Pathways to Fishery Reform: Accounting for Political Economy

by

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Every fishery is embedded in a matrix of political institutions and these institutions, together with other factors, determine the management regime that will best capture the resource's potential rent. This chapter examines evidence on this link. Resource management structures are equivalent to property rights regimes because they delineate who has authority to decide how a resource is used and determine how the resource's returns are distributed among various parties. For this reason the following discussion links political conditions to the performance of specific assignments of property rights, with the focus on fisheries.

The discussion is organized around three conceptual themes. First, property rights are multidimensional and, as a consequence, specific aspects of how a resource is used may be controlled by different individuals or organizations. For example, a particular fishery might be organized so that the state controls how much of the resource is appropriated each period, an association of fishermen controls how the total harvest is allocated among its members, and the individual harvesters decide how to allocate their effort across time and space. The range of possibilities for managing a fishery is

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therefore very broad. Cases in which all property rights are vested either in a private owner or a central government are only polar extremes.

Second, how well government performs as a property rights holder depends on the underlying political institutions. In countries where political power is concentrated among a few individuals or groups, a political regime can survive by accepting bribes or political support from a narrow political elite in exchange for using the state's coercive power on their behalf.[1] By contrast, in countries where political power is broadly dispersed and competition for political office is brisk, politicians must offer policies that benefit broad segments of society in order to remain in office. Almost by definition, these broadly beneficial policies have the character of public goods such as a well functioning legal system and police to enforce laws. Governments based on narrowly concentrated rather than broadly dispersed political power will therefore behave differently. Placing some aspect of fishery management under government control will therefore have different consequences under different types of political regimes.

Third, when a property right is assigned to a specific party the incentive to use that right to maximize the resource's return is sharpest when the return accrues to the rights holder. Incentives are said to be efficiently aligned in this circumstance.[2] When applied to a privately owned asset such as a home this principle is self-evident in the different levels of 'care' applied by homeowners versus renters. This principle has a political dimension because specific rights to fisheries and other resources are often held

[1] See Bueno de Mesquita *et al*. (2003), Acemoglu, Johnson and Robinson (2001) and Putnam (1993). Deacon (2009) applies this reasoning to frame empirical analysis of public good provision by dictatorships.
[2] Assigning rights so that ownership is correlated with rewards is the basic idea behind Coase's (1937) explanation for the structure of the firm and for the extension of that theory by Alchian and Demsetz (1972).

or enforced by government. For example, government is often responsible for policing exclusivity in fishing rights while those who gain from exclusivity are licensed harvesters. In a political system dominated by a narrow group of elites, license holders can expect their rights to be upheld only if they themselves are elites or if they reward elites to perform the job. Where political power is broadly based and government is orientation toward providing economy-wide public goods, government enforcement of exclusivity is a routine part of the overall system of laws and police protection.

The remainder of this chapter explores the relationship between property rights, political systems and fisheries management. The next section explores the nature of property rights in fisheries and other resources and then examines in more detail how political systems and property rights regimes are linked. The third section considers the specific resource allocation tasks a fishery management regime must solve and draws inferences on how management regimes can be structured to perform well in particular political contexts. Section 4 gives examples of management systems that have proven successful in specific political systems and Section 5 concludes.

Property Rights, Political Institutions and Resource Management

Property rights specify relationships between people with regard to things. The classic 'bundle-of-sticks' analogy makes clear that property rights are multidimensional and can be held by multiple parties.[3] While a homeowner may have the exclusive right to occupy a property or rent it out, a neighbor may own an easement granting entry in order to reach

[3] For a discussion of the bundle of sticks analogy, see Anderson (2007).

an adjoining parcel and a local government may control the kinds of activities or structures that can occupy the property.

Property rights to fish stocks are also multidimensional. At a minimum they specify who may harvest from the resource, which implies the right to exclude parties not holding such rights. A harvest right may be quantitative, specifying an amount the owner may harvest, or simply temporal, granting the right to harvest any amount during a specific time period. The right to harvest normally implies the right to benefit from harvesting by selling the catch. It may be held by an individual, a private group, a community, or a corporate entity. Transferability, the right to sell, loan or lease any the harvest right to another party, may or may not be included in the bundle or sticks held by the harvester. Additionally, licensed private harvesters may have the right to decide specific details regarding the method, time and place of harvest. Alternatively, the time, place and method of harvest may be controlled by government via regulation.

In a fishery, the resource's economic value can vary over time or space due to such factors as heterogeneous stock densities, differences in proximity to processors or temporal variation in unit values. A property rights (management) regime that fails to recognize such variation may give rise to conflicts among fishing rights holders or to wasteful rent-seeking to harvest the most valuable stocks. To mitigate or avoid such problems, fishing rights must additionally specify who has priority to fish at specific times and locations. [4]

[4] See Costello and Deacon (2007) and Deacon and Costello (forthcoming).

Property rights generally do not grant permission to take actions that interfere with the rights of others. However, interference is common in marine fisheries because fish stocks are shared by harvesters. Sharing can take place at the group or sector level as well, involving, say, among commercial and subsistence harvesters, among harvesters using different gear or vessels, or among harvesters of different origin (e.g., local and foreign fishermen). If the property rights regime is ambiguous regarding how the stock is to be shared, conflict between the parties is likely to arise.

Monitoring and enforcing how and by whom a property is used is necessary to determine whether or not the owner's exclusive use rights are being observed. There are advantages and disadvantages to relying on the state for these activities and the relative merits depend on the political system. Using the state's coercive power for rights enforcement can be advantageous when power is broadly dispersed and oriented toward public good provision. In such systems state coercion can be used to punish violators before conflict escalates into costly violence. It can also overcome the free-rider problem inherent in relying on the private individual to deter violations. When the political system is dominated by elite groups, however, relying on state coercion for enforcement may result in weak or no enforcement if politicians have little to gain from the resource or transfer of resources to powerful groups when there is much to gain.

In such cases there are alternatives to state (or purely individual) enforcement. As described later, private resource users may form an association to carry out enforcement on behalf of the group.[5] It is also possible that separate parties have an interest in enforcing exclusion, even though they do not benefit directly from the harvest. These

[5] Also see Scott (this volume).

parties may choose to subsidize the enforcement of harvest rights held by others, a possibility discussed later in a description of debt-for-nature-swap contracts and in Deacon and Murphy (1997).

The political economy of government behavior

Government has a monopoly on sanctioned coercion. Governments in some countries use this coercive force mainly to solve free-rider and coordination problems in order to provide public goods. Others use it mainly to control a country's natural wealth or to extract accumulated wealth for the benefit of the politically powerful. Current theories of political economy identify the distribution of political power in a country as a key determinant of the course its government follows; see Bueno de Mesquita, et al. (2003) and Acemoglu and Johnson (2005).[6] If political power is concentrated among a few individuals or groups, a political leader can gain and hold power by using government coercion to facilitate wealth transfers to these powerful elites. Using government to provide nonexclusive public goods such as an impartial judiciary or a public health program has little payoff in such a system because much of the benefit would accrue to non-influential outsiders.[7]

If political power is broadly dispersed and competition for political office is vigorous, a political leader must provide benefits to broad groups in order to gain office. The economies of scale inherent in providing public goods to large numbers imply that

[6] This basic intuition on the relative size of the controlling group also drives predictions on public good provision in McGuire and Olson (1996), Milesi-Ferretti, *et al.* (2002) and Lizzeri and Persico (2004).
[7] The deep factors determining the distribution of political power are not pursued here. Salient factors may include a country's history, climate, geography, and religion; see Acemoglu, et al (2001) and Putnam (1993) for a discussion. Research on the resource curse suggests that a country's resource endowments may affect its political system; see Deacon and Mueller (2006) for a discussion of the evidence.

providing public goods is an effective way to gain office in such circumstances. Using the government's power to direct transfers to specific groups in exchange for political support is relatively unattractive in this case because the large size of the group whose support must be won dilutes the transfer-benefit each member receives.[8]

Alternative theories of governance stress different factors. A contracting theory emphasizes the state's role in providing a legal framework that facilitates contracting between private parties (e.g., see Thompson, this volume). Acemoglu and Johnson (2005) recognize this point, but argue that the distribution of political power affects property rights at a deeper level because it regulates the vertical relationship between ordinary private citizens and the politically powerful; a legal system mainly affects the horizontal relationship between private parties and these parties can often circumvent legal obstacles to engage in mutually beneficial exchange. An economic theory of governance articulated by Demsetz (1967) and North (1981) argues that institutions are created when the social benefits from creating them outweigh the transactions costs. Countries with great material wealth therefore stand to gain more from governments that provide public goods and protect assets from theft than do impoverished societies, which agrees broadly with cross-country evidence.[9] Others trace the performance of government to cultural factors and emphasize the positive role trust and tolerance can play in solving collective-action problems. Societies lacking trust and tolerance are deemed less likely to develop governments focused on providing public goods and more likely to develop governments

[8] Certain public goods such as a stable set of legal institutions and impartial courts enhance investment opportunities and economic growth. This link has motivated much empirical work on the political economy of property rights formation and macroeconomic performance.

[9] The economic argument also explains why, within any political system, property rights to assets are more likely to emerge when the potential value from creating them increases; see Demsetz (1967). Deacon and Mueller (2006, 124-127) provide a discussion in the context of natural resources.

that serve the interests of narrow elites. The same theories sometimes trace trust and tolerance levels to such basic societal factors as religion and historical experience (LaPorta, *et al* 1999 and Putnam 1993. Of course, the forces stressed in different theories could operate simultaneously.[10]

When political power is concentrated and the state provides little protection to non-elites, corruption—the use of government authority for private gain—is likely to flourish. Petty corruption by minor officials, the flaunting or selective application of established laws and regulations in return for bribes, makes it impossible to rely on impersonal laws to enforce private property rights. When a bureaucrat-enforcer's advancement within government depends only on satisfying the political elite, identifying infractions and imposing sanctions has no payoff unless the injured party has political power. Instead, diverting eyes from an infraction may generate a payoff in the form of a bribe from the violator.

It is natural to ask why Coasian bargaining does not arise to capture the gains that property rights and secure ownership can bring. In other words, why wouldn't an all-powerful, elite dominated government agree to create a system of property rights in order to promote private investment and generate additional wealth, in return for a share of the wealth created? A fundamental reason is that a promise to abide by contracts and to fulfill

[10] Acemoglu and Johnson (2005) empirically test the political power theory against the contracting theory and find pervasive effects of unequal political power in the cross-country pattern of investment, economic growth and wealth. While variations in legal systems also have effects, these occur mainly in financial markets. LaPorta, *et al*, (1999) assess political, economic and cultural theories empirically and find evidence of a strong link from political factors (e.g., legal origins and measures of ethnic heterogeneity) to various measures of 'good government' (e.g., public good provision, political freedom and government intervention in the private sector.) They also find support for a link between good governance and cultural factors, as indicated by religious affiliation. They find much of the evidence to be consistent with the basic economic theory that good institutions arise when demand is sufficient, but their tests are somewhat inconclusive because strong economic performance can also be a direct *consequence* of good government.

promises is not credible if the government is not constrained by legal institutions. (Acemoglu 2003, Acemoglu and Johnson, 205). If a property rights system were instituted and led to wealth generation, it would invite confiscation by government and thereby contain the seeds of its own destruction. In addition, the groups seeking property rights protection would need to solve a coordination problem in striking a deal with the sovereign because the rights system is a public good all would enjoy.[11]

The question of what motivates government is relevant to fisheries management because government often controls how fisheries are used and by whom. A 'good' government, i.e., one oriented toward public good provision, can enhance rents by assisting with monitoring and enforcement, by settling disputes and by helping to coordinate the use of the shared stock. A good government can also help resource users overcome free-rider problems in providing infrastructure, information on stock locations and stock enhancement. Political systems oriented toward enriching the political elite have little incentive to provide these benefits.

Structuring property rights to align incentives

A fish stock or other natural resource generally produces a flow of returns valued by various groups in society. When the parties who value that return most highly own the right to control how the resource is used, the incentive structure favors actions that maximize the resource's economic return. If the party holding the right does not place the

[11] As a separate consideration, sheer instability in the machinery of government can affect investment and natural resource use under any system of government; see Bohn and Deacon (2000) and Deacon (1994) for evidence.

highest value on the return, then incentives are not aligned to encourage rent capture.[12] The assignment of rights would be immaterial if transactions costs were zero because rights would flow to the parties who can create the most value by exercising them. Extensive evidence indicates that transactions costs often block rent enhancing reallocations, however.[13]

The political dimension of this principle is illustrated by the case of a fish stock that can support subsistence harvesting by local populations, but that has no export market and little commercial value. If management responsibility is held by an elite-controlled government the outcome may well be neglect and stock depletion. Local users may have some success managing the resource informally, but would have difficulty exercising exclusivity without backing from the state. If the 'quality' of government is different at the national, regional and local levels, placing the 'right' government in charge can potentially enhance rent capture.[14] Assigning rights to private parties has the potential advantage of precisely aligning ownership with rewards. Assigning rights to groups of private users, rather than individuals, may achieve additional gains by fostering coordination among individual harvesters and by encouraging innovation.[15]

Adapting Management Regimes to Political Conditions

[12] Assigning rights so that ownership is correlated with rewards is the basic idea behind Coase's (1937) original explanation for the contractual structure of the firm; the extension by Alchian and Demsetz (1970) follows similar logic.
[13] See Libecap's (1989) examination of bargaining for changes in property rights to fisheries, timber, crude oil and federally owned range land in the U.S.
[14] Anderson and Grewell (1999) compare property rights imposed from above by high level governments to property rights created locally, from the bottom up, and ask what attributes of a resource favor a particular strategy. The present discussion turns this question around and asks what attributes of a political system favor of one strategy or the other for managing a given resource.
[15] See Deacon, Parker and Costello (2009) for an example.

How can management regimes in fisheries be structured to perform well under a particular political context? Let us review the available evidence,[16] The discussion is organized around specific rights, e.g., limiting access, setting the allowed catch, enforcing rules, and so forth. A necessary step is to identify the parties who value the return the resource can generate, i.e., the 'stakeholders'. In an artisanal fishery the important stakeholders are the local consumers who value a sustainable flow of fish for consumption and the harvesters who earn income from their skills and fishing capital. The local community may also benefit from a cultural and economic orientation toward fishing and protection of the local marine habitat. The stakeholders for an offshore fishery oriented to supplying a foreign market are much different. In this case resource use decisions may have little effect on local consumers and there may be little local [ok?] interest by any party in the offshore habitat the stock occupies. The returns largely amount to the profits of harvesting firms and earnings of employees.

Delineating Exclusion and Limiting the Catch

Delineating who has the right to fish and enforcing this right are minimum requirements for capturing rents.[17] Excluding some groups in society from using the resource is arguably the most difficult management task for private parties to achieve without the state's coercive power. With a clear delineation of who is excluded and a

[16] Much of the empirical research on these topics is reported in case studies. Agrawal (2001) notes that the usefulness of this work is limited by the lack of an accepted theory of what elements are necessary for a successful common pool management system, which makes it difficult to identify causal factors as opposed to correlates. The case study literature also pays little attention to governance institutions in the settings examined when judging whether a given management system will succeed in a particular time and place. The latter clearly is an important omission for the purposes of the present chapter.

[17] In one-shot game theoretic treatments of common pool resources, limiting use to a well-defined group makes the difference between achieving zero net return, the theoretical outcome with free entry, and a positive non-cooperative Nash equilibrium return; when interactions are repeated the difference in returns can be more dramatic.

state judicial system in which violators can be prosecuted, however, private users can often manage the mechanics of exclusion.

In locally oriented fisheries where local consumers and small-scale fishermen are the main stakeholders, assigning responsibility for exclusion to a central government control may well yield benefits if the political power structure is broadly based. Namibia is a case in point. With a broadly representative government in power at independence, Namibia formed resource management institutions that rely on state control but delineate exclusion in ways that spread the returns widely among domestic harvesters. Alternatively, if an elite-dominated government controls a locally oriented fishery, the most optimistic outcomes may be benign neglect or devolution of authority to users or to a more democratic local government. Devolution of this sort occurred in Mexico's Baja California lobster and abalone fisheries in the 1930s. An autocratic central government gave harvesters' cooperatives authority for overall management, monitoring and enforcement, with the state providing only legal authority. This system has worked well since its inception.

When a fishery has a valuable export markets and the central government is elite-dominated, such devolution is unlikely. A simple way for such a government to extract rents in this case is to license foreign fleets to do the harvesting and pocket the license revenue they pay. Kaczinski and Fluharty (2002) present evidence from West Africa that agrees with this hypothesis. Fleets from the European Union (EU), China, Korea and Japan fish in the exclusive economic zones of Guinea, Guinea Bissau, Sierra Leone and other West African countries, under licensing agreements with the central governments of these countries. Licenses with the EU limit the gross tonnage of vessels and the season

fished, but restrictions are loosely enforced and seldom control the catch directly. All processing is done in the fleets' home countries, so local populations do not benefit from either food or employment. License revenues go to the central governments which, in many cases, are among the world's most corrupt and least democratic.[18]

The empirical literature on institutions and macroeconomic growth has found that elite-dominated regimes tend to under-invest in ordinary capital. One plausible reason is that private investors lack the tenure-security needed to invest in countries that are ruled by elite groups rather than by impersonal laws and institutions. Another is that the elite may view their grip on political power as uncertain and therefore under-invest, themselves, for this reason. Similar reasoning suggests that fish stocks will not be adequately conserved in elite-dominated states. Reducing the current catch to produce a larger stock and a larger return in the future is an act of investment. User groups and local fishing communities will lack incentives to conserve the stock if they cannot count on receiving the ultimate reward. Members of the political elite also will lack conservation incentives if their personal claim on future political power is uncertain.

Evidence from case studies of common-pool resources indicates that responsibility for setting quantitative extraction limits differs sharply between developing and developed countries. In developing countries user groups seldom if ever establish such limits for fisheries or irrigation water, although quantitative limits are fairly common for groundwater and forest resources (Ostrom, *et al*., 1994, 306). Schlager (1994) examined case studies of 30 coastal fisheries in primarily developing countries

[18] Guinea, Guinea Bissau and Sierra Leone all rank poorly on indicators of corruption, law and order and democratic accountability based on International Country Risk Guide ratings.

and found no examples in which user groups had placed quantitative limits on catch. In developed countries, however, user-imposed catch and effort limits are fairly prominent. A private corporation, the Challenger Scallop Enhancement Company in New Zealand, directly limits total catch of scallops and dredge oysters.[19] In coastal areas of Japan user groups known as fishery management organizations (FMOs) regulate the allowed catch as well as fishing seasons and gear.[20] In a prominent Norwegian fishery, private industry limits fishing seasons and gear and has been directly involved in management for over 100 years.[21]

A plausible reason for the difference in developing versus developed country management practices is a difference in investment incentives. That is, private harvesters have an incentive to protect future returns by controlling the catch when property rights to future returns are secure, as is more typically the case in developed countries that have rights-based fisheries management systems in place (Scott, this volume). Developing countries on the other hand are often ruled by elite groups that can siphon off returns from private investments if they yield attractive returns. In these circumstances private users have little incentive to rebuild stocks by limiting catches; their only sensible course is to focus on short term returns. Ostrom et al (1994) argue that the mobile, hidden nature of fish stocks is the reason why user groups seldom, if ever, control catch in developing countries. This reason does not explain why user groups often perform this task in developed countries, however.

[19] See Arbuckle and Drummond (2000)
[20] See Uchida and Makino (2008).
[21] See Jentoft (1989) and Pomeroy and Berkes (1997).

Monitoring, Enforcing and Sanctioning

Assigning monitoring and enforcement responsibilities to government versus resource users results in different incentives. If the political system is largely free from corruption and the bureaucracy bases employee advancement on performance, government enforcement can be advantageous due to government's monopoly on sanctioned coercion. If these favorable conditions are missing, however, a bureaucrat charged with enforcement may find that looking the other way in return for a bribe or simply taking the path of least resistance and ignoring violations yields the highest personal reward. Enforcement by users instead of government is advantageous because users have a collective incentive to exclude outsiders. Each member of a group realizes only a small part of the group's reward from deterring violations, however, so a user group's effectiveness depends on its ability to overcome this free-rider problem. This is arguably easier when the membership is culturally and economically homogeneous.[22] Similar reasoning suggests that assigning enforcement to a local rather than a national government will result in more effective enforcement because a local constituency is likely to be relatively homogeneous and to include the main beneficiaries of exclusion. User groups have the added advantage of interacting with the resource regularly and being in a position to detect violations.

Evidence from 47 developing country case studies indicates that user groups are more adept than government bureaus in policing the use of irrigation systems.[23] The rights in this case concern who is allowed to withdraw water, how much is withdrawn,

[22] Anderson and Grewell (1999, 79) make several of the following points.
[23] The following description is from Tang (1994); the systems studied are primarily in Indonesia, India, Iran, Nepal, Pakistan, Peru, and the Philippines.

and users' obligations to help maintain the system. Enforcement regimes vary because some systems are communally owned by users while others are government owned. In user-owned irrigation systems the guards typically are local farmers. In nearly all cases user-guards are judged to be proactive and effective; conformance with rules is reported to be high in the majority of these systems. In government-owned systems guards are invariably employees of the government bureaucracy. Government guards are considered effective in only about one-third of the cases studied; users complain that they often regard water offenses as trivial and not worth pursuing aggressively.[24]

Case studies report mixed success with user-based monitoring and enforcement for other developing country resources. In a study of five locally managed coastal fisheries in Turkey, Berkes (1986) found that a key ingredient for success in enforcement is a third party authority that facilitates or at least legitimizes the exclusion of outsiders.[25] In the three cases where local management was deemed successful, enabling legislation by a government authority played a crucial role. In the two unsuccessful fisheries, users were unable to restrict access to a single well-defined group. Agrawal (1994) reports evidence from six community-managed forests, or *panchayats,* in India. Rule violations amount to removing quantities of wood and fodder in excess of one's allotment and to violating rules that prohibit cultivating crops or pasturing animals in specified areas of the forest in certain seasons. [Bob: Are the latter two activities forbidden?]. The free-rider problem in getting members to report violators is a frequent problem in this context and

[24] Other than Iran, these countries have unfavorable ratings for corruption according to the International Country Risk Guide.
[25] Berkes (1986, 1992) explains that Turkish fishermen who organize themselves into cooperatives can apply to the Turkish government for exclusive harvest rights in local areas.

only three of the six villages found a successful solution.[26] On these three, the forests condition was judged to be good or excellent; on the remaining three, violations were exceedingly common and the forest condition relatively poor.

In developed countries, industry often is involved in enforcement even when formal responsibility rests with government. Japan's coastal fisheries are managed by local fisheries cooperative associations (FCAs) under the Fisheries Law of 1901, which codified hereditary fishing privileges originally bestowed by feudal lords.[27] These rights amount to ownership of the sea in delineated areas, making FCAs responsible for monitoring exclusion.[28] Tietenberg (2001) points out that individual transferable quota (ITQ)systems adopted in New Zealand fisheries and the US (wreckfish fishery) have given quota holders monitoring and enforcement incentives that were missing under previous systems, and this has led to greater industry involvement.

When it comes to sanctioning violators, government's coercive power gives it a potential advantage, but this potential can backfire if government is oriented toward grabbing rents for the politically powerful rather than providing public goods. The available empirical evidence indicates that user-imposed sanctions result in greater rent capture than top-down sanctions imposed by an external authority. Evidence reported by Ostrom, *et al* (1994) shows that experimental subjects in common pool allocation games capture a larger share of a resource's potential rent when the sanctioning system is designed and adopted by users, rather than being imposed externally by the researcher.

[26] The solution was to have the managing council monitor the appointed user-monitors by performing the relatively easy task of inspecting the forest to see if *any* unreported violations had occurred.
[27] Pomeroy and Berkes (1997).
[28] The federal government remains responsible for setting overall allowed catch levels in coastal areas, however; Pomeroy and Berkes (1997).

The advantage of user-adopted systems is even greater when subjects are allowed to communicate with one another before sanctions are adopted, even though the experimental design does not allow them to make binding agreements involving user-imposed rules. Tang's (1994) evidence on irrigation systems provides corroboration; system management typically is deemed more 'effective' when rules for use and sanctions for violations are chosen by users rather than imposed by government.[29] None of this work incorporates the role of political institutions or variations in the motives of any external authority involved in the evaluation process, however, which limits its value for the present purpose.

Allocating the catch among users and solving coordination problems

Case studies consistently show that user groups operating in a wide variety of political circumstances are able to solve problems associated with gear conflicts, competition for favored fishing sites and allocation of a total catch among individual harvesters. Schlager (1994) describes the well-known case in Valença, Brazil in which gear conflicts and competition for sites are resolved by an agreement on the gear types to be used for specific sites and a reservation system in which individuals announce intentions to fish at specific spots on particular days. In a review of 30 fishery case studies primarily from developing countries Schlager (1994) found that rules allocating individual harvesters to particular spots, sometimes on a rotational basis and sometimes

[29] Experimental evidence indicates that common-pool management regimes are most effective when sanctions are graduated, gauged to the severity of the violation, and that participants never impose severe sanctions for any violation; see Ostrom *et al*, (1994), 218 ff. This disagrees with game theoretic results indicating that 'trigger strategies'—which impose severe sanctions for any violation—are an effective way to generate cooperation when participants interact repeatedly. Agrawal (1994) reports that sanctions for over-using community forests in India always are gauged to the severity of the violation and sometimes to the violator's past behavior; trigger strategies are never used.

by assigning time slots, are nearly ubiquitous. Another user-adopted example is the rotational system used to avoid conflicts and to assign preferred fishing sites in the Alanya fishery in Turkey, as described by Berkes (1986). The Chignik Salmon Cooperative that operated in Alaska during 2002-2004 seasons achieved a remarkable degree of coordination among its members with no involvement by government (Deacon, *et al*. 2008b). Sullivan (2000) notes that in the Pacific Northwest whiting fishery members of the Whiting Conservation Cooperative negotiated participants' catch shares and other details of a harvesting agreement in less than a day. The Bering Sea pollock negotiations, which involved a far more complex allocation problem, still agreed to catch allocations in less than two months (Sullivan 2000).[30] In New Zealand's *paua* (abalone) fishery, government controls the total catch, but industry groups coordinate among themselves on allocating effort spatially, enforcing size limits and contributing to stock enhancement efforts.

Experimental evidence indicates that communication enhances coordination among users. Ostrom, *et al*. (1994, 199) report that subjects in common-pool resource experiments communicate to formulate joint strategies and enforcement plans and such communication increases rent yields even though the agreements are not binding. Kopelman, *et al*. (2002) argue that communication promotes cooperation by enhancing group identity and solidarity.[31]

[30] Wilen (2004) describes the gains achieved by the Bering Sea pollock cooperative's ability to coordinate its members' fishing activity.
[31] Falk, *et al*. (2002) point out that communication can enable participants to reach the efficient outcome in coordination games.

Management Options for Diverse Political Contexts: Illustrative examples

We now turn to examples of management strategies that have succeeded in widely varying political circumstances. In the first case, we see that an absence of strong legal institutions in a particular state does not imply that resources cannot be protected; experience with debt-for-nature swaps demonstrates that ingenuity in designing contracts and sensitivity to issues of sovereignty can yield gains even in difficult circumstances. A well-established rule of law is undoubtedly a positive force overall, but the next two examples demonstrate that strict adherence to legal institutions can sometimes provide opponents with tools to block policy change (the Chignik salmon cooperative) or require those pursuing change to exercise considerable ingenuity in order to overcome seemingly minor details of the laws in place (Morro Bay trawl fishery). While the stereotype of a developing country government is one ruled by elites and not constrained by the rule of law, there are important exceptions. An examination of outcomes in Botswana and Namibia shows that management by broad-based governments can generate rents for wide segments of society, even when no indigenous user group exists. Finally, a case from Mexico demonstrates that, with minimal state involvement focused on legitimizing exclusivity, management by user groups can be successful even when political power in the country is held by a narrow group of political elites.

Contracting for enforcement of developing country resources 'owned' by others

Natural landscapes and stocks of flora and fauna in developing countries are often degraded despite legal protection as natural reserves because enforcement of established laws is lacking. The 'paper parks' found in Latin America and elsewhere exemplify this

phenomenon. These natural areas are delineated on maps and have laws protecting them, but suffer from open access use by loggers, miners and subsistence farmers due to lax enforcement. This phenomenon is particularly common in countries with elite dominated governments. Often, enforcement is lax simply because political elites place a low priority on conservation. In such cases a third party that values these resources can enhance conservation by augmenting enforcement of existing legal protections.

Since the early 1990s several conservation NGOs and developed country environmental agencies have adopted this strategy in structuring debt-for-nature swaps.[32] Working in the secondary debt market, these groups have acquired debt instruments for specific developing countries, swapped these IOUs for host country government bonds, and placed the bonds in a conservation trust fund.[33] The fund is partially controlled by the NGO with requirements that bond interest be used only for designated conservation actions. A prominent action in many such swaps is enforcement of protected area restrictions already on the country's books. That is, the NGO that organizes the swap effectively funds enforcement of property rights held by others. To avoid political complications and sovereignty issues, the funds are sometimes held in a separate country and the contracts seldom include the host government as a party.

Modifying policy to yield environmental gains in 'good' governance regimes

U.S. fishery policy is generally imposed from the top down, making it politically difficult to accomplish locally-oriented environmental goals. In 2006, The Nature Conservancy (TNC) overcame this political obstacle with a creative application of the

[32] See Deacon and Murphy (1997) for a more detailed description.
[33] With this structure the host government cannot renege on the fund without defaulting on its bonds.

conservation easement approach to trawl fishing operations based in Morro Bay, California.[34] TNC's goal was to reduce the negative environmental effects of bottom trawling along California's central coast, particularly bycatch of depleted species and degradation of seafloor habitat. To accomplish this TNC purchased federal trawl permits and vessels based in Morro Bay, California and leased them to commercial trawl fishers, with restrictions on the areas fished and gear used.

The TNC strategy resembles the use of conservation easements on land. Owing to the legal status of federal fishing permits, it was impossible to write easements on the permits directly. Essentially the same outcome was achieved, however, by creative contracting. Strong U.S. legal institutions made contracting between TNC and fishermen a reliable mechanism. Because these transactions were voluntary and the terms were negotiated to obtain industry buy-in, the process did not encounter purely political obstacles. In fact, the commercial fishermen involved supported a TNC initiative to have an extensive area of the California coast closed to trawling.

Modifying policy to enable problem solving by users: A developed country example

Organizing fishermen was also part of the strategy in the Chignik, Alaska sockeye salmon fishery. In 2001, a group of commercial fishermen petitioned the Alaska Board of Fisheries to allocate a portion of the 2002 sockeye salmon catch from the Chignik fishery to them collectively, with the intent of fishing this allocation as a voluntary cooperative.[35] The fishery is located on the Alaska Peninsula and had operated under limited entry since 1974. Season closures were imposed to ensure that the total catch each

[34] See Deacon and Parker (2008) and Deacon (2009) for further discussion.
[35] This case is examined in Deacon, *et al*, (2008b).

season did not exceed a biologically determined target. This approach results in a race to fish as each harvester seeks to maximize his share of the total catch before the season ends. Predictably, catches were concentrated and processing capacity was strained during the time the season was open. The petitioning group proposed forming a cooperative with voluntary membership and profits shared equally among members. The intent was to coordinate members' effort in order to slow the rate of fishing and extend the season, concentrate effort among the group's most efficient members and improve the way fish are handled in order to raise quality.

The State approved the petition and allocated the group a portion of the total catch based on the number who chose to join. Due to the migratory behavior of salmon, the regulator could manage the catch of co-op and independent fleets separately by opening the season at separate times for the two groups. Roughly three-fourths of the existing permit holders joined. Those who chose not to join fished independently subject to a standard season closure to ensure that catch did not exceed their allocation.

The cooperative operated during the 2002-2004 fishing seasons. During that period the cooperative limited the members who fished to less than one-third of its membership, which had the effect of slowing the rate of fishing and extending the season by roughly 40 percent. Consistent with the effort to raise quality, the average price paid to harvesters in this fishery was abnormally high during years the co-op operated.[36] In addition, the cooperative instituted several policies that reduced costs, including sharing information on stock locations, providing shared inputs and directing its members' effort

[36] The higher price is also consistent with increased market power by the cooperative in sales of fish to the local processor.

over space and time.[37] These gains were made possible by modifying existing regulations to allocate a dedicated portion of the allowed catch to the cooperative to manage as it saw fit.

The Alaska Supreme Court later concluded that State regulators over-stepped their authority by allowing the cooperative to concentrate all fishing among a subset of its members, with profits shared by all. The suit was filed because some independents thought the State's allocation of allowed catch between the cooperative and independent fleets was unfair, a fact that highlights the importance of designing policy modifications to avoid making some stakeholders worse off.[38] Despite its temporary nature, the Chignik case illustrates the importance of the alignment principle even under a 'good' governance structure: inefficiencies were avoided and quality improvements achieved when the users, who stood to capture the resulting profits, were allowed to manage effort.

Empowering users to encourage creative management: Developed country examples

While many developed countries enjoy a strong rule of law and relative absence of outright corruption, the link between the rewards of bureaucrats who manage fisheries and the economic or environmental performance of these resources often is weak at best. Political competition, even in broad-based, highly democratic regimes, simply is not sufficient to align incentives sharply. Making matters worse, assigning management to government agencies typically means that goals and practices must be codified in laws and regulations, which makes the process rigid and discourages experimentation and

[37] For more detail on these policies and empirical tests, see Deacon, *et al* (2008b).
[38] Ironically, the legal impediment was the co-op's main source of efficiency, its policy of restricting fishing to its most efficient members. The practice of sharing profits among all members, including those not designated to fish, violated an Alaska law requiring all beneficiaries of fishing to be actively engaged in fishing..

innovation. Assigning the finer points of management to stakeholders, even if government retains control over broad outcomes such as catch levels or the condition of stocks, can produce gains, as the following examples illustrate.

Leal (2008) describes a user-implemented management regime that has been successful in the Yaquina Bay, Oregon herring roe fishery. The nominal regulatory regime was limited entry and season closure, to achieve an allowed catch. The 9 permit holders in this fishery obtained regulatory approval to divide the allowed catch equally, essentially forming a privately negotiated ITQ system. The group jointly owns one fishing permit and uses the revenue it generates to fund research on stock assessment. This user-initiated catch share system essentially ended the race to fish in this instance.

A second example comes from New Zealand's *paua* (abalone) fishery, which has been managed under an ITQ system since 1986. Since 2004, a group of quota-holders operating near Christchurch has spatially coordinated the group's fishing to avoid over-fished areas. The group also shares information on stock locations and diving conditions. In addition, it has adopted more restrictive size limits than regulators require, proposed diver accreditation to reduce incidental mortality and invested in reseeding of depleted fishing areas.[39] In this case, the emergence of such groups was enabled by legislation allowing the formation of management action committees.

The Challenger Scallop Enhancement Company (CSEC), an enterprise formed from 38 individual quota holders under New Zealand's ITQ system, is a well-known

[39]This description is from http://www.seafood.co.nz/doclibrary/industryorgs/paua. Costello and Deacon (2008) provide further discussion.

example of user-based management.[40] While the Ministry of Fisheries maintains a catch limit, Challenger has constrained actual catches at lower levels to conform to yields and has invested in stock enhancement and research on stock abundance. Challenger coordinates harvests across areas based on information it collects on the spatial distribution of stocks; Challenger also reseeds areas harvested. The company's operations are financed by fees the quota holders levy on themselves by majority vote.

The fisheries management literature contains several additional examples of user-based management in developed countries.[41] Political economy problems in fishery management are if anything more severe in developing countries, however. The remainder of this section presents examples of developing country management systems that represent successful adaptations to varying political conditions.

Avoiding the resource curse: Botswana's diamonds and minerals

Botswana, a landlocked southern African country approximately the size of Texas, is rich in mineral resources. During its first 35 years of independence Botswana enjoyed the fastest rate of per capita GDP growth in the world.[42] In 1998, Botswana's per capita income was four times the average for Africa, inflation is rarely above 10 percent and secondary schooling rates are near 90 percent. There is broad agreement that

[40] This description relies on Arbuckle and Drummond (2000) and Townsend (2005).
[41] Townsend (2005) describes a Canadian system in which the government assigned shares of the overall quota for offshore scallop harvests to nine firms, in the form of enterprise allocations. This led to effort consolidation, an industry-funded research program and industry efforts to control harvests of under-sized scallops. Townsend (2005) also explains how permit holders in British Columbia's geoduck fishery petitioned for an ITQ system and formed an association with responsibilities for monitoring and enforcement, research on stock enhancement, and spatial effort management. User groups known as fishery management organizations (FMOs) carry out many regulatory functions in coastal areas of Japan (Uchida and Makino, 2008). FMOs often control the allowed catch, seasons and gear. In Norway, industry has been heavily involved in managing the Lofoten cod fishery for over 100 years and presently manages fishing seasons and gear; see Jentoft (1989) and Pomeroy and Berkes (1997).
[42] Much of the following information is from Acemoglu, Johnson and Robinson, (2003) and Iimi (2006).

Botswana's superior performance is due to favorable institutions, primarily institutions that protect property rights and encourage investment.

In light of extensive evidence that natural resources can be a curse for economic development, the fact that Botswana's wealth comes largely from mineral resources, chiefly diamonds, nickel, copper and gold, makes its performance even more striking. In 2002, Botswana's mineral wealth per capita ranked 18th out of 161 countries worldwide; its minerals currently account for 80 percent of total exports and nearly 40 percent of GDP.[43] Table 1 presents summary data indicating that Botswana's governance institutions stand out from those of other African countries. Additionally, Iimi (2006) reports that Botswana's scores for political stability, voice and accountability in government, effectiveness of government and quality of regulation are similar to levels in high income countries and substantially better than averages for sub Saharan Africa.

[editor: Table 1]

Two questions naturally arise: (i) What caused Botswana to develop favorable political institutions? (ii) How does Botswana manage its natural resources and what success has it achieved? Acemoglu, *et al* (2003) answer the first question by pointing out that Botswana's pre-colonial tribal institutions encouraged broad participation in decision making and placed significant constraints on political leaders. Fortunately, British

[43] Iimi (2006), 6-8.

colonial governance had only a limited effect on those institutions, so this tradition of constraints and broad participation was largely intact at independence.[44]

The central government has played a dominant role in the path Botswana has followed for developing its resource wealth. In 1967, one year after independence, the Mines and Minerals Act transferred all sub-soil mineral rights from the tribes to the central government. Since then the country's dominant political party, the Botswana Democratic Party (BDP), has encouraged mining companies to explore and produce by granting long term contracts—over 10 years for minerals in general and 25 years for diamond-mining. [45] The country's record of stability evidently makes such long term commitments credible to investors. The central government claims a 50 percent share of profits and, as a matter of policy, allocates this revenue to investments in infrastructure, health and education. Botswana resisted the trend in other African countries to indigenize its bureaucracy and instead retained expatriate workers and consultants until Botswana workers could be trained.

Botswana presents an example in which the national government's orientation is toward providing public goods, including an effective rule of law and institutions of property, rather than serving the interests of political elites. As a result, Botswana's national government has managed the country's resource wealth with relative efficiency and largely avoided rent dissipation. A country that is similarly resource rich, has taken a similar path in resource development and has enjoyed considerable economic success is

[44] In explaining the relative absence of British interference, Acemoglu, *et al* (2003) note that Britain's primary interest in Botswana was geographic rather than economic, since it occupied a strategic position vis a vis the Boer states and German Southwest Africa (now Namibia).
[45] Information on mining contracts and the use of revenues is from Iimi (2006), 10-11.

Norway. Its central government and national oil company are heavily involved in managing the country's offshore oil resources. Not surprisingly, political power in Norway is highly dispersed and Norway's institutions receive near perfect assessments for democratic accountability, law and order and absence of corruption.

User management with state support for exclusion: Mexico's lobster fishing concessions

A single stock of red lobster (*Panuliris interuptus*) found on the west coast of Baja California, Mexico is harvested by fishers' cooperatives under concessions established in the 1930s. In 2004, after extensive scientific review the Marine Stewardship Council (MSC) certified that this fishery satisfied MSC's criteria for sustainable fishing.[46] To receive MSC certification, a fishery must be managed to avoid overfishing and stock depletion, to avoid interference with ecosystem functioning and to respect applicable laws. Only 51 fisheries worldwide have received MSC certification and Mexico's red lobster fishery is one of only a few in the developing world.[47]

Catch from this fishery has remained stable since 1988 and trends in catch per unit effort suggest that stocks have not fallen below maximum sustainable yield levels.[48] Fishing is done with traps fitted with gaps to allow escapement by fish of sublegal size. Tangle nets, once common in this fishery and still widely used elsewhere in Mexico, are not permitted. 'Ghost fishing' by lost or abandoned gear is considered insignificant and

[46] The certification study is documented in Scientific Certification Systems, Inc. (2004), hereafter denoted SCS. Unless otherwise indicated this document is the source for information on this fishery.
[47] Information from the Marine Stewardship Council's web site, accessed on March 17, 2009 at: http://www.msc.org/track-a-fishery/certified.
[48] Information is from SCS.

illegal fishing is regarded as almost nonexistent. Bycatch is recorded and discharged at sea and bycatch species are not regarded as threatened or endangered.

The institutional setting for this success story is dominated by a group of nine fishing cooperatives that have exclusive access to the red lobster stock in the central region of Baja California.[49] These cooperatives were established during the 1936-1938 period by the national government and each was assigned a group of species, including lobster and abalone, within a delimited fishing territory. A system whereby entry is limited evolved from this system of concessions. The central government's role since 1992, when 20 year renewable concessions were established, has largely been limited to designating parts of the year as closed seasons and to specifying a minimum legal size.[50]

The nine cooperatives that sought MSC certification consist (approximately) of 1,300 members operating 230 boats and 14,000 traps. Each cooperative employs a biologist or technician to assist with data collection and to provide data to government agencies. Each cooperative limits effort within its concession. Before the season starts, each co-op submits a plan specifying the number of fishermen, boats and traps intended for operation to the governing agency for approval.[51] The co-ops are responsible for regulating fishing operations to comply with the plan. The co-ops have the power to enforce regulations and management objectives within their concession areas. They also play a role in settling disputes and enforcing illegal actions by their own members.

[49] These 9 cooperative are responsible for the major portion of the catch. A smaller 10th cooperative operating in the same general region was not included in the MSC review. In all, 26 cooperatives are authorized to harvest lobster in Baja California. Groups harvesting from smaller portions of the stock in northern and southern regions of Baja California were not covered by the MSC certification.
[50] An agency of the National Commission on Aquaculture and Fisheries is in charge of issuing permits, policies and regulations and for compliance. See SCS, p. 9. Regarding the nature of the concessions, see Costello and Kaffine (2008).
[51] SCS, 52.

Government enforcement activity is at least partially funded by the cooperatives, which each contribute $100,000 per year for this purpose. The cooperatives have a reputation for severely punishing members who violate rules, including removal from the co-op.[52]

This management regime and effective ownership structure seems well-suited for success, given Mexico's political institutions.[53] Although Mexico has made remarkable progress over the last 15 years on democratic accountability, lawlessness and corruption remain problematic and seem to be getting worse as Table 1 indicates. The existing management system relies on the central government to legitimize exclusion, but apparently for little else. While the government sets seasons, it is clear that the cooperatives effectively limit effort themselves by restricting deployment of boats, gear and personnel.

When the current management regime was adopted in the 1930s the catch was largely consumed locally, or at least within Mexico, and of limited value. This presumably allowed it to escape the attention of political elites who might otherwise have sought to control it. This seems fortunate, as Mexico's central government was at that time thoroughly autocratic and placed few constraints on the chief executive.[54] The catch now averages 1,600 tons annually, is sold abroad in Asia and elsewhere and plausibly generates several million dollars per year in revenue. If the lobster fishery's value had been this high in the 1930s it might have experienced the same fate as Mexico's oil resource.

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[52] SCS, 58.

[53] Costello and Kaffine (2008) conclude that the lobster's relatively rapid natural growth rate makes an important contribution to the success of its management under limited tenure concessions. They support this point by noting the poorer record of success for the slow growing abalone harvested in the same area by the same concessions.

[54] This assessment is based on the Polity data base.

Enabling rent capture by broad stakeholder groups: Namibia's new fishing industry

Namibia's fisheries management regime is widely regarded as a success story, particularly among fisheries in the developing world. The country's unusual political history and management approach makes the story particularly interesting. The country was under German colonial rule from 1884 until the end of World War I, after which it was successively under the nominal control of the League of Nations and the U.N., but was *de facto* administered by South Africa. In 1990, Namibia became an independent state with a democratic government. The Marxist South West People's Organization (SWAPO) has been the dominant political party since independence. Despite the dominance of SWAPO and the fact that voters elected the same president for the first 14 years of its history, Namibia receives high scores for democratic accountability by political rating systems; see Table 1.

Prior to independence Namibia's fishery resources were heavily exploited by distant water fleets based in the USSR and Spain and to a lesser extent by fleets from Asia, Europe and former Soviet bloc nations.[55] Virtually uncontrolled fishing led to spectacular catches of sardine and hake, followed by collapse or near collapse of both stocks. The hostile natural environment of Namibia's coastline did not accommodate a significant domestic fishing industry or even extensive subsistence fishing prior to independence.[56]

[55] Sumaila and Vasconcellos (2000) and Nichols (2005). Sumaila and Vasconcellos (2005, 459) report that 99 percent of the hake catch was by foreign fleets until 1985 and the proportion was only slightly lower between that date and independence.
[56] Sumaila, *et al.* (2005, 1-2).

A combination of unusual geographic, marine ecological, historical and socio-political factors contributed to the unusual path of fishery management Namibia took following independence. Physically, the availability of only two natural harbors on the coastline simplified the job of monitoring catches (Sumaila, *et al*., 3; Bergh and Davies, 2005, 295). Ecologically, two upwelling cells near the country's maritime borders form natural barriers that limit migration of many fish stocks, meaning that these stocks are either not shared with other countries or are shared to only a limited extent, simplifying the politics of management. Historically, the harsh environmental conditions existing on the coast forestalled development of an extensive local fishing industry, meaning that the country began independence with an almost clean slate from the perspective of fisheries policy (Sumaila, *et al*., 2005, 3). Socio-politically, the absence of a well-developed domestic fishing industry meant that organized user groups did not dominate policy formation, a fact that may have minimized rent-seeking. The absence of a significant domestic user group made it impossible to adopt a management scheme that relied heavily on community or user groups, as is often done in TURFs and harvester cooperative systems.

Two aspects of the Namibian approach to fishery management are noteworthy. First, upon gaining independence Namibia declared a 200-mile exclusive economic zone and enforced it with a vengeance. On the day the law became effective, over 100 foreign vessels were fishing illegally in Namibian waters (Nichols, 2005, 325). Rather than taking the path of least resistance by licensing foreign fishers as other developing countries had done, Namibia took into custody 11 Spanish trawlers and one Congolese trawler during 1990 and 1991 (Nichols, 2005, 325; Bergh and Davies, 2005, 290).

Namibian courts awarded most of the captured assets to the Namibian government. This message, plus an extensive monitoring and enforcement system, largely eliminated poaching.[57]

Second, the country's fishery management policy has distributed fishery rents throughout the population. The basic policy instrument is a set of fishing quotas for individual species. Quotas are granted preferentially to firms that are owned and controlled by Namibian citizens and that employ or otherwise benefit Namibian citizens.[58] Namibian groups who suffered under pre-independence apartheid rule are particularly favored under this policy. Quotas vary in duration from 4 to 20 years, with longer tenure granted for firms owned by and employing Namibians. Fees or taxes are imposed on fishing quotas as a way to capture rent, but fee levels also favor firms owned by and employing Namibian citizens.[59] Between policy adoption and the late 1990s, employment of Namibians in the fishery sector rose from 54 percent to 85 percent and Namibian vessel ownership from 60 percent to 85 percent (Armstrong, *et al*. 2005).[60] According to Nichols (2005), Namibian ownership of quotas for the two most important species rose from less than 20 percent at independence to over 90 percent by 2003.

How well have these policies fared? At present entry into fishing is 100 percent limited in Namibia. TACs and quantitative individual fishing quotas apply to over 90

[57] According to Bergh and Davies (2005, 297) only one large foreign vessel has been caught fishing without a license in Namibian waters since this event. The monitoring system includes on-board observers on over 70 percent of all vessels, sea, air and shore patrols to detect illegal fishing, complete monitoring of all landings at the country's only two ports and a satellite-based vessel monitoring system to report vessel movements in real time; Nichols (2005).

[58] The following policy description relies on Nichols (2005) and Armstrong, *et al*. (2005),

[59] A portion of fishing quotas are set aside each year for Namibian newcomer applicants, a policy intended to benefit previously disadvantaged groups; Armstrong, *et al*. (2005).

[60] The Namibianisation policy is not without critics. Some claim that rents go mainly to a few rich operators and that much actual ownership is foreign, with Namibians acting as fronts; Armstrong, *et al*. (2005).

percent of the catch. Evidence indicates that the monitoring system is effective; since the early 1990s violations per inspection have declined dramatically (Bergh and Davies, 2005, 298, 299). The Namibian fishing industry is not subsidized (Nichols, 2005, 324). Due to the deliberate policy of employing Namibian citizens and favoring specific Namibian groups, fishing quotas are not transferable. While this no doubt causes some proximate inefficiency, the resulting broad distribution of rents enhance longer run efficiency by forestalling potentially destructive rent seeking by elite groups. Harvests of the main commercial species, hake and horse mackerel, were stable or increasing during 1998-2002 and the same is true of most less important species.[61]

Because Namibian fisheries policy has deliberately broadened the set of stakeholders, it would be difficult for an elite group to appropriate rents for themselves. Namibia's ability to accomplish this broadening owes in part to the absence of a domestic fishing industry at the time policies were formed. The orientation toward broad rent distribution is no doubt partly due to the strongly democratic nature of the founding government—a government that was, ironically, led by a Marxist political party.

Conclusions

Recognition that common-pool resources can suffer from the tragedy of the commons initially led to calls for unitary ownership, typically by government. Experience from Africa, Latin America, Asia and the U.S. indicates, however, that transferring control to government often transforms resources toward, rather than away from, open access. With

[61] Sardine catches remain low, though there is recent evidence of a possible recovery (Nichols, 2005, 323-324). Stocks of hake and horse mackerel are reportedly recovering; sardine stocks remain low, due in part to adverse environmental factors (Nichols, 2005, 329).

government assumption of control, indigenous institutions often are rejected and the actions local users once took to steward resources are sometimes rendered illegal.[62] In many instances government, with its own motivations and priorities, fails to monitor and enforce resource use or manages resources primarily to achieve political ends. In such cases rent capture can be low and environmental damage high. In other instances, however, government management has succeeded and the difference in outcomes is partly due to differences in the political institutions that shape government behavior. The aim of this chapter was to compile knowledge on links between political institutions, government behavior and success in managing fisheries and other resources.

A broad conclusion from the evidence examined is that private stakeholders, particularly fishermen, can perform many of the management tasks typically assigned to government agencies in fisheries around the world. Government's essential roles lie in assigning initial rights to the resource and providing a legal system in which conflicts over those rights can be adjudicated. In cases where there are external effects between interested parties, e.g., commercial fishing versus environmental interests, a well-performing government can be useful in mitigating conflicts and promoting efficient outcomes. In a wide variety of circumstances, however, the conventional wisdom on which tasks the private sector can perform need to be revised. Extensive experience for a variety of resources and a range of political systems indicates that users can effectively perform the monitoring and enforcement functions necessary for managing common pool resources. Evidence from developed and developing countries also demonstrates that user groups can solve the common-pool problem of apportioning an overall level of extraction

[62] Dietz, *et al* (2002), 11-13.

among individual extractors. When attempted by government this apportioning task can become politicized and grind to a halt before any progress is made. In a few cases (New Zealand's Challenger example and Japan's FMOs), private entities have been granted responsibility for determining catch levels.

When these tasks cannot be assigned to private users for some reason, selecting a *particular government* to be responsible for management may open a pathway forward. The 'quality' of government can vary widely across national, regional and local levels. An under-exploited avenue for reform is to shift management toward the 'right' government, a government oriented toward providing public goods and one in which resource stakeholders are politically empowered.

The principle of involving user groups in operational management tasks could be extended to engaging these groups more actively in setting management goals. One vehicle for this is the Marine Stewardship Council's certification process. To date stakeholders in 51 fisheries have funded the studies and undertaken the requisite mitigation, so the MSC brand evidently adds value. MSC certification requires that (i) target stocks be managed for long term viability, (ii) that the host ecosystem, related species and habitat diversity be maintained, and (iii) that applicable laws and management systems support sustainability and are respected. Certification might be denied due to the type of gear used, excessive poaching, bycatch of depleted species, or unsustainable catch levels for target species. MSC certification conditions amount to a

shadow regulatory system, typically more stringent than government requires, that fisheries may opt into to gain the MSC label.[63]

Two observations from the review of existing research point in directions deserving further study. First, it would be useful to have a 'tool kit' of best practice approaches to solving specific fisheries management tasks. As the evidence reviewed here indicates, a number of success stories that appear to offer lessons for reform elsewhere. A critical qualification, however, is that the success of a given management approach depends on the political context in must work from. Best practice recommendations should therefore be targeted toward a specific management task *and* a specific set of political institutions. Unfortunately, existing case studies and statistical analyses of the success of common property arrangements in managing common-pool resources are not appropriate for identifying best practices in this sense. They typically treat government as a generic entity and seldom if ever link outcomes to such factors as government's susceptibility to corruption, responsiveness to stakeholders, etc.[64] These factors deserve more prominent attention in future case study and statistical work.

Second, the ability of resource user groups to solve management problems may depend on their own internal political economy. Bardan and Dayton-Johnson (2002) report field evidence indicating that various forms of inequality hinder success in user managed irrigation and other common pool resource systems. The specific factors identified include inequality in income, wealth and social status, unequal access by virtue

[63] The desirability of MSC as an institution depends on the conditions it imposes, of course. Also, the practical effects of certification are not entirely clear as the fisheries seeking certification typically are already well-managed. A substantive examination of these questions is beyond the present scope.
[64] Agrawal (2002, 45).

of location, and social and ethnic heterogeneity; Bardan and Dayton-Johnson (2002, 98ff). A plausible conjecture is that simple rules that treat users identically tend to be both efficient and broadly acceptable when the group is relatively homogeneous. Likewise, social institutions that treat different users treated differently may be difficult to negotiate, even in situations where such treatment is needed for efficiency. A better understanding of the factors that promote adoption of user-based management institutions could make a valuable contribution to common pool management.

Fishery management regimes, like property rights, are multidimensional and different tasks can be assigned to different parties. Accordingly, a broad range of pathways toward better common pool management is available to consider. An important ingredient in many of the successful examples described earlier is a clear assignment of management responsibilities to a private agent who has a direct stake in the outcome, in other words, an assignment of rights to private stakeholders. Instead, assigning rights and relegating management to a government agency is often the default course in fisheries management and the result is to make individual success depend less on skill in fishing than on skill in navigating the political system.

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Table 1. Summary data on institutional quality

	Democratic Accountability			Law and Order			Corruption		
	1990-95	1996-00	2001-05	1990-95	1996-00	2001-05	1990-95	1996-00	2001-05
Africa	2.63	2.72	3.02	2.70	3.29	3.02	2.88	2.45	2.03
Botswana	4.00	3.53	3.47	5.00	4.10	3.69	3.50	3.00	3.00
Namibia	3.98	4.32	4.00	4.38	6.00	5.72	4.55	3.42	1.75
Latin America	3.45	4.07	4.28	3.15	3.40	2.81	2.94	3.00	2.48
Mexico	3.77	5.08	6.00	3.00	2.48	2.38	3.00	2.55	2.28
US	6.00	5.98	5.54	6.00	6.00	5.32	5.00	4.18	4.37

Higher numbers indicate more favorable institutions. Min=0 and Max=6 for all indicators.
Source: International Country Risk Guide, Political Risk Services.