purchasing power is simply how much real goods or services money can buy. This concept of power is not relevant for our discussion here.

On the other hand, firms sometimes spend a lot of effort to try to change public policies, but to no avail. Other factors matter for the power of individuals. This is then from other bases than those giving reward power. Other social science subjects may be more useful than economics in understanding and assessing these.

Economists commonly subscribe to the rational choice perspective, where humans choose among alternative actions, given some constraints on the set of actions. To use power is then to limit or expand the set of alternative actions, as well as affecting the cost or benefits associated with actions (Schutz 1995). On the other hand, those with power can sometimes alter individuals' values and preferences (Lukes 2005), while in standard economic studies preferences are assumed stable (Schutz 1995). This demonstrates how the economic and other social science approaches to power studies complement each other.

Effect of tradable rights regimes on power?

If a tradable rights regime is introduced where none was in place before, we should expect power relations to change for at least two reasons. One is that those that previously determined allocations will have their powers reduced, through reduction of their formal and reward powers. The other is that tradability of rights may alter power relations between rights holders, and between rights holders and those that have no rights.

If rights are allocated by a bureaucrat, local chief, mayor or religious head, or similarly at some individuals' discretion, these obviously have power legitimised through their official position, as well as "reward power" (in French and Raven's terminology). Creating a market for rights, they will lose the power related to the allocation procedure.

The introduction of a tradable rights regime can thus affect power structures by affecting the bases of power.

Initial allocation

If the old holders of power are allowed to determine the initial allocation of tradable rights, their power will increase. Tradable rights can be time-limited or they can be indefinite. The power of the allocator will be larger the longer the rights are valid for, as this affects the value of the right. The higher the value, the higher the reward power of the allocator. In addition to having large power during the initial allocation process, it is also possible that the allocation is used strategically to broaden and strengthen their power base, or the one of their allies. That way power in the initial phase can become a source for continued power.

Auctioning out rights can be a way to avoid that the initial allocation is used to cement old power structures. Grandfathering, meaning that those with a history of resource use are given rights for free when a tradable rights system is introduced, is a very common principle for initial allocation. To the extent that resource access gives social power, it becomes cemented, but it will obviously also be challenged by financial powers. In a study of the introduction of ITQs in Atlantic Canada, those who had significant quota became “gatekeepers” to the fisheries, and others became dependent job seekers (Apostle et al. 2002;121). This changed social relations in the small local communities studied “in ways that no one seemed to like”.

Retaining power

Even if those that formally were in charge in a management system lose their formal and reward powers through a reform, they can still have some power from other bases (individual charisma, ascribed power (religious or similar), or legitimate powers in an alternative system (e.g. tribal hierarchy). This they might try to use to continue influencing the sector where their formal and reward power is reduced. For example, if the management of the fisheries sector has been reformed, reducing local level leaders’ influence, they might try to use the powers

they still have in other sectors to affect fishers' behaviour and other aspects of the fisheries sector, to further their own interests.

Market power

Market power in rights has been a concern both in the theoretical literature on tradable rights (Hahn 1984), and in the practical use of them. Those given rights in the initial allocation are, to some degree at least, empowered, while those losing rights are disempowered. Further buying and selling of rights have in some cases lead to concentrations of ownership that have negative effects Tietenberg (2002) concludes that it has not been a problem for air emissions control, but has been a factor in fisheries (Helgason and Palsson 1998; Apostle et al. 2002).

If a market for tradable rights is large, the power of each individual actor in the market usually is small. If a market is small, individual actors may have large power, either directly in the market as a buyer or seller, or in a more informal way, through non-market relations between market actors.

In the first case, pure market power can be reduced by authorities at the higher hierarchal level, either by limiting market power by legislation, or somehow assisting in the functioning of the market by setting up a clearing house or similar. This has been successful in the case of tradable development rights for land (Colby 2000).

To reduce an actor's power in the second case is more difficult, but again the authorities could assist in trading, for example working as a trading agent and make buyers and sellers anonymous for each other until the major points of a deal have been decided.

If rights to use a resource are given to all members of a community, and not just those that have a history of use of that resource, many would not know what to do with it. They would not have the know-how to utilise the right, and they probably would not know the value of the right either. Those with know-how of resource use, as well as the capital to buy rights, would now be the powerful ones. But if a clearing house mechanism was established (by the authorities?) the value of rights should have a chance of being revealed fairly quickly, provided the market is not too small (Colby 2000). All those with know-how and capital would compete for the rights, pressing the price up to its “true” expected value.

Community

Introducing tradable rights may change power relations in ways that not only harm individuals, but also the communities and regions in which they are situated. That some communities have been losers, and some winners, from the trade of ITQs are evident both from Norway (White Paper 16 2006), Iceland (Eythorsson 2000) and Canada (Apostle et al. 2002;Ch. 8). From having power over resource allocation through a political system, the communities were overlooked when ITQs were introduced and financial strength decided resource allocation.

Social capital is an important element of efficient fisheries management systems (Grafton 2005). It reduces the need for monitoring and enforcement measures, and makes negotiation and deliberation smoother and easier. Local level management systems may have a higher level of social capital, due to the actors’ usually broad and long history of cooperation and interdependence. If the introduction of tradable rights makes ownership footloose, social capital relevant for fisheries and coastal management will be reduced (Apostle et al. 2002; ch. 8), giving a negative external effect on the functioning of the management system for the

resource made tradable, but also other governance processes depending on community levels of social capital.

Rent-seeking and lobbying

Lobbying and rent-seeking is common where privileges can be handed out at someone's discretion, and the costs to society of these activities can be of a considerable size (Tullock 1993; Congleton et al. 2007). Having allocation mechanisms that make lobbying and rent-seeking difficult or impossible, can be a way to improve the efficiency of the management system, reducing the institutional costs.

When the powers of individual actors in a management system are reduced, these individuals become less interesting as targets for lobbying and rent-seeking. The time, money and resources spent on these unproductive activities should then go down.

The basic results from the economics literature on rent-seeking, is that individual's rent seeking effort go up the higher the prize is, the cheaper it is to lobby, and the fewer competitors he has, provided actors are homogeneous. Even though the individual effort goes down as the number of actors increase, the aggregate effort goes up when actors are similar. If actors are heterogeneous, only the ones with the lowest costs of lobbying, or who value the prize the highest, will actually partake in lobbying (Hillman and Riley 1989). When decisions are made by majority voting in committees, rather than at the discretion of individuals, total rent seeking effort goes down (Congleton 1984), and also increasing the number of members of committees gives the same effect (Congleton et al. 2007)

If a reform introducing a tradable rights regime only shifts the possible focus of lobbying and rent-seeking, from actual allocation of resources, to being allowed as potential rights buyers,

there may not be much reduction in these activities, or they could even increase. When lobbying and rent-seeking is on a local scale, each rent-seeker will be an individual or group actually seeking resource access. If it takes place on a higher level, it is more likely to be larger interest groups and organisations, seeking principal access to resources rather than actual access. While each rent-seeker's effort is expected to be smaller in the first case than in the latter, sum efforts may still be higher as the number of rent-seekers will be higher. On the other hand, the principal discussion on which group that shall be allowed as rights holders will be more seldom than the allocation of actual rights. This points towards less lobbying and rent seeking with a tradable rights regime than discretionary allocation.

Concluding comments

In summary, management reforms, including the introduction of tradable rights, is likely to alter power relations and structures, through their effect on power bases. Actors partaking in the management of marine and coastal resources may gain or lose power through this, as may resource users and other stakeholders. The context of a particular management reform, as well as the nature of the reform, will be crucial. As power can be used both destructive and constructive, it is not possible to say that introducing tradable rights will be always good, or always bad, due to effects on power relations.

If power abuse is present we can expect that distribution of rights and thus wealth was unfair, resource allocation and use had limited efficiency, or possible there were over-exploitation of natural resources. If resource managers at a higher level become aware of such power abuse on a lower level, a management reform should also aim to alter power relations in ways that improve the situation.

Conclusions

Tradable-rights schemes that to a larger degree than today allow tradability of marine and coastal resource rights *between* user-groups can be envisaged. This is both for single resources like fish-stocks, and for more complex resources like locations or areas. Experience, as well as theoretical contributions on tradable rights regimes, shows ways of dealing with externalities on other resource users, other stakeholders, and also ensuring the provision of public goods like ecosystem services.

Tradable rights regimes may in some circumstances also reduce the illegitimate power of some resource users or stakeholders, giving subsequent gains in the efficiency of resource use, and reduced costs on lobbying or rent-seeking. For management reforms also the possibilities of changed power relations must be carefully considered. Whether reduced power for some actors is good or bad depends on context, particularly who gains power, and how they use it.

Who is in favour of introducing a system of tradable rights? Existing rights holders are often pressing for conversion to a tradable system, as they expect to keep rights/receive rights for free, and thus can get a large windfall gain through selling (Hannesson 2005). On the other hand, reforms in fisheries have often only been implemented when fish stocks have been in a bad state. A major aim of most reforms is then to reduce capacity, meaning that some traditional rights-holders must leave the fisheries. Then reluctance to accept reforms grows as the situation gets worse, hindering a reform that can slow or halt resource degradation. With increasing pressure on coastal resources, we must hope reforms can take place before conflicts and state of resources becomes bad.

Integrated coastal zone management (ICZM), is by many viewed as the most likely solution to reconcile the complex and dynamic problem of coastal management (Jentoft 2000). One problem with ICZM is that, depending on the level of resource control asserted to the ICZM process, allocating and re-allocating resource access or other user-rights can be a very demanding and cumbersome task. As I have argued above, a tradable rights market can be dynamically efficient, and it is possible to safeguard interests of different stakeholders as well as public good. Co-management does not exclude the use of tradable rights. Individual property rights holders also have strong incentives to participate in management, be it co-management or otherwise (Grafton 2005).

With many interests that neither will nor easily can be expressed in a market, there will be a need for direct regulation at least at a “high” hierarchical allocation level (Grafton et al. 2006). Examples of this are natural resources essential for public goods like biodiversity-conservation or transportation-routes, as well as rights with potentially large collective but small individual effects of use. Some sort of regulatory oversight is legitimate to address spatial or temporal externalities associated with resource use (Colby 2000). Without such oversight efficiency cannot be achieved. There is however inherent trade-off between flexibility and low transaction costs on one side, and the level of safeguarding of public interests on the other. Stakeholders who object to a specific transaction of rights can imply costs and delays on others. For tradable rights regimes to be effective the rights markets must become active despite this (Colby 2000).

Many property rights based management systems have limitations on who can own rights. This limits the risk of unexpected negative external effects, but it may also bar allocation to the use with the highest economic return. If a rights market is the sole allocation instrument,

the one with most capital can decide. This is usually seen as less morally acceptable than user groups or stakeholders being excluded through a bureaucratic or political process (Maurstad 2002). Whether exclusion from coastal resources is more unfair when it is done by someone with illegitimate powers, or in the market due to individuals' lack of capital, is not clear to me.

References

- Apostle, R., B. McCay, et al. (2002). Enclosing the Commons: Individual Transferable Quotas in the Nova Scotia Fishery, Institute of Social and Economic Research.
- Aswani, S. P. (2005). "Customary Sea Tenure in Oceania as a Case of Rights-based Fishery Management: Does it Work?" Reviews in fish biology and fisheries **15**(3): 285.
- Bartlett, R. (1989). Economics and Power - An Inquiry into Human Relations and Markets, Cambridge University Press.
- Beddington, J. R., D. J. Agnew, et al. (2007). "Current Problems in the Management of Marine Fisheries." Science **316**(5832): 1713-1716.
- Bennett, R. G. (2000). "Coastal planning on the Atlantic fringe, north Norway: the power game." Ocean & Coastal Management **43**(10-11): 879-904.
- Bess, R. and R. Rallapudi (2007). "Spatial conflicts in New Zealand fisheries: The rights of fishers and protection of the marine environment." Marine Policy **31**(6): 719-729.
- Borch, T. (2004). "Sustainable Management of Marine Fishing Tourism. Some Lessons from Norway." Tourism in Marine Environments **1**: 49-57.
- Bowles, S. and H. Gintis (forthcoming 2008). "Power". New Palgrave Encyclopedia of Economics, McMillan.

- Buanes, A., S. Jentoft, et al. (2004). "In whose interest? An exploratory analysis of stakeholders in Norwegian coastal zone planning." Ocean & Coastal Management **47**(5-6): 207-223.
- Christensen, A.-S., J. Raakjaer, et al. (2007). "The voices of Danish fishermen in resource management -- An examination of the system of negotiated economy." Ocean & Coastal Management **50**(7): 551-563.
- Christie, P. (2005). "Is Integrated Coastal Management Sustainable?" Ocean & Coastal Management **48**(3-6): 208-232.
- Cicin-Sain, B., D. Jang, et al. (1998). Integrated coastal and ocean management : concepts and practices. Washington, D.C., Island Press.
- Coase, R. H. (1960). "The Problem of Social Cost." Journal of Law and Economics **3**: 1-44.
- Colby, B. (2000). "Cap-and-Trade Policy Challenges: A Tale of Three Markets." Land Economics **76**(4): 638-58.
- Congleton, R. D. (1984). "Committees and rent-seeking effort." Journal of Public Economics **25**(1): 2.
- Congleton, R. D., A. L. Hillman, et al., Eds. (2007). 40 years of Rent Seeking Research, Springer Verlag.
- Copes, P. (1986). "A Critical Review of the Individual Quota as a Device in Fisheries Management." Land Economics **62**(3): 278-292.
- Crowder, L. B., G. Osherenko, et al. (2006). "Sustainability - Resolving mismatches in US ocean governance." Science **313**(5787): 617-618.
- Dahl, R. A. (1957). "The Concept of Power." Behavioral Science **2**(3): 201-215.
- Davis, A. and C. Bailey (1996). "Common in custom, uncommon in advantage: Common property, local elites, and alternative approaches to fisheries management." Society & Natural Resources **9**(3): 251-265.

- Davis, D. and D. F. Gartside (2001). "Challenges for economic policy in sustainable management of marine natural resources." Ecological Economics **36**(2): 223-236.
- Douve, F. and C. N. Ehler (2007). "International Workshop on Marine Spatial Planning, UNESCO, Paris, 8-10 November 2006: A summary." Marine Policy **31**(4): 582-583.
- Dowding, K. M. (1996). Power. Buckingham, Open University Press.
- Eythorsson, E. (2000). "A decade of ITQ-management in Icelandic fisheries: consolidation without consensus." Marine Policy **24**: 483-492.
- Flaaten, O., K. Heen, et al. (1995). "The Invisible Resource Rent in Limited Entry and Quota Managed Fisheries: The Case of Norwegian Purse Seine Fisheries." Marine Resource Economics **10**(4): 341-56.
- French, J. R. P. and B. Raven (1959). "The bases of power." Studies in Social Power, Institute for Social Research, Ann Arbor.
- Galbraith, J. K. (1984). The anatomy of power. London, Hamilton.
- Gibbs, N. and K. Woods (2003). Facilitating tradeoffs between commercial fishing and aquaculture development in New Zealand. Rights and Duties in the Coastal Zone, Stockholm, Beijer Institute, Stockholm.
- Gonz, J. lez, et al. (2006). "The Chilean TURF system: how is it performing in the case of the loco fishery?" Bulletin of Marine Science **78**: 499-527.
- Grafton, R. Q. (2000). "Governance of the commons: A role for the state?" Land Economics **76**(4): 504-517.
- Grafton, R. Q. (2005). "Social capital and fisheries governance." Ocean & Coastal Management **48**(9-10): 753-766.
- Grafton, R. Q., R. Arnason, et al. (2006). "Incentive-based approaches to sustainable fisheries." Canadian Journal of Fisheries and Aquatic Sciences **63**(3): 699-710.

- Greiner, R., M. D. Young, et al. (2000). "Incentive instruments for the sustainable use of marine resources." Ocean & Coastal Management **43**(1): 29-50.
- Grey, S. J. and M. S. Sullivan (2001). Conflict for space between aquaculture and fishing - the New Zealand experience. Open Ocean Aquaculture IV, St. Andrews, NB, Canada, Mississippi-Alabama Sea Grant Consortium, Ocean Springs, MS. MASGP-01-006.
- Grossman, G. M. and E. Helpman (2002). "Special Interest Politics." Journal of institutional and theoretical economics **158**(4): 731.
- Hahn, R. W. (1984). "Market Power and Transferable Property Rights." Quarterly Journal of Economics **99**(4): 753-65.
- Hanna, S., C. Folke, et al. (1995). Property Rights and Environmental Resources. Property rights and the environment. Social and ecological issues. S. Hanna and M. Munasinghe, Beijer International Institute of Ecological Economics and the World Bank Washington, DC, USA: 15-29.
- Hannesson, R. (2005). "Rights Based Fishing: Use Rights versus Property Rights to Fish." Reviews in Fish Biology and Fisheries **15**(3): 231-241.
- Helgason, A. and G. Palsson (1998). Cash for quotas: Disputes over the Legitimacy of an Economci Model of Fishing in Iceland. Virtualism: A new political economy. J. G. Carrier and D. Miller. New York, USA., Oxford.
- Hersoug, B., P. Holm, et al. (2000). "The missing T. Path dependency within an individual vessel quota system -- the case of Norwegian cod fisheries." Marine Policy **24**(4): 319-330.
- Hillman, A. L. and J. G. Riley (1989). "Politically Contestable Rents and Transfers." Economics and Politics **1**(1): 17-39.
- Holdt, S., F. Moehlenberg, et al. Polyculture in Denmark: Status, Feasibility and Future.

- Huppert, D. D. (2005). "An Overview of Fishing Rights." Reviews in fish biology and fisheries **15**(3): 201.
- Jentoft, S. (1989). "Fisheries co-management, : Delegating government responsibility to fishermen's organizations." Marine Policy **13**(2): 137-154.
- Jentoft, S. (2000). "The community: a missing link of fisheries management." Marine Policy **24**(1): 53-60.
- Jentoft, S. (2005a). "Fisheries co-management as empowerment." Marine Policy **29**(1): 1-7.
- Jentoft, S. (2005b). "Go for it. Property rights and co-management could connect to improve the management of artisanal fisheries." Samudra(42): 8-11.
- Jentoft, S. (2007). "In the Power of Power - The Understated Aspect of Fisheries and Coastal Management." Human Organization **forthcoming**.
- Koutstaal, P. (1999). "Tradable Permits in Economic Theory." Handbook of Environmental Resource Economics. Edward Elgar Publishing: 265-274.
- Lukes, S. (2005). Power : a radical view. Basingstoke, Palgrave Macmillan.
- Macinko, S. and D. W. Bromley (2002). Who Owns America's Fisheries?, Center for Resource Economics.
- Makino, M. and H. Matsuda (2005). "Co-management in Japanese coastal fisheries: institutional features and transaction costs." Marine Policy **29**(5): 441-450.
- Marshall, J. (2001). "Landlords, leaseholders & sweat equity: changing property regimes in aquaculture." Marine Policy **25**(5): 335-352.
- Maurstad, A. (2002). "Tradisjonelt fiske og oppdrettsanlegg: Nye arealkonflikter på fjordene (In Norwegian: Traditional fishing and aquaculture plants: New area conflicts in the fiords)." Dieut, published by Nordisk samisk institutt, Kautokeino, Norway **1**: 67-79.
- Mikalsen, K. H. and S. Jentoft (2001). "From user-groups to stakeholders? The public interest in fisheries management." Marine Policy **25**(4): 281-292.

- Mikalsen, K. H. and S. Jentoft (2003). "Limits to participation? On the history, structure and reform of Norwegian fisheries management." Marine Policy **27**(5): 397-407.
- Mikkelsen, E. (forthcoming). "Aquaculture-fisheries interactions." MARINE RESOURCE ECONOMICS.
- Montgomery, W. D. (1972). "Markets in Licenses and Efficient Pollution Control Programs." Journal of Economic Theory **5**(3): 395-418.
- Munro, G. (1991). The management of transboundary fishery resources: A theoretical overview. Essays on the economics of migratory fish stocks. R. Arnason and T. Bjørndal. Berlin, Springer.
- Murai, T. (1992). "Aquaculture conflicts in Japan." World Aquaculture **23**(2): 30-31.
- Muthoo, A. (1999). Bargaining theory with applications, Cambridge University Press.
- National Research Council (1999). Sharing the Fish: Toward a National Policy on Individual Fishing Quotas. Report of the Committee to Review Individual Fishing Quotas, National Research Council of USA.
- Norse, E. A. (2006). A zoning approach to managing marine ecosystems. International Workshop on Marine Spatial Planning Paris, France, UNESCO.
- OECD (1999). Implementing Domestic Tradable Permits for Environmental Protection.
- OECD (2006). Using Market Mechanisms to Manage Fisheries: Smoothing the Path. Paris, France.
- Parsons, G. J., S. E. Shumway, et al. (2002). "Polyculture of sea scallops (*Placopecten magellanicus*) suspended from salmon cages." Aquaculture International **10**(1): 65-77.
- Parsons, L. (1993). Management of Marine Fisheries in Canada, National Research Council of Canada and Dept. of Fisheries and Oceans.
- Parsons, T. (1951). The social system, Free Press Glencoe, Ill.

- Pauly, D., V. Christensen, et al. (2002). "Towards sustainability in world fisheries." Nature **418**(6898): 689-695.
- Pikitch, E. K., C. Santora, et al. (2004). "Ecosystem-based fishery management." Science **305**(5682): 346-347.
- Reid, W. V., H. A. Mooney, et al. (2005). Millennium Ecosystem Assessment Synthesis Report. Washington, DC: Millennium Assessment and World Resources Institute.
- Robinson, S. M. C., T. Lander, et al. (2006). Using the Blue Mussel (*Mytilus edulis*) as an effective Biofilter Component to extract fine Organic Particulates from an Integrated Multi-Trophic Aquaculture (IMTA) System in the Bay of Fundy, New Brunswick, Canada. AQUA 2006. Florence, Italy.
- Rosenberg, A. A. (2003). "Managing to the margins: the overexploitation of fisheries." Frontiers in Ecology and the Environment **1**(2): 102-106.
- Russell, B. (1938). Power. London, Unwin.
- Sanchirico, J. N., D. Holland, et al. (2006). "Catch-quota balancing in multispecies individual fishing quotas." Marine Policy **30**(6): 767-785.
- Sanchirico, J. N. and J. E. Wilen (2005). "Optimal spatial management of renewable resources: matching policy scope to ecosystem scale." Journal of Environmental Economics and Management **50**(1): 23-46.
- Sanderson, J. C., M. S. Kelly, et al. (2006). Integration of Seaweed and Salmonid Aquaculture in North-West Scotland: Bioremediation and economic benefits. AQUA 2006. Florence, Italy.
- Schutz, E. (1995). "Markets and Power." Journal of Economic Issues **29**(4).
- Schutz, E. (2005). What has Neoclassical Economics contributed to the Understanding of Social Power? Accociation for Heterodox Economics Annual Conference. London.

- Scott, A. (1989). Conceptual origins of rights based fishing. Rights Based Fishing. P. Neher, R. Arnason and N. Mollett. Dordrecht, Kluwer Academic Publishers: 11-38.
- Shertzer, K. W. and M. H. Prager (2007). "Delay in fishery management: diminished yield, longer rebuilding, and increased probability of stock collapse." ICES J. Mar. Sci. **64**(1): 149-159.
- Squires, D., H. Campbell, et al. (1998). "Individual transferable quotas in multispecies fisheries." Marine Policy **22**(2): 135-159.
- Steelman, T. and R. Wallace (2001). "Property rights and property wrongs: Why context matters in fisheries management." Policy Sciences **34**(3): 357-379.
- Sutinen, J. (1997). Recreational entitlements - Integrating Recreational fisheries into New Zealand's Quota Management System, New Zealand Ministry of Fisheries.
- Symes, D. (1999). Rights-based Management: A European Union Perspective. Use of Property rights in Fisheries Management - FishRights99, Freemantle, Western Australia, Rome: FAO.
- Thobani, M. (1997). "Formal Water Markets: Why, When, and How to Introduce Tradable Water Rights." World Bank Res Obs **12**(2): 161-179.
- Tietenberg, T. (1995). "Tradeable permits for pollution control when emission location matters: What have we learned?" Environmental and Resource Economics **5**(2): 95-113.
- Tietenberg, T. (1999). Lessons from using transferable permits to control air pollution in the United States. Handbook of Environmental and Resource Economics. J. van den Bergh, Edward Elgar Publishing.
- Tietenberg, T. (2002). The tradable permits approach to protecting the commons: What have we learned? The Drama of the Commons. E. Ostrom, National Academies Press.

- Toffler, A. (1990). Powershift : knowledge, wealth, and violence at the edge of the 21st century. New York, Bantam Books.
- Townsend, R. E. and M. D. Young (2005). "Evergreen Leasing of Aquaculture Sites." MARINE RESOURCE ECONOMICS **20**(2): 203.
- Troell, M., C. Halling, et al. (2003). "Integrated mariculture: asking the right questions." Aquaculture **226**(1-4): 69-90.
- Tullock, G. (1993). The Welfare Costs of Tariffs, Monopolies, and Theft. Public choice theory. C.-K. Rowley. Volume 2, The characteristics of political equilibrium.. Elgar Reference Collection series. International Library of Critical Writings in Economics vol. 24. Aldershot: distributed in the U S by Ashgate, Brookfield, Vt , 1993; 3-11
Previously published 1967.
- Turner, M. and Q. Weninger (2005). "Meetings with Costly Participation: An Empirical Analysis." The Review of economic studies **72**(1): 247.
- Weber, M. (1920). The distribution of power within the political community: Class, Status, Party. Economy and Society.
- White Paper 16 (2006). Strukturvirkemidler i fiskeflåten (Instruments for adjustment of the fishing fleet). Norwegian Ministry of Fisheries and Coastal Affairs.
- Wilén, J. (2003). "Spatial Management of Fisheries." Marine Resource Economics **19**: 7-19.
- Wilén, J. E. (2006). "Why fisheries management fails: treating symptoms rather than the cause." Bulletin of Marine Science **78**: 529-546.