

FENCING FISHERIES IN NAMIBIA AND BEYOND: LESSONS FROM THE DEVELOPING WORLD

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TO THE READER

Thoughtful reform is unusual. PERC has explained the scope of the environmental and economic benefits that can emerge from amending the structure of a regulatory regime, but logic and evidence are rarely enough to carry the day. Constructive changes in policies often come about in a time of crisis or when there are few special interest groups working to protect an existing structure.

Namibia is something of a backwater. A large country—double the size of California—it has a small population, of just two million. It was long an appendage of South Africa and gained independence only in 1990. As there were few established economic interests, especially in fishing, the slate was clean. Fortunately, as Laura Huggins describes, the result was the adoption of a fisheries policy so amazingly sensible, one might think it was designed by PERC!

Fisheries around the world suffer abuse due to the lack of property rights. The result is environmental destruction and economic waste. In a few instances, when fisheries were in collapse, developed nations were spurred to adopt individual quotas or some other rights-based approach that produced better environmental and economic results. Don Leal and Robert Deacon are premier scholars in this area and we thank them for reviewing this *Policy Series*.

Unique about Namibia is that a catch share system was adopted in a poor nation with a population consisting of several deeply-rooted tribes. This development shows that market-based reform is not a Western notion that somehow conflicts with traditional values. The lessons from Namibia and other fisheries success stories discussed in this essay illustrate that property rights and environmental protection can happen anywhere.

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FENCING FISHERIES IN NAMIBIA AND BEYOND: LESSONS FROM THE DEVELOPING WORLD

Namibia is famous for its wildlife safaris, sand surfing, and, for the adventurous angler, shark fishing. After seeing lions at Etosha National Park, and getting a mouthful of sand while surfing, I had to try fishing. Near the city of Swakopmund, a monster fishing rod in hand, I stood staring at the Atlantic Ocean. Accustomed to fly-fishing for trout in small rivers in the American West, I had no idea what I was doing. The result: I got skunked. Part of me was glad. The thought of getting a hook out of a shark's mouth was daunting. On the other hand, I was envious of the locals who were landing fish all around me—a good reminder that locals know best.

One local who was not getting skunked was Johanna Kwedhi, Namibia's first female trawler captain. Kwedhi commands the *Kanus*, one of the largest trawlers operating from Luderitz Harbour (BBC 2010). She recently proved that a woman cannot only navigate a coastline infamous for shipwrecks, but can also bring in a profitable catch. She broke another barrier too: "We have never seen a black person in charge of a ship," says Evalisto Shipo, a local boatswain.

When Kwedhi first came to Luderitz to train with the Namibian Fisheries Institute, she lived in a house with no electricity or bathroom. “People said to me, ‘Wow, an officer living in the shantytown!’ But I say, ‘No, I am here with peace of mind and I have my health.’” Her company is training four more local women to be skippers.

Johanna Kwedhi’s story is just one example of how indigenous Namibians, who were disenfranchised and discriminated against under colonial rule, are finding ways to participate in the nation’s new fisheries regime. While developing skills and strengthening the local economy, Namibians are rebuilding fish stocks and becoming a leader in marine management. There is still much progress to be made toward a true free-market democracy, but Namibia’s advancement in instituting rights-based management adds to the lessons learned in natural resource reform in emerging nations.

WELCOME TO NAMIBIA

The clean, cold waters off the coast of the Namib Desert are home to some of the richest fishing grounds in the world, with the potential for sustainable yields of 1.5 million metric tons per year (Namibian Government 2010). Commercial fishing and fish processing are a significant and growing sector of the Namibian economy, contributing 5.7 percent to GDP and accounting for 18 percent of Namibia’s foreign exchange earnings (MFMR 2007). The main species found off the coast of Namibia are hake, sardines, anchovy, and horse mackerel. When Namibia gained independence in 1990, several fish stocks were on the verge of collapse.

Prior to independence, “management” of Namibia’s fisheries consisted of constant jockeying for control. The fishery was, in effect, an open access fishery, over which neither South Africa, as the de facto authority over Namibia, nor the United Nations, as the de jure authority, were able to exercise jurisdiction, (Manning 2005, 169). With no rule of law that could be enforced, the fishing grounds became an international free-for-all. In the years prior to independence, more than

Figure 1: Namibia



300 mid-water and bottom-trawl vessels were reportedly operating off the Namibian coast (Beaudry, Folsom, and Rovinsky 1993). According to an account by the *African Economic Digest* (1993), the USSR had a 32 percent market share in the sale of the country's fish, followed by Spain with 26 percent.

Unrestricted access to Namibia's fishing grounds had devastating effects on the fishery. There were simply too many fishers catching too many fish. The hake catch, for example, grew from 47,600 tons in 1964 to 815,000 tons by 1972—a 1,700 percent increase (Manning 2005). In addition to the hake fishery, the pilchard or sardine fishery had been one of the most important fisheries in the region. In 1968, total landings for the Namibian sardine were recorded as 1.4 million tons, dropping steadily to a modest 100,000 tons in the following decade (Jurgen 1998, Elago 2004). With the collapse of the Namibian sardine came a growing concern that the Hake fishery would be next.

Today Namibia's fisheries are recovering. The trend toward collapse has reversed since independence to the point that Namibian fisheries management is now considered a model. And the few fishing ports (see figure 1), which were once stark desert coast ghost towns, are thriving hubs where Namibians flock for jobs with the processing plants and fishing fleets.

How did pastoral Namibians with no real experience as a nation state, let alone fisheries management, accomplish this feat? Two words: property rights. Namibians instituted a system that enforced an exclusive fishing zone and created individual rights to fish stocks. In essence, they erected fences for their fisheries. As several scholars have pointed out, property rights provide the foundation for economic and environmental prosperity (see Demsetz 1967; North 1990; De Soto 2000; Anderson and Leal 2001).

A BIRD'S EYE VIEW

A recent joint report from the World Bank and the United Nations Food and Agricultural Organization (FAO) reveals the extent to which marine fisheries¹ are underperforming global assets (Arnason, Kelleher, and Willmann 2009). The difference between the potential and actual net economic benefits from marine fisheries, according to the report, is in the order of US\$50 billion per year. These benefits could be much higher if institutions created incentives for greater investment in marine assets. The payoffs from fisheries reform can enhance economic growth in developing countries as well as protect fisheries for future generations (Leal 2010).

Unfortunately, the pre-1990 state of Namibia's marine resources is the norm for most of the world's ocean fisheries. According to the World Bank (2011), 25 percent of the world's marine fish stocks are considered overexploited and an additional 50 percent are fully exploited. This dismal economic and ecological scene is most visible in Africa. The marine resources around the continent provide livelihood and employment for millions of fishers, foreign exchange for trade, and food security.

Yet, as the *State of World Fisheries and Aquaculture Report* (FAO 2008) explains, all FAO-designated marine fishing areas around Africa are overexploited (Cunningham and Neiland 2010, 65). Continued mismanagement of African

All FAO-designated marine fishing areas around Africa are overexploited.

fisheries means losing the potential to realize an additional US\$2–5 billion in revenues to coastal nations per year, according to Tim Bastook, fisheries advisor to the U.K. Department for International Development (FOROYAA 2010). Furthermore, as the latest *PEW Ocean Science Series* points out, Africa has the highest marine life losses relative to its actual catch (Srinivasan et al. 2010).

Poor fisheries management can be seen in Mozambique. There, the fisheries sector contributes about 4 percent of GDP and 28 percent of the country's foreign exchange earnings, with prawns being Mozambique's largest single export (Omar 2006). The main domestic fisheries sector consists of 90,000 subsistence and small-scale fishers, according to Maria Omar, a member of Mozambique's Ministry of Fisheries. But the fishery is under constant threat from outsiders with larger and better equipped vessels. Like many coastal nations, the property rights to the marine resources are not clearly defined or enforced, meaning the country is a target for illegal and uncontrolled fishing (Lopes and Pinto 2006). An Institute for Securities Studies report (2007) estimated that illegal fishing of shrimp and tuna in Mozambique amounted to approximately US\$38 million in lost revenue. Local economies suffer as small-scale fishers lose potential revenue from shallow coastal waters that are overfished by outsiders.

FEEDING FRENZY FOR FISH

The problem in Mozambique and in most other coastal nations is a failure to escape the freedom-of-the-seas² mindset and, more importantly, a failure of governments to establish property rights to fisheries in a way that maximizes both economic benefits and long-term survival

of fish. In an attempt to combat the collapse of fish stocks, the United Nations, in conjunction with many coastal nations, created the Law of the Sea Treaty (LOST) in the late 1970s. This treaty defined specific jurisdictional limits on the ocean area that countries may claim—including a 200-mile exclusive economic zone (EEZ) (see United Nations 2011). The treaty also called for technology and wealth transfers from developed to undeveloped nations and required nations to adopt specific regulations regarding the marine environment. Such provisions are among the reasons the United States has not ratified the treaty.³ Although defining the EEZ is a positive step toward fencing fisheries, LOST relies on the United Nation’s bureaucracy—focusing too much on regulations and too little on economic incentives (Meese 2005).

The prevailing “management” approach is for governments to impose regulations restricting vessels, gear, seasons, and catch characteristics. Such regimes fail to instill in each fisher a regard for the future value of the resource. In a regulated commons, shares of the catch are up for grabs, leading to a destructive “race-for-fish.” Attempting to prevent overfishing through regulations is not only expensive, it often doesn’t work. Fishers become more adept at catching larger amounts of fish in shorter amounts of time and in fewer trips. They simply use bigger boats, bigger nets, and bigger crews (Leal 2002).

This style of fisheries control creates perilous outcomes because fishers cannot save fish for the future. If they restrain their catch to leave enough fish to reproduce for the following seasons, the fish may be taken by someone else. Each fisher in a commons gets all of the benefits of catching more fish now while facing only a fraction of the future cost of stock depletion. The evidence is overwhelming that this approach fails to deliver desirable economic, social, or biological results.

While the rest of the world was busy focusing on strict fishing regulations, a few nations, led by New Zealand and Iceland, began experimenting with a new approach to fishery management. This approach, known as catch shares, is designed to secure a legal right to fish to individuals, communities, or fishery associations (Deacon 2009).

Catch share systems combine two features to help overcome the destructive race-for-fish. First, a total allowable catch (TAC) size is determined based on scientific criteria about sustainable stock levels. Then fishing entities (individuals or defined groups) are assigned shares of the TAC. These shares can be used, sold, or leased to others, but no one is allowed to harvest more than the amounts specified in their quotas. The most common form of catch share management is the individual transferable quota (ITQ), which allocates to its owners the right to harvest a specified quantity of fish every year. In essence, fishers gain property rights to shares of the catch, much as they have rights in their boats and gear. Collectively, rights owners have incentives to protect and maintain the quality of the fishery because the value of their shares hinges on its sustainability.

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Catch shares help protect fisheries by providing an economic rationale for conserving resources. Just as shareholders of a company want the firm to excel so shares gain value, fishers in catch share system want the fishery to remain productive (Environmental Defense Fund 2010). Case studies of fisheries in British Columbia, Iceland, New Zealand, the United States, and other areas demonstrate that this system can dramatically improve the economic and biological health of fisheries.

When catch shares were adopted in the Alaskan halibut fishery. In 1995, the fishing season lengthened from 48 hours to more than eight months a year, meaning the boom-and-bust market cycles disappeared (Leal 2005). Fishers received higher prices because they could deliver fresh halibut year round. Safety problems were reduced as there was no need to fish in hazardous conditions. The costly technological arms race switched from maximizing vessel size and catch to maximizing the productivity of the fishery and the value created by offering a superior product over a longer portion of the year. The result: Actual harvests no longer exceeded the total allowable catch each season.

The catch share system can also help improve the biological health of fisheries. Some benefits arise from slowing the race-for-fish. There may be less dumping of unintended catch, for example, and less discarded fishing gear cut loose when anglers are in a hurry. In the Gulf of Mexico, catch shares for red snapper have cut the accidental killing of fish by 70 percent and led to a 60 percent increase in red snapper (Environmental Defense Fund 2010). Other ecological benefits arise when secure access to a catch creates incentives for fishers to reduce overfishing and avoid sensitive spawning areas to promote stock recovery (Deacon 2009). Damage to wreckfish habitat off the south Atlantic coast, for example, decreased with the introduction of catch shares because there were fewer weights dragging across corals and because the slower pace of fishing allowed fishers to be more selective. They were also able to comply with a ban on bottom longlining, which is a mainline with baited hooks attached at intervals by branch lines (Griffith 2008).

A highly-cited report in *Science* by Costello, Gaines, and Lynham (2008) takes the study of catch shares to a new level. The authors compared 121 fisheries where ITQs and other catch share systems have been implemented to more than 11,000 fisheries around the world where such systems are absent. They found that once catch shares are established, the process of collapse⁴ stops and, in many cases, fish stocks rebound. The authors estimate that had catch shares been adopted in all fisheries beginning in 1970, the incidence of fisheries collapse may have been reduced by two-thirds. Rather than the

failed fisheries we see today, fish stocks would be growing while still supporting fishers and nourishing consumers.

Catch share systems are expanding around the world—approximately 150 are operating today (Costello et al. 2010). In the United States, there are 15 catch share programs, which, according to the Environmental Defense

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Fund (2010) produced an 80 percent increase in revenues five years after implementation.

Despite these positive advances, obstacles to instituting property rights in world fisheries remain formidable. Less than 2 percent of the world's fisheries have adopted rights-based strategies (Leal 2010). Namibia is part of that small number and is proving to the rest of Africa and beyond that under the right conditions—the use of local knowledge and a system of property rights compatible with political and economic circumstances—fisheries can be improved.

NAMIBIA IN A NUTSHELL

The people of the Republic of Namibia range from subsistence farmers (more than 70 percent) to an urban population consisting of traders and civil servants (BBC 2010). They belong to different cultural and ethnic groups including the Owambo, Herero, Damara, Kavango, Himba, Nama, and at least six other smaller tribes. Namibia is a low-middle income country with an estimated annual GDP per capita of US\$4,310 (World Bank 2011). It has extreme inequalities in income distribution and standard of living, with two in five Namibians living on less than US\$1.25 per day (*Economist* 2011). Average life expectancy is 52 years for both men and women; infant mortality is 46 per 1,000 live births (CIA 2011).

Namibia was ranked in the *Freedom of the World Index* with a low score of 2.69 in the “Property Rights & Legal System” category the same year it became independent and began to implement a limited access regime to its fisheries (Gwartney, Lawson, and Block 1990).⁵ In the past, the nations that have successfully implemented catch share systems have been developed nations that score closer to ten. Given Namibia's low score, it was not a place where one would expect to find a rights-based fishing sector. Yet it emerged.

A combination of unusual historic, geographic, and sociopolitical factors contributed to the success of Namibia's fisheries management (Deacon 2010). After World War II, the economy of South West

Africa (now Namibia) experienced a colonial boom, reaching a peak of US\$20,000 per capita for Europeans and US\$150 for black Namibians in the late 1970s (*Encyclopedia Britannica* 2010). The economy was based on minerals, cattle, diamonds, and fish (largely for fish meal and canned sardines). Exploitation of West Africa's marine fisheries by European, Asian, and Russian fleets increased six-fold between the 1960s and 1990s; there was little benefit to Namibians. The lack of restraint of fishery exploitation set the stage for stock depletions.

By the late 1980s, two-thirds of black Namibians were in severe poverty and the nation as a whole was an economic mess. Adding to the misery was a 16-year war in Angola—Namibia's troublesome northern neighbor. A hot spot in the larger Cold War, Angola was propped up by the Soviet Union and Cuba. And South Africa was encouraged to suppress Communist efforts in Angola via support by the United States. South Africa clung to its control of Namibia, while Angola attempted to capture the colony and establish a Communist nation.

Poverty, war, and the desire for human rights served as the catalyst in the rise of the South West Africa People's Organization (SWAPO), a Marxist liberation movement that fought a decades-long campaign for Namibia's independence against South Africa and apartheid. The United States eventually supported Namibia's quest for freedom and threatened South Africa with economic sanctions. On March 21, 1990, Namibia became an independent nation.

Exploitation of West Africa's marine fisheries by European, Asian, and Russian fleets increased six-fold between the 1960s and 1990s.

At that time, Namibia inherited a fisheries sector on the verge of collapse (Manning 2005). Despite this condition, commercial fishing—mostly processing—was Namibia's third largest sector of the economy. The local people and the new government had an incentive to revitalize the remaining stocks (Van Zyl 2001).

Geographically, Namibia's fishery

is located in one of the few major ocean upwelling systems in the world, which means water from the deep sea travels up to the surface, making it highly productive for marine life. Yet the hyper-arid Namib Desert stretches the length of Namibia's long coastline, and reaches up to 150 kilometers inland. Sand dunes make road and rail construction along the coast nearly impossible. As a result, the only harbors in Namibia are Walvis Bay and Luderitz (see figure 1). The existence of just two ports simplified the job of monitoring landed catches (Sumailia et al. 2005).

A lack of a historical association with the sea meant that despite the richness of Namibia's marine fisheries, few Namibian people had traditions of ocean fishing. There was no customary claim to the resource (Manning 2005). In one sense this may have been beneficial. The absence of an established domestic fishing industry meant that organized user groups did not exert undue influence on the formation of fisheries policy. Namibia began with a "clean slate" (Deacon 2010; Sumailia et al. 2005).

STARTING FROM SCRATCH

The inexperienced Namibian government, faced with the task of rebuilding a fishery long exploited by foreigners, contracted with fisheries experts to assess and monitor the state of its various fish stocks through donor countries, primarily Norway (Manning 2005). Fisheries scientists with international experience were able to conduct research at a level comparable to that usually found in developed nations (Van Zyl 2001).

The new government learned enough about the state of their marine life to know that it should establish a system of property rights to their fishery. First, Namibia declared jurisdiction of a 200-mile exclusive economic zone, which was established under the Law of the Sea Treaty (United Nations 2011). This was a crucial step to closing Namibia's open-access waters. Second, the government ordered unlicensed foreign vessels to exit the zone. On the day the law became effective, it was estimated that more than 100 foreign vessels were fishing illegally in Namibian waters (Nichols 2005, 325). The fledgling government had

no aircraft to patrol the 500,000 square kilometers of ocean, but made a strong statement by hiring a private helicopter to fly out volunteers from the Namibian Defense Force to arrest Spanish trawlers at gunpoint. The vessels were ordered in, impounded, and the skippers and officers were put on trial in the relatively stable court system inherited from South Africa. This sent a clear signal to poachers that Namibia was serious about enforcing rights to its waters.

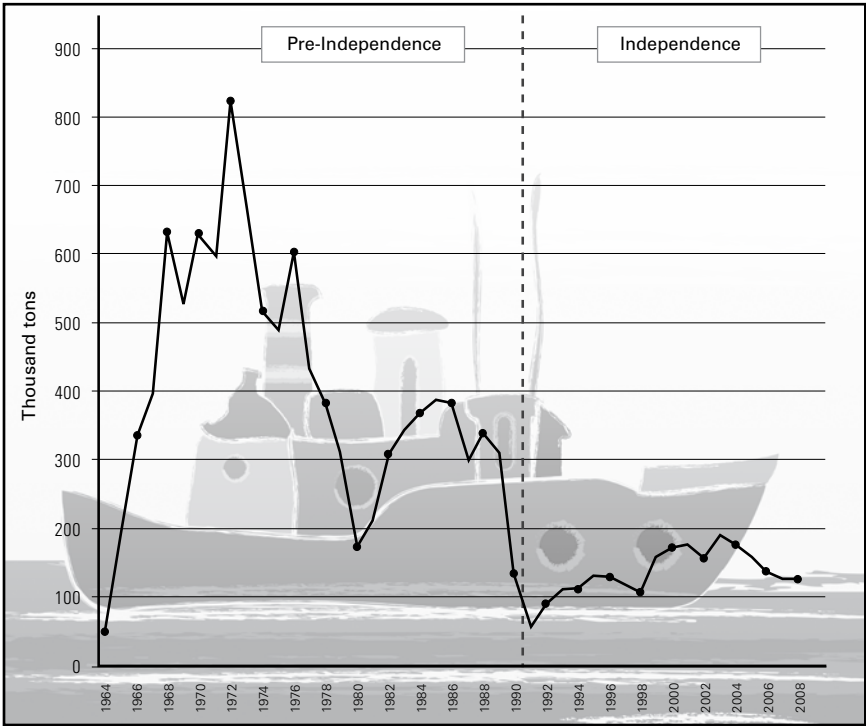
The next step toward reducing fishing pressure was to set the total allowable catch for individual species. A dramatic reduction in the TAC was necessary to enhance the chance of recovering the fisheries. This was especially important for the hake fishery, which represents the majority of total fishery earnings (Manning 2005). The government set the hake TAC at a remarkably conservative 60,000 metric tons in 1991 to encourage the fishery to grow (see figure 2). This was the lowest amount caught since 1964 when foreign trawlers began arriving. The hake fishery was also regulated through the size of nets and area restrictions (Van Zyl 2001).

The TACs were divided into fishing quotas for eight species: hake, horse mackerel, orange roughy, alfonsino, sardines, red crab, rock lobster, and monk. Once the TACs were set, a combination of harvesting rights, individual quotas, enforcement policies, fees, and a monitoring system were established.

Renewable harvesting rights form the core of the Namibian fisheries management system and limit access to the fishery. Rights are issued to bidders for a period of 4 to 20 years depending on various factors such as investment in vessels, fishing experience, and level of Namibian ownership (Ithindi 2003).

Individual quotas are issued to harvest-rights holders; preference is given to firms owned by Namibians and that employ Namibian citizens. Furthermore, vessels are not given a license to fish unless they are registered in Namibia, are at least 51 percent Namibian owned, and have a crew that is at least 85 percent Namibian. This structure is a result of the “Namibianisation” process adopted by the fledgling

Figure 2: Namibian Hake Catch Pre-and Post-Independence



Source: Catch data from 1964–2003 is from Butterworth and Rademeyer (2005, 290). Catch data from 2003–2008 is from MFMR (2003) and MFMR (2007).

government to help recompense those who suffered under apartheid rule (Manning 2005, 176).

Namibianisation shapes the specifics of the nation’s quota system in several ways. The quota levies paid by the fishers, for example, are tiered, with cheaper fees for Namibian-owned vessels. This practice helps explain why Namibia does not grant fixed rights, but grants them for only a period of years. It is also why fishing quotas are technically not transferable. According to fisheries economist Robert Deacon, this is “due to the deliberate policy of employing Namibian citizens.” While this “no doubt causes some proximate inefficiency,” Deacon writes that the broad distribution of the benefits from fisheries across a large

number of Namibians seems to protect the long-run efficiency of the fishery and forestalls efforts by elite groups to lobby the government for power (Deacon 2010, 266). Although Namibia's democratization process has been messy and full of friction, it arguably has played an important role in the initial success of fishery management.

What, then, is a fishing right in Namibia? The government overcomes the common property problem by renting out a limited number of rights to a resource. Although the fisheries are still a public resource (individual quotas are not transferable, other than with permission of the Ministry of Fisheries), Namibians have found creative ways to lease and buy shares. Rights are leased under the guise of chartering vessels. The services of processing and marketing the catch are also included in the contract. The operating company pays the fee and the quota holder (i.e., small holding company) has nothing to do with the quota for the rest of the year. "The 'chartering' of a vessel in such cases is no different than leasing the quota," says Manning (2005, 191). This arrangement created a web of joint ventures with large operating companies at the center. The small quota holders gain by having a legal way into the market that can be exploited personally or by renting the quota. The operating companies gain by acquiring more quotas and efficiency in scale of operation.

Despite these gains there are still some road bumps with Namibia's arrangement. As Manning describes, it is hard for "newcomers" to enter the operations side and hence they often collect a smaller portion of the rent. More broadly, the process of privatization is incomplete. As such, it will be difficult for Namibia to realize the full potential of its fishery until individual quotas become perpetual and transferable.

Enforcement

It is essential for rights holders to have confidence that their rights will be enforced. Compliance with limitations on fishing activities depends on fishers recognizing that limitations are necessary. As stated in a Policy Brief by the World Bank, "regulation with the consent of the regulated leads to greater compliance and lower costs of enforcement"

(2004, 2). In fact, evidence shows that fishers with rights to fish often monitor and enforce fishing rights themselves (see Leal, DeAlessi, and Baker 2008). Recall that licensed vessels offered detailed intelligence to the Namibian government to help enforce their rights. They even paid for a helicopter to nab intruders (Manning 2005, 174).

Namibia remains vigilant in its efforts to discourage illegal fishing, but with only a few patrol vessels, this task is daunting (Van Zyl 2001). Therefore, the main focus of enforcement is monitoring licensed vessels. All large vessels carry onboard observers who both monitor and collect data for analysis. Fishing rights holders pay levies to finance the Fisheries Observer Agency. Evidence indicates that this monitoring system is effective as violations per inspection have declined dramatically since the early 1990s (Bergh and Davies 2005, 298–9).

Recently Namibia's fisheries department installed a Vessel Monitoring System (VMS) (FAO 2010). A VMS uses electronic transmitters placed on fishing vessels that send information via satellite about the ship's position to enforcement agencies. This lets commercial fishing boats communicate and allows regulators to track vessels' movements from port to the ocean and back. Someone on land can monitor transmissions to determine if a vessel is in a closed area. Also, at port, fisheries control officers inspect offloaded fish by counting and weighing fish. This information serves as the basis for setting quotas and for payment of fees.

Whether in port or offshore, the Namibian courts serve as the ultimate enforcer of the fisheries regime. The courts have supported the Sea Fisheries Act of 1992 and the Marine Resource Act of 2000, both of which strengthened components of the Namibian fishery policy (Manning 2005, 176). Under the 2000 act, violations such as unlicensed use of fishing gear, the unauthorized harvesting of marine resources for commercial purposes, or the possession of dismantled fishing gear on board an unlicensed fishing vessel, carry fines up to N\$2 million, N\$1 million, and N\$500,000 respectively. The act also gives courts the power to declare a vessel found fishing illegally in Namibian waters as forfeited to the State (Menges 2004).

Potential Snags

Some fishery experts claim that the Namibianisation of the industry has not altered who the beneficiaries are as much as one might think. Manning (2005) suggests that foreign interests and wealthy national companies have found ways to protect their interests in Namibia's fisheries sector through competent attorneys and political handouts. Spain, for example has given millions of dollars in aid to Namibia—some of it directly to the fishing industry. From 2006 to 2009 Spain's aid to the country was worth in excess of \$70 million, according to data from Spain's foreign affairs ministry (iWatch News 2011). And Henning Melber (2003), former director of the Namibian Economic Policy Research Unit, criticizes Namibia's fishing sector, claiming that it promotes the interests of a privileged black minority and has failed to correct "the grossly inequalitarian social structure and distribution of wealth." Yet Deacon (2010, 266) argues that because Namibian fisheries policy has deliberately broadened the set of stakeholders, it is difficult for elite groups to appropriate rents for themselves.

One thing is clear: If the individual quotas were legally transferable, the transaction costs involved in trading quotas would be lower than the side door deals cut to make the system work. There is extensive evidence that transaction costs often block beneficial reallocations of a resource (see Libecap 1989). Furthermore, the system would be more conducive to a free-market process where sale prices and lease rates for quota rights could fluctuate freely depending on expectations of catch levels and fish prices, which in turn could create the incentive structure to improve the overall economic efficiency of the fishing industry. Indeed, evidence indicating excess capacity in vessels and processing for a few companies in Namibia signifies some wastefulness in the system and a tendency to focus on short-term operating costs (Manning 2005).

Individual transferable quotas, however, can lead to fewer fishers and fewer boats, which can cause unemployment and socioeconomic dislocation in coastal communities. When catch shares are allocated, those who receive the largest initial distribution of share—or have

the most capital to buy and lease shares—can gain control over the fishery. Smaller-scale fishers can be pushed out while a few larger fishing companies and packers dominate. Several scholars argue that the change catch shares create in the nature of fishing jobs—the shift from a larger, part-time, more seasonal work force to a smaller, full-time,

There are huge opportunities to improve the chances for successful fisheries reform in the developing world.

higher paid and safer work force—is both economically and ecologically positive (Costello, Gaines, and Lynham 2008, Heal and Schlenker 2008). Although this process may be more efficient in the long run, it is not currently consistent with the goals of Namibianisation.

In addition, given the lack of historical local fishing claims in Namibia, there were equity concerns over the initial allocation of fishing shares. With these hurdles facing a democratic founding government (run by a Marxist political party), transferable quotas, in spite of being economically superior to supposedly nontransferable rights, could have been a deal breaker.

Twenty years later there are signs that the regulations promoting equity are not working. The Ministry of Fisheries, for example, chooses who gets hake quotas. In the past ten years, only 38 applicants have received quotas (iWatch News 2011). Although the current rights system helped spur reform of the Namibian fishery, the process of privatization is incomplete. If the country is to progress, there will be a need to look at efficiency as an important social goal. Without longer term quota rights and transferability it will be difficult to realize the full potential of the fishery sector (Scott 2010).

FROM FAILING TO FLOURISHING

Namibia's post-independence fisheries policies offer hope and change for other developing nations. The fishery has stopped declining. The asset value of fish stocks increased by nearly 40 percent in the

A key component to this system's success was establishing the principle that natural capital is not free and that management of the resource is part of the cost.

1990s—reflecting the specific growth of the hake stock and the general increased economic value of the total stock (Lange 2003). During this same time, the contribution of the fisheries sector to GDP rose from approximately 4 percent at independence to 10 percent in the late nineties—6 percent from fish processing and 4 percent for the harvesting sub-sector (Manning 2005, 191). As of 2007, the fishing sector in

Namibia contributes 5.7 percent to GDP and accounts for 18 percent of Namibia's total foreign exchange earnings (MFMR 2007). This is down from earlier in the decade due to reduced landings combined with currency and price fluctuations.

Recognizing the recovery of the hake fishery, the TAC for hake was increased by 5,000 tons for the 2010/2011 fishing season—meaning 140,000 tons of hake could be landed in 2010/2011 (Hartman 2010). Perhaps even more significant for Namibia is that the hake industry as a whole earns the country about N\$1.4 billion per year; the exchange rate is about N\$7 to US\$1 (*Windhoek Observer* 2011). Furthermore, the Namibian government and fisheries sector deserves credit for operating without subsidies (Nichols 2005, 324). This is striking given the global pattern of government subsidies for the fishing industry.

The objective of creating jobs for Namibians is also generally viewed as a success by the public. The domestic fishing industry that emerged employs 14,000 locals out of about 2 million Namibians—a substantial number in a country where unemployment is about 51 percent (Heita 2010). The argument can be made, however, that this is not the economically optimal outcome. The government, for example, insists on landing 60 percent of hake catch “wet” for onshore processing, which creates jobs. But the hake frozen at sea attracts a much higher price than the land-frozen product. The cost in lost revenue due to mandated land

freezing should be factored into policy decisions. The revenue lost in this process in 1999 was more than N\$128 million or approximately N\$51,000 per job—an expensive way of creating new jobs (Eide, Manning, and Steinshamn 2003).

Despite such shortfalls, Namibia's catch share system can be commended for its social, economic, and environmental impacts that are superior to what occurs in most coastal nations.

ONE SIZE MAY NOT FIT ALL

Fishery management regimes, are multidimensional, meaning there is a broad range of pathways toward better management. But two fundamental ingredients for success in Namibia were: 1) a clear assignment of rights, and 2) the ability to develop rights-based reform pathways compatible with the political economy circumstances of the nation (see Deacon 2010 and Cunningham and Neiland 2010).

Namibians were able to fence their fishery by establishing rights to an exclusive fishing zone and then enforce those rights. They further defined rights by establishing catch shares for fish stocks. An incentive structure quickly emerged to alter the desire for fishers to race-for-fish, which reversed the process of fishery collapse and raised the total value of the fishery.

In addition to creating rights, a key component to this system's success was establishing the principle that natural capital is not free and that management of the resource is part of the cost. Namibia introduced payments for fishing quotas early on—even when the resource was depleted. As a result, the notion of paying for the use of a resource is a given in Namibia today (Manning 2005).

As the case of the Namibian fisheries demonstrates, there are huge opportunities to improve the chances for successful fisheries reform in the developing world. Some scholars argue that a catch share system is impractical in countries where there is little domestic capacity to manage resources sustainably or where there is little will to protect property rights held by non-elites (Arnason et al. 2009). That may be

so. In such cases, another pathway, such as devolving responsibilities to lower levels of government or to fishing communities, holds promise (see Leal 2010).

Community fishing rights, where defined groups are given exclusive rights, is attractive where other rights-based approaches cannot be applied for sociopolitical or enforcement reasons (Arnason 2001). Among the advantages of communal fishing rights are that they can be socially acceptable and facilitate effective law enforcement on the basis of physical proximity and traditional institutions (see Ostrom 1990, Wilson 2001, and Arnason 2001). Well-functioning community management arrangements have shown benefits in both household income and environmental conditions (Shyamsundar, Araral, and Weeraratne 2005).

Beach Management Units in East Africa

Beach Management Units (BMUs) for Lake Victoria in East Africa are emerging as an effective fisheries management strategy. BMUs are organizations that bring together those involved in a fishery, including boat owners, processors, traders, and boat and net repairers, to work with the government in managing fisheries resources. Each BMU has at least 30 boats, an assembly and committee, and legal authority over BMU activities. There are more than 1,000 BMUs for Lake Victoria (Lake Victoria Fisheries Organization 2010).

The fishing in Lake Victoria, which covers parts of Tanzania, Uganda, and Kenya, was previously “managed” by the national governments, which viewed fisheries resources as common property. Anyone could gain access to the resource. This led to increasing fishing effort (in terms of number of fishers and vessels) and declining catches (Bulayi 2001). In addition to overfishing, exotic species introduction, poor land use practices, and pollution from various sources all contributed to the depletion of fish populations (Lynch 1996). Because of the enormous ecological and social cost of this loss, BMUs became a more attractive option to policy makers.

Beach Management Units emerged in Uganda in 2003. The duties of the BMUs in Uganda cover the daily management of the local fishery: issuing fishing permits, registering fishing gear, and working with the government fisheries department to enforce regulations against illegal fishing practices. The BMUs also collect fishing data to help guide their management decisions. As Waldman points out in *World Resources 2005* (WRI 2005, 65–68), the local committees are allowed to keep 25 percent of the money generated from licenses and landing fees to fund their operations.

These local institutions are demonstrating that decentralization can be ecosystem-friendly and serve the interests of the nation's fishers. The BMUs have declared three non-fishing zones designed to protect known nursery areas to help maintain the fish stock. Additionally, the fishing statistics that BMUs in Uganda have collected show greater local awareness of the need to reduce fishing pressure and, therefore, control illegal fishing. It is too early to tell if these improvements in management will translate into more income for local fishers, but there have been anecdotal reports of higher daily catches (Lake Victoria Fisheries Organization 2010).

Perhaps the most significant benefit of devolution of resource management to local levels is that it gives people a voice and a direct incentive to manage resources where they previously had none. In Uganda, for example, local culture discourages women from joining fishing crews and, more broadly, owning property. But under BMUs some women have started fishing from the shores of Lake Victoria. A few have become boat owners, and a handful are now official members of a BMU (see WRI 2005). This is an important step, as the absence of rights to land and resources particularly affects poor women and means

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missed opportunities for economic and environmental development. The World Bank's Agenda for Development, for example, points out that agricultural output in many sub-Saharan African countries could increase by up to 20 percent if women had equal access to agricultural inputs (see Saito, Mekonnen, and Spurling 2005).

Beach Management Units are just one example of community-based natural resource management. Fisheries management authorities in India and other countries are starting to recognize that a fishery cannot be managed effectively without the cooperation of fishing communities.

Community Fisheries in India

South Asia's five coastal countries (Bangladesh, India, the Maldives, Pakistan, and Sri Lanka) account for less than 2 percent of the world's total coastline. Yet these coastal zones are rich in marine resources, which help support about 135 million people (Paul and Nishida 2008). India alone has nearly 4,000 fishing villages that support 15 million residents and provide food security for the nation (FAO 2011).

In India, as in many regions in the world, coastal and marine ecosystems have been governed in a piecemeal and erratic fashion, which has led to unsustainable pressures on natural resources (Arnason, Kelleher, and Willmann 2009). A study conducted by the PEW Charitable Trusts and the Sea Around Us Project at the University of British Columbia Fisheries Centre predicts that over the next 50 years India could lose up to 40 percent of its fish stocks (Cheung et al. 2009). This problem is exacerbated by the institutional regulatory framework, which spreads management of coastal and marine resources across multiple agencies without adequate coordination, technical capacity, or enforcement (Paul and Nishida 2008).

This was not always the case. The coast of India has a long history of fishing villages practicing an array of traditional community-based fisheries management systems. In 1909, Edgar Thurston was one of the first to chronicle the fishing castes of India. Thurston and other

anthropologists indicated the existence of vibrant and sustainable use patterns and resource management within the fishing communities (Thurston and Rangachari 1909). The traditional caste system for fisheries management, according to the Indian Director of Integrated Coastal Management (Salagrama 2005), provided functions such as: assertion of rights over fishing areas, establishment of rules of access, a balance of fishing activities with resource capacity, and systems of governance that help maintain the social integrity of the villages (see also Bavnick 2001).

Over time, these local management systems came under increasing stress, primarily due to central government initiatives instigated in the post-independence era. Customary arrangements were pushed aside to make room for a new emphasis on achieving the socialist ideal through planning, science, and technology (Salagrama 2005). In the short term, this path accelerated growth in the fisheries sector, but it also augmented damage to local fisheries. With increasingly nonviable fishing options came a growing vulnerability to many very poor people (see Arnason, Kelleher, and Willmann 2009).

To remedy this situation the government focused on excluding both traditional and modern fishing practices with seasonal bans, bans on fishing in specific areas, and restriction on fishing gear. But the bans have been ineffective. The government's disregard for the local systems, according to Salagrama (2005, 112), "meant that the knowledge and understanding accumulated over generations were not taken advantage of while designing the new systems."

Today, the government of India, with a nudge from the World Bank, is coming full circle to accept that there is much to learn from customary fishing systems. To promote the sustainability of coastal and marine ecosystems, the World Bank and

The traditional systems were built upon centuries of experience and understanding of the fisheries, and can certainly show a way forward.

the Indian government are supporting several regional initiatives through the Integrated Coastal Zone Management program. One of the objectives of this program is to improve national marine management through capacity building at the state and local levels. Another objective is to introduce and enforce zones along the coastline to help establish property rights and monitor the health of the fisheries (World Bank 2010).

Given the largely informal nature of the fishing economy, many of the management regimes, such as individual transferable quotas, would be difficult to establish in the Indian context. But new approaches from fishing villages across India are surfacing. Bavnick (2001), for example, finds detailed local systems governing access to the fishing grounds in the sea communities on the Coromandel Coast. And in the state of Andhra Pradesh, Salagrama (2005) summarized the success of the community based management approach as follows:

- Management systems vary between villages and build on specific conditions of the natural and social environment in the given area.
- The assertion of rights of access and withdrawal, and their constant reiteration, provides a security of tenure to the fishers and the fishing grounds that can be equated in farming terms to acquisition of land tenure for cultivation.
- Participatory decision making is a key ingredient of community based management. The communal system allows leaders to enforce a fishing regulation because the community decided on the rule.

A major component to the pilot programs (primarily in the states of Gujarat, Orissa, and West Bengal) is the management of fisheries resources by those who depend on them and have the greatest stake in protecting them. As Imtiaz Ahmad of the World Bank's Dhaka office stated, "An important lesson learned from earlier fisheries projects is the importance of beneficiary involvement in project preparation and implementation" (World Bank 1999).

Although more research and case studies are needed on community run fisheries, local institutions are shedding light on marine management strategies in India. "The traditional systems," writes Salagrama (2005, 143), "were built upon centuries of experience and understanding of the fisheries, and can certainly show a way forward." Devolving control of fisheries to local levels is a step in the right direction. In addition, "the historic rights of traditional fishers to fisheries resources should be secured," as noted in the findings of the national governance assessment (Mukherjee, Upadhyay, and Sane 2008, 4).

CONCLUSION

About half of the world's population lives within 200 kilometers of a coastline (Creel 2003). Many coastal regions are experiencing a decline in marine resources and a loss of fish stocks. The problem is particularly acute in developing countries where fish play a vital role in the nutritional status and livelihood of millions of people (Cunningham and Neiland 2010).

The reasons for environmental decline of coastal habitats are complex, but a lack of property rights plays a significant role. Property-rights-based fisheries management regimes have demonstrated successes in the management of fisheries resources in developed countries. Common property problems are eliminated by establishing property rights over the fish stock, which reduces the incentives for over capitalization of the resource and consequently contributes to economic efficiency.

In the developing world, catch share systems are rare because the legal, managerial, and fiscal frameworks are often absent (Leal 2010). Namibia, however, is demonstrating that a catch share structure can be built from the ground up and can work beyond the developed world.

After 20 years of independence, Namibia still suffers from a high rate of poverty and inequality, but few would have imagined that a new nation in an area dominated by strife would have a relatively stable democratic government, a free press, and an economy that has grown

at an average rate of 4.2 percent a year since independence in 1990 (*Economist* 2011). As evidence of good governance, the 2010 *Economic Freedom of the World Report* gave Namibia a score of 7.58 out of 10 in the “Property Rights & Legal System” category—up from 2.69 in 1990 (Gwartney, Hall, and Lawson 2010). In the most recent survey by Freedom House, Namibia gets high marks for both political rights and civil liberties (Puddington 2011). And in the latest index of good governance in Africa, published by the Mo Ibrahim Foundation, Namibia comes in sixth out of 53 countries (*Economist* 2011).

Namibians are proving that tools for effective resource management are universal—there is no one “African solution.” Any nation, and its resources, can benefit from pursuing market-based economic principles and establishing secure property rights. Namibia did this by instituting the principle that a right to benefit from the natural capital of a country has real value and a payment should be made for it. This right and payment came in the form of fishing quotas under a catch share system. This system was then enforced, which helped reassure fishing companies that their rights were secure.

Yet the catch share system implemented in Namibia represents only one way of fencing a fishery. As fisheries scientist Jeremy Prince writes, “Depending on the nature of a fishery, other methods may work better. These might divide up and sell lobster pots, numbers of fish, numbers of boats, bits of the ocean, or even individual reefs. The best choice depends on the value and underlying biology of each fishery” (quoted in *Economist* 2008).

Around Lake Victoria, the property path came in the form of Beach Management Units. Nobel Laureate Elinor Ostrom (1990) suggested that if a community of fishers exhibit a high degree of social, cultural, and economic homogeneity, then they would be well positioned to successfully manage the resources. This appears to be the case for the BMU’s of Lake Victoria. These arrangements indicate that decentralization can be ecosystem-friendly and serve the interests of the local fishing communities. The BMUs have managed to empower locals, successfully

fence off critical breeding grounds to anglers, and generate income from licenses and landing fees to fund their operations.

A few lessons from BMUs can be summarized. Effective decentralization requires, at a minimum, that local institutions—whether they are official bodies such as village councils or more informal arrangements such as cooperatives—are formed on principles of representation and are accountable to their constituents. Even more important is that the state grants these local institutions actual authority over resources—something that is still far from common.

Lessons are also emerging from India's traditional community-based fishing. Community-based cooperative fisheries management is a viable option in some of the artisanal fisheries in developing countries. A key component emerging from the pilot programs in India is bottom-up management of fisheries resources by those who depend on them, have the most knowledge about them, and have the greatest stake in protecting them. This bottom-up approach paired with the need for the government of India to introduce and enforce more fishing zones along the coast line as part the new National Fishing Policy show promise for stronger property rights and healthier fisheries.

There is growing evidence from developing countries around the world, that insecure property rights limit economic development and resource conservation. In the middle of the nineteenth century, the development of American agriculture was similarly limited when farmers were unable to protect frontier lands from encroachment by livestock. To solve this problem fencing techniques such as barbed wire were created. This invention enabled individuals to establish property rights and secure their resources. Such fences are obviously not possible in the deep sea, but property rights can still be erected for fisheries.

Fences for fish vary among countries in the extent that they approach full property rights, but overall securing rights to marine resources have saved fisheries in the developed world. Similar strategies can work in the developing world. Traditional systems of participatory government mixed with market approaches to resource management

such as catch shares, devolution of control to local levels of government, and community-based management for fisheries are helping improve both environmental quality and quality of life in Africa and beyond.

NOTES

- 1 The term fishery is used to identify one or more species of fish in a region as well as the fisheries vessels and equipment used to harvest, process, and deliver the fish to the wider market (Leal 2002).
- 2 The oceans had long been subject to the freedom-of-the-seas doctrine—a principle put forth in the seventeenth century essentially limiting national rights and jurisdiction over the oceans to a narrow belt of sea surrounding a nation’s coastline. The remainder of the seas was proclaimed to be free to all and belonging to none.
- 3 Notwithstanding concerns raised about the Law of the Sea Treaty—and there have been many—the U.S. Senate Foreign Relations Committee recommended U.S. accession to the treaty in a unanimous vote in March 2004. More than seven years later, a vote of the entire U.S. Senate has yet to be scheduled.
- 4 A conventional measure of collapse is a decline in catch to a level equal to 10 percent or less of the maximum recorded catch for that fishery.
- 5 The *Freedom of the World Index* uses a 0 to 10 scale in five broad categories to measure the degree to which the policies and institutions of countries are supportive of economic freedom. A low level of economic freedom is problematic because the more economic freedom a country has the quicker they gain civil liberties, political freedom, and economic growth.

REFERENCES

- African Economic Digest. 1993. Namibia: Fishing for Growth. *African Economic Digest* May 17: 4.
- Anderson, Terry L., and Donald Leal. 2001. *Free Market Environmentalism*. New York: Palgrave.
- Arnason Ragnar. 2001. Alternative Fisheries Management System: The Icelandic Experience. Paper presented at the seminar on “The Future of Commons

- Fishery Policy: The Voice of Europe's Fishing Regions." European Centre for the Regions, Santiago de Comostela, Spain, November 29–30.
- Arnason Ragnar, Kieran Kelleher, and Rolf Willmann. 2009. *The Sunken Billions: The Economic Justification for Fisheries Reform*. Agriculture and Rural Development Series. Washington DC: World Bank and the Food and Agriculture Organization of the United Nations.
- Bavnick, Maarten. 2001. *Marine Resources Management: Conflict and Regulation in the Fisheries of the Coromandel Coast*. New Delhi: Sage Publications.
- BBC. 2010. Namibia's First Female Trawler Captain. BBC World News. August 6. Available at: <http://news.bbc.co.uk/2/hi/africa/8893367.stm> (accessed on November 2010).
- Beaudry, Frederick H., William B. Folsom, and David J. Rovinsky. 1993. *World Fishing Fleets: An Analysis of Distant-water Fleet Operations: Past–Present–Future. Volume II: Africa and the Middle East*. Silver Spring, MD: National Marine Fisheries Service, National Oceanic and Atmospheric Administration, 51–?.
- Bergh, Per Erik, and Sandy Davies. 2005. Against All Odds: Taking Control of Namibian Fisheries. In *Namibia's Fisheries: Ecological, Economic and Social Aspects*, eds. Ussif Rashid Sumailia, David Boyer, Morten Skogen, and Stein Stenshamn, Delft, Netherlands: Eburon Academic Publishers.
- Bulayi, Magese Emmanuel. 2001. *Community Based Cooperative Fisheries Management for Lake Victoria Fisheries in Tanzania*. Final Project, UNU-Fisheries Training Programme. Reykjavik, Iceland: The United Nations University.
- Butterworth, Douglas S., and Rebecca A. Rademeyer. 2005. Sustainable Management Initiatives for the Southern African Hake Fisheries over Recent Years. *Bulletin of Marine Science* 76(2): 287.
- Cheung, William W. L., Vicky W. L. Lam, Jorge L. Sarmiento, Kelly Kearney, Reg Watson, Dirk Zeller, and Daniel Pauly. 2009. Redistribution of Fish Catch by Climate Change: A Summary of a New Scientific Analysis. *Ocean Science Series*. Washington, DC: PEW Environment Group of the PEW Charitable Trusts.
- CIA. 2011. *The World Fact Book*. Washington, DC: Central Intelligence Agency. Available at: www.cia.gov/library/publications/the-world-factbook/geos/

- wa.html (accessed on August 8, 2011).
- Costello, Christopher, John Lynham, Sarah E. Lester, and Steven D. Gaines. 2010. Economic Incentives and Global Fisheries Sustainability. *Annual Review of Resource Economics* (2): 299–318. Available at: www.annualreviews.org (accessed December 15, 2010).
- Costello, Christopher, Steven D. Gaines, and John Lynham. 2008. Can Catch-Shares Prevent Fisheries Collapse? *Science* 321: 1678–81.
- Creel, Liz. 2003. Ripple Effects: Population and Coastal Regions. Washington, DC: Population Reference Bureau. Available at: www.prb.org/Publications/PolicyBriefs/RippleEffectsPopulationandCoastalRegions.aspx (accessed September 16, 2011).
- Cunningham, Stephen, and Arthur E. Neiland. 2010. African Fisheries Development Aid. In *The Political Economy of Natural Resource Use: Lessons for Fisheries Reform*. Ed. Donald Leal. Washington, DC: World Bank, 21–44.
- Deacon, Robert T. 2009. Creating Marine Assets: Property Right in Ocean Fisheries. *PERC Policy Series 43*. Bozeman, MT: PERC.
- . 2010. Pathways to Fishery Reform: Accounting for Political Economy. In *The Political Economy of Natural Resource Use: Lessons for Fisheries Reform*. Donald Leal, ed. Washington DC: World Bank, 119–142.
- Demsetz, Harold. 1967. Toward a Theory of Property Rights. In Papers and Proceedings of the Seventy-ninth Annual Meeting of the American Economic Association. *The American Economic Review* 57(2): 347–59.
- De Soto, Hernando. 2000. *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else*. New York: Basic Books.
- Economist*. 2008. A Rising Tide: Scientists Find Proof that Privatising Fishing Stocks Can Avert a Disaster. September 18. Available at: www.economist.com/node/12253181 (accessed September 16, 2011).
- . 2011. Happy but Unequal Namibia: On We Go: Swapo Rules and Harmony Prevails. March 10. Available at: www.economist.com/node/18340509 (accessed September 15, 2011).
- Eide, Arne, Peter Manning, and Stein Ivar Steinshamn. 2003. In Assessment of the Economic Benefits African Countries Received from Their Marine Resources: Three Case Studies. *SNF-Report No. 05/03*. Bergen, Norway: Institute for

Research in Economics and Business Administration.

- Elago, Panduleni Ndinelago. 2004. *Duration of Fishing Rights and Investment: An Empirical Study of Investment in Namibian Fisheries*. Final Project, UNU-Fisheries Training Programme. Reykjavik, Iceland: The United Nations University. Available at: <http://innri.unuftp.is/Proj04/PanduPRF04.pdf> (accessed August 23, 2011).
- Encyclopedia Britannica*. 2010. Britannica World Data-Namibia. Available at: www.britannica.com/EBchecked/topic/402283/Namibia/44014/Independence-before-the-conquest (accessed October 26, 2010).
- Environmental Defense Fund. 2010. *How Catch Shares Work: A Promising Solution: Reviving Fisheries and Fishing Communities*. Washington, DC: EDF. Available at: www.edf.org/page.cfm?tagID=3332 (accessed October 22, 2010).
- Food and Agriculture Organization (FAO). 2008. *The State of World Fisheries and Aquaculture*. Rome: Fisheries and Aquaculture Department, Food and Agricultural Organization of the United Nations. Available at: www.fao.org/docrep/011/i0250e/i0250e00.htm (accessed August 23, 2011).
- . 2010. Fishery and Aquaculture Country Profiles—Namibia. Washington DC: FAO. Available at: http://www.fao.org/fishery/countrysector/FI-CP_NA/en (accessed December, 21, 2010).
- . 2011. Fishery and Aquaculture Country Profiles—India. Washington, DC: FAO. Available at: www.fao.org/fishery/countrysector/FI-CP_IN/en (accessed September 30, 2011).
- FOROYAA Newspaper* (Serrekunda, Gambia). 2010. Africa Losing U.S. \$2–5 Billion Fisheries Revenue Due to Mismanagement Says DFID Fisheries Advisor. September 22. Available at: <http://allafrica.com/stories/201009220814.html> (accessed December 1, 2010).
- Griffith, David R. 2008. The Ecological Implications of Individual Fishing Quotas and Harvest Cooperatives. *Frontiers in Ecology and the Environment*. 6: 191–8.
- Gwartney, James D., Joshua C. Hall, and Robert Lawson. 2010. *Economic Freedom of the World: Annual Report*. Vancouver, BC, Canada: Fraser Institute. Available at: www.freetheworld.com/reports.html (accessed December 1, 2010).
- Gwartney, James D., Robert Lawson, and Walter Block. 1990. *Economic Freedom*

- of the World*. Vancouver, BC, Canada: Fraser Institute.
- Hartman, Adam. 2010. Higher Quotas for Hake, Monkfish. *The Namibian* (Windhoek, Namibia), April 30. Available at: <http://allafrica.com/stories/201005030147.html> (accessed December 1, 2010).
- Heal, Geoffrey, and Wolfram Schlenker. 2008. Sustainable Fisheries. *Nature* 455 (23 October): 1044–5.
- Heita, Desie. 2010. Unemployment the Big Worry. *New Era* (Namibia), December 17. Available at: www.newera.com.na/article.php?articleid=14629&title=Unemployment%20the%20big%20worry (accessed December 20, 2010).
- Institute for Security Studies. 2007. *The Crisis of Marine Plunder in Africa*. Tshwane (Pretoria), South Africa: ISS. Available at: www.iss.co.za/pgcontent.php?UID=22399 (accessed October 28, 2010).
- Ithindi, Andreas P. 2003. *Rent Capture in the Namibian Fisheries: The Case of Hake*. Final Project, UNU-Fisheries Training Programme. Reykjavik, Iceland: The United Nations University.
- iWatch News* 2011. Spain's hake appetite threatens Namibia's most valuable fish. *iWatch News*. The Center for Public Integrity. Available at: <http://www.iwatchnews.org> (accessed October 10, 2011).
- Jurgen, J. D. 1998. *A Tongue in Cheek Assessment: Namibia Brief, Focus on Fisheries and Research*. UNU-Fisheries Training Programme, No. 20. Reykjavik, Iceland: The United Nations University.
- Lake Victoria Fisheries Organization. 2010. *Lake Victoria Fisheries Organization: An Institution of the East African Community*. Jinja, Uganda: LVFO. Available at: www.lvfo.org/ (accessed December 29, 2010).
- Lange, Glenn-Marie. 2003. *The Value of Namibia's Commercial Fisheries*. DEA Research Discussion Paper No. 55. Windhoek, Namibia: Ministry of Environment and Tourism, Directorate of Environmental Affairs. February. Available at: http://mdgs.un.org/unsd/envaccounting/ceea/archive/Fish/Namibia_Value_Commercial_Fisheries.PDF (accessed December 1, 2010).
- Leal, Donald. 2002. *Fencing the Fishery: A Primer for Ending the Race to Fish*. Bozeman, MT: PERC. Available at: www.perc.org/articles/article120.php (accessed August 22, 2011).
- . 2005. *Evolving Property Rights in Marine Fisheries*. Lanham, MD: Rowman

- and Littlefield.
- . 2010. *The Political Economy of Natural Resource Use: Lessons for Fisheries Reform*. Washington DC: World Bank.
- Leal, Donald, Michael DeAlessi, and Pamela Baker. 2008. Beyond IFQs in *Marine Fisheries: A Guide for Federal Policy Makers*. Bozeman, MT: PERC.
- Libecap, Gary. 1989. *Contracting for Property Rights*. New York: Cambridge University Press.
- Lopes, Simeao, and M. A. Pinto. 2006. Illegal Fishing: The Case of Mozambique. Paper presented at the “Forging Unity: Coastal Communities and the Indian Ocean’s Future” Conference Organized at IIT Madras, Chennai, India, 9–13 October 2001. Available at: www.icsf.net/icsf2006/uploads/publications/proceeding/pdf/english/issue_11/chapter868.pdf (accessed October 28, 2010).
- Lynch, Jeff. 1996. Lake Victoria and Invasive Species and Trade. TED Case Studies No. 388. Available at: www1.american.edu/ted/victoria.htm (accessed September 3, 2011).
- Manning, Peter. 2005. The Namibian Hake Fishery. In *Successful Fisheries Management: Issues, Case Studies and Perspectives*. Stephen Cunningham and Tim Bostock, eds. Delft, Netherlands: Eburon Academic Publishers, 169–196.
- Meese, Edwin III. 2005. Ed Meese: Reagan Would Still Oppose Law of the Sea Treaty. *Human Events*. April 25. Available at: www.humanevents.com/article.php?id=7249 (accessed August 29, 2011).
- Melber, Henning. 2003. Of Big Fish & Small Fry: The Fishing Industry in Namibia. *Review of African Political Economy* 30(95) 142–9.
- Menges, Werner. 2004. PG to Decide Fate of Pirate-Fishing Suspect. *The Namibian* (Windhoek, Namibia), July, 5.
- Ministry of Fisheries and Marine Resources (MFMR). 2003. *Annual Report*. Windhoek, Namibia. Available at: http://209.88.21.36/opencms/export/sites/default/grnnet/MFMR/downloads/docs/annual_report2003.pdf (accessed on December 1, 2010).
- . 2007. *Annual Report*. Windhoek, Namibia: MFMR. Available at: http://209.88.21.36/opencms/export/sites/default/grnnet/MFMR/downloads/docs/2007_Report.pdf (accessed on December 1, 2010).

- Mukherjee, Krishnendu, Sanjay Upadhyay, and Amruta Sane. 2008. *Policy Brief on Governance and Integrated Coastal Management: India*. Bangkok, Thailand: Mangroves for the Future.
- Namibia. 2010. Namibia Government—Economy. Available at: www.namibiagovernment.com/economy.htm (accessed November 18, 2010).
- Nichols, Paul. 2005. Marine Fisheries Management in Namibia: Has It Worked? In *Namibia's Fisheries: Ecological, Economic and Social Aspects*. Ussif Rashid Sumailia, David Boyer, Morten Skogen, and Stein Stenshamn, eds. Delft, Netherlands: Eburon Academic Publishers, 319–332..
- North, Douglass. 1990. *Institutions, Institutional Change and Economic Performance*. Cambridge, UK: Cambridge University Press.
- Omar, Maria Isabel Virgilio. 2006. Overview of Fisheries Resources: Mozambique. Presented at the “Workshop on Fisheries and Aquaculture in Southern Africa: Development and Management,” in Windhoek, Namibia, 21–24 August 2006. Mozambique: Ministry of Fisheries, Department of Aquaculture.
- Ostrom, Elinor. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge, UK: Cambridge University Press.
- Paul, Tapas, and Jane Nishida. 2008. South Asia Region. *Environment Matters* (Annual Review): 44–7. Available at: <http://siteresources.worldbank.org/EXTENVMAT/Resources/EnvironmentMatters2008-a.pdf> (accessed September 2, 2011).
- Puddington, Arch. 2011. *Freedom in the World 2011: The Authoritarian Challenge to Democracy*. Washington, DC: Freedom House.
- Saito, Katrine, Hailu Mekkonen, and Daphne Spurling. 2005. *Raising the Productivity of Women Farmers in Sub-Saharan Africa*. Washington, DC: World Bank.
- Salagrama, Venkatesh. 2005. Traditional Community Based Management Systems in Two Fishing Villages in East Godavari District, Andhra Pradesh, India. In *Successful Fisheries Management: Issues, Case Studies and Perspectives*. Eds. Stephen Cunningham and Tim Bostock. Delft, Netherlands: Eburon Academic Publishers, 111–148.
- Scott, Anthony. 2010. New Directions in Fisheries Management. In *The Political*

- Economy of Natural Resource Use: Lessons for Fisheries Reform*. Ed. Donald Leal. Washington DC: World Bank, 1–20.
- Shyamsundar, Priya, Eduardo Araral, and Suranjan Weeraratne. 2005. *Devolution of Resource Rights, Poverty, and Natural Resource Management: A Review*. *Environmental Economic Series No. 104*. Washington, DC: The World Bank.
- Srinivasan, U. Thara, William W. L. Cheung, Reg Watson, and U. Rashid Sumaila. 2010. *Overfishing Trends and the Global Food Crisis: A Summary of a New Scientific Analysis*. *Ocean Science Series*. Washington, DC: PEW Environment Group of the PEW Charitable Trusts.
- Sumaila, Ussif Rashid, David Boyer, Morten Skogen, and Stein Stenshamn. 2005. *Namibia's Fisheries: Ecological, Economic and Social Aspects*. Delft, Netherlands: Eburon Academic Publishers.
- Thurston, Edgar, and K. Rangachari 1909. *Castes and Tribes of South India*. Madras, India: Government Press.
- United Nations. 2011. United Nations Convention on the Law of the Sea. December 10, 1982. Available at: www.un.org/depts/los/convention_agreements/convention_overview_convention.htm (accessed August 29, 2011).
- Van Zyl, Ben J. 2001. *Managing Namibia's Marine Fisheries: A Decade of Rebuilding*. Nairobi, Kenya: United Nations Environment Programme. Available at: [www.unep.org/bpsp/Fisheries/Fisheries%20Case%20Study%20Summaries/VanZyl\(Summary\).pdf](http://www.unep.org/bpsp/Fisheries/Fisheries%20Case%20Study%20Summaries/VanZyl(Summary).pdf) (accessed December 12, 2010).
- Wilson, Douglas C. 2001. Lake Victoria Fishers' Attitudes towards Management and Co-management. In *Broaching from the Inland Waters of Africa the Management Impasse: Perspectives on Fisheries and Their Management*. Eds. Kim Geheb and Marie-Therese Sarch. Aalborg, Denmark: Innovative Fisheries Management.
- Windhoek Observer* (Namibia). 2011. Spain's economic woes may hit hake sector. August 17. Available at: www.observer.com.na/59-spains-economic-woes-may-hit-hake-sector (accessed September 1, 2011).
- World Bank. 1999. World Bank to Help Bangladesh Boost Environmentally-friendly and Sustainable Fish and Shrimp Production. Washington, DC: World Bank, July 20. Available at: <http://web.worldbank.org/external/default/main?pagePK=34370&piPK=34424&theSitePK=4607&menuPK=>

- 34463&contentMDK=20015453. (Accessed September 1, 2011).
- . 2004. Some Key Considerations for Improving Fisheries Management Performance. Policy Brief 15. Washington DC.
- . 2010. Integrated Coastal Zone Management—India. Washington DC: World Bank. Available at: <http://web.worldbank.org/external/projects/main?pagePK=64283627&piPK=73230&theSitePK=40941&menuPK=228424&Projectid=P097985> (accessed September 1, 2011).
- . 2011. Fisheries and Aquaculture. Washington DC: World Bank. Available at: <http://go.worldbank.org/DM59TK1531> (accessed September 1, 2011).
- World Resources Institute (WRI) in collaboration with United Nations Development Programme, United Nations Environment Programme, and World Bank. 2005. *World Resources: The Wealth of the Poor—Managing Ecosystems to Fight Poverty*. Washington, DC: Available at: [//pdf.wri.org/wrr05_lores.pdf](http://pdf.wri.org/wrr05_lores.pdf) (accessed September 6, 2011).