

The Indian Ocean

Resource and Governance Challenges

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Fisheries in the Southwest Indian Ocean: Trends and Governance Challenges

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Fish are a renewable natural resource that millions of people around the world depend on for food and livelihoods. In the last half century, the production of fish and fish products in the Indian Ocean (IO) region has increased tremendously as a result of improvements in fish capture technology and rising demand caused by a growing global population. Other dynamic trends that relate to this industry include the IO's growing prominence in the world energy trade, piracy attacks that have led to challenges in maritime security, and environmental stresses brought on by marine and land-based waste and pollution.

This assessment presents an overview of the current and prospective fisheries in the context of other transnational issues that affect the Southwest Indian Ocean (SWIO) region.* It also examines key governance challenges, as well as trade-offs that can be made in the short and long term to meet the needs and interests of local fisher communities,[†] national governments, and the international trade mechanisms that shape the region's maritime policies. Finally, it reviews the work of regional and global fishery organizations in managing the IO fisheries.

Overview

Off the coast of East Africa, there are two main types of fisheries: inshore small-scale or artisanal fisheries and industrial, open water fisheries. Artisanal fisheries, in inshore lagoons and coral reef habitats, are exploited using traditional crafts and fishing gear, which is labor intensive and requires low technological input and investment. The targeted fish stocks are mainly inshore and demersal, meaning they are closely associated with a

*The SWIO region includes five continental countries—Kenya, Mozambique, Somalia, South Africa, and Tanzania—and six islands and archipelagos—Comoros, Madagascar, the Maldives, Mauritius, Réunion (France), and the Seychelles.

[†] “Fisher” is the term used by the Food and Agriculture Organization of the United Nations to describe any male or female who takes part in fishing conducted from a fishing vessel, a floating or fixed platform, or the shore.

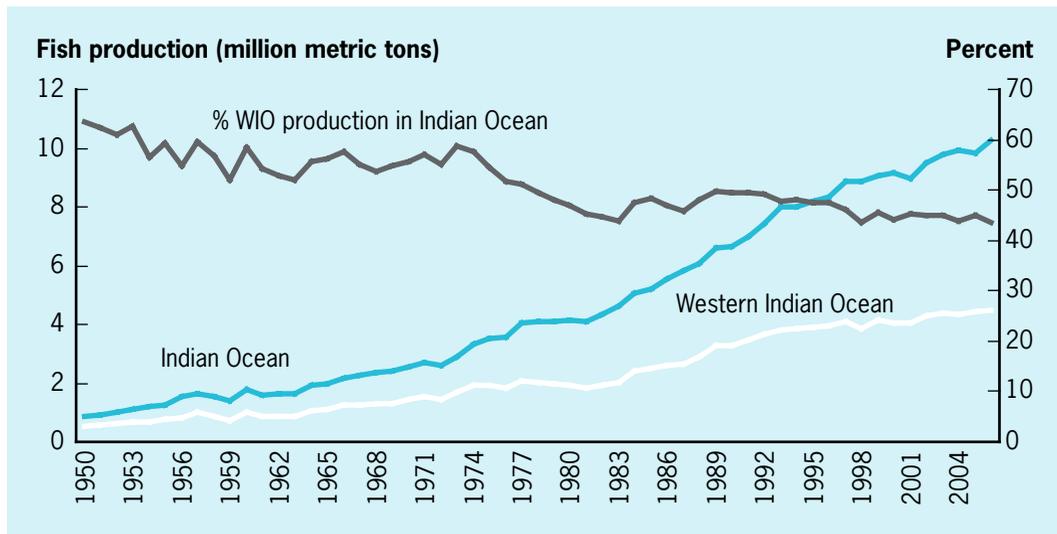
particular bottom habitat. Industrial fisheries require higher technology and investment, and are located in offshore areas, including territorial waters, exclusive economic zones (EEZs), and international waters. Industrial fishers target a wide range of migratory fish, such as tuna, kingfish, bonito, and mackerel, most of which end up in the export market. Other significant fisheries in the region include prawn trawling in Kenya, Madagascar, Mozambique, and Tanzania, and aquarium and sports fisheries in Kenya, South Africa, and Tanzania. In South Africa, for example, there are over 300,000 people who are recreational anglers.¹ The main SWIO fish exports include crabs, lobsters, octopus, sardines, sea cucumbers, squids, tuna, and aquarium fish.

In recent years, the IO has produced approximately 10 percent of the almost 93 million tons of global fish production. The Western Indian Ocean (WIO) produces about 50 percent of the IO landings, and the SWIO region produces slightly over 10 percent of the total WIO landings. The population of the 11 SWIO countries, as estimated from various censuses and projections, is over 107 million, 47 percent of which lives within 100 kilometers of the coastline. The importance of marine fisheries to the national economies and food security of the SWIO countries varies widely, with small island nations—the Maldives, Mauritius, and the Seychelles—far more dependent on fisheries as a source of animal protein and foreign exchange compared with mainland countries.

Artisanal fisheries still account for the predominant share of catch from coastal areas, which include bays, coral reefs, estuaries, lagoons, mangroves, sandy beaches, seagrass beds, and wetlands. While coastal fisheries are mainly harvested by operators from coastal states, the more profitable offshore oceanic fisheries are harvested by distant water fishing (DWF) fleets from the European Union (EU), Japan, South Korea, and Taiwan, at times without bilateral agreements. The general view is that source countries are not benefiting fully from their offshore fisheries. Because of the gross decline of inshore freshwater and coastal stocks, affected countries are now focusing on maximizing exploitation of their EEZ fish resources to support economic development. Without effective management mechanisms, achieving ecological and economic sustainability will be a challenge in light of the projected needs for increased fishing because of global demand, population growth, and the growing sophistication of fishing technology.

Fishery Production Trends

The IO region has the highest incidence of stocks whose state of exploitation is unknown or uncertain, thereby making projecting fish production unreliable. However, the Food and Agricultural Organization's (FAO's) marine capture statistics show that there has been a steady increase in fish production there, from 861,000 tons in 1950 to 10.2 million tons in 2006 (see figure 1). According to FAO projections, the Indian and the Western Central

Figure 1: Fishery Production of the Western Indian Ocean between 1950 and 2006

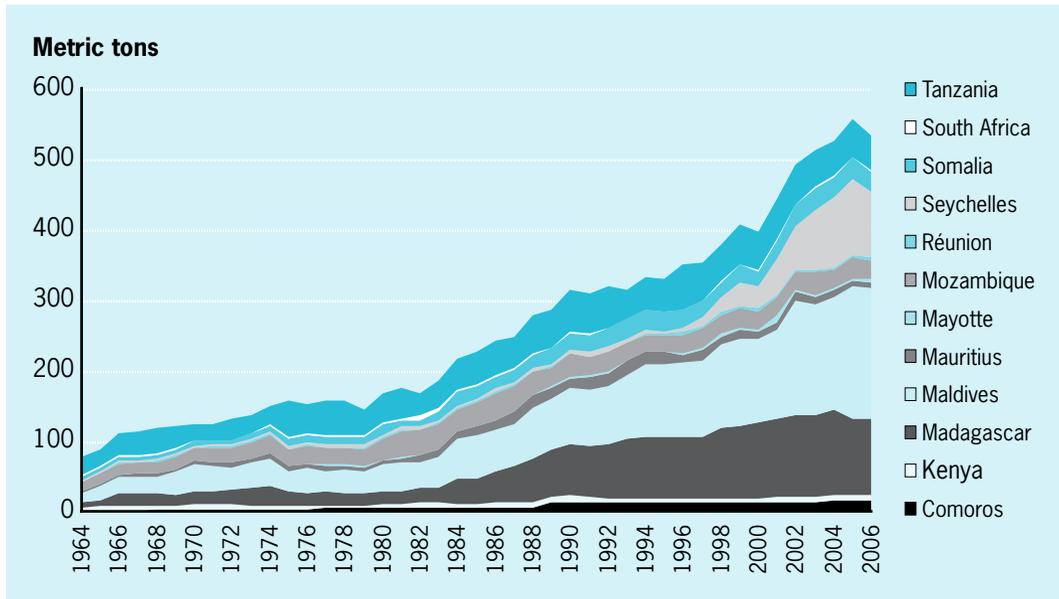
Source: FAO fishery statistics, 2006.

Pacific Oceans are the only oceans that show any potential for further increase in production.²

FAO statistics also show that fish production in the SWIO countries has increased from 44,000 tons in 1950 to 532,000 tons in 2006, contributing approximately 5 percent to the total IO production and 13 percent of the production from the WIO (see figure 2). The bulk of the production is from the Maldives, Madagascar, the Seychelles, and Tanzania. The reported production from the mainland countries is mainly from small-scale/artisanal fisheries; however, the data collection and reporting systems of this sector are often poor, resulting in gross underestimation of production statistics. Actual marine fisheries catches are likely 2.0 times more in Kenya, 1.7 times more in Tanzania, and as much as 5.0 times more in Mozambique than those reported to the FAO.³

Underreporting of catches leads to a misrepresentation of the contribution of marine fisheries to the economy relative to other economic activities, such as tourism and agriculture, as well as to local food security. This situation has acted as a disincentive to public as well as private investment in the marine fisheries sector. Although many inshore fisheries are considered overexploited or maximally exploited, total production may be sustained in the near future depending on a number of factors: increased fishing effort and exploitation of coastal pelagic (open water) fisheries formerly not fully exploited due to lack of technology and equipment, exploitation of species previously ignored by fishers because of poor commercial value, and increasing aquaculture production to reduce pressure on capture fisheries.

Figure 2: Marine Fish Production Trends in SWIO Countries between 1964 and 2006 as Reported to the FAO



Source: FAO fishery statistics, 2006.

Economic Dimensions

Food Security

The importance of fisheries for poor coastal communities in developing countries cannot be overstated in terms of subsistence and livelihoods. In all countries of the region, fish play an important role in daily diets. Compared to other sources of animal protein, fish are often one of the cheapest sources, with simple and inexpensive technology such as smoking, drying, and salting being the main modes of preservation. Fish comprise over 20 percent of total animal protein in the island states of Comoros and Mauritius. This proportion is even higher in Mozambique, where it is estimated at 50 percent. In Tanzania, fish comprise about 30 percent of the total animal protein consumed nationally, with the per capita fish consumption ranging from 6 to 8 kilograms per year⁴ and estimated at between 25 and 30 kilograms per year in the coastal region. The Seychelles is ranked fifth in the world in per capita consumption, estimated at 75 kilograms of fish per person annually.⁵ Fisheries-related threats to food security include declines in production and quality because of over-exploitation, habitat destruction, and pollution. Also threatening are post-harvest losses that result from inadequate distribution, preservation, sanitary facilities, refrigeration capacity, access roads, electricity, and telecommunication.

Most of the fish that actually reach local populations come from small-scale/artisanal fishing operations, suggesting that marine artisanal fisheries could play a significant role

in reducing vulnerability to food insecurity and poverty. Artisanal operations contribute between 90 and 100 percent of the Comorian, Kenyan, and Tanzanian marine fish landings; 53 percent of Madagascar's landings; and at least 75 percent of Mozambican landings.⁶ South Africa is an exception because the major part of its total landings is harvested by a semi-industrial, midwater trawler fleet that targets horse mackerel and an industrial fleet targeting pilchard in both the Atlantic and Indian Oceans. Other exceptions include the Maldives, in which landings of tuna-like species dominate; and the Seychelles, where the traditional artisanal landings represent only 4.5 percent of all landings.⁷ In Kenya and Tanzania, the situation is somewhat different because most fisheries are inland, in lakes such as Lake Victoria and Lake Tanganyika. Marine fish landings represent less than 5 percent of fish production in Kenya and between 10 and 30 percent in Tanzania.

Livelihoods

Although fishing does not generate high economic returns to local fishers, the occupation and related industries provide employment to many and keep young people from turning to illegal economic activities. Artisanal fisheries offer more employment opportunities for local communities than do industrial fishing activities: artisanal fisheries typically support a large number of workers in related industries, such as those who repair boats and fishing gear. In addition, a high number of women are involved in the processing and selling of fish. In Mozambique, only 17 percent of fishers are involved in industrial fishing; in Tanzania, it is 5 percent. It is difficult to accurately estimate the number of people engaged in marine fishing in the WIO. However, Ardill and Sanders estimated in 1991 that 160,000 marine fishers were active in eight WIO countries (Comoros, Kenya, Madagascar, Mauritius, Mozambique, the Seychelles, Somalia, and Tanzania), equal to 0.18 percent of the population including that of South Africa and extrapolated to 2004 population estimates. Studies have estimated a marine fisher population ranging from about 320,000 to an excess of 400,000 fishers, with an estimated dependency ratio of about 7:1,⁸ which indicates that almost 3 million people are directly dependent on artisanal fishing for their livelihood along the shores of East Africa and Madagascar.

National Economies

Fisheries contribute relatively little to national economies in the region, although fish product exports provide a valuable source of foreign exchange. GDP contributions of fishery products range from 1 to 5 percent, with an average of approximately 2 percent.⁹ In Mauritius, the fishing industry as a whole contributes only around 1 percent to GDP, but the sector remains important for trade, with a positive trade balance for fishery products of US\$8.57 million in 2002. In Madagascar, the fishing sector is an important source of foreign exchange for the national economy, but accounts for only 3.5 percent of GDP. For many years, the export of marine products represented the single largest earner of foreign

exchange in Mozambique, accounting for 45 percent of the country's global exports¹⁰ and 3.2 percent of GDP. In Tanzania, the marine fisheries sector contributes 2 to 5 percent of GDP in the mainland and 2 to 10 percent in Zanzibar. In Kenya, the national fisheries sector contributes 2 to 3 percent of GDP. According to Cunningham and Bodiguel, fishing was the largest contributor to GDP in the Maldives until tourism overtook it in the mid-1980s.¹¹ Despite the relative decline (from 16 to 9 percent) in the contribution of fishing to GDP resulting from the tourism boom, the landed value from the major fisheries increased substantially in the country, from US\$24 million in 1989 to US\$40 million in 2003.

Industrial fishing provides an important source of foreign exchange revenue through fish exports to markets in developed countries, especially in Europe and Asia. For instance, in 2002 fish exports were more than 30 percent of the value of agricultural exports in Madagascar, the Maldives, Mauritius, Mozambique, and the Seychelles. In the Maldives and the Seychelles, over 40 percent of all exports are fish and fish products. Fish exports from the region primarily include unprocessed fresh or frozen whole tuna, canned tuna, small pelagics such as mackerels and sardines, and crustaceans (mainly shrimp and rock lobsters) and mollusks. In the Seychelles, the fisheries sector is the main source of foreign exchange, and the country contains the most important tuna port in the world (Port Victoria). The Seychelles has the second largest tuna processing factory in the world, with canned tuna exports representing 87 percent of the country's foreign exports; it handles 88 percent of the total tuna catch in the WIO fleet. Fishery exports from Kenya and Tanzania are mainly from the inland freshwater fisheries, which have been declining because of overfishing, environmental degradation, and pollution, compelling the countries to consider their offshore marine fishery resources. Exploiting these resources is considered essential to increasing revenue and maximizing foreign exchange returns from the export trade in fish.

Management and Governance Challenges

Despite their contribution to local food security and economies, the management and governance of SWIO marine fisheries face increasing challenges in all sectors.

Artisanal Fishery Overcapacity and Overfishing

FAO studies indicate that in the WIO, 75 percent of fisheries are currently being exploited at their maximum biological productivity, while the other 25 percent are overexploited and require better management. The greatest challenge facing SWIO fisheries is management of the "commons." Due to the open nature of the region's fisheries, monitoring, controlling, and surveillance are difficult, especially in remote areas. Furthermore, tropical fisheries are mainly multispecies, unlike those in temperate regions, and species composition and fish size vary with the type of gear, technique, location, and season. As a result, fishers continually seek ways to increase efficiency by using less selective methods, which are

often more environmentally destructive. There is little incentive for fishers to comply with existing regulations or to take responsibility for resource management or the surrounding environment, since anything they do not catch will probably be taken by other fishers. Overfishing not only results in reducing targeted fish stocks but has spiraling effects on the ecosystem. For example, in Kenya, sea urchin populations have exploded because of fishing out triggerfish, which are their main predators. The increase in sea urchins has resulted in overgrazing, the destruction of seagrass beds, and eroding coral reefs, which reduce food for other fish and jeopardize fast recovery of fish stocks.

As the fishers compete for dwindling resources, conflicts among small-scale fishers are on the rise, in particular between those using traditional gear and vessels and those using modern, more efficient gear, and between “local” fishers and “migrant” fishers from neighboring villages or countries. In Kenya and Mozambique, there have been increasing conflicts between fishers using traditional basket traps and handlines, and those using beach seines.* There have also been increasing conflicts between industrial and small-scale fisheries, such as between prawn trawlers fishing for export and artisanal fishers. The conflicts have resulted from zone violations, as the trawlers often encroach onto fishing grounds used by the artisanal fishers, leading to the destruction of artisanal fishing gear. The high rates of fish bycatch and accidental catching of endangered species, such as sea turtles, also causes conflict, which is compounded by inadequate management, control, and surveillance structures.

In most countries of the region, fishery legislation is outdated and inappropriate. Additionally, surveillance and enforcement of regulations have been inefficient because of a lack of capacity. Efforts to assess and manage fisheries have been hampered by scientific uncertainty, as most of the countries lack adequate manpower and financial or technical capacity to carry out scientific research needed to properly manage fish stocks. A core challenge among fisheries managers of the region is devising policies that maximize social and economic benefits for those linked to the industry, particularly in coastal areas, while balancing sustainability considerations to ensure the viability of the resource. Fisheries governance in the region has been gradually shifting from the centralized, top-down approach to the fishers themselves through community-based and co-management approaches. This devolution of control allows local communities to formulate regulations regarding access to fisheries, collect some form of levy from fishers for operations, and penalize those who do not adhere to the regulations.

* Beach seines (also called haul nets) are small mesh nets (or mosquito netting) up to 100 meters in length set in the lagoon or in open water reef areas, usually by young migrants or settled migrant fishers. The nets are dragged to the beach or onto a reef crest and have been documented to be highly destructive, indiscriminately catching everything, including juvenile fish. Their use is banned in Kenya and rejected by local fishers but still prevails. Beach seines are licensed in Mozambique with limited compliance.

Kenya and Tanzania have established local-level beach management units (BMUs), which empower local fishers to play a key role in protecting and establishing rules for using natural resources in specified areas. This arrangement is popular with managers because it reduces their responsibility, and with the individual communities because it gives them more control over their fisheries. The benefits include more active involvement of fishers in resource management and an ongoing system for organizing local fishers into cooperatives to facilitate savings and access to credit facilities.

Total success with these approaches is yet to be realized in Kenya and Mozambique. One problem is unclear policy guidelines in delineating authority and sharing resources, which leads to conflicts and mistrust among members of the BMUs themselves, and among them and other commercial fishers and the fisheries management agencies. There is a need to explore mechanisms to build trust that include promoting good governance (accountability and transparency) and enhancing management skills, knowledge, and understanding through capacity-building activities. With the current political will for co-management that is in place in the region, there is great optimism for improving the management of fisheries.

Transboundary Challenges: Artisanal Fisheries

Fishery resources are regulated by national laws created to operate within the confines of national boundaries, with little regard for the transboundary nature of the resources. In eastern Africa, there are both resident fishers who make daily trips to nearby fishing grounds in small nonmechanized boats, and migrant fishers who follow the seasonal currents driven by the monsoon winds up and down the coast of Kenya, Tanzania, and northern Mozambique. The migrant fishers are expert traditional fishers and sailors who work in large groups using dhows propelled by sails and often outboard engines.* They mainly target larger long-ranging fish species, such as sharks and tuna, which they land locally and trade in adjacent coastal villages. Because of their efficiency, migrant fishers are often hired by businessmen and middlemen to fish particular high-value fish, such as lobster, octopus, and sea cucumber for the local tourist market or for export.

Until recently, migrant fishers have had unlimited access to fisheries along the entire coast of East Africa. For a long time, they have influenced the coastal economies and kept coastal communities socially and economically interlinked through marriages. Although fishing migrations are thought to be useful for inshore fish stocks because they allow time for recovery when the fishers follow migrations to other fishing grounds, migratory species are often overexploited through the introduction of highly efficient but destructive fishing methods. Migration-based fishing also leads to a localized increase of fishing effort in some areas during certain periods of the year, which has been the cause of fishery conflicts

* These migrant fishers are often associated with Pemba Island in Tanzania (*wapemba*) and Lamu Island in Kenya (*wabajuni*).

in local communities. Resident fishers are becoming more protective of their access rights, partly because of a consensus that those closest to the fishery resource have the right to benefit from it. With the change in management paradigm from a top-down to a co-management approach, and with local communities given more power over the resources closest to them, conflict with migrant fishers could increase. Migrant fishers, regarded as foreigners by the local/resident fishers, are in jeopardy of losing their livelihoods. This can lead to cross-border conflicts or conflicts that have even more wide-ranging implications.

Transboundary Challenges: Open Water Fishing

One of the major challenges to open water fishing is boundary disputes. The coastline of SWIO countries, from Somalia to South Africa, including Madagascar, amounts to approximately 27,880 kilometers with a total EEZ of 8 million square nautical miles. The EEZ boundaries and shared waters between Comoros, Madagascar, Mayotte, and the Seychelles remain an unresolved issue, which poses a problem for the implementation of national policy and the definition of regional plans. The offshore waters of the SWIO region possess rich fishing grounds measured by total size and biomass of commercial species. These waters lie within the “yellowfin tuna belt,” which is targeted by distant water fishing nations (DWFN) from the EU and the East Asian states of South Korea and Taiwan. These resources remain untapped and poorly managed by their respective East African governments. Countries of the region have resorted to allowing access to the DWF fleets to exploit the resources through bilateral and multilateral fishing agreements or licenses, not only because they do not have the required infrastructure to do so themselves, but because the DWF fleets have a competitive advantage in operating with high levels of government subsidies. Local fleets cannot compete unless they too are subsidized.¹² Countries with no fisheries agreements with DWFN, but that allow access to DWF vessels through access licenses, receive much less financial benefit than those with agreements.*

According to Ansell (2007), approximately 1 million tons of oceanic tuna and tuna-like species, with a processed value of € 2 to 3 billion, are harvested each year from the WIO. DWF nations began longlining for tuna in the WIO in the early 1950s.† The Japanese initiated this, soon followed by the Taiwanese (1954) and South Koreans (1960). Since then, Asiatic longline presence in the IO has increased significantly. Indonesia and Sri Lanka are also active players in the fishery, with rapidly developing fleets active in almost all areas of

* The EU member countries have signed 15 or more agreements with African and WIO countries since 1993. Relative to other fishing nations, the EU plays an important role as a DWF fleet with a significant allocation of financial investments. In 2002, catches under the international fishing agreements accounted for 20 percent of all EU catches, valued at approximately € 1 billion. See WWF (2005).

† Longlining is a method of fishing that can be either surface set (pelagic) or bottom set (demersal) line fishing. Both methods comprise main lines to which branch lines are attached, each fitted with one or more baited hooks or artificial lures.

the tropical IO. Numbers of active Japanese and Korean longliners have diminished in recent years because of declining profitability.¹³ Large-scale purse seine fishing for tuna began in 1983,* when French and Spanish fleets moved into the WIO, fishing under access rights. Other purse seine fleets active in the WIO are registered in Iran, the Seychelles, and Thailand.

Because of the lucrative nature of fishing in the EEZ, fisheries access should be considered “give-and-take,” with the DWFN that have permission to fish the waters also being obligated to follow certain regulations. Important considerations are the long-term interests of the host countries’ economies and of coastal fishing communities, and the sustainable management of the respective EEZ fisheries. Generally, new fisheries access agreements are moving toward building more fishing capacity in host states.¹⁴ Increasingly, fisheries agreements contain “targeted actions,” such as sums of money to be spent on stock management, research, and policy development activities. The best example is the Seychelles, which has, with the EU, provided for regular consultations by both parties on the management of fish stocks and other matters of mutual interest, with payment based mainly on the value of the catch.

DWF fleets have increasing incentives to exploit new resources because of the ever-increasing global demand for fish. Large numbers of vessels are undertaking illegal, unreported, and unregulated (IUU) fishing on the high seas and within the EEZs, taking advantage of the lack of effective monitoring control and surveillance. IUU fishing includes a wide range of illicit activities: fishing without permission or out of season, harvesting prohibited species, using outlawed fishing gear, and nonreporting and underreporting of catch weights.

Illegal fishing undermines efforts to conserve and manage fish stocks. IUU fishing is a global problem affecting EEZs and the high seas, and is a significant threat to the economic and social well-being of SWIO states. The environmental impacts of IUU fishing include bycatch associated with fish-aggregating devices or with longlines.† Vessels involved in IUU activities in the EEZ are largely from DWFNs, and their illegal activities include fishing in off-limit areas and misreporting or underreporting of catches. IUU fishing vessels have lower costs and fewer social responsibilities than licensed vessels, which drives them to exploit resources irresponsibly. The current overcapacity of the world fishing fleet, in terms of numbers of vessels and technological power—created largely through subsidies

* Purse seine fishing is a method of fishing capable of harvesting large quantities of surface-schooling fish by surrounding the school with a net.

† Fish-aggregating devices are devices that fish like to school around, such as a certain type of bottom-anchored buoy, thus making the fish easier to catch in large number. Their use, like that of longline fishing, tends to capture a large volume of unwanted fish, or bycatch. Bycatch often die during the catching process or are killed and discarded.

to the fishing sector in developed countries—is a major cause of marine fishery problems in the SWIO region.

Monitoring, control, and surveillance of the EEZ resources remain major challenges in the region. Enforcing regulations is often undertaken by the police or navy—whose core responsibilities and priorities are not fisheries—or it is performed by the fishery management agencies, which lack the technical and human capacity to fulfill the task. The level of compliance is thus often low. Kenya, Mozambique, and Tanzania have recently established distinct fisheries ministries. Almost all countries have introduced vessel-monitoring systems technology to assist in monitoring activity in industrial fisheries. Comoros is also interested in adapting this technology to the artisanal fleet for monitoring and safety purposes. Good monitoring, control systems, and procedures coupled with the political will to enforce regulations, cooperation with neighbors on surveillance, and active participation in regional and subregional fisheries agreements would reduce the problem of IUU and increase food security and the security of artisanal fishers' livelihoods.

Climate Change and Extreme Events

The world's climate is constantly changing and has a major influence on all biological processes, species, and ecosystems.¹⁵ Coastal habitats and their resources are likely to be affected by climate change through sea level rise, warming sea temperatures, a build-up of nutrients in the water column (eutrophication), and the spread of invasive species. Globally, 50 million people may be at risk from climate change.* Projections suggest that reef loss and a decline in fish availability will cause global per capita consumption of fish to drop by approximately 15 percent by 2015.¹⁶ Semi-arid developing countries with significant coastal or inland fisheries, such as many African countries, are particularly vulnerable because of a high dependence on fish protein and a low capacity to adapt to change.¹⁷ The devastating effects of recent climate change are most pronounced on coral reefs, where there are clear links between increasing ocean temperatures and regional scale bleaching of corals.¹⁸ The 1998 global mass bleaching was the most devastating and widespread bleaching event ever recorded. It contributed greatly to an increased realization that global climate change is a real phenomenon and a significant threat to entire ecosystems. Bleaching was particularly severe on coral reefs in the IO, where coral cover declined by an average of 46 percent following the 1998 bleaching.¹⁹ In the WIO, the event resulted in an average of 30 percent mortality of corals.²⁰

Apart from the ecosystem effects, climate change is a burden to other poverty drivers such as declining fish stocks, increases in the spread of HIV/AIDS, and diminished alternative livelihoods. The negative effects of environmental degradation and climate change on

* Increasing human population densities compound these risks.

inland fisheries, such as Lake Victoria, are already being felt in food security and livelihoods. The likelihood and magnitude of extreme events, such as drought, flooding, and cyclones increase with changes in climate. Protection of natural barriers—coral reefs, mangrove forests, and sand dunes—is therefore critical, as the barriers dampen the impact of extreme events and protect coastlines from their full power. The effectiveness of actions to sustain fisheries will therefore depend on governments' and societies' capacity to recognize and understand the impacts of these stresses and the environmental effects of climate change as well as the capacity to adapt to the changes.

Regional and International Agreements

International policies and legal frameworks applicable to fisheries of the WIO region are based on a variety of treaties and international instruments. The significant global instruments that govern these realms include the 1982 UN Convention on the Law of the Sea (UNCLOS), the 1995 United Nations Fish Stocks Agreement, and the 1995 FAO Code of Conduct for Responsible Fisheries. Agreements that form an integral part of the Code of Conduct include the 1993 FAO Compliance Agreement and various international plans of action (IPOAs), which were all in force in 1999, in particular the following:

- The 2001 IPOA to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing
- The IPOA for Reducing Incidental Catch of Seabirds in Longline Fisheries
- The IPOA for the Conservation and Management of Sharks
- The IPOA for the Management of Fishing Capacity

Effective conservation and management of shared international fisheries resources also call for actions to be undertaken at the regional and subregional levels. The SWIO region has two regional fishery advisory bodies related to tuna and tuna-like fisheries: the Western Indian Ocean Tuna Organization established in 1991 and the complementary Indian Ocean Tuna Commission established in 1996. Other regional bodies are

- the Southwest Indian Ocean Fisheries Commission established in 2004 to promote the sustainable utilization of the living marine resources of the SWIO region;*
- the South Indian Ocean Fisheries Agreement (SIOFA) established in 2006;†

* Comoros, France, Kenya, Madagascar, Mauritius, Mozambique, the Seychelles, Somalia, and Tanzania are all members of the commission.

† Comoros, France, Kenya, Mozambique, New Zealand, the Seychelles, and the European Community have signed SIOFA. According to the FAO, the “SIOFA will also join the existing network of fishery commissions already established in the region...and will cooperate with these bodies.” See FAO, “New Agreement Governing High-Seas Fishing in Indian Ocean,” press release, July 12, 2006, available at www.fao.org/newsroom/en/news/2006/1000360/index.html; accessed April 17, 2009.

- the Southern African Development Community (SADC) Treaty Protocol on Fisheries, of which Mauritius, Mozambique, South Africa, and Tanzania are members.

All countries in the SWIO region have signed and ratified UNCLOS. This treaty defines the rights and responsibilities of nations in their use of the world's oceans, establishing guidelines for businesses, the environment, and the management of marine natural resources including fisheries. In particular, this convention gives coastal nations the right to explore, manage, and conserve fisheries resources within the EEZ, 200 nautical miles offshore, and the continental shelf up to 350 nautical miles or 2,500 meter isobath.* However, as previously mentioned, most of the SWIO nations do not have the capacity to fully undertake their responsibilities and benefits within the EEZ and the continental shelf.

Building on the general UNCLOS framework, the 1993 FAO Compliance Agreement seeks to address the threat to international fisheries management posed by vessels that do not abide by fishing rules. The agreement has been ratified by all countries except Comoros, South Africa, and Tanzania. Five countries signed the UN Fish Stocks Agreement (Kenya, the Maldives, Mauritius, the Seychelles, and South Africa). The first to ratify it was Mauritius in 1997, and the latest was Kenya in 2004, when it became a member of the Indian Ocean Tuna Commission.²¹ The performance of countries in implementing IPOAs is uneven. However, all countries have initiated actions on at least one IPOA and are in the process of developing national plans of action (NPOAs). In South Africa, high seas fishing permits have been introduced for flag-state vessels,[†] and this has helped control domestic effort. However, high seas activity by flag-of-convenience vessels remains difficult to control.[‡] Monitoring the landings of IUU vessels has dramatically improved in South Africa and in other ports in countries that are signatories to the SADC Fisheries Protocol. In 2004, the Seychelles produced an NPOA against IUU activities that sets out state responsibilities including control over nationals, sanctions on unauthorized fishing by national vessels outside of its EEZ, a review of practices relating to IUU fishing, and port state and coastal state measures that it has established. Several measures against IUU fishing are in place in Mauritius and a formal NPOA against IUU is in preparation. Mauritius and the Seychelles are also in the process of developing an NPOA for sharks, and a 10-year ban on coastal shark fishing is in place in seven atolls in the Maldives. An NPOA on shark management has also been submitted by South Africa.

* A mapping line that connects points of equal depth under water.

† A flag-state vessel is one registered in the same country in which its owner has citizenship. A ship must follow the laws and regulations of the country in which it is registered.

‡ A flag-of-convenience vessel is one registered in a country different from that in which the owner has citizenship.

Within the SADC, activities related to establishing effective cooperation on monitoring, control, and surveillance among the SADC coastal member states (Angola, Mozambique, Namibia, South Africa, and Tanzania) have been undertaken, along with activities related to information collection, training, review and analysis of legal issues, economic planning analysis, and co-management review. Besides the regulations spelled out in the agreements among partner nations, each country has national laws and statutes regarding fisheries. The SWIO region has established an unofficial Southwest Indian Ocean Fisheries Commission to advise on the management of the fisheries resources within the EEZ.

Individual governments put a high priority on the promise of international laws and on conventions and agreements aimed at ensuring greater management of maritime resources by the coastal states. Nevertheless, the level of implementation and enforcement of regulations provided for in these management mechanisms is low, leaving most of the offshore fishery resources an easy target for IUU fishing. Budgetary difficulties and low capacity make prohibitive costs and lagging implementation two of the greatest challenges faced by national fisheries authorities. At the national level, there are often multiple institutions with overlapping mandates involved in the administration of maritime-related activities, including navies, police, fishery departments, and port authorities. This makes implementation of bilateral and multilateral agreements and national regulations more complicated. Kenya and Tanzania are setting up national maritime authorities to coordinate the activities of all agencies with maritime-related mandates. However, these are recent efforts whose results are not yet clear.

Conclusion

The fisheries resources of the SWIO contribute significantly to the food security and social stability of the region's growing populations. However, the full potential of the marine fisheries resources to contribute to economic development has not been reached, primarily because of a lack of scientific and economic capacity and uncoordinated management of national EEZ and international water resources. Within inshore fisheries, challenges include overexploitation and related issues of stock collapse and change of inshore habitats, such as coral reefs and seagrass beds. Conflicts between resource users, pollution of near-shore habitats, and global warming are the major threats. Fishing overcapacity and IUU fishing are two important fisheries management challenges faced by the SWIO countries. Of immediate concern are national and regional coordination in regulation, monitoring, and surveillance; the development and implementation of an early warning system for extreme events; and the enhancement of regional preparedness to deal with ocean-based disasters. Reduced productivity of fisheries and its negative impact on food security and economic activity are likely to increase cross-border conflicts and illegal marine economic activities, such as smuggling, piracy, and human trafficking, as those employed in the fishing industry seek other alternatives. The region is ill prepared to manage and adapt to the impacts of climate change and extreme events which threaten all coastal economic sectors, especially fisheries.

Maritime Security and Resources in Somalia

Jumaina Siddiqui

Somalia illustrates a perfect storm of maritime threats and challenges facing Indian Ocean littoral countries. The country has been without a formal national government since 1991. The humanitarian crisis in Somalia is so grave that 3.2 million of its people survive strictly on food aid. However, with the security situation deteriorating rapidly, the World Food Programme halted food shipments to Somalia in January 2009 after the death of two of its employees; it plans to resume aid once it has security assurances from local administrations, warlords, and armed militias.

The civil war and political instability in Somalia has left many citizens with few options for employment. Additionally, widespread drug abuse is eating away at meager earnings and hindering their ability to work. This, compounded with the fact that two generations of Somalis have little or no education or training, has created fertile ground for recruitment by both Islamist groups and pirates alike. This is a serious threat not only to Somalis but for commerce and security in the region.

The overexploitation of fisheries by both international commercial and illegal foreign fishing has marginalized local Somali fishers. Poor governance of maritime resources has also led to dumping of hazardous waste in Somalia's coastal areas. The indigenous fishers face other problems such as lack of infrastructure and technology to maximize their catch. Because of the dire employment situation, the number of households that rely on fishing as a source of income has doubled between 2000 and 2005. Many of these fishers were previously farmers who had to turn to fishing to survive.

While some experts feel that regulation and improved distribution infrastructures for fisheries could have an enormous impact on the industry, the actual impact on the local economy and food security is hard to determine due to scarcity of formal records. It is estimated that the pelagic fish stocks in Somalia's EEZs are capable of providing sustainable annual catches of approximately 200,000 tons, but this is based on data from the 1970s and 1980s; 1990 figures show that the total landings are estimated to be 14,850 tons and only contribute to about 2 percent of GDP.

The diminished opportunities for gainful employment has led some Somalis toward piracy and Islamist groups. These two extremes have led the international community to question which group is the greater threat. Some observers believe that piracy is funding the Islamist groups, noting reports that some of the ransom money was shared with an al Qaida-linked Islamist group. Islamist groups have denied any links with the pirates and have even offered to fight the pirates who hijacked the Saudi oil tanker in November 2008; Islamist groups felt it was a sin to steal the property of another Muslim country. In 2008, there have been 120 attacks on the east coast of Somalia and the Gulf of Aden—an increase of nearly 200 percent from the previous year.

The international community has rallied together to combat piracy in the region. The United States has established a new maritime task force, CTF-151, specifically for anti-piracy efforts. The UN Security Council has passed a series of resolutions to combat piracy in Somalia, six of them just in 2008, which have progressively become broader, allowing countries to aggressively pursue pirates. The most recent resolution, 1851, allows countries to pursue pirates on land, where previously navies had to end their pursuit as soon as pirates reached land.

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