THE POLITICAL ECONOMY OF NATURAL RESOURCE USE

LESSONS FOR FISHERIES REFORM

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LESSONS FOR FISHERIES REFORM

Report

prepared for

Global Program on Fisheries (PROFISH)

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Abbreviations and acronyms

ABC	allowable biological catch
ADMADE	Administrative Management and Design for Game Management Areas
AERE	Association of Environmental and Resource Economists
AfDB	African Development Bank
ASDF	Asian Development Fund
BDP	Botswana Democratic Party
BIDS	Bangladesh Institute of Development Studies
CAMPFIRE	Communal Areas Programme for Indigenous Resources
CAS	Country Assistance Strategy
CDC	Center for Disease Control and Prevention
CFA	Conservation Finance Alliance
COAG	Conference of Australian Governments
CSEC	Challenger Scallop Enhancement Company
CSP	Country Strategy Paper
DAC	Development Assistance Committee
DFID	United Kingdom Department for International Development
DWF	distant-water fleet
ECPA	Electric Consumers Protection Act of 1986
EPA	Environmental Protection Agency
EU	European Union
FAO	United Nations Food and Agriculture Organization
FCA	fisheries cooperative association
FERC	Federal Energy and Regulatory Commission
FMO	fishery management organization
GB	Grameen Bank
GDP	gross domestic product
GEF	Global Environment Facility
GL	gigaliter
GNI	gross national income
GTZ	German Development Agency
ha	hectare
IBRD	International Bank for Reconstruction and Development of the World Bank Group

ICRG	International Country Risk Guide
IDA	International Development Association of the World Bank Group
IFC	International Finance Corporation
IFPRI	International Food Research Policy Institute
IIFET	International Institute for Fisheries Economics and Trade
IMO	International Maritime Organization
INCRA	Instituto Nacional de Colonização e Reforma Agrária (Brazilian National Institute for Colonization and Agrarian Reform)
ITQ	individual transferable quota
IUCN	International Union for Conservation of Nature
IUU	illegal, unreported, and unregulated
IVQ	individual vessel quota
kg	kilogram(s)
Kt	kiloton(s)
m	meter(s)
MCA	Multi-Criteria Analysis
ML	megaliter
MSA	Master Settlement Agreement of the Tobacco Trust Fund
MSC	Marine Stewardship Council
MST	Movimento Sem-Terra (Brazilian landless peasants movement)
NAQS	National Ambient Air Quality Standards
NEPAD	New Partnership for African Development
NGO	nongovernmental organization
NOAA	National Oceanic and Atmospheric Administration
NSW	New South Wales
NWC	National Water Commission
NWI	National Water Initiative
OD	Official Aid
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
OOF	Other Official Flows
PAF	Partnership for African Fisheries
PERC	Property and Environment Research Center
PLAID	Project-Level Aid

PROFISH	Global Program on Fisheries of the World Bank Group
PRSP	Poverty Reduction Strategy Paper
RBM	rights-based management
RCRA	Resource Conservation and Recovery Act
RDC	Rural District Council
RIS	Regulatory Impact Statement
SCS	Scientific Certification Systems, Inc.
SOFIA	*The state of world fisheries and aquaculture*
SSA	sub-Saharan Africa
SWAPO	South West People's Organization
TAC	total allowable catch
TNC	The Nature Conservancy
TURF	territorial use right
UN	United Nations
UNCLOS	United Nations Conference on the Law of the Sea
UNEP	United Nations Environmental Programme
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
USSR	Union of Socialist Soviet Republics
WCPA	World Commission on Protected Areas
WSSD	World Summit on Sustainable Development
ZAWA	Zambian Wildlife Authority

Preface

The release of *Sunken billions: The economic justification for fisheries reform* has drawn renewed attention to the enormous loss of wealth suffered in fisheries each year due to weak fisheries governance and the need for fundamental fisheries reform. Such reform calls for directly and effectively addressing the "tragedy of the commons" plaguing the world's fisheries, whose symptoms include persistent overfishing and fleet overcapitalization, and addressing the political economy challenges of developing country-specific pathways of reform.

Despite growing evidence of success in selected fisheries, less than two percent of the world's fisheries have actually undergone effective reform because of these challenges. While *Sunken billions* paints a very dismal picture of the world's fisheries, it does have a silver lining. It is estimated that the world's fisheries could generate at least US$50 billion per annum and the economic benefits generated could be much higher if management systems were established to enable investment in growing this important economic sector in a sustainable manner. Equally important, the potential pay-off from economic fisheries reform is not only globally significant for the sector, it is crucial for enhancing economic growth and alleviating poverty in developing countries with significant fisheries assets.

This report seeks to move this debate forward by discussing key lessons drawn from reform experience in the wider natural resource sector that might inform successful reform in fisheries. This report is a compilation of 12 papers prepared by acknowledged international experts in the fields of fisheries and wider natural resource reform which were reviewed at a workshop convened by the Property and Environment Research Center (PERC) in May 2009. The report forms an important initial input into an ongoing enquiry into the political economy of fisheries reform initiated by the World Bank in partnership with the Partnership for African Fisheries (a United Kingdom Department for International Development funded program of the New Partnership for African Development (NEPAD)).

Lessons for the reform of fisheries drawn from the background papers and from workshop discussions are synthesized in a final chapter on "Lessons for Fisheries Reform and Development Assistance".

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This final report is the product of these papers and a forum held in Big Sky, Montana, on May 7–9, 2009, jointly sponsored by the World Bank and the Property and Environment Research Center. Forum participants are acknowledged for their constructive comments on the papers presented. Special mention must also be made of Monica Guenther, Colleen Lane, and Debora Thornhill for providing invaluable logistical support to the forum and to the follow-up phases leading up to this report.

Contributions provided by Arthur Neiland and Steve Cunningham of IDDRA Ltd distilled from a parallel stream of work investigating the performance of development aid in fisheries in African have added significantly to the depth of issues addressed in this report

Don Leal, Research Director for the Property and Environment Research Center (PERC) deserves overall credit for his role in commissioning the various individual papers, directing the forum session and synthesizing the various lessons learned. Don also provided editorial oversight ably assisted by Dianna Rienhart from PERC. Kelly Greisen, Laura Huggins and Mandy Bachelier from PERC are also acknowledged for their contributions in preparing the final report

Michael Arbuckle (Agriculture and Rural Development Department, World Bank) prepared the terms of reference for this program of work and assisted with the development of the report as an input into a wider study on the political economy of fisheries reform. Valuable contributions and support were also provided by other members of the PROFISH team at the World Bank including Kieran Kelleher, Finn Alfredsson, Oleg Martens and Irina Ghobrial.

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Chapter 1

New directions in fishery management

by

Anthony Scott

Behind our interest in the political economy of natural resource use is the general recognition that the growing economies have made increasingly valuable use of many of their natural resources by making the best use not only of new knowledge but also of new "institutions." In the process, however, the new, growing, economies have failed to give shape to their fishery institutions.

This lag occurred earlier in the history of fishery institutions in what are now the developed economies of Europe. Until recently these institutions remained much as they had been in the 18th and 19th centuries. Indeed, if it had not been for the need to accommodate new technical inventions such as steam and diesel power, radio communications, and synthetics for nets, the institutions of the modern fishery would still have many of their features in the good old days of sail and muscle power.

In the following discussion I focus on what we know of the development of fishery institutions in the Western economies. The changes of the last two decades—still going on—have been very rapid, and there is much to catch up on. Their new forms may be a model, or a warning, to those who would reform the fishery institutions of the developing world. The history and description of these institutions center on what economists think of as property rights (sometimes regardless of the more careful definitions used by legal scholars and working lawyers). Coping with the unique challenges of fishing, especially those of migratory resources and open boundaries, the fishing industry has had grave difficulty building on the rights and duties that routinely support the organization of other industries.

To go into this, I present a way of thinking about the characteristics of any property right, not just those held by fishers, and report very briefly on the history of these characteristics, We shall see how the weaknesses of such characteristics have contributed to overfishing yet have left even the most powerful of the rights' holders incapable of correcting the problem. It is implicit that the weakness of property characteristics has also resulted in the squandering of huge potential wealth from the world's marine fisheries—an estimated $50 billion a year, according to a recently published study by the World Bank (2008).

I then suggest the elements of institutional change needed to manage and to develop the fish stocks of the developing world. Strengthening property-rights characteristics in marine fisheries will enable fishers to rise above the status of peasants and hunters. Their associations and the producer firms with which they trade will become important new institutions that can see to the management of the stocks; see to the production of flows of product for final markets; and detect where new facilities, vessels and ports will increase yields and incomes. These steps will not usually need much large-scale investment or industry modernization. Where they do, the institutions discussed here will help attract foreign investors and induce donors to entrust them with the sums needed.

Property characteristics: exclusivity

A sea fishery presents challenges to users, managers, and owners that are strikingly different from those encountered

on farms, in mining, or in the forest. Indeed, for hundreds of years a sea fishery has had no single "manager." Each has been exploited by dozens, perhaps hundreds, of vessel owners. The vessel owners did not "manage" the fishery, and their vessels and crews did not "produce" the outputs. Their responsibilities were only to hunt and catch the fish.

For hundreds of years their hunting and catching has been authorized for inshore fisheries by a permit or license issued by a landowner with great coastal landholdings. Further offshore, no permit or license was needed for many centuries. Then, one by one, the world's coastal governments began to act like the top owners of their fishery resources. They took over the task of issuing licenses and permits. Typically, licensing has given the vessels a right to fish, specifying however, the size, the species, and the place or area. In some respects it reminds us of the property right over land or natural resources held by the farmer, the miner, and the forester. But there are great differences.

The differences lie in the extent to which the rights have each of the following six characteristics: *exclusivity, permanence, transferability, divisibility, quality of title, and flexibility.* The property right to a farm, or to a city lot for that matter, has much of all six, but the right to fish is conspicuously deficient in all six.

The first characteristic, *exclusivity*, is most important. For the fishing right it is a measure of the degree to which the holder can operate free of interference from other fishers. This right would have exclusivity to the extent it gave the holder his own ocean area, an area in which he was protected from trespass or encroachment by other fishers. Even then, however, having his own exclusive area would not give him his own exclusive stock of fish, for in the ocean fish wander or migrate from area to area, where they could be fished by the holders of rights to other areas. Thus, we can say that the typical license held by fishers has lacked exclusivity, almost totally.

This deficiency is much worse for fishers than it is for the holders of rights over other natural resources. True, in the old days rights to some other natural resources may have lacked exclusivity. In the institution of the English manor, for example, those with rights to graze cattle or cut timber or dig coal did so in common with other users. Elsewhere, rights to take water from a stream or an aquifer, or to drill for crude oil from a reservoir, did not promise sole use of those resources. But the open-access character of rights to other resources has substantially disappeared. Between them, the governments and the courts have improvised rules that give exclusivity to the holders of rights to these resources. They have authorized boundaries and fences, contracts and leases. Exclusivity is protected and enforced under the law of property or of nuisance, perhaps even by the police in the criminal justice system. No longer are these other industries afflicted with externalities and spillovers among their operators.

Things are obviously quite different at sea. There is no ocean area that is exclusive to a license holder. Other fishers can always approach and fish alongside. The license holder cannot and may not build fences to keep the other vessels out or to keep his fish in.

Common property, racing and stuffing

In the decades around 1900, the fishing industry, biologists and governments recognized that the world's most valued ocean fish stocks were actually declining. The general explanation was that the food demand for fish was so great that the fishing industry was responding by catching more fish than the oceans and fish stocks could yield, just as some farmers were said to be mining the soil.

Several Scandinavian economists offered another explanation centering on the absence of individual property rights. Scott Gordon in 1954 shaped this approach into a formal, general theory, one that is still current today.[1] Starting with property characteristics, the fisher has no exclusive right to a fish stock. He shares it with hundreds or thousands of others. The absence of exclusivity in the license affects his supply decisions. The more he catches, the more fish are offered on the market and the lower the price the consumer will pay. In any other industry this price

fall would be controlled by a producer decision about how much to produce. The less the producer offers, the higher the price he receives, thus when the price fall reduces income he is motivated to catch less and offer less on the market. But what can the fisher do to balance the price against his costs and so his income? The answer is nothing because his right is not exclusive. If he reduces the number of fish he catches, some other fisher will increase the number he catches and markets. Gordon's theory predicts that when fishers have nonexclusive rights, the group of fishers as a whole will end up catching and marketing more fish than the amount that would maximize their incomes and society's rent.

Nowadays we take Gordon's theory further. We observe that when fishers are catching more than the market wants; they are steadily, and perhaps enduringly, depleting the fish stock. Fewer fish are growing to a marketable size, and thus valuable fish are scarcer. To get their share, vessel owners acquire larger and faster vessels, take on larger crews, spend longer time on the water, and invest in ever-newer types of fishing gear and winches. In the language of the fishing expert, the vessel owners, infected by a penchant for capital "stuffing", become locked into "racing" for the fish. Even if the price stays level, and even if they have better vessels and gear, their incomes, the nation's rent, and the government's tax revenue all decline as input costs increase and fish become scarcer.

But what can the individual vessel owner or crew man do to keep the fish stock up to a profitable population level, with a profitable composition of species and sizes? The answer is nothing. His right is not exclusive. If he fishes less, other fishers will take his place and catch, and market, more. We call them free riders on his attempt to make an improvement. As long as fishing rights lack exclusivity, the fishery's natural resource, is what Gordon called common property. Eventually it will produce no rent and will be characterized by a continuing tendency to a depletion of the fish stocks in value and in numbers.

Five more characteristics

After exclusivity, the second characteristic is *permanence*. It takes the passage of time into account, as well as the rate at which the fish stock and the market may change. The greater a license's permanence, the more a license holder's present efforts to increase the future fish stock will be rewarded in his own future catches. To illustrate, consider a simple fishery in which a number of independent vessels use surface nets. The incentive for them to conduct their operations to, say, preserve spawners is partly that they will gain a stable or larger catch in the future. Now assume that their rights are exclusive but that they lack permanence. If that is so, they will have no incentive to improve the fishery if their right to the future reward is no longer in force. You can see that their license's or property right's permanence complements and reinforces its exclusivity. Those whose exclusive rights are permanent, and who act to improve the fish stock, capture the benefits whenever they occur—in the year of the action or in future years.

This is where their right's third characteristic comes in. It is called *transferability*, or tradability. It complements the previous two characteristics' incentive to act to improve the fish stock. When a fisher's stock-improvement actions predictably increase his expected future catches, they also increase the value of his right to these catches. This characteristic gives him power to sell his license for its increased value, and so to be rewarded financially for his part in improving a fish stock before the actual increase in quantity or quality of catch materializes. If he makes or consents to an alleged improvement, he need not wait for months or years for his reward.

In addition, by allowing outsiders to buy licenses, and holders to sell or lease their licenses, transferability improves the mobility of labor. In the fishing community, indeed in the economy as a whole, the owners of factors of production are motivated to migrate to firms and industries that pay them best, and that maximizes their contribution to the whole social product. This is what some economists call an improvement in the allocation of a factor of production, and what modern economists call a contribution to the processes of economic growth and development.

What some fishery economists now also insist on is that transferability in fishers' rights provides an incentive, and the means, for fishers to work together (Munro 2009). Transferability aids fishers' common motive and priority in fish-stock management because it allows them to sell or lease rights that have gained in value as a result of collective action to improve the stock. Also, imagine an economy where the goal is to help independent fishers and vessel owners to cooperate so that they collectively bear risk and undertake management. You can see that they will be much more willing to join with others if they have the freedom to join or leave. For example, suppose it is proposed that the group as a whole adopts a changed management policy which promises a new level of risk or cost. The proposed policy is likely to attract some fishers and frighten off others. If members or outsiders who like such proposals can hold and/or buy membership fishing rights, more fishers will be attracted to joining like-minded fishers in self-management than if their memberships would tie them permanently to one fishery or group or policy.

That brings us to a fourth characteristic. I call it *divisibility*. Among natural-resource economists, divisibility is merely a subcategory of the transferability characteristic. They believe it to be obvious that if a right can be sold or bought, a fraction of that right must also be negotiable. Of course, it is not obvious: in the world's financial and proprietorial market places where there are many instruments that are indivisible. In the case of fishery rights, their divisibility complements their transferability and allows their holders to spread their risks. Granted, the catch entitlements of most quotas and licenses are already small and hardly need to be divided further. However, because its divisibility allows the holder of even the smallest quota to divide annual vessel hours among stocks and fishing grounds to increase the profitability of the total fishing enterprise, this characteristic is different from mere transferability.

The fifth characteristic is *quality of title*, or security. People who hold property rights to land will be slow to care for it if their ownership may be taken away from them. In the early days of private fishing property, fishers' rights were only as good as the word of the lord of the manor, or that of his father or even more remote ancestors. Under such circumstances, they would of course be very reluctant to bear the burden of fisheries improvement. They would fear, with good reason, that their lord would repossess their rights. The best example is found back in the thirteenth century. The English king and his lords had rented out the fishing rights in their local saltwater resources to churches, abbeys, guilds, and retailers. But after the king, in the Magna Carta, ruled against this practice, he and the lords simply withdrew their tenants' rights to their fishing places. The tenants' rights had had no quality of title. Thereafter, for hundreds of years, no one took responsibility for preserving or improving these fishery places. Even today, anyone who held a license or permit issued by a coastal landowner would know that there was no quality in this license, and would do nothing to look after that fishery.

The final characteristic of a property right is *flexibility*. It has to do with the rigidity of the conditions that are attached to a right that a fisher holds. It is difficult to provide, for it may well seem to encroach on the quality of title. Many holders of rights to resources want their landlords to sell or rent them rights that will be fixed and rigid. It turns out, however, that if a right holder is cooperating with other fishers or with his landlord, and if they are confronting, say, changing water temperature or pollution or predation, that they may each wish to change the conditions attached to their entitlement. This is easy to visualize with a leasehold or simple contract, less so when one is dealing with an age-old, freehold right.[2]

In sum, if a fishing-vessel owner had a license or permit that had all six characteristics, the owner would be in the position of a modern farmer, or of any land holder. He would have it for his own enterprise and could sell it, divide it, or add to it without interference from other fishers or from whoever issued his license. He could rely on even remote future benefits from his present actions. If the characteristics and terms of his ownership seemed onerous, he could bargain or negotiate with whoever issued his license.

Let us now turn from the fishers' ideal property right to the actual property condition of the world's fisheries.

The actual fisheries

Most sea fisheries are within national waters. Nominally, many centuries ago some of those fisheries within the developed waters of Europe and the Americas were long under the orders of private owners. In Scandinavia, Norman Britain, and parts of the Mediterranean, the land-holding lords claimed the adjacent coastal waters including the fish. Around 1300, this regime began to change. Any pretense of personal ownership of the coastal waters passed from the lords. For example, in Britain in 1215, decisions based on the Magna Carta started scrapping any idea of fishery *ownership* in tidal waters. To the extent that any tidal or saltwater fishery was subject to any ownership, that institution was the government. There was an institutional vacuum and it could not be easily filled because no one knew how to give exclusivity to the vessel's fishing right.

A little more insight into this situation can be given by surveying the various sea fisheries, starting with those nearest the high water mark along the coast—i.e., inshore fisheries. There, we find that most people who fished on the beach and in river mouths had no exclusivity in their fishing rights. There were exceptions, especially where some minor branches of the fish industry seem to have something like proprietary rights in adjacent land. For example, there were those using pots on the beach or in shallow waters, for oysters, lobsters, crabs, and clams. In some countries these enterprises were given special charters or licenses. These beds had not only certain exclusivity but also some of the other characteristics of property, such as permanence and quality of title or security. They were, and are today, fairly easy to enforce because they occupy designated patches of the beach floor. In this respect they were like today's fish farms, holding rights to spaces well above the seashore.

Moving farther out from the beach and the shore, we would have encountered canoes and other light vessels in the shallows. Some of them fished without rights or licenses. If their right to be there had any exclusivity, it probably arose from a local community's decision through a council-like arrangement specifying the days of the week on which each person could fish. We would find that a few of the others were out because they owned fixed nets and traps which they tended every day or so. As such, their ownership of the fixed gear and their right to tend it was recognized by the other local fishers.

Take another step outward toward the high seas. There we would have found larger crews working lines, dredges, trawls, and seines. Some of them fished close to their community, racing other vessels like their own. Others ventured across the ocean. They were prepared to fish in distant grounds, competing not only with vessels from their own region, but also with vessels from other nations. Many spent most of their working lives completely outside the realms of law and ownership. They were indifferent to the privileges or restrictions of permits, licenses and rights.

International institutions

In our final step away from the shore, on the high seas, we find ourselves in that vast area of the earth's surface that for most of history has had no nationality—few institutions, no property, no government. This was not just because achieving exclusivity was difficult. It was partly because there was in fact little fishing. No high-seas or international license or permit was needed. Unless the vessels had sought the protection of their own government against foreigners, they fished beyond regulation or control of any kind. Additionally, as it happened, the great powers had become dedicated to creating and perpetuating the doctrine of the freedom of the seas. This was the negation of what are usually thought of as institution and its component law of property. These same powers had shown that, if necessary, they could create maritime arrangements for fisheries. Closer to the shore, where their vessels had been in conflict, they had taken steps to create institutional regimes. Dominant cities and states such as Venice and Genoa had joined with their neighbors to make some rules. Here and there they softened their coastal claims. There came some inter-country fishing understandings, such as developed between Britain and Holland in the North Sea following the Treaty of Utrecht in 1713 and, later, among various European powers and the new United States in the northwest Atlantic.

Such agreements might be informal, annexed to more serious understandings about naval matters and coastal navigation. Rigorous claims to exclusive ocean jurisdiction had not arrived until the 15th century. Best known today is the Pope's 1493 division of parts of the oceans off Spain and Portugal. Jump three hundred years ahead to the 1793 adoption of the three-mile territorial sea limit by America, Britain and France. To find a really significant fisheries management or conservation treaty we must wait another hundred years for the 1893 Bering Sea fur seal treaty. Thereafter, there began a slow wave that continues today of treaties between pairs of countries. Their agreements were, and are today, typically less concerned with stock management and research than with preventing conflict between vessels over the fishing and the catch. Only a few of them have created active treaty organizations.

Since 1945, the nations collectively began settling the question of the extent of inshore waters—waters under national jurisdiction. The United Nations (UN), following the single-country claims made by Iceland, by Peru and her neighbors, and by the United States, began to regularize the Law of the Sea. Some started with claims to the map-makers' continental shelf; others with a stated number of miles, jumping decade by decade from a three-mile territorial limit to claims to a coastal zone 12, 25 , and 50 miles from shore. Eventually, between 1958 and 1965, the nations (led by Afghanistan!) ratified a UN-directed grouping of four Conventions. One of these was concerned with creating an exclusive economic zone to the edge of the continental shelf or to a depth of 200 meters or to a distance of 200 miles from shore. This idea has subsequently hardened along most coasts to a 200-mile exclusive zone over which the neighboring coastal state has authority over fishing as well as over most other marine activities and resources out to 200 miles from shore.

This progress on the shelf, however, had little bearing on fisheries beyond the 200-mile exclusive limit. Another Convention in 1982 made some provision for the kind of international fishery agreements and cooperatives already mentioned, but membership and adherence is voluntary. Today, the members of these treaties are basically the neighboring coastal states plus the foreign states whose "distant-water" fleets travel to the fishing grounds. A very few of them have assigned catch quotas to their members. Another group has considered agreeing on other regulations, limits, or controls, but they have to contend with "pirate vessels" from countries that have not signed and so are not subject to any regulations.

Both coastal and high-seas international agreements paper over an essentially unorganized, institutionless global picture. Essentially, ocean fisheries outside exclusive coastal zones are subject to treaties that offer minimal restraints, hardly protected by rules, regulations, or international governance. Some of these agreements are in disastrous condition. The chief value of mentioning them here is that they show that relying on international diplomacy to give the characteristics of property to those who manage or work the world's fisheries is not enough.

Government, regulation and licensing

Little is known about the dates at which various fishing countries began to impose a licensing requirement on ocean fishers. Some began early, reflecting the mercantilist practices of the medieval period. Others may later have followed the local practices of licensing inland fishing, in streams and lakes. When they began, some licenses were short-term, requiring annual renewal. Some were limited to a particular fishing ground. Most played almost no role in fishery management. They are perhaps best thought of as a source of public revenue.

It was around 1900 that observers began pointing out to policy-makers that some of the ocean stocks on which these fisheries depended were fading away. Not just vulnerable marine mammals but huge stocks of historically staple fish species, such as cod and herring, were actually declining. In response, the politicians slowly began to impose laws calculated to reduce the pressure on the stocks. There ensued more than a century of government intervention and rule making. Most countries began with a tightening-up of the issuing of their licenses and permits by, for example, charging higher fees, demanding annual renewals, confining licenses to one area or species, or denying its issuance to foreigners. They also began, even before World War I, to consider introducing fishing regulations, many of them

based on the model of those already required for angling in some of their fresh-water fisheries. A beginning was made in controlling the fishery by regulating the most potent gear and vessels After the war, the government regulators learned to formalize their controls under the banner of attempting to moderate the human catching "effort" (as the biologists termed it) on an identified fish stock.

One strategy for reducing effort was to close the fishery for one or more periods during the season. As we now know, it was found that closures and the fear of further closures induced the vessel owners to increase their racing to the fishing ground. Thus began years of substituting larger and faster vessels for the previous work-every-day smaller vessels and investing in modernized gear and larger crews. Eventually it became clear to scientists and the fishers themselves that the new fishing area closures were not reducing the effort or the catch. Between closures there were open-access periods, when the ever-better-equipped fishers were restoring the pressure of their effort on the stocks. Just the same, the governments and even their regulators thought their closed-period rules worked in the desired directions. In the very short run, at least at the time of a new closure, it cut down the year's total catch and so the pressure on the stock. In addition, the necessary inspection and enforcement were relatively simple.

To reinforce these area closures, government agencies responded with gear regulation. One form of this was net control, banning the fishers from using very fine-mesh nets in trawling and in seining. This kind of regulation had a less general purpose than fishery closing. It was designed chiefly to allow small fish, not yet grown to spawning or to commercial size, to escape from capture. It was closely studied by biologists and led to a general mathematical scheme of what was called "eumetric" fishing (for example, Beverton and Holt 1957; Turvey 1964).

Other forms of regulation were very specialized. Some had to do with limiting the number of hooks or pots that an inshore vessel might drop. Others had to do with the power or size of the vessel. What was the result? Somewhat like regulation by closure, gear regulation had the effect of inducing the vessel owners to spend more on whatever the government had left uncontrolled.

From regulating gear to limiting licenses

European governments at last accepted the academic and fisher opinions that trawlers and other super-vessels were depleting stocks and reducing catches. They were now advised by their professional fishery biologists and engineers and obtained some consent from active fishery interests. Among these advisors were distinguished scholars who were developing fishery-dynamic models for each stock, area, or species. With this advice, most governments ignored the opinions of many of their fishers and simply imposed tighter closure and gear restrictions on them.

Impressed by the urgency of restoring the fish stocks, they had set out to prevent fishers from evading, trespassing, or interfering. Generally, fishers were regarded as a nuisance. In simplified terms, government shaped their goal to one of establishing stocks of a size that would produce a maximum sustained yield. In this venture, fishing was like ocean currents or the climate: it was an outside influence. Currents and climate could not be modified, however. Fishing could be modified.

To get a sense of the attitude forced on them, one needed only to compare a country's ministry of agriculture with its ministry of fisheries. The former was usually comprehensive, paternalistic, sensitive, scientific, social, and economic. The latter more often was a tough-minded bureau staffed by hardened enforcers, engineers, bureaucrats, and a mere leavening of fishery scientists. Their combined role was somewhat similar to that of a police force. While the agriculture ministry's politicians and staff were visibly concerned with farmers and rural life, those of the fishery agency centered their attention on measuring stocks, effort, landings, and calculating how much to tighten the existing closure, vessel, and gear controls.

In those days their main direct contact with most law-abiding fishers arose in the issuing of a fishing license to the vessel or owner. Their power to grant or refuse it proved to give the government agencies a routine means of enforcing the new gear and opening regulations. Fishers caught violating regulations risked losing their licenses. The

possibility of issuing a range of license types also facilitated the government's discrimination among fishers. For example, those who wanted permission to use high-powered gear or an extra-large vessel could do so only if they had acquired, say, a "blue" license. These might be awarded according to seniority, extra payment, or as a lottery prize. Those foreign vessels wishing to fish in domestic waters could do so only if they paid a premium for their "striped" license.

In addition to this complementing of government's gear-regulation activities, the issuing of licenses provided government scientists with a source of annual data for a new approach. In the 1960s, biologists had formalized a means for controlling fishing mortality that depended directly and entirely on setting a target for the total amount harvested each season in a fishery, called the total allowable catch (TAC). Some countries' licensing systems provided data on the amounts being caught and marketed, relative to the TAC. In other jurisdictions, keeping track of the catch was too difficult, so biologists fell back on using the licensing system to keep track of the number of vessels and, perhaps, how long they stayed on the fishing grounds. Inserted into the new biologists' formulae, these data were defined as measures of "effort." In either case, the TAC regulatory goal could be met by setting and adjusting the total level of fishing effort. This could be done if, instead of issuing licenses to all applicants, the government controlled and *limited* the number of licenses issued to meet and not exceed the effort target.

License limitation was tried, seemed to succeed, and as a policy was quickly introduced in many Western fishing nations. In the 1970s, the UK and the Netherlands began to issue limited-entry permits and licenses to fishers catching herring, mackerel, and groundfish. In the 1980s, the U.S. regional fishery councils began placing moratoria on the number of licenses issued to catch certain species. By the late 1990s, there were almost thirty of these. In the 1980s, two Australian states limited the issuance of licenses for abalone, rock lobster, and scallops. Canada, and then other countries, followed suit. Additionally, rather than merely terminating the granting of new licenses, the limitation schemes in most countries called for a gradual reduction in licenses already outstanding. This was done by lottery, by canceling some randomly, or by offering to purchase a certain number of outstanding licenses, the so-called buy-back version of license limitation.

Limitations of license limitation

The limitation of licenses had an initial success when adopted to protect fish stocks and stabilize the catch of certain species. As the scientists had predicted, a reduction in effort allowed the exploited stock to grow towards a desired size. As well, seen from the institutional angle, it seemed to be on the way to converting free licenses into property rights. Because it reduced the number of rivals against whom a vessel must compete, it might be said that it had made the owner's fishing right more exclusive. Because in most countries the vessel owner might buy or sell a license, the owner's right had acquired transferability. Because in some countries the license had become a rare and personal possession, the owner's right seemed to have been given a certain permanence.

These gains in three fishery property characteristics were offset, however, by weaknesses in two others: divisibility and security.[3] Although the rights were tradable, the government had not given the license a definite and fixed entitlement. To make the license itself divisible would simply create more licenses and undo the limitation scheme. Quality of title was reduced because the license limitation scheme dissolved the fishers' trust in the government. As the scheme was implemented, they saw more and more of their fellows unwillingly having to give up their right to fish. They feared, reasonably enough, that they might be next among those being forced annually out of the industry. In the language of property, they felt that their license no longer had its previous quality of title to fish.

In sum, limitation might have been a step toward converting government licenses into a sort of fishing right with tangible property characteristics, but the step left the license holder still with many steps not yet taken. Furthermore, it was later seen that the initial success of a policy of license limitation in preserving or increasing the value of the catch was being eroded by the increasing costs of fishing. Limitation had not removed the incentive of license holders to outrace and outfish their rivals. This racing, in turn, caused government regulators to shorten the fishing season, repeatedly and dramatically, in some fisheries from a period of months to a period of days. These reactions

then caused owners' fishing costs to rise. Furthermore, they caused them to adjust to short seasons by buying bigger and faster vessels and new types of gear. Again, fishing costs increased.

In the end, in most fisheries where the number of licenses had been limited, the license's lack of exclusivity and other property characteristics meant that the holders incurred higher costs than before and suffered decreases in profit and rent. There was generally little or no economic benefit.

Governments, associations and institutional change

The modern ocean-fishery solution did not appear until well after World War II. Appalled by the increasing impact of effort on the stocks and cheered on by certain academic economists, the governments of the coastal nations began in the 1980s to follow Iceland and New Zealand in a new direction. They greatly modified their previous emphasis on hardware regulation and fishery closures. Still trying to find a way to economically stay within the year's TAC they took a new look at licenses and permits.

From license to quota

Clearly, merely relying on a reduction in the number of licenses was not adequate. Now they went the whole way and limited the quantity of fish each license holder was allowed to land annually. This "quota" of fish was associated with a given percentage of the whole TAC for a given stock or area, commonly referred to as an individual transferable quota (ITQ). The individual quotas added up to the year's TAC.

With approval and enthusiasm, governments transferred experience with ITQs from one fishery to another and from one country to another. Of course, the basic purpose of the governments' ocean-fishery agencies remained, overwhelmingly, to protect the stocks from overfishing. They continued their basic, century-old responsibility for protecting the fish rather than the fisher. But from their administrative point of view, they found that ITQs eased their burdens and costs of enforcement. Much less patrolling of fishing grounds was needed for, in principle, they could now rely on an inspection of each vessel's landings at the port. The new quota system just made their role easier.

From the fisher's point of view and that of the industry, the new quota system was transforming. It allowed a veritable abandoning of the fisher's routine of racing to catch as many fish as possible as quickly as possible, which resulted in mostly frozen fish marketed to consumers each year. Instead it led to a steady landing and marketing of mostly premium-priced fresh fish over much of the year. In addition, fishers were able to match their effort with the seasonal fluctuations in consumer demand. Low demand periods during the season resulted in reduced fishing. Thus, for a given annual catch the fishers' costs went down while their total sales revenue went up.

In many fisheries, this transformation changed not only the fisher's routine, but their attitude. Their attitude changed from one of hostility toward fishery managers to one of cooperation because fishers now saw those who made the rules as assisting in adding to the value of their catches and quota licenses.

The quota as a property right

The quota license or right now had some *exclusivity*—indeed, much more so than with limited licenses. True, unlike the farmer's right to land, the fisher's right did not extend to owning the fishing area. The quota system still left the sea open to other vessels and potential competition. But each vessel owner now had the legal power to choose the manner and time of landing his given amount of quota regardless of the activities of others. In some respects the new quota was most similar to the farmer's appropriative water right in the western United States (for example, Scott 2008, 100–124). This right had given each holder an exclusive entitlement to a given flow of water

The fisher's quota right had a greater *permanence* than before. In many fishing countries, this gave him a longer

season, maybe a full year, to land his quota. If he caught little this week, he could make it up later. He could also allocate both his inputs and his product more efficiently over time to meet consumer demand. Indeed, he might also, in a certain sense, allocate his inputs and his product between present and future years. Having permanent quota percentages of the TAC, he and his fellow license holders might, by catching less this year, be rewarded with larger catch quotas and income in later years. As we shall see, however, to achieve this through private initiative, he would need joint agreement and action with his fellows to lower the overall catch.

The new quota system had *transferability* and *divisibility*. As noted previously, divisibility was absent in license limitation. Those who had the time or the skill or the understanding of the market could afford to expand by buying all or parts of quota from their fellows. Eventually most of the rights would be found in the possession of a reduced number of holders, those who could make the most valuable product from them. Transferability could be the condition for changing the industry's production structure, channels and processes and, as we shall see, forming fisheries' associations and other institutions. One new institution, found in Iceland, is like a stock exchange, where quota can be bought and sold.

The practice of transferring through buying and selling quotas turned out to give the holders a new quality of title or *security*. Once the government had allowed holders to buy and sell valuable, market-priced quotas, it was forced to abjure the practice of arbitrarily retiring licenses. Quality of title to a catch quota could be the basis for an increased willingness to cooperate with the scientists who calculated the TACs and with the government's enforcers.

In effect, the reformed property right turns the quota holder into an entrepreneur. True, in terms of stock or species, he still must put up with the common-property aspects of his rights. The free riding of other fishers makes any individual attempt to improve the stock unprofitable. But in the harvesting and marketing departments, he has escaped from the wasteful competition with other fishers and is free to develop his own catching methods, timing, selection, and so on (for example, Anderson and Libecap, this volume). If his catching and marketing decisions lead to higher rent or profits, the profits accrue entirely to him.

This theoretical and legalistic conclusion is supported by statistics in individual studies, especially those of the pioneering fisheries in Iceland, New Zealand, and Australia.[4] They appear to show that, while much of the gain has accrued to fish processors and fish consumers, ITQ fisheries are yielding an economic rent without depleting the stocks. This result is in sharp contrast to the economic position of many of the Western world's largest fisheries, which have not adopted a system of quota licenses. In Newfoundland, for example, after the cod fishery collapsed in 1992, most of the approximately 40,000 fishers were forced into unemployment. The cod stocks have not yet recovered.

Quotas as the building blocks of new institutions

Before the arrival of ITQs, groups of fishers could hardly be described as "institutions." Their independent vessels had competed with each other, and the crews had little to gain from working together.[5] There were, of course, general reactions to rules and to market forces. For example, in the days of license limitation and ever-shorter openings, some fishing groups reduced the risk of missing an opening by moving to isolated communities as near as possible to the fishing ground. Then, after licenses were converted into ITQs, openings again became longer. The quota holders no longer had a reason to live near the fishing grounds and moved back to more populated coastal areas where they lived near most of the other fishers. They could work with them to form new functional collective fishery institutions.

The mere fact of a switchover from a regime of limited licenses to a regime of ITQs reduces government's role as a regulator. This can be explained in two ways.

On the one hand, there were fewer tasks for which government's powers were indispensable. True, it still had the tasks of setting the TAC for each species and area and addressing multispecies and bycatch concerns, and there

might even be reasons for it to continue to impose closures or to suppress a gear type.[6] Nevertheless, it is fair to say that in most of the new ITQ fisheries, government's emphasis on gear regulation was reduced, and most of its previous enforcement activities were dropped.

Under ITQs the focus to make sure that vessels' landings were within their quotas in number, size, species, or weight. No longer was government called on to provide spies, watchmen, detectives, and traffic cops. Now, with an ITQ system, it provided staff whose role was merely that of a warden checking parking meters. Indeed, such jobs could now be farmed out to private agencies or to a collective formed by the fishers themselves. Sometimes checking catches and landings could even be accomplished by social pressure, the quota-holding fishers keeping an eye on each other.

There is a second reason for a diminished government role under ITQs: the appearance of fisher "associations," as I call them, that can take on many of government's former duties (for example, Scott 2008, 184). The exclusivity and security characteristics of the fisher's quota rights create a willingness and capacity to take on some tasks of self-government. Consequently, beginning to think and to act collectively has not been difficult. In addition, government has often played a supportive role in forming associations. Indeed, the initiative in creating some local associations has often been taken by the regulatory agencies in creating an organization chart, suggesting voting and rotation rules and sub-committees for landings enforcement, providing liaison with biologists, assisting in associations' contracting with outsiders, and so on.

The association's appearance signals the start of building a real fishers' institution, and perhaps lays the groundwork for a new fishers' culture, not only for each separate fishing area and village, but along the whole coast. Perhaps culture and institution are words that are too hifalutin and ambitious for what is appearing. There is no doubt that the association's ultimate explanations are in improving the technology of fishing and in its economic rewards. But another rationale for associations is to accommodate fishers' desires to increase their welfare by making their own improvements in the welfare and the productivity of their fishery. The nature of the fishery is such that to do this they cannot effectively act separately. They must act collectively. Because of the introduction of ITQs, which have many of the characteristics of property rights, fishers are no longer trespassers or free riders or competitors. As individual vessel owners, they can become companions and allies, personally and collectively seeking to keep fishing costs down while meeting market demands. In most respects it has become their joint fishery, giving them powers to exploit and manage its fish stocks, take income and rent from it, and buy or sell their shares in the association and/or the whole enterprise.

What powers will the association use to these ends? The most obvious and urgent role is to take over from government those functions that ensure the exclusivity of each member's right. This comes down to inspection of members' catches as they are landed and assurance that each catches only the quantity allowed by their quota. Beyond this, associations' powers can be used to include reporting to and hearing from biologists and their own hired scientific advisors, checking and assisting in stock assessments and TAC setting, and communicating to the membership the implications for their fishing.[7] As well, the associations' functions should include general government liaison, public relations, and specific counsel about vessels, equipment, and marketing.

Obviously, some of the functions an association might take over can be complex, perhaps too much so for elected officers and their vessel-owning members. Some skeptical governments have been slow to let groups gain or to utilize wide powers, and some organizers have failed to gain the confidence and support of all their fellow fishers. For such groups and governments, the new institution has yet to become established and may need further modification. Of course, as I noted above, where fishers having ITQ rights are fishing in a bounded area containing only one species of fish, many, perhaps most, regulations are quite unnecessary. Where there is a fishery with more than one species to be caught, however, the ITQ system needs to be supported by regulation. Each vessel will land and may discard some fish as bycatch that are of the species that are the main object of other vessels' fishing. In such multispecies fisheries, vessel observation and inspection to control bycatch can be unattractively expensive. Vessel owners are less keen about ITQs and much less keen about letting those fishing for the secondary species

have a voice in stock management. Indeed, in New Zealand and Australia, where fishers have welcomed ITQ rights in a large number of simple, high-value fisheries, there are some fisheries left out. They are still under government gear and closure regulation, without a formal channel for fishers' input.

The "constitution" of a fishery association

Assuming the mix of fishers and the mix of species favor the formation of a fishers' association, what can we say about that association's "constitution"? First, it must clearly specify the area and grounds to which the quota system applies, the period for which it is valid, and the species and age of fish that quota-holding members are expected to be seeking. Here also may be formally stated the understandings and arrangements arrived at by government pressure or by voluntary contracting for sharing the fishery with a sports-fishing entity. Similarly, it may describe the division of the rights to use the fishing area's waters with ferries, shipping lines, naval operations, and so forth.

Next, the constitution must deal with its own membership. Probably the government will settle the entitlement to membership before the association begins to make decisions. As with their tendency to make the rules for dividing up other natural resources (such as oil, minerals or water), governments do not duck out of this task. In the case of ITQ fisheries, their rules for distributing the new ITQs among fishers will probably also serve to distribute association membership. There are a number of procedures for initial allocation of ITQs among which they must choose. These include bestowing membership by auction sale (see Huppert 2007), a lottery, or a race of some kind. Instead of these, most governments choose to grant quotas and memberships by the "grandfather" system: those who held the previous type of license automatically receive the new type.[8] This assures that the change of system does not squeeze out those who were fishers under the previous license system. Pushing the grandfather idea further, the system usually provides that those who had the largest average catches under the previous system get the largest quota for the future. It is not surprising that government reserves for itself the choice of means for granting ITQs. It is obviously a very political matter.

The handing out of association memberships, however, does not usually go all the way with the handing out of quotas. When quotas are grandfathered, the fishers wind up with amounts of quota reflective of their previous fishing success. Highliners, those who have the top historical catches, get large quotas, but they do not usually get larger membership standing. As far as I can discover, all fishers in an association are equal (one member, one vote) when it comes to deciding the size of their association, membership dues, dividends, and so on.

The next matter to be settled is the structure of the association. There are two types. I will try to be brief in describing the abstract principles behind each.[9] One type is a little different from what has been mentioned so far. It can perhaps be likened to a farmers' irrigation district or to a cooperative apartment house. A group forms an association. The members collectively acquire an asset by buying it, receiving it from the government or making it themselves. In our case the group acquires as its assets a collective right to catch certain fish along with powers to manage the stock in the process. It is the group's right that has the characteristics of property, especially of exclusivity. It also has permanence and healthy amounts of security or quality of title, divisibility and transferability.

The cooperative group divides its secure and permanent right into individual secure and permanent rights and transfers them to its members. As for exclusivity, what the member now gets is the prevention of interference by nonmembers of the association. Seen another way, he gets his share of the benefits accruing from his group's willingness to reduce their present TAC so as to win an enlargement in their future TAC. He gets a determination from the association and backing from government that these benefits shall not be taken by free-riding outsiders, domestic or foreign. What the individual gets is the exclusivity attached to his right plus all he needs of characteristics such as transferability, quality of title, divisibility, and so on. In simple terms, as a member, the co-op grants him a right to fish that includes protection from interference.

There are indeed fishery associations like this. Their fishing costs and regulating costs may be quite low. That may be why they can afford to exploit large, but low-value, fisheries such as those for whiting, pollock, and herring. And

there are variants. Some co-ops have not been built around a group (as sketched above) but about an existing processor or buyer, to whom the members deliver all or most of their catch. Another variant is one popularized in the UK.[10] Reflecting the political and regional differences within the industry, it has emerged as a rather puzzling compromise between the co-op type and the later discussed condo type. Although the individual catching rights the co-op bestows on its members are for all practical purposes ITQs, they continue to belong to the co-op. If a member migrates from one port to another, his original co-op transfers "his" quota to the new co-op. It's up to the new co-op to decide whether to bestow this amount on the new arrival or to divide it among all its members.

The second type of association has a more familiar structure. Before a group is formed or even spoken of, the government distributes ITQs to the fishers or vessel owners. When they go into business they are already quota holders. Their structure differs from that of the cooperative-apartment group. It is more like that of a condo-, or strata-title, apartment group. Condo members buy their apartments from the previous occupant or from the original developer. Their apartment ownerships entitle them to their membership shares in the condo. In simple terms, as they become members, they join in making arrangements that reinforce their ITQs by preventing interference and free riding as well as endeavoring to protect and multiply the stock. Probably a healthy majority of fisher associations found in Iceland, Europe, the Americas, Australia, and New Zealand have this condo-type structure.

As for multispecies fishery areas, condo associations attempt to deal with the complications themselves. They insist that their members' vessels must not discard any fish that they have caught, including species for which the member has no quota or has a quota that is fully used up. True, they find this insistence difficult to enforce, especially against their own members whose style of fishing and choice of gear and location have steadily led them to large bycatches of fish that come from a forbidden species or have a forbidden size. The association's inspections and their disciplinary actions may induce these members to rebel, perhaps imperiling their association's continued effectiveness.

In some places the rights to what the association sees as a useless profitless bycatch species are held by a separate association of fishers. If their areas overlap, conflict may well ensue. Perhaps the associations will unite, arranging to assign the fish of each species to particular members. Or perhaps they will draw on their new powers to contract, to agree to a compact for a boundary which their vessels are not to cross (even when the species they seek has crossed over).

The next provision in the association's constitution sets the extent to which the government is still relied on to participate in the management of the fishery. The most important continuing role of government is in the use of its scientists to interpret changes in the density of the fish and their size and species. Neither kind of association can aspire to having its own labs and so forth, except on a minor scale, to help the officers to understand what they are hearing from members or government. Unless the members believe that the government has been in error or has been trying to mislead them, they may soon gratefully welcome whatever scientific assistance the government is willing to continue. A second role is likely to be the policeman's in patrolling and inspection. These too are costly. Probably, in periods of routine fishing, members of associations will be glad that some of that necessary expense will be borne by the taxpayer.

The initial distributional functions involved may well also be the government's last distributional act for that fishery. In the co-op structure, initial distribution takes place by government assigning the TAC or a share of the TAC to the cooperative. Redistribution is carried out by trade within the cooperative or by a co-op approval of a new entrant. In the condo structure, each fisher's new quota percentage, and his condo-membership percentage, has permanence, so any further redistribution will be implemented by each fisher himself, taking advantage of the transferability of his quota. He and the others can buy and sell quotas on the market. Once this quota market has come into operation, neither the government nor the fisher association need be involved in distributional questions about rights of membership. These are looked after by the markets for the members' tradable shares or quotas.[11]

These "articles" may complete the constitution and structure of associations and the government's necessary role in them.

Multiple-product resource and contracting

The account of the fishery so far has been simplified by concentrating on the management of a single stock fishery. Here, I pause to recognize that a fishing area, like most natural resources, can contain other activities than fishing.[12] An ocean area, for example, is used for many purposes: navigation, petroleum drilling, waste dumping, recreation, as well as for fishing. Indeed, fishing can include separate groups of vessels specialized in catching different species, perhaps all in the same season.

When there is conflict, which uses are to prevail? In the past, final decisions among the alternatives were made, by default, by governments.[13] But if each fisher or group of fishers holds a property-like quota license, its quality of title may give other users and the government pause. And if he is a member of an association, he and his fellows may be able to bring legal, political, or financial pressure to bear on the decision process. We may say that when he is represented by an association, he is able to contract—that is, bargain—with conflicting user groups and parties. His collective may be able to rely on the *quality of title* characteristic of its members' rights to impede the other users. Or, it may be able to exploit their rights' *transferability* and *divisibility* characteristics, thereby gaining something to offer in bargaining with other users. Or, again, the collective may be able to use the *permanence* characteristic of its members' quotas in order to make a bargain in which the rights to produce in present and future years are assigned to different users.

Associations in unindustrialized and developing regions

There are fisheries, often based in developing economies, where the local fishers have collectively controlled aspects of their fishing, working out rotational schemes for the best fishing spots and attempting to exclude intruders. Their aims are usually not those of the fishery regulators in the developed Western economies. I noted above that in the Western nations the government agencies seem more concerned with the well-being of the fish than of the fishers. In the developing economies, the concern is the opposite. There, their chief function, typically, is to get fairness among themselves, to share while avoiding disturbance and conflict.

Most of them are not ocean fisheries. Some of the best-known, such as those in developing communities along the shores of Brazil, in the Philippines, and even on the coasts of Japan, fish along the beach, in deep bays or in coastal swamps. With the support of their villages or communities, they devise institutions whose objectives are to reduce their costs and to give them some freedom from outside interference. Rarely do these institutions seek to manage or enhance fish stocks. If they do protect the fish stock, it is in the course of arrangements for taking turns to fish, sharing and cooperating.

Ostrom (1986 and 1990) and other scholars have shown that, until very recently, government played almost no role in such fisheries, except perhaps supporting and acknowledging the rights of locals in certain regions. Perhaps this was because in many of the underdeveloped regions, there had been little or no tradition of local saltwater fishing until the 20th century. Where sea fishing did begin, it was often undertaken by vessels in the distant-water fleets (DWFs) of developed countries. Some of these DWFs paid off the local communities or the local government. The local governments did not enforce or even impose fish-management regulations. In any case, they seemed unaware of overfishing and uninterested in stock conservation or promotion of the livelihoods and welfare of their coastal fishers. Looking back, the governments' fishery goal seems to have been to exploit the new Law of the Sea so as to collect revenue for inshore fishing concessions.

Later, when, with the support of the 1952 and 1982 Law of the Sea's 200-mile exclusive economic zone provisions, most DWFs were expelled from coastal waters, the governments of undeveloped coastal states were driven to taking more responsibility for marine resources within their zones. Now some of them are paid a sort of rent by the DWFs, but still almost no enforced local governmental action to control fishing has emerged. One of a government's few

functions has been intervention to draw boundaries to reduce conflict among its own coastal villages and among the individual fishers in these villages. Until recently it has rarely attempted to preserve or improve the fish stock, even inshore. The sharing of fishing among community members, where it survives, is still arranged at the community level.

Here is fertile ground for the introduction of quota systems. If the community is isolated, the quotas may be administered on a local level. Whether based on the geographic locality or on the whole fish stock, they can easily lead to the forming of associations to administer the quota systems. The point is to reduce the local fishers' present preoccupation with sharing arrangements by personal agreement. Slowly, the fishers can move on to more ambitious fishing enterprises, helped by their quota right's transferability and exclusivity. As individual members, they can begin to look for profit and rent in their fishery.

The association, co-op, or condo is not often seen as a development channel. This is a serious omission. Once formed, the association can begin to accumulate some of the rent for investment not only in its members' skills but also in their vessels and gear, as well as in the fish stock itself. In this connection it can become the receiver, administrator, and user of development funds from international agencies. One may predict that it is less likely to squander these funds than would an agency which does not hold members' rights and depend on members' votes.

Foreign fishers and treaties

A challenge to the control of a fishery by an association may be in the quota-holders' inability to exclude foreign intruders and free riders. They come, perhaps in fleets, from the high seas beyond the 200-mile limit. Even if a fisher's government has limited the number of licenses and has granted the holder of each an ITQ, there may be little exclusivity in his right. International law says that fishers from other nations may fish in the same place and land as many as they wish.

Only where its fishery is within 200 miles of a nation's coast can a government endeavor to prevent foreign fishers from other countries from interfering and free riding on a fishery that it is managing or protecting for its own quota-holding vessels. The danger from foreign fisher is of two types. One is an illegal danger, such as when the foreign vessels invade the 200-mile coastal exclusive economic zone and catch fish in the protected fishery. The other is a quite legal danger, as when foreign vessels catch fish that have wandered or migrated from the first country's waters out into the open sea or into the 200-mile coastal area of its neighbors.

These are the kinds of situations that now, with the backing of 1982's UNCLOS [14], and a recent arbitration based on it, induce the first nation to request the second to sign up for a fisheries' treaty regime. The countries have a duty to enter into discussions leading to agreements on the positions of the maritime boundaries between them. Furthermore, they have a duty to enter into cooperative fisheries development. The older treaties and the newer agreements, therefore, can serve as the basis for jointly managing the shared fisheries. They represent attempts to get the two fishing nations adhering to the same stock managing targets and seasonal fishing rules. If the fish do not wander too far from the coast, they are always under the management and the legal protection of one government or another.

Negotiating and signing international fisheries' treaties and agreements has already been done by dozens of pairs and triplets of fishing nations.[15] Such treaties' drafting and their administration are not easy. Furthermore, the detailed making and enforcement of regulations adequate to implement the treaties and agreements is sometimes almost completely missing. For example, a maritime boundary agreement between the UK and Denmark (on behalf of Scotland and the Faroe Islands) creates a Special Fishing Zone open to the vessels of both nations. But this is far from being an internationally managed and enforced fishery. Indeed the treaty specifies that in the Zone each nation

must refrain from inspecting the vessels of the other country. Under these lax conditions, it does not deserve the name of joint fishery management.

More difficulties arise if the two countries attempt to introduce a quota system. Their officials and fishers would have to agree on one TAC to govern both countries' vessels' catches in the respective zone. This would be difficult, but it has actually been achieved by some of the international treaties. Next is the extremely difficult task of distributing the quotas. How many shares of the TAC, or quotas, should be assigned to and within each country? The solution to this problem has eluded most treaty drafters. Instead, they have fallen back on regulating gear and seasons while letting nations' vessels race for the fish. All this seems to open an obvious opportunity for fishers' associations. Where the individual coastal fishers can have no voice, they can participate through their associations. At the very least their attitude and their grasp can be a great corrective to (inland) government ignorance and indifference. It is not inconceivable that they may go farther and become their country's instrument in a treaty arrangement inshore or on the high seas. They may well take the place of inexperienced businesses and communities in making use of international assistance.

The remote high seas, beyond nations' exclusive economic zones, are the real "commons". There, no fisher has quality of title. No country's nationals have better rights than any other. No fishing-area or species treaty, even if negotiated by all the interested countries, is enforceable. No matter how good the signators' intentions, exclusivity and permanence are usually missing.[16]

Free riding and invasion can be predicted to be endemic as long as today's treaty organizations fail to administer features assigning or sharing out the allowed catch (not just the fishing) among their member's vessels. They will be endemic, indeed, until all the fishing nations of the world have become members of, and bind themselves to respect, such treaty organizations.

Conclusion: Fishers' self-governance and economic development

This chapter described the emergence of the characteristics of property rights as now widely held in the fisheries of many developed countries. These are attached to the quotas assigned to each vessel or fisher group for each fish stock. We have seen that, for single-species fisheries at least, this innovation can achieve an efficient and low cost system of regulation. The licenses and permits long held by vessel owners lacked much of these property characteristics and, as such, induced their holders to adopt the redundant strategies of racing each other to the fishing grounds and of stuffing their vessels with ever-more-costly gear. Their profits and rents were meager and little of it went to research or the promotion of orderly fishing. Instead, such funds were diverted to investments in new vessels and gear.

The quota system is not just a bureaucratic alternative to annual licensing, however. Its adoption can have two important institutional effects. One of these effects is voice: it encourages vessel owners and crew to support their governments' attempts to prevent evasion and trespassing by outsiders. Since the system limits each of them to taking no more than their own quota, they can be predicted to give support to the enforcement of such limits on others. The other is that it encourages fisher associations. The existence and operation of such collectives help to accumulate information and to make it available to the managers and to the other fishers. They have been shown to have every incentive to support inspections and to prevent illegal fishing and landings. They can act for owners and fishers in the drafting of regulations and treaties. They can recommend the form and scale of international assistance and implement its use. With mature and experienced associations, the fishers can take most functions over from government, emphasizing fishers' well-being as much as fisheries' survival.

Thus, if international economic aid leads to the increased availability of capital goods and so on, an important feature of the plan should be to accompany the donation with encouragement of a fishers' self-government system.

With an association based on members' quota rights, the new investments will likely be devoted, frugally and economically, to the financing of activities and facilities needed by the associations' members. As their experience with finance and outside support increases, they can plan for increasing their own and their children's skills, education, and business administration abilities. Soon they can collectively plan, finance, and sometimes operate their own dock, storage, and perhaps a spawning facility, a processing plant and even a factory ship for communities up to the task of fishing remote ocean stocks.

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Endnotes

1. Gordon's 1954 article has, according to 2006 prize-awarding committee of the Association of Environmental and Resource Economists (AERE), been cited 817 times, not only in fishery economics literature, but in a dozen other fields. (AERE Luncheon Proceedings, Chicago, March 2007).

2. I will not be making much use of this characteristic in the rest of this chapter, but lawyers and their clients must know that when long-term and large-scale rights to natural resources are being created, the original purpose and the original distribution of wealth can most easily be maintained if the parties agree that their bargain shall, with many safeguards, be changeable.

3. The sixth characteristic, flexibility, was unaffected.

4. For examples, see Wertheimer and Swanson (2002, 127–36); Gissurarson (2002, 1–16); Connor (2002, 267–78); Huppert (2007); Arnason (2008).

5. In the mid-20th century, fishers did form "unions" on the model of industrial unions ashore. These were best known for undertaking collective bargaining with buyers and packers over the pricing of the fish they landed and sold at the dock. Union membership was not confined to a particular fishing area or stock but was spread along the countries' coasts to include members in many fisheries. They also joined in protests regarding government regulations.

6. A standby government presence is needed for emergencies. Many fisheries are unpredictable because of sudden temperature, current, and mortality changes. The TAC set for the year, and the shares of it represented by the fishers' quotas, would need correcting in midseason. In a year of serious emergencies, closures must be imposed; otherwise the fishers may react with too many trips or too-destructive gear.

7. Such information about the stock and its growth would previously have filtered down from government in messages about revisions in gear controls and fishery closures.

8. See Anderson and Libecap (this volume) for a discussion of the grandfather and auction systems.

9. For more on this topic, see Sanchirico (2008).

10. See, for example, the comparison by Valatin (2000, 137).

11. The association may prevent its members from subdividing and selling their shares because it wants to avoid the enforcement and transactions costs of an overly large membership. Such matters were analyzed by James Buchanan (1965) in his landmark article, "Economic Theory of Clubs" following similar work on mining camps cited in Scott (2008). The government or the association may also erect protective requirements for membership, for example, to bar the sale of quotas to foreign fishermen.

12. It should be understood that, if only because they are natural, these resources are not specialized to produce one given product.

13. Governments have powers to support some uses and suppress others. If not, there can be legislation toward peaceful and efficient allocation of ocean space. Coast guards enforce some of these.

14. United Nations Conference on the Law of the Sea (UNCLOS) in 1982.

15. For works giving attention to the circumstances of early treaties and their organizations see the bibliography in Christy and Scott (1965).

16. Munro (2009) explores these matters fully.

Chapter 2

African fisheries development aid*

by

Stephen Cunningham and Arthur E. Neiland

Several observations regarding fisheries apply to Africa as well as to many other regions throughout the world. First, Africa has major fish resources, which are exploited by the marine, inland (or freshwater), and aquaculture subsectors. Second, although the exploitation of these resources produces a range of benefits, these tend to be limited to activity-related benefits—for example, fishing and processing jobs, port revenue, or a food (protein) source. The contribution that fisheries might make to a country's economic growth and sustainable development under the right conditions goes largely unaddressed in fisheries policy. Third, perhaps as a result, the international development record shows that few, if any, African countries have fully realized this potential. Most have realized none of it.

Yet, our understanding of how to improve fisheries economic performance and the funding for achieving it has existed for some time. Fisheries economists have produced a very robust analysis of why fish resources are overexploited, and they have developed a broad prescription of the requirements for improvement (for example, Scott, this volume). Moreover, throughout this period, the fisheries sector has been receiving what appear to be significant investments in development aid, including funds from bilateral and multilateral sources. Therefore, it behoves us to ask: What has aid accomplished in terms of the economic performance of fisheries in Africa, and what role has our understanding of fisheries exploitation played in African fisheries aid projects?

In an effort to address these questions this chapter examines the role and impact of development aid in African fisheries. We start with a brief review of development aid in general in order to set the fisheries-aid question into context. Next, we examine fisheries aid using a recently developed database, made available by World Bank, to identify global and African trends in such aid. We follow this up with an assessment of African fisheries performance, principally using *The State of World Fisheries and Aquaculture* (SOFIA), published by the United Nations Food and Agriculture Organization (FAO 2009). This publication provides the best overview of world fisheries, with one important caveat. It addresses performance using only certain performance indicators—those focused on fishing output and stock status.[1] For comparison, we also consider some reviews of development projects assessed against their own goals. We then investigate more closely the link between fisheries development aid in Africa and the economic theory of fisheries overexploitation,[2] and offer some thoughts on the direction of fisheries aid over the next few years.

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* This chapter is the first output of a project which seeks to use the lessons derived from the World Bank project on "The political economy of fisheries reform: lessons and applications for development assistance," which serves to inform and build linkages with the Partnership for African Fisheries Governance and Trade (PAF) program. It provides background and seeks more to raise questions than to provide answers. Those answers that are suggested should be taken as hypotheses at this stage. They will be investigated more fully through five African country case studies in the future.

Development aid—Context and issues

Development aid (also called development assistance, technical assistance, international aid, overseas aid or foreign aid) is aid given by developed countries to support development (economic or social) in developing countries. More recently, the term "development cooperation" has been used to emphasize the idea of partnership between nations, rather than any form of asymmetric relationship between North and South countries (or developed and developing countries). The term development aid is often used to refer specifically to Official Development Assistance (ODA), which is aid given by governments on certain concessional terms, usually as simple donations. It is distinguished from humanitarian aid in that development aid is aimed at alleviating poverty in the long term, while humanitarian aid is aimed at alleviating human suffering in the short term.

Development aid per se is given by governments through individual countries' international aid agencies, through multilateral institutions such as the World Bank, and by both governments and individuals through development charities such as Oxfam. It has been long assumed that resource transfers, in the form of aid, would help to enhance economic growth, which would in turn increase standards of living and lead to a reduction of poverty, in absolute, if not necessarily in relative, terms.

Resource transfers represent the main "instrument" used by both bilateral and multilateral agencies for aid interventions in developing countries. It can take different forms, including grants, loans, direct donations, or budgetary support for programs or projects. Viewed in the context of international capital flows to developing countries, it consists of official flows from bilateral sources and multilateral sources (such as the World Bank and its two affiliates—the International Development Association (IDA) and the International Finance Corporation (IFC) on concessionary and non-concessionary terms), as well as flows from foreign direct investment, and commercial bank loans.

Both development aid and humanitarian aid are included under the general category of foreign aid. Some governments contentiously also include military assistance under foreign aid. The Development Assistance Committee (DAC) of the Organisation for Economic Cooperation and Development (OECD) classifies foreign aid into three categories: Official Development Assistance (ODA), Official Aid (OD), and Other Official Flows (OOF). ODA is development aid provided to developing countries (on Part I List) with the clear aim of economic development. OD is development aid provided to developed countries (on Part II List) and international organizations. OOF is aid which does not fall into the other two categories, either because it is not aimed at development, or it consists of more than 75 percent loan rather than grant.

Quantity

Over the past 20 years, the estimated total value of annual ODA has varied from $50 billion to $100 billion.[3] In 2008, ODA rose from the previous year by 10.2 percent in real terms to $119.8 billion. This is the highest figure ever recorded. It represents 0.3 percent of the members' combined gross national income (GNI). Bilateral aid programs and projects also rose by 12.5 percent in real terms compared to 2007. In 2008, based on preliminary data, the net bilateral ODA from DAC donors to Africa totaled $26 billion, while $22.5 billion went to Sub-Saharan Africa (SSA), an overall increase of at least 10 percent in real terms.

The largest donors in 2008, by volume, were the USA, Germany, the UK, France, and Japan. Five countries exceeded the United Nations' country-donor target of 0.7 percent of GNI. They were Sweden, Luxembourg, Norway, Denmark, and the Netherlands. Countries falling below the target level included the USA, Japan, Italy, Greece, and Portugal. The largest non-DAC donors were Saudi Arabia, South Korea, and Turkey.

Private donations also make a significant contribution to development aid. For example, private donations in the United States are estimated to be at least $34 billion a year, using data up through 2000. Overall, however, it is very

difficult to determine the level of private contributions for any one country, and even more difficult to make comparisons between and across different countries.

Effectiveness

Aid effectiveness is the degree to which development aid works successfully. This can be judged in the broadest sense by the extent to which aid achieves the intended outcomes of stimulating economic growth, increasing standards of living, and reducing poverty. However, the impact and effectiveness of aid is the subject of significant debate and disagreement. Most alarmingly, there appears to be a large body of academic papers which point to a nonexistent, weak, or even negative relationship between ODA and growth in recipient countries. Based on a review of a set of critical studies, the main conclusion of researcher David Roodman was that "aid is probably not a fundamentally decisive factor for development . . . not as important as domestic savings, inequality or governance" (Yusuf et al., 82). Economists such as Friedman (1958) and Bauer (1972) also argued that aid is ineffective. Many econometric studies in recent years have supported the view that development aid has no effect on the speed with which countries develop. In addition, there are possible negative side effects of aid, which can include an unbalanced appreciation of the recipient nation's currency (known as Dutch Disease, see Barder 2006), increasing corruption, and adverse political effects such as postponements of necessary economic and democratic reforms.

On the other hand, many development agencies can point to an increasing number of projects and programs which have had a positive effect on growth and yielded good returns (according to project evaluation criteria). There is also evidence that development assistance is becoming more closely tied to the needs of recipients and to the types and quality of policies and institutions which are emerging (Claessens et al. 2007). But even these authors describe considerable variability among donors and what is even more damaging to the long-term development process—the unpredictability of aid flows. This unpredictability curtails long-term investment spending from non-aid agencies.

Easterly (2007) claims that the situation is much worse than described and that there is no evidence of greater selectivity by the World Bank or other donors with respect to need, policies, and institutions. Easterly (2007) and Birdsall (2008) also assert that the World Bank and other donors have been persistently slow learners, who do not acknowledge failure and who do not adjust operational practices accordingly.

The overall picture is therefore confusing at all levels—project, program, and policy. Clearly there is increasing buildup of knowledge and experience of what works and what fails to work. However, the variability, which appears to exist in terms of the quality and selectivity of lending, and whether it has improved over time, suggests that policy decisions and underlying technical interventions are affected, to varying degrees, depending on the context, by other imperatives or factors.

Key issues

The overall heterogeneity of findings on aid effectiveness raises a whole set of issues. The first concerns the value and relevance of the findings of aid-effectiveness assessments. It could be claimed that the complexity of the relationship between aid and development outcomes makes any assessment exercise quite problematic. The extent to which an econometric approach can do this has been reviewed by Easterly (2007). If our understanding of the nature of the development process itself is limited, it could mean that the impact of aid may not necessarily fall within the boundaries of measurement from conventional methodology. The pace of change may be slower than expected, depending on the country and context in question, until, for example, a "critical mass" of capital (human, financial, technology, and so on) is in place. Although that is often the pattern, the economic performance of certain Asian countries, such as South Korea, also shows how rapidly change can occur.

Clearly a good understanding of the development process within a particular country is needed in order to identify both the opportunities and constraints that present themselves. International donors have long been criticized for

imposing unrealistic solutions on countries in Africa and elsewhere in the developing world. Galbraith's (1980, 41) research into rural poverty pointed the way with the following conclusion

> … diagnosis [of poverty] that proceeds from the available remedy [i.e. capital and technology in rich donor countries] does not inspire confidence. And the results of the current considerable effort and greater interest [poverty alleviation], though not negligible have certainly fallen short of expectation in the countries of mass poverty—India, Pakistan, Bangladesh, Indonesia, large parts of Africa and Latin America.

Related to the "remedy" issue, it should also be noted that knowing, learning, and thinking about development have evolved rapidly over the past sixty years. Changes in conceptualizing the development process and the nature of poverty, economic growth, and welfare have resulted in a host of narratives and approaches regarding development and significant levels of aid in particular activities. In hindsight, it is clear that early approaches in Africa that focused on state-directed, technology-driven production as a means of stimulating growth were ill-conceived. They underestimated the weakness of the State, the level of political development and governance, institutional arrangements, and capacity. Contemporary narratives, approaches, and aid investments have attempted to address development on a broad front, taking into account the need to focus on growth, while addressing the underlying weaknesses of many African states. However, it should also be noted that in many countries, a variety of different narratives may be used at any one time to inform the use of development aid, including ones that ignore the political and governing context. In other words, old narratives do not disappear that easily even when shown to be inappropriate.

In some countries, it can be asserted that aid has had a negative impact on development in a number of ways—principally by creating a dependency on aid and encouraging rent-seeking[4] and corruption. Clearly, under conditions of weak governance, where the policy-making process may be controlled and the focus is on channeling benefits to a minority-elite, donors have to consider carefully whether the perceived needs and funded approaches being used to address development constraints are appropriate.

The form and quality of aid have also been questioned over the years. Grants or loans, direct donations, budgetary support for programs and projects—clearly the choice depends on the context as well as a good appraisal and understanding of what form of aid would be most effective. One area of criticism has been the side conditions attached to aid. Tied aid can reduce the effectiveness of aid when side conditions result in more corruption or other impediments to economic development. Another is the tendency to focus on short- and medium-term projects—with an emphasis on their products, results, and accountability to project goals—rather than on a long-term, and more uncertain, investment in a process of development, using an adaptive, learn-by-doing approach.

The issues of aid performance and accountability have been increasingly scrutinized. While detailed and mathematically sophisticated econometric studies may show that aid has no effect on development, other studies show that some forms of interventions can be highly effective—for example, investments in clean water supplies, education vouchers for textbooks, suitable fertilizers, and others. In some situations, aid disbursement appears to be the main criteria of success, rather than taking a closer look at aid impacts, which may be positive or negative. Other forms of aid (private aid and remittances) can be substantial and are not at all well known as to the amounts given or their impact.

Finally, the debate over aid effectiveness also feeds into the debate on the future of aid. For example, whether the form of aid should be changed or, indeed, whether aid should be decreased or increased. Clearly there is an increasing body of knowledge and experience on the use of aid, and despite the pessimistic analyses of the impact of aid on development, it is unlikely that aid will not be given in the future. Some experts like Sachs (2005) advocate a substantial increase in the level of aid. Yunus (2007), however, emphasizes a need to shift aid intervention towards the activation of local assets and the greater use of micro-credit (as in the Grameen Bank[5]). Others such as Collier (2007) question the role of aid at all in Africa, where governance is weak and many countries are unable (and unlikely to be able) to support viable economies into the foreseeable future.

Fisheries development aid: Global and African estimates

The extent to which development aid has been provided to the fisheries sector throughout the world over the past fifty years is not well-known. Indeed, there is little reference to the total level of aid provided to the sector in the international literature. Various sources of data suggest there are a large number of donors who provide development aid to fisheries and other related sectors. The avenues and methods of disbursement of funds are complicated, and there have been very few attempts to collate and analyze the information on a global or regional basis.

A database developed by Hicks (2007) and made available by the World Bank provides a comprehensive overview of development aid to fisheries for the 1973–2001 period, It should be noted, however, that the results reported are preliminary and tentative. Using a combination of databases from different sources including Project-Level Aid (PLAID) data and both multilateral and bilateral agencies, the Hicks (2007) database indicates that there were 4,396 fisheries projects out of 450,000 total development aid projects during the period. The total amount of fisheries aid identified by the database on a global basis was $16.324 billion—of which, the top 10 donors gave $11.312 billion. As indicated in table 2.1, the highest amounts were given by the International Bank for Reconstruction and Development(IBRD) of the World Bank, one of the five institutions comprising the World Bank ($3.558 billion), Japan ($3.285 billion), followed by a number of other multilateral and bilateral donors. It should be noted that the African Development Bank (AfDB), established in 1964 with the intention of promoting economic and social development in Africa, is not ranked among the top 10 donors. The total number of fisheries aid projects during the same period was 3,037, with Japan (526), Canada (375), and Norway (373) operating the highest number of projects, followed by other donors mainly on a bilateral basis.

Table 2.1 Fisheries development aid—Top 10 global donors

Donor	US $ million	Donor	No. of projects
1. World Bank (IBRD)	3,558	**1. Japan**	526
2. Japan	3,285	**2. Canada**	375
3. World Bank (IDA)	734	**3. Norway**	373
4. Asian Development Fund (ASDF)	627	**4. France**	347
5. Inter-American Development Bank	600	**5. European Union**	293
6. Norway	563	**6. United Kingdom**	258
7. France	549	**7. Sweden**	250
8. Germany	501	**8. Netherlands**	213
9. Sweden	462	**9. Australia**	208
10. Netherlands	433	**10. Italy**	194
Total	**11,312**	**Total**	**3,037**

Source: Calculations based on database developed by Hicks (2007)

The major recipients of fisheries aid during the period, which totalled $ 7.563 billion, were countries in Asia (see table 2.2). The top five were China ($2.145 billion), Brazil ($763 million), Indonesia ($742 million), Bangladesh ($706 million), and the Philippines ($705 million). Many African countries were included in the category of Least Developed Countries ($687 million). The number of fisheries aid-funded projects totalled 1,436 globally. Of this amount the Least Developed Countries (mainly in Africa) had the highest proportion 341 projects total. A mix of

specified Asian and African countries (Mozambique, Angola, Senegal) and unspecified countries in Africa were included in the top 10.

Table 2.2 Fisheries development aid – Top 10 global recipients

Recipients	US $ millions	Recipients	No. of projects
1. China	2,145	**1. Least Developed Countries**	**341**
2. Brazil	763	2. Asia /Pacific (unspecified)	185
3. Indonesia	742	**3. Mozambique**	**147**
4. Bangladesh	706	4. Indonesia	131
5. Philippines	705	**5. Africa (unspecified)**	**113**
6. Least Developed Countries	**687**	6. India	112
7. India	659	**7. Angola**	**106**
8. Sri Lanka	406	8. Bangladesh	104
9. Mozambique	385	**9. Senegal**	**103**
10,Angola	365	10.Vietnam	94
Total	**7,563**	**Total**	**1,436**

Source: Calculations based on database developed by Hicks (2007)

Of the 4,396 fisheries aid projects listed in Hicks' database, 1,988 concerned Africa or African countries (including some projects that were identified only as targeting least developed countries). And Africa's share was $4.60 billion out of the $16.32 billion total. The 10 major donors for fisheries development aid in Africa gave a total of $3.35 billion and the number of projects was 1,506 (see table 2.3).

Table 2.3 Fisheries development aid in Africa – Top 10 donors

Donor	US $ millions	Donor	No. of projects
1. Japan	799	1. France	294
2. France	432	2. EU-OECD	206
3. Sweden	392	3. Sweden	167
4. Italy	312	4. Japan	165
5. EU-OECD	309	5. Norway	161
6. AfDB	281	6. Italy	131
7. Norway	272	7. Canada	117
8. West Germany	234	8. Netherlands	100
9. World Bank (IDA)	178	9. Belgium	84
10.World Bank (IBRD)	145	10.pain	81
Total	**3,354**	**Total**	**1,506**

Source: Calculations based on database developed by Hicks (2007)

For Africa specifically, as shown in table 2.4 below, the top ten recipients have received fisheries development aid valued at $2.678 billion. The top three recipients were Mozambique ($385 million), Least Developed Countries (unspecified) ($372 million) and Angola ($366 million). The total number of fisheries projects funded for the top ten recipients in Africa was 1,130. The major recipients in terms of number of projects were Least Developed Countries (334), Mozambique (147) and Africa (unspecified) (113).

Table 2.4 Fisheries development aid in Africa—Top 10 recipients

Recipient	**US $ millions**	**Recipient**	**No. of projects**
1. Mozambique	385	1. Least Developed Countries	334
2. Least Developed Countries	372	2. Mozambique	147
3. Angola	366	3. Africa (unspecified)	113
4. Morocco	342	4. Angola	106
5. Senegal	302	5. Senegal	103
6. Mauritania	203	6. Madagascar	75
7. Egypt	191	7. Mauritania	69
8. Madagascar	190	8. Tanzania	64
9. Tunisia	178	9. Namibia	60
10.Somalia	149	10.Morocco	59
Total	**2,678**	**Total**	**1,130**

Source: Calculations based on database developed by Hicks (2007)

Projects in the database are also coded, very broadly, to indicate their main target. Projects are coded using the OCED CRS Sector Codes as follows:

31300-Fishing, general

31310-Fishing policy and administration and management

31320-Fishery development

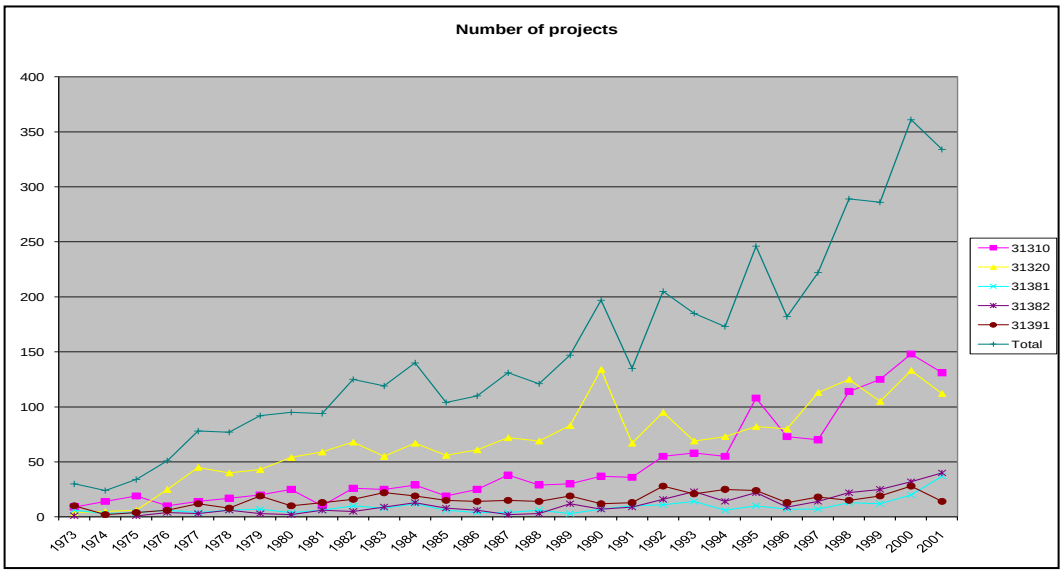
31381-Fishery education/training

31382-Fishery research

31391-Fishery services

Figure 2.1 (next page) shows the total number of projects and number of projects by category from 1973 to 2001. As indicated, the number of projects increased almost linearly over the period with an increasing proportion of the projects falling in the fishery policy (31310) category as the period progresses.

Figure 2.1 Fisheries development aid projects worldwide by number, 1973-2001.



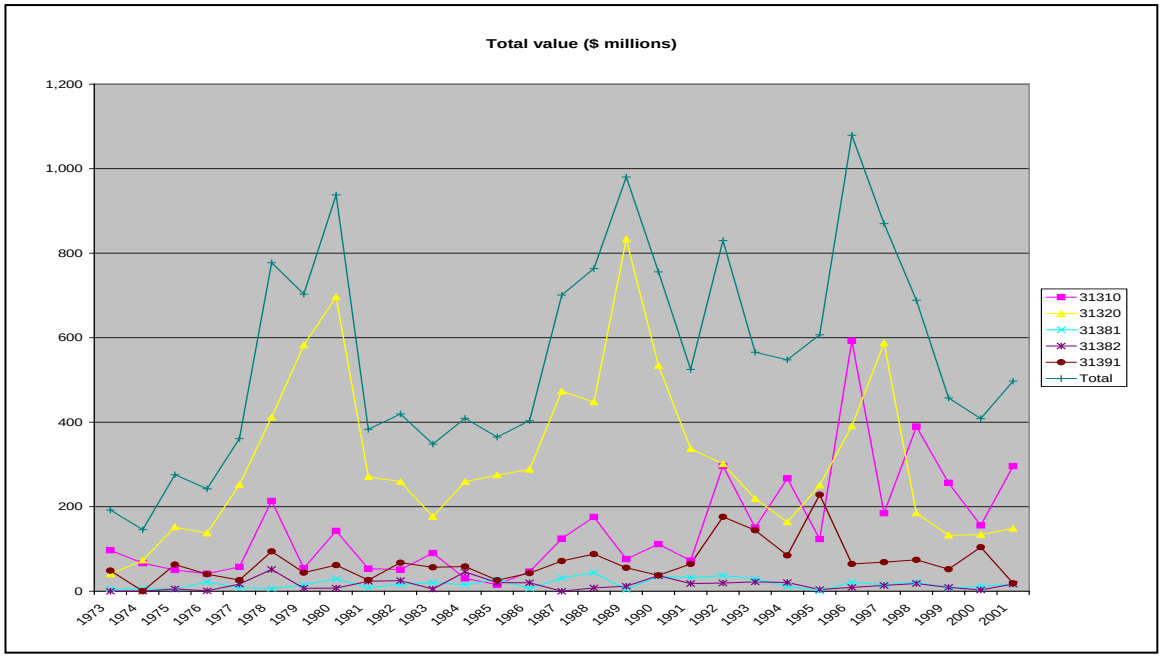
Source: Calculations based on database developed by Hicks (2007).

Figure 2.2 (next page) shows the changes in the total value of projects and the value of projects by category during the period. The trends are more variable than those displayed in figure 2.1. As opposed to in the total number of projects, there is no overall upward trend in total value over the period. This would indicate that the average expenditure per project declined over the period. For most of the period, spending on "fishery development" dominated the other categories. In recent years, there has been a clear trend toward the fisheries policy category, which may explain the decline in average project value. Nonetheless, spending on development has remained substantial. Spending on human capital development (as indicated by education, training and research) has always been at relatively low levels.

These statistics require careful interpretation. For instance, the apparent large increase in spending on fishery policy in 1996 can be explained entirely by Australia's donation of over 300 million dollars as core funding for the Forum Fisheries Agency. The amount is assigned to that year. In 1998, over a quarter of the spending in this category represents a single project in China entitled, "Sustainable Coastal Resource Development Project." The title is somewhat suggestive that this project might easily have been classified as fishery development, although without knowing project scope and objectives it is impossible to be sure at this point. In 2001, there is no dominant project, so the figures probably do represent a switch towards an increased policy focus. Nonetheless, even here it is noteworthy that funding for the second largest project was $38 million, made available by the European Union to improve the health of fishery products, which has little to do with fishery policy.

Turning to Africa, the trend in number of projects is quite similar to the global trend (see figure 2.3). The number of projects has increased, not quite monotonically but almost, with fishery development projects dominating for most of the period and a gradual increase in the number of fishery policy projects. The latter comprised the greatest share of total projects per year from 1999 through 2001. Regarding value (see figure 2.4), the trends in Africa reflect those globally, with perhaps a less marked concentration on fishery development compared to fisheries policy. As elsewhere, the human capacity dimension is difficult to discern, at least as measured by fishing education, training, and research. It is, however, quite likely that some of the fishery development projects did include such capacity development to some extent.

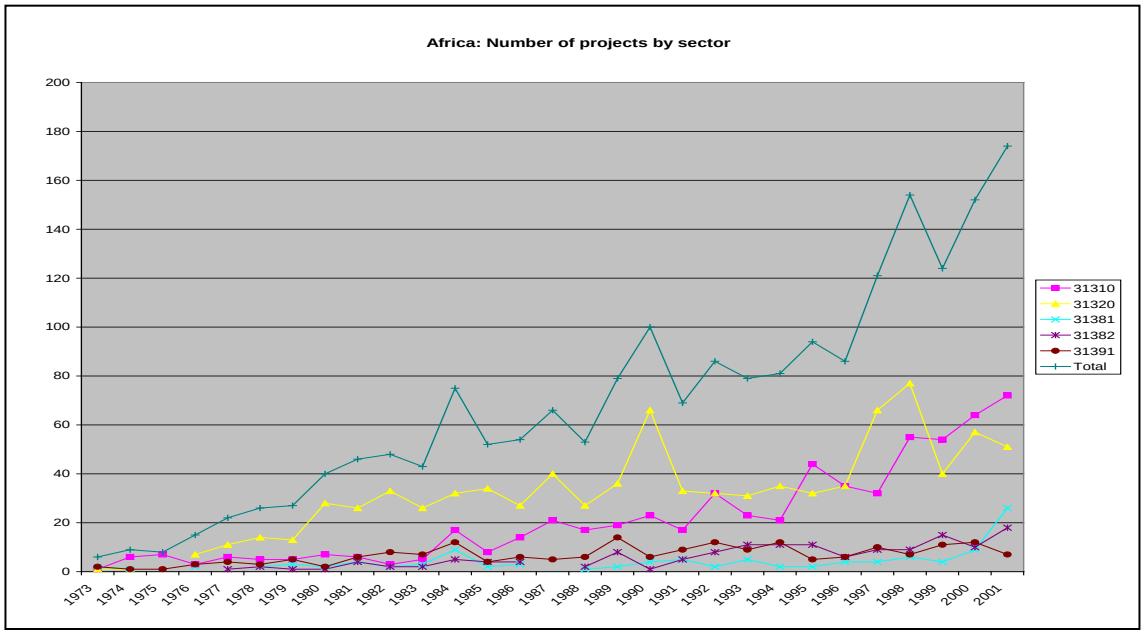
Figure 2.2 Fisheries development aid projects worldwide by value, 1973-2001.



Source: Calculations based on database developed by Hicks (2007).

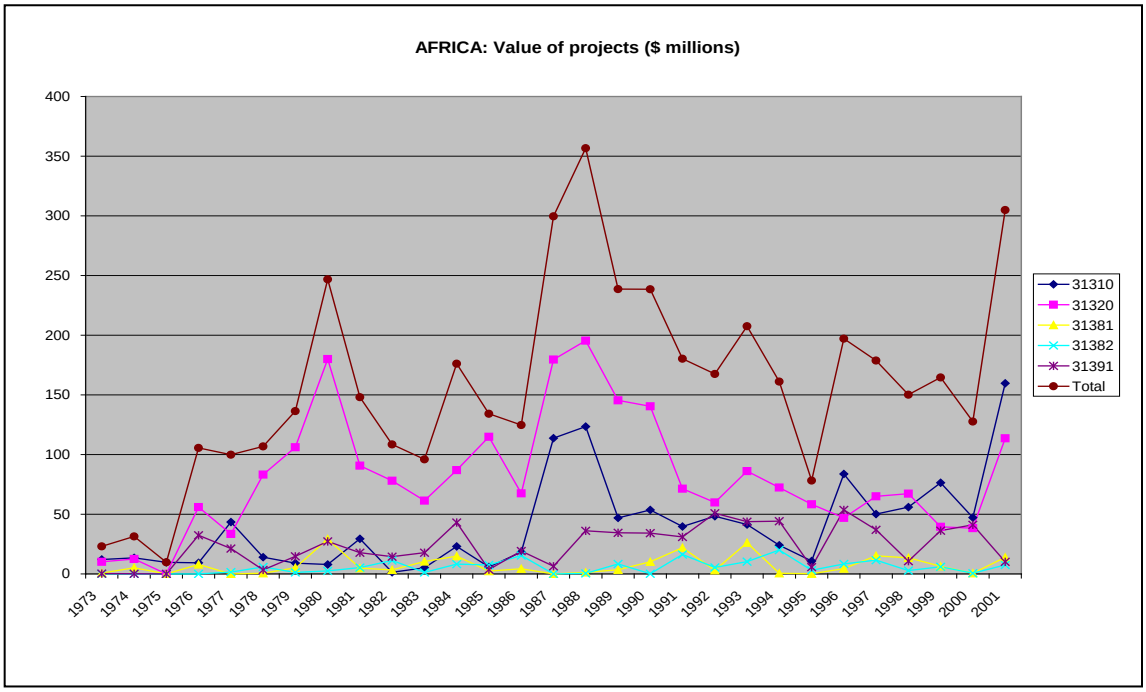
Two features stand out. First, for most of the period, the overriding focus of fisheries aid has been fishery development. The database shows that, at least until 2001, substantial sums continued to be invested in development, both globally and in Africa. This held despite clear indication from FAO's annual report on stock status of a growing percentage of troubled stocks.[6] Second, there was an apparent increasing focus on fisheries policy projects toward the end of the period covered by the database.

Figure 2.3 Fisheries development aid in Africa—By number of projects, 1973-2001



Source: Calculations based on database developed by Hicks (2007).

Figure 2.4 Fisheries development aid in Africa—By number value, 1973-2001



Source: Calculations based on database developed by Hicks (2007).

Fisheries performance in Africa[7]

The extent to which development aid has affected performance of African fisheries is not an easy assessment to make. As noted previously there is uncertainty surrounding the exact level of development aid which has been provided. In addition, there are comparatively few national or international assessments of the performance of the fisheries sector in relation to sustainable development. This would involve evaluating the contribution of fisheries to economic, social, and environmental (or biological) objectives. By and large, fisheries assessments have tended to focus on fisheries production (output) and the status of the fish stocks (environmental criteria), and have not considered the economic and social dimension to the same extent.

To overcome these constraints, we will consider the status and performance of fisheries in Africa in the context of development aid from two perspectives. First, African fisheries will be examined briefly in the wider setting of global fisheries status and performance based on *The State of World Fisheries and Aquaculture Report–2008* (FAO 2009). The major trends will be identified, and African fisheries will be compared at regional and national levels. Second, the performance of specific fisheries programs and projects in Africa will be examined, based on a recent study for FAO (Macfadyen 2008).

Fisheries production: Global and African perspectives

In 2006, global annual fisheries production was 144 million tons. This was made up of marine capture fisheries (57 percent of the total), inland or freshwater capture fisheries (7 percent of the total) and aquaculture (36 percent of the total) (FAO, 2009).[8] Overall, production in capture fisheries has stabilized at slightly over 80 million tons annually in recent years, whereas production from aquaculture has continued to increase at an annual rate of 7 percent. China, Peru, and the United States remain the top country producers, while Asian countries, including China, Japan,

Indonesia, India, Thailand, and the Philippines accounted for 52 percent of global capture production. China headed the list of producers in aquaculture and inland waters.

For Africa, annual fisheries production stood at 7.68 million tons in 2006, or just above 5 percent of global annual fisheries production. The marine subsector produced 4.56 million tons, followed by the inland subsector (2.3 million tons) and aquaculture (0.76 million tons).

Total fisheries production in Africa has increased by 22 percent over the past decade, due mainly to output increases from inland fisheries and aquaculture. Marine capture fisheries production has remained relatively static at about 5 million tons per year. The leading fish producing nations were Egypt, Morocco, South Africa, Nigeria and Namibia (between 500 and 1,000 kilotons (Kt) per year).

Fish consumption, trade, and supply

In 2006, more than 110 million tons (77 percent) of world fish production was used for direct human consumption. The remaining 33 million tons was used for nonfood products, especially fishmeal and fish oil. Global trade in fish and fish products, representing more than 37 percent (live weight equivalent) of total fish landings and valued at $85.9 billion, is significant. From 2000 to 2006, exports of fish products increased by 32.1 percent. Overall, fish prices show an upward trend, in line with that shown by food prices in general. China is the leading fish exporter ($9.3 billion), and Japan ($14 billion) is the leading importer. Exports from developing countries are economically important and reached $24.6 billion in 2006. Aquaculture products have also grown significantly.

Africa has been a net exporter of fish since 1985. Total annual exports are currently valued at $4.4 billion (or 5 percent of the annual value of global fish trade). Total imports are $679 million (or less than 1 percent of global fish trade). On average, for countries in Africa, fish exports represent 19.4 percent of total agricultural exports. The leading exporters are Angola, Gabon, Namibia, and Mauritania, and the main market is the European Union valued at $3.5 billion.

Global per capita fish supply increased slightly to about 16.7 kilograms (kg) in 2006 from 16.4 kg in 2005. There has been an overall upward trend from the 1960s base figure of 9.9 kg. Fish protein constitutes about 15 percent of world protein supplies. It is an important source of animal protein in many developing countries (more than 50 percent for Bangladesh, Cambodia, Indonesia, and many parts of Africa).

In the past three decades, the per capita supply of fish has remained almost static in sub-Saharan Africa (SSA) at 8.3 kg/capita. The contribution of fish to daily protein intake per capita is high (21 percent on average by country). Fish is particularly important in this regard for countries such as Ghana (65% daily protein intake per capita is fish), Sierra Leone (63%), and Gambia (57%). It also remains relatively important for countries with large economies and populations—for instance, Nigeria (36%) and South Africa (8%).

Capital and labor

Other interesting global–African comparisons involve fishing capital and labor. The number of fishing vessels powered by engines in the world's fisheries is about 2.1 million and is concentrated in Asia (70 percent of this amount). Almost 90 percent of vessels are less than 12 meters (m) long. Africa is second to Asia with over 200,000 vessels, with a high proportion of vessels in the fleet less than 12 m in length (96 percent). The size of the global fishing fleet has remained stable over the past decade. There were 47.5 million people engaged directly, full- or part-time, in fisheries production (capture and aquaculture) worldwide. Taking into account primary (fishing and aquaculture) and secondary (fish processing, and so forth.) activities, employment for the fishing industry worldwide is about 170 million. Taking into account families, about 520 million people could be dependent on the sector, or nearly 8 percent of the world's population. Dependency on the fishing industry is greatest in Asia. After Asia, Africa has the highest number of fishers (3.6 million), representing, on average, 0.8 percent of the economically active

workforce in African countries. The highest level of participation in fisheries occurs in Chad (8% of total workforce), Ghana (2.4%), Benin (2.2%), Gabon (1.5%), Mali (1.3%), Senegal (1.3%), and Tunisia (1.3%).

Stock status

As noted previously, about 28 percent of fish stocks worldwide were either overexploited (19 percent) or were depleted or recovering from depletion (8 percent); 52 percent were fully exploited and 20 percent were moderately or underexploited. This situation has remained stable for the past 10 to15 years. For inland fisheries, production has grown continuously and reached 10 million tons (11 percent of total capture production) in 2006. Inland fisheries are considered important in many developing countries, especially for diet contributions. There are few reported examples of overexploitation in inland fisheries.

For the four FAO-designated marine fishing areas around Africa (areas 34, 47, 51, and 57), the status of the stocks is either fully exploited or overexploited, with annual catches of between 1 and 5 million tons. Inland fisheries in Africa appear to be fairly healthy at present and capable of supporting further exploitation. Aquaculture is relatively insignificant in Africa, except in a few countries such as Egypt (595,030 tons in 2006). Overall production is low but the current annual growth rate is high (173 percent), albeit from a low baseline. It remains to be seen whether aquaculture will continue to develop at this rate in Africa.

Fisheries policy and management

Fisheries policy development and fisheries management implementation are major challenges for many countries (FAO 2009). Limited institutional capacity is a major constraint on better fisheries management. Improvements in resource management are proceeding hand-in-hand with public sector reform and measures to improve better governance. Development assistance is being used as an incentive in the process. However, there is a lack of progress in certain key areas: reducing fishing overcapacity and subsidies that spur overcapacity; mainstreaming the precautionary and ecosystem approaches to fisheries; eliminating bycatch; regulating bottom trawl fisheries; managing shark fisheries; and dealing with illegal, unreported, and unregulated (IUU) fishing. There is also a need to prioritize capacity-building for fisheries management in both developed and developing countries as well as to strengthen the international and regional dimensions of fisheries management and aquaculture.

Using a variety of sources, it is possible to piece together some information on the coverage, quality, and impact of fisheries policy in Africa. There is no comprehensive assessment in the literature; nevertheless a number of tentative conclusions can be drawn. First, many countries in Africa (65% overall) have completed strategic policy frameworks for economic development, poverty reduction, and aid, including a Poverty Reduction Strategy Paper (PRSP) (World Bank), a Country Assistance Strategy (CAS)(World Bank) and a Country Strategy Paper (CSP) (European Union). Second, the extent to which the fisheries sector potentially contributes to national development is recognized to be very low PRSP (32% average quality score), CAS (6%) and CSP (10%) [9]. Third, the average quality score in all three policy frameworks is only 16 percent. Third, fisheries management across a sample of major fishing nations in Africa was assessed in terms of formulation quality, implementation quality, and an overall score. They were given low average scores in each 35%, 32%, and 34%, respectively. Fourth, these fisheries management quality scores for Africa are quite low compared to countries with successful fisheries. Examples of best practice include Iceland with quality scores of 72%, 62%, and 66%, respectively, and New Zealand (71%, 57%, and 64%). Only Namibia in Africa scored well in this respect (63%, 70%, and 67%).

As an alternative to examining the overall performance of African fisheries, FAO and the World Bank's Global Program on Fisheries (PROFISH) commissioned a study by Macfadyen (2008) to assess the impact of development assistance in fisheries and aquaculture. Building upon an earlier PROFISH review of fisheries development assistance at the project level using the PLAID database, the objective was to review and analyze the available impact assessments of fisheries and aquacultural development assistance undertaken by the major multilateral and

bilateral donors and agencies. Projects in Africa were included. Some of the key findings in Macfadyen (2008, v–vii) were the following:

1. Donor organizations may have a vested interest in seeing evaluations that report positively on their activities. Such vested interests may compromise the integrity of the evaluations completed, irrespective of whether they are self-assessments or evaluations that are contracted out to consultants/third parties.

2. Impacts are often inadequately dealt with in evaluation reports, especially because they may be more problematic to assess than other evaluation questions.

3. Many donors do not appear to have conducted program evaluations.

4. There is often a tendency for program design documentation to be more specific about activities and outputs than outcomes and impacts; many evaluations fail to state clearly the intended impacts and outcomes.

5. Meanwhile, two of every three evaluations reviewed claim very extensive or good impacts/outcomes resulting from development assistance.

6. For evaluations in the post-1990 period, the most common intended impacts relate to improved management and sustainable exploitation rather than production increases.

7. Various problems and inconsistencies with evaluation methodology were encountered, reducing the confidence in the impacts being claimed in the reports.

8. Few evaluations suggest that development assistance actually results in negative impacts/outcomes.

Macfadyen (2008) concludes that many claims are made about the positive impacts of fisheries/aquaculture development assistance, but that the quality and rigor of the evaluations often preclude any certainty about whether such impacts actually occurred and, if they did, whether they were caused by the intervention or just correlated with it.

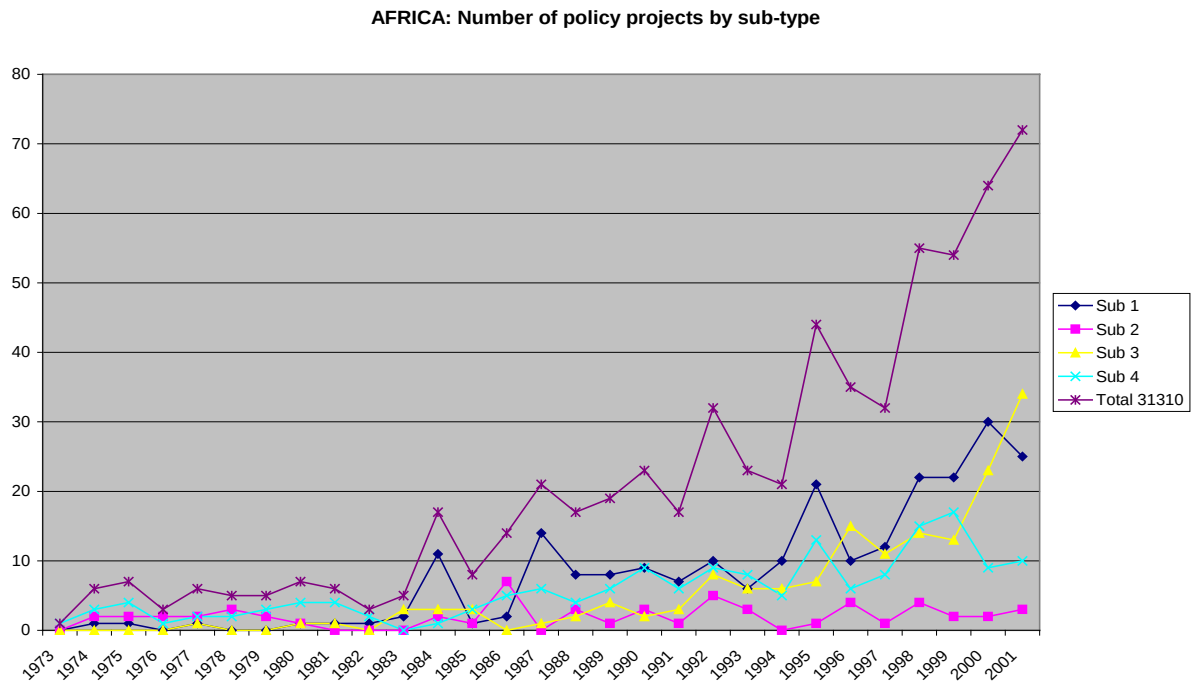
Overall, there is a major inconsistency in attempting to assess the performance of fisheries in relation to fisheries aid. While fisheries performance in Africa and other parts of the world is relatively poor (FAO 2009), the project-based assessments portray a picture of success, but with questions about the credibility of this result.

Fisheries development aid in Africa and the economic theory of fisheries overexploitation

Over the past 50 years or so, economists have developed a very robust analysis of why marine capture fisheries are overexploited.[10] The analysis leads to two main conclusions. First, fisheries with free and open access are prone to overexploitation, first economically and second biologically (if economic parameters allow sufficiently high exploitation rates). Second, management systems that fail to deal with these access conditions (so-called regulated open access systems) are likely to make things worse by encouraging a race for fish (for example, Scott, this volume). Solutions are to be found in the area of policy and institutions that avoid the race for fish and give fishers an incentive to invest in the sustainability of fish resources.

The recent increase in projects oriented towards fisheries policy offers some encouragement, but this category is broadly defined. As a further refinement, Hicks (2007) identifies more definitive project areas within the policy category—areas that include policy and institutions (Sub 1); fishing boats and equipment specified for research and management (Sub 2); conservation of fisheries or fish habitat, marine pollution control (Sub 3); and monitoring and assessment, workshops unspecified, other (Sub 4).[11] Figure 2.5 depicts the number of African projects in each over time.

Figure 2.5- Policy projects in Africa by type, 1973–2001



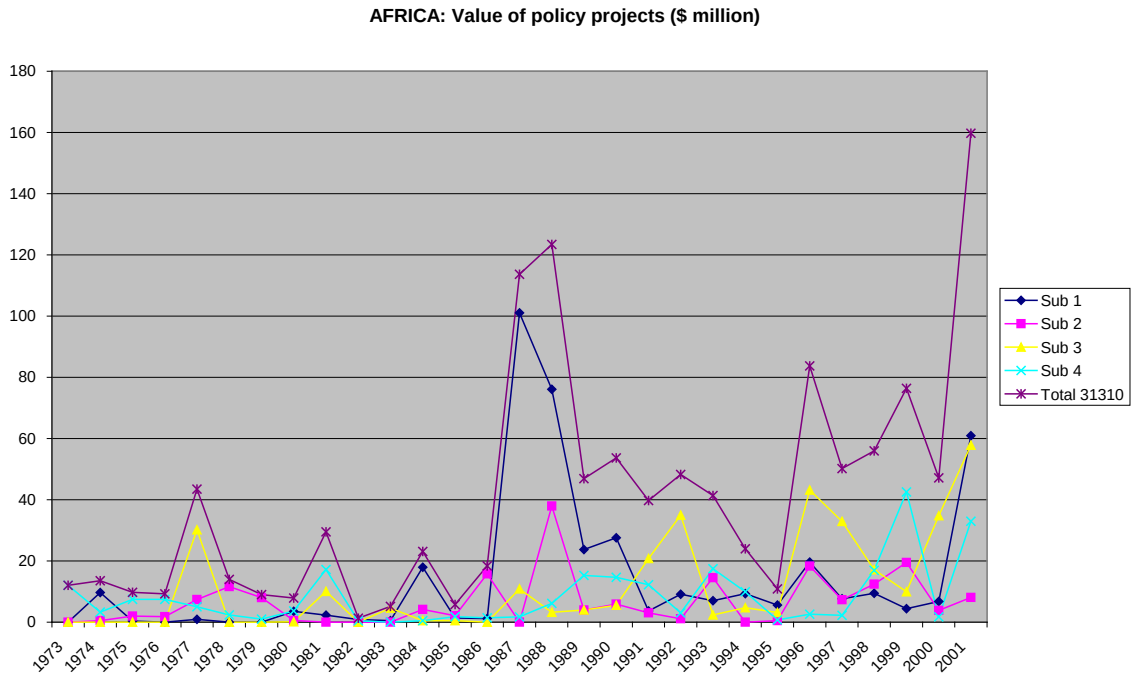
Source: Calculations based on database developed by Hicks (2007)

Of the 622 fisheries policy projects, some 236 fall under policy and institutions (Sub 1). This area has become gradually more important than the other areas. Interestingly, the most important category in 2001 is conservation (Sub 3). Having spent some twenty-plus years spurring fisheries development, the focus of aid may now be switching to conservation, not unlike the pathways of fisheries development in other regions of the world, where the early emphasis was on maximizing output from the resource followed by efforts to conserve a depleted resource.

Examining trends in terms of project value, there is more variation year to year than the previous trends (see figure 2.6).

The very high figures for 1987 and 1988 represent some very large individual projects rather than a change in broad trend. Of the $76 million attributed to "policy and institutions" (Sub 1) in 1988, almost $60 million relates to a Swedish-funded project in Angola, $32 million of which was for "construction works," which does not seem to fit very well with policy and institutions. In 1987, either Sweden funded another very large project in Angola ($76 million) or, as seems more likely, there is an error in the database with the ten project lines each being attributed the total project budget of $7.6 million. The same query also arises concerning a Swedish project in Kenya where either the total budget is $32 million or more likely the $10 million budget has been attributed to three separate lines. In each case, the lower figure would fit in better with the overall data set, but, of course, this does not necessarily make the lower figure correct.

Figure 2.6: Policy projects in Africa by value, 1973-2001



Source: Calculations based on database developed by Hicks (2007).

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The high figure for 2001 also calls for some comment. Of the $61 million attributed to policy and institutions, over $39 million relates to an EU-funded project aimed at least developing countries that focuses on fish product health. While an important issue, especially if these countries wish to continue to export to the EU, it is perhaps not quite the kind of fisheries management project that might be expected to be found under the policy and institutions banner. The next highest valued project that year is for $7 million, a contribution by Norway to the Trust Fund for the UN Division for Ocean Affairs & Law of the Sea.

An analysis of the policy and institutions category and its sub-areas provides perhaps the key to the widespread failure of fisheries development aid. In analyzing the PLAID database, it is impossible to find a single project that directly addresses the fundamental fisheries management issues identified by fisheries economics and summarized at the beginning of this section. Hence, it is hardly surprising that development aid in fishing is widely considered to be a failure. We hypothesize, therefore, that the most significant problem is that fisheries aid has not focussed on the key issues. Instead, it has largely focussed on fisheries development with predictable consequences in terms of encouraging increased exploitation and intensity of fishing effort.

We attempted to assess the performance of fisheries in general and deduce something about aid performance. Such an approach, however, comes up against the problem that data are only available for certain indicators, which are not necessarily those that provide an adequate basis on which to assess aid. Arguably, they do not even provide an adequate basis on which to assess the state of fisheries, even though they are widely used for this purpose. The other alternative, also previously discussed, is to use project evaluations, but these tend to be overly optimistic.

The litmus test, at least for economists, is whether foreign aid has a positive impact on gross domestic product (GDP) and on economic growth. On this basis, the current wisdom seems to be that aid works only if the appropriate policy environment of good governance exists in the recipient country. On the other hand, Easterly (2003,.30) points out that "[t]he empirical literature on the connections between aid and economic growth has been hampered by the lack of a clear theoretical model by which aid would influence growth and which could pin down the empirical specification of the aid-growth relationship."

In contrast, the theoretical model of the economics of fisheries exploitation exists. Moreover, it provides a robust framework for the route by which fisheries aid might influence growth. Hence, the difficulty is not so much that there is a lack of a clear model; the problem is that almost nobody seems to use it either in practice to design fisheries aid interventions or in theory to analyze their impact.

On the question of project design, it is far from clear what theoretical model underpins, even implicitly, fisheries aid. For a long time fisheries aid was dominated by fishery development. Since the natural productive limit of fish stocks has long been recognized, it is not clear what the outcome of such aid was expected to be, other than resource overexploitation, as sure as night follows day. As such, it is not clear how an increase in production results in an increase in social and economic welfare.

Our examination of the recent switch towards fisheries policy as the focus of fisheries aid reveals that few, if any, projects correspond to an attempt to apply the economic analysis of the fisheries problem. Why is this? We hypothesize the following reasons:

1. Until recently, there have been no role models. International best practice in fisheries policy and management is beginning to emerge through the experience of countries such as New Zealand and Iceland, but much remains to be done in order to translate these into viable models for developing countries.
2. Policy-makers find the economics difficult to understand, and it has been poorly communicated by economists (The latter have tended to be more concerned to influence one another's thinking than to get the basic message of economics into mainstream policy.).
3. Partly as a result of 2, the policy agenda has been, and in many places continues to be, dominated by other disciplines, especially fish biology or fisheries science, with a resulting overemphasis on the fish stock and now the ecosystem as the objective rather than the constraint.
4. Recipient countries may have no real interest in solving the economic problem facing their fisheries. One possible reason for this (doubtless among many) is that the political level at which fisheries aid intervenes may be inappropriate or incomplete. In particular, if the accepted need is to change the way in which success in the fisheries sector is measured, then there is likely to be a need to develop appropriate success indicators for line agencies (Ministry, Agency, and so forth. depending on the precise circumstances). This is likely to require working with the Fisheries Ministry (or equivalent) and other levels of Government to change the economic perception of the sector and the expectations as to what it is capable of delivering to the economy as a whole.
5. Donor countries (or organizations) may have no real interest in solving the economic problem facing developing country fisheries. One reason (again, among many) is that donors may prefer to see fish resources as a means of providing direct poverty alleviation, especially in the form of some kind of social safety net. Such an approach raises all kinds of issues, one of which is that even if this approach may be

appropriate when rents are small (on the principle that rents are best collected at a level where they matter), it clearly does not provide a general approach to the problem. It would certainly be unacceptable in those developing countries where fish resources are of sufficient economic importance to matter nationally. This approach may also be responsible for the development of a somewhat "romantic" notion of small-scale fisheries as something to be protected for their own sake.

In trying to develop a more realistic vision for aid, Easterly (2003, 41) concludes, "I am glad that some aid dollars can reach some very needy people some of the time." The issue of benefiting some people some of the time is interesting to discuss in the case of fisheries. Clearly in many (perhaps most) countries, the fisheries sector is small relative to the overall economy. Nevertheless, fish resources are valuable and have the potential to make a difference in enhancing social and economic welfare. Because of their renewable nature, fish resources, if exploited sustainably, have the potential to provide benefits all of the time. This is already an improvement on Easterly. Of course, by its very nature, the fisheries sector, like any other sector, can only provide in most cases some benefits.

The exception is in the case where fish resources are the basis for a very large share of economic activity, thereby benefiting all of the country's people all of the time. Consider, for example, the case of Mauritania, a northwest African country with a small population (around 3 million), a large landmass that is mostly desert with few natural resources. The country's substantial fish resources are vital to its social and economic welfare. During the 1980s, Mauritania developed a somewhat novel fisheries management system, from which fisheries resource rentals, at its maximum in 1986, some 22 percent of central Government expenditure was financed. Regrettably, for various reasons, but mostly due to pressure on the Government related to structural adjustment, this system broke down in the 1990s. Mauritania continues to finance a similar percentage of its central Government expenditure through its fish resources, but it does so mainly on the basis of fishing agreements, especially with the EU. Because the payment made to Mauritania by the EU under this agreement is not a reflection of good fisheries management (as it does not relate to the generation of resource rentals), stocks have become overfished. Estimates of resource rentals available from the main fisheries strongly suggest, however, that Mauritania could obtain at least as large a return from well-managed fisheries as it does currently from its fisheries agreements (the EU being only one), provided that appropriate institutional arrangements are put into place (as they were in the 1980s).

In other places, fish resources are insufficient to benefit everyone, and the direct beneficiaries must be identified. The most common choice is to favor those people who happen to be fish-resource users at the right time (for instance, when a co-management system, an individual transferable quota (ITQ) system, or limited licensing is introduced). There is not an a priori reason why this has to be the case, but it seems to be the most commonly adopted.

Even in such cases, the key issue is the relationship between well managed fisheries and GDP. The fisheries sector often receives very poor press from a macroeconomic viewpoint. The focus on production as a key indicator seems to be leading to a loss of political interest in the marine capture sector as production has stopped increasing and has begun to fall in many places. As a result, policy has begun to focus on inland fisheries and aquaculture, even in countries such as Mauritania, where these sectors have no conceivable hope of ever producing on an equivalent scale to the marine sector. Moreover, in many places, the fisheries sector either does not appear in the PRSP—the key macroeconomic strategic framework in many developing countries—or is assigned a marginal role. But part, perhaps a large part, of the problem seems to be that those responsible for the PRSPs see the fisheries sector only in terms of its problems instead of in terms of its potential.

There are at least two major issues here. First, in many cases, the contribution that fisheries make to GDP is assessed only in terms of first-sale landings. Any value that may be added subsequently is assigned to other economic sectors. From a decision-making perspective, however, the amount of GDP that depends on the sustainability of the fish resources is greater than indicated by first-sale landings. Second, and probably more significant in most countries, the fisheries sector's contribution to GDP is assessed only on the basis of current management and exploitation

arrangements even though the key decision-making variable is the higher contribution that the sector could make if it were rationally managed and exploited.

Correcting the GDP vision of the fisheries sector for these two problems would help to ensure that the sector is included in the PRSP in an appropriate way. It might still leave the sector as marginal in many places in terms of potential GDP contribution. Nonetheless, the point would be strengthened that fish resources are something of a cash cow, capable of contributing to economic growth to a greater extent that generally supposed—and on a renewable basis. For this to happen, the key issue is to provide an institutional framework that leads to the sustainable generation of resource rents and subsequent wealth.

Wilen (2005) estimates that, globally, potential fish resource rents due to efficiency gains are in the order of $60 billion per annum; but appropriate institutional arrangements will lead to further wealth gains due to improvements on the revenue side that he estimates to be some 35 percent of the potential efficiency rents (another $21 billion) giving a total potential for wealth creation of some $80 billion. This is in a situation where the world as a whole is not starting from zero rents but with subsidized fisheries (estimates of the extent of such subsidies are difficult to make and vary, but $20 billion per annum seems a minimum estimate). The World Bank (2008), using a slightly different methodology, estimates the potential resource rents due to increased efficiency to be $50 billion per annum.

While such estimates are of interest, the key question is how to move the world to a different set of outcomes in its fisheries. Economic theory and empirical evidence both strongly suggest that, in the case of fisheries aid to developing countries, the priority should be given to policy and institutional reform, with the generation and distribution of sustainable wealth on the basis of resource rents as the central issues to be addressed.

Fisheries aid in Africa—Some likely future trends

The fisheries sector is one of the few sectors where quite specific commitments were made at the World Summit on Sustainable Development (WSSD) held in Johannesburg in 2002. Achieving these commitments in developing countries is likely to require increasing amounts of aid, especially since little progress seems to have been made in the first seven years after Johannesburg.[12] There are signs that the trend towards a focus on fisheries policy and institutional support identified towards the end of the 1973–2001 period has continued. Some important initiatives are underway including the Global Environment Facility (GEF) Strategic Partnership, and the New Partnership for African Development (NEPAD) Fish for All.

The structure of aid appears to moving strongly in favor of multilateral donors (such as the World Bank, European Union, and African Development Bank) and away from traditional bilateral donors, many of whom now seem to be working increasingly though the multilateral agencies. This change is leading in particular to a rise in the importance of development banks such as the World Bank and the African Development Bank, not only in the multilateral sphere but also within national aid agencies in countries such as France, Japan and Germany. The likely increase in development bank intervention is potentially significant. On the one hand, development banks tend to have more influence on macroeconomic policy and may encourage finance ministries and the like to take a more “economic” view of the exploitation of their nation’s fish resources. On the other, a number of difficulties may arise with development bank intervention. First, institutional support is not their principal calling, especially where they are lending money to generate a rate of return. Second, banks may find practical difficulties in dealing with such support. To begin with, institutional support projects, especially given the limited capacity of many developing countries to absorb such projects, probably require relatively low levels of funding (a few million dollars at most), whereas for a development bank a $5 million project is already very small and may be the lower limit of what is considered feasible.

Perhaps the biggest issue, however, is whether the development banks can move beyond a problem that has dogged them for years. As argued by Easterly (2003, 34), "Although voices have been raised throughout the years against 'pushing loans' and 'moving money' and change may actually have occurred, the continuity of stressing aid volume is more noticeable than the changes." If supporting institutional change provides, as argued, relatively low opportunities for lending compared to, say, building a new fishing port or renewing the fishing fleet, it may be insufficient to stress the alignment of fisher incentives with policy goals as the key to success. There is also a need also to consider the incentives of other players.

Of course, development agencies and their staff cannot impose loans on a recipient country. But there are many reasons why recipient countries and their representatives may offer little resistance to "loan pushing". One factor, for example, is the current trend towards periodic debt forgiveness, which creates an obvious moral hazard problem: why be so foolish as to refuse loans, especially if offered on soft terms, when there is a reasonable expectation that they will be forgiven in the future if the country demonstrates an inability or even an unwillingness to repay.

The likely importance of development banks in the near to medium term future makes it imperative to consider carefully the success indicators against which their staff will be judged in their future careers. Assessing staff purely on the basis of the size of their loan book will have predictable consequences. At the very least, projects should be independently evaluated against the fundamental economic theory of fisheries exploitation in order to determine their likely impacts. Current financial evaluations (at least those we have seen and been involved with) usually entail making assumptions about future catch rates, prices, and other economic parameters to demonstrate the financial viability of investments. We are unaware, however, of any case where such evaluations have been undertaken within the context of a bioeconomic model, even conceptually, so as to capture the fishery-wide impacts of the investment. Instead, partial models are constructed with, usually implicit, assumptions that important relationships (such as between fishing effort and catch) are linear and always increasing.

Apart from the probable increasing importance of the development banks, the other apparent trend is the rise of new bilateral donors, especially Asian countries that were once aid recipients. Likely candidates include China, India, South Korea, and Thailand. It seems that aid from these countries is much more likely to be tied than has been the case with the traditional bilaterals. Ensuring that fisheries aid in the foreseeable future does focus on those areas where it is likely to lead to an improvement in the performance of African fisheries is not, therefore, going to be an easy task.

Conclusions

The aid project database shows that from 1973 through 2001, African fisheries have received substantial aid.[13] Towards the end (final five years) of the period, given the continuing poor economic performance of fisheries in many African countries, the available data suggest that development aid has been broadened and redirected towards addressing the underlying constraints, including building institutional capacity to develop and implement appropriate policies for fisheries management and fish trade. As a result, more projects are categorized as fisheries policy rather than as fisheries development. However, closer examination of the content of fisheries policy projects (judged largely by their title) leads us to hypothesize that not a single such project was built on the theoretical underpinning provided by fisheries economics. But both theory and empirical evidence strongly suggest that until this is done, there is no reason to expect any fundamental improvement in the economic performance of African fisheries (or any others).

Of course, it would be unfair to lay the blame for the state of African fisheries at the aid door. African fisheries policy, like fisheries policy in many other countries, has failed largely because either it has addressed the wrong issues or it has addressed the key issues in the wrong order. In the first category, there has been an excessive focus

on production. In the latter, there is now a focus in many countries on increasing the value of fish resources before having any effective mechanism to control exploitation levels.

Fisheries aid has certainly not helped African countries to modify their fisheries policies in order to improve the performance of their fisheries sectors. Of course, the database only covers 1973 through 2001. It is possible that there has been a change in focus since 2001 which modifies this conclusion, and this is certainly an issue that will be addressed in the case studies. We hypothesize that there has been no sea change over the past few years and that fisheries projects continue to lack any solid theoretical underpinning. If this hypothesis holds, the main issue is the need to change the focus of the available fisheries aid budgets and bring them far more firmly into line with the theoretical underpinning provided by fisheries economics. (It may also be the case that the current level of development aid is inadequate but this is difficult to assess on a global basis.)

The key requirement seems to be to bring all stakeholders, and especially the key ones of policy makers, resource users, and researchers, to understand the economic implications of different exploitation patterns, particularly from the point of view of wealth generation. In this context, recent work by World Bank (2008) and others estimating global resource rents is a useful starting point, but there is a need to build on this work in the development of practical fisheries management systems at the level of fishery management units.

One practical suggestion is that all aid projects should be pre-evaluated against their likely economic outcomes, including some bioeconomic assessment, even if this can only be done on a qualitative basis. This might help guard against over-enthusiastic investment appraisals, which frequently seem to be undertaken using unjustified assumptions of linearity between key variables while ignoring the dynamics that economic change generates. (For example, it is often assumed by non-economists that fishing incomes can be increased sustainably with no impact on the number of fishers.)

Likely future trends in fisheries development aid are not encouraging. It seems likely that both loan pushing and tied aid may increase over the next few years. In the case of the former, it seems critical to ensure that success criteria for career staff within development agencies reward the quality of their loan book rather than simply its size. Tied aid may prove more difficult to deal with. Perhaps the most effective approach is for “untied” aid to assist recipient countries to develop robust fisheries strategies and policies that may then help such countries to guide tied aid to useful areas.

As stressed in the introduction to this paper, these conclusions are tentative at this stage and should be considered as hypotheses. The project within which this paper is the first output is proceeding to investigate further these hypotheses, beginning with five country case studies. Further reports will become available as the project progresses.

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Endnotes

1. The set of indicators that are available is itself interesting and perhaps indicative of the main interest that policy makers have tended to have in the exploitation of fish resources.

2. Given the substantial amount of time that this theory has existed and the substantial amount of empirical support for it, it seems not unreasonable to expect that it would have influenced at least some development projects, on the assumption that the purpose of such projects is to assist African countries to improve the performance of their fisheries sector and develop increased sustainable benefits from the exploitation of their fish resources.

3. Unless otherwise stated, all dollar figures are in US dollars.

4. According to *The Economist* (http://www.economist.com/research/Economics/), rent-seeking is about cutting yourself a bigger slice of the cake rather than making the cake bigger, trying to make more money without producing more for customers. Classic examples of rent seeking include a protection racket, in which a gang takes a cut from a shopkeepers' profit or a cartel of firms agreeing to raise prices or lobbying the government for tax, spending or regulatory policies that benefit the lobbyists at the expense of taxpayers or consumers or rivals. Whether legal or illegal, as they do not create any value, rent-seeking activities can impose large costs on any economy.

5. Grameen Bank (GB) provides credit to the poorest of the poor in rural Bangladesh, without any collateral. As of February, 2010, it has 8.04 million borrowers, 97 percent of whom are women. With 2,563 branches, GB provides services in 81,343 villages. Grameen Bank's positive impact on its poor and formerly poor borrowers has been documented in many independent studies carried out by external agencies including the World Bank, the International Food Research Policy Institute (IFPRI) and the Bangladesh Institute of Development Studies (BIDS).

6. In 1974, around 10 percent of the world's fish resources were categorized as "overexploited, depleted and recovering", and 50 percent as "fully exploited," leaving only 40 percent as "underexploited and moderately exploited" (FAO 2005, 11). Increasing exploitation in subsequent years shrank the percentage of underexploited and moderately exploited stocks. By 2007, the percentage of underexploited and moderately exploited resources stood at 20 percent (FAO 2009, 30). It is interesting to speculate why fishery development would continue as a priority for aid agencies through this period.

7. A detailed account of the characteristics of African fisheries and their performance can be found in Cunningham and Neiland (2009).

8. Economic values for the fisheries and aquaculture sector are not provided, although the estimated first-sale value of global capture fisheries production is US $91.2 billion (FAO 2009).

9. The policy quality scores are averages for Africa based on the results of the national assessments of development policy undertaken by Thorpe (2004). This study examined the extent to which the fisheries sector has been incorporated (and if so, to what extent) in national development discourses. A high quality score indicates that fisheries has been well-incoporated into development policy.

10. This analysis is also relevant to inland water bodies (certainly the larger ones, such as Lake Victoria).

11.The other broad codes were similarly sub-divided but we will not analyze these here.

12. The overarching commitment at the 2002 WSSD was to develop sustainable fisheries. Within this, key objectives are: To maintain or restore stocks to levels that can produce the maximum sustainable yield: for depleted stocks on an urgent basis and where possible not later than 2015; To monitor and regulate fishing capacity in line with fishing opportunities; To ratify and implement UN and other international agreements; To prevent, deter and eliminate illegal, unregulated and unreported (IUU) fishing; To eliminate progressively subsidies contributing to IUU fishing and overcapacity; and To ensure that fisheries policies take into account the needs of transitional and developing countries.

13. This database is an extremely valuable tool and there is a clear need to continue to develop it, in particular to bring it and keep it up-to-date and, if possible, to broaden the information contained in it (for instance, a link to project documents would be extremely useful).

Chapter 3

The Political economy of institutions and resources*

by

James A. Robinson

At the heart of economic theory is a powerful set of concepts which explains how a particular set of institutions, a free market economy with well defined and enforced property rights, generates socially desirable economic outcomes under specific conditions. These conditions, which we can roughly summarize as an "absence of market failures," were worked out over a long period of time stretching from Marshall (1920) and Pigou (1920), right through to Samuelson (1954) and were subsequently enshrined in economic theory.

Yet even if economic theory was very precise in pointing out when and why markets failed, it took a somewhat odd approach to the issue of failure. Earlier scholars, such as Pigou or Samuelson, saw market failures as providing a theoretical justification for the role of the government in the economy, a vision still at the heart of the subfield of public finance. A later set of theorists, inspired by Coase's (1960) seminal paper, instead argued that as long as property rights were well defined, rational private agents, transactions costs aside, would be able to solve problems of market failures by entering into mutually beneficial contracts. A further, even more optimistic wave, embodied in Ostrom (1990), argued that even if private property rights were not well defined. communities could come to mutually efficient solutions of common resource problems.

Under any of these paradigms, market failures ought not to be a problem. Either the government will solve them, or rational private agents will do so. Even though embedded in a discipline emphasizing how institutions shape incentives and socially desirable outcomes, all the paradigms take a curious approach to institutions. On the one hand,t emphasizing the idea that market failures are solved by governments completely ignores political institutions and the incentives of politicians. Nowhere is it asked whether politicians actually have the incentives to undertake the actions carefully computed by economists that will make society better off. To the extent that market failures exist, it must be that economists have not yet pointed them out to policymakers. On the other hand, the Coase-theoretic literature proposes a world where the only relevant institution is private property rights and where economic agents come together to bargain over the allocation of resources. Even if, in principle, bargaining may be subject to transactions costs, in practice the thrust of the argument is always towards private agents and "private orderings" reaching efficient solutions as in Coase's famous paper on the lighthouse (Coase 1974) or Ellickson's study of the ranchers of Shasta County (Ellickson 1994). Efficiency then becomes a basic postulate rather than something to be demonstrated (as in Djankov et al. 2003). Finally, the literature inspired by Ostrom does focus explicitly on institutions but suggests that individuals will innovate institutions which promote the efficient allocation of resources even in the absence of private property rights.

Any of the three approaches would be fine except for the overwhelming fact of inefficiency of resource allocation in the world today. In line with basic economic theory, empirical evidence suggests that this inefficiency stems from the incentive environment that agents face. Resources are inefficiently allocated because private marginal costs and benefits diverge from social marginal costs and benefits. This divergence is explained by institutions. In fact, empirical evidence suggests that differences in institutions, via their impact on incentives, explain the preponderance of differences in incomes per-capita across countries today (Acemoglu, Johnson, and Robinson 2001 and 2002).

* I would like to thank Donald Leal and the organizing committee for inviting me, and Terry Anderson and John Frazer Stewart for their advice.

Such findings are paradoxical either from the perspective that relies of governments to correct market failures or from that which relies on private agents to engage in efficient Coasian bargaining or Ostrom-like collective agreements.

What is wrong with these paradigms? On the one hand, we have begun to understand that the notion that the political system generates outcomes that are socially desirable is massively flawed. The fact that market failures exist, and are well understood, does not imply that political systems will eradicate them. This will not come as a surprise to anyone who has studied political systems in Africa, Latin America, or Asia. On the other hand, though there is a sense in which the Pareto frontier is always salient, in practice there are numerous problems in stopping agents from effectively bargaining to reach a desirable outcomes. These problems are often "politics in the small."

There is no better way to illustrate the notion that markets may fail than the "tragedy of the commons" (Hardin 1968). Hardin's polemical paper was precisely aimed at challenging the idea that the interaction of rational individuals would lead to socially desirable outcomes. The tragedy shows how individually rational agents will use a common resource in a socially irrational way because, when each agent exploits the resource, they ignore the negative externalities that this generates for other agents. The consequence is that the resource is overutilized in a dramatic way, even though all those involved could change their behavior—that is, extract less—and all be better off.

How do the conventional paradigms deal with this "tragedy"? The standard public finance approach would see the tragedy as justifying government regulation. The other approaches would regard this as unnecessary to the extent that the agents involved can engage in Coasian bargaining or innovate institutions which deliver efficient extraction. Whichever way, contrary to the specter raised by Hardin, whether or not resources are owned communally should not matter. Potential inefficiencies should be solved by appropriate government intervention or ,if not, then by private contracting and institutional innovation. There really is no tragedy of the commons.

That these paradigms should have become dominant in economics takes some believing. After all, one does not hear many economists arguing that Soviet agriculture after collectivization was efficient (though the field is not completely empty, see Allen 2003). How come the Soviet state left "$100 bills on the sidewalk" to quote the much beloved aphorism of Chicago economists? Where was the Coasian bargain, the institutional innovation? The plot only thickens when we recall that it was Deng Xiaoping's initial retreat from collective farming in 1978 that got the Chinese economic miracle going. Possibly the Soviet and Chinese adherence to inefficient systems of property rights and collective ownership can be put down to "ideology," but, if so, what exactly is the scope of the standard arguments?

Another brilliant example of the schizophrenia with which topics such as these are approached is the issue of the underdevelopment of Africa. The idea that the government, private Coasian contracting, or Ostrom-like institutional innovation will guarantee that resources are allocated in a socially optimal way leads inexorably to a presumption that observed resource allocation is socially efficient. Such a view is quite hard to sustain in Africa given that levels of income per-capita are as low as one-fiftieth of those of rich countries. To square the circle it, is necessary to argue that poverty is socially optimal in Africa. Again, as with the efficiency of Stalinist collectivization, this is a view which has its proponents, such as Jeffrey Sachs with his arguments about the consequences of malaria, landlocked countries, or intrinsically low agricultural productivity (Sachs et al. 2004). Nowhere is it more difficult to sustain this view than in Africa, however. For example, a proponent of the "poverty is efficient" view in Africa has to grapple with a series of historical paradoxes, such as the absence of the wheel and plow from sub-Saharan Africa outside of Ethiopia until the late 19th century. An advocate of the views proposed by Diamond (1997) might argue that this was because African societies lacked the historical circumstances, in particular crop and animal species, which would have allowed these technologies to be independently developed. The problem with this hypothesis, however, is that the poverty of Africa is about the dissemination of technologies, not their invention. Polities in West and Central Africa were well acquainted with wheels and plows at least from the late 15th century onwards, but they did not adopt them (though they did enthusiastically adopt other technologies such as firearms). Similarly African nations today fail to successfully adopt many well known technologies which would greatly increase their incomes.

The poverty is efficient school would, however, deny that such examples are evidence of economic inefficiency in Africa. Rather, technologies such as the wheel or the plow were not "appropriate" to Africa. This view is well spelled out in Hopkins (1973) who argues, for example, that wheeled transportation was not economically rational in West Africa because it was so expensive to cut down the forest to make roads. No doubt in this he was understandably reacting to works of the early colonial period depicting Africans as "backward," but he was also ignoring numerous works showing that transportation by head porterage was in fact very inefficient even taking into account the costs of road building (McPhee 1926; Lugard 1930). More puzzling, he was ignoring the fact that Africans themselves, for instance the Kingdom of Asante in the early 19th century, built extensive systems of roads through the forest, roads which were apparently perfectly suitable for wheeled transportation (Wilks 1975).

Nowhere has "efficiency revisionism" progressed further in Africa than in the study of land. Most African countries are poor and rural, and, leaving aside natural resources such as oil and diamonds, land is their major asset. A naïve view about African poverty might start from the premise that the main income earning asset in Africa was likely to be misallocated. Most land in Africa is not held in fee simple ownership but instead controlled by lineages or local political institutions, such as chiefs, and in such a way that individual ownership is almost impossible and sale just as difficult. Again, thinking simplistically, one could conjecture that such arrangements would lead to massive inefficiencies leading to insecure property rights and underinvestment. Yet instead, a large literature has argued that, appearances notwithstanding, land is allocated efficiently in Africa. The image used to support this is again the Coasian bargain or institutional innovation along the lines proposed by Ostrom (it possibly being tricky to sustain a claim that African governments make socially desirable decisions), except this time with chiefs and lineages taking the place of western citizens.

It turns out in the African case that the absence of wheels does seem to have been associated with large social losses (Chaves, Engerman, and Robinson 2009), and this goes for the absence of fee simple property rights in land as well (Goldstein and Udry 2008). It is not socially efficient for Africa to be poor, and the tragedy of the commons really is a tragedy.

The inefficient allocation of resources therefore stares us in the face. There is no better illustration of this than one of the examples Hardin himself discussed in his seminal paper—fisheries. There is now overwhelming evidence that world ocean fisheries are incredibly inefficiently managed and are subject to precisely the type of tragedy of the commons which Hardin pointed out in 1968. In the intervening 40 years, neither government intervention, nor Coasian bargaining nor institutional innovation has led societies to efficiently allocate these resources. The evidence for this is powerfully summed up in *The sunken billions: The economic justification for fisheries reform* (World Bank 2008). It points out that at the moment the social losses from the inefficient utilization of world ocean fisheries are around US$50 billion per year. It shows that the total marine catch has been stagnant since the early 1990s at around 85 million tons of fish (World Bank 2008, 5). Within this total, the share of developed countries is actually falling. This stationary catch has been accompanied by a sustained increase in the number of fishing boats and number of people involved in the fishing industry. The number of fishing vessels in the world has risen monotonically, with undecked vessels increasing from 1,750,000 in 1980 to almost 2,500,000 in 1998, and with decked ones increasing from 700,000 in 1980 to about 1,100,000 in 1998 (World Bank 2008, 14). So while inputs of both ships and men have increased, productivity has decreased. For example, the number of metric tons of fish caught per fisher has fallen monotonically since the 1970s, from 5.25 tons in 1970 to about 3 tons in 2000, and this occurred despite considerable technical change (World Bank 2008, 14).

This World Bank report convincingly shows that the most canonical example of market failure proceeds unabated with little effective response from governments or from private agents. Indeed, only New Zealand and Iceland have managed to construct the type of rational fisheries regulation which would solve these problems. The main point of this paper is to ask: why?

The paper proceeds as follows. First, to provide some context I briefly summarize the literature which suggests that it is differences in institutions which explain differences in the efficiency of resource allocation and prosperity. I

then discuss a simple theory of institutions which explains why institutions are inefficient in many countries and go on to explain what this theory implies about institutional differences and what causes the tragedy of the commons to persist in equilibrium. I argue that the only plausible explanation for the persistence of the tragedy of the commons is that, as my overview of the literature suggests, there are political failures which preclude the solution of market failures. These political failures can be in the large, at the level of the national government, or in the small, at the level of the local community. I illustrate how this would influence one to approach policy and discuss how this positive theory of equilibrium regarding the tragedy of the commons influences how one thinks about policy advice. The final section concludes.

The importance of institutions

Douglass North (1990, 3) offers the following definition: "Institutions are the rules of the game in a society or…the humanly devised constraints that shape human interaction." Three important features of institutions are apparent in this definition: (1) that they are "humanly devised," which contrasts with things like geographic factors, which are outside human control; (2) that they are "the rules of the game" setting "constraints" on human behavior; and (3) that their major effect will be through incentives.

The notion that incentives matter is second nature to economists, and institutions, if they are key determinants of incentives, should have a major effect on economic outcomes, including economic development, growth, inequality, and poverty. But do they? Are institutions key determinants of economic outcomes or secondary arrangements that respond to other, perhaps geographic or cultural, determinants of human and economic interactions?

Much empirical research attempts to answer this question. Before discussing some of this research, it is useful to emphasize an important point: ultimately, the aim of the research on institutions is to pinpoint specific institutional characteristics that are responsible for economic outcomes in specific situations (for example, the effect of legal institutions on the types of business contracts). However, the starting point is often the impact of a broader notion of institutions on a variety of economic outcomes. This broader notion, in line with Douglass North's conception, incorporates many aspects of economics, political, and social organization of society. Institutions can differ between societies because of their formal methods of collective decision-making (democracy versus dictatorship) or because of their economic institutions (security of property rights, entry barriers, the set of contracts available to businessmen). They may also differ because a given set of formal institutions are expected to and do function differently; for example, they may differ between two societies that are democratic because the distribution of political power lies with different groups or social classes or because in one society, democracy is expected to collapse while in the other it is consolidated. This broad definition of institutions is both an advantage and a curse. It is an advantage, since it enables us to get started with theoretical and empirical investigations of the role of institutions without getting bogged down by taxonomies. It is a curse, since, unless we can follow it up with a better understanding of the role of specific institutions, we will find it hard to move towards useful policy advice.

There are tremendous cross-national differences in the way that economic and political life is organized. A voluminous literature documents large cross-country differences in many dimensions of economic institutionsas well as a strong correlation between these institutions and economic performance. Scholars have examined measures of the security of property rights, the extent of corruption, the organization of the bureaucracy, and many other things. To quote one example, Djankov, Glaeser, La Porta, López-de-Silanes, and Shleifer (2002) compiled measures of entry barriers across countries finding that while the total cost of opening a medium-size business in the United States was less than 0.02 percent of GDP per capita in 1999, the same cost was 2.7 percent of GDP per capita in Nigeria, 1.16 percent in Kenya, 0.91 percent in Ecuador, and 4.95 percent in the Dominican Republic. These entry barriers are highly correlated with various economic outcomes, including the rate of economic growth and the level of development.

Nevertheless, this type of correlation does not establish that the countries with worse institutions are poor because of their institutions. After all, the United States differs from Nigeria, Kenya, and the Dominican Republic in its social, geographic, cultural, and economic fundamentals, so these may be the source of their poor economic performance. In fact, these differences may be the source of institutional differences themselves. Consequently, evidence based on correlation does not establish whether institutions are important determinants of economic outcomes.

To make further progress, one needs to isolate a source of exogenous differences in institutions, so that we can approximate a situation in which a number of otherwise identical societies end up with different sets of institutions. European colonization of the rest of the world provides a potential laboratory to investigate these issues. Acemoglu, Johnson, and Robinson (2001) documented that in a large number of colonies, especially those in Africa, Central America, the Caribbean, and South Asia, European powers set up "extractive institutions." These institutions (again broadly construed) did not introduce much protection for private property nor did they provide checks and balances against the government. The explicit aim of the European powers in these colonies was extraction of resources, in one form or another. This colonization strategy and the associated institutions contrast with the institutions Europeans set up in other colonies, especially in colonies where they settled in large numbers, such as the United States, Canada, Australia, and New Zealand. In these colonies the emphasis was on the enforcement of property rights for a broad cross section of the society, especially smallholders, merchants, and entrepreneurs.

A crucial determinant of whether Europeans chose the path of extractive institutions was whether they settled in large numbers. In colonies where Europeans settled, the institutions were being developed for their own future benefits. In colonies where Europeans did not settle, their objective was to set up a highly centralized state apparatus, and other associated institutions, to oppress the native population and facilitate the extraction of resources in the short run. Based on this idea, Acemoglu, Johnson, and Robinson (2001) suggest that in places where the disease environments made it easy for Europeans to settle, the path of institutional development should have been different from areas where Europeans faced high mortality rates. These settler mortality rates can potentially be used as an instrument for broad institutional differences across countries in an instrumental-variables estimation strategy.

The key requirement for an instrument is that it should have no direct effect on the outcome of interest (other than its effect via the endogenous regressor). There are a number of channels through which potential settler mortality could influence current economic outcomes or may be correlated with other factors influencing these outcomes. Nevertheless, there are also good reasons for why, as a first approximation, these mortality rates should not have a direct effect. Malaria and yellow fever were fatal to Europeans who had no immunity, thus having a major effect on settlement patterns, but they had much more limited effects on natives who, over centuries, had developed various types of immunities. The exclusion restriction is also supported by the death rates of native populations, which appear to be similar between areas with very different mortality rates for Europeans.

The data also show that there were major differences in the institutional development of the high-mortality and low-mortality colonies. Moreover, consistent with the key idea in Acemoglu, Johnson, and Robinson (2001), various measures of broad institutions, such as measures of protection against expropriation risk, are highly correlated with the death rates Europeans faced more than 100 years ago and with early European settlement patterns. They also show that these institutional differences induced by mortality rates and European settlement patterns have a major (and robust) effect on income per capita. For example, the estimates imply that improving Nigeria's institutions to the level of those in Chile could, in the long run, lead to as much as a 7-fold increase in Nigeria's income. This evidence suggests that once we focus on potentially exogenous sources of variation, the data points to a large effect of broad institutional differences on economic development.

Naturally, mortality rates faced by Europeans were not the only determinant of Europeans' colonization strategies. Acemoglu, Johnson, and Robinson (2002) focus on another important aspect, how densely different regions were settled before colonization (see also Engerman and Sokoloff 1997).

Overall, a variety of evidence paints a picture in which broad institutional differences across countries have had a

major influence on the efficiency with which their resources are allocated and on their economic development. An important aspect of Acemoglu, Johnson, and Robinson (2001) is that it provides direct evidence against views which suggest that resources are allocated efficiently. For instance, say one wanted to test the idea of Sachs that African countries were poor not because of their institutions but because of their poor underlying economic fundamentals, such as geography or disease environment. Ideally, one would want to randomly select some African countries and improve their institutions. If Sachs is right, one would expect no improvement in prosperity. If he is wrong, we would. Though we cannot conduct an experiment on such a grand scale, the instrumental variable approach in Acemoglu, Johnson, and Robinson (2001), if the exclusion restriction is valid, is precisely an experiment-like variation in institutions. The fact that the econometric results suggest that improvements in economic institutions would lead to huge gains in prosperity in poor countries is direct evidence against the idea that market failures are solved by governments, Coasian bargains or institutional innovation a la Ostrom.

This cross-national empirical literature is very consistent with the view that one cannot assume that, in general, tragedy-of-the-commons-type situations will be eliminated, though they may be in some specific circumstances. Institutions everywhere generate perverse incentives from the social point of view, and there is no reason to expect fisheries to be any different. Such statements will no doubt strike those scholars who research this topic as platitudinous. Nevertheless, they should bear in mind of the attempts of researchers, such as Sachs, McArthur, Schmidt-Traub, Kruk, Bahadur, Faye, and McCord (2004) to argue that African countries are too poor to have good governance or institutions. Such a claim, thankfully inconsistent with a scientific analysis of the data, implies that the social losses from the tragedy of the commons in African fisheries are not worth solving, given the costs of doing so.But if institutions have such a large effect on economic riches, why do some societies choose, end up with, and maintain these dysfunctional institutions?

Elements of a theory of institutions

I now briefly discuss a theory of institutions (see Acemoglu, Johnson, and Robinson, 2005, for an extensive development). Economic institutions matter for resource allocation and prosperity because they shape the incentives of key economic actors in society. In particular, they influence investments in physical and human capital and technology as well as the organization of production. Economic institutions not only determine the aggregate economic growth potential of the economy but also the distribution of resources in the future. In other words, they influence not only the size of aggregate income but also how income is divided among different groups and individuals in society.

Economic institutions and policies are endogenous and are determined as collective choices of the society. Clearly, there is no guarantee that all individuals and groups will prefer the same set of economic institutions because, as noted above, different economic institutions lead to different income distributions. Consequently, there will be a conflict of interest over the choice of economic institutions. In such a situation, it will be the distribution of political power in society that determines what institutions are chosen. The group with more political power will tend to secure the set of economic institutions that it prefers. Such a claim is not only true at the national level but also at the local level.

The distribution of political power in society is also endogenous, however. Following Acemoglu and Robinson (2006) I distinguish between two components of political power: *de jure* and *de facto* political power. Here de jure political power refers to all types of power that originates from the political institutions in society. Political institutions determine the constraints on and the incentives of key actors in the political sphere. Examples of political institutions include the form of government (for example, democracy vs. dictatorship or autocracy) and the extent of constraints on politicians and political elites. There is more to political power than political institutions, however. A group of individuals, even if they are not allocated power by political institutions as specified in the constitution, may nonetheless possess political power. Namely, they can revolt, use arms, hire mercenaries, co-opt

the military, or use economically costly but largely peaceful protests in order to impose their wishes on society. I refer to this type of political power as de facto political power, which itself has two sources. First, it depends on the ability of the group in question to solve its collective action problem, that is, to ensure that people act together, even when any individual may have an incentive to free ride. Second, the de facto power of a group depends on its economic resources, which determine both their ability to use (or misuse) existing political institutions and also their option to hire and use force against different groups.

It will be composition of de facto and de jure power in society that determines the actual power of a group or set of interests, and this will determine which economic institutions arise. Those with power today make decisions not just to maximize their income today but also to maintain their grip on power. These goals are often in contradiction. This can be for the simple reason that economic policies which increase even the incomes of elites today may increase the incomes of opponents even more, thus influencing the future distribution of de facto power. It may also be that, as pointed out in the seminal study by Bates (1981), good economic policies are not good politics. In particular, though providing public goods may increase the incomes of the elite, staying in power may be better achieved by using redistributive instruments which can be targeted at supporters and withheld from opponents.

Finally, it is crucial to emphasize that there is nothing in this theory of institutions which implies that the equilibrium institutions of a society will generate a socially efficient allocation of resources. This may be true, if the interests of those with power happen to coincide with those of society, but it can certainly not be expected. The simple reason is that distribution and efficiency cannot be separated, an important reason for which is related to problems of commitment (see Acemoglu 2003 and Powell 2004). This argument implies that for institutional changes to occur it is likely that the power of those who directly benefit from them will have to increase. One cannot expect that those with power will implement reforms that benefit others, even if this is socially desirable.

Determinants of institutions and the tragedy of the commons

I shall refer to the outcome of the composition of de facto and de jure power as the political equilibrium of a society. It will be the nature of the political equilibrium which will determine whether or not there is, or is not, a tragedy of the commons. Failure to solve the tragedy of the commons is a political failure. It should be evident from the above discussion that the political equilibrium is made up of a complex interlocking juxtaposition of forces often with quite surprising comparative statics (see Acemoglu, Johnson, Querubín, and Robinson 2008, for examples). The particular political equilibrium a society has will depend on many things including aspects of the economy, technology, trade possibilities, factor endowments, and social structure. It will particularly depend on its long-run development path.

To frame this discussion it is important to note that there is a lot of agreement between experts on what a sensible solution to the tragedy of the commons in fisheries looks like. It must involve restricted access and some fixing of the total catch along with appropriate monitoring systems which will make sure that these rules are enforced. The preferred option is the introduction of individual transferable quotas (ITQs). Typically the holder of such a quota gets the right to catch a certain percentage of the fixed national quota and he may sell this quota, just like any marketable asset. The idea of this system is that since overfishing is a consequence of too much “fishing effort” and too many resources in the industry, the least efficient recipients of such ITQs will sell out to the more efficient. They will be compensated, and fishing effort will fall, as is desirable. Moreover, to maintain the value of their asset, holders of ITQs will have an incentive to enforce the agreement and behave in socially desirable ways. The literature on solutions to the tragedy of the commons in fisheries tends to define “success” as getting close to the introduction of ITQs.

To think about what facets of the political equilibrium are relevant to understanding the persistence of the tragedy of the commons it is worthwhile reviewing a few key facts about the nature of the fishing industry and also about which countries have done relatively better in solving the problem (see Hannesson 2004; OECD 2008, for partial overviews).

First, the most obvious thing which is different about ocean fisheries is that any sort of property rights are difficult to define. Even if land in Africa is not held in fee simple tenure, user rights to plots are usually well defined as are property rights over crops grown on plots of land, if not the land itself. Yet, in the ocean anyone can sail their boat more or less anywhere. There are no rules specifying even user rights to pieces of the sea. One reason may be that fish move about and it is the fish rather than a piece of the ocean which is valuable.

Second, alongside this issue is the fact that there is a general reluctance of nations to allow for private property of coastal waters. To my knowledge, individuals are not allowed by any country to buy the sea bed in the same way as they are allowed to buy land, for example. Even countries which have moved the furthest towards making user rights private property have not defined property rights over the fish themselves or other ocean assets.

Third, for effective government regulation to be implemented, the correct balance of political forces has to be in play. An important part of this balance must be that those who benefit most from eliminating the tragedy of the common, the fishermen themselves, can act collectively to push their interests. This is hampered by the unique difficulty of solving the collective action problem in this context. In oceanic fisheries, the juxtaposition of both domestic and foreign nationals may make effective collective action difficult (something which would imply that fisheries in inland bodies of water, such as lakes, would be better managed). In addition, there may be something intrinsic to the technology of fishing that makes acting collectively difficult (contrast the behavior of the cattle farmers of Shasta County, California, described in Ellickson 1994, with that of the lobstermen of Maine depicted in Acheson 1988). It is also possible that fishing requires fewer specific skills than other occupations, making fishers more mobile and thus reducing their incentive to engage in collective action in the fishing industry (exit rather than voice). Finally, it could be that the very risk, the dangerous and solitary nature of fishing, creates a type of adverse selection—the industry attracts risk-loving, competitive people who find it difficult to cooperate with each other.

Even if no country in the world has perfectly solved the tragedy of the commons in ocean fishing, some have done better than others. First, it is significant that the countries which have moved furthest towards a rational set of institutions for solving this problem have all been developed countries with well functioning democracies. By well functioning I mean one where political competition tends to be about public goods rather than private goods. To use the language of political science, such democracies are programmatic rather than clientelistic (see Kitschelt 2000). Second, they have also been countries where the stakes are largest in the sense that fishing is a larger proportion of GDP than is typical. It seems to be the interaction of these things that is important. Rich democracies where fishing is relatively small, such as the United States or Canada, have done much less well than Iceland and New Zealand, where fishing is large. Poor countries which are not programmatic democracies, for instance many sub-Saharan African countries, have not done well at solving the tragedy of the commons in fishing, even though the stakes in countries like Liberia or Mozambique are large. Third, cases of successful reform seem to be driven by the government rather than by the industry, even if they cannot succeed without bringing the majority of the industry onboard. Fourth, when reform has taken place it does not seem to be conditional on compensating losers. Sometimes this happens if the losers have sufficient political power, as with Maori fishermen, but generally the difference between successes and failures does not seem to hinge on devising complicated compensation schemes. Finally, it is worth emphasizing that even in the most successful cases, only in New Zealand has it really been possible to create real property rights in ITQs or user rights. In Iceland and the United States, the notion of ITQs as a property right has been challenged with the Supreme Court getting involved in the former country and the notion of restricting entry, and giving exclusive fishing rights to holders of ITQs has been controversial. In other countries, such as Chile or Norway, it has proved politically impossible to introduce ITQs.

To some extent this is what you would expect. There are strong arguments suggesting that democratic political competition will tend to promote social efficiency (Wittman 1989). This argument is really conditional on competition taking place over public goods (Lizzeri and Persico 2001), but that is probably a reasonable approximation to the situation in rich democracies. Such democracies would also tend to have a relatively rich set of fiscal instruments, which is probably necessary for efficiency. There are also strong reasons to believe that collective action is more likely to take place when the stakes are bigger (Wade 1988; Platteau and Gaspart 2005). Nevertheless,

the fact that initiative seems to come primarily from the government probably is less relevant. Rather, the size of the stakes is more important for making the issue politically salient in a democracy and getting politicians to focus on it. The fact that giving away property rights to fishing is so controversial in countries where private property rights are well accepted seems to be related to the huge wealth transfers that take place when such rights are distributed. For example, the usual case is that rights are distributed based on historical catch, perhaps with an allowance for the amount of investment. This involves giving a very valuable asset for free to those already in the industry. One appeal of this is that to some extent it compensates people in the industry who might be concerned about the distribution of the benefits. However, this solution does not compensate everyone since the rights typically go to boat owners, not workers of processers. It appears to be the massive redistributional aspect of ITQs which has made them so controversial in Iceland.

The flip side of this argument is that we would not expect to see well understood and efficiency-promoting policies adopted to deal with the tragedy of the common in nondemocracies, or in democracies where political competition is about private goods. The reason that the latter is important is that property rights are public goods. If the problems of collective action by fishermen are so bad that it always needs the state to intervene to solve their collective dilemmas, it should be in the interest of the state to provide such public goods. But this is often not the case. For one thing, clientelistic states do not want to give away property rights; they want to be able to make privileges conditional on providing political support. Something given as a property right is harder to reverse. Such states also do not want to give away massive potential revenues by handing out ITQs. Many coastal, developing countries sell licenses to fish in their coastal waters, which generates a lot of revenues. They would not want to sacrifice these without getting something in return. It is also important to note that massive redistributions of wealth may be much more politically destabilizing in poor countries than in Iceland or New Zealand. Historically, many types of privatization of assets, from the enclosure movement in England to the state assets sell-offs in Latin America in the 1990s, created inequality and social conflict. This would be much harder to cope with in countries with less resilient political systems.

I doubt that low income per-capita in itself is an important impediment to promoting efficiency in poor countries. Rather it is the nature of the political institutions that are correlated with income that is more important for this issue (Acemoglu, Johnson, Robinson, and Yared 2008).

Thinking about policy

The positive approach of this paper has important implications for the way one thinks about policy. In particular, it is not enough for economists to propose sensible solutions to the tragedy of the commons. These already exist. The problem is that the sensible solutions are not adopted because political forces are not aligned in the right way. Another way to think about this is to observe that too much attention has been given to figuring out what is the optimal policy, with little concern given to what is politically feasible. As my brief discussion and the literature suggests, the first-best, ITQs, is barely politically feasible anywhere. Even in the best possible circumstances, in rich, well functioning democracies where the stakes are high, ITQs are highly controversial.

These two points lead to two different ways of thinking about policy. The first is to consider what interventions could be used to change the political equilibrium so that ITQs, for example, became possible in more societies. This involves coming up with better ways of changing the power of groups, perhaps by thinking of how to facilitate the collective action of fishermen via empowerment mechanisms or interventions. While this approach is interesting, it is probably much less practical than the one that stems from my second argument. If ITQs are not politically feasible in Norway, what chance have they of being adopted in Ghana or Sierra Leone? Very little would be my guess. This implies that policymakers should stop trying to persuade African politicians to adopt ITQs. The first-order problem is not that these governments are uncertain about the efficiency costs of the present situation, but rather that it is just not politically feasible or politically rational for them to adopt ITQs. Instead, the focus ought to be trying to

understand what improvements are possible, given the political forces at work in Africa. This may be to some extent context-specific, but the style of politics one observes is very common across African countries. What works in Ghana may well work in Mozambique.

Conclusions

In this paper I have summarized some of the literature on the importance of institutions for the incentives of economic agents and the efficiency of resource allocation. I have also proposed a simple theoretical framework for thinking about institutional variations, which can account for why societies do not typically end up with institutions which are socially efficient. One of the most puzzling examples of this is the tragedy of the commons. Though this type of market failure has been clearly understood for at least 40 years and though well known technical solutions for it exist, it persists in fisheries with huge consequent social losses. According to my approach, in line with the existing research on comparative institutions, this is a consequence of the nature of the political equilibrium. Those who benefit from solving this particular social tragedy appear to be uniquely disadvantaged politically, and governments seem to have perpetually little incentive to intervene in order to promote efficiency in this sector. Fascinatingly, this generalization holds across diverse political systems and historical paths of development. I made some tentative conjectures about why this may be so. Understanding these issues is particularly important for policy, since without an understanding of what political forces lead to the endurance of the tragedy of the commons in fisheries, we will not be able to solve it. The political economy approach leads to a very different way of thinking about policy than the one current in international institutions. It suggests that too much attention is being paid to the first-best solution to this problem and not enough to finding politically feasible ways of mitigating the tragedy of the commons.

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Chapter 4

Legal issues in fisheries reform:

Lessons from resource management

by

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Legal rules, organizations, and processes are central to the success of any effort to reform fisheries management. The major reforms that have been suggested for improving the performance of fisheries, ranging from catch shares to community management, show mixed results. For example, some efforts at community management have improved maintenance and even restored stocks, while others have produced limited if any success (Kellert 2000; Pomeroy 2001). Catch shares are generally associated with more sustainable fisheries, but a sizable number of fisheries with catch shares are still in trouble (Costello, Gaines, and Lynham 2008). Although many factors contribute to the success or failure of any specific reform attempt, the legal infrastructure underpinning and guiding the attempt is often a major determinant (Meinzen-Dick and Knox 2001; Pomeroy 2001).

This chapter draws on experiences in the management of a diverse variety of natural resources to identify legal lessons for effective fisheries reform. The resources examined include not only marine fisheries, but also freshwater (both surface waters and aquifers), air, petroleum, wetlands, and public lands. The discussion considers the relevance of the lessons learned from these resources for three broad issues involved in fisheries reform: how to improve government regulation, how to use property rights and markets to encourage sustainable fisheries, and how to devolve effective management to local public or private institutions.[1]

Government regulation

Effective governmental regulation is generally essential to the sustainability and wealth-maximizing use of any natural resource, including fisheries. As discussed in the next section, property rights in a resource provide the owner with an incentive to support efficient management of the resource. But those property rights typically operate within a regulatory structure that sets overall extraction levels, addresses externalities that are not resolved by the property rights themselves, and monitors and punishes violations. Absent effective property rights, moreover, regulation is often the only available tool for pursuing wealth-maximizing extraction and use.

Unfortunately, government regulation of natural resources has often failed to provide efficient production and use, particularly where resource users lack an economic incentive to support effective regulation. Traditional government regulation of fisheries has a notoriously poor track record in preventing inefficiencies and, in particular, protecting fish stocks from over-exploitation (Ellis 2003; Fujita 2003; Scott, this volume; Wilen 2005). Significant groundwater overdrafting continues in many parts of the world, despite laws in some areas that prohibit withdrawals in excess of safe yield (Glennon 2002; Postel 1999; Seckler, Molden, and Barker 1999). In the United States, water agencies and courts have generally failed in policing against inefficient surface-water use (Neuman 1998). Inefficient petroleum production often continues despite state regulation (Pierce 1983), and governmental efforts to

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regulate rangeland use of the federal public domain have led to economically inefficient overgrazing (Carlson and Wald 2001; Kerr 1998; Hess and Holechek 1995).

Although there are multiple causes of governmental regulatory failure, four factors are particularly relevant in thinking about how legal reforms could improve performance. First, resource users tend to dominate regulatory decision making and, particularly where the resource is a commons, generally favor high levels of current exploitation. Regulatory bodies frequently include direct representation of resource users (for example, Eagle, Newkirk, and Thompson 2003). Even without direct representation, resource users are generally politically more concentrated and active than public and conservation interests and, therefore, have greater influence on regulatory bodies. Second, regulatory processes often closely link "allocation issues" (who gets how much) with "conservation issues" (how much in total can be extracted), encouraging decision makers to make lax conservation decisions in order to relieve allocation pressures. Third, both monitoring and enforcement tend to be underfunded and ineffective. Finally, governmental regulations often address only part of an interrelated physical or economic system. Such partial regulation, even when effective in the limited areas addressed, often fails to address important externalities and, by constraining resource use in one part of the system, can actually shift pressure to another part.

Decreasing control by resource users

If resource users do not have a long-term ownership stake in a resource, they typically benefit from short-term increases in extraction levels but see no secure gains in providing for long-term resource sustainability. Even where resource users enjoy a long-term interest, a variety of cognitive biases can lead them to prefer significant long-term risks to the sustainability of the resource over short-term restrictions on extraction. As a result, control of regulation by resource users tends to produce relatively lax levels of regulation (Thompson 2000c). To try to overcome this bias, governments have sought in various contexts to (1) increase the decision-making power of conservation interests, (2) provide for greater judicial oversight of regulatory decisions, and (3) design and implement processes that make it more difficult for a decision-making body to adopt lax standards.

Effective representation of conservation interests

The choice of regulatory agency can be instrumental in addressing the risk of political imbalance. For example, rather than provide for governmental regulation by a single-resource entity that is readily subject to capture (such as a fishing agency), the government can give regulatory authority to a broader-based, multi-industry agency with general authority for protecting a range of resources or the environment (Ayres 1991; Thomas, Soule, and Davis 2009). In the United States, Congress tried to reduce the chances that developers could capture the process of regulating wetlands by giving the Environmental Protection Agency (EPA) veto power over permits issued by the Army Corps of Engineers (Salzman and Thompson 2006).

Governments alternatively can give regulatory authority to a single-purpose agency but provide greater balance by requiring other governmental agencies with conservation missions to provide input into the decisions of the regulating agency. Such has occasionally been the case in the United States. Under the Electric Consumers Protection Act of 1986 (ECPA), for example, Congress required the Federal Energy and Regulatory Commission (FERC) to consult with EPA and other conservation agencies before making decisions on hydroelectric facilities and to explain any decisions to ignore those agencies' advice (16 U.S.C. §§ 797 & 893). A study of FERC decisions by DeShazo and Freeman (2005) found that, by forcing FERC to consider and respond to the views of EPA and the other conservation agencies, ECPA successfully led FERC to more fully consider conservation concerns.

When a government wishes to give resource users direct representation in regulatory decisions (either because of their strong expertise or for political reasons), the government can help reduce the chances of capture and biased decision making by using multiparty regulatory commissions with "balanced" representation from both resource users and conservation interests. Regulatory commissions in the United States and elsewhere that are responsible for managing water, fish, wildlife, and other resources often require that some members of the commission be from the

conservation community (Eagle, Newkirk, and Thompson 2003; Johns 2005). The Federal Advisory Committee Act, although it governs advisory groups rather than the decision makers themselves, provides that membership in advisory committees must be "fairly balanced in terms of points of view represented" (5 U.S.C. app. 2; Crowley and Funk 1997). Regional fishery management councils in the United States, by contrast, historically have consisted largely of industry representatives with few, if any, conservation representatives. A comprehensive survey of council members in the early 2000s found that council members themselves believed that an expanded range of representatives and views would strengthen council decisions (Eagle, Newkirk, and Thompson 2003).[2]

Efforts to "balance" influence by resource users, however, have seldom succeeded. In most cases, resource users still dominate decision making (Carlson and Wald 2001; Eagle, Newkirk, and Thompson 2003; Feller 2001). The ineffectiveness of multistakeholder management has led some observers to argue for providing each key stakeholder group, including conservation interests, with a separate share of a resource to manage (e.g., Eagle 2006). The United States public-land system, for example, divides the federal domain into separate land categories and awards control over some categories, such as parks or wildlife refuges, to conservation agencies, and other categories, such as national forests and mineral lands, to agencies with closer ties to industry groups (Eagle 2006; Coggins, Wilkinson, and Leshy 2002). Spatial management of the oceans could allow a similar geographic allocation, with some ocean "zones" under the jurisdiction of conservation groups and others under the jurisdiction of commercial fishers, recreational fishers, or other extractive interests (Eagle 2006; Eagle, Sanchirico, and Thompson 2008; Sanchirico et al. 2010). Where marine resources are highly migratory, however, such spatial zoning can create externalities that reduce their effectiveness.

Even if the provision of greater power to conservation interests leads to greater levels of protection, it may not maximize social welfare. Conservationists have their own political agenda and may push for results, such as very high levels of protection, that maximize their own goals but not overall societal wealth. Some conservation interests, for example, have pushed for complete protection of freshwater fisheries from water pollution and stream withdrawals, even where the societal costs of such protection exceed the benefits (Jones and Meyers 1978; NWC 1973).

Judicial involvement

An alternative approach that governments have used to try to address welfare-weakening political pressures from resource users is judicial oversight. In many nations, such as the United States and Australia, courts today are largely independent from other governmental branches and the electorate, isolated to at least some degree from political pressures, and culturally devoted to the concept of "principles" (Goldman and Sarat 1989; Thompson 1990).[3] Empirical studies confirm that interest group pressures have little, if any, influence in the decisions of such courts (Goldman and Sarat 1989). Courts are also less likely to suffer from a variety of cognitive errors that result from having direct personal interests in a resource (Thompson 2003c).

Judicial oversight is least likely to be subject to political pressure when conducted by courts of general jurisdiction. Because such courts deal with multiple issues, resource users are less likely to be able to lobby effectively for the appointment of particular judges. Also, because judges on courts of general jurisdiction are unlikely to have sought or gained appointment because of their policy views on the management of any specific resource, they are unlikely, as a group, to have strong policy biases regarding such resources (Sax 1970). The flip side of this "objectivity," however, is that courts of general jurisdiction are less likely to be experts on resource issues.

In some cases, governments have given courts direct management of specific resources. In the United States, for example, a specialized set of water courts administer water law in Colorado, and courts of general jurisdiction have sole state-level jurisdiction over the extraction of groundwater in California (Krogh 1995; Sax et al. 2006). Colorado water courts enjoy a strong reputation for effective- management, although some complain of the typical costs and delays of the judicial process (O'Leary 2003). Even though the water courts are potentially subject to political capture because of their narrow focus, their judicial role appears to isolate them from significant political pressure,

and appeals go to the Colorado Supreme Court that, as a court of general jurisdiction, is strongly protected from political pressure. Judicial oversight of groundwater in California, by contrast, generally has not been effective. Hampered by a lack of expertise as well as by complex and costly procedures, trial courts have not proven successful mechanisms for resolving overdrafting of groundwater aquifers (Blomquist 1992; Sax et al. 2006).

Governments can provide for indirect judicial involvement by giving courts the power to review and reverse erroneous decisions by regulatory agencies. Under the United States Administrative Procedure Act, virtually all national administrative decisions dealing with resources or the environment are subject to judicial review to ensure that the decisions are not arbitrary and capricious or an abuse of discretion (5 U.S.C. §§ 551 et seq; Salzman and Thompson 2006). To ensure effective judicial review, agencies must provide the courts with comprehensive administrative records setting out the basis for their decisions. Anyone aggrieved by the decision, including conservationists, can seek such judicial review (Thompson 2000b).

Process

Another method of protecting the sustainability of resources from political pressure is through processes that make it harder to adopt lax regulations. Governments, for example, can influence agency decision makers through burdens of proof. Where governments are worried about lax regulation of resource use, they can place a high burden of proof on resource users to show that their level of resource extraction is sustainable. In the mid-1980s, Congress questioned whether EPA's regulation of hazardous-waste disposal under the Resource Conservation and Recovery Act (RCRA) was sufficiently protective of human health. Concerned that industry was dominating EPA's decision making, Congress amended RCRA to ban the disposal of hazardous waste unless EPA affirmatively found it safe. EPA's regulation of hazardous-waste disposal became far more rigorous (Salzman and Thompson 2006). In California water management, the judicial imposition of a "public trust" standard, which requires the state to find that both new and existing appropriations are consistent "where feasible" with the trust purposes, appears to have had a similar constraining effect on the administration of water appropriations (Blumm and Schwartz 1995; Weber 1995).

A government can also help reduce the political influence that resource users have on management decisions and encourage more deliberate decision making by increasing the visibility and transparency of regulatory decisions. Judicial review is one method of increasing visibility and transparency. The United States, along with a number of Commonwealth and European nations, also have increased visibility and transparency by requiring agencies to publish proposed and final decisions, along with a detailed explanation of the decisions' rationale, and to solicit and respond to public comments on proposed decisions (Salzman and Thompson 2006).

The development and provision of scientific information regarding a resource can be critical in ensuring transparent and effective decision making. The form in which regional fishery management councils in the United States receive scientific information regarding the likely allowable biological catch (ABC) levels for fisheries appears to have strongly influenced decisions. Actual ABCs are subject to considerable scientific uncertainty, so scientists must estimate them. Scientists provide some councils with a specific point estimate of the ABC (based generally on the scientific mean), while they provide other councils with only the endpoints of a broad range within which the actual ABC is likely to lie. Studies indicate that those councils that receive point estimates are more likely to set conservative catch limits than those that receive only range limits— in part, because the consequences of higher limits are more obvious to the councils and courts (Eagle and Thompson 2003).

Decoupling conservation and allocation

Regulators often must make conservation decisions in close proximity to allocation decisions, encouraging the regulators to set lax conservation standards so that allocation decisions can be easier and less controversial. In the United States, for example, regional fishery management councils must first decide on the appropriate quota for a fishery (the conservation decision) and then allocate that quota among different fishing groups (the allocation

decision). Eagle, Newkirk, and Thompson (2003) find that this pairing increases the pressure on council members to adopt higher quotas in order to ease the allocation decisions.

Governments can try to decouple conservation and allocation decisions in several ways. First, governments can give the conservation and allocation decisions to different regulatory bodies. Under the U.S. Clean Air Act, for example, the national government sets overall pollution requirements in the form of National Ambient Air Quality Standards (NAAQS), while states generally determine how to allocate individual pollution rights within this confine (Salzman and Thompson 2006). While interest in "cooperative federalism" partially motivated this approach, the separation also reduces the political pressure to weaken the conservation decision (although it does not totally eliminate the pressure). In surface water allocation, the United States and some states similarly provide that an agency other than the allocating water agency can remove sensitive stretches of a river from appropriation or appropriate environmentally important instream flows (Boyd 2003; Gillilan and Brown 1997; Sax et al. 2006; Thomas 1996). One of the most common recommendations for reforming national fisheries management in the United States has been to separate the agencies making conservation from those making allocation decisions— typically with the National Oceanic and Atmospheric Administration (NOAA) setting quotas and regional fishery management councils allocating the quotas (U.S. Dept. of Commerce 1986; Eagle, Newkirk, and Thompson 2003).

Alternatively, governments can try to temporally separate conservation and allocation decisions by making conservation decisions at an early stage before there are significant allocation issues riding on the decision. For example, in the context of water allocations, the United States and western state governments sometimes have required agencies to set instream-flow standards, where possible, at an early stage, prior to the filing of appropriation applications for that water (Gillilan and Brown 1997; Sax et al. 2006; Thomas 1996). Unfortunately, this approach requires governments to get ahead of the curve and regulate particular resources before they are significantly exploited. This can be particularly difficult where the information needed to make conservation decisions is not yet available or is likely to change over time.

Improving monitoring and enforcing

Both the monitoring of resource use and the enforcement of resource limits are often weak, undercutting even strong regulation. In the fishing field, studies estimate that the amount of illegal fishing in the United States is significant— perhaps with noncompliance rates as high as 40% in some fisheries (Eagle and Thompson 2003; Sutinen, Rieser, and Gauvin 1990). The problem appears to be even more extensive globally (Sumaila, Alder, and Keith 2006).

Provision of adequate funding and inspection authority to a governmental enforcement agency is essential. Where resource users do not enjoy secure rights in a resource, the government generally cannot depend on resource users to bring violations to their attention. Indeed, users often hesitate to raise the issue of violations for fear that enforcement actions will limit their own ability to extract the resource or lead other resource users to ostracize them (Sax et al. 2006). Where general public funding is scarce, governments can require users to provide the necessary funding, either through user fees or the hiring of on-boat monitors (Sutinen and Soboil 2003. Inadequate funding, however, is only part of the problem. Enforcement agencies are often subject to political pressure not to pursue strong enforcement (Greeve 1990).

Citizen monitoring and enforcement can help supplement governmental resources, and they can substitute for governmental monitoring and enforcement when political pressure undermines agency efforts (Hodas 1995; Thompson 2000b). The United States has made extensive use of citizen monitoring and enforcement, although more frequently under pollution-control laws than under resource laws. Environmental groups have often brought lawsuits against violations (Greeve 1990), and a growing posse of "waterkeepers" actively monitor rivers and coasts for violations of environmental and conservation laws (Thompson 2000b).

The United States has encouraged participation by environmental groups and individual citizens both by authorizing their participation in enforcement and by providing monetary incentives. Virtually all of the major environmental

statutes passed in the 1970s, for example, provide for "citizen suits" against violators and against the government for failure to undertake mandatory regulatory actions, as well as for the award of attorney fees to successful citizen "prosecutors." These provisions have not only led to increased enforcement and a lower degree of leniency error by federal prosecutors, but also have generated new enforcement approaches and provided environmental groups with greater political power in the overall implementation of the statute (Thompson 2000b).

A number of U.S. laws, including the Endangered Species Act, also provide rewards to private citizens who come forward with information that leads to successful prosecutions of violators (Thompson 2000b). The Federal False Claims Act further encourages citizen informants to ferret out violations of some U.S. environmental laws by allowing informants to bring their own prosecutorial actions if the government fails to do so and to keep a percentage of any penalties (Baird 1994; Lininger 1997; Thompson 2000b).

Incomplete regulatory coverage

A final problem that often plagues the regulation of natural resource use is incomplete coverage of integrated resource systems. Many western states in the United States, for example, have historically failed to effectively regulate groundwater, even where hydrologically interconnected to surface water (Blomquist, Schlager, and Keikkila 2004; Sax et al. 2006). In these states, groundwater extraction has often undermined efforts to manage surface water. Efforts to reduce surface water use, moreover, have often simply increased the use and overdrafting of groundwater. The latter is a form of "regulatory leakage," where efforts to regulate overuse of some resources can encourage overuse of others. Although leakage is typically discussed in the context of climate change where carbon emissions that are regulated in one region or sector can "leak" to another region or sector (Babiker 2005), the problem is common to a wide variety of resource regulations.

Expansion of the regulatory regime to include all significantly interrelated resources and issues, while the obvious solution, can be administratively complex and is typically opposed by interest groups vested in the current regime. Different agencies, for example, may already have jurisdiction over disparate parts of a system (for example, over 20 federal agencies currently have jurisdiction over competing activities in U.S. territorial waters [Crowder et al. 2006]) or a resource may span multiple geographic jurisdictions (for instance, rivers often cross sovereign borders). In these settings, it may be difficult to create a new regulatory body with comprehensive jurisdiction. The most feasible approach may instead be formal coordination among the separate regulators (Caldwell and Sivas 2008). Integration can also be challenging where different sets of often inconsistent rules currently govern separate parts of an integrated resource system. Regulation of groundwater and surface water, which are often subject to different allocation schemes, illustrates this latter problem. Here, the only viable solution is generally to merge one resource into the scheme employed for the other (Sax et al. 2006), but resource users vested in the "losing" scheme are likely to strongly oppose the merger.

Effective use of property and markets

The creation of property interests in a resource, as well as markets in those interests, can increase the sustainability and value of the resource. Property rights can provide resource users with a long-term stake in the sustainable regulation of the resource and thus reduce the pressure that regulators might otherwise face to set unsustainably lax standards. A growing number of studies, for example, find that adoption of individual catch shares for fisheries is generally associated with healthier fisheries (Costello, Gaines, and Lynham 2008; Leal 2006; Leal 2005). Indeed, without property rights, some regulatory approaches can create perverse incentives in the exploitation of the resource, such as "derby" fisheries (EDF 2007; Scott, this volume). Property rights also allow conservation groups or others interested in a higher level of conservation to negotiate with a limited set of users for stricter regulations. As discussed in more detail below, The Nature Conservancy (TNC) in June 2006 agreed to buy out half of the fishing trawlers in Morro Bay, California, in return for the fisherss' support of a new regulation that now protects a

large swath of local water from trawling (Deacon 2009; TNC 2006). Finally, property interests can give rights holders a fiscal interest in monitoring and prosecuting violations. Appropriative holders of senior water rights frequently bring suits to enjoin juniors or nonrights holders from taking "their" water (Sax et al. 2006).

The creation of tradable property rights and a viable market carries a number of other potential advantages. First, markets in the tradable interests can ensure that extraction rights go to those users who can make the highest economic use of them, thereby increasing resource wealth. Studies of water markets in the western United States have found that the markets can significantly increase societal wealth (for example, see, Newlin et al. 2000: Sax et al. 2006). In 1991 alone, a state-run market in water rights in California created about $100 million in value— even though the market was artificially constrained (Howitt, Moore, and Smith 1992). Second, markets can permit conservation interests to reduce resource extraction by purchasing rights from individual users. For example, environmental groups, such as the Oregon Water Trust, interested in restoring instream flows in the western United States, have acquired millions of cubic meters of water from farmers and other water users and used them to protect freshwater fish (Scarborough and Lund 2007; Thompson 2000a).[4]

Like regulation, however, property rights require careful legal design and implementation to be effective. Governments must make several important choices in particular. First, should the government create individual property interests or only a group property interest? Second, how should the government define the core elements of the property right? Third, should the property right be tradable, and, if so, what infrastructure should be created to oversee the resulting market? Finally, how should the resource rights be initially allocated?

Individual versus group property rights

An important choice in the development of a property right is between group and individual property. In the fishery context, for example, governments could issue a limited and fixed number of permits entitling the permit holder to fish in a specific fishery, thereby creating a group property right in the collective of permittees, or it could create and issue individual fishing quotas. As explained below, individual property rights generally maximize the economic benefits and advantages of a property system. Group property rights, however, can provide important opportunities for the rationalization of the resource in some settings (Ostrom 1990 and 2003) and should not be rejected as an option— particularly where political considerations prevent creation of individual rights.

States in the United States often award group property interests in major resources, which provide useful case studies in their advantages and disadvantages. A majority of states, for example, award groundwater use to owners of land overlying an aquifer— a form of group property rights (Sax et al. 2006). Overlying landowners in the United States similarly share ownership of petroleum underlying their properties; although each landowner technically owns an individual right to whatever they can extract, the effective result is group ownership among overlying owners (Goldstein and Thompson 2006).[5] As economists would predict, such group ownership has often led to the overdrafting of groundwater aquifers and the inefficient depletion of petroleum reservoirs (Craft 1995; Glennon 2002).

Under some conditions, however, the individuals who share ownership have been able to agree to a common scheme to manage the total resource stock on a sustainable basis,such as the creation of a local groundwater management district in the case of water (Blomquist 1994), or voluntary unification in the case of petroleum (Libecap 1989). As others have discussed in detail (for example, Ostrom 1990 and 1992), multiple factors appear to influence the likelihood that group property will lead to such rationalization of resource extraction, including:

1. *Group size*. Small groups are more likely to overcome the transaction costs of engaging in effective collection action (White 2006).

2. *Long-term stability*. Groups that are relatively stable and expect to remain resource users for a long period are more likely to see value in agreement (Grima and Berkes 1989).

3. *Homogeneity*. Groups with similar interests, understandings, cultural views, and economic expectations are more likely to reach effective agreements (Sethi and Somanathan 1996).

4. *Available information*. Groups with access to accurate information regarding the condition of the resource and the opportunities for gain from collective action are more likely to reach agreement (Blomquist 1992; Gilles and Jamtgaard 1981).

5. *Administrative costs*. Groups that can negotiate at low cost and, more importantly, have the means to monitor and enforce any agreement (either because the costs are low or because of internal or external funding) are more likely to develop a sustainable long-term management structure (Berkes 1992).

6. *Outside assistance*. Public and private entities can sometimes help facilitate agreement, either by serving as a catalyst or facilitator for negotiations or by providing resources to reduce administrative costs. This factor is discussed in more detail in the final section of this chapter on devolution of management.

The recent agreement between TNC and Morro Bay bottom-trawlers, mentioned earlier, helps illustrate a number of these points. The trawling fleet was over-capitalized and operated in a broad area off the coast of California, including in sensitive habitats important to the long-term sustainability of local fisheries.[6] TNC, which wanted to reduce pressure on the marine ecosystem by setting aside a large no-trawl area and by reducing the overall amount of destructive trawling, served as a catalyst, facilitator, and funder of a program designed to reduce the number of trawling boats and establish a governmentally enforced no-trawl zone.[7] The small size of the Morro Bay trawling fleet (only about a dozen boats), the fact that no new permits could be issued, and the homogeneous interests of those vessel owners wishing to remain in the industry aided discussions and agreement. TNC provided the permit holders with detailed information about alternative means of structuring a no-trawl zone and the economic implications of each approach. Because the federal government would administer and enforce the no-trawl zone, the permit holders also faced no administrative costs in implementing an agreement.

Defining the property right

In creating a system of property rights, whether group or individual, the government must also define the core elements of the property interest. As shown in Table 4.1, a property right in any specific resource can be defined in terms of (1) access (specifying when and where the owner has access to the resource), (2) extraction (specifying the stock, flow, or share of the resource that the owner has the exclusive right to extract, as well as any conditions on how the resource can be extracted), (3) use (stating how the owner can use the resource), (4) duration, and (5) transferability.

There is no ideal set of property characteristics in the abstract. Instead, the appropriate elements of a property right for any particular resource depend on the answer to a number of questions regarding the resource and the underlying regulatory structure:

1. *What is the physical character of the resource?*

The physical features of a resource are critical to the appropriate elements of a property system. The geographic range and movement of a resource, for example, are important in determining whether to define a resource primarily in terms of access or extraction levels. Property rights in relatively fixed resources, such as forests and hard minerals, are often defined by exclusive access to particular areas (which, as discussed below, is generally easy to administer and police), while property rights in highly migratory resources, such as surface water, are typically defined by quantitative extraction rights. Similarly, living marine species, such as shellfish and crustaceans, that move only short distances can often be managed through territorial use rights (TURFs), while fish that migrate significant distances (either as adults or larvae) may require property rights defined by extraction quantities.

Where the timing and location of resource use can make a difference to sustainability, property rights also generally include appropriate restrictions. Appropriative water rights in the western United States, for example, carefully specify points and timing of diversion (Sax et al. 2006). A sound property system in fisheries should similarly take into account potential impacts on recruitment from fishing in sensitive spawning areas during spawning season.[8]

Table 4.1: Definitional elements of property rights in resources

Access	Places of permissible extraction Times for permissible extraction Degree of access exclusivity
Extraction	Quantity or percentage of the resource stock that the holder can extract Quantity or percentage of resource flows that the holder can extract Allocation system in case of shortages Percentages of any quotas permitted that the holder can extract Right to "bank" extraction rights for future periods Methods of permissible extraction Other conditions on extraction
Use	Rights to maintain the resource Permissible types of resource use Permissible users of the resource
Length	Duration of the property right Renewability of the property right, including any presumptions regarding renewal "Use it or lose it" provisions
Alienation	Rights to transfer the property right

2. *What degrees of property security and regulatory flexibility are desirable?*

Some degree of property security is necessary to obtain the beneficial incentives highlighted at the beginning of this section. Because they lack secure property interests, holders of western grazing rights do not always invest in important maintenance and improvement and are not fully supportive of regulatory restrictions (White 2006). Water right holders in the West, despite the theoretically "perpetual" nature of their rights, often do not engage in valuable trades because they fear that the offer to transfer water will lead regulators to conclude that their prior water use was "unreasonable" and that their water rights should be reduced accordingly (Thompson 1997a). In a similar fashion, fishers are unlikely to support tighter quotas and needed habitat management if there is a significant chance that they will lose their entitlement before enjoying the fruits of those measures.

At the same time, establishing property rights in fixed flows or stock percentages can limit regulatory flexibility if it later turns out that the total amount of property is unsustainably high. Regulatory flexibility, for example, has been a problem with fixed water rights in both the United States and Australia (Sax 1989; Schofield and Burt 2003). One approach to balancing security and regulatory flexibility is to issue a perpetual property right defined in terms of a percentage of an allowable overall take set periodically by regulators (for instance, a yearly overall fishing quota)—providing both security to the right holder and flexibility to the regulator. Other approaches used by government to try to balance security and flexibility include (1) awarding a property right for a limited period with a presumption of renewal (used under the U.S. Taylor Grazing Act), and (2) awarding a perpetual right that the government reserves the right to eliminate without paying compensation (used by the Clean Act Air in issuing SO_2 emission allowances) (White 2006).

3. *What monitoring resources are available, and what degree of enforceability is desired?*

In a setting where it is difficult to continually monitor extraction levels, a property right defined primarily by access can sometimes be preferable. Because monitoring extraction levels was difficult, early courts often defined property rights in wildlife and groundwater in terms of geographic access rather than by extraction levels. Where the cost of monitoring fish catch is high relative to the value of a fishery, a property right system based on access to particular ocean zones might make similar sense, despite the potential for interzone externalities.

4. *Will the property rights be transferable?*

Where the government wants to promote a market, simpler property rights will generally be preferable, everything else being held constant, to more complex property rights. For example, the complexity of prior appropriative water rights, which establish exactly how much, where, when, and for what purpose surface water can be extracted, has significantly complicated market transfers and led to relatively inefficient, thin markets in the United States (Haddad 1999; Thompson 1993). The right to remove timber, by contrast, is a straightforward "stick" in the bundle of rights that makeup private landownership in the United States and can, therefore, be transferred relatively easily by either sale of the underlying land or by conveyance of an easement to remove the timber (Goldstein and Thompson 2006).

Many resource rights, including water rights, grazing rights, and rights to remove timber or minerals from public land, include "use it or lose it" provisions (Sax et al. 2006; White 2006; Hess and Holechek 1995). Such provisions might make sense where rights cannot be transferred because, otherwise, as resource users went out of business or otherwise disappeared, rights would go unclaimed. Where rights can be transferred, however, the market can effectively govern use and nonuse, and "use it or lose it" provisions can prevent conservation groups from buying and retiring rights (Fairfax 1997; Thompson, 1997a). Also, "use it or lose it" provisions can discourage conservation by resource owners and encourage overuse (Hess and Holechek 1995). For this reason, property rights systems designed specifically for market transfers, such as SO_2 emission allowances, do not include such provisions (Stavins 1998). Where fisheries are managed through catch shares, "use it or lose it" provisions could both preclude conservation groups like TNC from reducing catch levels by purchasing and retiring shares and also prevent the fishers themselves from deciding not to harvest their entire catch shares for purposes of voluntary stock rebuilding.

Transferability of property rights

As economic theory would predict, virtually all property systems move toward transferability as the resource becomes scarcer and initial allocations grow more inefficient (Demsetz 1967). Most states in the western United States., for example, initially barred markets in appropriative water rights. As the economic value grew of allowing the rights to move to higher-valued uses, however, all states ultimately chose to allow transfers (Sax et al. 2006; Thompson 1997a; Thompson 1993). Fears that such markets would undermine communities that were historically resource-dependent have not materialized (Thompson 1997a).

Transfer restrictions

Although governments have opened markets, they have also frequently restricted to whom rights can be transferred, for what uses, and under what circumstances—often undermining the resulting benefits. For example, governments frequently do not permit water to be transferred for use outside of their jurisdictional boundaries. Such limits have undercut the efficiency of water markets and, in a subnational context, sometimes raised constitutional concerns (Thompson 1991 and 1997b).

Some of the most common and troubling limits on marketability restrict the ability of conservation groups to acquire resource rights in order to retire them from use and thereby increase the overall level of resource protection. In some cases, governments explicitly provide that rights can be transferred only to resource users. As noted above, "use it or lose it" provisions also undermine the ability of conservation groups to retire any rights that they purchase. Conservation groups in the United States, who have increasingly sought to use market acquisitions to provide additional protection, have encountered such transfer restrictions in connection with rights to water, public rangeland, fisheries, and other resources (Boyd 2003; Fairfax 1997; Sterne 1997). These restrictions prohibit the efficient reallocation of rights from use to conservation without any clear offsetting benefits. Reflecting the strong policy arguments against these restrictions, states are increasingly eliminating them, particularly in the water field, and replacing them with express authorizations for environmental acquisitions. Unfortunately, such restrictions still remain in a variety of contexts and jurisdictions (Boyd 2003; Sax et al. 2006; Thompson 2000a).

Clear and simple transfer rules are critical to the effectiveness of markets. In the freshwater field, recent decades have shown a governmental trend toward imposing vague, public-interest standards on transfers. Responding to public concerns that water transfers could impact local communities and the environment, for example, New Mexico allows transfers only if they are "not detrimental to the public welfare of the state" (N.M. Stat. Ann. § 72-5-23). Although such provisions give state regulators broad powers to ensure that transfers are in the public interest, they also allow transfer opponents to impose significant delay and transaction costs, invite political abuse, and undermine water markets (Thompson 1993).

Subdividing rights

An important, but often ignored, issue in the design of transferable resource rights is the degree to which a right holder should be able to subdivide the right and transfer a portion of the right to another party while either retaining the remainder or transferring the remainder to yet a third party. Under the common law (as well as a number of civil law nations), property in land can be subdivided physically, by time, and into the individual sticks that make up the bundle of rights that constitutes "real property" (Goldstein and Thompson 2006). A landowner therefore can give half of his property to a friend, rent the property for ten years, or sell a utility an "easement" to string power lines across the land. The ability to transfer only part of a property right generally increases the potential value of the right, by allowing those who most highly value each part of the right to control that part, although increasing the fragmentation of a property right can risk a tragedy of the "anticommons" (Heller 1998).

Like property rights in land, transferable property rights in resources are also generally subdivisible physically. In most of the United States, for example, the owner of a transferable property right to *X* units of water, *Y* percent of a fishing quota, or *Z* acres of minerals can typically transfer a portion of the right to others (EDF 2007; Sax et al. 2006). Governments also typically allow the holders of resource rights to subdivide them temporally (for example, to transfer an appropriative water right for a fixed number of years, while retaining a reversionary interest in the water (Thompson 1993), although the right to engage in temporal subdivisions of resource rights should be but seldom is explicit.

Unfortunately, property systems in natural resources infrequently address whether the holder of the property can subdivide and transfer individual sticks in their bundle of rights—what in real-property law would be considered a "nonpossessory interest" or "servitude" (Goldstein and Thompson 2006). This issue is of significant importance to

private conservation efforts. Under conservation-easement laws in effect in all 50 U.S. states and in a growing number of foreign nations, a landowner can transfer the right to develop his or her property (or some segment of it), to an organization such as TNC, while retaining the underlying fee,. Because the landowner no longer owns the development right, future purchasers of the land do not acquire the right to develop the property (Cheever 1996; Gustanski and Squires 2000). Unfortunately, laws dealing with resource rights are generally silent on the transferability of the individual sticks that make up the rights, leaving it unclear whether a conservation organization such as TNC can similarly restrict the way in which holders of a water or fishing right can use their right.

To understand the relevance of this issue to fisheries, consider TNC's acquisition of trawling permits in Morro Bay, California, discussed earlier. After acquiring the permits, TNC decided not to retire them but to lease them to local fishers, subject to restrictions on how they are used that are designed to minimize any impact on the environment. TNC, in effect, decided to lease the permits subject to a form of conservation easement. Because the lease will be short term, TNC can probably enforce the restrictions against the lessees as a matter merely of contract law (although the question of whether regulators can preempt the TNC restrictions is an open question). Contract law, however, cannot bind subsequent purchasers of a property right; only an explicit provision in the law can ensure that conservation restrictions "run with the right." As a result, TNC may not be able to sell its permits subject perpetual long-term conservation restrictions or enforce the restrictions against future permit owners.

Market infrastructure

A final issue in the creation of transferable rights is the legal infrastructure needed to encourage efficient market transfers. Resource users must be able to enforce their rights and associated market contracts, which generally can be accomplished through existing legal institutions without special legislation, assuming that the right to contract is firmly embedded and protected. Registries that keep track of who owns what rights and under what limitations have long promoted transfers in land and water permits, by giving buyers greater confidence in what they are purchasing, and can similarly benefit markets in other natural-resource rights (Goldstein and Thompson 2006).

The governmental process, if any, for reviewing governmental transfers of resource rights also can be critical to market effectiveness. Just as simple and clear property rules help promote markets, simple and clear transfer procedures can promote markets by reducing transaction costs. Transfers of many property rights, including rights in land, do not involve any form of governmental overview in the United States and thus are easy to execute, supporting robust markets. Transfers of water rights in the western U.S., by contrast, involve often complex, lengthy, and costly administrative review, undermining the opportunities for efficient transfers (Gray 1996; Thompson 1993).

Initial allocation of rights

The most difficult task in establishing a system of resource rights is often the initial allocation of rights. [9] To whom the rights are allocated is generally less important to the effective functioning of a market than establishing clear property rights that can be traded. Except where all resource users are similarly situated, however, any proposed allocation of rights is likely to seem unfair to many, if not all, of the users, undermining the political support often needed to establish a rights system (Thompson 2000c; Wade-Benzoni, Tenbrunsel, and Bazerman 1996).

Governments generally consider at least five factors in deciding how to allocate new resource rights.

1. *Political Viability*. Because the key goal is generally to establish a clear allocation of rights so that the market can operate, the most important consideration in deciding on a system for allocating rights is typically political feasibility. Allocations based on historical use, or "grandfathering," are often politically viable, which is one reason they are very common. Governments also often allocate rights to interest groups that are likely to otherwise oppose the creation of the rights. In establishing SO_2 emission allowances under the U.S. Clean Air Act, for example, Congress allocated special credits to states and

plants strongly opposed to the regulatory scheme (Salzman and Thompson 2006).[10]

2. *Public Revenue*. Through either auctions or sales, the government can obtain significant up-front revenue that can be used to pay for regulatory administration and to compensate the public for what is often viewed as a "public resource."[11]

3. *Efficiency*. Although an effective market will ultimately produce efficiency no matter how rights are initially allocated, an efficient allocation of initial rights minimizes later restructuring and thus reduces transaction costs. Auctions, which have been used to allocate timber and mineral rights on the U.S. public domain (Watson 2005; Baldwin, Marshall, and Richard 1997), are the simplest system for ensuring efficiency because those who place the greatest value on the resource will obtain the rights. An alternative approach is to allocate rights based on factors that are likely to correlate with high resource value. One consideration in allocating grazing rights in the United States for example, is the ownership of neighboring property, which is likely to influence the value of rights to users (Raymond 2003).[12]

4. *Equity*. Of the potential considerations, equity is trickiest because there is no generally agreed-upon norm for "fairness" in allocating new property rights (Thompson 2003a). Current users, not surprisingly, often argue that "grandfathering" is equitable because it protects the status quo and rewards prior effort. Partly for this reason, the 1990 Clean Air Act Amendments in the United States essentially grandfathered SO_2 emission allowances (Stavins 1998). Auctions get mixed reviews on fairness: because while auctions avoid windfall gains, existing users often do not have the capital needed to compete (White 2006).

5. *Future Flexibility*. Governments also sometimes provide for the future issuance of rights to new entrants who might not be able to afford to purchase existing rights (sometimes accompanied by reductions in existing rights). Under the SO_2 program, for example, EPA periodically holds auctions to sell new allowances (Salzman and Thompson 2006).

Devolution

Local users and communities, given the authority, can often improve on centralized regulatory and property regimes. Water management in the western United States., for example, makes water transfers difficult and, by totally cutting off junior rights in periods of drought, often leads to unnecessary welfare losses.[13] Local farming communities have frequently overcome these problems by creating mutual water companies or public water districts that foster active internal markets and often allocate water on a more efficient pro-rata basis during droughts (Thompson 1993). As noted earlier, groundwater users in southern California and other portions of the world have sometimes created public groundwater management districts or other organizations to eliminate overdrafts and to create local groundwater markets (Blomquist 1992; Ostrom 1990). Petroleum users in the United States have commonly overcome commons dilemmas through "unification" strategies in extraction (Libecap 1989).

In addition to establishing regulatory and property systems, governments can also aid resource management by facilitating and encouraging effective devolution to local resource users and communities.[14] A relatively noncontroversial first step is for governments to authorize voluntary devolution. Many states in the western United States., for example, have helped foster voluntary devolution of water management by authorizing mutual water companies and local water districts, providing a legal infrastructure for their governance and giving the organizations the legal authority to internally manage water under rules that differ from standard state law (Thompson 1993). Congress and federal courts have also created exceptions from antitrust laws for certain forms of resource collectives (Weaver and Asmus 2006).

Governments have also assisted voluntary devolution by providing local users and communities with scientific and

economic information useful in understanding the ramifications of particular management approaches and thus in reaching agreement on a voluntary management system. In the United States, for example, information from state water agencies and from federal agencies such as the U.S. Geological Survey have helped local users in reaching agreement on local groundwater management programs.

Moving beyond voluntary devolution, governments have often helped to overcome bargaining costs and strategic behavior that might otherwise stand in the way of devolution. Judicial groundwater adjudications in southern California, for example, have helped to provide both a forum for negotiating groundwater management agreements and a method for forcing dissenting groundwater users to participate in the agreements (Blomquist 1992). Recent river adjudications in New Mexico have served a similar role in the creation of local management schemes and markets (Richards 2009). Laws authorizing governmental water districts generally permit a majority or supermajority of local users or voters to impose a district on all users in the district's jurisdiction (Sax et al. 2006). Most oil-producing states in the United States have adopted laws that allow a supermajority (often 60–85 percent) of the owners overlying a petroleum field to impose a unitization plan on holdouts (Libecap 1989).

Governments, however, should be careful in compelling devolution on unwilling resource users. Devolution will not always maximize wealth. Local water districts, for example, sometimes benefit controlling water users at a cost to overall societal wealth (Thompson 1993). In some settings, unitized petroleum production may not be pareto-improving relative to initial endowments (Libecap and Smith 2001). For this reason, devolution laws sometimes provide for governmental oversight that examines whether a proposed devolution will improve overall wealth before allowing it to be imposed on local users. In water adjudications, for example, a judge cannot impose a proposed settlement without first determining that the proposed settlement is in the best interest of all parties (Sax et al. 2006).

Conclusion

Effective regulations, resource rights and markets, and devolutionary opportunities can all benefit the sustainability of fisheries and help increase societal wealth. Well-designed laws, a well-functioning justice system, and strong monitoring and enforcement, in turn, are essential to all three of these elements. By looking to lessons learned from the management of other natural resources, governments can maximize the chances of success in their management of fisheries.

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Endnotes

1. This chapter does not examine a number of other issues, including effective fiscal policy (such as the elimination of unwarranted subsidies) or how to manage the transition from current resource regimes to more sustainable programs. Although the management of other natural resources provides valuable lessons for these issues, this chapter focuses on those issues traditionally considered to be part of the legal system.

2. Members of the New England Council, which was the only council at the time that included a representative of a national conservation organization, "emphasized the value of having environmental views included in their discussions and deliberations"— including the consideration of a "wider range of perspectives" and the identification and effective evaluation of "a more extensive set of options" (Eagle et al. 2003, 40).

3. By contrast, unfortunately, judicial independence is still often lacking in many developing countries (Court, Hyden, and Mease 2003).

4. Because contributions to environmental organizations are voluntary and thus subject to free-riding, the level of instream flow protection provided by groups such as the Oregon Water Trust by themselves are likely to be suboptimal from a societal standpoint. Groups like the Oregon Water Trust, however, permit individuals who wish to see greater instream flows than the government provides the opportunity to pursue their preferences; they thus increase overall societal wellbeing (Thompson 2000a; Thompson 2002).

5. In the case of both groundwater and petroleum, the courts often provide for some general form of allocation among the overlying owners— typically providing that each overlying owner is entitled to a "reasonable" or "fair" share of the total resource. Because of the vagueness of this allocation, however, the rights in actuality are reduced to group property rights (Goldstein and Thompson 2006; Sax et al. 2006).

6. As a result of overcapitalization and overfishing, revenues from groundfish trawling along the Pacific coast as a whole had fallen from $100 million in 1987 to $35 million in 2003 (TNC 2006).

7. The program took the form of a buyout by TNC of approximately half the fleet (including both permits and vessels) and an agreement by all parties to support an order by the Pacific Regional Fishery Management Council to ban bottom trawling in 3.8 million acres of ocean (TNC 2006).

8. Space constraints prevent a discussion of all the ways in which physical characteristics determine the appropriate property regime, but the list is extensive. Whether a resource periodically replenishes, for example, is generally determinative of whether to define an extraction right in terms of stock or flow. It would make little sense, for example, to define extraction rights to surface water in terms of stock rather than flow (Sax et al. 2006). Because fish stocks replenish each year and are hard to estimate, a property right based on flow (e.g., permissible fish catch per year) is similarly more logical than one based on stock.

9. See Anderson and Libecap (this volume) for ramifications of "grandfathering" and auctions as initial allocation mechanisms.

10. Congress also tried to overcome political opposition by providing for side payments to potential opponents such as unemployed Appalachian coal miners (Salzman and Thompson 2006).

11. Auctioning or sale of resource rights is not the only means of generating revenue to the government for management costs or other purposes. Governments, for example, can impose user fees on the exercise of the rights.

12. Anderson and Libecap (this volume) argue that "grandfathering" rights is more efficient than auctions in a resource already under use, such as a developed fishery.

13. Assuming a marginal declining value for water, it is likely that the first unit of water used by junior appropriators will often be more valuable than the last unit of water used by seniors. The prior appropriation system, however, cuts juniors off entirely in order to meet the full needs of seniors (Thompson 1993).

14. For more on management devolution in fisheries, see Scott (this volume).

Chapter 5

The allocation and dissipation of resource rents: Implications for fishery reform

by

Terry L. Anderson and Gary D. Libecap

How natural resources contribute to economic development largely depends upon whether they become assets, nurtured by users, or whether rents are dissipated through a "tragedy of the commons."[1] Maximizing the rental stream requires a system of property rights that avoids a competitive race for rents and instills incentives for conservation of the resource and efficient production from it. The alternative of open access leads to excessive short-term output, underinvestment, and limited trade, reducing the wealth and welfare of those whose livelihoods often depend upon the natural resource.

In developed countries, the initial response to open-access generally has been prescriptive regulation to control entry and production. Both input and output controls are familiar regulations in fisheries, and they include limitations on seasons, entry, vessel size, and various harvest equipment and techniques, as well as restrictions on the amount and type of fish harvested. In most cases, these have not been successful and there has been a move toward rights-based management (RBM) involving individual transferable quotas (ITQs), individual vessel quotas (IVQs), or other forms of catch shares of a total annual allowable harvest (Libecap 2008). An important issue in the transition is how the rights will be allocated initially.

In this chapter we argue that first-possession or grandfathering the allotments of local users in existing fisheries can be the most efficient distribution mechanism for assigning property rights in fisheries.[2] In the case of renewable natural resources, the direct involvement of incumbent users is critical not only for management success but also for increasing rents. Locals often have the most complete information about the asset and the most effective and low-cost ways of producing from it and investing in it. Indeed, the capturing of additional resource rents created by entrepreneurial activities provides incentives for innovations in harvest and production methods and for activities that conserve and enhance the resource. Rents are not a fixed stock given by nature as is commonly assumed, but rather they depend upon the actions of those who use the natural resource and convert it into valuable goods and services. First-possession allocation assigns ownership and rents to existing users, reinforcing their incentives for stewardship. By contrast the alternative, auction allocation, assigns ownership to winning bidders, but the rents are captured by the auctioneer, often the state, not local agents.

In contrast to the conventional view, we argue that there can be important efficiency effects from the allocation rule. In the case of renewable resources, such as fisheries, the assignment of rents to the state changes motivation for wise use and management by actual users. Natural resource rents can be reduced by the actions of the parties involved in resource use when they are heterogeneous in skills. Further, competition for the revenues secured by the state dissipates rents. Although there can be rent–dissipating competition in determining the grandfathering rule, we argue that losses are likely to be comparatively small in most incumbent fisheries.

We describe first-possession and auction allocation, and then illustrate some of the problems associated with auctions by presenting a political model that outlines opportunity for rent seeking with proposed CO_2 emission permits. The efficiency arguments for auctions, whereby revenues are used to reduce distortive income taxes, are weakened by overriding political incentives to divert revenues to influential constituencies and the underlying wasteful competition this encourages. Experiences with the tobacco trust fund allocations demonstrate the point.

We conclude by summarizing the benefits from rationalizing fisheries across the world through rights-based systems and argue that grandfathering allocation mechanisms is preferable. Grandfathering rights to local fishers creates a stake in fishery management that encourages rent enhancement to increase wealth.

Movement toward RBM

Natural resource rents can be the basis for wealth creation, but they are vulnerable to dissipation under open-access conditions. As noted above, the lack of clear property rights (informal or formal, group or individual) to a resource encourages competition among agents, resulting in the standard losses of open access. Further, in the absence of any recognized property rights, the parties have little basis for bargaining with one another to constrain harvest or extraction and to reallocate the resource to higher valued uses.[3] In the absence of price signals to reveal opportunity costs and in the presence of free riding, valuable labor and capital inputs are diverted from productive use to predation and defense, which in turn dissipates the *in situ* rents. Through these actions to capture the value of common-pool resources, there is too much air pollution, overfishing, excessive deforestation, or undue depletion of groundwater and oil and gas deposits.

Pigouvian taxes are a standard, textbook method for addressing open access (Baumol 1972). Conceptually, such a tax placed on fishers would raise costs and reduce effort and output to more optimal levels. In fact, however, such taxes are rarely applied. This is either because governments do not have the information to set a tax necessary to encourage best possible resource use, do not have the political power to do so, or both. Hence, although discussions of optimal taxation may be an interesting theoretical exercise, the only practical way to reduce or eliminate the losses of open access, in light of the ineffectiveness of most prescriptive regulation, is through rent-creating RBM. Practical experience indicates that RBM dramatically improves economic performance in fisheries while helping to meet environmental objectives.

Accordingly, rights-based arrangements increasingly are considered as a solution to the tragedy of the commons. [4] The more complete are property rights, the more the private and social net benefits of resource use coincide, reducing the losses created by competition in the common pool. Such arrangements may evolve from local practices as they did for land and minerals in the American West in the nineteenth century, or they may be created from administrative decisions as in the case of tradable emission permits under the Clean Air Act Amendments of 1990.[5]

The principal benefit of RBM is that it creates incentives for investment in the resource, provision of collateral for accessing capital for investment, more flexible exchange, greater information generation, and improved cost savings in meeting conservation or environmental objectives. For example, tradable emissions permits under the SO_2 abatement program have been successful in meeting reduced pollution targets relative to prescriptive regulation, with a cost savings of over $1 billion (Stavins 2007, 23).

In the case of fisheries, individual transferable quotas or shares to the annual allowable catch (TAC) were first suggested by fishery economist Francis Christy in 1973 (Hannesson 2004, 71). Under this arrangement, the TAC is set by regulators based on assessments of the condition of the stock, and catch shares are assigned to fishers as a property right to the flow or harvest. In this manner, those fishers with ITQs have a long-term indirect ownership relationship with the stock, and hence, are more motivated to protect it.

Since 1973, economists have documented many advantages from implementing RBM in fisheries. Arnason (2002) summarizes international experiences with ITQs; Hannesson (2004) describes a general pattern of moving from uncontrolled entry to centralized governmental regulation (command and control) to adoption of property rights of some type; and Grafton, Squires, and Fox (2000) demonstrate the benefits of ITQs in the British Columbia halibut fishery. Using a global database for 11,135 fisheries from 1950 to 2003, Costello, Gaines, and Lynham (2008) find that implementation of catch shares halts, and even reverses, the trend toward widespread collapse.

Although it is well established that ITQs can raise fishing incomes and motivate fishers to conserve stocks, they are found in less than two percent of the world's fisheries (Costello, Gaines, and Lynham 2008). A fundamental question is how to expand their coverage and what characteristics to include in their implementation.

Alternative allocation systems

The implementation of rights-based management requires an allocation mechanism, and as we will discuss below, the method chosen can have significant implications for rent maximization. Although there are a number of ways to assign property rights, we examine the two most common, first possession and auction.

First-possession

First-possession, or grandfathering, assigns ownership to existing users who generally obtained their claim on a first-come, first-served or first-in-time, first-in-right basis. Such first-possession rules recognize incumbent parties, who have experience in exploiting the resource and, hence, are likely to be low-cost, high-valued users having outcompeted less-efficient parties. Having a direct stake in access to the resource, incumbent users will be important constituents in a property rights distribution because they will want consideration of past investments—physical or human capital—in specific, nondeployable assets. By recognizing historical production patterns and capital outlays, first-possession rules signal security in property rights and encourage future investments including those in the resource itself. First possessors recognize that the value of human and physical capital dedicated to the fishery depends upon maintaining and enhancing the value of the stock.

Establishing rights based on first possession necessarily requires reducing the access of some first possessors to the fishery. It is this restriction that is the main source of rents created by RBM. Consider the rents that exist even without entry restrictions, rents from individual fishing skills (normally thought of heterogeneity of fishers) or from resource-specific capital investments (information, knowledge, or equipment). To the extent that restrictions on entry rights are granted to first possessors in accordance with past shares and that the allocation is not anticipated so as to have caused a race to fish, the efficiencies gained in the first-possession process will remain. Furthermore, transferring rents from the first possessors to the polity, whether through a competitive auction or taxation, will not reduce the efficiency gains from restricting access.

If the rights allocation does not follow past shares and if the rents are reallocated to the polity, however, there may be significant allocation or efficiency implications because bureaucratic and political processes are likely to be based on other criteria not consistent with efficient production. For example, nineteenth-century ranchers on the American frontier developed customary grazing territories encompassing the thousands of acres necessary for viable production under semiarid conditions. In contrast, federal land laws imposed a 160-acre limitation that either led to farm failure or to costly efforts to circumvent legal restrictions (Libecap and Hansen 2002; Hansen and Libecap 2004; Libecap 2007). When initial allotments are not optimally sized, if transaction costs are low, as is likely among incumbents, then trade can take place when exchange is not restricted by size limits, as was the case under U.S. land law. Moreover, first possessors have an incentive to find ways to economize on transaction costs because they internalize any gains.

First possession has been criticized on fairness grounds because it discriminates against new entrants and may encourage large holdings. If first-possession ownership is viewed as rewarding those who by luck and connections got early access, such criticism may be warranted and may lead to political opposition to the sanctioning of claims based on first possession (Alesina and Angeletos 2005, 960-80).

There may also be rent dissipation under first possession, depending on the criteria used for allocation. For example, the rule of capture that applies in fishing and oil and groundwater extraction is a type of first-possession rule.

Ownership is granted to the party that invests in extraction. But the rule of capture grants ownership to the flow and not generally to the resource stock. Hence in the presence of open-access conditions, first possession can exacerbate competitive extraction incentives, especially after first comers signal the value of the stock.[6] If the competing parties are homogeneous and ownership is short-term, then full dissipation is possible as parties rush to capture the asset. If, on the other hand, the parties are heterogeneous and use rights are long-term, first-possession assignments may be associated with limited rent dissipation.[7]

The same criticism of first-possession rules and rent dissipation applies if homogeneous claimants race to establish property rights to the stock (Anderson and Hill 1990).[8] But as before, if the parties are heterogeneous and the resulting rights are secure and permanent, full dissipation will not occur. Moreover, the winners of such a race are likely to be successful because they invested in the information and human capital necessary to obtain first possession and, as suggested earlier, may be the most efficient producers. The more that allocation rules are based upon historical, unalterable use patterns, the less there will be significant dissipation. On the other hand, in new fisheries, for example, where there is no record of past harvest, then announcement of the proposed rule can lead to wasteful efforts to be in compliance.[9] Most of the world's fisheries at risk from overexploitation, however, have comparatively long-standing harvest patterns.

Finally, it is important to recognize that first possession encourages efficiency because it draws upon existing local knowledge and encourages production of additional information and cooperation once rights are established. These actions can *increase* resource-based rents. In the case of fisheries, knowledge of the response of the stock to different management regimes, of exogenous weather effects, and of shifts in endogenous factors, such as fishing effort, is especially valuable. Based on this information, fishers can coordinate harvest practices to enhance their returns as well as the condition of the stock, and they can collaborate with regulators in setting the TAC, which reduces resistance to the catch limit and incorporates stock and habitat information collected by the industry. Because there is less antagonism between fishers and regulators in these circumstances, marine scientists are more likely to take account of industry recommendations and insights to advance the fish stock and achieve more effective regulatory policies. Accordingly, ITQs based on first possession can lead to more beneficial private and collaborative fishing along with the setting of more optimal annual harvest rates, reduced free riding, and greater compliance by fishers.[10]

Auction

Auctions are another way of allocating access rights to the commons, and there are several reasons to support this method on efficiency and equity grounds.[11] First, auctions may place the resource directly into the hands of those who have the highest value for it and ,thereby, avoid the transaction costs of reallocation. Second, auctions generate information about the value of the resource. And finally, auctions transfer rents to the state (as the seller), an issue we examine in detail below.

The amounts and distribution of rents created by an auction depend upon auction design, which can be complex. The net amount of the rents created depend on the auction costs, on measurement and enforcement costs following the auction, and on the lobbying costs invested in influencing the terms that may provide specific advantages to certain groups during or after the auction.[12]

In practice, auctions have been adopted more rarely than economists who espouse their virtues might like. For example, ITQs in fisheries have generally been grandfathered rather than auctioned, and SO_2 permits under the Clean Air Act Amendments of 1990 were granted to existing emitters (Joskow and Schmalensee 1998) Nonetheless, auctions have been called for to allocate CO_2 emission permits to limit greenhouse gas emissions under cap-and-trade regimes.

The major argument for auctioning permits for carbon emissions to create a cap-and-trade system is that the auction revenues can go to the state, instead of to individual firms, and that these revenues can be used to broadly benefit the

public by reducing distortive income taxes. If this happens, society could achieve both the public good of less carbon emissions and a more efficient tax structure. Whether this happens, however, depends on the political framework that actually determines the allocation of auction revenues. Later we will analyze the probable allocation results in the context of a realistic model of political rent allocation.

The nature and role of rents in resource management

Although there is consensus among economists and resource managers that RBM is the most practical way of reducing losses from open access and of generating wealth associated with natural resources, questions remain about whether the rents created by RBM will subsequently be captured, enhanced, or dissipated. Here we focus on how allocation of the rents to users or to government will affect the rents spawned by RBM.

In general, the economics literature contends that resource allocation is invariant to rent taxation and that an auction (which can be thought of as a form of taxation) is the preferred method for assigning rights because it ensures that they will go to those users who value them the most.[13] Rents are viewed as invariant to human action, and, therefore, agents will continue to produce efficiently even if the rents are eliminated either via a lump sum tax or auction. For example, Clark, Major, and Mollett (1989, 138) argue that the economic rent generated by the creation of transferable fishing quotas "can either be taxed away by the government or left in the fishery to be capitalized into the value of the ITQ." If the right is auctioned, the winning bid will be determined by the highest expected future value of the rental stream. In this context, rents are returns over and above opportunity costs, and therefore their distribution will not affect resource allocation.

We argue, however, that the amount of rents created and saved through RBM is not invariant to allocation for at least three reasons. The first is that the rents created by RBM and transferred to government, whether by auction or taxation, will be competed for in a potentially-rent-dissipating political process. As we discuss below there are theoretical and empirical reasons to believe that such rent dissipation is more likely than not.

The second reason lies in the process whereby rents are created. The notion of *in situ* resource rents suggests that they arise simply from the natural existence of the resource to which homogeneous units of other inputs are applied. Computing the rents is a simple matter of subtracting the cost of other inputs from the value of the output created. As long as the resource remains open to access by all, rents at the margin will be fully dissipated by competing entrants. Hence, rents are dissipated or created by increasing or reducing the amount of additional factors employed in resource use.

Ignored in this reasoning is the role that heterogeneous resources play in the production process. Following Johnson and Libecap (1982) and Johnson (1995), it is important to recognize that even under a completely open-access regime, some rents will be captured by inframarginal users. These users might be first entrants who recognized the value of the resource before others, users who apply superior management skills to the resource production process, or those who have invested in human capital, most likely through learning-by-doing. In any case, and especially for a resource that has been exploited for a long time by users who have acquired time- and place-specific information about the resource, there will be a sorting process that leaves some rents for the inframarginal, more efficient producers. The amount of these rents, of course, will depend on the contribution that heterogeneous inputs make to the value of the production process. In any case, not all resource rents arise solely from the mere existence of the asset. Some additional rents are generated by the productive activity of inputs that turn the resource into valuable products and services. An example is harvesting and marketing fish in a manner that insures that the highest valued product is delivered to market. Such actions generally involve added costs and coordination among fishers.

In this context, consider the incentive effects of redistributing these rents to government, whether by auction or taxation. What are the implications for the inframarginal, low-cost producer who has managerial or entrepreneurial

talent that generates additional value? Such talents are likely to have alternative uses. If rents are eliminated in the resource sector, the entrepreneur/manager will shift effort elsewhere where the inputs are somewhat lower valued, but earn rents, thus creating an allocation effect. Of course, exit by one resource user will open the door for another, but the new user will be less efficient and therefore will create fewer rents from the resource and less social value.

The third reason that rent distribution matters for rent creation relates to information and coordination costs in the production process. In general those who acquire first-possession rights do not do so randomly. Whether they are rushing for gold or racing to fish, first entrants have some reason to believe they are best able to generate and secure rents.[14] Moreover, once first possessors acquire rights, they begin securing production information that *increases* the rents they capture. Redistribution of those rents to the state reduces the incentive to discover and the incentive to acquire information thereafter. As a result, total wealth generated from the resource is reduced.

This implication is even more apparent once secure rights are assigned under RBM in fisheries. The owners of an ITQ have an incentive to make two types of investment. One type of investment would generate private returns. These returns could result from investing in finding better information about where the more productive locations are or from augmentation of the resource's future production if that value is captured by the investor. Known investment potential would be incorporated into the expected value of secure quotas, but opportunities that evolve as owners search for additional rents require added effort. If entrepreneurs expect the returns on those investments to be taxed away, the incentive to engage in this socially-valuable activity is eroded.

An example from the New Zealand abalone fishery is illustrative.[15] Until RBM was implemented in 1986, abalone divers needed only a non-transferable license to harvest in what was otherwise an open-access resource. Under these conditions, they harvested as much as possible and did not invest in the stock, which declined.[16] RBM, however, allowed divers a tradable share in a total cap established by fishery authorities. As a result, quota values rose an order of magnitude from approximately NZ$33,000 per metric ton in 1988 to NZ$320,000 per metric ton in 1993.

Some of this increase resulted directly from reduced access, but additional returns were due to value-enhancing investments by individual fishers. Under RBM there was an opportunity to earn even more than the divers initially were realizing. To achieve these gains, the diving business had to be redefined with a new business model. Specialized dive boats with support crews for harvesting abalone were introduced. Research into other abalone fisheries, market trends, and processing operations was conducted, and abalone aquaculture was started with the development of an "aqua barrel," a molded polyethylene barrel in which abalone could be planted, grown, and harvested.

Such innovations resulted from investment made by heterogeneous, entrepreneurial fishers such as Roger Beattie. He diversified into Sea-Right Investments Limited, a company that invested in developing an abalone pearl culture operation. Sea-Right obtained permits for developing a five-hectare marine farm site in Akaroa Harbour in 1994 and purchased farmland adjacent to the marine farm for NZ$600,000 in order to secure the company's interests by protecting it from effluent.[17] Beattie described the importance of RBM for the success of his business: "Property rights changed the company from a hunter/gatherer at the ends of the earth to a business launching into the top end of the fine jewelry market in sophisticated world capitals."[18]

The disincentive created by reallocation of rents away from the producer is even more critical if they require collective action. Johnson (1995, 337) notes that a quota system "provides incentives for the industry to act collectively to lower costs and engage in activities such as product development and fishery management that have the potential to increase quota value." Pooling information on resource availability could increase collective rents. Cooperation to invest in technology dependent on economies of scale is more likely if the returns on such investments cannot be competed away by unrestricted entry. Again quoting Johnson (1995, 337), "because the identities of the participants are known, organizational costs are lower than in an open access setting." Creating collective rents requires undertaking coordination costs for which there is only a return once rights are established. If

those rents resulting from their coordination efforts do not remain with the owners, the investments will not be made, a welfare loss will occur, and social wealth will be less.

Again an example, this time from Alaska, is illustrative as described in recent work by Deacon, Parker, and Costello (2008). The Chignik sockeye salmon run has suffered from the same open-access issues that plague most such fisheries. Access was limited by regulation of season, licensing, and equipment, but the fishery continued to be overexploited. Between 2002 and 2004, however, a self-selected cooperative operated under approval from the Alaska Board of Fisheries. Because members of the cooperative shared in the rents created by the cooperative, they had an incentive to undertake the costs of collective action. These cooperative efforts included reducing the number of vessels in the fishery by 60 percent, pooling of information about the location of fish, and positioning barriers or "fences" to channel fish to locations where they could be more effectively caught in nets. Importantly, such actions were not undertaken by independent fishers who did not join the cooperative, suggesting that rights to the rents created were critical for investment decisions.

Because rent creation and augmentation are sensitive to rent distribution, there is good reason to base RBM on first possession and to allow rents to be captured at the local level. Competition for first possession could lead to some dissipation, but as we describe above, when the parties are heterogeneous not all rents will be lost. Moreover, in fisheries, if grandfathering is based on historical catch and vessel size, there will be little opportunity for competitive waste. Local users have the greatest knowledge of the resource and of how it is likely to respond to alternative management schemes. Moreover, the wealth and well-being of local users depend upon the protection and, indeed, maximization of rents. If these parties perceive that their actions to reduce exploitation and to conserve the resource are linked to a commensurate increase in rents that they capture, then they are motivated to protect and enhance the value of the resource. When incumbent users are residual claimants to rents that are created, there will be "buy in" for a new regime.[19]

On the other hand, if they expect the rents to be taxed away through auction, there is an incentive for the most efficient users to exit; for reduced investment in the resource; and, accordingly, for lower levels of wealth and welfare. Those who remain because of fewer other options will provide lower value and may have less incentive to comply with management in efforts to protect the resource. Moreover, the revenues raised from auctions have no clear property rights, resulting in political rent dissipation as potential recipients compete for control of the resource. We now turn to this issue.

The politics of allocating resource rents

The literature in economics and political science indicates that government delivery of collective goods for the broad public and particularistic goods for private constituencies results from a complex political process. The mix depends upon political bargaining among legislators who prefer public goods or private goods or some combination of both. Politicians have to weigh the political benefits and costs of the tradeoffs associated with these choices, issues that have not been carefully addressed by auction advocates. Accordingly, it is not possible to assert that auction revenues will be targeted to income tax reduction or other public goods activities, rather than to interest group transfers. They may, or may not, depending on political preferences and negotiations.

In the United States, vote-maximizing politicians represent narrow jurisdictions and must be responsive to them, at least to some extent, in considering broader policy objectives. Volden and Wiseman (2007) describe how politicians trade off the political returns from providing various combinations of collective and particularistic goods, subject to the constraint of a fixed budget. A winning congressional coalition must be assembled before any proposed mix can be selected.[20] Proponents of a particular policy must offer budget distributions to constituencies and projects favored by their colleagues in order to win their support. These necessary political exchanges reduce the funding available for the initial public objective. Volden and Wiseman (2007, 84) argue that, paradoxically, the greater the value

placed on the public good, the more it will be under-provided by Congress. Those who support the public good will be willing to pay even more to entice the backing of their reluctant colleagues. In the case of auction revenues, this argument suggests that even if tax reduction is highly valued by many members of Congress, at least some and perhaps a considerable amount of the funds will be directed to particularistic constituent services valued by those who otherwise would oppose cap- nd trade. Moreover, in this case, politicians prefer an open rule allowing for amendments in debate, making it more difficult *ex ante* to lock in income tax reduction as part of legislation authorizing a permit auction.[21]

Accepting that auction revenues are likely to be diverted to private constituent services, we must ask how revenues are allocated among competing demands and to what extent this competition for transfers will dissipate rents. Following Peltzman (1976) and Becker (1983), vote-maximizing politicians must trade off the marginal votes gained from providing transfers to interest groups with votes lost from taxpayers. Under their models, none of the parties get all that they want; taxpayers pay more taxes than they would otherwise prefer; and constituent groups get fewer transfers. In this process, politicians balance the incremental gains or losses in votes as tax-funded transfers are provided to interest groups.

Now amend this framework to consider a scenario where politicians distribute revenues from a lump sum tax on a well defined group—for example, revenue from an auction of resource use rights—rather than revenue from an income tax. In this case, because the revenues are generated as part of a regulatory process to control access to a resource, the marginal votes lost from using the revenues to fund constituent transfers may be less than if taxes are explicitly levied for these transfers. Hence, tax revenues so generated will be considered a windfall by politicians. Political theory suggests that revenue windfalls result in expenditure increases that exceed those that would be funded through taxes on similar increases in income (Gramlich et al. 1973; Fisher 1982; Hines and Thaler 1995).[22] Accordingly, Congress may use an auction windfall to provide more transfers than would otherwise be the case.

How will the distribution of the revenue windfall be decided? Again, following Peltzman (1976) and Becker (1983), as well as the insights of Krueger (1974); Buchanan, Tollison, and Tullock (1980); and Murphy, Shleifer, and Vishney (1993), interest groups will compete for transfers by lobbying. The more homogeneous, wealthy, and small the group, the more likely it will be successful because the group's interests are aligned, because the group has resources, and because there is less opportunity for free riding (Olson 1965). Under these conditions, a large, heterogeneous group of taxpayers, who might prefer the income tax reductions suggested by auction proponents, are at a relative disadvantage in political bargaining, making less money available for tax reduction than auction proponents have suggested. Making matters worse, competition among interest groups preferring particularistic goods from auction revenues will further dissipate rents.

In support of these concerns consider the proposed use of cap-and-trade auction funds by the Obama Administration of $645 billion or more (Broder 2009). The administration plans to dedicate $15 billion a year of revenue from the sale of emissions permits to develop new sources of clean energy. But that leaves a large pool of potential government income that will be up-for-grabs by lobbyists as they compete for funds for constituent projects rather than for balancing the budget or reducing income taxes as suggested by auction proponents (Broder 2009).

Tobacco Trust Fund allocations

To get a sense of how politicians actually have distributed funds between public and particularistic goods as well as the rent dissipation involved in determining who receives those transfers, we consider the case of the Tobacco Trust Fund allocations. In November 1998, a settlement was reached between the major U.S. tobacco producers and 46 states.[23] The lawsuit was brought by the states' attorney generals on behalf of their state's Medicaid programs, seeking compensation for healthcare expenditures attributed to smoking. The Master Settlement Agreement (MSA) between the states and four major tobacco companies, representing over 99 percent of the domestic cigarette market, required that the tobacco companies make annual payments to the states in perpetuity. It also restricted the marketing and advertisement of cigarettes and required a five-year, $1.5 billion dollar contribution toward the

establishment of the American Legacy Foundation for antismoking education. In exchange, state lawsuits against the participating tobacco manufactures were dropped. [24] Total payments were projected to be $206 billion over the first 25 years (Schroeder 2004). Funding first became available in 2000. To date, $79.2 billion from tobacco settlement money has been received by the states.

The MSA stated that the awards were to provide "significant funding for the advancement of public health, the implementation of important tobacco-related public health measures" (NAAG 1998), and most states indicated their intent to use the funds to pay for the increased costs of Medicaid from smoking-induced illnesses and to pay for tobacco control programs (Schroeder 2004). Indeed, part of the formula determining the allocation of payments across states was based on smoking-related medical costs and expenditures.[25] These latter costs are payable in annual installments from 2008 through 2017 (Singhal 2008).

The annual payments states receive are adjusted in two ways—inflation and volume. The volume adjustment is based on the total volume of cigarettes shipped nationally and is not state specific. State allocations of the initial and annual funds are based on two equally weighted factors: a state's share of smoking-related medical costs and a state's share of smoking-attributable Medicaid expenditures (Singhal 2008). The Center for Disease Control and Prevention (CDC) provided states with a minimum funding recommendation for tobacco control programs based on the demographics of each state (CDC 1999).

Given the focus on tobacco-related health expenses, tobacco control programs to reduce smoking and compensation for communities adversely affected by the settlement, it is instructive to see how the states have actually used the settlement funds. Table 5.1 describes the allocations across categories between 2000 and 2005. What is most noticeable is that Budget Shortfalls are the second largest category and that other expenditures are for areas unrelated to tobacco health or control issues. Debt service on securitized funds (5.4 percent) reflects the actions by states to issue bonds based on future annual payments from the tobacco settlement. These funds are used to help balance state budgets (Sloan et. al. 2005a and 2005b). Between 2000 and 2005, 16 states securitized some or all of their settlement proceeds. In 2005, four states, California, Rhode Island, South Carolina, and Wisconsin, allocated all of their annual MSA payments to servicing debt on securitized funds (GAO 2006 and 2007).

Table 5.1 Tobacco Trust Fund allocations

Category	Amount (US$billions)	Percent
Health	16.8	30
Budget shortfalls	12.8	23
Unallocated	6.6	12
General purposes	4.0	7
Infrastructure	3.4	6
Education	3.1	5.5
Debt service on securitized funds	3.0	5.4
Tobacco control	1.9	3.5
Economic development for tobacco regions	1.5	2.7
Social services	1.0	1.7
Reserves/rainy day funds	0.8	1.4
Tax reductions	0.6	1.1
Payments to tobacco growers	0.5	0.9

Source: GAO (2007).

A report titled "A Decade of Broken Promises," written by four anti-smoking lobbies, found that in the last 10 years, states spent only 3.2 percent of total tobacco generated revenue (MSA funds and tobacco taxes) on tobacco prevention and cessation programs.(Robert Wood Johnson Foundation et al. 2008) No state tobacco-prevention programs were funded at the CDC-recommended level, and only nine states fund them at over 50 percent the recommended levels (Campaign for Tobacco-Free Kids 2008).[26]

It is apparent that much of the tobacco trust fund allocations support activities unrelated to tobacco health or control despite the spirit of the MSA. The associated political allocation likely involves rent-seeking activities as lobby groups mobilize to channel funds in their direction or to protect existing allocations. Windfall allocations attract lobbying from interested parties who seek to direct funds their way. A survey by Austin-Lane et al. (2004) found that tobacco control and prevention advocacy is one of the most important factors influencing revenue allocation. Sloan et al. (2005a and 2005b) found that interest groups behaved as expected: tobacco-producing states spent less on tobacco control and states with more per capita teachers and more American Medical Association members per capita spent more on it. Further, reports issued by the American Cancer Society, Campaign for Tobacco-Free Kids, the American Lung Association, and the American Heart Association suggest that those groups are actively working to influence MSA payments (Campaign for Tobacco-Free Kids 2008).

Fishing for rents

In general, the opportunity to use RBM in fisheries as a revenue source has not attracted the attention of politicians in the same way that potential windfalls from CO_2 emission permits have. Perhaps in part for that reason, the movement towards RBM in fisheries has occurred through first possession, rather than auctions. And they have had remarkable success in generating rents. But much more is possible See World Bank 2008). The following case examples from the developing world suggest the potential economic rents available from RBM.

- *Bangladesh*: The hilsa shad (Tenualosa ilisha) fishery is the largest single-species fishery in Bangladesh. The potential annual net economic benefits from the fishery are in the order of US$260 million compared to little or no net economic benefits under the existing management regime. The fishing effort (measured in standardized boat units) required to attain sustainable maximum economic benefits is about one-third of the current fishing effort (Mome 2007).

- *Vietnam*: Currently there is excessive capacity and overfishing in the fisheries in the Gulf of Tonkin. The potential net economic benefits from improved management are some 56 percent greater than the current level, and the catch could be achieved with approximately 46 percent of the current level of fishing.[27]

- *China*: The loss of rents in the Bohai and Yellow Sea fisheries due to overexploitation are in the order of US$1 billion annually, or approximately double the current level of net economic benefits (economic rents).[28] Remedies will require major reductions in fishing effort and the number of vessels involved.

- *Peru*: The Peruvian anchoveta fishery is the largest single-stock fishery in the world. The El Nino phenomenon, as well as excess capacity, has resulted in economic losses of US$400 million annually. Excessive fleet and processing capacities are estimated to be in the order of 60–70 percent and between 65 and 80 percent, respectively.[29]

- *Namibia*: Despite a reputation for being comparatively well managed, the net economic benefits (economic rent) in the Namibian hake fishery of N$222 million in 2002 could potentially quadruple to an estimated N$1,200 million if the fish stock were allowed to recover and the fishing fleet were rationalized.[30]

The loss of economic benefits in fisheries is not restricted to developing countries, however. Partly because of higher subsidies in developed countries the loss of economic rents can be even higher than in the developing world (Asche et al. 2008).

Conclusion

This discussion suggests that there are large benefits to be gained from improved management of the world's fisheries, especially in inshore fisheries. Rights-based management systems have a proven record in promoting fishing practices that raise rents and welfare. For community-based fisheries, where the participants are often poor but well informed about the resources on which they depend for their livelihood, effective policy design is essential. A key aspect of this process is the allocation mechanism. There are strong reasons to believe that first possession, or grandfathering, based on past fishing effort and capacity, is more likely to elicit local support, maintain the rents in the community, reduce costly rent seeking, and direct the actions of fishers toward advancing the stock. An RBM approach not only encourages more efficient use of the fishery or other natural resources, but it also helps build an institutional infrastructure based on property rights and the rule of law that can sustain economic growth where traditional development approaches have failed.

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Endnotes

1. Resources solely with amenity values may not require investment and production for value. For the losses of open access, see Hardin (1968). Indeed, under certain circumstances resources can be a barrier to growth as argued by the resource curse literature. See Humphreys, Sachs, and Stigliz (2007).

2. See discussion of first possession in Epstein (1979), Rose (1985), and Lueck (1995, 1998).

3. Bargaining of the kind discussed by Ronald Coase (1960) is not possible.

4. See Stavins (2007) for discussion of the movement toward market-based instruments.

5. For discussion, see Libecap (2007and 2008) and Anderson and Hill (2004). For example, consider the success under the Clean Air Act Amendments of 1990 in designing air pollution emission permits that lower the cost of meeting air quality targets (Tietenberg 2005, 395-402).

6. The property right is granted to the flow, rather than to the stock, because stock ownership may be too costly to define and enforce due to the nature of the resource or to political constraints. For discussion of reasons to limit alienation in these cases, see Johnson and Libecap (1982).

7. Johnson and Libecap (1982) show that heterogeneity among fishers limits rent dissipation even under open access and the rule of capture.

8. Stavins (1995) refers to grandfathering as a give away. See also Haddock (1986) for criticism of rent dissipation when the parties are homogeneous.

9. This situation is illustrated by the race to capture land rights under the Oklahoma land rush and the origin of the term "sooners." See Anderson and Hill, chapter 9.

10. In a similar setting, Johnson (1995) has shown that the imposition of taxes on quota rents in ITQ fisheries could lead to reduced incentives of fishers to conserve (invest in) the fish stock.

11. For summary of auction issues, complications, and applications, see McAfee and McMillan (1987), Milgrom (1989), and Klemperer (2002).

12. See discussion by McMillan (1994) regarding the experimentation and costs of designing auctions for the spectrum. For discussion of auctions in ITQs see Morgan (1995).

13. An important exception is Johnson (1995) who challenges the view that resource rents can be taxed without distortionary effects.

14. The allocation rule under first possession can have a sorting effect to raise values. In the case of the Homestead Act under U.S. land law in the 19th century, the requirement to occupy and farm a plot for five years may have served to direct claiming to those who had farming skills.

15. For a more complete discussion see "Property rights in New Zealand abalone fisheries," Graduate School of Business, Stanford University, Case Number P-28, May 2001.

16. There was an indirect limit imposed on the abalone harvest, because abalone processors faced a cap on what they would buy due to export quotas. These export quotas were neither property rights nor transferable, however, and so they did nothing to encourage divers to stop the fishery's decline or tohelp the fishery grow.

17. Akaroa Harbour was to the southeast of Christchurch, across the Banks Peninsula.

18. Email communication from Sea-Right Investments Limited, December 2, 1999.

19. Witness the ability of cattlemen's associations to establish customary grazing rights. See Libecap (2007). Anderson and Hill (1975, 1983, 1990, and 2004) provide multiple examples from the American West consistent with bottom-up evolution of property rights in response to changing resource values and changing costs of definition and enforcement.

20. Volden and Wiseman (2007) begin with a homogeneous legislature where politicians have similar preferences and then relax that assumption. In either case, the predictions hold.

21. Volden and Wiseman's argument is in contrast to that of Baron and Ferejohn (1989), who argue that politicians generally prefer closed rules (no amendments) to reduce bargaining costs, when a single good is valued.

22. This is the so-called "flypaper effect," a description of how government block grant money sticks where it hits. See Hines and Thaler (1995).

23. Four other states, Florida, Minnesota, Mississippi, and Texas, had previously reached individual settlements with tobacco companies that totaled $40 billion. Also the District of Columbia, Puerto Rico and four territories joined the 46 States in the MSA.

24. The four major tobacco companies to initially settle were Brown & Williamson, Lorillard, Philip Morris, and R. J. Reynolds. Since 1998, other tobacco companies have joined the MSA.

25. There are three types of payments under the settlement: an initial allocation distributed across the first five years of payments, 1999-2003; annual payments, which are paid in perpetuity; and contributions to a Strategic Contribution Fund that compensates states' previous lawsuit costs. According to the National Conference of State Legislatures 2003 report "State management and allocation of tobacco settlement revenue," $86.1 billion will go into the Strategic Contribution Fund (McKinley, Dixon, and Devore 2003). See also Singhal (2008).

26. The nine states funding tobacco prevention programs at greater than 50 percent the CDC recommended levels are Alaska, Delaware, Wyoming, Hawaii, Montana, Maine, Vermont, South Dakota, and Colorado.

27. See the "Economic assessment of Tonkin Gulf fishery, Vietnam,"a study undertaken by Nguyen Long (Research Institute for Marine Fisheries (RIMF), 224(170) Le Lai, Hai Phong, Vietnam).

28. See the "Fisheries in the Bohai and Yellow Sea, China: Case Study for FAO/World Bank Rent Drain Project," prepared by: Zijiang Yang, Chinese Academy of Fishery Sciences, zijy0505@cafs.ac.cn and Xiaojie Nie, Dalian Fisheries University, victory_sq@yahoo.co.uk

29. See "The Peruvian anchoveta sector: Costs and benefits," a study undertaken by Carlos E. Paredes, Instituto del Perú, cparedes@intelfin.com.pe and Maria Elena Gutierez, Intelfin, mgutierrez@intelfin.com.pe

30. See the "Case study of the Namibian hake fishery," a study by U. Rashid Sumaila_and A. Dale Marsden for the FAO/World Bank rent drain project. Fisheries Economics Research Unit, Fisheries Centre, the University of British Columbia, Vancouver, BC, Canada.

Chapter 6

Governance and fiscal requirements for marine resources management

by

Jon G. Sutinen

The institutions that have governed the use of marine resources since the establishment of Exclusive Economic Zones[1] in the 1970s have a dismal record of conservation and management. The world's marine ecosystems are heavily polluted, resource stocks are overexploited, and critical habitats have been destroyed or seriously degraded (UNEP 2002). The institutions exhibit patterns of policy decision making that are troubling. For example, it is common for scientific advice to be ignored in setting policy. In fisheries, total allowable catch rates (and other regulations that determine the effective fishing mortality) are commonly set above what are recommended by fishery scientists for sustainability. Management authorities too often ignore the evidence on what regulations work best, selecting regulations that are too soft to control resource use. Another troubling pattern is interference by elected officials in setting policy, often weakening regulations. Although there are several bright spots for some marine fishery resources (marginal improvements in stock status, growing use of rights-based management, capacity reduction programs, to name a few), the evidence overall leads me to conclude that our marine resource management institutions have failed to conserve resources and improve the economic health of coastal communities.

In this chapter I explain and analyze marine resource use and policy formulation, while identifying some of the fundamental causes of market and government failures that account for much of the overexploitation and degradation of the world's marine resources. I follow this by arguing that a fiscal approach involving the use of sustainable financing tools has the potential to mitigate many of these failures.

Marine resource governance

To account for and explain variations in human activities that impact marine resources, I draw on Juda's (1999) framework for governance, which categorizes and analyzes the forces that influence human interactions with the natural components of an ecosystem.[2] This framework divides the sets of drivers that shape human use of and encroachment upon ecosystem resources into three basic mechanisms: markets, government, and the institutions and arrangements of civil society. Individually and collectively, the three mechanisms affect how humans use and otherwise interact with a marine ecosystem.

Markets, where goods and services are exchanged by profit-seeking producers, traders, and consumers, affect what resources are extracted as well as the manner in which these resources are exploited. As explained below, market-driven economic activities are a direct cause of overexploited fishery resources, reduced productivity and biodiversity in marine ecosystems, and poor overall ecological health.

Government policies, programs, and regulations, whether at a local, regional, or national level, are well recognized mechanisms that affect human behavior. Fiscal policies provide incentives for particular types of conduct and, through government spending patterns, direct society's resources to promote specific objectives. Regulatory efforts, such as zoning and permitting, can discourage or encourage specific uses and behavior. Governmental institutions are not always perfect, however, and can sometimes implement policies that are counter-productive and ultimately harmful to the condition of a marine ecosystem (for example, subsidies that aggravate fishing overcapacity,or that increase nutrient loadings to the marine ecosystem).

The institutions and arrangements of civil society play a central role in influencing behavior. Social norms and networks (social capital) shape individual and collective behavior and also facilitate cooperation among individuals and between groups of individuals. The social norms and networks can encourage trust and civic engagement, as well as enhancing effective governance while reducing management costs (compare Ostrom 1990). As with markets and government, the institutions and arrangements of civil society are not always supportive of sustainable development since social norms are not always consistent with conserving marine ecosystem resources, protecting habitats, and the quality of the aquatic environment.

The following discussion explains the influence of markets and governmental mechanisms.[3]

Markets and marine resource use

Markets are powerful institutions and have a solid record of producing great improvements in the lives of people in all corners of the globe. Unfortunately, market forces also can do great harm—especially to the earth's natural ecosystems. Considered below are some of the fundamental forces that emanate from markets, and how those forces affect the status of marine ecosystems in general.[4]

Market failure

Living marine resources present a classic commons in which there is little incentive for individual resource users to conserve (compare Scott, this volume). In addition, the presence of numerous nonmarketed, but ecologically beneficial, goods and services from marine ecosystems means that markets alone cannot be expected to internalize the ecological costs of coastal economic activities. Hence, market-driven economic activities are one of the direct causes of overexploited or degraded fishery resources, pollution, and habitat destruction—the three principal threats that are degrading the overall productivity, biodiversity, and health of marine ecosystems. In turn, degraded marine ecosystems threaten the long-term well-being of the human communities supported by those economic activities.

This "tragedy of the commons" is playing out on a large-scale in coastal and marine ecosystems.[5] Markets are at the center of the tragedy, as the economic activities that contribute most to a country's gross domestic product are often coastal activities. These include: shipping and maritime transport, oil and gas exploration and production, mining and aggregate extraction, fisheries and aquaculture, land reclamation, dredging and dumping of wastes and litter, electrical power generation, human settlements and coastal industries, and recreation and tourism. The benefits of these economic activities have drawn people to settle in and visit coastal areas, increasing crowding and ecological impacts. The settlement and growth of populations in coastal zones, in conjunction with the associated economic activities, constitute major forces affecting marine ecosystems. These economic and other human activities often degrade and destroy natural habitats, dispose of waste and discharge pollution to water bodies, overexploit living marine resources, and increase vulnerability to coastal hazards, such as invasive species, pathogens, toxic contaminants, and harmful algae blooms.

Overfishing

The Food and Agriculture Organization of the United Nations estimates that for the world marine fisheries stocks in 2005, one quarter of the stocks were overexploited, depleted, or recovering from depletion; just over half were fully exploited; and less than one-fourth could tolerate more catch (FAO 2006). The recent time trends are not comforting. Since the mid-1970s, the proportion of overexploited and depleted stocks has increased 2.5 times, and the proportion of stocks offering potential for higher catches has declined from 40 percent to about 25 percent. Overfishing remains the primary threat, due largely to excessive fishing capacity, with too many highly productive fishing vessels harvesting from fish stocks that are dwindling in both size and number.

The markets shaping commercial fishing activities are failing to tell the "ecological truth," writes Brown (2001, 22), as the market prices of the inputs (fuel, bait, labor, gear, and other capital) and the prices of fish products do not

include the ecological costs of stock depletion. Fishing operators typically pay no price to remove fish from the sea. Yet there are costs in the form of smaller stocks, lower future yields, reduced biodiversity, and associated damage to habitat and mortality of marine mammals and sea birds. Since markets favor those who produce and sell a product of the same type and quality at the lowest cost, the market mechanism effectively drives participants to ignore the ecological costs of habitat destruction and overexploitation. The "un-priced" use of marine fisheries is the fundamental cause of overexploitation in modern fisheries.

Pollution

According to the United Nations Environmental Programme, sewage is the principal source of marine and coastal pollution (UNEP 2002). Sewage discharges dominate in urban areas, and agricultural runoff and atmospheric deposition are major global sources of fixed nitrogen. Annual fertilizer use has risen tenfold over the past 50 years (Larsen 2004). The growth in nitrogen inputs has caused eutrophication in marine and coastal waters, with severe cases in several enclosed and semi-enclosed seas. Greater growth and decay of phytoplankton has increased the number and extent of dead zones (oxygen-depleted waters), which now number nearly 150, having doubled each decade since the 1960s (Larsen 2004). Red tides of harmful algal blooms have had major economic impacts on fisheries, aquaculture, and tourism in many coastal regions. Other important types of marine pollution are marine debris, oil spills, and ocean dumping.

Why are humans contaminating their marine ecosystems in such quantity and diversity? Industries, households, and even municipalities use water bodies as convenient places to dump sewage and industrial wastes. Those who discharge these wastes into the marine environment are often unaware of the indirect ecological costs and view it as free or allowab;e for a nominal charge. Such charges do not reflect the full ecological cost of the harm to the natural ecosystems. As a result, businesses and households produce more waste than they otherwise would if their costs of disposal were "true."

Habitat destruction

Habitat destruction and other forms of direct physical alteration are among the greatest threats to coastal and marine ecosystems (UNEP 2002). During the 20th century, almost half of the world's coastal wetlands and more than half of the world's mangrove forests were destroyed. Nearly 60 percent of the world's coral reefs are dying or under threat from human pressures. Loss of coastal wetlands, mangroves, and coral reefs reduce the buffer zone between land and sea, increasing ecosystem impacts due to land-based sources of pollution, vulnerable inhabited coastlines, storm surges, and tidal waves. These losses have further aggravated the impacts due to elevated levels of nitrogen in coastal and marine ecosystems (UNEP 2002).

Development of coastal areas for human use directly causes much of this physical alteration, through dredging for ports and shipping lanes, creation of solid waste dumps and landfills; coastal construction of buildings and roads; cutting and destruction of mangrove and other coastal forests; and mining of marine sand, gravel, and reefs. The markets that drive the development and alteration of coastal areas place little or no value on coastal and marine habitats and other ecological assets. Since the costs of destroying these habitats and assets are not reflected in the market, excessive and harmful dredging, dumping, construction, and extraction of marine ecosystem resources not only continues, but it is intensifying.

In summary, most markets do not reflect the ecological costs of the economic activities that use and encroach upon marine resources. Market prices for fish and other ocean products and services—the key drivers of production, trade, and consumption—fail to reflect the full costs of exploiting marine ecosystem resources. The artificially low (consumer) prices and (producer) costs drive consumers to demand more and suppliers to produce more marine-ecosystem-based products. As a consequence, excessive levels of economic activities are threatening the sustainability of marine ecosystems.

Government and marine resource use

Government, the second mechanism in Juda's framework, also influences humans' interactions with the natural components of a marine ecosystem. In the context of marine resources, governments primarily act to set and enforce rules (for example, regulating the use of natural resources and business practices), recognize and protect property rights, and produce goods and services. The presence of public goods and spill-over effects, which are common for marine ecosystem resources, typically mandates government intervention.[6] In the case of fisheries, open access to the resource leads to too many fishers chasing too few fish (a case of "reciprocal spill overs") and typically prescribes government intervention, in the form of fishery management policies, to correct the market failure.

A principal goal of government policies and programs is to correct market failures, which arise from prices not telling the ecological truth while generating too many activities with externalities, where one party's actions impose costs on other parties. Government policies and programs that aim to correct market failure generally involve regulations (such as fishery and environmental management regulations), research, enforcement, and fiscal measures (for example, user charges and subsidies).[7]

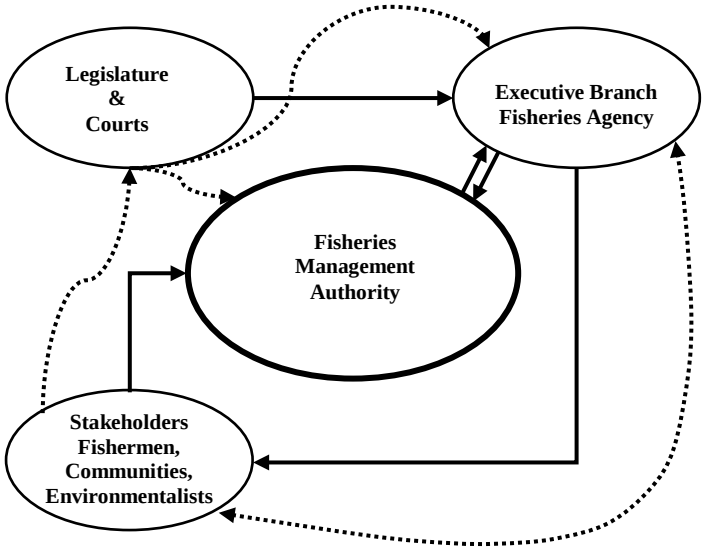
The "political economics" of marine resource policy

Government policies and programs have generally failed to prevent widespread overexploitation and degradation of coastal and marine ecosystems. To overcome such failures, it is necessary to understand how those policies and programs are produced, to examine how management services are produced; and to ask what conditions lead to government's successes and failures. With such analysis and understanding, we may be able to prescribe ways to correct the obstacles in the public sector that lead to failures of governmental processes and policies. Otherwise, by promoting government intervention without prescribing proper arrangements, we might encourage greater inefficiencies that result from what Wolf (1988) calls nonmarket failure.

Consider the case of fisheries. As reported above, many of the world's fisheries are overexploited by fleets with overcapacity, a record demonstrating that our fishery management institutions have failed to conserve fishery resources and improve the economic health of fishing communities. Why have our management institutions not done better? The FAO (2000) and other observers attribute this poor record to (i) tendencies to give priority to short-term social and economic needs at the expense of the longer-term sustainability of fish stocks; (ii) poorly defined objectives; and (iii) institutional weaknesses, particularly in relation to the absence of long-term rights among the different key stakeholders and decision-making structures and processes. These three problem areas are really just manifestations of the incentive structure found in most fisheries (and many other natural resource) governance regimes.[8]

Although I use fisheries to illustrate this analysis, the phenomena and principles apply to marine resource governance generally (see Olsen et al. 2006). The analysis explains how the incentive structure can lead to counter-productive policies and programs that harm the marine ecosystem. In democratic countries, the fisheries governance system consists of both formal and informal linkages among four components of the system.[9] The legislature passes fisheries laws that authorize the implementation of fisheries policies and programs by a fisheries agency. In turn, the fisheries agency commonly establishes a fisheries management authority to develop fishery management plans that specify the set of management measures that are applied to the fisheries under its jurisdiction. Stakeholders (such as fishing producers, communities and environmental advocates) usually have a formal role—from advising to decision making—in the management plan development process. The resultant plans, if approved, are then implemented by the fisheries agency. The solid arrows in figure 6.1 represent these formal linkages.

Figure 6.1. Fisheries governance system



In addition to the formal linkages, there are informal linkages represented by the dashed arrows in figure 6.1. As voters who help elect members of the legislature, fisheries stakeholders frequently take their problems and concerns to their elected representatives. If a group of stakeholders finds the fishery management process and/or outcome unfavorable, they often ask their elected representative to assist them. The assistance may take the form of influencing the fisheries agency and/or fisheries management authority (Sutinen and Upton 2000). Although not strictly informal, litigation is another tactic that stakeholders use to attempt to alter and postpone policy outcomes (see NAPA 2002).[10] Sissenwine and Mace (2001) refer to this as the end-run phenomenon.

The political process controls government, and, in democratic countries, political decisions are produced by a legislative process. Voters elect representatives to guide government policies and actions; agencies are formed; bureaucrats are hired to implement government policies. These three domestic groups are major players in the political process, and government policies and actions result from complex interactions among these players.

Voters—especially groups of voters with special interests—express their demand for government policy and action. Elected representatives supply legislation (policy) to address this demand; then government bureaucrats implement the programs and rules specified in the legislation. In the fisheries context, the principle products of this political marketplace are fisheries laws and regulations related to conservation and management, safety, environmental protection, and so forth. Voters are the consumers of the political process, demanding political products. Voters—including groups of voters that form to pursue their special interests—demand public-sector action to reduce inefficiencies and to redistribute income, usually through self-serving benefits. Votes, campaign contributions and lobbying are the currency by which these demands are expressed. In addition, foreign groups also participate in the political process by lobbying for their special interests.[11]

Politicians are the elected administrators and legislators in federal, state/provincial and local government, including members of executive and legislative branches. Politicians are motivated in part by the need to be elected or remain in power by supplying the political goods that are demanded by voters. Therefore, politicians tend to select positions that maximize the probability of reelection.

Bureaucrats work at national, state/provincial and local levels as hired officials. Agency employees implement laws and regulations and develop programs. Bureaucrats are motivated in part by self-interest too. They naturally resist

downsizing their budget and number of employees and commonly attempt to increase the size of their budget and number of employees. To achieve this objective, they often appeal to politicians with programs that would be favored by voters.[12]

Political equilibrium is reached as voters, politicians, and bureaucrats make choices to achieve their own objectives. Both socially desirable and undesirable outcomes are possible, depending on the underlying incentives of these groups.

Government failure

It is well established in the public choice literature that government failure (socially undesirable outcomes) is due to a number of interrelated features of typical democratic governance systems. These include the shortsightedness of elected officials and of users of marine resources, the effects of special interests, voter ignorance of issues, the "decoupling" of costs and benefitsas well as bureaucratic inefficiencies.

Special-interest effects occur when a relatively small number of citizens or foreign parties make large individual gains at the expense of a large number of citizens who bear small individual losses. Rent seeking occurs when individuals and groups attempt to use the political process to redistribute income from others to themselves. Special interests gain disproportionate power relative to their numbers because they can provide campaign funds, publicity, and delivery of voters who are passionate about a particular issue. Meanwhile, rational voter ignorance occurs because it is seldom worth the cost for the typical voter to acquire the information needed to make a fully informed voting decision. In addition, the choice of a single voter is seldom decisive when the overall number of voters is large. This further decreases the voter's motivation to acquire more information, while in many cases the individual may not bother to vote at all. These factors induce the politician to favor special interests.

The packaging or bundling of the candidate's positions further accentuates special-interest effects and rational voter ignorance. Members of the general public who are relatively disinterested in a specific issue are unlikely to vote on the basis of that issue alone. It is likely that many other issues are of greater importance to her or him, especially when the impact on their welfare is small. Yet members of an interest group are likely to vote strictly according to the issue, especially when it has a significant effect on their welfare. A given political candidacy tends to be accepted or rejected on the basis of the entire package of positions and not on the basis of a single special-interest issue. Since voters can only express their will through a legislator who represents a bundle of political goods, the political process becomes imprecise with regard to voter preferences. For example, it has been estimated that the typical citizen makes only one public choice decision for each thousand made in the private sector. In addition, politicians often package issues in a manner so complex that most voters will be unaware of the true costs that programs will impose upon them. However, special interests are more likely to be well informed regarding the underlying costs and benefits of a policy that is specific to their interests.

Politicians tend to be shortsighted because they face short reelection cycles than range from 2 to 6 years.[13] They are concerned about the consequences of policies and programs before the next election. The long-term consequences tend to carry little weight in the calculations of the politician. Politicians often exhibit shortsightedness when they enact special legislation and appropriations for fisheries and periodically attempt to directly influence the contents of fishery management plans.

Shortsightedness also is present on the demand side. Fishing interests in most managed fisheries tend to be shortsighted about fishery management policy. In open-access fisheries, fishers have no secure claim on future outcomes in their fishery. That is, they have no assurance that they will reap the benefits that might accrue from their short-term sacrifices. Fishers in rights-based fisheries, on the other hand, tend to be less shortsighted. Fishers also tend to be shortsighted because of the great uncertainty they face regarding future fishery policies, fish stocks, and markets. Fishers are simply being rational in their shortsightedness.

The shortsightedness on both demand and supply sides of the political marketplace combines to favor legislation that provides easily identified current benefits at the expense of future costs that are complex and difficult to identify. Conservation, which requires short-term sacrifice in exchange for long-term gains, tends to be disfavored in this environment.

Another characteristic that strongly influences fishery policies and outcomes is decoupled benefits and costs. Political products have benefits and they have costs. For many fishery products, those who benefit are not those who pay the cost of a product. For other products, benefits accrue at a different point in time from the costs. An example of decoupled benefits and costs are government-financed vessel buyback programs, such as the US$25 million vessel/permit buyout program in the United States' Northeast fisheries. The beneficiaries are the fishers whose vessels are purchased by the program as well as those remaining in the fishery. The costs, on the other hand, are borne by the general taxpayer. The beneficiaries do not pay in proportion to the benefits they receive, and the payers do not benefit in proportion to what they pay. In short, the principal conclusion from this analysis is that who pays and how they pay for management services influences policies and the economic performance of a fishery (Andersen and Sutinen 2003).

The two characteristics of shortsightedness of the principal actors and decoupled benefits and costs of fishery products have a powerful influence on the choice of fishery management policies. The presence of shortsightedness and de-coupled costs and benefits works against adoption of effective conservation policies. The structure of the fishery management system without rights-based management tends to disfavor effective conservation policies because they concentrate short-term costs upon resource users in exchange for future benefits that would not necessarily accrue to those users making the sacrifice.

Last on our list of causes of government failure are bureaucratic inefficiencies. Government agencies do not face incentives to produce goods and services efficiently. By cultivating the political influence of powerful politicians and groups of constituents, bureaucrats create opportunities for themselves to lead larger government agencies. While bureaucrats compete for tax revenues and—like private employees— promotions, higher incomes, and greater power, they do not face incentives to increase the value and decrease the costs of their outputs. Public employees cannot increase their income by improving the efficiency of the agency, and their job performance is usually difficult to measure (at least in terms of the contribution to the agency's output). As a result, they tend to be less conscious of costs, especially since they are spending other people's money. There is no need to compare revenues with costs; there is no measure of inefficiency and no pressure to reduce it. The incentives inherent in government agencies lead to inefficient production of government goods and services (Niskanen 1971; Wolf 1988). In addition, government is often the sole provider of the good or service. Such exclusive right of production is often mandated by law.[14] In general, the lack of constant competition for customers leads to inefficiency in government production.

Unlike the private sector, there is no systematic mechanism to weed out governmental inefficiencies. In the private sector, inefficient firms do not survive—they go bankrupt. In the public sector, agencies with high costs or that exceed their budgets are often rewarded with increased funding. Agencies that reduce costs and do not spend their budget allocation are penalized with the threat of a smaller budget the following year.

With this diagnosis of market and government failures in hand, the next section explores ways to overcome these failures—at least in part—and improve the prospects for marine resource management programs.

Taming markets and improving government performance with sustainable financing

Sustainable financing is a fiscally sound approach to natural resource management reform that can yield multiple dividends (compare CFA 2006, Emerton, Bishop, and Thomas 2006, EPA 1999, Le Quesne and McNally 2005). In

addition to covering the costs of marine resource management projects with charges to resource users (called cost recovery), the financing arrangements and mechanisms of sustainable financing can be used to mitigate the previously discussed market and government failures. If properly designed and implemented, sustainable financing tools can mitigate shortsightedness, link benefits with a more complete assortment of the ecological costs of resource use than markets, and reduce government's inefficiencies in the provision of policies and programs.

Mitigating market failure

As explained above, markets do not reflect the full costs of using marine resources and services, a condition that drives economic activities that lead to degradation of ecosystems. Sustainable financing offers a suite of mechanisms for creating markets that better reflect ecological costs and mitigate their tendency to harm marine ecosystems.

The judicious application of taxes, user charges, fees, and other financing mechanisms can make markets more ecologically truthful. By calibrating taxes, charges, and fees, to reflect ecological costs and by adding them to costs of capital and labor, market-driven activities will reduce their exploitation of fisheries, damage to habitat, and pollution. Economists, working with natural resource scientists, can apply valuation techniques to estimate these costs. This involves the integration of economics with the natural science of fish and fisheries, pollution and ecosystem health, and productivity.[15]

Once the ecological costs of resource extraction, pollution, and reduced productivity are calculated, the costs can be incorporated into the market prices. One way to incorporate ecological costs into market prices is to apply taxes to those activities that harm the marine ecosystem. In Namibia, for example, the government levies a tax on commercial landings, and the revenue collected is placed into a Fisheries Management and Research Fund, which is used to support stock assessments and enforcement of no-take marine protected areas (Spergel and Moye 2004). In the United States and other countries, pollution charges resulting from damage assessments for marine oil spills are used to fund the cleanup and restoration of injured resources. Thus, compensation for damages provides sustainable financing for protection of marine ecosystem resources. In addition, charging extractors and polluters for damages also internalizes environmental costs so that the ecological costs of a harmful activity are better reflected in the market price of outputs. By raising the cost of market goods to include their harmful effects, charging polluters for damages serves to help "get the price right," a cornerstone in sustainable resource use. Another method is to place a cap on the amount of the damaging activity and allow producers to trade their allowances—known as "cap and trade" and "tradable permits."

Subsidies of some economic activities (such as fishing and agriculture) also lead to overexploitation and damage to marine ecosystems. Conservative estimates of government subsidies to the fishing sector amount to more than a quarter of the annual value of trade in fish (Milazzo 1998). Many of these subsidies, in effect, lower the cost of fishing, further distorting the market's ability to tell the ecological truth. Economists can assess the nature and extent of subsidies—identify which subsidies cause overfishing and overcapacity—which can then be phased out or replaced with environmentally neutral subsidies.

The approach that some developed countries (for example, Sweden and other European countries) are using is not to simply add more taxes and eliminate subsidies but rather to shift taxes and subsidies to work in ecologically benign ways. For example, subsidies on fuel and fishing gear can be shifted to remunerate fishermen who work to restore and protect coastal mangroves and other essential fish habitat. Some countries are reducing income and property taxes in exchange for adding taxes on environmentally damaging activities such as use of virgin raw material, pesticides, and others, with an overall neutral effect on the total amount of taxes collected. Subsidies can also be shifted such that their overall level is essentially unchanged while they no longer promote ecological harm.[16]

If these and other ways are found to tame markets so they support conservation, we can look forward to improving the ecological condition of marine ecosystems (Le Quesne and McNally 2005). With effective management and market mechanisms, we can imagine that the condition and nonmarket value of marine ecosystem services will

begin to rebound in the not-so-distant future, and, after a lag in time, the market value of marine ecosystem-related economic activities will grow to heights not heretofore realized—the result of markets that work in harmony with the marine ecosystem.

Mitigating government failure

As argued above, the demand for marine resource management services provided by government will tend to be inflated because of the rational ignorance of voters, the decoupling of benefits and costs, and rent seeking. When government is the sole arranger and producer of fishery management services, the costs are widespread while the benefits of those services are concentrated, accruing largely to the fishers. This is a classic case of the special-interest effect, leading to rent seeking and waste of scarce resources.

Government failure on the demand-side can be mitigated by balancing what people pay with the benefits they receive. When balance is achieved, the demand for management services will be less inflated. Services that offer good value for money will be supported by consumers of the services, and services for which the benefits do not justify the costs will not be supported. Arrangements for providing services that concentrate the benefits and costs on the same group of individuals will tend toward efficiency. Private and local public goods can exhibit this distribution, especially where those benefiting pay directly for the government output. User charges are often used to finance such government goods and services as issuing passports, parks, mass transit, bridges and highways, electric power, and use of natural resources (water, minerals, and forests). Ensuring that beneficiaries of government management efforts pay in proportion to the benefits they derive from the use of marine resources and services—through the use of taxes, user charges and fees, for example—encourages cost-effective provision of government program products.[17]

In addition, government agencies face incentives that lead to an inefficient supply of goods and services since public employees do not have the incentive to produce services at least cost or to increase their value. There is no mechanism to eliminate these inefficiencies. How well are the alternatives to government expected to perform? Andersen and Sutinen (2003) expect the efficiency of any alternative to depend heavily on the extent to which consumers have a choice (of service and supplier) and the extent to which consumers pay the cost of supplying the service. Therefore, the market alternative is expected to be the more efficient, primarily because there is a close link between consumers and producers of the services and because of competition among producers and consumers. Andersen and Sutinen (2003) rank the expected efficiency of alternatives—from most to least—as follows: market, vouchers, grants, franchises, contract, and intergovernmental agreement. Voluntary provision may be efficient, but is not likely to be feasible for many management services.

The financing challenge

During the past thirty-plus years, coastal nations have enacted numerous environmental and natural resource laws and programs to mitigate or halt the degradation of marine ecosystems. There now exist myriad national and international programs to regulate pollution, to reduce the destruction of coastal wetlands, mangroves, and coral reefs, and to manage fishery resources at scales that range from inshore small-scale fisheries to large marine ecosystems.[18] In some regions, the implementation of the laws and programs has resulted in substantial expenditures for pollution control, fisheries management, and land use regulation in the coastal regions. In other settings, there is a large "implementation gap" and little has been done to implement formally adopted policies and management schemes.

Although there is no global accounting of the total amounts that coastal nations have spent and are spending on programs to improve the condition of marine ecosystems, Emerton, Bishop, and Thomas (2006) have summarized the latest available data on the amounts and sources of funding globally for all protected area management, which totals US$6.5 billion annually. In comparison, Spergel and Moye (2004) claim that the operation of a global network of marine protected areas could cost from US$7 billion to US$19 billion annually. Although we do not know the

magnitudes with much certainty, we can comfortably conjecture that the amount of expenditures on conservation and management of marine resources has grown steadily since the mid-1970s.

There is a growing awareness of the need for and application of financial planning in environmental and resource management programs. Several excellent guides for planning and implementing sustainable financing mechanisms are available (listed below). The guides explain the principles and methods of developing financial plans and explain and provide examples of specific financing mechanisms or tools that are being used throughout the world.

As good as they are, the guides on sustainable financing tend to focus on a relatively narrow set of issues and approaches to environmental and natural resource management. The excellent guides by the World Wildlife Fund (Spergel and Moye 2004) and the World Commission on Protected Areas (WCPA 2000) concentrate on financing protected areas, both marine and terrestrial. In spite of this limitation, the guides provide valuable advice to marine resource managers. For example, directors of marine resources programs and projects should view the development of long term financial plans for implementation as a top priority. Paraphrasing the WCPA(WCPA 2000), a financial plan helps to determine the funding requirements (including the amounts and timing of the funding) and to identify income sources for each of the needs. In other words, the planning involves identifying both how much money is needed for all the activities and determines the most appropriate funding sources for short-, medium-, and long-term needs. WCPA (2000) notes that alternative sources of funding vary by their reliability, ease/difficulty of obtaining, and the degree to which they can be used freely according to management priorities or come with strings attached. In addition, funding sources vary by the time horizons for which they are available (such as bank overdrafts vs. mortgages), and by the effort required to acquire the funding. Some funding arrangements require considerable amounts of time and effort to establish, and while they provide little revenue in the short term, they offer the prospect of providing steady and reliable revenues over the long term.

The guidelines in WCPA (2000) provide an excellent set of principles and procedures for developing plans for sustainable financing. Although the WCPA focuses on financial planning for protected area management, their guidelines can be readily adapted to marine resource management programs. The guidelines prescribe three operational principles:

- Develop financial plans within the full context of marine resource management plans and its legal framework.
- Adopt a business approach to financing marine resource management programs, including identifying specific consumers (beneficiaries) of marine ecosystem resources and management programs and determining methods for capturing appropriate remuneration from those consumers.
- Link public revenue streams to public goods, and link private revenue streams to club, local public, and private goods.

The guidelines encourage program managers to investigate a wide range of financing options and to diversify their portfolios of revenue sources. Chapter 2 in the WCPA guidelines explains how to identify and classify benefits from the environmental and natural resources and how to link the consumers/beneficiaries with each form of the benefits. Chapter 3 explains the basics of implementing the financial plan in the context of an overall business plan for the management program. The second part of the guidelines catalogs various sources of funding, and the third part presents a few case studies of sustainable financing programs.

In a recent update of the WCPA guidelines, Emerton, Bishop, and Thomas (2006) provide a more sophisticated and complete exposition of sustainable financing for protected areas. Numerous examples and case studies are presented that demonstrate the full set of challenges and promising prospects of sustainable financing approaches. Those who are interested in developing long-term financial plans for marine resource management programs will find this report immensely valuable.

Valuation of marine ecosystem services and assets

The coastal and marine natural resources of a marine ecosystem are capital assets—in effect, representing wealth embodied in its marine natural resources. Capital assets—natural or otherwise—can provide valuable services ("interest") over time if maintained; much like savings in a bank provides a flow of interest income. Resource valuation involves the use of concepts and methods to estimate the economic value the public holds for ecosystem services and assets. These services may be direct or indirect, and they may or may not be bought and sold in the marketplace.

Direct services include on-site use of marine parks, beaches, exploitation of marine minerals, and harvesting of fish, shellfish, or wood from mangroves. Indirect services occur off-site, for example, when fish "produced" by a mangrove stand are harvested many miles away. Some natural resource services are exchanged in organized markets, such as commercial fisheries, oil and other minerals, coastal land and other property, or tourism. However, a central feature of many, if not most, marine resource issues is that the ecosystem services provided are not traded in markets. The services provided, as for example, by mangroves, corals, and sea grasses, water quality, recreation, scenic amenities, and biodiversity are not bought and sold in markets—and, as a result, often are given inadequate attention in public policy.

Resource valuation, which estimates the value of particular resource services, can be used to inform policy for improving resource management. Many advances have been made in natural resource valuation, and the opportunities and limitations of resource valuation are becoming increasingly well understood. The World Bank's manual, *Estimating the Costs of Environmental Degradation*, explains, in practical terms, the methods of resource valuation.[19] The multitude of studies and applications documented to date is evidence that data problems and other difficulties are being overcome and that resource valuation is a critical tool for managing marine resources.

In addition, estimates of the value of lost or degraded ecosystem services and assets can be used to calculate the ecological costs of market-driven activities. Once resource valuations have estimated the ecological costs of resource extraction, pollution, and reduced productivity are calculated, these costs can be incorporated into the market prices by applying taxes and user charges to those activities that harm the ecosystem. In other words, the ecological cost estimates can be used to design financing mechanisms that correct market prices that would otherwise ignore ecological costs.

Financing mechanisms

There are literally hundreds of mechanisms for sustainable financing of marine resource management programs. Fortunately, there are four basic types of methods for financing government programs: taxes, grants, borrowing (bonds and loans), and user charges. Broad-based *general taxes* comprise the main source of government revenue. Designating general tax revenues for marine resource management programs raises at least two significant concerns. First, general tax revenues are the primary source of funding for defense, transportation, education, and social services programs. Earmarking general taxation funds for marine resource management programs places the financial security of those programs in competition with the other programs upon which the governments commonly place higher priority. In addition, earmarking these funds constrains policy makers' ability to redirect these funds where they may be most needed at certain points in time.

The second concern with using general tax revenue is that there is no relationship between the amount of taxes paid by individual taxpayers and the amount of ecological goods and services they have used or benefits received. Broad-based taxes (such as income, property, sales taxation) are appropriate means of financing public goods. Public goods, such as national security or elementary and secondary education, are financed with broad-based taxation because the benefits are widespread and excluding nonpayers from access to those benefits would be nearly impossible.

Since many government-provided goods and services are not pure public goods, and perhaps because of a widespread sentiment to reduce the taxpayers' burden, there is movement away from broad-based taxation toward user charges (also known as fees and selective taxes). An important advantage of user charges is that this form of generating revenue is capable of balancing what people pay with the benefits they receive. From an economic perspective, user charges allocate scarce resources and distribute costs. When the correlation between benefit and charge is strong, user charges become prices, which help to mitigate the harm that markets do to marine ecosystems.

Grants from the World Bank and the Global Environment Facility (GEF) have provided core funding for programs to conserve and manage marine resources. Since 1993, GEF has provided over $260 million and mobilized $450 million in additional funding to improve the assessment and management of Large Marine Ecosystems across 121 countries participating in GEF projects.[20] GEF funding, although large by some standards, is limited and will not continue indefinitely into the future. A long-term sustainable financing plan is therefore needed to ensure that work will carry on beyond the period of the GEF funding and other grant financing.

Other major sources for grants and loans include arms of the United Nations. Among these are: the UN Development Program, UN Environment Programme, UN Industrial Development Organization (UNIDO), Food and Agricultural Organization (FAO), and the International Maritime Organization (IMO), among other sources.

Bilateral and multilateral grants, technical assistance, and capacity building are supported by many countries, including Australia, Canada, Denmark, the United States, and Switzerland, among many others. For example, the National Oceans Office in Australia supports ecosystem management, and European large marine ecosystem projects receive support from the European Environmental Agency. The U.S. Agency for International Development has traditionally supported marine resource management programs throughout much of the world.

Loans from the World Bank and regional international lending facilities (InterAmerican Development Bank, Asia Development Bank, Africa Development Bank, European Development Bank) support country-initiated priority development projects, including marine-related projects. Increasingly, the scope of projects funded by these lending facilities has been broadened to consider the environmental and social effects of proposed projects.

User charges are fees individuals pay to government that are based on the benefits received or the amount used of the good or service provided by the government. There are at least four types of user charges: user fees, regulatory fees, beneficiary-based taxes, and liability-based taxes. **User fees** include royalties on the use of natural resources, bridge and highway tolls, lease and rental payments, and charges for recurring sales of resources (such as timber, minerals, and water). **Regulatory fees** include charges for inspecting and testing services, patent and copyright fees, permit and license fees associated with regulatory programs, judicial services, and passport and customs services. Other examples include fees that households and businesses pay for the costs of providing water and waste water services, electricity, and so forth. Some specific examples include fees for access and connection to public utilities (such as sewerage lines), construction of environmental facilities (such as underground storage tanks), operating franchises/businesses on public property, monitoring and inspection services, recreational uses (such as moorings), permitting services, product registration, solid waste disposal, and water withdrawal. Examples of special charges include effluent and emission charges, impact fees, severance taxes (a charge for the extraction of a natural resource on public lands, such as timber, water, fish, coal, oil and gas, minerals), and for hazardous waste disposal. **Beneficiary-based taxes** (sometimes referred to as earmarked taxes) are correlated with, but not tied to, the use of a government-provided good or service. For example, taxes on gasoline in the U.S. are dedicated to a highway trust fund for financing highway construction and other transportation projects. **Liability-based taxes** are charges for the purpose of abating hazards (like oil spills) or compensating for environmental and other damages imposed on third parties. Other examples include selective taxes on sales of energy, petroleum products, agricultural chemicals (fertilizer, pesticides), motor fuels, vehicles, rental cars, marine fuels, watercraft, hotels, real estate transfers, and hard-to-dispose items.

An excellent discussion of some of the more common financing mechanisms can be found in Spergel and Moye (2004). Table 5 in Olsen (2006) lists many of the funding methods that they present and also presents a few actual

examples how these financing mechanisms are being applied to tourism, energy and mining, fisheries, real estate, and other human use activities.

Contestability

If user charges are used only to pay a monopolistic government provider, very little efficiency gain may be realized. Supply-side efficiency can be fully realized only if there is competition among suppliers of fishery management services. This requires making the provision of such services contestable, where alternative suppliers bid to provide a given service. For example, two or more enforcement agencies may bid on providing a given number and type of dockside inspections of fishers' landings in a specific fishery during a specific period. Two or more research institutions may bid to conduct stock assessment research for fishery decision-makers.

Also, the consumers of the service must have a voice in deciding which services to purchase and which providers will supply the service. Beneficiaries of fishery management services (that is, the fishers) may find that there are less costly and more efficient ways to manage their fishery than relying on government to arrange and supply management services. Many of these services (along with the associated responsibilities) can be devolved to the beneficiaries themselves, resulting in efficiency gains in both the provision of management services and the use of fishery resources (see Scott, this volume). Of course, where there is a larger social interest in a fishery (say, due to marine mammal interactions or other environmental concerns), the government should retain a role in decision-making and require adherence to a set of standards.

The benefits of sustainable financing can be enhanced by other governance arrangements. For example, one important arrangement is the devolution to users and other stakeholders with strong interests in a marine resource the rights and responsibilities of setting management policies and bearing the full consequences of those policies. Such action would attempt to harmonize interests of managers and users to act in society's interest. This can be achieved by efforts to encourage and facilitate implementation of individual or community fishing quota and other rights-based programs. Government still has a legitimate role in management, but it should be the role of oversight rather than operational decision making. Appropriately done, such reform would further weaken the tendency toward shortsightedness among resource users, giving them the incentive to be willing to make the short-term sacrifices needed to rebuild depleted stocks and avoid overexploitation and degradation of the marine resource.

Selecting among financing options

Financing provides the means to carry out governance activities, and also has the potential to tame markets and improve governments' delivery of policies and programs. Olsen et al. (2006) show that there are numerous examples of sustainable financing mechanisms that are operational in the field. Taming markets, improving government performance, and practicability are important considerations when designing sustainable financing plans for marine resource management projects. In addition, there are other criteria that are relevant for weighing the potential success of financing approaches. For instance, excessive transaction costs to study, implement, and enforce compliance with a resource management program will cause the program to fail. Hence, designing financing methods requires anticipation of transaction costs and tailoring methods to the seriousness of the issues faced. In sum, criteria that can be important in assessing financing options include efficient resource use, cost effectiveness, transaction costs, political feasibility, and fairness.

Financing will be easier to justify if the benefits of proposed marine resource management programs clearly exceed their costs. The public would be ill served—and few programs sustainable—if costs systematically outweigh benefits. Nor would the public interest be served by blatantly excessive costs imposed on operators, driving them out of business. Similarly, failure to use a cost-effectiveness standard, for example, for restoration of coastal wetlands or to treat water pollution, would mean costs that are higher than necessary. This reduces what could be accomplished with a given budget. Perceptions of wasteful use of resources will also erode public support for governance.

High transaction costs undermine the potential for success, and thus curtail or eliminate potential gains from governance. For example, simplified approaches for assessing damages from oil spills or other marine pollution provides a quick and inexpensive way to assess damages for small incidents. Generally, making programs too costly or too inconvenient is a formula for failure.

Fees and charges provide environmentally friendly incentives and can be used to raise funds for governance programs. At the same time, imposing fees and penalties is rarely popular, those individuals/users subject to regulations may not comply, and proposed actions for financing which lack broad public support will not be implemented or successful. Hence, political feasibility also is a major concern when weighing financing options.

Fairness encourages support for financing and compliance with programs. As explained in Olsen et al. (2006), compliance is encouraged when affected parties feel they have a say in new programs and when the costs of programs are distributed in a way considered to be equitable by those most affected by the policy. The above criteria are interdependent. For example, an onerous user fee system, or a program which is too complicated, likely will not be politically feasible to implement or maintain.

Similarly, a system of transferable quotas for fisheries management or for nutrient pollution control could capture considerable economic rents for public uses through the auctioning of quotas or permits. However, a transferable quota or permit system might not be politically feasible, unless at least some of the permits are given to those currently in the industry ("grandfathering"), with the balance of permits auctioned and awarded to the highest bidders.

Conclusion

This analysis of governance and fiscal requirements for marine resource use and management has identified some of the fundamental causes of market and government failures that account for much of the overexploitation and degradation of the world's marine resources. It appears that the use of appropriate sustainable financing tools has the potential to mitigate if not overcome many of these failures.

Implementing sustainable financing and other reforms will not be easy or immediate, especially in the current, more complex policy environment that has emerged in recent years. The complexity to which I refer is the ecosystem approach to management of the environment and natural resources. The ecosystem approach, also known as ecosystem-based management, is almost universally endorsed as the strategy for managing natural resources and the environment.[21]

Traditionally, management has been organized around particular uses, such as fisheries or mineral exploitation, resulting in separate governance regimes for each. Over time, it has become apparent that such a sectoral approach results in conflicts among users and is inadequate in meeting the need for sustaining the goods and services that flow from healthy ecosystems. The ecosystem approach aims to overcome and correct many of the shortcomings of the traditional approach to management of marine ecosystem resources, such as the incongruence between ecological and political spaces, the lack of integration among uses of ecosystem resources, and others (Juda and Hennessey 2001; Crowder et al. 2006).

Advocates of the ecosystem approach to fisheries and other marine resources argue that it has great promise for overcoming the failures of traditional marine governance. From a political economy perspective, however, the ecosystem approach has its own unique challenges.

As management authorities collaborate, or even merge, to apply the ecosystem approach, the focus will shift from specific uses of individual resources to all uses of all ecosystem resources. Since the ecosystem approach involves explicitly recognizing the interdependence of ecosystem components, the complexity of the management task

increases exponentially (FAO 2001). Under the ecosystem approach, all users of an ecosystem's resources become stakeholders in the policy development and implementation process, increasing the number of competing users and potential conflicts of interest, making the setting of goals and objectives much more difficult. In addition, greater interagency collaboration, coordination, and cooperation among a larger number of government organizations will be required (Sutinen and Soboil 2003). The ecology of governance (Hennessey 1998) will grow in scale and complexity with its own set of uncertainties.

Although the ecosystem approach may overcome some important shortcomings of the traditional approach to management, it contains no provisions for restructuring the underlying governance incentives that are driving government's failure to tame markets' tendency to overexploit common property fishery resources, contaminate marine ecosystems, and damage and destroy coastal and marine habitats. Specifically, the ecosystem approach fails to address the incentives that lead to the influence of private interests and bias against conservation prevailing in most ecosystem governance regimes. Nor does it prescribe principles or measures to discourage interagency competition and conflict and , instead, encourage interagency collaboration, coordination, and cooperation among the large number of government organizations necessarily involved in an ecosystem approach.

With prevailing governance incentives, what are the future prospects for the ecosystem approach? What can we expect from this larger, more complex governance regime? The set of private interests will expand—from fishing, say, to shipping, oil and gas, tourism, and fishing—which may result in more conflicts of interest due to, among other things, spillover effects among users. The expansion in private interests may also produce more and larger groups with common private interests, especially when resisting government regulations. How will the larger and more diverse private interests affect the political dynamics of policymaking?

Under certain circumstances, more diverse private interests could be beneficial and strengthen the chances of successful management. Studies by Kroszner and Strahan (1999 and 2001) show that the rivalry of competing interests in the U.S. banking industry was key in determining outcomes of banking reforms. They conclude that such intra-industry competition can increase the likelihood of beneficial reform. A divide-and-conquer strategy split industry interests and set up a situation in which rival groups battled each other, weakening overall opposition to proposed reforms.

It is unclear, however, whether such intra-industry competition exists or would emerge as a significant factor among marine resource users. If it does not, coalitions of common interests among the expanded set of stakeholders may form under the ecosystem approach to exert an even more powerful private-interest influence on management policy and regulation than has been the case with traditional, single-sector management. An ecosystem resources management agency would have the authority to regulate all users of an ecosystem's resources. This arrangement will create opportunities, and perhaps strengthen incentives, for various user groups to form coalitions in order to influence regulatory policy. Extractive users (oil and gas, mining, and fishing) may combine forces to oppose limits on extraction rates in general and have more influence than when operating separately in the policy arena. Similar coalitions may emerge among users responsible for pollution, destruction of habitat, and other coastal alterations. My concern is that the ecosystem approach may create a set of political economic conditions that will allow private interests to have even greater influence and further aggravate overexploited fishery resources, altered productivity and biodiversity, and the poor health of marine ecosystems.

Few if any reforms will likely be implemented in the face of strong opposition from private interests. Overcoming this and other obstacles to reform of marine resource governance may benefit from experiences in other sectors. Based on his extensive experience in the Netherlands and other OECD countries, de Geus (2008) emphasizes three main points for reform efforts: First, build the case for change by making clear the costs of inaction and by designing reforms with input from all stakeholders. Second, identify who is going to gain or lose from proposed reforms and consider whether compensation would be appropriate. Third, "sell the reform" by articulating the costs of inaction for the ecosystem, and for the economy and society at large.

Identifying how a proposed reform would affect specific interest groups—de Geus' second point—is not straightforward. As discussed in Sutinen (2007), scholars and policy-makers do not fully understand the policy interests of fishery and other marine resource producers, and the details of how they influence policy. For example, a specific reform can yield both gains and losses to a given individual, but at different points in time and depending on the decisions and actions of others. In their experimental analysis of lobbying behavior in fisheries, Bwalya, Anderson, and Sutinen (2007) report that private fishing interests' efforts to influence policy decline with lobbying experience—a result contrary to actual practice. Clearly, more research on this and other related issues is needed before de Geus' prescription for reform can be fulfilled.

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Endnotes

1. Exclusive Economic Zones are coastal areas of the oceans adjacent to territorial waters in which the coastal states have specific rights of the use of fish and other marine resources.

2. In Juda's framework, governance is neither synonymous with management nor confined to government actions. Governance includes all mechanisms that govern or influence human behavior. Management, in contrast, is the process by which human and material resources are harnessed to achieve a known goal within a given institutional structure. See Olsen et al. (2006).

3. For the influence of the institutions and arrangements of civil society, see Olsen et al. (2006).

4. Space constraints preclude discussion of the many linkages and interactions between markets and the organizations and institutions of government and civil society—the other two forces shaping humans' interactions with natural components of marine ecosystems.

5. This well-known metaphorical description was used by Garrett Hardin (1968) in explaining why a pasture shared by livestock users is prone to overuse.

6. Public goods are those which, when once provided, are available to all at a zero price—for free. More specifically, public goods are those for which one party's use of the good does not subtract from another party's use (examples include marine research and education, navigational aids, clean waters and beaches, habitat and species preservation and restoration, early warning systems for tsunami and typhoons, and attractive vistas). Spill-over effects (externalities) occur when one party's actions imposes costs on other parties.

7. See UNEP (2007, 468) for a list of current environmental policy instruments and policies.

8. I draw heavily upon and use excerpts from, Sutinen and Soboil (2003). The arguments presented are based on an extensive public choice literature; see, e.g., Buchanan and Tullock (1962); Buchanan (1980); Niskanen (1971); Olson (1964); and Wolf (1988). Applications of public choice to fisheries can be found in Andersen, Sutinen and Cochran (1998), Sutinen and Soboil (2003), and Sutinen and Upton (2000).

9. This analysis does not apply to non-democratic countries such as Burma, China, Cuba, Egypt, Iran, Pakistan, Saudi Arabia, and Vietnam, where more than one-sixth of the world's people live. The analysis of government performance by non-democratic states requires further research.

10. Powers (2005) analyses strategic interaction in U.S Fisheries Management Councils using a bargaining model with opportunities for litigation. He shows that "bargaining power favoring one constituent group could lead to Council outcomes that deviate from management policy" a result that is consistent with the private interest theory of regulation.

11. For example, EU industrial fishing fleets and US-based international NGOs are forms of foreign interests that have significant influence on developing countries and their marine ecosystem management.

12. For a study of this phenomenon outside of fisheries, see Johnson and Libecap (1994).

13. We use the term shortsightedness to describe the tendency by people to ignore, or give little weight to, future consequences, especially consequences in the medium to distant future.

14. Education and postal services in the USA are exceptions.

15. For examples of such integrated assessments, see Hennessey and Sutinen (2005, chapters 9-12).

16. For more details on the use and outcomes of this approach, see Brown (2001, ch.11).

17. See Andersen and Sutinen 2003 for a detailed discussion of this issue.

18. Large marine ecosystems are expansive ocean areas, generally greater than 200,000 km^2 (77,220 mi^2) that have distinct bathymetry, hydrography, and biological productivity whose plant and animal populations are inextricably linked to one another in the food chain (Sherman and Alexander 1986, and Alexander 1993).

19. Excellent examples of resource valuation studies can be found at several websites, including the IUCN's Biodiversity Economics (www.biodiversityeconomics.org/library/index.html), the Conservation Finance Alliance (www.conservationfinance.org/Relevant_links/CF-Papers.htm), and the WWF (www.worldwildlife.org/conservationfinance/pubs.cfm), among others.

20. Duda and Sherman (2002); Alfred Duda, pers. comm. On March 17, 2006.

21. There are various definitions of the ecosystem approach to management of natural resources and the environment. The Convention on Biological Diversity described the ecosystem approach as 'a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way' (COP 2000). The Europe Union defines it as 'the comprehensive integrated management of human activities based on the best available scientific knowledge about the ecosystem and its dynamics…' (JMM 2003). In the United States, the National Oceanographic and Atmospheric Administration describes it as geographically specified, adaptive, taking account of ecosystem knowledge and uncertainties, considers multiple external influences, and strives to balance diverse societal objectives; see Burgess et al. (2005). It is important to note that the National Oceanographic and Atmospheric Administration defines an ecosystem as a geographically specified system of organisms (including humans), the environment (which includes biological, chemical, physical, and social conditions that surround the organisms), and the processes that control the ecosystem's dynamics.

Chapter 7

Pathways to fishery reform: Accounting for political economy

by

Robert T. Deacon[*]

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 to 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 fishers 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 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 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 oriented 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

[*] The author is grateful for comments from Tim Bostock, Don Leal, and Elizabeth Witham.

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. The fourth section gives examples of management systems that have proven successful in specific political systems and the fifth section 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 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 of 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]

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 (that is, local and foreign fishers). 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 may result in 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 for separate

parties to have an interest in enforcing exclusion, even though they do not benefit directly from the harvest. These 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 in order 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 noninfluential 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 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 (for instance, 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 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; 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 promises is not

credible if the government is not constrained by legal institutions. (Acemoglu 2003; Acemoglu and Johnson 2005). 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 (that is, 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 by 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 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 they 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

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, such as 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: that is, 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 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 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 fishers 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 market 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 underinvest 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 ,underinvest 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, Gardner, and Walker 1994, 306). Schlager (1994) examined case studies of 30 coastal fisheries in primarily developing countries 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, Gardner, and Walker (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.

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, 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. The free-rider problem in getting members to report violators is a frequent problem in this context, and only three of the six villages found a successful solution.[26] On these three, the forest 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(Pomeroy and Berkes 1997). These rights amount to ownership of the sea in delineated areas, making FCAs responsible for monitoring exclusion.[27] Tietenberg (2002) points out that individual transferable quota (ITQ)systems adopted in New Zealand fisheries and the U.S. (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 more oriented toward grabbing rents for the politically powerful than toward 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, Gardner, and Walker (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. 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.[28] 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 bya 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 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 the 2002–2004 seasons achieved a remarkable degree of coordination among its members with no involvement by government (Deacon, Parker, and Costello 2008). 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 reached agreement on catch allocations in less than two months (Sullivan 2000).[29] 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, Gardner, and Walker (1994, 199) report that subjects in common-pool resource experiments communicate to formulate joint strategies and enforcement plans and that such communication increases rent yields even though the agreements are not binding. Kopelman, Weber, and Messick (2002) argue that communication promotes cooperation by enhancing group identity and solidarity.[30]

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.[31] 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.[32] 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 conservation easement approach to trawl fishing operations based in Morro Bay, California.[33] 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's 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 fishers 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 fishers 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 fishers was also part of the strategy in the Chignik, Alaska sockeye salmon fishery. In 2001, a group of commercial fishers 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.[34] 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 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.[35] In addition, the cooperative instituted several policies that reduced costs, including sharing information on stock locations, providing shared inputs, and directing its members' effort over space and time.[36] 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 overstepped 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.[37] 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 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 nine 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 overfished 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.[38] 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 by 38 individual quota holders under New Zealand's ITQ system, is a well-known example of user-based management.[39] 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.[40] 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.[41] 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 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.[42] Table 7.1 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.

Table 7.1 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
U.S.	6.00	5.98	5.54	6.00	6.00	5.32	5.00	4.18	4.37

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

Two questions naturally arise: (i) what caused Botswana to develop favorable political institutions? (ii) and how does Botswana manage its natural resources and what success has it achieved? Acemoglu, Johnson, and Robinson (2003) answer the first question by pointing out that Botswana's precolonial tribal institutions encouraged broad participation in decision making and placed significant constraints on political leaders. Fortunately, British colonial governance had only a limited effect on those institutions, so this tradition of constraints and broad participation was largely intact at independence.[43]

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 subsoil 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. [44] 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 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.[45] 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.[46]

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.[47] 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 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.[48] 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.[49]

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 fishers, boats, and traps intended for operation to the governing agency for approval.[50] The co-ops are responsible for regulating fishing operations to comply with the plan, and they 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. Government enforcement activity is at least partially funded by the cooperatives, with each contributing $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.[51]

This management regime and effective ownership structure seems well-suited for success, given Mexico's political institutions.[52] 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 7.1 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, placing few constraints on the chief executive.[53] 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.

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 UN 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 7.1).

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.[54] 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.[55]

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.2005, 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). Sociopolitically, 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.[56]

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.[57] Namibian groups who suffered under pre-independence apartheid rule are particularly favored under this policy. Quotas vary in duration from four 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.[58] 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 increased from 60 percent to 85 percent (Armstrong et al. 2005).[59] 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 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, 298–9). 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.[60]

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 government assumption of control, indigenous institutions often are rejected and the actions local users once took to steward resources are sometimes rendered illegal.[61] 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 fishers, can perform many of the management tasks in fisheries around the world typically assigned to government agencies. 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(such as 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 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 underexploited 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 MSC'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 in order to gain the MSC label.[62]

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 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 within which one must work. Best practice recommendations should therefore be targeted toward a specific management task *and* toward 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, and so forth.[63] 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 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 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, with the result being to make individual success depend less on skill in fishing than on skill in navigating the political system.

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Endnotes

1. See Bueno de Mesquita et al. (2003), Acemoglu, Johnson and Robinson (2001) ,and Putnam (1993). Deacon (2009a) 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).

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

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

5. Also see Scott (this volume).

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, Perotti, and Rostagno (2002) and Lizzeri and Persico (2001).

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, Johnson, and Robinson (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.

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.

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 (such as legal origins and measures of ethnic heterogeneity) to various measures of "good government" (such as 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.

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.

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 (1972) 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 United States.

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.

16. Much of the empirical research on these topics is reported in case studies. Agrawal (2002) 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 noncooperative Nash equilibrium return; when interactions are repeated the difference in returns can be more dramatic.

18. Guinea, Guinea Bissau and Sierra Leone all rank poorly on indicators of corruption, law and order and democratic accountability based on the Political Risk Services Group's International Country Risk Guide (ICRG) ratings. The ICRG provides a rating system to assess the political, financial, and economic risk of 166 countries (140 on a monthly basis and an additional 26 updated annually). The political risk rating is comprised of 12 separate components, including: democratic accountability, law and order, and corruption.

19. See Arbuckle and Drummond (2000).

20. See Uchida and Makino (2008).

21. See Jentoft (1989) and Pomeroy and Berkes (1997).

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.

24. Other than Iran, these countries have unfavorable ratings for corruption according to the ICRG.

25. Berkes (1986, 1992) explains that Turkish fishers who organize themselves into cooperatives can apply to the Turkish government for exclusive harvest rights in local areas.

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. The federal government remains responsible for setting overall allowed catch levels in coastal areas, however (Pomeroy and Berkes 1997).

28. 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, Gardner, and Walker (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 overusing 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.

29. Wilen (2004) describes the gains achieved by the Bering Sea pollock cooperative's ability to coordinate its members' fishing activity.

30. Falk, Fehr, and Fischbacker (2002) point out that communication can enable participants to reach the efficient outcome in coordination games.

31. See Deacon and Murphy (1997) for a more detailed description.

32. With this structure, the host government cannot renege on the fund without defaulting on its bonds.

33. See Deacon and Parker (2008) and Deacon (2009b) for further discussion.

34. This case is examined in Deacon, Parker, and Costello (2008).

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

36. For more detail on these policies and empirical tests, see Deacon, Parker, and Costello (2008).

37. 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.

38. Costello and Deacon (2007) provide further discussion.

39. This description relies on Arbuckle and Drummond (2000) and Townsend (2005).

40. 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 undersized 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).

41. Much of the following information is from Acemoglu, Johnson and Robinson (2003) and Iimi (2006).

42. Iimi (2006, 6–8).

43. In explaining the relative absence of British interference, Acemoglu, Johnson, and Robinson (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 South-West Africa (now Namibia).

44. Information on mining contracts and the use of revenues is from Iimi (2006, 10–11).

45. 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.

46. Information from the Marine Stewardship Council's web site, accessed on March 17, 2009 at: http://www.msc.org/track-a-fishery/certified.

47. Information is from SCS.

48. These nine cooperatives 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.

49. An agency of the National Commission on Aquaculture and Fisheries is in charge of issuing permits, policies and regulations and for compliance (see SCS, 9). Regarding the nature of the concessions, see Costello and Kaffine (2008).

50. SCS, 52.

51. SCS, 58.

52. 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.

53. This assessment is based on the Polity data base, http://www.systemicpeace.org/polity/polity4.htm (Marshall and Jaggers 2002).

54. Sumaila and Vasconcellos (2000) and Nichols (2005). Sumaila and Vasconcellos (2000, 459) report that 99 percent of the hake catch was by foreign fleets until 1985 and that the proportion was only slightly lower between that date and independence.

55. Sumaila et al. (2005, 1–2).

56. 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 onboard 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).

57. The following policy description relies on Nichols (2005) and Armstrong et al. (2005).

58. 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).

59. 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).

60. 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).

61. Dietz et al. (2002, 11–13).

62. 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.

63. See Agrawal (2002, 45).

Chapter 8

The political economy of development aid and marine fisheries reform

by

Mick Moore[*]

A neglected but crucial aspect of donor-assisted marine fisheries reform is linking any such reform to the political economy of development aid. This approach includes (a) actions that might be taken in poor countries, by their public authorities and the aid agencies that operate there; and (b) the scope for orienting development aid more toward regional- and global-level action. Based on my understanding of marine fisheries problems, development aid should support de facto changes in property rights regimes that provide greater incentives for fishers and other stakeholders to conserve fish stocks and marine environments and to harvest sustainably. It should also enable more effective monitoring and policing of fishers' harvesting rights, territorial waters and international agreements, notably to combat large scale, industrialized piracy of global marine resources, and the corruption with which it is often associated. There are likely to be wide variations in the extent to which local action can contribute to conserving marine resources without prior or simultaneous curbs on industrialized marine piracy.

The world of overseas development aid is fast changing, and, as such, it is important to distinguish between two broad categories of aid: *conventional* aid and *emergent* aid.[1] Conventional aid involves the transfer of resources from governments of rich countries to the governments of individual, poor countries to fund country-specific activities, through a wide and growing range of channels. In the subsequent discussion I present reasons why conventional aid is not a very effective instrument for dealing with marine fisheries problems. By contrast, emergent aid is more likely to be pooled at the regional or global level and to be directed at providing global public goods, including those in which rich countries have a direct interest. I am more optimistic about emergent aid for promoting fisheries reform

The problems in marine fisheries

Marine environments are complex and variable, as are the causes of resource mismanagement and depletion. The analysis and conclusions presented are based on the following broad understanding of these problems:

1. Most global fish stocks and marine environments are undergoing major, adverse changes and are in serious danger of catastrophic, irreversible declines that might inflict major economic, welfare, and dietary-cum-health costs.
2. Overexploitation results both from the activities of domestic fishers (including small scale fishers) and from large-scale, capital-intensive harvesting and processing operations ("industrialized fish piracy"), conducted by enterprises that, while legally registered in a variety of jurisdictions, are rooted dominantly in some rich and middle-income countries. In some poor countries, domestic fishers sell to (illegal) capital intensive pirate operators.

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3. Overexploitation of marine resources is characterized by a mixture of (a) harvesting excessive quantities of usable catch, (b) the waste of significant amounts of bycatch, and (c) the use of equipment and techniques that damage marine ecosystems.
4. This overexploitation reflects the inability of governments and the relevant international institutions to agree on effective rules and property rights for sustainable global fisheries and to police effectively those many rules and agreements that are in place.
5. Governments of rich countries—the source of most international development aid—are in varying degrees complicit in persuading the governments of some poor countries to open their coastal waters to industrialized overexploitation by foreign vessels.
6. The largest categories of visible losers from the current pattern of marine resource exploitation are poor people in poor countries: both fishers and protein-scarce consumers.

As a public policy problem, global marine overfishing is similar in structure to another issue of global public goods: climate change.[2] Both are very much "wicked problems," according to Jentoft and Chuenpagdee (2009), posing very significant threats, which are recent and evolving rapidly. They involve complex, ill-understood interactions within and among natural and human systems that vary widely over place and time and that are embodied in highly mobile biotic and inanimate entities. They routinely cross the boundaries of political jurisdictions and are caused by the aggregate overexploitation of global environmental assets.

In neither case, overfishing nor climate change, has mankind yet begun to suffer in a major way; most of the pain is anticipated rather than experienced. Yet climate change is now a big issue on national and global policy agendas, while marine fisheries are relatively neglected.[3] Why this difference in levels of policy attention within rich countries?[4] There are three possible reasons. First, rich country fisheries industries represent a small but powerful, physically-concentrated and vociferous interest group whose members are endowed with excess production capacity and habituated to investing a great deal in successful rent seeking and political lobbying for subsidies and lax regulation. Second, a clear beneficiary has emerged from the growing scarcity of marine products: the capital-intensive aquaculture industry has few incentives to focus attention on the policy failures to which it owes its existence and prospects. Third, the combination of (a) continual shifts to the harvesting of hitherto-underexploited marine species and (b) the reduced global transport and communication costs, that have provided high income global consumers with a wider variety of marine products on a more continuous basis, means that these consumers have not (yet) borne high costs in terms of price or availability of marine products. The implication is that rich countries cannot be regarded as especially highly motivated agents for the reform of the management of global marine resources, able and likely to give a positive lead to the poorer world. They are very much part of the problem.

In the fishing waters over which rich country governments have legal jurisdiction, overexploitation stems dominantly from a combination of weak property rights resulting in perverse incentives for fishers (Scott, this volume) and the political power of domestic fishing interests that results in a lack of support for effective regulatory structures, a collusive evasion of agreements and treaties, and the unwillingness of governments to enforce regulation by employing the coercive resources that they have available. By contrast, the fishing waters belonging to poor countries are much more likely to be exploited by foreign vessels based far away. The governments of poor countries have few naval resources, limited access to electronic surveillance information, and thus less capacity to use coercion to enforce regulation of their coastal waters.[5] In some cases, politicians and senior officials corruptly authorize industrialized fish piracy (Standing 2008).

There are likely to be two major components to any successful strategy leading to improved management of marine resources: (a) changes in property rights regimes to provide greater incentives for fishers to harvest sustainably and to conserve fish stocks and marine environments (the incentive component) (Costello, Gaines, and Lynham 2008); and (b) more effective monitoring and policing of fishers' harvesting rights, territorial waters, and international marine harvesting agreements, notably to combat large scale, industrialized fish piracy (the policing component).

It is likely that, in poor countries in particular, the viability of any incentive policy will depend on complementary improvements in policing. Otherwise, the persistence of industrialized fish piracy might overwhelm and negate the effects of institutional changes designed to encourage locally based conservation activities. There is little, if any, incentive for local fishers or governments to invest in conservation if foreign factory ships are likely to snatch most of the benefits.

The extent of interdependence between conservation incentives and effective policing depends on complex interactions at the level of marine biology that vary over time and place. For example, local action to conserve and promote fish stocks is more likely to be effective in regions like Southeast Asia, with its highly indented coastlines and extensive shallow continental shelf, than in most of Africa, where coastlines are less indented and the continental shelf is narrow. Species also matter. It is no coincidence that successful formal local fisheries self-governance or comanagement is much more frequent in the harvesting of more or less sedentary species (such as shellfish) than in the case of mobile finfish. Harvesting of sedentary species is more localized. It is easier to limit access to a small number of harvesters; harvesters have stronger incentives not to harvest sub-prime material; and, in some cases, artificial reseeding is easier and more rewarding (Townsend and Shotton 2008, 11-13).

The trajectory of overseas development aid[6]

Overseas development aid is as diverse and complex as marine fisheries. There are a very large—and fast growing (see below)—number of actors and stakeholders, with very different motivations, interacting in complex ways. Many of those interactions are visible only to a small number of people directly involved, who often have strong vested interests in conveying particular interpretations of events to the outside world. Scholars and commentators have addressed many different types of questions about aid, and produced a wide variety of answers. My perspective is broadly realist: I tend to assume that public action is motivated largely by self-interest and that people seek solutions to public policy problems that are grounded more in bargaining and cooperation among competing interests than in altruistic behavior. I differ from many rational choice realists in that I see public policy as being significantly driven not only by the material interests of definable groups but also by the drive and capacity of (public) organizations to impose their own interpretations (narratives, definitions of the situation) on policy issues in pursuit of the broad, long-term interests of the organizations themselves. Concretely, this means that the following propositions underpin my interpretation of development aid:

1. Because conventional aid is dominantly funded by the taxpayers of rich, democratic countries and is subject to annual legislative appropriations, it needs continuously to be justified and legitimated in terms acceptable to legislators, voters, and taxpayers.
2. Because the agencies that actually transfer and spend the aid are not significantly accountable for the actual outcomes of their activities in poor countries, but answerable mainly to their home legislatures for the procedures they follow and the way they represent their activities, they have considerable incentives and autonomy to frame and reframe understandings of aid and how it relates to economic development.
3. The main organizational conduits for aid—notably the bilateral aid agencies of OECD governments, international organizations of the United Nations family, including the World Bank, and large international development nongovernmental organizations (NGOs)—interact intensively with one another and tend to converge toward a common, albeit continuously evolving, set of narratives about their context, purpose, and mode of operation. In other words, there are strong elements of fashion about the aid business.

For present purposes, I distinguish between conventional and emergent aid. That distinction is best explained historically. Conventional aid has been the norm since the current aid business was initiated in the 1950s. It mainly takes the form of financial transfers from OECD governments to the governments of poor nations. Most transfers are direct, but some are mediated through international organizations, especially the United Nations family, including

the World Bank, and, more recently, international NGOs. Most of these transfers are made through specialist aid agencies—either national or one of several dozen UN agencies—that have some presence in the capital cities of the recipient countries. Typical "turf" and "boundary" arguments around conventional aid are whether technical assistance, humanitarian assistance, military assistance, and subsidies to private enterprises located in the donor countries,[7] should be considered as "real" aid and/or handled by aid agencies or some other organization as well as whether donor organizations focusing on large scale financing should be separated organizationally from those focusing on smaller scale project activity, including technical assistance. Within recipient countries, the equivalent recurrent arguments concern in particular the extent to which donor agencies should work through the existing organizations of the recipient government, bypass them, or try to reform them.

Four historical trends are important to my story. The first three can be summarized simply:

1. The aid business has become steadily more pluralistic (or fragmented), as measured in particular by the growing numbers of aid donors, agencies, and channels through which aid is disbursed. The numbers have grown much faster than the volume of aid. According to the widely cited figures produced by Kaul and Conceicao in 2006 (cited in Burall and Maxwell 2006, 1), the total number of financing mechanisms increased from about 60 in the 1955–1964 period to almost a thousand 1995–2004 period, with almost all the increase taking place since the mid-1990s in the form of new investment funds and philanthropic foundations. In the decade after 1995, the volume of aid almost doubled in real terms, while the number of financing mechanisms more than tripled. Between 1990 and 2007, the number of official aid projects multiplied eightfold, and the average financial value of each project declined to about one sixth of the 1990 figure in real terms (Frot and Santiso 2010, 14-15).
2. Since the aggregate volume of aid has increased while many middle-income countries have graduated" from recipient status,[8] the governments of a large number of the poorest countries, especially in Africa, have become very dependent on aid for their revenues.[9]
3. As a result of these two previous trends, many governments receive aid through a bewildering multiplicity of channels, to the extent that their capacity to coordinate and make good use of funds is seriously in question (Acharya, de Lima, and Moore 2006; Easterly and Pfutze 2008; Frot and Santiso 2010; Knack and Rahman 2004). Donor agencies have become increasingly concerned about this problem. Aid harmonization—the responsibility of aid donors to harmonize their procedures with those of recipient governments, as well as to better coordinate and share information—was a major theme of the OECD donors' Paris Declaration on Aid Effectiveness in 2005. The fruits seem slow in coming.

The fourth historical trend comprises shifts in the basis of domestic political support within OECD countries for public expenditure on overseas aid. Two major shifts have occurred since the 1950s. The Cold War was the dominant original stimulus for aid. Domestic companies were also recruited into the support base, through privileged access to aid-funded construction and procurement contracts, including the general practice of tying aid-funded procurement to enterprises located in the donor country. The end of the Cold War largely terminated that original military and security-based support for aid. It was replaced, inevitably through processes more variable and complex than can be conveyed in any summary account, by a reconfiguration of the support base around a more altruistic conception of aid as poverty reduction—as exemplified by the adoption of the Millennium Development Goals in 2001. Within donor countries, political support for aid shifted to the Christian churches; domestic and international development NGOs, that were funded through official aid budgets with increasing generosity; and the increasing population of consultancy firms specializing in overseas development. In some donor nations, notably the UK and the "like-minded" donor nations of the Netherlands and Scandinavia, this new coalition had considerable success in curtailing the use of development aid to subsidize domestic businesses through procurement and construction contracts.

The second shift in the character of domestic support for aid in OECD countries is recent and still seems to be in its early stages. Following increasing concern about the vulnerability of rich countries to threats like terrorism, illegal

immigration, epidemic diseases (Bird Flu, Ebola, SARS), and piracy originating or incubating in poor, ill-governed, and conflict-ridden regions, overseas aid is increasingly being viewed as one of a set of instruments to deal with the problems posed by globalization and global interdependence. In a partial reversion toward Cold War conditions, the language of the aid agencies is increasingly converging with that of foreign affairs ministries and security agencies, and operational coordination is becoming more frequent. In more formal terms, the declared purposes of aid increasingly are the provision of global public goods that benefit poor and rich countries alike—including, in particular, climate change mitigation and adaptation.

This shift in declared purpose, away from (just) poverty reduction toward global public good provision, is the first defining characteristic of what I term emergent aid. The second is the redirection of funding through mechanisms like the Global Environmental Facility, the Global Alliance for Immunization and Vaccines (against HIV/AIDS), the various programs of the Gates Foundation, and the Millennium Challenge Fund, that are focused on tackling generic problems, especially relating to health and the environment, through open-ended means. They are not obliged to channel money through the governments of poor countries. The third defining characteristic is the rapid growth of private philanthropy, most visibly through the Bill and Melinda Gates Foundation. Coincident with these shifts is an increasing concern with testing and demonstrating alternative ways of using aid to achieve measurable goals.

I turn in the next two sections to explaining why conventional aid is not a very good instrument for tackling problems of marine resource management, and why we can be more optimistic about emergent aid.

The limitations of conventional aid

Thousands of aid-funded fisheries projects have been implemented in developing countries in recent decades.[10] I know of no overall evaluation but have a strong impression that the outcomes generally have been dismal. [11] Why? I see three likely reasons:

1. The intrinsic obstacles to effective public interventions—especially those driven by development aid—in complex, small-scale, diverse production systems.
2. The orientation of conventional aid systems more toward humanitarian and social welfare objectives (disaster relief, health, education) than toward enhancing direct production capacity.
3. The fragmented character of aid interventions.

In exploring each reason, I look at the incentives and constraints facing the two most influential sets of stakeholders, aid agencies and recipient governments.

Intrinsic obstacles to effective public intervention

The staffs of government agencies find it difficult to engage effectively with what I term *inaccessible production systems*; that is, production systems that are small scale, complex, deeply embedded in diverse local natural and social environments, remote, scattered, difficult to access physically, and populated by producers widely separated from government employees in terms of culture, educational experience and language. Diagnosing and prescribing solutions for these interacting series of disconnections has been a major theme in the study of (rural) development in poor countries for decades. The problems of disconnect are significant, for example, in the domain of small scale irrigation, worse in relation to pastoralism, and even more severe in relation to marine fisheries.

Inaccessible production systems are prevalent in poor countries and so too is aid funding of public programs. If not well managed, development aid operates in a very "impatient'" fashion, and exacerbates the inherent tendencies of public agencies to promote simple, standard interventions—and even to construct problems for which they have

tailor-made solutions. Aid agencies often have a great deal of money, and generally are under pressure to spend it. Especially in the institutionally fragile poorest countries, in-country aid agency offices often exercise a great deal of influence over public policy. Unencumbered by much accountability to the people they are intended to benefit or for the final outcomes of their interventions, aid agencies can be very responsive to consultants, ideologues, and consultant ideologues eager to promote their own solution to (assumed) problems. If those solutions benefit one socioeconomic interest over another, a powerful rent-seeking coalition may emerge. For example, if solutions involve the allocation of formal property titles where none currently exist, the strong will usually line up in support, knowing that they are likely to be able to use formalization to appropriate the de facto property rights of the weak.[12]

The pattern of public interventions into the pastoral economies of Africa just before and after decolonization provides many well-researched examples of combinations of impatient interventions, the invention of problems and diagnoses to fit the solutions available, and rent seeking. Bore wells sunk in the belief that herders needed easier access to water led to excessive local concentrations of livestock and pasture degradation. Attempts were made to impose standard four-month rotational grazing in environments where weather conditions were very variable over space and time. The simplistic theory of the inevitable tragedy of the commons was used to justify the privatization of rangeland, often with adverse effects on productivity, sustainability, and equity. The fundamental fallacy underlying all these interventions was the notion that "Western" equilibrium institutions, including elaborated property rights and territorially-based systems of public administration, could and should be introduced into complex biological and social systems that rarely were in equilibrium but undergoing constant adaptation (Scoones 1995).[13] Scoones (1995, 3) summarizes the outcome:

> The last 30 years have seen the unremitting failure of livestock development projects across Africa. Millions of dollars have been spent with few obvious returns and not a little damage. Most commentators agree that the experience has been a disaster, so much so that many donors and other international agencies have effectively abandoned the dry zone in their development effort.

There is some evidence that small-scale fisheries in poor countries sometimes receive similar treatment today (Mantjoro 1996), but their inaccessibility—to outsiders of all kinds, including researchers—relative even to pastoralism may mean that there are fewer critics able to dish the dirt convincingly. In the absence of good evidence, one should assume that public interventions in marine fisheries in poor countries, especially those funded by aid, generally have not been well judged.

Low priority for marine fisheries

If I am correct on the previous point, then I should surely not be too worried about the relative lack of attention to marine fisheries. It seems inconsistent to complain both that lunch tasted awful and that the portions were too small. My concerns about priority, however, relate less to levels of expenditure on fisheries by aid agencies than to the quality of their attention to the sector.

The underlying issue here is not that marine fisheries in particular have received low priority from aid donors but that productive activities generally receive low priority. The roots of the modern aid business lie in the Marshall Plan to assist Europe after World War Two. This was heavily focused on rapid restoration of production capacity. Assistance from the Soviet Bloc to developing countries during the Cold War also concentrated on production, mainly in the manufacturing sector. Early Western aid to developing countries had a substantial production emphasis, including on agriculture and infrastructure. There has, however, been a steady shift away from economic sectors (production and infrastructure) toward social sectors, especially health and education, support for governance and civil society, and humanitarian relief in response to conflict and natural disasters. Data held by the Development Assistance Committee of the OECD relating to development aid from all sources indicates that in 1978 the ratio of the value of aid to economic sectors relative to social sectors was 4 to1; by 2004 it had been completely reversed, and stood at 1 to 4 (Killick and Foster 2007, 182; see also Frot and Santiso 2010, 15-19). Part of the reason is the ending of Soviet Bloc aid. But the Western aid donors have also switched emphasis. There are, for example,

frequent complaints about the reduced size of the World Bank's agriculture portfolio. One reason for the shift is the relegitimation of the purposes of Western aid that took place after the end of the Cold War. Support to production and heavy infrastructure made sense when (a) the primary justification for aid was to encourage economic growth to rescue countries from the threat of Communism (from a Western perspective) or to demonstrate the advantages of central planning under socialist rule (from the Soviet perspective); and (b) national companies looking for procurement and engineering contracts were an important part of the support base for aid. After 1990, different narratives—about curing poor sick people, sending poor children to school, and succoring refugees—were needed to elicit the enthusiastic support of the Christian churches and the development NGOs for continuing large, official aid programs. This was the era of the Millennium Development Goals that, while they did include an aspiration to increase incomes, have dominantly been understood in terms of the aims to improve access to schooling, reduce mortality and ill-health, and reduce gender inequalities. In addition, donors find it easier to disperse large quantities of money through large public sector health and education bureaucracies than to deal with the complexities of fisheries, agriculture, and other small scale production sectors (Frot and Santiso 2010, 18).

If the problem were simply a matter of the dearth of financing for marine fisheries or other production activities, it might be relatively easily to reverse. However, my experiences with and conversations about aid agencies of all kinds—official multinational, national, or NGO—leave me with a strong impression that something else significant has happened that would make it difficult for most aid agencies to be very effective in fisheries (or other production activities). The shift away from financing production activities, combined with the global tendency to contract out implementation activities to commercial firms or NGOs, has substantially changed the character and capacities of the staff recruited to or retained in aid agencies (and large NGOs).[14] The ability to explain and justify activities to funders, legislators, taxpayers, and voters has taken increasing precedence over the capacity to deliver aid "on the ground." Few aid agency staffers have, or continue to practice, technical expertise in accountancy, agronomy, aquaculture, engineering, medicine, transport management, veterinary science, an so forth. Their strengths lie rather in more generalist bureaucratic and political skills, including administration, economics, finance, management, and, overlying all these, the capacity to engage effectively in abstract debate through verbal and symbolic representation that is so important to organizations that need to legitimate their activities in the face of continuous scrutiny and skepticism. This bias interacts with the fact that aid offices in poor countries are still run largely by expatriates who serve in one place no more than four years at most and on average much less. Both the political incentives and staff mobility are especially congruent with abstract, universalistic task definitions: "governance" and "rights-based approaches," rather than with seasonal shortages of veterinary drugs or outdated road maintenance manuals.

Despite the obstacles arising from the organizational trajectory on which they have embarked, aid agencies would better be able to orient themselves to focus on supporting production activities if there were more pressure to do so from the governments receiving aid. Those recipient governments, however, have generally acquiesced in the shift of aid away from production. Part of the reason may be that, being so dependent on aid even for their own revenues (see endnote 9), they may have limited power to contest the donor consensus, but there is another dimension to that high aid dependence: governments of many of poorest countries are not desperate for additional revenues. Like all governments, they would tend to seek more revenue if they could achieve that at low cost. There are two main ways of increasing revenue. The first is to tax at higher rates. That rarely makes government popular and might impact adversely on ruling elites in particular. The second is to promote economic growth and thus increase revenues semi-automatically. But to do that requires investments in technical and organizational capacity. Once national poverty itself has become a prime criterion for entitlement to large amounts of aid and aid donors make it clear that they are especially keen to see progress on the more measurable of the Millennium Development Goals in the fields of health and education, recipient governments face only muted incentives to invest scarce political and organizational resources in promoting production and economic growth, including in fisheries.[15]

Fragmented aid interventions

Effective solutions to contemporary marine fisheries problems will involve institutional change to promote more sustainable harvesting and to better protect stocks against industrial fish piracy. Those solutions imply action at

global and regional levels rather than (just) at national and local levels. The conventional aid system, by contrast, is significantly geared to the opposite types of intervention: (a) to distributing subsidies (subsidized boats and equipment, publiclyfunded cold stores) rather than promoting institutional change; and (b) to small-scale, local interventions.[16] In making that judgment, I will no doubt appear to be dismissing many efforts by many people actually to promote the right kinds of reform. That is not my intention. My purpose here is rather to explain an important part of the aid story: the prevalence of what I am summarily labeling "fragmented aid interventions."

There are three reasons why aid agencies have tended to support fragmented interventions, in general as well as in the case of fisheries:

1. Most of the main aid-donor countries are themselves either implicated in industrialized fish piracy or, as is the case with members of the European Union in particular, conspicuously unable to design or police sustainable harvesting systems for their own fishing areas. They are ill-placed, in terms of experience, economic interests, and moral and political standing, to give priority to the global public-goods aspects of any support they might give to marine fisheries in poor countries.[17] It is much easier and less controversial to spend the money on, for example, constructing toilets and other visible community facilities in poor fishing communities.
2. Conventional aid is still to a high degree allocated to individual recipient countries. Indeed, in recent years there has been an increasing rhetorical emphasis on what is usually termed (recipient country) *ownership*. This is the first item in the 2005 Paris Declaration on Aid Effectiveness. The rhetoric reflects some real concerns about the abuse of national sovereignty by aid donors/agencies and the tensions that arise when aid is legitimated in terms of the altruistic concerns about the plight of poor people yet remains largely under the control of rich-country aid agencies. The motives behind this emphasis on national ownership are generally laudable; the consequences are, however, questionable. If aid is clearly owned by individual recipient governments, it becomes more difficult to use it to provide cross-border public goods of any kind, including even international highways in Africa, let alone something as intangible as regional fisheries institutions.
3. The actual spending of aid has become increasingly fragmented over the years as the number of aid donors—and even more the number of aid channels and instruments—has increased faster than aid volumes. There is now a large stock of statistics and anecdotes about the extent to which political leaders and public servants in aid-recipient countries disperse their energies in dealing with large numbers of aid donors, who employ different procedures and operate more or less independently of one another within the same jurisdiction. The following excerpts from World Development Reports 2001 and 2003 illustrate:
4. At one point there were 405 donor-funded projects in the Mozambique Ministry of Health alone. In the early 1990s in Tanzania there were 40 donors and more than 2000 projects. In Ghana during the same period 64 different government or quasi-government institutions were receiving aid (World Bank 2001, 193).
5. Developing country borrowers, for example, must produce 8,000 audit reports every year for multilateral development banks, with the World Bank accounting for 5,500 such reports. Tanzanian government officials have to prepare about 2,000 reports of different kinds and receive more than 1,000 donor delegations each year (World Bank 2003, 207).[18]

Most aid donors recognize these problems. In recent years, there has been a flurry of meetings and declarations around issues of coordination and harmonization among aid donors and recipient governments. There have been strong expressions of support for the sectoral pooling of aid by groups of donors at country level, such that, for example, all aid to agriculture in Nepal might be combined and managed jointly. However, both the transactions costs and the practical obstacles to cooperation among aid agencies are high.[19] In addition, a few donors, most notably Britain, have responded to the problem by dispersing significant amounts of aid through general budget support, untied to particular sectors or activities, thus, in principle, much less demanding in terms of transactions

costs. The political risks to the donor of general budget support are such that its limits have probably been reached. In the meantime, because the number of channels for aid has continued to rise faster than the amount of aid (above), the underlying problems of fragmentation of aid may be worsening.

I have given three reasons why conventional aid is not well suited to supporting the kinds of high-level institutional reforms that are required to make a serious dent in the problems of depletion of marine fisheries resources. The problem, however, lies deeper: in the weak motivation and limited capacity of the governments of many of the poorest countries to perform any better.[20] From the perspective of current concerns, the most important unifying characteristic of these polities is the weakness of public authority: the fact that governments tend to be seriously deficient in terms of fundamental governance resources, including legitimacy, the political capacity to aggregate and represent interests and to reconcile differences, and effective public service structures. Such states tend to score low in measures of democracy and to be, at best, weakly responsive to the needs or expressed wants of the bulk of their populations. They tend to perform badly the core tasks of states: providing protection from external threats and managing external relationships; peacefully resolving internal differences and conflicts; and providing and encouraging the provision of collective goods and services. In these circumstances, we should be pessimistic about the prospects that national governments will take initiatives to resolve effectively collective action problems around coastal fisheries—and even more pessimistic about their ability to do this by granting formal property rights in coastal fisheries. In poor countries, the marine fishers who suffer most livelihood deprivation through the overexploitation of marine resources tend to be very poor and not to constitute well-organized interest groups able to command policy attention in polities that anyway are generally unresponsive to citizens' interests and needs.[21]

In addition, we are talking of countries that typically lack unified systems of law and policing characterized rather by legal and policing pluralism. The formal government courts might deal with only a small proportion of cases that obtain some kind of judicial hearing, with most coming under the purview of various kinds of "traditional" or alternative courts or authorities organized under the aegis of formal or informal "chiefs," community or ethnic groups, religious organizations, or the formal administrative apparatus of government. Differing judicial authorities might be in competition with one another. Coordination between formal state courts and the apparatuses of enforcement (police, bailiffs, prison authorities) might be weak.

To varying degrees, those seeking judicial support might engage in forum shopping, choosing the judicial venue most likely to be their advantage and on occasion changing venues. The situation in respect to policing is similar (Baker 2008). In these circumstances, the writ of national legislation assigning property rights in coastal fisheries might not run very far, not least because this will typically involve a reassignment of existing de facto rights. Coastal fisheries in poor countries seem rarely to constitute open-access resources. There are varieties of regimes, each with more or less effective enforcement systems to restrict access and therefore to grant some de facto access rights to some fishers. National legislation would likely conflict with these (relatively) informal arrangements, but typically it would not be more enforceable.[22]

Conclusion

Marine fisheries in poor countries have been subject to many aid interventions of many types, including direct production support, technical assistance, legislative change, and institutional development. I have argued that conventional aid instruments generally are not very effective in dealing with marine fisheries issues. Those instruments are too much driven—and fragmented—by the bureaucratic and organizational needs of the donors and insufficiently sensitive to the complexity and diversity of marine fishing systems. But fixing those problems should have a lower priority than dealing with two major political economy problems arising from inappropriate institutions. The first, treated extensively in this volume, is the dearth of the kinds of property rights for fishers that would provide adequate management and conservation incentives. The second is the problem of industrial fish piracy. This is particularly serious along the coastlines of the poorest countries of the world, notably sub-Saharan

Africa. With a few exceptions, most notably Namibia (see footnote 5), governments have little capacity to police effectively the use of their own territorial waters. The granting of property rights to local fishers is less likely to lead to the positive results achieved off Alaska, Canada and New Zealand if industrial fish pirates can continue to harvest with impunity or can illegally buy produce from local fishers at prices that encourage them to maximize incomes in the short term.

Industrial fish piracy persists because of the dearth of effective collective action among even the governments of the rich world. Beholden to competing "national" fishing interests, the governments of the European Union cannot even manage their own marine stocks sustainably. They use "aid" agreements with African and Pacific countries to give European fishing vessels privileged access to already overfished territorial waters in the Southern Hemisphere. Rich countries collectively have exhibited much less interest in effectively managing the global marine commons than in dealing with global climate change. Curtailing industrial fish piracy around the coastlines of the poorest countries—and thus permitting property rights regimes to work as they do in Alaska—requires a clear recognition, followed by action, that this is part of a collective, global problem. The likelihood of generating adequate concern and support for marine resources management will increase if the problem were framed, like climate change, as one of global public goods in which most of the world has a stake and not (only) a matter of poverty somewhere else in the world.

We can, therefore, be moderately optimistic about the possible effects of the current trends in international aid summarized above.[23] Aid is increasingly focused on global public goods. It is more and more channeled through funding mechanisms with regional and global—rather than national—remit. Private philanthropy, which generally comes with a strong focus on rigorous performance measurement and tangible results, is now large enough to pose a competitive threat to official aid agencies.[24] In sum, international aid is increasingly directed toward global issues and performance measurement. In dealing with the problem of overexploitation of marine fisheries resources, aid is likely to be more on target in the future than in the past and to support, rather than to supplant, essential property rights reforms.

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Endnotes

1. The language is mine, but the inspiration comes from Severino and Ray (2009).

2. Barrett (2007) usefully explores the comparative political economy of different global public goods.

3. A recent Google search on "climate change" generated 50 million hits, while the search on "fish stocks" produced less than a million.

4. There appear to be no significant differences at the level of political organization. True, the Intergovernmental Panel on Climate Change seems to have much greater stature than the International Union for the Conservation of Nature or the World Fish Centre, but that probably reflects rather than explains the greater salience of the climate change agenda. It is also true that, if the more pessimistic plausible scenarios are valid, climate change will inflict more pain on humankind than marine fisheries depletion. But the seriousness of the marine fisheries problem has been more evident for a longer period of time, and, at least until very recently, the probability that the pessimistic scenarios would prove valid seemed much greater. From a logistical perspective, it would be much easier for empowered world authorities to vanquish the relatively small number of actors who currently plunder our marine resources than to effect a significant reduction in the human contribution to climate change through changing the ways in which most of the world manufactures, generates and uses energy, moves people around, and keeps them in comfort.

5. Contemporary Namibia is sometimes cited as a poor country with a successful national fisheries policy. Physical conditions there are, however, quite specific. The marine fishing business is new. It is relatively easy to monitor catches because there are only two fishing harbors. And natural patterns of marine upwelling substantially isolate Namibia's fish stocks from those of other countries (Deacon, 2009: 26).

6. Among the many sources that shaped this section, I would cite in particular Birdsall (2004); Easterly and Pfutze (2008); Martens (2005); and Severino and Ray (2009).

7. For example, through the tying of aid to procurement of goods and services in the donor country and through direct subsidies to companies constructing infrastructure in recipient countries.

8. And can no longer obtain it as a by-product of Cold War competition for "friends" in the South.

9. Making a number of assumptions to overcome the problems of the lack of reliable fiscal information for very poor and aid-dependent countries, Adrian Wood (private communication, 2008) estimated that in 2006, there were 31 countries with populations of more than a million whose governments received aid equivalent to 50% or more of the tax revenues they raised. Of those 31 aid-dependent countries, 17 also appear in the Brookings list of the 31 weakest states in the world—again excluding countries with populations of less than a million people (Rice and Patrick 2008). Those 14 countries in the Brookings list of the 31 weakest states that were not heavily aid dependent were either significant oil or mineral producers (Angola, Chad, Republic of Congo, Equatorial Guinea, Guinea, Iraq, Sudan, Togo, and Yemen), "pariah states" that the international community is not willing to aid (Myanmar, North Korea, and Zimbabwe), or in so much internal turmoil that large official aid programs are not possible (Cote d'Ivoire and Somalia).

10. PROFISH documents refer to more than 5,500 fisheries-related development projects since 1950.

11. This section builds in part on the paper 'Evolution of Fisheries Development Assistance' by Bjorn Hersoug presented at the PROFISH Forum 2007.

12. See, for example, Musembi (2007) and Woodruff (2001). Formal property rights regimes are in part dependent on effective systems of identity registration. These are lacking in many contemporary poor countries (Szreter 2007). Conversely, formal privatization of land rights has sometimes been welcomed by pastoralists as a means of protecting their territories against encroachment (Mwangi 2006; Oxby 1981). The effects of land titling depend very much on context (Kanji et al. 2005).

13. See also Cullis and Watson (2005), Lane and Moorehead (1995), Sandford (1983), and Swift (1995).

14. For example, professionals with experience of marine fisheries in poor countries are scarce globally.

15. Also, particularly fierce political opposition would be likely to greet any attempt by governments of poor

countries to raise revenue directly from fishers in return for (stronger) protection of their harvest rights. Governments that have tried to charge poor people for irrigation water or urban drinking water have often found themselves accused of trying to make money out of things that God gives free.

16. Thanks to Dan Gustafson for reminding me of the extent to which the international response to the 2004 Asian tsunami focused on providing replacement boats and gear for fishers, and thus exacerbating overcapacity.

17. Norway and the Norwegian aid program provide the most conspicuous exceptions to these general claims.

18. See also Acharya, de Lima and Moore (2006) and Burall and Maxwell (2006, 3).

19. See also Acharya, de Lima and Moore (2006).

20. I am here referring not to the traditional category of 'developing countries', which now includes a number of successful, fast-growing economies whose governments exercise considerable influence in the world. I refer rather to the countries of which Paul Collier (2007) wrote in his highly successful book *The Bottom Billion*—the poorest countries, especially those with smaller populations, those cursed with significant oil, gas, mineral or diamond extraction activities, those receiving large quantities of development aid relative to their incomes, and those most likely to be labeled as failed states, fragile states, shell states, shadow states, weak states, collapsed states, Low Income Countries Under Stress, or Fragile and Conflict-Affected Countries. These *Bottom Billion* states are located mainly in sub-Saharan Africa, but found also in the Andes, Central America, the Caribbean, Central Asia and the Caucasus, the Middle East and Southeast Asia.

21. It is striking how much literature exists on fisheries issues, policies and politics in the South Indian state of Kerala. This seems to reflect unusual historical circumstances: a relatively large fisheries sector in a densely populated coastal state long known for the strength of Communist political parties and social movements; the high level of general politicization; and considerable investment since the 1960s in groups related to the Catholic Church in organizing fishers. In 2007, the state legislature passed the Kerala Monsoon Fishery (Pelagic) Protection Act, recognizing the harvesting rights of "traditional" fishers.

22. This may be one reason why, in most poor countries, governments that have attempted to reform local marine fisheries management have intervened through what are conventionally labeled 'co-management' arrangements, that involve government agencies (a) engaging in joint action with groups of fishers; (b) deploying public authority in a mode that is more informal than legal-bureaucratic; and (c) to the extent that they recognize fishers' rights at all, recognizing (rescindable, nontransferable) regulatory rights to the harvest rather than a wider spectrum of property rights (to re-assign use, sell, inherit, and so on).

23. See especially Severino and Ray (2009).

24. They have responded by showing more interest in performance evaluation. Randomized trials of aid interventions are very much in vogue. The International Initiative for Impact Evaluation was established in 2007.

Chapter 9

The political economy of wildlife management in East and southern Africa

by

Fred Nelson[*]

Wildlife is one of the most valuable natural resources in sub-Saharan Africa, particularly East and southern Africa where the largest and most spectacular wildlife[1] populations reside. The abundance and diversity of large mammals, native to the region's savannahs and grasslands, provides the basis for tourism. Tourism industries are major contributors to national economies and leading sources of foreign investment and revenue. Wildlife utilization provides additional income from activities such as trophy hunting and harvesting such products such ivory, hides, and meat, all of which are important in commercial terms as well as, in the case of bushmeat, for food security and subsistence values.

Beginning in the colonial era, wildlife management in Africa has generally been based on regulating modes and levels of utilization through government ownership of wildlife and on establishing protected areas managed by the state where wildlife is the top management priority. One result of these policies, combined with the economic value of wildlife through tourism, is that African countries have high proportions of their total land area designated as federally protected areas for wildlife—up to 30 percent in contemporary Tanzania. Despite such measures, most African governments have been unsuccessful at sustaining wildlife populations. Large mammal populations across much of the continent continue to contract in both number and distribution (Caro and Scholte 2007).

Underlying these wildlife declines is the perverse incentive structure created by the existing management regime. Because the state owns the wildlife and controls utilization in most countries, rural landholders have no rights to wildlife use and hence are not legally guaranteed returns from investing in wildlife as a form of land use. This is even the case in areas where wildlife is more sustainable and profitable than alternative agricultural land uses in semiarid and arid areas. The combination of no guaranteed return and substantial costs created by species such as elephants that destroy habitat or lions that kill livestock creates an incentive for local landholders to replace wildlife with other land uses (Emerton 2001).

In addition to perverse landholder incentives, another factor negatively impacting wildlife is illegal poaching and the inability to deal with it effectively. Government's limited capacity to prevent poaching renders wildlife a *de facto* open-access resource. As a result, patterns of wildlife harvesting across rural Africa are generally unsustainable, with few incentives for collective or individual investments in sustainable use (Nasi et al. 2008).

In contrast to this general pattern of depletion, a number of southern African countries provide important illustrations of how certain institutional reforms can prompt more sustainable patterns of wildlife utilization, leading to both more wildlife and more wildlife-based economic activity. Namibia, South Africa, and Zimbabwe all carried out reforms during the late 1960s and early 1970s that effectively granted proprietorship of wildlife on private

[*] This chapter draws on a collaborative research project supported by various organizations. For details, see Nelson, forthcoming, in the references. The analysis and views provided here are mine alone and should not be attributed to those organizations. I wish to express thanks for the comments on an earlier version of this paper received at PERC's Political Economy Forum held in Montana in May 2009, and to PERC and the World Bank for inviting and supporting my participation at that event.

freehold lands to the landholders themselves. These reforms led to a dramatic increase in wildlife on private lands as ranchers increasingly opted to replace or complement livestock production with game production (Child 2004; Suich, Child, and Spenceley 2008). After Zimbabwe and Namibia transitioned to majority rule in 1980 and 1990, respectively, policy-makers extended the devolution of wildlife on private freehold lands, which had until then been synonymous with white-owned lands, to the communal lands where the bulk of the rural population lived. In both countries these later reforms worked to further enhance wildlife's economic value in rural areas and thereby to create new local incentives for conservation (Jones and Murphree 2001).

The relative success of some southern African countries' devolved wildlife management and property rights regimes also highlights the central challenge facing natural resource governance across the region. Institutional reforms that promote secure private rights to utilize and benefit from wildlife remain exceptional across the region despite their empirically demonstrated advantages. In the majority of countries, proprietorship over wildlife remains centralized (Shackleton et al. 2002; Jones and Murphree 2004). Many countries have spent the past two decades, and millions in external donor funding support, ostensibly working toward reforms. In some cases, the rhetoric of government policy-makers and donor agencies espouses decentralization of wildlife management ,while at the same time actual regulatory and legislative changes have served to reconsolidate central authority (Nelson, Nshala, and Rodgers 2007). Such wildlife-sector reform processes across sub-Saharan Africa are in many respects emblematic of broader experiences with natural resource decentralization efforts throughout Asia, Africa, and Latin America (Ribot 2004).

The political and economic dimensions of wildlife governance in African nations underly the failure of many reform programs to catalyze the intended institutional changes. Reform efforts tend to emphasize the public gains to be realized by decentralizing wildlife management, in terms of more sustainable and widespread wildlife populations, rural economic opportunities, and increased national investment in wildlife-based commerce. However, the construction of African wildlife governance institutions is driven largely by private interests within central government, which revolve around controlling the appropriation and allocation of wildlife's economic value for purposes of patronage and clientelism (Gibson 1999; Nelson and Agrawal 2008; Nelson, forthcoming).[2] Reform efforts that seek to enhance wildlife's economic productivity and promote local incentives for sustainable use tend to be in direct confrontation—sometimes quite violently—with a wide range of political economic interests straddling the public-private divide. Furthermore, these interests are often informal and largely hidden from formal legalistic policy processes.

Efforts to support institutional reforms to wildlife governance in the fifty countries and territories of sub-Saharan Africa need to formulate strategies based on a more accurate appraisal of the interests and motivations of different groups in a given political setting than has generally occurred to date. There are numerous examples across the region of large-scale donor-funded reform initiatives that seek to support the adoption of devolved wildlife governance models with little apparent appreciation of the political implications of such reforms, and the inevitable roots of resistance to such measures. The result is considerable investment in reform efforts that are strategically inoperable and that ultimately do not produce the intended results. While East and southern Africa have produced a range of promising models for local natural resource governance, greater attention needs to be placed on developing better models for achieving the decentralized proprietorship that underpins local investments in wildlife management and conservation. Such models will need to differ from the past approach of routing large volumes of external funding through central government agencies, which have demonstrated their inability to achieve reforms.

Historical patterns of wildlife use and management in Africa

Contemporary patterns of wildlife governance in Africa vary considerably but are predominantly derived from the transformative experience of European colonization. Wildlife governance systems instituted during the colonial era were part and parcel of the broader objective of centralizing direct and indirect control over African resources to serve European economic interests (Neumann 1998; Mandondo 2000).

Colonial regimes placed regulatory restrictions on wildlife utilization, with the first licensing systems developed in the late nineteenth century to control hunting (Marks 1984). Colonial authorities also created the first wildlife "reserves." Initially this meant that hunting was restricted in these areas but as regulatory measures became more restrictive and Africans were banned from owning firearms, effectively only Europeans had the right to utilize wild animals. State protected areas such as national parks and game reserves also expanded steadily throughout the first half of the twentieth century, gradually tightening restrictions on land use and residence so that Africans were steadily displaced by the expanding wildlife conservation estate (Adams 2004).

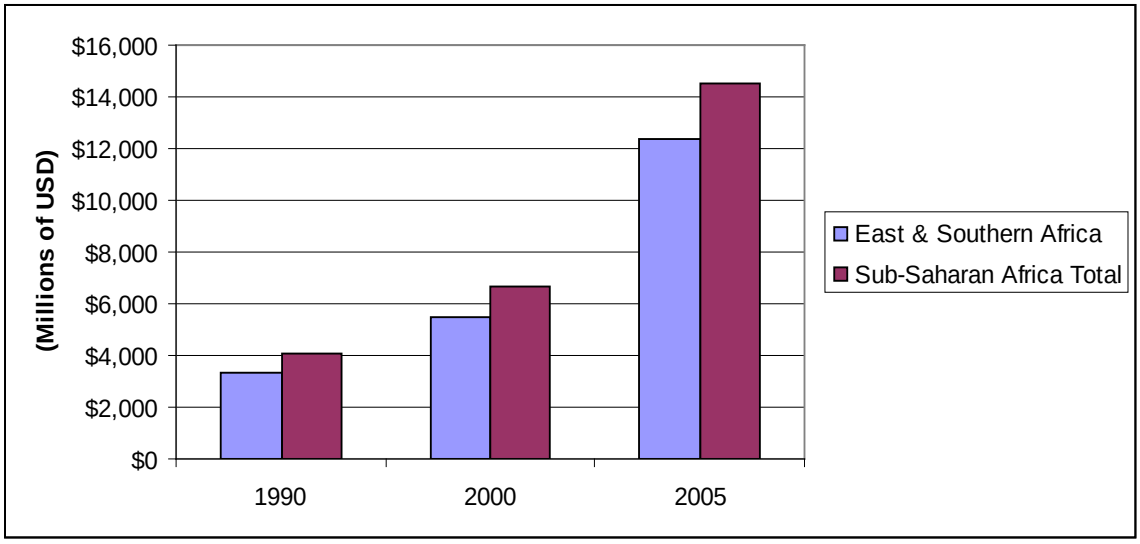
The post-independence African governments that came into being in the late 1950s and 1960s not only maintained but generally reinforced wildlife conservation measures along colonial lines; increasing the size and number of protected areas and further restricting wildlife utilization (e.g. Gibson 1999; Nelson, Nshala, and Rodgers 2007). Similar to the colonial era, broader political objectives influenced the continuity of post-independence wildlife policy. African regimes in the 1960s and 1970s almost uniformly sought to further centralize political authority. The reasons for this varied. In some cases, African states degenerated into factional struggles, or what Allen (1995) calls a "crisis of clientelism," over the control of public resources central to constructing the patronage networks that allowed rulers to maintain their authority (Ake 1996). In such cases, centralized control over valuable natural resource such as wildlife, forests, fisheries, and land was politically expedient and decentralization antithetical to patrimonial objectives. In addition and more relevant to more stable developmentalist countries such as Zambia and Tanzania in the 1970s, post-colonial Africa's prevalent socialist ideologies called for central consolidation over productive resources and economic activity, which often extended to wildlife and related industries such as tourism and trophy hunting.

The historical forces that have shaped wildlife management in Africa are highly salient to contemporary reform efforts because they create a legacy of both ideas and vested instrumental interests that continue to shape patterns of wildlife governance. The progressive centralization of authority over wildlife since the onset of colonialism has meant that both bureaucrats and citizens often assume that wildlife is best managed as a public good, under the direct allocative and tenurial authority of the state. Just as importantly, there are well-established commercial relationships between central authorities exercising proprietorship over wildlife and private companies that depend on access to wildlife. Informal rent-seeking[3] interests and formal state proprietorship may create strong incentives for perpetuating centralized wildlife management systems, particularly where the value of wildlife is high, administrative accountability is low, and management decisions are made regardless of trends in wildlife populations (Nelson and Agrawal 2008; Nelson forthcoming).

Divergent paths: Wildlife management outcomes in East and southern Africa

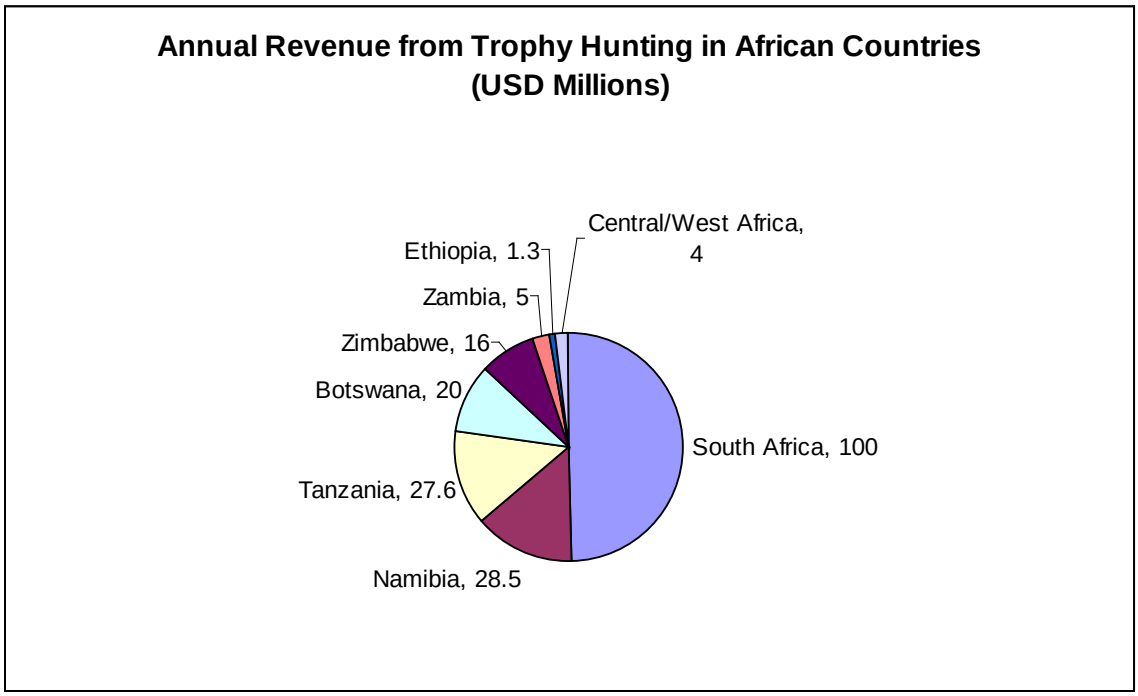
The countries of East and southern Africa[4] contain most of Africa's wildlife. For example, these regions together contain 92 percent of the lions left on the continent and more than 80 percent of Africa's known elephant population (Bauer and Van Der Merwe 2004; Blanc et al. 2007). The preponderance of Africa's wildlife in these regions results in the most tourism investments in sub-Saharan Africa. In 2005, about 85 percent of sub-Saharan Africa's total international tourism receipts of $14.5 billion, up from just over $4 billion in 1990, were realized in East and southern Africa (figure 9.1). Similarly, nearly all of Africa's trophy hunting industry, which generates more than $200 million annually in direct revenue from wildlife, is based in these regions (figure 9.2).

Figure 9.1: Tourism receipts in sub-Saharan Africa in total, and in East and southern Africa combined, from 1990 to 2005



Source: UNWTO 2007.

Figure 9.2: Annual revenue from trophy hunting in sub-Saharan African countries.



Source: Lindsey, Roulet, and Romañach 2007.

While both the eastern and southern regions retain a rich wildlife resource and increasing levels of wildlife-based tourism investment, they exhibit important variations in their wildlife governance institutions and management outcomes. This variation amounts to several long-term comparative experiments in wildlife governance undertaken by different countries and provides valuable empirical experiences for evaluating wildlife management policies and practices across regions on environmental and economic grounds.

Southern African exceptionalism

Southern Africa is the continent's leading region in terms of experimenting with devolved and decentralized modes of wildlife governance. The first key reforms occurred in Namibia and South Africa in the late 1960s,[5] when freehold landowners were granted conditional proprietorial rights over wildlife on their lands. More sweeping ownership of wildlife on private freehold lands were given to farmers and ranchers in Zimbabwe (then Rhodesia) in 1975 legislation. At this time, freehold land ownership in all three countries was restricted to whites, and black Africans were largely consigned to residence in communal lands owned by the state. These wildlife governance reforms were radical changes from prior centralized management regimes; although it is important to emphasize their context as measures propagated by racially-based minority regimes that applied only to lands owned by the enfranchised portion of the population.

In terms of wildlife distribution patterns, the impact of these devolutionary changes was unambiguous. Wildlife on private lands in Namibia increased by an estimated 80 percent in abundance from 1972 to 1992 (Barnes and de Jager 1995). In Zimbabwe and South Africa, wildlife production expanded rapidly, with more than 100,000 km^2 combined being devoted in the two countries over the next thirty years (Child 2004). Rare species, such as white and black rhinos, increased steadily on private lands in Southern Africa to the point where South Africa, Namibia, and Zimbabwe contained more than 90 percent of all rhinos in Africa by the 1990s (Nelson 2006).

The experience on private freehold lands provided the basis, both conceptually and empirically, for extending reforms devolving authority over wildlife to communal lands residents in Zimbabwe and Namibia after those countries transitioned to majority rule (Jones and Murphree 2001). In 1982, Zimbabwe passed legislation which enabled the government to grant authority over wildlife utilization to Rural District Councils (RDCs). By the late 1980s, the Department of National Parks and Wildlife Management began to implement the Communal Areas Programme for Indigenous Resources (CAMPFIRE), which sought to give residents of communal lands rights to benefit from wildlife—similar to the rights exercised since the 1970s by freehold landholders (Murphree 2005). From 1989 to 2001, CAMPFIRE expanded from two to 37 districts, with a total of 43,000 km^2 of communal lands being allocated for wildlife management (Frost and Bond 2008). During this same period, CAMPFIRE generated more than $20 million in direct income from wildlife, with about 50 percent of this revenue going to the communities themselves and the other half being collected by the RDCs (Frost and Bond 2008).

The core weakness of CAMPFIRE, as perceived by both its proponents and critics, was that rights over wildlife in communal lands were not granted to the communities themselves, but rather to the RDCs. The district governments often appropriated a large amount of revenue for district-level services and expenditures, which meant that wildlife revenues were not returned to the communities where the revenue was being generated. This weakened the incentives for local investment in wildlife conservation and often continued to favor wildlife's replacement by other land uses (Murombedzi 2001). Nevertheless, CAMPFIRE represented a substantial decentralization of wildlife management authority, and the program has proven remarkably robust and resilient in the face of deteriorating political and economic conditions in Zimbabwe during the past decade (Rihoy, Chirozva, and Anstey 2007). Part of this resilience stems from the political interests of the RDCs in wildlife, which gives both districts and local communities incentives to resist potential efforts by the central government to reclaim rights over wildlife (Rihoy, Chirozva, and Anstey).

Namibia also reformed its wildlife policies following its own political independence in 1990. Similar to Zimbabwe's, this process focused on granting residents of communal lands rights to utilize, manage, and benefit

from wildlife such as already exited on freehold lands. These reforms were principally crafted and promoted by an initially small cadre of government technocrats who believed in the economic and conservation value of devolved wildlife management regimes and who were also aware of the political imperative to grant rural communities equivalent rights to those held by white landholders (Jones and Murphree 2001). In 1996, Namibia passed legislation enabling communities to form their own self-defined "conservancies" that would be granted direct proprietorship over wildlife. Since those reforms were adopted, community conservancies have spread rapidly; as of 2007, about 50 conservancies containing more than 118,000 km^2—roughly 14 percent of Namibia's total land area—have been established (NACSO 2008).

The rights granted over wildlife in conservancies allow local communities to develop joint ventures with private tourism and hunting companies as well as to keep 100 percent of revenues generated through such commercial enterprises. Over the past decade, this reform has led to a dramatic increase in wildlife's local economic value and has created incentives among local landholders to conserve wildlife—enabling large-scale wildlife recoveries on Namibia's communal lands (NACSO 2008).

Tanzania and Zambia: The limited reach of reforms

The reforms carried out in Zimbabwe and Namibia helped catalyze wider regional experimentation with community-based wildlife management. With a strong push from foreign donors in the context of wider policy shifts and fiscal crises during the 1980s as well as the post-Cold War democratization of African political systems in the 1990s, community-based wildlife management approaches spread across the region and became a dominant development and conservation narrative during the 1990s (Hulme and Murphree 2001).

Tanzania and Zambia are two countries that possess relatively abundant, albeit declining, wildlife resources and that have received substantial amounts of foreign support during the past twenty years for community-based wildlife management initiatives. Yet, despite government policies supporting local ability to manage and benefit from wildlife, neither country has devolved meaningful rights over wildlife to local communities, and wildlife governance remains highly centralized.

Zambia developed a national program called Administrative Management and Design for Game Management Areas (ADMADE) in the 1980s, which aimed to share revenues from trophy hunting with local communities in order to encourage conservation in rural areas. In Zambia, communal lands under the authority of local chiefs are the main areas used for trophy hunting concessions (Lindsey, Roulet, and Romañach 2007). This program received extensive funding from the United States Agency for International Development (USAID) during the 1980s and 1990s and has occasionally been touted as another southern African success in community-based wildlife management (Lewis and Alpert 1997). However, ADMADE never decentralized any proprietorial authority over wildlife to local communities, which limited local control over wildlife revenues.

In addition, ADMADE's impacts have been questionable (Marks 2001). By the mid-1990s, Gibson (1999) reported that only about 2 percent of the gross profits from trophy hunting on community lands reached the communities themselves. A more recent review finds the amount of revenue reaching communities in one locale to be around 6 percent of the total generated by hunting concessions, with "no evidence of significant impact of community wildlife management on local behavior, community welfare and wildlife conservation" (Bwalya 2003, 41). From 2001 to 2003, all trophy hunting in Zambia was stopped by executive order, temporarily cutting off the flow of benefit-sharing revenues from ADMADE.

Tanzania has perhaps the richest wildlife resource base in all of Africa and, following the adoption of market-oriented economic policy reforms starting in the mid-1980s, has witnessed rapid growth of national tourism and hunting industries. In the 1990s, Tanzania, with substantial support from foreign donors such as USAID and the German Development Agency (GTZ), undertook a wildlife policy review that called for devolving rights to manage and benefit from wildlife outside state protected areas to rural communities in order to create broader incentives for

conservation and to reduce human-wildlife conflict. Since then, the trajectory of wildlife sector reforms has been erratic. Some donors continue to support ostensive community-based reforms, but various regulatory changes are increasing central control over wildlife and tourism activities on community lands. The result is widespread conflicts between the state and local people regarding authority over lands and resources (Nelson, Nshala, and Rodgers 2007). The value of centrally controlled tourist hunting concessions, which are granted with no market competition or public oversight and of which about half are situated on community lands, is a strong incentive for policy-makers to resist efforts to devolve authority over wildlife to the local level (Nelson and Agrawal 2008).

Public wealth and private gains: The political economy of African wildlife governance

Systems of wildlife governance across East and southern Africa vary considerably, from the relatively decentralized and privatized institutional frameworks that have developed in Namibia, Zimbabwe, and South Africa, to the more typical experiences of Tanzania and Zambia. The latter two countries have shared some revenues with local communities and received considerable external support for reform, but ultimately they maintain centralized proprietorship and authority over their increasingly valuable but depleted wildlife resources.

Other countries reflect similar patterns of the rhetorical adoption of "community-based," decentralized governance models, only to ultimately retain and extend central authority. For example, Anstey (2005) describes recent experiences in Mozambique, where the radical community-based natural resource management and land tenure reforms passed in the mid-1990s, following the end of the country's long civil war, have widely been subverted by a growing emphasis on expanding state-protected areas and private, commercial control over land, wildlife, and forests. Across Africa's wildlife-rich nations, the overall trend is toward expanding central control over valuable resources, often in direct contrast to the rhetoric of decentralization reforms adopted during the 1990s (Nelson forthcoming).

Surveying the overall evolution of community-based natural resource management reforms in southern Africa during the 1990s, Murphree (2002, 1–2) concludes:

> … most initiatives lacked the critical ingredient for success: the devolution of authority and responsibility through societally sanctioned entitlements. Government and agency implementation retained ultimate power to shape objectives and control benefits; 'involvement' became compliance and 'participation' became co-option. Robust devolution requires significant allocative transfers in access and power, which politico-bureaucratic establishments are reluctant to surrender. Thus many of these initiatives have become case studies in aborted devolution.

Indeed, by the end of the 1990s, there was a growing sense of disappointment across East and southern Africa in the limited impact of many community-based wildlife management initiatives and policy reform efforts (Marks 2001; Shackleton et al. 2002; Jones and Murphree 2004) and an emerging preference among many donors and NGO's for alternative narratives, such as transfrontier conservation areas (Hutton, Adams, and Muronbedzi 2005).

Underlying the disappointing outcomes of wildlife governance reform efforts are political economic factors, which vary across different countries in East and southern Africa. In a comparative study of the political economy of wildlife policy in Zambia, Kenya, and Zimbabwe, Gibson (1999, 3) describes the way different actors compete to control wildlife's economic value:

> … because wildlife is an important economic and political resource … individuals and groups have sought to structure policy to secure its benefits for themselves. These actors operate in an arena composed of numerous institutions that affect their strategies and choices. The outcome of

> their efforts is wildlife policies that do not necessarily protect animals … Rather, wildlife policies and their outcomes reflect attempts by individuals and groups to gain private advantage.

Gibson (1999, 160) concludes that "although rural residents respond to incentives, bureaucrats do not appear interested in creating policies that undercut their own authority." Jones (2004, 39) notes that retaining central control over wildlife in Zambia is particularly important because of the high degree of reliance on the part of the Zambian Wildlife Authority (ZAWA) on hunting concessions on community lands: "ZAWA is not going to implement approaches that cut off its own funding." In Tanzania, the reversal of initial steps to decentralize wildlife management is attributable to wildlife's increasing value in the context of a heavily centralized and opaque hunting-concession administrative system that offers manifold opportunities for officials to capture both formal and informal rents from wildlife (Nelson, Nshala, and Rodgers 2007).

Rent seeking plays a central role in creating incentives on the part of African policy makers to retain discretionary central control over wildlife (Nelson and Agrawal 2008). These incentives are enhanced when wildlife's value is relatively high and governance institutions are characterized by lack of transparency and accountability, enabling corruption. It is critical, however, to frame rent-seeking interests in wildlife and the effects that rent seeking has on reform processes within the broader context of African states' political economies. Efforts on the part of policy makers and governing elites to retain control over wildlife often simply follows the political logic of states characterized by merged public and private spheres of activity, informality and patron-client relationships, weak rule of law, and intense competition over control of the concentrated powers of the executive branch.

Political competition, concentrated powers, and patrimonialism

Political instability resulting from intense competition for the state's concentrated central powers has been a characteristic of many post-independence African states (Allen 1995). At independence, new leaders often lacked broad popular legitimacy, particularly in fractious states with deep religious, regional, or ethnic divisions or where nationalist movements had been parochial in their reach. At the same time, the institutional framework of the colonial state was relatively centralized, with strong executives and weak legislatures. In order to bolster their own positions or enable the pursuit of transformative development policies, most post-independence leaders further centralized authority. As a result, control of the executive branch in African states confers wide privileges and access to resources, including opportunities for personal enrichment with few institutional checks on executive authority. Ake (1996, 67–70) noted in the mid-1990s that in Africa "the state remains a battleground where individuals fight for whatever power or resources they can capture."[6]

In struggling for political control, patronage is a key strategic device. African politicians attract and maintain supporters through the distribution of resources, whether it be to other politicians, military officials, religious and traditional leaders, or personal relatives (Chabal and Daloz 1999). These patron-client relationships create strong incentives for public officials to use public resources for private political purposes. Natural resources, subject to a high level of discretionary central control, are valuable patronage tools (Gibson 1999). Hunting concessions, access to protected areas for construction of tourism facilities, or even access to products such as ivory or game meat can all be granted in exchange for various forms of political or financial support. Child and Dalal-Clayton (2004, 269) observe that in Zambia "senior politicians are heavily involved in hunting concessions." In Tanzania, recent parliamentary debates on the management of hunting concessions has reportedly been influenced by the private interests of some parliamentarians in retaining existing or obtaining new concessions when existing leases expire (*This Day* 2009).

Where these patrimonial interests dominate governance processes, public institutions are largely subverted to private aims. These private motivations are widespread in African natural resource sectors, particularly where resources have high commercial value. In Cameroon, Essama-Nssah and Gockowski (2000, 62) raise the possibility that the "government's behavior in the forest sector is driven mostly by incentives in the form of the vast private gains and political patronage that can be secured in the context of uncontrolled, unsustainable and, at times, illegal forest

exploitation." In sub-Saharan Africa, the concentration of power in the executive branch and weakness of legislatures, the judiciary, and civil-society organizations facilitates such patrimonial expropriation.

Informal institutions and "hidden" economies

Patronage is an element of any political system. In sub-Saharan Africa, though, it is the combination of high levels of political competition and instability, with relatively weak formal institutions and conversely strong informal institutions, that turns the pursuit of patronage resources into widely institutionalized corruption. As Chabal and Daloz (1999) usefully point out, "corruption" in reference to African political systems is often a misleading term. The normative consignment of illegal use of public office to the malign realm of "corruption" obscures the fundamental differences between formalized western-style bureaucratic states and the largely informal African states that are effectively "hybrid" regimes where formal governance institutions are regularly and widely subverted by informal relationships and interests (van de Walle 2001).

In much of Africa, informal institutions are at the center of political relations, allegiances, and the stability and authority of leaders. Corruption, if used in a substantive sense, free of its normative connotations, simply refers to a situation where informal institutions dominate formal ones as a way of ordering and governing society. As Kelsall (2008, 642) says, "this is the essence of neo-patrimonial governance; the rules are merely a screen, or else they are cynically used to create opportunities for rent-seeking."

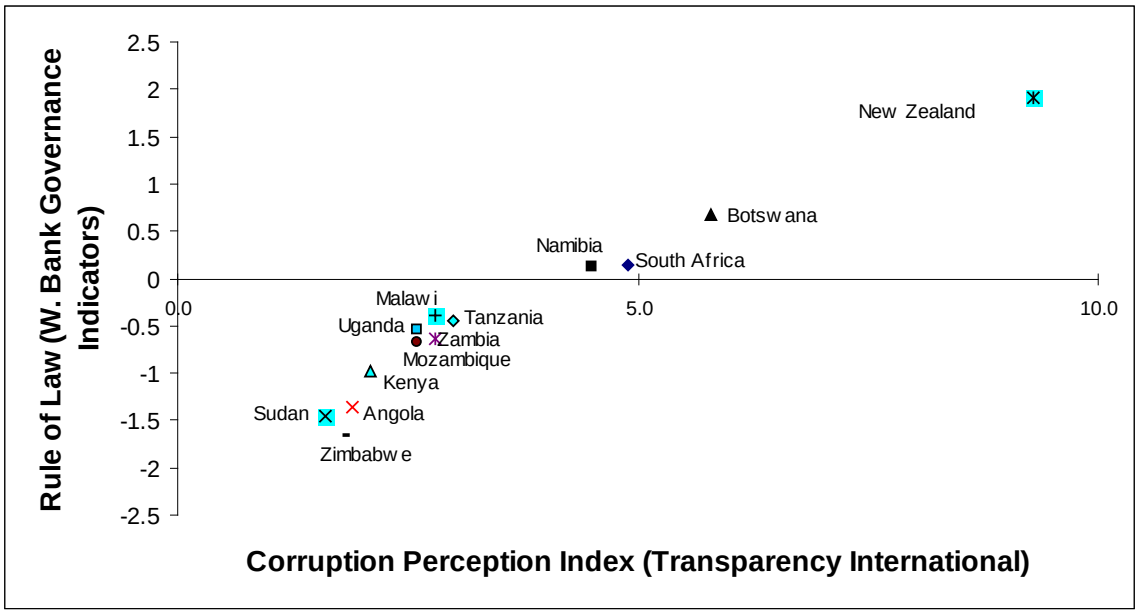
The informality of African states means that much of what is actually happening in a political-economic sense is effectively "hidden" from external view, since it is nominally illegal. A recent World Bank (2008) study in Tanzania finds that informal and "hidden" natural resource uses may amount to $100 per capita—around a third of the national per capita income—and draws from an earlier study that finds that 95 percent of Tanzania's timber trade in 2003 was illegal (that is, in the informal economy) (Milledge, Gelvas, and Ahrends 2007). Similarly, the same study estimates that the current returns to the government from leased hunting concessions in Tanzania is only about 55 percent of their actual market value (World Bank 2008). Much of this additional value is captured through illegal, but widely practiced, sub-leasing of hunting concessions; the result is that 45 percent of the concessions' value is captured informally and thus functions as what Bates (1981) terms an "administratively derived rent." This informal system of generating, capturing, controlling, and distributing rents, rather than the formal donor-backed policy narratives of community-based reform and decentralization, accounts for contemporary patterns of institutional change in such settings.

Because wildlife is a valuable patronage resource, and African states are characterized by high levels of informal and extralegal economic activity, it is natural that wildlife should be subject to high levels of illegal use. Such use may be small-scale and local in nature, such as in the consumption of bushmeat across much of rural sub-Saharan Africa (Nasi et al. 2008), or it may involve national-level macroeconomic decisions, such as in the use of hunting concession allocations to extract rents (that is, corruption in the allocation and procurement of concessions), which are then redistributed through various patronage networks bridging the nominally public and nominally private spheres (Barnett and Patterson 2006). The key point is that these informal and extralegal practices may be more institutionally legitimate and supported within African nations than formal written policies and laws. This is a central reason for the wide gap between reformist rhetoric and entrenched patrimonial practices, not only in the case of wildlife management but at a much broader macroeconomic level across African states (Nelson, forthcoming).

Given that informality and extralegality are prevalent and central to the governance of many areas with valuable natural resources such as wildlife, it is equally important to recognize and explore how the degrees of informality vary across African countries. Figure 9.3 plots East and southern African countries using two qualitative governance indicators: the 2008 Transparency International Corruption Perceptions Index and the World Bank Governance Indicators.[7] Most countries in the region fall in the lower left quadrant of the plot, meaning they are in the bottom

half of all countries in the world in terms of perceived levels of corruption (that is, they have higher levels of corruption) and are also below the mean of zero in terms of the strength of the rule of law.[8] Three African countries on the graph are outliers in that they are the only ones with above-average rule of law, and are all close to, or, in the case of Botswana, above the mean position for perceived levels of corruption.[9] What this plot captures is that Botswana, South Africa, and Namibia are relatively more formalized bureaucratic states, with commensurately lower levels of corruption and less "hidden" extralegal economic activity. In such countries, formal bureaucracies will tend to play a greater role in government decision-making processes, and using public office as a means to capture private rents is more difficult because formal rules (laws) can be enforced to prevent such behavior. Informal patronage will play a less important role in mediating power relations and the control of state institutions. Policy-making processes will have a very different character from those of the largely informal states in the lower left quadrant, which are the more typical African states.

Figure 9.3: Levels of corruption and strength of the rule of law in East and southern African countries, with New Zealand also included for comparative purposes



Note: The scale for perceived levels of corruption is 0 (highest) to 10 (lowest corruption), and the scale for rule of law on the y-axis is -2.5 (weakest rule of law) to 2.5 (strongest rule of law), with zero being the mean value across all countries evaluated.
Sources: Kaufmann, Kraay, and Mastruzzi (2008); Transparency International (2009).

It is highly notable that reforms decentralizing rights over wildlife to local landholders, both communal and individual, have largely been confined within Africa to those "outlier" countries such as South Africa, Namibia, Botswana, and Zimbabwe.[10] A combination of factors drove reform processes in those countries, including the relatively unique dynamic in Zimbabwe and Namibia of earlier reforms devolving rights over wildlife on white-owned freehold lands being succeeded by extension of similar albeit more limited rights to communal lands residents (Jones and Murphree 2001). This context created a strong imperative to extend devolved wildlife rights to communal lands in those two countries after the onset of majority rule, as well as the empirical basis for believing in the environmental and economic benefits of those reforms, which could be sold to politicians and technocrats. In addition, it is notable that in all the southern African reformist countries, commercial exploitation of wildlife on private and communal lands was relatively limited prior to the enactment of reforms (Nelson and Agrawal 2008). Indeed, commercial wildlife industries in southern Africa really only took off after reforms enabled the spread of wildlife production onto private and later onto communal lands. These countries' bureaucracies never had the same

incentives to maintain control over wildlife on private and communal lands because the types of benefits derived from wildlife in those areas were limited and because the opportunities for state agents to capture rents from public resources were also much more limited in these more formalized bureaucratic polities (Nelson and Agrawal 2008).

Wildlife, accountability, and reform: Lessons and implications

Several basic conclusions emerge from this overview of wildlife governance dynamics in East and southern Africa. Reforms that devolve or decentralize property rights to wildlife to local landholders, both private and communal, have in some places led to dramatic changes in land use patterns in favor of wildlife conservation and sustainable use. Such reforms have widely been promoted but have only taken root in a few exceptional places, mainly in southern African countries (Nelson forthcoming). In most other countries, reforms have been rhetorically espoused and have been subject to many large-scale donor-government projects and programs, but ultimately they have had limited impact on the distribution of rights and authority over wildlife and its economic value. Such truncated reform outcomes reflect patterns of natural resource governance in other parts of the developing world (Ribot 2004), as well as the broader limitations facing many macroeconomic reform efforts in sub-Saharan Africa during the course of the past twenty years (Devarajan, Dollar, and Holmgren 2001).

Reform efforts are having limited impacts because there are strong disincentives for policy makers to implement changes that lead to a reduction in central discretionary authority over wildlife. In East and southern Africa, wildlife's economic value has increased in recent years with the growth of the tourism and trophy hunting industries, which enhances wildlife's value as a patronage resource in the context of highly competitive, largely informal African governance systems. In many African states, maintaining central discretionary control over valuable public resources such as wildlife is a critical component for governing elites who wish to keep their privileged control of the executive branch.

This situation creates a fundamental paradox, in that reforming existing wildlife governance systems depends on actions by governmental decision makers that will effectively undermine their own strategic political economic interests (Murphree 2000). The conventional approach by foreign donor agencies and NGOs for promoting wildlife and natural resource management reforms in African countries, as with broader economic policy reforms, has been to work primarily with central government agencies to institute such reforms. This approach is often ineffective as it is not in the interest of central decision makers to carry out such reforms (Nelson, 2009). The disincentives of central policy makers to decentralize control over wildlife, and the lack of coercive leverage on the part of donors, under pressure to spend funds and continue existing programs (Gibson et al. 2005), account for the general difficulty in implementing wildlife governance reforms. As Figure 9.3 demonstrates, it is primarily in the few African countries where formal bureaucratic processes are more central to governance processes and informal patrimonial interests less dominant that entrepreneurs within government and external supporters have had the political space to craft and implement wildlife governance reforms. That political context, however, is an aberrant one across sub-Saharan Africa.

The critical question for those seeking to promote institutional reforms for wildlife and other natural resources in the majority of African countries is: "What might change the structure of incentives at the political center such that policy makers would consider it in their interests to decentralize resource rights to local actors?" The answer to this question is unlikely to be, "more central funding," or "more persuasive empirical data in support of localized resource management systems." External funding for wildlife governance reforms has been widespread across the region and has not been correlated with the adoption and implementation of reforms (for example, see Gibson 1999; Nelson and Agrawal 2008), and empirical arguments based on public benefits are unlikely to sway policy-makers whose choices are largely determined by private incentives.

Rather than funding central governments to do things that run counter to their political economic interests, natural resource reform efforts need to develop more effective strategies for changing the underlying suite of incentives central policy makers face. How can this come about? The logical source of change lies in local communities and civic actors in African countries.[11] Reformists need to find more effective ways of directly enhancing the ability of local communities to affect institutional change in support of their own livelihood and resource tenure interests. This means promoting capacity for collective action and for local access to information and knowledge, and encouraging alliances across local groups and their allies in government, the private sector, or internationally. Local communities need to be able to demand more accountable and equitable wildlife governance systems through political action to change policy-makers' preferences and choices. Reform, in other words, depends upon democratizing the reform process. Decentralizing wildlife governance institutions on the ground requires decentralizing the conceptual and operational models for pursuing institutional reforms. These dynamics may also be applicable to institutional struggles over other valuable natural resources managed through patrimonial governance systems.

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Endnotes

1. In this paper, "wildlife" refers broadly to terrestrial mammal species.

2. In this sense, wildlife management is simply reflective of African states' political economies more broadly, whereby policy formulation is driven largely by private political interests rather than collective public values (Bates 1981; Ake 1996; Hibou 2004).

3. Rent seeking refers to the desire of different actors in society, including public officials, to capture the economic value ("rents") of a given activity or resources. In the context of public officials managing public resources, rent seeking refers to the desire to privately capture the economic value of that resource.

4. For purposes of this paper, "East Africa" includes the main countries of the East African Community, namely Uganda, Tanzania, and Kenya. "Southern Africa" roughly corresponds to the countries of the Southern African Development Community, including Mozambique, Zambia, Zimbabwe, Botswana, Namibia, Angola, Malawi, and South Africa.

5. Namibia, then known as South-West Africa, was controlled by South Africa at the time and would be until its independence in 1990, near the end of the Apartheid era.

6. Those high stakes remain evident in the 2008 dispute over Kenya's presidential election, among other recent events.

7. Using rule of law, one of six categories included in the latter survey.

8. The two variables are of course not independent; weak rule of law and high levels of corruption should be strongly correlated.

9. In terms of highlighting the difference between perceived levels of corruption in Botswana in comparison to African norms, Botswana is ranked above countries such as South Korea, the Czech Republic, and Italy on the Transparency International index.

10. Prior to 2000, Zimbabwe had one of Africa's highest-quality bureaucracies, although since then its formal governance institutions have been subverted by informal political objectives and relations.

11. As Chhatre (2008, 12-13) states, writing about natural resource reforms in India, "Decentralisation in natural resource management is about community agency," meaning the ability of communities to "mobilize to oppose the imposition of institutional forms that they deem inappropriate" by advocating for their own resource use and governance interests.

Chapter 10

Brazilian land policy reform

by

Bernardo Mueller

In Brazil, nearly 50 percent of the agricultural land is held—often unproductively—by the largest one percent of landowners, while more than 4 million peasants are landless. This arrangement has led the landless into the Amazon region and other areas lacking clear property rights. The result has been devastating environmental consequences (Alston, Libecap, and Mueller 1999a, 1999b, 2000).

Such a state of affairs, so obviously at odds with common notions of economic efficiency as well as of equity, has prompted a fifty-year campaign for land reform. The circumstances in which these attempts took place have varied dramatically over time, from early periods when large landowners dominated the political process to the current period when well-organized landless peasant groups have become the prevailing political force behind the reforms. The limitations in the results obtained provide insights into the practical as well as the political difficulties of reforming natural resource ownership in Brazil and other countries—particularly countries in sub-Saharan Africa.

Why land reform has been pursued and what it has achieved

A rich literature analyzing the optimal form of agrarian organization dates at least as far back as Adam Smith's writings in the 18th century. In the absence of imperfections in all the relevant markets—land, credit, labor, insurance, managerial skill, among others—one would expect the optimal form of organization to naturally emerge in a given region. In these circumstances, theory predicts a prevalence of relatively small farms given the inverse relationship between farm size and total factor productivity (Berry and Cline 1979; Binswanger, Deininger, and Feder 1995; Hayami and Otsuka 1993). However, in the presence of market failures, such as high transaction costs and asymmetric information, the same theory shows that the optimal form of agrarian organization may fail to arise. A prominent example of this is the use of sharecropping, which has prevailed in many regions across space and time. Sharecropping is not a first-best outcome because, as noted by Marshall (1890) and other classical economists, the incentives for optimal effort are subdued given that the tenant does not receive the full value of his or her effort. Nevertheless, the use of sharecropping may be optimal in a second-best sense, as the mitigated incentive effort may be more than compensated by other effects that correct for a large series of possible market imperfections, including risk (Cheung 1969; Stiglitz 1974), measurement costs (Allen and Lueck 1992), transaction costs (Williamson 1979; Murrell 1983), credit constraints (Laffont and Matousssi 1995), and landlord moral hazard (Eswaran and Kotwal 1985), to name a few.

The fact that such an extensive literature has emerged providing theoretical justification for and empirical evidence of ways of dealing with imperfections that plague land use and agricultural organization suggests that if first-best forms of organization are not always attainable, at least second-best solutions can routinely be achieved. But in developing countries, it is frequently the case that even the second-best solutions are not prevalent. The existence of highly skewed landownership patterns throughout the world and the relative absence of land tenancy contracts in most of Latin America are two examples of commonly observed characteristics that are incompatible with a second-best situation. Binswanger, Deninger, and Feder (1995, 2738–58) painstakingly detail the emergence and evolution

of farm systems, based on large properties and covering 29 countries in four continents. They conclude that "… neither the establishment nor the continued existence of large farms was due to their superior economic efficiency and/or the presence of economies of scale in agricultural production."

Regarding tenancy contracts, Hayami and Otsuka (1993, 8) show that in 1970 only 11.8 percent of land was under such contracts in Latin America, compared to 40 percent in Europe, 63.4 percent in North America and 32.1 percent in Africa. Given the high levels of landownership concentration in Latin America, tenancy would seem to be particularly suited for those countries. These examples indicate that in addition to those market imperfections mentioned above, there may be further problems that push toward third-best outcomes or to outright inefficiency. A major class of such problems is rooted in political issues and insecure property rights—the theme of this chapter.

Given that inefficient forms of agrarian organization are ubiquitous and persistent throughout the world, without any apparent tendency for automatic self-correction, there has naturally been a strong case for government imposed land reform, with practically every country at one point or another explicitly having pursued some kind of land reform. Focusing on land reforms that involve redistribution of land from large estates to small farmers or landless peasants seems rather straightforward, involving a mere transfer of land from one economic agent to another; especially in contexts such as Latin America where unproductive latifundia (large estates) coexist with masses of landless peasants. Reforms of this nature seem to simultaneously achieve greater economic efficiency and social justice, and all at very low apparent cost, as governments normally have the power to expropriate the land with no or minimal compensation. This perception, however, is mistaken—land reform is, in fact, an enormously complex and explosive undertaking, as Galbraith (1951, cited in Dorner 1992, 4) notes:

> Unfortunately, some of our current discussion of land reform in the underdeveloped countries proceeds as though this reform were something that a government proclaims on any fine morning—that it gives land to the tenants as it might give pensions to old soldiers or as it might reform the administration of justice. In fact, a land reform is a revolutionary step; it passes power, property and status from one group in the community to another. If the government of the country is dominated or strongly influenced by the landholding group—the one that is losing its prerogatives—no one should expect effective land legislation as an act of grace.

The track record of land reforms throughout the world is a testament to the enormous difficulty involved in governmental attempts to change land use and ownership structures. The literature on land-reform experiences is vast and often tainted with ideological bias. Classifying a given country's experience as successful or unsuccessful is not always straightforward as expectations matter and results operate on many different dimensions.

Focusing solely on the more academic and reputable literature yields an unmistakably dismal picture. The few cases of consensually successful land reforms, such as in Japan and South Korea, were achieved in very specific circumstances of foreign domination that cannot be replicated as policy recommendations. Dorner (1999, 4) reviews some of the major land reforms in the 20th century and finds that "(m)ost of the major reforms … came after political uprisings and revolution, often followed by authoritarian power (whereas) … extensive reforms carried out under a system of democratic institutions are quite rare." Similarly, Binswanger, Deininger, and Feder (1995, 2683) argue:

> Since land reform involves the transfer of rents from a ruling class to tenant workers, it is not surprising that most large-scale land reforms were associated with revolts (Bolivia), revolution (Mexico, Chile, China, Cuba, El Salvador, Nicaragua, Russia), conquest (Japan, and Taiwan) or the demise of colonial rule (Eastern India, Kenya, Mozambique, Vietnam, Zimbabwe). Attempts at land reform without massive political upheaval have rarely succeeded in transferring much of a country's land (Brazil, Costa Rica, and Honduras) or have done so very slowly because of a lack of political commitment to provide the funding to compensate owners.

Rashid (2001, 3) provides a very forceful indictment against the use of land reform as a means to achieve economic development:

> … careful reading of the previous literature shows so many ancillary requirements are imposed upon successful land reforms that they amount to a veritable program of economic development. … If land reform is successful only if coupled with a program of economic development why not deal directly with economic development and let land reform take its due place.

Even authors who are not so openly hostile to land reform and who have based their careers on the pursuit of policy recommendations to achieve better forms of agrarian organization recognize the poor results obtained thus far. Deninger and Feder (2000), for example, review a number of problems that have plagued attempts at land reform and conclude:

> Due to these difficulties, and the fact that land reform was a highly politicized topic, many of the reforms that have been undertaken since the 1960s have not achieved their stated objectives. Evidence on the longer-term impact of land-reform on poverty and productivity is more limited than desirable. (Deininger and Feder 2000, 34)

Similarly, in a paper titled "The Lost Game of Latin American Land Reform," de Janvry and Sadoulet (1989) provide a game theoretical framework to explain the failure of land reform in Latin America to break the bipolarity of those countries' tenure systems.

Even when successful instances of land reform are found, the actual reforms are much more modest than the initial goal. Research by Besley and Burgess (2000) is a widely cited example of empirical evidence that land reform can reduce poverty. These authors note that the poor track record has lead "policy analysts to question the wisdom of implementing redistributive policies at all" (Bessley and Burgess 2000, 389) and propose a need of positive evidence to "combat such pessimism." Their test explores the fact that land reform in India varied across states and finds that though very little land actually got redistributed, some kinds of land legislation did result in a reduction in poverty. Although any reduction in poverty is an achievement to be celebrated, one would have liked to see more dramatic results from a case of successful land reform. In fact, when Conning and Robinson (2007, 438) cite this paper, it is as evidence that "(t)here seems to be fairly general agreement that agrarian reforms in India have been relatively modest in their impacts on the patterns of landownership inequality in India."

Impediments to land reform

The reason why land reform has had such a dismal track record is no mystery. The greatest impediment for an effective land reform is political. Logistic impediments are also important, as land reform is inherently complex, but these obstacles can generally be overcome if the political conditions are favorable. Yet simply recognizing that political issues are the fundamental barrier for land reform to be effective does little more than locate the problem and state the obvious. What is required is a deeper understanding of the complex ways in which these political issues manifest themselves in each individual case as this allows the assessment of what form of land reform is viable, if any, given the political circumstances and what can realistically be achieved.

An interesting example of this point is the critique made by Alain de Janvry in the *Journal of Development Economics* (de Janvry 1994, 169–71) of Peter Dorner's book, *Latin American land reforms in theory and practice*, whose main thesis was that land reform "can be achieved only if there is a strong commitment and sufficient political will to counter the strong, often violent, opposition" (Dorner 1992, 34). De Janvry correctly argues that:

> Calling on "political will" offers neither an explanation nor a basis for the design of politically feasible approaches without an analysis of the determinants of political will. Reducing the political analysis of land reform to the statement that "so long as people whose interest are threatened by

> reform hold power, they will find ways of assuring that legislation is ineffective" is insufficient (de Janvry 1994, 170).

To ascribe the fate of land reform merely to political will may be tautological (if land reform works, the will is inferred to have existed) and is certainly too simplistic; especially if by political will one means the preference of whoever is in power. There are many cases, such as Brazil, where the government is truly committed, and yet the reforms fail. If, however, by political will one means the result of the political equilibrium that is in place at the time of the reform, then the notion can be rehabilitated. The political equilibrium arises from the interaction of all relevant groups and is determined by their relative preferences, size, powers, and ability to coordinate and engage in collective action, all of which is filtered through the country's institutions and inherited distribution of wealth and power. Whether a land reform is initiated and the form it takes are determined by this political equilibrium, which in turn is endogenously affected by the land reform.

This process has been formally modeled in different ways by Alston, Libecap, and Mueller (1999a, 1999b, 2000, 2008), Conning and Robinson (2007), de Janvry and Sadoulet (1989), Grossman (1994) and Horowitz (1993). In all of these analyses it is necessary to specify how the different actors' preferences translate into the final political equilibrium. Bardhan and Mookherjee (2008), for example, tested whether politicians implementing land reform from 1978 to 1998 in West Bengal had pursued their own ideology or the preferences of the electorate and found a predominance of the latter.

Understanding the political equilibrium will be a major focus of the analysis of land reform in Brazil. The major point is that a deep understanding of the nature of the political equilibrium is essential for designing any reform process, as it determines and limits what can be successfully achieved. This may seem a rather straightforward and uncontroversial proposition, but it is one which has routinely been violated as shown by the previous discussion of the dismal practical results of land reform throughout the world. The next section demonstrates how the impact of the political equilibrium on final policy can be much more subtle and nuanced than a direct contest between those against and those in favor.

Land reform in Brazil

There are several reasons why Brazil is a good case study for land reform. High inequality and a 0.85 Gini coefficient of landownership concentration in 1996 (where 1 indicates perfect inequality and 0 perfect equality in landownership), involving 120 million hectares of unproductive land side by side with more than 4 million landless peasants, have made land reform a burning political issue since the 1960s. Despite this situation, less than 10 percent of the agricultural area is held in tenancy contracts, and much of that involves large rather than small producers. In addition, the Brazilian case is especially interesting because of the radical change in the political equilibrium behind the reform, with an early period (1960–1990) when landowners' interests prevailed and a subsequent period (1990–present) when landless peasants became increasingly organized and managed to tilt policy significantly toward their own interests.

Because of this reversal, Brazilian land reform has been held as a model of a new wave of bottom-up, decentralized, peasant-driven, participatory reform. The key role played by the landless peasant movement, known as *Movimento Sem-Terra* (MST), in pressuring for land distribution has inspired many recommendations that this is a more effective way to pursue land reform. Ten years ago de Janvry, Sadoulet, and Wolford (1998) extolled the virtues of this new model:

> Ironically, the drive to provide land for the poorest rural groups is taking place in one of the Latin American countries that to this date has made the least progress with state-led land reform—Brazil. As opposed to previous attempts in the 1960s, however, the initiative now comes not from

> the government but from small communities of squatters that have been organized nationally by one of the largest grassroots organization in Brazil's history—the Rural Landless Workers' Movement (MST). In the 15 years since its inception, MST has helped to establish over 1,000 land reform settlements by mobilizing approximately 145,000 families to occupy 'unproductive' land and pressuring the government to negotiate for title to the property. According to one observer: "MST is the most dynamic, best organized and effective social movement in Brazil today" (Petras, 1997). (de Janvry, Sadoulet, and Wolford 1998, 13–14).

A few years later this compliment was taken to the global level when Noam Chomsky declared that the MST "is the most exciting popular movement in the world today" (*The Economist* 2004).

It is easy to understand the appeal of the recent phase of land reform in Brazil and the temptation to view it as a model that could carry lessons for reforms in other countries. Through its occupations of unproductive properties (average of 364 per year), the MST and other smaller groups have caused government expenditures in land reform to increase dramatically, by creating 7,670 settlement projects by 2006 and by transferring more than 63.2 million hectares of land (an area greater than France and Portugal together) to 890 thousand families (Gasques, Vila Verde, and Bastos, 2006).[1] As a result, the Gini coefficient of landownership concentration, which had been flat for much of Brazil's history, started to decline by 2000, the last data point available (INCRA, 2001). This is no mean feat in a country that has been tenaciously resistant to any form of redistribution. Furthermore, the MST has been commended for fostering education in its settlement projects, for delivery of financial services to smallholders via programs of group lending (de Janvry, Murgai, and Sadoulet 2002), and for having important spillover effects on the neighboring communities (Heredia et al. 2002). Although these achievements have required the blatant disrespect of property rights and the nation's laws, with much violence and conflict as a direct consequence, it is often accepted that such momentous change, breaking with a past of inequity and oppression, could not be achieved by any other means.

And yet, without disputing the importance of the changes that have taken place in the past twenty years, the remainder of this chapter will argue that land reform in Brazil has been much less successful than what the results in the previous paragraph seem to suggest and that, consequently, it is by no means a model that other countries should emulate. The actual benefits from land reform policy are lower than those which are widely extolled, and the costs are greater than those which are officially recognized, despite the admittedly high level of the official cost figures.

If data were available for a rigorous cost-benefit analysis of land reform in Brazil the final result would be much lower than what is generally perceived in the policy debate. This study does not suggest that the final cost-benefit results would be negative but that the current policy is so blatantly wasteful that other tried and tested alternatives would certainly fare better. In order to make this argument, the remainder of this chapter will focus on the nature of the political equilibrium that has led to and locked in the current model of land reform. The major lesson to be learned is the need to factor in explicitly to any process of reform—be it land, fisheries, or other resources—the intimate yet intricate relationship, which always exists, with the existing political equilibrium.

Land reform in Brazil before the MST

Although the high levels of landownership concentration in Brazil are often associated with the large land grants given by the Portuguese Crown from 1500 to 1822, the crucial period that consolidated this pattern was the second half of the 19th century, when coffee became a major export. Unlike the United States, where the plantations existed side by side with numerous small farms, the Brazilian coffee sector originated and became established with a pattern of land occupation based exclusively on large plantations and slave labor, with practically no small properties involved. Thus, when abolition of slavery came in 1888, and large scale immigration of European labor was initiated, bringing in more than enough hands to keep wages low, coffee producers not only had already occupied the best land available but also had set up laws and accumulated political power that allowed them to deny immigrants access to land, forcing them instead to work on the plantations (Alston, Harris, and Mueller 2009). This

highly concentrated pattern of ownership naturally reproduced itself over time, persisting to the present day, even after political power shifted from agriculture to industry.

The undesirable effects of this concentrated form of agrarian organization were quickly recognized, and in the 1946 Constitution there was a provision for land reform. Ever since, land reform has been a major political issue in the policy debate. For example, in the early 1960s the growing clamor for land reform was one of the reasons that prompted a military coup. Nevertheless the military pursued their own land reform as they (correctly) perceived that the concentrated landownership structure was inefficient, driving up the prices of agricultural products and, consequently, wages and inputs to industry. Despite the authoritarian nature of the regime, the political equilibrium was such that the landowners were able to avoid significant redistribution. What happened in this period in Brazil is well captured in "The lost game of Latin American land reform" a study developed by Janvry and Sadoulet (1989, 1399):

> The particular land reform strategy followed in Latin America after 1961 used the threat of expropriation combined with generous programs of agricultural development to induce modernization of medium and large farms, instead of using outright expropriation and redistribution. … (This) created economic and, hence, political power among these farmers which allowed them to gain (or reinforce their) privileged access to the state. This political power could then be used either to force the state into making the promise of non-expropriation-if-modernization credible, or to successfully engage in rent-seeking activities.

Given the symbolic nature of land reform in Brazil, when redemocratization arrived in 1985, a large program based explicitly on expropriation of unproductive latifundia was announced with fanfare. Mueller (1994) showed how the unexpectedly high levels of opposition from landowners and the timid support from landless peasants quickly eroded the political resolve by the new civilian government to actually go through with the announced reform. It was still the case that the political equilibrium was incompatible with actual redistribution of land.

Land reform in Brazil after the landless peasants movement (MST)

The nature of land reform changed, especially in the mid-1990s, with the rise of the landless peasant movement. Before the MST, land reform was government-driven. Landless peasants would sit tight and wait for the official land reform program to obtain land, mostly public land far from markets. The pace at which this proceeded did close to nothing to reduce the number of landless peasants. What the MST did, through its strategy of invasions of private properties, was take control of the pace of the reform. Only unproductive properties and those with no or dubious title were selected to be invaded, so that the constitutional requirement that land should fulfill its "social function" would in a sense legitimize the occupation and allow the government to legally expropriate it in their favor. In effect the invasions were not fundamentally about physical force, even though the result was often conflict and violence. Rather they were a means to create a commotion, which attracted attention and embarrassed the government, thus prompting it to dedicate more resources and effort toward actually redistributing land. This was achieved not only through invasions but through other strategies as well, such as marches, road blocks, invasions of public offices, and several publicity stunts. This strategy worked and fundamentally changed the outcome of land reform. The eight years of the Cardoso government (1995–2002) redistributed more land than the entire previous history of land reform, and the subsequent years under President Lula have maintained that pace.

The working of the MST-led land reform is modeled in Alston, Libecap, and Mueller (1999a, 1999b, 2000) through a game-theoretic framework where landless peasants strategically chose how many invasions to engage in and landowners strategically chose how much violence to provide, either as a deterrent or to evict the squatters before the government is attracted to expropriate the land. The payoffs are crucially affected by institutional factors that determine the probability of expropriation, which is a function of the amount of conflict and violence that emerges. These institutional factors are related to factors that, in turn, affect the level of property right security, including the constitutional requirement that land be productive; the courts' level of protection against invasion of private property, and the government's political will toward land reform.

The papers mentioned above, however, provide only a partial view of the new political equilibrium that emerged under the influence of the MST. The government's political will is treated as exogenous rather than being determined within the model, and the key element necessary for the MST's strategy to work was not considered. These shortcomings are addressed in Alston, Libecap, and Mueller (2008) by endogenizing the level of government effort for land reform and explicitly focusing on its main determinant: urban voter's preferences for land reform. The claim is that, as was found by Bardhan and Mookherjee (2007) for West Bengal, politicians in Brazil are motivated for land reform not by ideological preference but by electoral incentive, where the relevant politician in Brazil is the President, who is exclusively in charge of land reform. Brazil's primarily urban electorate has historically been highly sympathetic toward land reform for three reasons. The first stems from the extreme level of rural inequality, making the transfer of land from large unproductive landowners to poor landless peasants seem fair and naturally appealing. The second ,related, reason is that land reform in Brazilian political debate actually encapsulates more than mere land redistribution; it represents an entire set of pro-poor policies and serves as a banner for an ideological position close to the median voter, which is highly adverse to the skewed wealth concentration. The third reason is that urban voters do not perceive that there are any costs to these policies as land is merely transferred from wealthy landowners to poor landless peasants—a notion that is clearly wrong.

Alston, Libecap and Mueller (2008) provide evidence that voters in Brazil do actually care about land reform and that these preferences are perceived by the President. They regress monthly levels of presidentially popularity from 1997 to 2007 (covering periods under both Cardoso and Lula) against a standard set of economic variables (interest rates, inflation, GDP, and exchange rates) plus the number of occupations of rural properties in the recent months. They find that rural conflicts have a statistically significant negative impact on the President's popularity. This evidence shows that even if the voters may be primarily concerned with issues that directly affect their pocket book, they nevertheless react to what goes on in land reform *ceteris paribus*.[2] If popularity is affected, it is clear that the President is aware of the impact and has the incentives to respond by showing that he is addressing the issue.

This strong demand for land reform by voters is a crucial element of the political equilibrium. Its actual impact, however, depends on how well the voters observe the government's efforts for land reform. Alston, Libecap, and Mueller (2008) argue that information asymmetries imply that voters can never be quite sure how much land reform is ever really being done. The government always has a land reform program in place, announces ambitious targets, appoints people who are known to favor redistribution to the key positions, and generally adopts a rhetoric that no effort is being spared. The voters are weary of any such claims but are never certain how much they must be discounted. Before the MST came onto the scene, the resulting equilibrium from this game was one where very little land reform was done. There was a always a program in place and all the right noises and motions were made, but as far as the public knew, the slow pace at which results materialized were probably the best that could be achieved.

When the MST started invading properties, they showed voters that much more could be achieved by the government. They effectively reduced the informational gap between what the voters knew the government was doing and what it could actually do if it were so inclined. Were it the case that voters did not care at all about land reform, the government could simply repress the MST by treating the invasions as illegal acts. But given that voters do care, the government's best reaction was to respond to the invasion and other MST-initiated events by actually dedicating more resources and efforts to land reform. It is under this new equilibrium that the major redistribution of land described above took place.[3]

The costs and benefits of land reform in Brazil

The above description suggests that the impact of the MST is highly beneficial both in terms of efficiency and equity. Not only do median voters get more of what they want, but idle land is shifted to smaller more productive properties and millions of landless peasants are given land, opportunity, and citizenship. The violence and conflict that have accompanied these changes can perhaps be discounted as unavoidable collateral damage.

This typical evaluation of land reform, which pervades the political debate, impacts the political equilibrium described above by concentrating on only a few variables and ignoring several relevant margins. This error skews the debate and results in a significantly lower cost-benefit bottom line than what is generally assumed to be realized.

The metric used in the debate over land reform is not a good measure of how much and how well the agrarian structure has been modified. This is an instance where land reform in Brazil can serve as an important lesson to other reform processes. If a given reform is evaluated by a measure that only partially captures the impact of that reform, the incentives of the actors that take part in the reform process will be skewed to those margins that are being measured. Because those margins will receive too much effort and others will be neglected, the true outcomes may be much different and more inefficient than what would otherwise be the case. Furthermore, because some groups may have preferences for those margins that are being measured and are being given too much weight, the policy debate may get locked-in, perpetuating inefficient outcomes.

In Brazilian land reform, the metric that dominates the debate is the number of families that have been settled. Every President announces the yearly targets to be achieved at the beginning of his term, followed by periodic announcements that those targets are in fact being realized. The MST and other entities then engage in a verbal battle ,through the media, contesting the numbers claimed by the government (see Ondetti 2008). President Cardoso, for example, promised to settle 280,000 families in his first term (1995–1999), and President Lula promised 400,000 in his first term (2003–2006). At the end of the term, Cardoso claimed to have slightly passed his target, and Lula claimed to have accomplished 95 percent of his. In both cases, critics contested the claims, accusing the official number of being inflated by a series of maneuvers biased to overestimate actual achievements, such as counting the capacity of a settlement instead of the actual number of families on the land and counting new families in abandoned plots in old settlements.

Despite the confrontations and quarrels regarding the number of families that have been settled, this form of debate is convenient for both the government and the MST. For the government, it is useful to have the debate cast around a variable that is intuitive and appealing. Voters easily grasp and accept the notion that the more families that are given land, the more government has done to solve the landless problem. Furthermore, settling a family is relatively quick in the sense that it fits in an electoral cycle. This creates incentives for the government to focus its efforts on obtaining land, by expropriation, purchase ,or gathering public land and quickly mounting settlement projects to distribute plots that can then be counted toward the target. And because the metric is the number of families that receive land, the government has very little reason to do the follow-through necessary to assure that those families actually thrive, emancipate from governmental credit, and become self-sustaining. The incentive is strong, for example, for the government to create settlement projects in any land they can get, regardless of its location and aptitude for productive agriculture (such as in the Amazon); what is being measured is not productivity but rather the number of families that received land. Once a family has been given land and counted, there are few incentives for the land-reform program to focus any further on those beneficiaries, as new families have to be settled for the next year's targets.

The MST is the main force that could pressure the government to carry through and make the settlements sustainable. However, the MST's interests are conveniently compatible with the government's emphasis on settlement rather than emancipation. Every settlement project receives several types of credit from the government to help settlers get installed, build housing, and start producing. The MST taxes its members at the rate of 2–4 percent of this credit (Harnecker 2003). Similarly it receives, often indirectly through NGOs, other sources of governmental subsidies or outright transfers, for several tasks associated with settlement projects, such as education. Thus, the MST's incentives are for there to be as many families as possible in settlement projects, which, in addition to increasing the flow of money, increases its area of influence—the MST has the long-term project of creating a socialist Brazil. The magnitudes of the transfers captured by the MST have become so large that it seems to be more concerned with pressuring the government to actually follow thorough in a timely manner with the already promised transfers than it is with actually getting new families settled. In summary, both the government and the MST are satisfied with having a mutually advantageous arena in which to fight out their disagreements and no interest in

moving the debate to other margins, such as examining the success rate of those numerous families that have already been settled.

The disconnect between the metric being used and the actual effect of the reform only exists because of the asymmetric information that voters receive. If voters could observe actual government effort, then a proxy for number of families settled would not have to be used. An important characteristic of Brazilian land reform is that the proxy is intuitive and seems to be highly correlated with everything that land reform should achieve, and yet, in reality ,it is tremendously limited for that purpose. It gives the government incentives to skimp on the difficult task of locating potential beneficiaries who have an aptitude for agriculture and would actually stand a chance of becoming self-sustaining farmers if given land. This process of properly targeting a reform is tremendously difficult, as argued by Besley and Kanbur (1990, 20):

> We posited an "ideal solution", where transfers went to the poor and only to the poor, as the benchmark for discussion and as the rationale for current trends in the policy debate. But the ideal solution fails to take into account three crucial aspects of the real world: (i) administrative and informational costs of implementation, (ii) individual responses and incentive effects and (iii) the political economy of the problem. It has been argued that each of these militates against the ideal solution.

In Brazil all three of these problems have militated against effective targeting of the reform to actual landless peasants as opposed to those who are poor but do not have the attributes to make land productive. The administrative costs of improved targeting would reduce the number of settled families, so the government has simply accepted whoever participated in an invasion or occupation. These have increasingly been urban poor attracted by the demonstration effect of previous land-reform beneficiaries. A large part of those being considered have no intention or aptitude to stay on the land and will typically live off government transfers and/or sell the plot and rights to the transfers. Although there is no reliable data, it appears to be the case that over time many settlement projects go through a process of reconcentration, with much of the land being sold to those who can make it more productive.[4] In addition, several settlers simply abandon their plots, especially in those projects which were hastily made, often in unsuitable land, and/or far from the necessary infrastructure. The government realizes that the plots are regularly traded but has no means to control the sale of the plots. Nor does the government have incentives to try to enforce stricter rules regarding sales, as those families have already been counted toward the land-reform targets. This problem of inappropriate beneficiary selection has grown over time as most of the "true" landless have already been settled, leading the MST to increasingly recruit among the urban poor.

The upshot is that the actual benefits from the land-reform program are much smaller than those which are visualized if one simply assumes that every family that is given land by the government will naturally evolve into a self-sustaining ,productive smallholder. This conclusion does not deny that the wealth transfer that has taken place in favor of a very poor parcel of the population has not had beneficial effects. Nor does it ignore that, in addition to the direct beneficiaries, the transfer creates several jobs in the surrounding area. The point made so far is that the true benefits are considerably smaller than what is generally presumed in the political debate. The next step is to look at the costs and then to compare the net benefits to competing alternatives.

Analyzing the cost of land reform is easier than benefits because of a rigorous study commissioned by the government together with the FAO to determine the cost of a family settled in Brazil in the 2000–2005 period. Marques (2007) uses budgetary data from the land-reform program to quantify the direct costs involved, including land acquisition, technical assistance, titling, credit, taxes, and so forth, using standard cost-benefit techniques to reach a final number, which varies by region and by the way land was acquired (purchase, expropriation, or public land). The final numbers vary considerably from a high value of US$33,329 per settled family in expropriated land in the southeast to a low of US$6,751 on public land in the south. A weighted average ,considering the numbers of

families in each region and type of land, puts the cost of a settled family at US$12,272. When this study came out it made the headlines as it flouted the conventional wisdom that land reform would be a relatively costless transfer from large landowners to landless peasants.

The figure reached by this study, however, does not reflect the entire cost of land reform as it leaves out at least three important associated cost. The first is the environmental cost, as settlement projects tend to have a huge impact on the surrounding area. It is easy to appreciate that when a farm is transferred to scores of landless peasants, there will be a strain on local resources such as water, forests, and fauna. Given the government's incentives to focus on numbers rather than sustainability, very little concern is placed on environmental issues. Many settlement projects already find it difficult to make ends meet even making full use of all available natural resources. Adding additional restrictions would simply make them even less viable. Much of the land-reform program takes place in the Amazon because the availability of public land there makes it cheaper. It is estimated that more than 15 percent of the deforestation that goes on in the Amazon forest is directly due to settlement projects (Freitas and Arini 2007).

A second cost of the land-reform program left out of the standard evaluation is the uncertainty associated with insecurity of property rights. The invasions and conflicts that are an integral part of the *de facto* land-reform program can have a large impact on investment and land markets, leading to several forms of rent dissipation by landowners trying to preempt invasions (Alston, Libecap, and Mueller 2000). Here again there are no estimates, but the cost should be high, especially in regions like the Amazon where property rights are more tenuous, leading to situations such as premature deforestation of an area to signal ownership.

Finally, the third additional cost component that needs to be taken into account is the pain and suffering of the beneficiaries throughout the land-reform process. This process can often take more than five years and involves camping for long periods, invasion, conflict, possible removal and subsequent reinvasion, violence, uncertainty, lack of basic needs, and obeying the strict rules imposed by the MST(such as no drinking or leaving camp and listening to indoctrination). It is true that many of the beneficiaries have very low opportunity costs, nevertheless the entire process can be grueling and is only endured due to the realistic promise of land and subsidized credit. An alternative form of transfer would certainly economize on much suffering.

An analysis that properly considers the true benefits of the Brazilian land-reform program, and includes all the relevant costs, would yield a much less appealing assessment than that which currently informs the policy debate. Not only are actual benefits much smaller than is normally assumed, but also adding the hidden costs to the already large direct cost would lead to a smaller level of land reform emerging from the political equilibrium, or a reformulation thereof. The information asymmetries that created the current political equilibrium are not simply a matter of having information about benefits and costs. Landowners and representatives of agricultural producers have been making such arguments all along. What counts is not the total sum of the information available but rather what is assimilated and accepted by the voters. This is where the role of the MST has been crucial; lending credibility to the view that the debate can be held in terms of the single dimension of how many families have been settled. In addition, the MST makes sure that the current policies are locked-in and will not be switched for another view that reduces the target number of beneficiaries, focusing instead on assuring their successful emancipation as self-sustaining smallholders. Any such attempt tochange the reform or the debate would be instantly attacked as a failure by the government to deliver a full-scale land reform, and voters would punish the President.

The fact that the current land reform has a significantly lower cost-benefit ratio than is usually believed is not enough to condemn the program outright. Current analysis only considers economic efficiency, and one might argue that this is an instance in which other criteria, such as social justice and equity, might be more important. Along the dimensions of environmental sustainability and of peace and stability, the Brazilian land-reform program scores badly, but a justification focusing on social justice may have more weight. After all, the program has already achieved a huge transfer of land and other resources in a country where the haves (wealthy) have traditionally managed to avoid attempts at redistribution.

But even if society is willing to sacrifice some economic efficiency in favor of social justice or equity, it is still necessary to assure the public that the social justice and equity are being obtained by the most cost-effective manner available. The current land-reform program is tremendously wasteful, requiring an enormous deadweight loss for every Real (Brazilian currency) transferred to a beneficiary. If the same amount of transfer can be achieved by other means at a lower cost, it would make sense to take that route instead.

It is not the scope of this chapter to suggest other designs for the land-reform program or to point out alternative uses for those resources, especially since one of the points is that, in political terms, the current program, despite its shortcomings, is the equilibrium, and switching to a "better" program is not a realistic option without changing the underlying political system. In order to illustrate the point that there are superior alternatives, consider the government's highly successful anti-poverty program, *Bolsa Familia*, and other spin-offs that make transfers to more than 11 million people in Brazil in exchange for keeping their kids in school and performing other similar desirable actions. Although this program sounds paternalistic, it has been extremely inexpensive and well targeted, managing to avoid the common perverse incentives inherent in such transfers. Furthermore, economic analysis of these programs' impact has shown that they have been responsible for a 26 percent and 41 percent reduction in poverty and extreme poverty, respectively, and have contributed to an unprecedented drop in wealth concentration—even after controlling for other potential determinants (Barros et al. 2007). When confronted with these programs, which deliver more both in terms of a cost-benefit analysis and social justice and equity, it becomes hard to defend the current model of land-reform in Brazil.

A brief overview of land reform in Africa

Land reform has been a major political issue in several countries in sub-Saharan Africa since the end of colonialism in the mid 20th century. Much of the focus of the reforms has been to reverse past seizures and restitute land to victims of forced removals. More recently, there has been an increased focus on redistribution schemes that seek to address poverty and landlessness, with several countries having passed new laws and announced ambitious new programs since the 1990s. This section briefly reviews the recent African experience, focusing on the motivation for those policies, the difficulties encountered, and the results achieved. The purpose is to compare and contrast the policy environment in which land reform takes place in Africa with that described above for Brazil. Because many of the political economy issues and logistical problems are similar in these two cases, lessons from the Brazilian case can be useful for understanding the obstacles for effective policy in Africa, not only in the area of land, but also of fisheries reform.

The common element making land-reform processes in Brazil and in much of sub-Saharan Africa comparable is the symbolic and emotional appeal that this policy area exerts over its respective societies—an appeal that has persisted despite the rapid pace of urbanization and that is strong even among people who are not potentially direct beneficiaries (for Africa, see Walker 2005). The nature of this demand for land reform differs in Africa from Brazil, but it has a similar tone of "correcting for past injustices." In the African case, the issue of colonialism and racism is different than in the Brazilian case but similar in that the support for a comprehensive redistribution of land in Brazil also rests on an argument founded on social justice and the need to address the extreme inequality of landownership patterns.[5]

Because there is such a strong demand for land reform, politicians naturally respond with programs and policies that promise restitution to the dispossessed and redistribution to the landless, as well as nationalization, registration, and tenure security. In sub-Saharan Africa, almost all countries currently have a land-reform program, with especially notable cases in South Africa, Zimbabwe, Malawi, Kenya, and Namibia. As previously shown, in Brazil the demand for land reform also generated grand programs and promises, but the actual results were insignificant before the MST while considerable but wasteful thereafter. What has been the result in Africa? By assessing achievements and

the difficulties encountered, we can look to the Brazilian case to improve our understanding of the determinants of those outcomes.

The result of land-reform policies in Africa has been unequivocally dismal. The ambitious targets that were initially set have typically failed to materialize, and the impact on landlessness and poverty has been minimal. This failure to effect any meaningful change has generally been true in the case of restitution as well as redistribution and tenure reform. In South Africa, for example:

> The inability of the state's land reform programme to transfer more than three-and-a-half percent of the country's farm land to black ownership over the past ten years is perceived not simply as a failure in land policy but, more fundamentally, as a failure to transform the very nature of society (Walker 2005, 806).

Furthermore, the little that has been achieved has more often than not failed to benefit the intended clientele and has been captured by politicians, bureaucrats, and local elites (Hall 2004). According to Williams (1996, 221), in Africa in general:

> The formal apparatus of the patrimonial state exists today primarily as an elitist instrument. An assemblage of individuals in bureaucratic agencies carries on with a charade of authority, while substantial rule-bearing authority often lies outside of official channels. Implementation of policy is usually accompanied by bombastic intentions, but the beneficiaries of most programs are primarily those individuals who have access to bureaucratic channels. Beyond these elites, regulation is uneven and unpredictable. The new dispensations in African land tenure therefore exist primarily as the private preserve of political and commercial elites.

Some of the reasons for the failure of land reform in Africa include: low budgets, lack of qualified personnel, lack of clear policy directives, local resistance, corruption, and—first and foremost—the lack of political will (Manji, 2001; Hall 2004; Walker 2005). The picture that arises of the state of land reform in sub-Saharan Africa today is thus very similar to that in Brazil before the early 1990s when the MST's strategy of land invasions began. As described above, at that time, there was a strong demand from voters for land reform, but information asymmetries allowed the government to get away with just setting up a visible land-reform structure and program—effectively dedicating few resources and realizing very little actual redistribution. This is more or less the result of the political equilibrium regarding land reform in most African countries today. The policies are set up but not pushed through, benefitting primarily the governments, that can dedicate the resources elsewhere, and those well-placed individuals who can privately capture parts of the benefits.

The comparison with Brazil raises the possibility that land reform in Africa may evolve into a second stage where grassroots groups will become organized and develop strategies, possibly based on invasions and occupations, to force governments to step up the pace of land reform. By now there is ample evidence that the disappointment and frustrated expectations with the meager results obtained so far have already led to these types of manifestations. According to Manji (2001, 338), in Zimbabwe, even before land invasions became internationally publicized, there was "a silent class struggle over land with its invasion by the poor and landless … caused by impatience as the formal, legal mechanisms fail to deliver the land needs of the rural population." During the writing of this paper, an article in *The Times* (Clayton 2009) described the invasion of a 3,200 hectare farm in South Africa in the following terms: "An armed mob, angered over the slow pace of land-reform benefits, has launched a Zimbabwean-style invasion of one of South Africa's new multimillion pound showpiece agricultural reform projects." Further evidence of land invasions in several other African countries can be found, though no systematic data seems to be available. In South Africa there is even a Landless People's Movement, created in 2001, which admits to knowing and admiring the MST (Siguad 2005, 275).

Thus far the invasion of land in Africa has not had the same effectiveness as in Brazil, where it has become institutionalized as a necessary step through which land redistribution is accomplished and has led to distribution of land to millions of peasants. In South Africa, for example, invasions have been brutally repressed by both the government and landowners. What is missing in the case of African peasant-led land reform? According to Alston, Libecap, and Mueller (2008), the effectiveness of the MST is not due to their ability to physically invade and stay on the land but rather to their ability to pass information to voters on the government's true level of effort to solve the landlessness problem. Doing this is not an easy task, and the MST is successful due to a series of characteristics it possesses as an interest group, including low cost of mobilizing members for the arduous and drawn out tasks involved in transforming an invasion into a settlement project, as well as the credibility with voters that this is a true and worthy cause. These are characteristics that are hard to acquire and emulate, thus the exceptionalism of the MST's success.

The similarities to the Brazilian case suggest that for land invasions to effectively change the nature of the political equilibrium in land reform in Africa, the groups involved will have to become more organized andless fragmented, as well as manage to develop a means to make invasions an indirect instrument to obtain land. This might be accomplished by embarrassing governments into dedicating more effort, resources, and political will toward their land reform programs.[6]

Even if a peasant-led land reform does materialize in Africa, this does not mean that the results will be entirely desirable. In the Brazilian case, the large transfers to the landless peasants have taken place but at a very high cost. One of the main problems pointed out was the use of a single dimension to measure the success of the government's efforts. The fact that a similar problem currently pervades land reforms in Africa suggests that the lessons of the Brazilian case are indeed pertinent to the African context. Referring to South Africa, Walker (2005, 819) notes:

> The most common indicators of progress, across the board, are the total number of hectares transferred and people counted as beneficiaries – criteria that flow from the national discourse about land reform and transformation, rather than local project requirements. This discourse puts pressure on departmental officials to speed up land transfers in the interest of national results. It works to the detriment of actual projects, by hurrying the pre-transfer process and undermining prospects for strong beneficiary institutions, capable of not simply holding title deeds but managing ownership of their land effectively after transfer.

Lessons for fisheries Reform in Africa

The analysis of land reform in general and land reform in Brazil and Africa provide several lessons that can inform other processes of reform including fisheries in Africa:

1. The history of land reform throughout the world has shown that even reforms which seem eminently straightforward are often hugely complex and full of pitfalls. Inefficient outcomes are common and persistent.

2. The main reason for (1) is political. It is thus crucial to understand the political equilibrium under which the reforms materialize. This involves explicitly considering who the relevant players are, their preferences, powers, and arenas of interaction, as well as the political institutions, which determine how preferences get aggregated and outcomes determined. It is important to take into account the information asymmetries between all players.

3. The political debate usually focuses on a few margins that are used to evaluate the reform's progress and the players' achievements. The incentives will be for effort to be concentrated on these margins to the

detriment of other margins. Good policy design requires setting up incentives to generate effort along the desired margins.

4. The misevaluation of the reforms in (3) is a consequence of the political equilibrium in (2) and endogenously serves to perpetuate that equilibrium. This misevaluation may lead to faulty targeting of beneficiaries, benefits smaller than expected, and hidden costs not taken into account. The result is inefficient policies that do not deliver the intended benefits and result in large deadweight losses persisting despite the existence of clearly superior alternatives.

The success of any attempt to reform the use and distribution of natural resources hinges on the fit of the changes being sought with the extant political equilibrium. If a country attempts a reform that is incompatible with that reality, the effort will tend to result in inefficiencies and unintended consequences. Many times realities are such that the scope of what is feasible is significantly less than what is desired by the reformer. The history of land reform throughout the world has shown that, in such circumstances, heroic attempts to push a reform that is inconsistent with those realities has not been a winning strategy.

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Endnotes

1. These numbers refer to all land reform up to 2006, the bulk of which can be traced to the period of influence of the MST. Data from INCRA, the Brazilian National Institute for Colonization and Agrarian Reform, provided by http://www.cna.org.br/site/noticia.php?ag=1&n=12566.

2. In addition to the number of rural conflicts the authors also add dummies to all months of May after 2003 to capture the effect of the "Red April" yearly campaigns in which the MST's number of invasions spike. These dummies also show a negative and significant impact on presidential popularity.

3. These interactions are modeled in Alston, Libecap and Mueller (2008) as a multiple-principle, multiple-task relation in which several interest groups plus voters pressure the government for their preferred policies. Each group can offer contributions or votes, or they can influence the information received by the other groups on how much effort the government is putting into each task. The optimal mix of votes, contributions, and information manipulation chosen by each group depends on their characteristics and comparative advantages. The authors argue that the MST is particularly well suited to affect outcomes through the information channel.

4. Most studies of the settlement projects are financed by the government and are often less than impartial. One of the best (though still financed by the government) is de França and Sparovek (2005) that tried to measure the quality of the settlement projects through surveys in over 4,000 of these. An important conclusion that corroborates the point I am making is that:

> The methods which the government adopts to evaluate land reform (quantitative, counting the families that have been settled and the destination of resources), has the power to evaluate land reform through only a very simplified point of view. Through this view … the numbers are favorable. Thus, why invest in other important aspects if they will not enter the evaluation of the government's achievements? Why spend resources, dedicate managerial energy, implement actions that are out of the restricted lens under which its actions will be analyzed? The natural tendency is to invest in land acquisition (where it is more easily available or where the social movements are more active); to provide the minimal conditions to install the families in the projects and meet the quantitative targets suggested by the central administration. Aspects such as quality of life, economic development of the projects, environmental impacts, regional benefits and benefits to the local community outside the projects; take a secondary role under this form of evaluating performance (de França and Sparovek 2003, 37-38).

5. An important difference is the existence of community forms of tenure in Africa that do not exist in Brazil. There have been attempts in several countries to reform land tenure institutions by creating mandated property rights through the issuance of titles and the establishment of administrative agencies and courts, yet the community institutions have endured often intertwined with the new tenurial forms (Williams 1996, 213).

6. An important effect of the highly organized and national structure of the MST is to eliminate most of the potential corruption in the land-reform process because the group acts as a watchdog to make sure the rents flow to them instead of being captured by bureaucrats and politicians. The high levels of corruption in African land reform may be partially due to the lack of unitized and well-organized landless peasants.

Chapter 11

Australia's water reform effort: Progress and prospects

by

Jeff Bennett

I love a sunburnt country,
A land of sweeping plains,
Of ragged mountain ranges,
Of droughts and flooding rains

—Dorothea McKellar, "My Country"

The common perception of Australia is that of a dry continent. Indeed, Australia is the second-driest continent, outdone only by Antarctica. But the "average" dryness belies considerable geographic and temporal variability within the country. This variability created opportunities for those who have been able to access and control water for generating wealth and the political process used for securing it.[1] At center stage in the institutional saga of wealth creation from access to water has been the process for defining and allocating property rights. Over the past 25 years, important steps have been taken in Australia to improve resource-use efficiency through the establishment of secure property rights to water and the development of water markets.

The goal here is to provide a better understanding of the political economy of the water reform process in Australia in order to generate lessons for other countries facing resource allocation, use and stewardship problems.

Background

Prior to European settlement, aboriginal Australians used water in compliance with custodial obligations, which were a form of common property rights. With English colonization came English common law, and under the common law system riparian rights were introduced—those who occupied the lands adjacent to rivers and waterways were permitted to use the water resources without ownership of the resource stock per se (usufructuary rights). Rights defined in this way were overseen by court cases that considered the reasonableness of upstream activities on downstream riparians. Non-riparians were able to gain access to water through contracts with riparians, but they were not protected from the actions of upstream users (Harris 2005). This form of common property rights—whereby riparians were members of the "community of the river"—restricted the development and hence wealth-generation potential available from the storage and diversion of water because of the insecurity of rights held by non-riparians.

Around 1880, a series of catastrophic crop failures from droughts encouraged a growth of interest in irrigated agriculture—particularly for farmers with small land holdings. This new demand for irrigated agriculture was the catalyst for change in institutional arrangements. Up until the early 20th century, irrigation trusts were formed that were mandated by government to promote irrigated agriculture within specified districts. Concurrently, private irrigation schemes[2] emerged with riparians diverting water to their own lands. These schemes were the province of very large landholders who were able to avoid legal challenges of "unreasonable use" from downstream users.[3]

The most significant reform of the era, however, was precipitated by the 1884 Victorian Royal Commission on water supply. The commission was chaired by Alfred Deakin, who would later become the second Australian Prime Minister. A key outcome of the commission was the permanent vesting of all Victorian water resources in the Crown through the Irrigation Act of 1886 (Woolston 2005). Other states followed suit. Furthermore, the Act facilitated the commencement of government-sponsored local irrigation trusts through direct access to treasury loans to fund infrastructure and incorporation powers previously out of the reach of private collective schemes.

The trusts formed to take advantage of the Irrigation Act collapsed as a result of breakdowns in construction coordination and poor financial management. The experiment with a decentralized structure of water supply was deemed to have failed, and state governments instituted legislation that centralized the processes of water rights allocation along with forming government agencies to implement the legislation.

For the next century the various state governments allocated licenses to water upon application with the licencees' expectation that their licenses would be automatically renewed annually. These licenses were tied to parcels of land. Notably, consistent with the pro-development ethos of the day, the price charged for water by the state was less than the marginal short-run cost of supply. Depending on seasonal conditions and the management position taken by the state agency involved, irrigators were supplied with a proportion of the water they were licensed to use. For instance, in a dry year where supply capacity was already run down ,irrigators would be supplied with substantially less than 100 percent of their licensed allocation. To help overcome the uncertainty that this policy created, different classes of licenses emerged. For example, the state government in New South Wales issued "high security" licenses at higher cost to irrigators whose crops were particularly susceptible to a lack of water. Other predominantly inactive licenses called "sleeper" and "dozer" licenses were also instituted.

With demand for water increasing as a result of a growing population and additional supply storage options becoming more costly, the centrally administered allocation scheme became stressed in the 1990s. A clear signal of this stress was the imposition of a cap on extractions from the Murray Darling Basin. This river system drains much of southeast Australia entering the sea near Adelaide in South Australia. It is the most significant source of irrigation water in the nation.

In 1994, the federal government took the initiative for reform at the annual Conference of Australian Governments (COAG) meeting. By threatening noncompliant states with reduced access to funding, the federal government secured agreement from the states to move toward the use of the market mechanism as the means for reallocating water. The most significant features of the 1994 COAG Agreement were as follows:

1. Separation of water entitlements from land title
2. Clear definition of entitlements in terms of volume, reliability, transferability and quality
3. Development of water markets
4. Formal allocations of water for the environment.

Subsequent to the 1994 COAG Agreement, significant policy shifts were taken in all states to facilitate the formation of water markets. Entitlements were defined (on a grandfathering basis) separately from land, with water title registers being established. Markets developed as online trading systems tied into title registers. Yet problems remained with regard to the extent to which the resource had been overallocated in some states, and progress toward the establishment of "environmental-flow" allocations was limited. Water-sharing plans, under which agreement was sought between extractors and environmental interests as to the nature of the balance between competing water uses, proved difficult to negotiate and implement.

To further the reform process, the COAG agreed to the National Water Initiative (NWI) in 2004 (Tan 2005).[4] A key component of the NWI was the allocation by the federal government of A$500 million (US$460 million) over a five-year period to reduce the overallocation of the resource in the Murray Darling Basin so as to achieve

environmental-flow objectives. This support was dedicated to funding water-saving schemes such as the subsidization of water-efficient irrigation technology and the buyback of entitlements through open market tender. Particular attention was given in the NWI to design measures intended to increase permanent trades in entitlements—until 2004 temporary transfers dominated water market transactions. These measures included the removal of institutional barriers to trade outside irrigation areas and across state boundaries. This initiative was furthered through a requirement for national standards in water accounting, reporting, and metering.

In a comparatively short period of time, the allocation of Australia's water resources—particularly in the drought-prone southern regions—had oscillated from a decentralized common-law approach to a period of highly centralized allocation, with a market-based process that has the hand of government firmly in place in the design of the underpinning institutions and in the vetting of the outcomes. The NWI also involved the establishment of the National Water Commission (NWC). This commission has oversight of the implementation of the NWI and a responsibility for reporting on the progress made toward achieving the Federal Government's goals in water reform.

In the following discussion, I assess the progress made toward water marketing and water resource efficiency. I also address the key forces behind the reforms with the goals of providing a better understanding of the political economy of the Australian water reform process and of generating lessons for other resource reform efforts.

Outcomes

The inaugural National Water Commission *Australian Water Markets Report 2007–2008* points to the extent of trade in water as evidence of the success of the market-based approach to water allocation (NWC 2008). With A$1.68billion (US$1.56 billion) worth of transactions resulting in the reallocation of 2,515 gigaliters (GL) during the 2007–2008 period, it is clear that trading has resulted in the movement of the resource between users and hence in a reassignment of rights to those who are able to generate higher marginal net benefits from the resource. Despite this overall result, water trades remain predominantly within irrigation districts and are dominated by temporary transfers rather than permanent transfers.

Interestingly, the extent of the trades in a type of water allocation (64 percent of total transactions) reflects the drought conditions prevailing in the southern Murray Darling Basin during the 2007–2008 period. These transactions consisted of trades between traditional irrigators who decided not to crop and those who did. In particular, water was reallocated from both NSW and Victoria to South Australia at the bottom of the Basin. This impact is also reflected in the prices paid for allocations, which fluctuated widely throughout the year as the drought progressed. Notably, "high security" water in NSW, which has a higher probability of delivery in dry years, was priced from A$150 per megaliter (ML) to $1100 per ML.

Furthermore, trade in water entitlements was boosted by purchases made by the federal government for environmental purposes. These purchases made up eight percent of the 921 GL of total water entitlements traded. In contrast to the level of intrastate trade in allocations, only 200 ML of entitlements were traded across state boundaries. Prices for entitlements were less volatile through the course of the year, but they varied widely (A$1,000 to A$2,500) on a geographic basis across the Murray Darling Basin, where most trades occurred.

The efficiency of trade in water allocations is examined by Brennan (2006). The markets for such temporary transfers are generally public and online, such as those displayed by the online trading venue, Watermove.[5] Brennan finds the transfers to have low transaction costs, streamlined administration, and allowance for strong information feedback on trade characteristics. The drivers of price variations across space are found to be constraints on trade that are predominantly physical, such as rainfall, rather than bureaucratic, such as trade restrictions. Prices during the 1998–2005 period were shown to be reflective of information coming to the market regarding seasonal allocations. Peaks in price of around A$500/ML were associated with the drought during the 2002–03 period. In particular, Brennan points to the temporary market as the arbitrageur of seasonal risk.

The significance of trade in periods of drought is also highlighted by Frontier Economics (2007). This consulting group stresses the risk management potential provided by trading allocations whereby irrigators (for dairying) in northern Victoria have been able to endure ten years of abnormally low seasonal availability of water. For the market in entitlements—the permanent market—they use the growth in new industries such as wine and horticulture in the lower reaches of the Murray River to show how trade has facilitated new plantings on previously unirrigated land, with associated employment and investment. Of course, the growth caused by trade in permanent rights is offset by the decline of other regions and industries.

Frontier Economics (2007) also recognizes the social costs of such adjustments. They point particularly to the strong community opposition to the permanent trading of water entitlements out of irrigation districts. This has been the cause of government policy that restricts such trades to below 4 percent of total entitlements in any irrigation district in any given year.

In terms of environmental outcomes, the establishment of water-sharing plans in individual catchments designed to determine the overall split of the water resource between extractive and environmental uses has proven difficult, especially in catchments where the available water had previously been overallocated through the administrative issuance of licenses. The negotiations that led to the water-sharing plans have involved government agencies, irrigator representatives, and environmental interest groups. The low prospect for these negotiations to deliver economic rents to the various interests groups is responsible for the difficulties encountered in reaching agreement. Where agreement has been reached, questions remain as to whether or not the outcome is in the best interest of society at large. This remains one of the key outstanding issues in the continuing evolution of property rights to water and the use of markets as an allocation tool.

Outstanding issues

The initiatives taken to define, defend, and trade rights to water use in Australia have transformed the process of water allocation from one that twenty-five years ago was dogged by administrative cost and vested interest groups seeking political favor—also known as rent seeking. It was thus characterized by gross inefficiency. The situation today is one in which flexibility is key, transaction costs are low, and efficiency improvements are apparent. However, it should not be concluded that Australia has a market-based water allocation system that is fully mature.

Environmental flows

The allocation of water entitlements between extractive and environmental uses remains problematic. Little environmental improvement has been observed in the major, overallocated rivers, particularly in the Murray Darling Basin, since the inception of the NWI program for the government to buy back water entitlements from irrigators. This has, however, largely been the result of the severe drought conditions experienced in the region. Thus, while the government now holds entitlements to be used for environmental flows, delivery against those entitlements has been limited because of a physical lack of water. Only very environmentally sensitive areas, including wetlands such as the iconic Macquarie Marshes and river side stands of trees such as the river red gums along the River Murray, have been watered, given the overall scarcity of the resource.

The federal government has also been accused of using taxpayer funds to buy “dry water” for the environment (Grafton, Bennett, and Hussey 2007). While announcing the purchase of say 100 ML of water, the government has effectively only secured access to a fraction of that amount because of the extent to which the river system is overallocated. Even in the wettest year, 100 percent of an entitlement is not delivered because more than 100 percent of the water has been allocated.

The process by which the extent of environmental flows in rivers has been determined has been based more on politics than economics. In both New South Wales (NSW) and Victoria, studies have been conducted to estimate the values of environmental flows to enable trade-off analyses to be performed. Morrison and Bennett (2004) used the

nonmarket valuation technique called Choice Modelling to estimate values associated with improved river health for five NSW rivers. The objective was to establish a database of values useful to the process of transferring the benefit estimates from already completed studies to other rivers across the state where value estimates were not available. Bennett et al., (2008) performed a similar exercise for Victorian rivers. Both studies were commissioned by the state government agencies with responsibilities for developing their state's water sharing plans.

Nonetheless, the political forces at work within the committees trumped the input of cost-benefit analysis informed by environmental value estimates. Interest group representatives generally prefer to rely on the strength of their political influence rather than on an objective analysis of costs and benefits, the results of which *a priori* cannot be known. To date, the use of cost-benefit analysis in the determination of environmental-flow objectives has not been mandated by the federal government under a COAG agreement, even though it has been for other policy initiatives. Policies advanced by government agencies are generally required to be supported by a Regulatory Impact Statement (RIS) in their passage through the parliamentary decision-making process. This approach is a direct attempt to infuse objectivity into policy making and reduce rent-seeking (Commonwealth of Australia 2009).

The debate regarding the appropriate extent of environmental flows is muddied even further by reference to long-term requirements for allocation adjustments due to global climate change. This argument has had an impact on water trading for extractive uses. While governments have sought to reallocate water from extractive to environmental uses through purchasing entitlements in the open market, there remain concerns that future policy may simply involve compulsory acquisition, with no compensation or at below-market prices. This has generated uncertainty in the market for permanent trades in entitlements and caused a reduction in trading volume. Buyers make do with annual allocation transfers rather than taking on the sovereign risk carried by the entitlement. Hence, the water entitlement market has been dominated by a single buyer—the government for environmental-flow water—and it remains unclear if the associated market power has distorted prices both in the permanent entitlement market and hence into the temporary allocation market given that the two markets effectively supply substitute goods.

A further dimension of the efficiency of environmental-flow allocations relates to the mechanism used to manage environmental flows. The federal government has taken a major role in purchasing entitlements for environmental flows. However, state governments have also been active purchasers and have managerial responsibilities. In addition, a number of private-sector "trusts" have been established specifically to secure water entitlements to benefit the environment. This move has followed the successful operation of a number of not-for-profit private organizations, such as Australian Bush Heritage, set up to receive public donations for the purchase of ecologically significant landholdings to be managed for nature protection.

Bennett (2008) concludes that coordination of the purchase of these alternative sources of environmental water has been lacking, with each purchaser being largely unaware of the extent of environmental water entitlements secured by alternative suppliers of the same public good benefits. The potential is for an overallocation of water entitlements for the environment. Furthermore, coordination protocols for the management of water releases for environmental benefit have not been established. Again, too much or too little water for the environment may well be the outcome.

Stranded assets

Further, regulatory limits have been placed on the water entitlements market. The political backlash from entitlement sales depleting water allocated to specific irrigation districts has resulted in limits being placed on interdistrict entitlement sales. The specific issue of concern is the creation of stranded assets. With irrigators leaving a district, the costs of operating and maintaining the fixed infrastructure used to deliver water to farms are shared by fewer and fewer farmers. So long as remaining farmers are paying only the variable costs of infrastructure operation, then allocations will be efficient (Heaney et al, 2006).

Equity issues are also involved, but because of the positive response from irrigators to the trading of allocations and

entitlements to manage periods of drought, these equity issues are being reconsidered by the regulators. Irrigators seeking to leave the sector due to drought are allowed a "soft-landing" through the sale of their entitlements out of the drought-affected district. With this in mind, the NWC has appealed to the government for an easing of the limits on interdistrict entitlement trading (NWC 2008).

Water accounting

One source of remaining inefficiency, in both extractive and environmental uses of water, is inappropriate accounting for water. In effect, a failure to account for water as it progresses through the collection and distribution system amounts to a failure to define water entitlements and allocations accurately. Young and McColl (2009, 34) assert that "the result is the emergence of a suite of misentitlement (sic) and over-allocation problems." A specific issue raised is the omission of plantation forestry from the accounting system. With each hectare (ha) of plantation reducing surface water yields in the catchments of southeast Australia by 2.5 ML/ha and the groundwater supply (once the trees are mature) by 1.66-2.55 ML/ha, the impacts of large-scale expansions in response to greenhouse gas emissions trading schemes are clear. Failing to account for these uses would result in an overallocated system. The proliferation of small farm dams for stock and domestic purposes acts in a similar way.

Gathering the necessary information to provide an adequate accounting system is costly. While a good understanding of the impacts of trees and farm dams on water flows may be available, accounting for interactions between surface and groundwater is more complex. Yet it is apparent that efficient use of the water resource as a whole requires the management of ground and surface water as a single entity. During the water-reform process, it was frequently the case that entitlements were established to surface water prior to the consideration of the groundwater. The result was a shift to bore-supplied water as it became comparatively cheaper than accessing surface water. Today most groundwater entitlements have been defined in the catchments. However, their interaction with surface water supplies is sometimes problematic. For instance, bore-supplied water located close to a river can cause a "gaining" river (one that has its flow augmented by groundwater) to become a "losing" river (one that loses water as it flows downstream). The bores in that case effectively act to draw down the surface water supply without consequence in the surface water market.

Reductions in extractions are usually heralded as being positive for the environmental condition of a river, and many government initiatives have been taken to support irrigators investing in water-saving capital (such as drip irrigation) and to improve the delivery efficiency of water delivery channels (such as lining to prevent seepage). Increasing water prices has also triggered such investments privately.

What has generally been ignored as a result of these water savings is the reduced levels of infiltration into the groundwater and reduced irrigation returns to the river. So while reductions in evaporation can be taken as real savings, other impacts cause costs to the water accounts, particularly because most entitlements in Australia are defined as gross rather than net (as is common in the United States).

Under the NWI, research has been commissioned to structure a system to account for water that is independent of state boundaries. Water accounting differences across states have been major obstacles to interstate trade. Of course, such initiatives are also instrumental in the development of a nationally consistent and transparent water title register. Without such a register, certainty of title remains in doubt. Without title certainty, trade in entitlements is likely to remain limited compared to trade in allocations.

Storage

The emphasis of the water reform process across Australia has been on capturing the gains from trade that emerge from differential marginal net benefits of water use at different sites in catchments. The relocation of water from low marginal net benefit to high marginal net benefit has been a strong efficiency outcome of the process.

Relatively little attention has been given to potential inter-temporal efficiency improvements. Yet in southeast Australia, where annual rainfall variability is a prominent climatic feature, differences in marginal net benefits are likely to be large and hence accounting for gains from inter-temporal trade could be expected. Brennan (2008) points out that, historically, both the Victoria and New South Wales governments have offered only limited use of their dams for centralized storage across years. Irrigators wishing to carryover allocations between seasons have been required to build on-farm storage capacity at comparatively high costs and with comparatively high evaporation loss. Brennan demonstrates that the omission of a storage market distorts the spatial market. Most recently, this omission has been recognized with state governments permitting limited carryovers. The change in policy, however, does represent a considerable increase in storage management complexity, especially in systems where hydropower generation and flood mitigation offer competing demands for storage capacity.

Brennan's result is supported by Young and McColl (2009), but they go further by advocating the alternative definition of entitlements as shares of storage capacity. Under their proposed scheme, water users (irrigators, miners, cities, hydropower generators, or flood mitigation authorities) would compete for space in the storage dams. Their willingness to pay would be conditional on their expectations of a return from water use as well as the losses they would expect in transmission.

Urban water

The allocation of water to the major urban centers of Australia has been treated very differently from water for irrigation in the reform process. This is despite the prospects in some cities, and the reality in others, of the same water being available for use for both urban and irrigation uses. Trade between the two markets has usually been highly regulated or completely banned. Hence, potential gains from trade arising from stark differences in marginal net benefits have not been utilized. Where the trade has been allowed, such as in Victoria with the construction of a pipeline from rivers used for irrigation supply into the Melbourne supply network, protests from irrigators and dependent rural communities have been strong.

Without water otherwise destined for irrigation and with environmental pressures preventing the construction of new dams, increasing demands for water have had to be met by existing supplies. Prices have generally played a secondary role in the rationing process. Most often, quantitative restrictions have been enforced, with resultant welfare losses (Grafton and Ward 2008). Water supply authorities, usually statutory authorities of government, have also attempted to reduce demand by advertising campaigns and the subsidization of water supply alternatives such as rainfall collection tanks on individual houses and water saving devices such as low-volume shower heads. Non-dam supply augmentations have also been initiated. For instance, third pipe schemes have been mandated in new housing developments whereby waste water from the laundry is plumbed for reuse to flush toilets or water gardens. Desalination plants have also been built or commissioned in Perth, Melbourne, Sydney, and Brisbane. The majority of these initiatives have resulted in higher marginal supply costs than either diverted irrigation supplies or supply augmentation from constructing new storage dams (Byrnes, Crase, and Dollery 2006).

The volumes of water involved in supplying urban water demand are dwarfed by those used in irrigated agriculture, yet the number of urban people affected by policy is higher and the potential for welfare improvement through the reform of allocation remains significant. Prices paid for urban water fail to reflect the scarcity of the resource, particularly given that they are largely constant over time no matter how severe the drought. Supply restrictions are used to perform the bulk of the rationing task despite their inefficiency, largely on equity grounds (that it's "unfair" to let rich people have access to water when poor people can't afford it). Proposed schemes based on a free base-level allocation of water per household and designed to satisfy core needs with incremental use thereafter based on long run marginal opportunity cost pricing, have been rejected by supply authorities.

Political economy

When water supplies in Australia became relatively scarce, the allocation of the available resource also became politically contentious. The interests of irrigators who sought to have water made available away from river frontage areas were key drivers for the move away from English common law to the vesting of use rights with the Crown. Through this change the access to the wealth that was predicted to come from irrigation was achieved through political processes. The developers were able to avoid the purchase of river frontage land, and the prospects of causing "unreasonable impacts" on downstream users. With water rights available through the political process due to Crown ownership, the path to secure rights was political sway. This was by far the cheaper option for the irrigators and a century of rent seeking in water took hold.

Farmers seeking to gain access to water simply had to apply for a license. State governments were enthusiastic supporters of the economic development that came with the increasingly dense settlements in regional districts. Little attention, however, was given to the physical constraints to this development route—notably the overall availability of the water resource, its variability through time, its quality in terms of suitability for irrigated crops, and the impacts of extraction on the environmental viability of the river systems. It is said that politicians facing an up-coming election would quip, "I feel a dam coming on."

As the 20th century matured, a number of key changes occurred in the irrigation situation and the political scene in Australia. First, the supply of water began to hit overall availability constraints. This meant that irrigators were seldom able to access their full entitlement, even in normal rainfall years. Particularly in NSW, the rivers of the Murray Darling Basin were overallocated. Second, quality issues began to emerge. Salinity brought about by excessive levels of tree clearing for dryland agriculture in river catchments and low flow levels to flush the salt out of the system began to impact water availability. Large-scale works to reduce salt levels, including pumping saline groundwater close to the rivers to remote evaporation ponds, were started. Both of these events concerned irrigators. Existing license holders found that their access to water was reduced due to the issuance of additional licenses.

The deteriorating environmental health of the inland rivers was another noticeable change. Not only were conditions declining, but the media began to run stories about the decline in the popular press. Toxic blue-green algal blooms along the Darling River in western NSW, dying stands of river red gum forests, drying wetlands, and a threat of extinction to the iconic Murray Cod made good copy at a time when environmental awareness was on the rise.

Changes in the political climate were also underway. Over the century, Australia's population had gradually become concentrated in the large cities as agricultural enterprises became larger and more capital intensive. Electoral boundaries also shifted with the changing population concentrations. The political balance shifted from rural to urban dominance as more electorates were established in the cities at the expense of rural seats. Successive state governments realized that there were more and more votes, and hence more seats, available to them in the environmentally conscious city electorates than those in the country with irrigation dependency.

Policies therefore became more driven by concerns for the environmental flows in rivers than by pressure for increased extraction. And changes in policy toward the allocation of water by competitive market processes were not met with rejection from irrigation lobbyists because of their realization that reform was necessary from a purely production-based perspective in the over-allocated systems.

At a broader level, water reform was being instituted at a time of unprecedented cooperation between environmental groups and the farming lobby. For example, the "Landcare" movement was launched to unite local groups of farmers with those interested in environmental conservation to tackle natural resource management programs on privately owned farming land. Landcare was a joint initiative of the National Farmers' Federation (a farmer lobby group) and the Australian Conservation Foundation (an environmental lobby group) and was able to secure significant federal funding. The approach of forming an alliance between rural and environmental interests turned out to be as productive as a rent-seeking strategy.

The political pressure from irrigation interests stemmed from concerns for adequate compensation for the rights embodied in licenses. While licenses were issued only on the basis of annual allocations at the behest of the government, the consistency of decisions over a century of policy had provided a market capitalization for the licenses in the land market. Allowing licenses to lapse would have resulted in capital losses to license holders.

Hence, when reform commenced in 1984, licenses were effectively "grandfathered" into entitlements, and successive governments have allocated funds for the purchase of overallocation entitlements. Such purchases have been controversial because of shifts in patterns of settlements around and between irrigation areas. Governments have, therefore, tried to increase water-use efficiency through capital investment—the logic being that the same irrigation enterprises may be able to survive with less water if efficiency could be increased. The problem with this logic, however, is that it ignores the flows of water, such as those to the groundwater and returning to the river from irrigation, that were characteristic of the previously management practices.

The political power of irrigation interests remains a key factor in the continued inefficiency of urban water supplies. The unwillingness of governments to allow transfers of water from relatively low marginal net benefit irrigation uses to higher valued urban users relates to an unwillingness to see rural electorates harmed by a further overall reduction in water availability in favor of their city cousins. Some sympathy for this position is felt in city electorates. There is, however, little understanding in city voters' minds of the comparative costs of water supplies between, say, desalination water and the opportunity cost of water in irrigation and little by way of political imperative for governments to improve that understanding.

Concluding remarks

Well-defined property rights remain the key to the water reform process in Australia. The gains from trade that have been enjoyed as a result of the past 25 years of reform have largely come from the separation of water title from land title—creating independently tradable assets. Markets emerged once the rights were well defined. However, the devil is in the details; property rights to water have yet to be defined with complete accuracy, certainty, and universality.

Water marketing has the potential to achieve further efficiency in Australia. Issues regarding the accounting protocols for water are critical in this regard. Holders of entitlements also need to have security of title, without fear of "sovereign risk," particularly as it relates to potential confiscations by the state to secure environmental flows. Consequences for third parties also need to be covered in the property rights definition. Water quality is a clear example of an omission from the current rights regime, but others relate to inter-temporal use and associated infrastructure. These are matters that are forming the ongoing debate in Australian water policy circles.

Perhaps the most serious omission with regard to the definition of property rights to water relates to environmental use. Because of the non-excludable nature of some of the benefits associated with environmental flows, property rights regimes have not extended beyond water for extractive use. Trade, therefore, has not been used as the mechanism for sending signals to water users and suppliers as to the relative marginal net benefits of extractive and environmental uses. Rather, that determination has been made in the political arena with results that remain hotly debated. Information regarding the marginal benefits of the various nonmarket benefits of environmental flows is surfacing ,but political processes have yet to take full advantage of that knowledge in cost-benefit assessments of alternative allocations.

Two alternatives for dealing with the environmental allocation issue are emerging. The first is the use of Multi-Criteria Analysis (MCA) as a decision-making tool in the policy process. MCA involves the prediction of alternative-flow regime outcomes in terms of a number of analyst-selected criteria. These measurements are then standardized mathematically or otherwise "scored" using a single scale and aggregated using criteria "weights" that

reflect their relative importance. MCA is criticized by economists for its conceptual failings (Commonwealth of Australia 1999), but it is increasingly being used in water policy making. Dobes and Bennett (2009) put its success down to the technique's apparent conceptual simplicity, ease of application, and capacity to be manipulated to produce recommendations that suit the political imperatives of the context. For the final reason alone, the MCA alternative should be rejected.

A more promising avenue for dealing with the demand for environmental flows is emerging through private-sector action. While it is apparent the a core level of entitlements has been purchased by government to supply environmental services, the establishment of private water trusts may be able to act as fine-tuners in optimising the division of rights between extractive and environmental uses. In Australian terrestrial nature protection, various private-sector conservation trusts have been actively purchasing land to supplement the estate of government-owned national parks. They have arisen to satisfy a demand from the general public for more terrestrial nature protection than the state has provided, and they have been able to do so, despite free-riding incentives, through public donation. Admittedly, these trusts do not operate completely outside the auspices of government as donations to them are afforded tax-deductible status and some purchases have been assisted on a dollar grant for dollar donation basis.

Competition between private water trusts would generate improved cost structures as well as a focus on outcomes achieved from water entitlement purchases. The prospect exists for private water trusts to become the managers of the environmental-flow entitlements already purchased by government. Such a policy would not necessarily involve the transfer of ownership of the entitlements but would provide superior incentives for managing the environmental flows to achieve improvements in environmental health outcomes.

The flexibility in management of environmental-flow entitlements provided by private management could also generate improved efficiency of water use across the extraction/environment divide. For instance, extractive flows tend to be most valuable in the dry summer season in southeast Australia. In contrast, environmental flows are of greatest value in the wetter winter months when natural flooding patterns have been most severely disrupted by dam storage. Additional water at this time allows for the restoration of flood plain connectivity so that water-dependent forests and wetlands can be protected. Entitlements, for example, can be used to augment or prolong a naturally occurring flood so that bird breeding can be sustained through the hatching and fledging stage. The difference in timing between the peaks of marginal net benefit from water supplied to the alternative uses indicates the prospects for trade to generate improved net benefits for society. Astute water managers from both sides of the extractive-environmental divide are aware of opportunities to trade across the divide.

Just as gains from trade are likely to be achieved if barriers between extractive and environmental water uses are removed, other barriers in water trade need to be dismantled in order to encourage resource use efficiency. As a federation of states, the Commonwealth of Australia has evolved with various water management regimes in the constituent states. Different institutional structures have needed to be dismantled and reassembled in order to allow for the development of water markets that extend across state boundaries. The COAG reform process, under which the federal government took the lead in pressuring states to adopt uniform institutions through financial sticks and carrots, has been critical in this regard. The process, however, is ongoing although negotiations between states are often difficult when trades take water away from some states in favor of others. Restrictions to trade in entitlements between irrigation districts, designed to ease industry and consequential social adjustments, must also be removed. Equity arguments remain.

There are many lessons to be learned from the water reform process experienced in Australia. These are fundamentally about the gains from trade that are available when property rights to a resource are adequately defined, defended, and divestible. But with a mobile resource such as water, achieving these "3-Ds" of property rights has not been easy either from a technical perspective or politically. For instance, understanding and accounting for water flows is technically challenging and requires the services of both surface- and ground-water hydrologists. The implication is that there are significant transaction costs involved in the process of securing gains from trade. No analysis of the extent of these transaction costs has been attempted, yet it is apparent that taxpayers

have met many of them through payments made to government agencies at the state and federal levels. The politics of water have allowed the commitment of these funds. This, in turn, has involved the coordination of numerous interests: irrigators, environmentalists, and state and federal legislators.

While political agreement does not indicate an efficient use of resources and often can be taken as an indicator of the opposite, the continuation of the water reform process should be considered in light of the gains likely to be achieved relative to the transaction costs incurred. With the marginal benefits of reform becoming smaller as the process advances, and the associated marginal costs rising, the time will come when further reform should be abandoned. That is not to say that future change should not occur. To the contrary, the importance of designing institutions now that can cope with changing conditions, in both supply and demand dimensions, in the future in order to deliver changing water-use patterns is crucial.

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Endnotes

1. Government entitlements to water, for example, became an important tool for farmers to generate wealth for themselves.

2. Many of these schemes were established as trials of alternative irrigation technologies and were used to extol the benefits of irrigated agriculture (Harris 2005, 47).

3. Riparian rights did not extend beyond use for stock and domestic purposes. For other uses, effects on downstream users were considered by the courts using a precedent test of "reasonableness."

4. The NWI involved the establishment of the National Water Commission (NWC), which oversaw the implementation of the NWI and reported on the progress made toward achieving the federal government's goals in water reform.

5. See: http://www.watermove.com.au/.

Chapter 12

Lessons for fisheries reform and development assistance

by

Donald R. Leal

Achieving healthy ocean fisheries is one of several key economic and environmental goals for this century. Fish is the main source of animal protein for over one billion people worldwide and is particularly important as a cheap protein source for people living in Africa, which include some of the poorest countries in the world (Cunningham and Neiland 2009). For the world economy, fisheries generate over US$91 billion in first-sale revenues and provide jobs for more than 170 million people (FAO 2009). Taking into account immediate family, about 520 million people probably depend on healthy fisheries, or 7.9 percent of the world's population (FAO 2009).

Unfortunately, efforts to reform fisheries facing crisis or issues of underperformance have repeatedly failed over the years. At a global level, fisheries simply have not delivered reasonable economic, social, or even sustainable outcomes. On the biological side, the health of the world's marine fish stocks has exhibited an overall decline over the last 24 years, although the number of troubled stocks appears to have stabilized in recent years. According to the United Nations Food and Agriculture Organization (FAO 2009, 30), in 2008,about 28 percent of marine fish resources were "overexploited, depleted, or recovering from depletion;" 52 percent were "fully exploited;" and 20 percent were "underexploited or moderately exploited." n 1974, the percentages were 10 percent, 50 percent, and 40 percent, respectively (FAO 2009, 33). In other words, the percentage of stocks overexploited, depleted, or recovering from depletion increased 2.5 times, and the proportion of stocks offering potential for higher catches declined from 40 percent to 20 percent since the mid-1970s. Many factors (such as ocean temperatures, pollution, and habitat damage or loss) contributed to this situation, but the primary threat remains overfishing (Sutinen 2008, 6).

Fiscally, the world's marine fishing sector is heavily dependent on government support. In 1992, the FAO published a report that estimated that the world's fisheries ran an annual deficit of $54 billion (FAO 1993, 18). Reasons for the large deficit include overfishing and overcapitalization (FAO 1993, 21). Milazzo (1998) later estimated that the aggregate level of subsidies to the fishing industry was between $14 and $21 billion a year. More recently, Sumaila and Pauly (2006) estimated that the world's fishing sector is subsidized at between $30 and $34 billion a year.

Although dismal enough, these assessments actually understate the poor economic record of the world's marine fisheries because they fail to address the potential wealth (what economist call resource rents) being squandered by mismanagement. Regarding the issue of rents in fisheries, Wilen (2005, 65) states the world's fisheries "… ought to be generating $80 billion in rents per year, instead of losing $30 billion per year."

A recent report by the World Bank (2008) provides additional insights regarding the enormous inefficiencies in the world's fisheries. For example, after a long period of rising catches, the world catch has been stuck in the range of 80 to 85 million tons per annum since 1990. The nearly stationary output has been accompanied by a notable increase in the number of vessels (an increase of about 100,000 decked vessels from 1990 to 1998) and fishers (an increase of about 5,000,000 between 1990 and 2000) around the world (World Bank 2008,12, 14). So while inputs have increased, output has remained stagnant, resulting in decreasing productivity. This decrease in productivity has occurred despite considerable technological change in fisheries (for example, sonar for locating fish and GPS for navigation) (World Bank 2008,14). Using conservative assumptions, the report estimates the loss in potential wealth (also called resource rents) in the world's fishing sector is on the order of $50 billion dollars per year. At a modest discount rate, this amounts to some $2 trillion in lost wealth over the last three decades.

Two worlds, the same fate

The failures occur in fisheries of developed and developing countries as well as in the application of development aid to fisheries. Many European Union fisheries, for example, are plagued by depleted stocks and fleet overcapacity. A study by Asche, Bjorndal, and Gordon (2008) finds the resulting loss in rents in Norwegian, Danish, and Swedish fisheries to be 65, 67, and 50 percent, respectively, of landed value. Dupont (1990, 1991) found that half of the fleet in the British Columbia salmon fishery is not needed to catch available salmon after escapement goals are met. A later study by Dupont (2000) estimates the loss in rents in that fishery to be on the order of 33 percent of the landing value. In some cases, there have been spectacular failures. Despite years of management, cod stocks off Canada's Grand Banks collapsed in 1992, throwing tens of thousands of fishers out of work in Atlantic Canada (Brubaker 1998). In the United States, the red snapper fishery in the Gulf of Mexico was severely depleted in the early 2000s even though the fishery had been placed under a series of increasingly tighter fishing restrictions over the prior fifteen years. In fact, there was strong evidence that the tighter restrictions (such as a rise in the minimum size for legally landing fish) led to higher fish discard mortality (Leal, De Alessi, and Baker 2005, 5–6).

In the developing world, fisheries are suffering the same fate. In Vietnam's Gulf of Tonkin, there is evidence of fleet overcapacity and depleted fish stocks.[1] The loss in net economic benefits is equal to about 56 percent of the current level of benefits. In Bangladesh, the hilsa shad (Tenualosa ilisha) fishery has little or no net economic benefits.[2] Reducing fleet excesses would help attain potential annual rents on the order of US $260 million. In Namibia, the hake fishery has a reputation for being comparatively well managed.[3] The rents in 2002 were estimated to be N$222 million. However, there are indications that stock levels are too low and fleet size too high for optimal wealth. If stocks were allowed to recover and fleet overcapacity was eliminated, rents could potentially quadruple to N$1200 million.[4]

Failures in developing countries point to another problem: development aid. Rather than trying to improve fisheries management, international aid has focused on building up fishing power and supporting industries, while ignoring natural resource limitations (Bailey 1988). In addition, there has also been little regard for the social problems caused when aid to large-scale fleets puts small-scale fishers and local communities at a competitive disadvantage for the fish. In poor coastal regions of Africa and Asia, small-scale fishers represent 90 percent of those employed in fishing industries, and they produce the majority of all fish for domestic consumers. Many aid projects exacerbate already stressed economic, social, and biological conditions in fisheries.

Why failure is systemic

Why has reform repeatedly failed to produce reliable economic, social, and even sustainable outcomes? To address this question, we must first recognize a longstanding problem in marine fisheries—the lack of property rights to the resource. By contrast, resource stewardship and wealth creation in grazing cattle, cutting timber, or digging for coal were accomplished long ago through well-defined and enforced property rights (Scott, this volume). Because ocean fisheries lack property rights, they are prone to the "tragedy of the commons" in which no one has an incentive to save fish for the future; saving fish means they will be available to others to catch (Hardin 1968).

In 1954, H. Scott Gordon articulated the economics of the fishery problem, focusing on the tendency for fishers to dissipate the potential rents from the resource when rights to the fish are nonexclusive. Scott (this volume) writes, "Gordon's theory predicts that when fishers have nonexclusive rights, the group of fishers as a whole will end-up catching and marketing more fish than the amount that would maximize their incomes and society's rent." Today, Gordon's explanation is taken further. In the race to capture rents before others, fishers not only deplete the fish sock of marketable size fish, they invest in bigger and faster boats and more sophisticated gear. They take on larger crews and fish longer. They become "locked into 'racing' for the fish."

The conventional approach to fisheries reform ignores the fundamental problem of rent dissipation brought on by nonexclusivity and instead focuses on treating the symptoms (overfishing, overcapacity, and conflicts among users) with government regulations, which raises the cost of fishing. The results have been wasteful, even absurd at times. For example, at one time oystermen in the state of Maryland (USA) could use dredges but had to tow them behind

sailboats on all but two days of the week when motorized boats were allowed (Christy and Scott 1965). While such regulations drive up the costs and discourage some fishing effort, they also encourage fishers to seek other ways to capture rents. For instance, limits on vessel size encourage investment in more boats, larger crews, and more sophisticated gear; specifying which days of the week one can fish encourages more intensive fishing on those days; and so on. Christy (1976) estimated that the overcapitalization and overuse of labor in American fisheries cost US$300 million per year or, at a 6 percent discount rate, the equivalent of a $5 billon investment. In the end, excessive fishing effort still results due to the absence of property rights.

In response to such failures limiting the number of licenses was introduced in Western fishing nations in the 1970s and 1980s. It had success initially, as scientists had predicted. A reduction of effort allowed stocks to grow, and institutionally it even had some degree of exclusion and trade associated with full-blown property rights. The problem was that there was no direct way to control the amount an individual could catch for the season (Scott, this volume). A limited number of fishers still raced to capture rents; they still found regulatory loopholes to catch as many fish as possible, as quickly as possible. Eventually, excessive fishing effort and stock depletion reappeared.

Another problem (one that still exists today) is that the annual catch is set by a government regime that focuses on conservation, not maximizing rents. The "conservation" standard is to approximate the maximum sustained yield of the fish stock. This measure has recently come under widespread criticism in the scientific community for being isolated from other biological factors, such as species interdependencies. Knowing the correct level is difficult at best, given the environmental uncertainties. Moreover, as numerous economists have demonstrated, maximum sustained yield is a biological, rather than an economic, standard which may be greater or less than the quantity which maximizes the rents in the fishery (Tietenberg 1988, 260).

New directions in fisheries management

There is, nonetheless, growing evidence that recent reform pathways based on property rights are showing signs of success. One of these is based on the idea of limiting the quantity of fish each license holder in a fishery is allowed to land each season. Each holder's exclusive quantity of quota is associated with a given percentage of the total allowable catch. When individual quotas are tradable, they are called individual transferable quotas (ITQs). While ITQs do not convey rights to the fish stocks themselves, they do possess all of the desired property rights characteristics described by Scott in this volume.

Overall, practical experience indicates ITQs have produced considerable benefits. They have generated higher incomes for fishers, improved product quality for consumers, reduced fleet excesses, and nearly eliminated instances in which the actual harvest exceeded the total allowable catch. There is growing evidence of rents being generated in fisheries following adoption of ITQs For examples, see Wilen (2005), Cunningham and Bostock (2005), Scott (this volume), and Anderson and Libecap (this volume). There is also growing evidence that fishers with ITQs become concerned with improving management of the fishery, because they now see it as helping add value to their catches and to the ITQs they hold (Scott, this volume). Before ITQs, groups of fishers could hardly be expected to work together for the good of the fishery. With ITQs, a number of fisheries are showing evidence of fishers working together to improve fish stocks and implement rules for harvest in cooperation with the state.

ITQs have been adopted largely in developed countries. New Zealand and Iceland use ITQs to manage nearly all their commercial fisheries; Canada and Australia use ITQs in quite a few of their fisheries; and the United States, Estonia, Greenland, and the Netherlands use ITQs for selected fisheries. For those developing countries in transition to more reliable legal institutions and stronger governance, ITQs are beginning to show up in selected fisheries. Chile uses them for some species; Peru recently adopted them in its anchovy fishery; and Argentina has plans for ITQs in several coastal fisheries.

In the lower income tier of the developing world, ITQs are quite rare simply because the necessary legal and fiscal frameworks and management capacity are either nonexistent of unreliable. In addition, the characteristics of many developing-world fisheries make administering ITQs more challenging. Many fisheries have large numbers of

fishing enterprises selling mixed catches in many locations, making monitoring difficult. Additionally, the manpower and technology for tracking and policing catches is not available.

Although ITQs generate considerable benefits, they are found in less than two percent of the world's fisheries (Costello, Gaines, and Lynham 2008). Since they determine who gets what, they remain controversial and difficult to implement.[5] As previously mentioned, in developing countries the conditions for ITQs to be feasible are typically absent. Under these circumstances, exclusive fishing rights granted to nearby coastal communities or fishing cooperatives are likely to be more practical. Defined rights could be in terms of community quota for mobile fishes or area rights for less mobile species. With community quota or a community areal rights, it is critical that there be legal support to give the group the right to organize and to require everyone with rights to fish to become members in order to protect against free riders. The organization should have the authority to levy fees to enable it to carry out its work effectively. It should be legally empowered to make rules and to enforce them. Notably, the authority to protect itself from nonmembers is essential for the organization to cope with the most common threat to traditional area-based management systems, namely the intrusion of outside, often industrial, fishing activity. Legislation is necessary to protect areas from outsiders. The role of government is in terms of maintaining an institutional framework to enable those with rights to fish to transact business and govern themselves (Thompson, this volume).

Because these arrangements are formed voluntarily and rely on cooperation, their occurrence depends on certain preexisting conditions. For example, the participants forming the group must possess a sufficient common interest (such as coming from the same community or using the same gear type) to make negotiations feasible. If not, it behooves reformers to identify groups with homogenous interests and assign to them exclusive areas or sector quotas. In addition, there must be clear indication to fishers that forming the collective will yield substantial benefits to fishing and nonfishing members alike to help promote acceptance. There also must be an effective system at the disposal of the collective for assigning catches to its members and for deterring violations with sanctions. Finally, there must be a clear signal that such arrangement will not be overturned by higher levels of government.

When these conditions are in place, the evidence is that collective arrangements have improved fishery performance. In developed countries there are number of high-profile, well-documented examples of success from such arrangements. The community development quotas used in the Alaskan halibut fishery, the cooperative quotas used in the North Pacific pollock fishery, the community sector quotas used in the New England groundfish fishery, and the Chignik salmon cooperative in Alaska are among the examples worth exploring (Leal 2005; Leal, De Alessi, and Baker 2008; Deacon 2009).

In developing countries, researchers are uncovering more cases as time goes by. One that has attracted much attention involves nine fishing cooperatives and affiliated Federation of Cooperatives off Baja California. These organizations work together to carry out fisheries management and research using only limited government assistance (Deacon, this volume). As an indication of success, in April 2004, the spiny lobster fishery became the first fishery in Latin America to be certified by the Marine Stewardship Council as sustainably managed.

How management works is noteworthy. Each cooperative has exclusive fishing rights inside a distinct area—rights formally ratified by the federal government of Mexico in 1991. The fishing rights, or concessions, are good for a period of twenty years with the possibility of being renewed or transferred after the twenty-year period is up. Each concession area has clearly defined boundaries and contains a small area open for extraction. Fishing for spiny lobster is controlled by setting the maximum number of traps. The traps are then divided among a subset of fishers belonging to the cooperative. Fishers who do not participate directly in the fishery work in processing, logistics, or administration and leadership of the cooperative.

In addition to paying for the right to use the concession, each cooperative invests its own money to survey its area and maintain the health of marine resources. Cooperative staff set the annual catch, report on actual catch, conduct census and assessments on stocks, and carry out activities to support repopulation. Fishing members support these activities by maintaining logbooks and conducting surveillance.

Because of limited police presence, cooperatives assume the lion's share of monitoring and enforcement to deter poaching. Each year they invest an estimated US$1 million in manpower and in equipment such as radios, high speed boats, night vision goggles, road surveillance, and checkpoints. All enforcement activity is done in collaboration with authorities from the Federal Attorney for Environmental Protection.

New rights arrangements and scientific support are helping artisanal fisheries in Chile reverse the overfishing trend in species with high economic and social values (Defeo and Castilla 2006). Important lessons include a new, national fisheries law that includes a moratorium on new entrants into specific fisheries and government-supported allocation of territorial user rights to fishing (TURFs) and community quotas. Institutionalizing comanagement by incorporating community governance through traditional rights as well as local customs and norms has also played a critical role in improving fisheries in Chile.

In Kenya's south coast, comanagement contributed to improved productivity (based on catch per unit of effort) for artisanal fishers (McClanahan, Hicks, and Darling 2008). In the north coast, around the city of Mombasa, however, there is less social cohesion for comanagement. There, local fisheries' productivity continues to deteriorate.

The political economy of development aid

In addition to rights-based reform, the papers in this volume point to the need to address the political economy of development aid. At the international level, recent assessments point to the neglect of political-economy issues in aid application and to the question of whether fisheries aid has been effective in improving economic conditions, including in depressed regions of Africa (Cunningham and Neiland, this volume; Moore, this volume). For example, recipient countries with political power controlled by elites may have no interest in solving the underlying fishery problem. Under such circumstances, aid is treated as a slush fund by bureaucracies or elites. If interest in reform does exist, fishery agencies may have no idea what constitutes success in fisheries performance or they may lack benchmarks (such as stock assessments, fleet capacity, and economic measures) by which to gauge performance. Donor agencies may lack the local and technical expertise to offer economically sound, experience-based solutions.

In addition, aid projects based on policy and institutional reform may be too small to justify the administration costs of multilateral-development bank loans or they may not be on the radar of other conventional aid sources. Aid in the conventional world has a long history of directing large-scale fishery development projects (fleet upgrades, port modernization, and so on). Only recently has there been indication of some shift to policy reform but questions remain as to whether these actually entail institutional reform (Cunningham, and Neiland this volume).

There is little evidence that aid has actually improved fisheries resources. Fisheries in four major regions of Africa, for example, have been classified as overexploited or fully exploited by FAO. Questions about the effectiveness of fisheries aid performance is not surprising because there is little indication that aid has been grounded in an understanding of the robust economic theory surrounding overexploitation in fisheries (Cunningham, and Neiland this volume). If aid is to be instrumental in improving fishery performance, it must shift to reforms grounded in sound economic theory.

What features characterize success?

The papers in this volume identify key features of success under rights-based management. Success here means providing the institutional ingredients for wealth creation from fisheries resources. Included are the six desired property rights characteristics laid out by Scott (this volume). First and foremost is exclusivity. Without it, there is a race for rents (catch fish before outsiders take them) and its consequences of overfishing, overinvestment in inputs, and underinvestment in stocks. Duration of rights is another important feature. For fishers to reap future benefits, rights must be of sufficient duration. Transferability has a number of benefits. Chief among them is that it allows fleet excesses to be reduced through market transactions. Divisibility allows operators to adjust fishing operations to the size desired. Quality of title and security give fishers the legal standing to defend their rights against pollution and other nonfishery uses and to bargain with others.

Of course, none of these characteristics is effective without a supporting legal framework. Countries should spell it out through national legislation and through legal rules that support well-defined and enforced property rights (Thompson, this volume). In addition, knowing that open access is a major driver of wealth dissipation, national

legislation must include one or more mechanisms for closing the fishery commons and identifying suitably sized management units to protect against external impacts from other fisheries. A market infrastructure is needed to honor contracts, identify registered owners, and record rights transfers. In addition, devolution of management functions requires legal authorizations for fishing management or comanagement agreements. In collective arrangements, legal authority is needed for protecting the integrity of the group, establishing voting rules, levying fees for management and research, fining members for violations, and administering research (for example, Sullivan 2000).

The resources needed to carry out rights-based management lead us to consider governance and the fiscal keys to success (Sutinen, this volume). A history of repeated failure in fisheries requires greater scrutiny of government performance. Poor performance is not only a problem in developing countries with political power narrowly distributed among elites; it is also a major concern in developed countries where political power is broadly distributed. In many developed countries, "[g]overnment policies and programs have generally failed to prevent widespread overexploitation and degradation of coastal and marine ecosystems," because of factors such as "special-interest effects" and "rational voter ignorance", "shortsightedness", and "bureaucratic inefficiencies" in fisheries of developed countries, writes Sutinen (this volume). Fortunately there is evidence that rights-based management coupled with certain fiscal measures can help mitigate government failure.

On the demand side, government failure can be addressed by eliminating subsidies that promote fishing overcapacity and through greater transparency of the costs of services and their effectiveness. Regarding the latter, beneficiaries of such services should pay in direct proportion to the benefits they receive. Having to pay for such services will sensitize them to the quality of service as well.

On the supply side, consider alternatives to government as the sole provider of management and research in fisheries. There is growing evidence that stock research and assessment, onboard observers, rights registries, and even policing can be provided more cost-effectively through private entities such as fishers' associations (Scott, this volume; Deacon, this volume). In terms of rights protection, the political conditions discussed later will dictate whether government is the best choice for overcoming free-rider and coordination problems in the private sector (Deacon, this volume). When these conditions are favorable, there are core management functions that government can and should perform, such as setting broad performance standards for harvest, management, and area protections aas well as mitigating conflicts with other ocean users.

A successful fiscal framework raises the question of how should rights and rents generated under rights-based management be allocated? For community-based fisheries, where the participants are often poor but knowledgeable about the resource, effective policy design is essential. Anderson and Libecap (this volume) argue that first-possession or "grandfathering" the allotments of local fishers can be the most efficient approach for assigning property rights, because it builds on existing local knowledge and proficiency (those who have outcompeted less efficient producers under the prior regime). First possession also signals security to incumbent users and recognition of prior investments, which helps gain support for rights-based reform at the local level.[6]

In addition, Anderson and Libecap argue that rent creation is not invariant to rent allocation. The conventional view is rents arise from the natural existence of the resource and that the rents created are merely a way of removing the excesses that have built up in the fishery under open access conditions.[7] But under rights-based management there is strong evidence that additional rents arise from innovations in production that turns the catch into higher-valued products (see Wilen 2005). There is also mounting evidence that under rights-based management, "collective" rents arise through users sharing information and coordinating harvests and carrying out activities that improve stock stewardship (see Deacon 2009, 8-20; Arbuckle and Drummond 2000). Preventing the capture of rents by users reduces the incentives for *increasing* wealth in the fishery under rights-based management.

Pathways to reform: Accounting for political economy

The evidence shows that there are viable alternatives to a strictly government-managed fishery, including cases where private stakeholders, particularly the fishers, assume management duties government. Users have been able to

handle the tougher problems of monitoring and enforcement, and they have been able to apportion the overall level of extraction among themselves without the gridlock and rent-seeking that usually arises in the political arena. And in a few cases, users have even been able to set overall extraction levels in which there is strong evidence of sustainability (for example, New Zealand's Challenger management company and Japan's near-shore fishery cooperatives; see Deacon, this volume). When these tasks cannot be assigned to users, selecting a lower level of government is an alternative if that level appears to be more responsive to local demands or more reliable when it comes to rights protection.

It is also possible to enlist the services of nongovernment entities, including out-of-the-country entities. One possibility is the use of the MSC certification process for sustainable fisheries. Certification requires that the stocks be managed for long term viability, that the health of the ecosystem be maintained, and that applicable laws supporting sustainability are observed. Certification may be denied if unlawful or destructive gear is used, poaching is excessive, or chosen catch levels threaten long-term viability of stocks. The MSC brand has been shown to add value to the catch, so there is motivation on the part of users to follow the guidelines and process for receiving certification (see Leal, De Alessi, and Baker 2008). Another possibility is the use of debt-for-nature swap contracts in which enforcement is funded by a third party using bonds swapped for developing country debt. Such an approach has been carried out by conservation NGOs to protect parks in Latin America (Deacon, this volume).

The papers in this volume suggest some pathways that might be pursued in implementing effective rights-based management, but these differ in effectiveness depending on political context. In countries where political power is concentrated among a few individuals or groups, a political regime survives by accepting bribes or political support from these elite in exchange for the state's coercive power on their behalf. In countries where political power is broadly based and competition for political office is brisk, politicians must offer policies more in line with socially beneficial public goods, such as a well functioning legal system and police to enforce laws.

A government based on narrowly distributed political power is expected to behave differently than one based on broadly distributed political power, and this has implication for which entity (government or nongovernment) does what under rights-based fisheries management. For example, suppose the national government is relied on to enforce fishing rights in a local fishery. In a country where the government is dominated by a narrow group of elites, local fishers can expect their rights to be upheld only if they themselves are elites or if they reward elites for directing the government to do so. In countries where political power is broadly based and the government's orientation is in providing public goods that promote wealth creation (for instance, a strong rule of law), government enforcement of fishing rights is considered a standard part of laws and police protection.

Two examples illustrate different reform pathways under much different political conditions. Local fisheries in Namibia were reformed with the state holding the management and enforcement rights. With a broadly representative government at independence, Namibia formed institutions (including a legal system and policing) that spread resource returns among domestic fishers rather than political elites. The absence of a domestic user group made it impractical to convey a TURF-user collective-management strategy at the time, so the instrument of choice was a set of time-limited, individual quotas that are not transferable. Although there remain inefficiencies, Namibia has in place a strategy that spreads the rents among domestic fishers, and this should discourage government claims to rents down the road. The broad distribution of the rents among fishers reflects the democratic nature of the founding government (Deacon, this volume).

Alternatively, authority to manage the lobster and abalone fisheries in Mexico's Baja California's is given to local harvesters' cooperatives, with the state providing only legal authority. Although Mexico's government (previously autocratic with few constraints on the chief executive) has made progress on democratic accountability over the last 15 years, lawlessness and corruption remain. Interestingly, the authority to manage the fisheries was devolved to the cooperatives in the 1930s when Mexico's government was dominated by political elites. At that time, the lobster catch was mostly locally consumed and revenues were modest enough to attract little attention from political elites that could have blocked such devolution. Today, the catch averages 1,600 tons per year, and revenues are in the tens of millions of U.S. dollars.Of course, this begs the question: would an elite-based government now have approved devolution of the Baja California fisheries, given their high asset value?

The need for further case study

More case -study work is needed to evaluate practical pathways to reform, a tool set, if you will, of best practice approaches to address particular fisheries issues and in-country political conditions. For example, how well did a given structure of fishing rights, de facto or de jure, reduce conflict between small-scale and large-scale fishing fleets, foreign or domestic? Do the property rights help resolve conflicts between fishing and other marine uses (such as recreational fishers, fish farmers, and environmental interests)? Under what circumstances have nongovernment alternatives to monitoring and enforcement worked well? Are there cases for funding fishery enforcement in countries lacking standard taxing mechanisms? What resources are required to organize markets for transferable fishing rights? Are lower levels of government or local communities capable of providing fishery oversight? These are some of the questions that need to be addressed in the operational area of fisheries.

The papers in this volume argue that there is strong link between selecting a reliable management-task performer (such as enforcement) and the political conditions. Unfortunately, most case studies and analysis of common-pool management do not tie the political conditions to the task and the performer selected. They treat government as a generic entity and ignore such critical dimensions of governance quality as the level of government corruption, the degree of political instability, and bureaucratic competency. Additional research is needed to develop a tool set that identifies the best-practice approaches based on political setting.

In addition, it would be very useful to research the local political economy factors that either promote or inhibit localized management options in fisheries. These would include examining and characterizing at the local fishing-community level the economic and social conditions, the possibility of traditional fishing systems, the social customs and norms, the legal and policing apparatus, and the degree of local representation in any aspect of fishery management. Third-party participation (for instance, by conservation NGOs) can be instrumental in helping support devolution of local management. Such was the case for African wildlife, which has very high potential rents. The political context in an African country played a major role in whether devolution of wildlife management took place (see Nelson, this volume). Additional case studies could offer more valuable insights on the potential for management devolution.

Methodology for future case studies

Given the possible external and internal factors that can affect design, implementation, and performance of fishery reform, it is necessary to have a methodology in mind when conducting future cases studies of fisheries reform. This methodology should be an integral part of both the information collection and the evaluation carried out in each case study. It is described under the relevant categories of investigation below.

Reform areas of interest

Each case study should consider the triggers, objectives, and metrics for reform as well as its performance. Was the reform initiated to overcome an environmental or economic crisis, or was it carried out as part of a broader economic reform effort in the country? Was it championed by political leaders, by fishing interests, or an international agency? Describe the degree of formal government recognition of reform. Is it spelled out in fishery legislation or agency directives? If so, do they signify fundamental change to generate wealth in fisheries, or do they reflect motives for fishery development?

What are the metrics used in measuring progress of the reform? Is there a priority on measuring output and employment or profits in the fishery? What is the status of economic and biological data collected and the quality of analysis? How often is data collected and analysis carried out? If records are available, assess the pre-reform and post-reform status of data collection and analysis. Note that most fisheries have only aggregate information on landings and the number of vessels in the fleet. Ideally, for future reference, time series data on individual earnings and costs for all fishers or for a representative sample of fishers are necessary. If tradable licenses or quota licenses are used, collect time series data on license lease and sale prices. Performance can be assessed in different ways,

such as profitability, competitiveness, efficiency (allocative, technical, and scale), productivity, equity, management costs, and quality of service. Methodologies are available for evaluating fishery performance pre- and post-reform.

Governance indicators—government

The papers in this volume emphasize the importance of considering the political context when assessing case studies of fishery reform. The political context is not only important for reforms underway, it is important when evaluating the prospects for future institutional reform (Mueller, this volume; Nelson, this volume; and Bennett, this volume). Indeed, Robinson (this volume) observes that the reason why so many fisheries fail to adopt rent-generating rights-based management is because of political failure. For instance, in countries governed by a narrow elite, those in power may have little to gain by making things right for fishers and the rest of society. Indeed, they may see the reforms as benefitting the opposition more than it does them.

For reforms underway, there are a number of studies available which can be used to identify the key dimensions of governance quality which might be used to systematically examine relationships between them and particular management tasks or rights. For example, one based on Kaufmann, Kraay, and Mastruzzi (2005) includes the following six key dimensions of institutional quality:

1. *Voice and accountability*—measuring political, civil, and human rights.

2. *Political instability*—measuring the likelihood of violent threats to, or changes in, government, including terrorism.

3. *Government effectiveness*—measuring the competence of the bureaucracy and the quality of public service delivery.

4. *Regulatory burden*—measuring the incidence of market—unfriendly policies.

5. *Rule of law*—measuring the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence.

6. *Control of corruption*—measuring the exercise of public power for private gain, including both petty and grand corruption and state capture.

These indicators are based on 352 different underlying variables reflecting a wide range of governance issues constructed by 30 different organizations worldwide. Kaufmann, Kraay, and Mastruzzi (2005) have aggregated these variables into the above governance indicators. As with most aggregated ratings, care should be used in making cross-country comparisons, but the information is useful for making heuristic determinations of status and changes in governance quality in countries and relating it to who owns certain rights (fishing access, the right to manage, the right to enforce, and so on) and who performs (government or nongovernment entities) certain fishery management tasks. As an added note, the authors provide useful insights on changes in governance in various countries in Africa over the 1994–2004 period.

Governance indicators—Devolving fishery management

In light of possible cases of devolved fishery management, Ostrom (1990) has studied a variety of user-managed resource commons and found the following characteristics of long enduring management systems. These are worth evaluating by each applicable case:[8]

1. **Boundaries must be clearly defined so that individuals within a group know from which resources they can harvest and how, and so that individuals from outside the group know when they are trespassing**. This factor is viewed as a critical step in promoting collective action on the part of users sharing the commons. So long as boundaries are uncertain, no one knows what is being managed and for whom. Moreover, local users face the risk that any benefits achieved through collective management may be captured by outsiders.

2. **Group decisions will require rules that determine how the group parcels out the value of the resource.** Simply defining the boundaries of a resource is not enough, however, because it is still possible for a limited number of appropriators to increase extraction rates and thereby dissipate potential rents or totally destroy the resource itself. To avoid these outcomes, collectives must develop rules of appropriation, and users must adhere to the rules.[9]

3. **Customary rules must be linked to time- and place-specific resource constraints, so that the rules are efficient. If they are not, there will be pressure to change them.** Tailoring rules to local conditions is another important contributor to robustness and longevity. Such rules take into account specific attributes of the resource being exploited, local economic and political conditions, and cultural views.

4. **Because there is always the potential for cheating, resources must be devoted to monitoring and enforcing the rules. That is, there either must be positive returns for individuals who abide by the rules[10] or negative sanctions against those who violate them.** Ostrom (1990, 93–94) writes that "even in repeated settings where reputation is important and where individuals share the norm of keeping agreements, reputation and shared norms are insufficient by themselves to produce stable cooperative behavior over the long run." Systems that last carry out effective monitoring and sanctioning activities to ensure rule compliance. Moreover, when appropriators design and enforce their own rules, they learn from experience which rules work and which achieve the highest rents. In a country in which governance quality is high, the rules and sanctions may be fortified by giving the group legal authority (Thompson, this volume).

5. **Where conflicting demands are likely to arise between group members, resolution mechanisms such as local arenas for bargaining are necessary.** Even in well run groups, disagreements are common. A mechanism for settling such disagreements is critical to maintaining cooperation in the commons. In collectives where likelihood of conflict is quite high, well-developed court mechanisms have been in place for centuries.

6. **The rules must not be subject to change by higher levels of government.** When the management system has rules in place that lack legal authority, they remain fragile at best. The danger is that outsiders may use government to overturn the rules devised by a collective. Often, the government in its own interest of imposing a fisheries management scheme ignores the de facto rights of a traditional system when it should be looking to strengthen it by codifying it into law.

In order for these factors to emerge and be maintained, participants must perceive themselves as having strong group identity, such as sharing a common interest (being quota holders or coming from the same community or from the same gear sector). The case study should describe what traditional or nontraditional elements are used to facilitate group cohesion—community origin, TURFs, harvest cooperatives, individual quotas or group quotas, corporate structures, and so forth.

Reform Approach

Each case should describe the rights-based approach and reform pathway to reach it. The approach should describe in detail the property-rights approach adopted—a limited license system, an ITQ system, a community quota, a harvest cooperative, a community TURF, or some other type—and which of the property-rights characteristics described in Scott (this volume) is in effect and its relative strength. The case study should examine whether there is evidence of racing (that is, most of the catch occurs in the early part of the season, investment in bigger and faster boats, and congestion on the fishing grounds). If it is a community holding a quota right or a TURF, examine the group structure, external and internal rules, and activities in the context of the factors outlined above.

The case study should also describe the pathway to reform. Was the new rights structure carried out in one shot or was it carried out in phases, say, first a limited license system and then a community rights system. Norway is a good example to examine of rights-based reform carried out in phases (see OECD 2008, 23–32).

In addition, each case study should describe the legal framework supporting both the fishing rights and the management structure. Are harvest rights backed by statute, administrative ruling, or are they carried out through traditional observance? If the case study entails a user group in the reform, are the group's territorial rights formalized by statute and does it have legal authority to carry out internal member control and to protect stocks and turf from intrusion by outsiders. The description should provide insights on the degree of security of the harvest rights and whether the rights have quality of title. Are enough resources devoted to monitoring and enforcement in order to deter regulatory or property rights violations? Can the actors be relied on to perform these duties? Is there a formal basis in the country's legal system for defending property rights, honoring contracts, tracking registries of ownership, and organizing a market for trading rights?

The case study should also describe the fiscal framework for supporting management and research of the fishery and the administration of fishing rights. It should describe the degree of transparency for the funds collected and spent by the agency or fishing association on management and research. It should rate the quality of management service and whether there is a mechanism to solicit customer judgment of the service. It should also describe the sources of funds—user fees, general public funds from taxes, or development aid—and whether they are earmarked for certain management or research functions or for government agency funding?

If the case study entails funding from international aid, what are the objectives? What are the metrics for measuring progress? Do the objectives emphasize production-oriented goals or are they in line with generating rents from rights-based reform (Cunningham and Neiland, this volume)? What role, if any, do rents play in the fiscal framework? Is there a mechanism used for rent sharing? If so, how are they apportioned among users, among nearby communities, and government?

The actors at every stage and level

Each case of reform entails different actors with specific roles or rights at different stages of reform. Each case study should identify to the extent possible the actors—government, international, and nongovernment—involved in identifying and defining the fishery problem, the approach to reform, and strategy for reform implementation. In addition, each case study should identify the actors and their roles or rights in carrying out each task of fisheries management? For example, the state through various levels of government (executive, legislature, fishing agency, justice system, and police) may hold nearly all the management rights. This would include setting the overall resource extraction level; applying the rights approach and enforcing it; issuing ancillary regulations on the time, place, and method of fishing; monitoring and enforcing the rights, regulations, and catch levels; and conducting stock and economic assessments. By contrast, a fishing association may be given legal authority from the state to hold all or some of these roles. It is important to identify who holds the various rights under the case study, whether those who execute the tasks are claimants to the rents, and whether the tasks and assignments are compatible with what can be expected in a country with a broadly based or narrowly based distribution of political power (Deacon, this volume).

Conclusion

Given the difficulty of specifying property rights, ocean fisheries have been the domain of the political process for well over a century. In an effort to overcome the tragedy of the commons, science-based, command-and-control management has been the tool of choice by governments for decades. Unfortunately this approach ignores the fundamental problem of rent dissipation in the fishery commons, and, as a result, it has not ended overfishing, but it has generated enormous economic wastes. International agencies have exacerbated problems in fisheries in the developing world by promoting fishery development with little recognition paid to the core problem of rent dissipation.

There is, nonetheless, evidence that reform pathways based on property rights are showing signs of success. In the developed world, pathways based on ITQs have become well known for their ability to generate rents dramatically by eliminating the costly race for fish. But they can also lead to other benefits. In New Zealand, for example, they have become the building blocks for fisher-led management and research.

Of course, such systems may not be suitable for government to carry out in a county that has little capacity or will to manage fisheries and protect property rights. Research is showing some promising pathways in these situations. In Baja California, for example, exclusive-area rights have been awarded to harvest cooperatives on the basis of twenty-year concessions. These cooperatives not only conduct management and research of fish stocks, they invest their own resources to guard against poaching. More case studies are obviously needed to develop more pathways and to develop suitable links between who carries out certain tasks and rights and the quality of institutions in a country.

The papers in this volume show that there is a tremendous opportunity to improve the chances for successful fisheries reform, even in countries with severe political economy challenges.

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Endnotes

1. This is based on a study entitled, "Economic Assessment of Tonkin Gulf Fishery, Vietnam," by Nguyen Long. Available at Research Institute for Marine Fisheries (RMIF), 224(170) Le Lai, Hai Phong, Vietnam.

2. Based on the study entitled, "The Economic Potential of the Bangladesh Artisanal Hilsa Fishery," by Massud Ara Mome (Department of Fisheries, Bangladesh). Availability through Department of Economics, University of Iceland. Contact Ragnar Arnason.

3. See the study of the Namibian hake fishery by U. Rashid Sumaila and A. Dale Mardsen for the FAO/World Bank rent drain project. Fisheries Economic Research Unit, Fisheries Centre, the University of British Columbia, Vancouver, BC, Canada.

4. References to a longer list of fisheries exhibiting rent losses can be found in Table 19 of the World Bank publication, *The sunken billions: The economic justifications for fisheries reform* (World Bank, 2008, 58).

5. In the United States, a congressional moratorium on ITQs lasted nearly seven years. See Leal (2005). In Norway, ITQs were summarily rejected and an incremental approach lasting two decades was necessary before approaching a variation of ITQs. See OECD (2008).

6. This argument (for grandfathering as opposed to auctions for new fisheries) holds for most of the world's fisheries which have long-standing harvest patterns.

7. Related to this point is that rents are generated merely from the elimination of excesses that built up in the fishery before rights-based management.

8. A number of these were also discussed in Thompson (this volume).

9. Note that in collectives formed by holders of individual quotas this factor is already satisfied. This is the so-called condo-type association discussed by Scott (this volume).

10. Anderson and Hill (1983) provide a discussion of the prospects of individuals abiding by the locally established rules.

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