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Small-Scale Fisheries in a Modernising Economy: Opportunities and Challenges in Mozambique

Alex Benkenstein

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CONTENTS

ABOUT THE AUTHOR

Alex Benkenstein is a senior researcher with the South African Institute of International Affairs' Governance of Africa's Resources Programme. His research focuses on the fisheries and mining sectors. Alex graduated from the University of Stellenbosch with a Master's Degree in International Studies. He has worked as a researcher in the non-profit sector and the private sector, completing projects for various clients, including the Parliament of South Africa.

ABBREVIATIONS AND ACRONYMS

ADNAP	National Directorate of Fisheries Administration (Administração Nacional das Pescas)
ASCLME	Agulhas and Somali Current Large Marine Ecosystems
BANP	Bazaruto Archipelago National Park
CCP	Community Fisheries Council (Conselho Comunitário de Pesca)
EEZ	exclusive economic zone
EIA	environmental impact assessment
FAO	Food and Agricultural Organization
FFP	Fisheries Promotion Fund (Fundo de Fomento Pesqueiro)
Frelimo	Mozambique Liberation Front (Frente de Libertação de Moçambique)
GDP	gross domestic product
IDPPE	National Institute for the Development of Small-Scale Fisheries (Instituto de Desenvolvimento de Pesca de Pequena Escala)
IFAD	International Fund for Agricultural Development
IIP	Institute of Fisheries Research (Instituto Nacional de Investigacao Pesqueira)
IMF	International Monetary Fund
INAQUA	National Institute for the Development of Aquaculture (Instituto Nacional de Desenvolvimento da Aquacultura)
IUU	illegal, unreported and unregulated
LME	large marine ecosystem
MICOA	Ministry of Coordination of Environmental Affairs, Mozambique (Ministério para a Coordenação da Acção Ambiental)
MPA	marine protected area
NAFP	Nampula Artisanal Fisheries Project (Projecto de Pesca Artesanal em Nampula)
NEPAD	New Partnership for Africa's Development
PPP	public participation process
UNEP	UN Environment Programme
VMS	vessel monitoring system

FIGURES

EXECUTIVE SUMMARY

Mozambique is in a period of rapid transition. Since the end of civil war in 1992 sound governance, infrastructure investments and support from the donor community have helped to boost commerce and tourism. However, it is the recent discovery of significant reserves of gas and coal which has contributed most to Mozambique's position as one of the 10 fastest-growing economies in the world from 2001–10. Notwithstanding the high levels of investment and exceptional growth rates, the majority of Mozambicans remain highly dependent on natural ecosystems to support their livelihoods. The report examines the opportunities and challenges confronting the small-scale fisheries sector in Mozambique in the context of a rapidly transforming economy boosted by rapid growth in the extractive industries as well as other sectors, such as tourism.

There are approximately 280 000 small-scale fishers in Mozambique, each of whom supports family members and a network of suppliers, processors and traders. These localised social and economic networks will remain central to Mozambique's development, even as the country's mining, tourism and other economic sectors experience rapid growth. As is the case in numerous African states, Mozambique's fisheries resources face a range of pressures. Some of these pressures stem from the fisheries sector itself as more people take up artisanal fishing, new technologies increase the impact of fisheries' activities, and illegal fishing practices undermine governance efforts. Increasingly, however, fisheries also face pressures that stem from other sectors of the economy. As conservation and tourism efforts gain momentum there are new limitations on fishing grounds, exploitation of mineral resources may damage fragile ecosystems, climate change poses a range of geophysical and biological risks, and even the development of roads and access to growing urban centres can make it easier for fishers to pursue unsustainable catch levels. The report investigates how the sustainability and prosperity of small-scale fisheries may be ensured in the midst of Mozambique's rapid economic changes.

The issues outlined in the report are of relevance to a number of African states that rely on marine and freshwater ecosystems to support extensive small-scale fisheries. Africa's population is growing faster than any other global region, while numerous national economies are experiencing rapid economic growth, in many cases driven by the expansion of extractive industries. Moreover, African countries are particularly vulnerable to climate change impacts owing to their significant exposure to climate variation as well as relatively low adaptive capacity. Through investigating the challenges faced by Mozambique in managing its small-scale fisheries sector, the report aims to develop a framework that may assist African policymakers in addressing both the internal and external challenges that face the sector in the context of the rapidly shifting social, economic and political dynamics on the continent. The report concludes with five key recommendations highlighting priority interventions that can support Mozambique's efforts at establishing an effective governance framework for its small-scale fisheries sector.

CHAPTER 1

INTRODUCTION

At the Regulo Luis landing site near Beira, Mozambique, fishers are sailing towards shore in small wooden vessels. Those already on the beach patiently remove a variety of small pelagic fish from their nets, sorting the catch and arranging prices with traders, mostly women, who will sell the fish in nearby markets. Regulo Luis is one of about 600 landing sites on Mozambique's 2 700 km coastline. Fishers based at these landing sites use a variety of fishing methods and target different species depending on factors such as the isolation of the landing site from important markets, the geology of the area, and the availability of different fish stocks. Access to deeper water and reefs allows fishers to pursue king mackerel and other game fish, reef fish such as grouper, and a variety of crustaceans. The bigger fish will fetch a good price if there are passable roads to transport them to large towns or tourist lodges. Extended banks of shallower water are suited to the use of gill nets and seine nets for small pelagic species and prawns, while shallow bays, seagrass flats and mudflats are productive areas for beach seines and allow shore-based gatherers to collect clams and other molluscs.

The day's catch at Regulo Luis seems plentiful, yet fishers at this landing site and numerous others along the coastline observe that catch rates have declined significantly in recent years. A member of the local Conselho Comunitário de Pesca (the CCP or Community Fisheries Council), co-management committees established to give fishers a greater role in governing the country's fish stocks, says 'fishing is a tradition I learned from my father, but I don't believe my children will have this life because there are not enough fish'.[1] The report investigates how the sustainability and prosperity of small-scale fisheries may be ensured in the context of a modernising economy based on rapid growth of the extractive industries as well as other sectors of the economy, such as tourism.

Mozambique was one of the 10 fastest-growing economies in the world from 2001–10, along with five other African countries, while the continent's gross domestic product (GDP) expanded by just over 5% in the same period. The International Monetary Fund (IMF) has forecast that seven of the world's 10 fastest-growing economies from 2011–15 would be in Africa, again including Mozambique. Although high growth rates often reflect a low economic base, with numerous socio-economic challenges still prevalent, there is a growing sense of optimism regarding Africa's economic future. Increasing demand for Africa's mineral and energy resources has played an important part in fuelling rapid growth in numerous African economies. Yet from 2000–08 natural resources directly accounted for just 24% of Africa's growth; the remainder was accounted for by sectors such as retail and trade, transportation, telecommunications and manufacturing.[2] The growth of Africa's middle class, the expansion of domestic markets and the increase of the continent's working age population will be important drivers of growth in coming decades. Global demographic trends indicate that by 2050 one in four people of working age will be African.[3]

The strong performance of many African countries over the past decade has been associated with significant infrastructure investments, particularly the expansion of transport infrastructure such as ports, roads, railways and airports. In Mozambique about $200 million has been spent in the past few years upgrading the country's airports, with investments of an additional $500 million planned over the next three years.[4] The capacity of the Sena railway, currently the only rail service capable of exporting coal from Mozambique's deposits in Tete province, has been doubled, while Vale is investing over $4 billion in the construction of a railway from its operations in Tete to the deepwater port of Nacala. In November 2012 the Ports and Railways Company of Mozambique announced that a $2 billion tender would be issued for the construction of a railway line from Tete province to the town of Macuse on the coast of Zambézia province, and the construction of a port there; also indicating that Mozambique would require further investments of about $12 billion to fully upgrade the country's port and rail infrastructure over the coming years.[5]

Despite the dire prediction of the fisherman at the Regulo Luis landing site, who does not expect his children to be able to maintain a livelihood through fishing, small-scale fisheries still form an important part of Mozambique's socio-economic landscape, and will continue to do so in the future. Although the contribution of fisheries to the country's GDP may decline relative to other emerging sectors, small-scale fisheries will continue to play a critical role in contributing to food security and supporting the livelihoods of thousands of Mozambicans. The sector faces a number of challenges, however, some of which stem from internal dynamics, but many arising from developments outside the sector. Population growth and decreasing agricultural productivity are leading ever-greater numbers of people to participate in small-scale fisheries. The expansion of the tourism sector and an increase in the number of national parks create new limits on access to fishing grounds, and investments in the country's gas and coal reserves may further restrict the free movement of fishers, increase traffic in shipping lanes and raise the risk of pollution. The growth of cities and towns together with improving road infrastructure provide new opportunities for greater efficiency and profitability in fisheries, but also make it easier for fishers and traders to pursue unsustainable catch levels.

The emergence of these trends, as well as questions regarding appropriate governance responses, forms the central focus of this report. It focuses specifically on the challenges facing Mozambique's marine small-scale fisheries, although many of these challenges are also being confronted by fishing communities based along the country's freshwater systems. Mozambique has a profitable industrial fisheries sector, primarily focused on shallow-water shrimp; however, the report addresses the industrial fishery only to the extent that it impacts on small-scale fishery activities.

Chapter two addresses small-scale fisheries in Africa broadly, specifying some of the key internal and external challenges facing the sector. Chapter three provides an overview of Mozambique's economy, as well as the country's fisheries sector and the policy instruments and institutional arrangements governing the sector. Chapter four discusses challenges and opportunities within Mozambique's small-scale sector, which provide the basis for the recommendations outlined in the final chapter.

METHODOLOGY AND STUDY AREA

The fieldwork for this study was initiated in February 2012 through a scoping study that included stakeholder interviews with representatives of the fisheries administration based in Maputo. The primary fieldwork was conducted in July 2012 in the two selected research areas of Beira and the Bazaruto Archipelago. Beira was selected due to its significance as Mozambique's primary fishing port and second-largest city, with a large number of small-scale, semi-industrial and industrial fishers based in the area. About 80% of Mozambique's industrial and semi-industrial fleet is based in Beira. The city lies in the central part of Mozambique's coastline at the mouth of the Pungue river in Sofala province. Beira is connected by rail and road links to Zimbabwe, Zambia and Malawi and serves as an important cargo port supporting regional trade. Beira's significance as a fishing centre is in large part owing to its proximity to the Sofala Bank, a 45 000 km^2 area of Mozambique's continental shelf between parallels 15°38' and 21°30' S, with an average depth of 20 m. The largest proportion of Mozambique's marine resources, particularly shallow-water shrimp and small pelagic fish, are found in this region. There is also a significant small-scale fishing sector in Beira and the surrounding area, which mostly targets small pelagic fish stocks. Interviews were conducted with a number of CCPs in the Beira region, including Njalane, Regulo Luis, Praia Nova and Estoril.

The Bazaruto Archipelago is an important area of biodiversity and provides insight into the interaction among small-scale fishing communities, conservationists and the tourism sector. The Bazaruto Archipelago comprises five islands located up to 20 km off the Mozambique coast in the province of Inhambane, within lattitudes 21°30'–22°10' S and longitudes 35°22'–35°30' E. The largest island in the archipelago is Bazaruto (12 000 ha), followed by Magaruque (600 ha), Santa Carolina (500 ha) and Bangué (5 ha). Over 180 species of birds, 45 species of reptiles and 2 000 species of fish have been recorded in Bazaruto. The Bazaruto Archipelago National Park (BANP) was established as a marine park in 1971. BANP covers 1 430 km^2 and includes the last viable population of dugongs in the West Indian Ocean, as well as other important marine fauna such as dolphins, manatees and turtles.[6] The islands support a population of about 3 500 people living in seven communities, while fishers from the coastal town of Vilankulo (population 25 500) utilise areas adjoining the park. Small-scale fishing is the primary activity and main source of income for over 70% of households on the islands, but tourism is becoming an ever-more important source of employment. There are currently five hotels within the park, with a focus on high-value, low-impact tourism. These hotels contribute substantially to the local economy and livelihoods of local residents, and are important stakeholders within BANP.[7]

Fieldwork consisted of semi-structured interviews with a range of stakeholders, including various departments within the fisheries administration, civil-society organisations, tourism operators, representatives of industrial and semi-industrial fishing companies, individual small-scale fishers and CCP committees. Appendix I provides a summary of the interviews.

Although the fieldwork conducted for this study focused on Mozambique, the trends shaping small-scale fisheries in this country can also be observed elsewhere on the continent. The following chapter therefore provides a broad overview of small-scale fisheries in Africa, presenting an outline of historical developments in small-scale

fisheries management and discussing in greater detail the challenges facing the sector, both internally and in relation to other sectors of the economy.

CHAPTER 2

SMALL-SCALE FISHERIES IN AFRICA

It is estimated that fisheries directly support the livelihoods of up to 10 million Africans, while about 200 million Africans rely on fish as their primary source of animal protein.[8] The predominantly foreign-owned industrial fishing fleets plying Africa's coastal waters make a relatively small contribution to these figures. Although industrial fleets do make significant catches and dominate Africa's international trade in fisheries products, it is the small-scale sector that employs over 95% of fishers and provides more than 90% of the fish consumed across the continent.[9] Small-scale fisheries and related activities, such as trade and processing, play a crucial role in numerous African economies, particularly in rural areas where alternative sources of income and protein may be scarce. The sector also supports the livelihoods of large numbers of African women, particularly in processing and trading activities.

Despite the importance of the small-scale sector, research and governance efforts in Africa's fisheries sector have in the past focused predominantly on industrial fisheries, in part owing to the potential of this sector to provide foreign-exchange earnings for governments. The result is that the small-scale fisheries sector has been marginalised through inadequate financial, institutional and scientific support.[10] In recent years, however, there has been increasing recognition of the critical role that small-scale fisheries play in contributing to food security, community livelihoods, poverty alleviation and national economies. A 2004 report by the Food and Agriculture Organization (FAO) detailing the potential of small-scale fisheries to contribute to poverty alleviation and food security noted that:[11]

> while there is often very little precise information on the real contribution of small-scale fisheries to livelihoods and economies in developing countries, and although many small-scale fishing communities are poor and vulnerable, it is now widely acknowledged that small-scale fisheries can generate significant profits, prove resilient to shocks and crises, and make meaningful contributions to poverty alleviation and food security.

The Global Conference on Small-Scale Fisheries and the inaugural World Small-Scale Fisheries Congress, both convened in Bangkok, Thailand, in 2008 and 2010 respectively, created new momentum for research and governance efforts aimed at the small-scale sector. The 2010 World Small-Scale Fisheries Congress saw the launch of the Global Partnership for Small-Scale Fisheries Research ('Too Big to Ignore'), a research network that aims to enhance the understanding of the contribution of small-scale fisheries to food security, nutrition, sustaining livelihoods, poverty alleviation, wealth generation and trade, as well as the impacts and implications of global change processes such as urbanisation, globalisation, migration, climate change, aquaculture, and communication technology on small-scale fisheries.[12] In 2011 the FAO initiated a wide-ranging consultative process aimed at the development of an international instrument in the form of guidelines for

securing sustainable small-scale fisheries (SSF Guidelines). The process is expected to lead to the adoption of the SSF Guidelines at the 31st session of the FAO Committee on Fisheries in June 2014.[13]

The importance of small-scale fisheries has also been highlighted in various African forums, particularly the Fish for All Summit in Abuja, Nigeria (2005) and the Conference of African Ministers of Fisheries and Aquaculture in Banjul, The Gambia (2010). The New Partnership for Africa's Development (NEPAD) Action Plan for the Development of African Fisheries and Aquaculture, which was launched at the Fish for All Summit, noted that:[14]

> African coastal fisheries, and in particular artisanal fisheries together with the small-scale processing and trading enterprises that are associated to these fisheries, display a number of comparative economic and social advantages which provide the sector with a particularly strong opportunity to drive poverty alleviation and local economic development.

Small-scale fisheries have also been highlighted in consultations towards the development of the Pan-African Fisheries Policy Framework and the Comprehensive African Fisheries Reform Strategy, a process being led jointly by the African Union's Inter-African Bureau for Animal Resources and NEPAD.

Although small-scale fisheries have become more prevalent in policy debates, a precise definition of the sector remains problematic.[15] Small-scale fisheries encompass a wide diversity of fishing practices and technologies, and definitions of the sector often depend on national and regional contexts. Small-scale fisheries in an industrialised economy such as Norway, for example, differ substantially from small-scale fisheries in Bangladesh or Senegal. In general terms, however, small-scale fisheries are characterised by the use of smaller craft and more labour-intensive and low-technology fishing methods, as opposed to the relatively capital intensive and sophisticated technologies associated with the industrial fisheries sector.[16] Small-scale fisheries may be undertaken for either subsistence or commercial purposes, and, in cases where the catch is sold, the primary markets tend to be local. In certain cases, however, small-scale fisheries can be quite sophisticated, requiring significant capital investments with a focus on export-oriented production.[17] Globalisation has made it easier for small-scale fisheries to access international markets and pursue export-oriented production. In Lake Victoria's Nile perch fishery, for example, small-scale fishers capture Nile perch from wooden canoes using simple fishing gears, but the Nile perch is then processed in modern processing facilities on the lakeshore and exported to global markets, primarily the EU. Even low-technology fisheries focused on local markets have experienced an increasing use of motorised boats, modern fishing gears, such as nylon nets, and modern navigation technologies, which have contributed to greater efficiency and safety in the sector, but have also increased fishing pressure on the stocks targeted by small-scale fisheries and led to growing competition between the small-scale sector and the industrial sector.

Low-technology small-scale fisheries are often referred to as artisanal fisheries to distinguish them from the broader small-scale fisheries category. This report will employ the term small-scale fisheries, reflecting its more common usage in African fisheries policy debates, while recognising that African small-scale fisheries in particular are often associated with low-technology fishing methods.

As in other areas of the world, the small-scale fisheries sector in Africa includes a wide range of fishing practices, with vessel size ranging from large West African pirogues holding a crew of up to 20 fishers, to East African dhows of various sizes, to small dugout canoes powered by sail or paddle, often with a crew of only two fishers. Fishing gears include hook and line as well as a number of netting gears and techniques (seine nets and gill nets are the most common). The sector also includes shore-based harvesters who gather and trap molluscs, crustacean and other aquatic life in rivers, estuaries, lakeshores and coastlines; or use beach seines to harvest shrimp and fish. The diversity of small-scale fisheries has implications for the management of the sector. The activities of subsistence fishers, for example, may differ from commercial small-scale fishers not only in terms of scale but also with regard to the types of gear used and the impact on aquatic ecosystems. Residential, higher trophic-level fish, such as grouper, or sedentary invertebrates, such as sea cucumbers, are more vulnerable to overfishing than fast-breeding species, such as sardines and other small pelagic fish.[18] Subsistence fishers often do not have the resources to acquire boats and therefore often focus on gathering molluscs, crustaceans and fish in near-shore or estuarine environments, which may pose ecological challenges quite different from commercially oriented small-scale fishers, who target stocks further offshore. The FAO therefore emphasises that the small-scale fisheries sector 'is not homogenous within and across countries and regions, and attention to this fact is warranted when formulating strategies and policies for enhancing its contribution to food security and poverty alleviation'.[19]

Historically small-scale fishing practices in Africa and the rest of the world have had a relatively low impact on aquatic ecosystems owing to the limits of vessel and gear technology employed, as well as local systems of cultural rights and obligations that sought to limit overfishing or allow for recovery of resources where these had been overexploited.[20] In West Africa significant marine fisheries developed after the conversion of traditional river boats to cope with ocean conditions in the late 19th century. By the mid-20th century Ghana was an important regional fishing centre with a large, commercially oriented fleet of seafaring vessels targeting near-shore stocks throughout the region.[21] Fisheries activity in Southern and Eastern Africa during this time was more limited yet remained important for local economies. Fishing pressure expanded dramatically in the waters off Africa and other developing regions after the Second World War. This period saw the rapid growth of distant water fleets from Europe, the former Soviet Union and Japan. Overfishing in these countries' territorial waters, subsidies for the expansion of national fishing fleets and the development of various new technologies – including diesel-electric trawler vessels, onboard freezing facilities and nets constructed from synthetic fibres such as nylon – greatly enhanced the range and ecological impact of fisheries activities.[22] The result was a significant increase in fish landings in African waters during the final decades of the 20th century. Total fish landings in West Africa, for example, expanded from 600 000 tonnes in 1960 to 4.5 million tonnes by 2000.[23] In Tanzania total fish landings increased from 32 000 tonnes in 1950 to over 418 000 tonnes by 1990, with significant landings by vessels from South Korea, Japan, Russia, Ukraine, Taiwan, France and Spain.

Widespread illegal, unreported and unregulated (IUU) fishing by foreign vessels also contributed significantly to increased fishing pressure in Africa's coastal waters. In the course of the 20th century coastal states sought increasing control over their territorial waters, culminating in the 1982 UN Convention on the Law of the Sea, which recognised

the right of coastal states to establish a 200 nautical mile exclusive economic zone (EEZ) in which foreign economic activities, including fishing, could be limited. African states, however, possess limited resources to monitor and enforce their EEZs. It has been estimated that up to one million tonnes of fish are illegally caught in African waters every year, representing about $1 billion in lost revenue.[24]

Fishing pressure has also grown significantly within the small-scale fisheries sector. Population growth has swelled the number of fishers and increased the demand for fish products, while the increasing use of motorised boats and access to modern fishing technologies have lead to the adoption of more intensive fishing practices. In Senegal, for example, the number of small-scale fisheries vessels has increased from 5 000 in 1982 to over 16 000 today. The number of small-scale fishers participating in Kenya's Lake Victoria fishery increased from 11 000 in the early 1970s, to 30 000 in 1995, and to about 75 000 at present. In many African countries, therefore, the small-scale sector is characterised by overcapacity, increasing competition for fisheries resources, and overfishing of stocks, particularly those found in freshwater and near-shore waters.

In addition to the pressures resulting from changes within the small-scale fishery itself, the sector also faces numerous threats from external dynamics, including infrastructure development along rivers and coasts, industrialisation, pollution, and land-use change in agriculture and forest zones.[25] Evans and Andrew[26] draw attention to the fact that 'factors arising from outside the fishery domain may offer opportunities and act as constraints on the fishery system, so driving fishery change and influencing management performance and the livelihoods and well-being of fishery stakeholders'.

The pressures on Africa's fish stocks are likely to grow in coming years, driven both by domestic and international demand. About 75% of Africa's fish stocks are either over or fully exploited.[27] Africa's rapidly growing population, projected to reach 2.1 billion by 2050, will create significant pressure on the continent's fisheries sector as a source of employment and food, particularly as urbanisation, a growing middle class and improved transport infrastructure fuel growing demand and facilitate the trade in fish products.

FISHERIES GOVERNANCE AND CO-MANAGEMENT

One of the key developments in fisheries governance in recent decades has been a shift towards a decentralised approach to fisheries management, particularly in the small-scale sector. This was part of a broader trend towards participatory approaches, devolution of authority and decentralisation of powers that emerged in the 1980s to 1990s in the field of resource management and development theory, arising from the recognition that centralised, top-down approaches to fisheries management had in most cases failed to establish effective governance frameworks and maintain stocks at sustainable levels.[28] A major review of past development assistance in the fisheries sector published in 1990 concluded that 'there was a need for more careful and comprehensive preparation involving wider consultation and active participation of beneficiaries, flexible and phased approaches with the emphasis on the development of human resources'.[29] Greater devolution of management authority to user groups was also supported by the work of Elinor Ostrom[30] and others on the emergence of self-governance in common-pool resource systems. Ostrom's research challenged the notion that open-access resources

would inevitably lead to the overexploitation and degradation of these resources by users, popularised by Garrett Hardin's conception of the 'tragedy of the commons'.[31] Instead, Ostrom and other researchers documented various cases in which user groups had established effective governance mechanisms to ensure sustainable exploitation of common-pool resources. Although earlier viewpoints implied the need for a central authority to manage and co-ordinate resource use, new perspectives on commons management saw a greater scope for community involvement, with the state playing a facilitating role.

The trends outlined above found expression in the co-management approach to fisheries management, which has been defined as an arrangement in which management responsibility is shared between the government and fishing communities, or more broadly the set of institutional and organisational arrangements that define the co-operation between the fisheries administration and relevant fishing communities.[32] Evans, Cherret and Pemsl emphasise that co-management is aimed at more effective collective action, conflict resolution, and higher compliance to management institutions (and therefore reduced costs of enforcement) as well as the integration of more diverse knowledge and value systems on which to base decisions, leading to better problem definition, social learning and innovation.[33]

The principle of co-management has been applied through various models covering a large range of institutional arrangements.[34] Reviews of Africa's experience with co-management have revealed a number of challenges in the implementation of this approach. Although generally recognising the benefits of an inclusive management approach, researchers have noted that co-management efforts may also suffer due to capture by local elites, conflict with other local power structures (such as traditional authority structures), corruption, poor management capacity, intimidation by local fishers and a lack of institutional, financial and compliance support from fisheries authorities. Hara and Nielsen[35] have observed that co-management efforts in African fisheries often fail to effect real empowerment of communities, rather, governments pursue an 'instrumental approach' to co-management whereby communities are seen as partners in the implementation of management measures, yet are not included in decision-making, the development of regulations, or the generation and integration of knowledge relevant to fisheries management. It has been observed that, although the implementation of co-management models has sought to increase the role of fishing communities in the governance of fish stocks, the decentralisation process itself in most African countries has been initiated and controlled by central authorities and resulted from pressures from donor agencies, with the result that the institution of co-management arrangements in many cases may still be characterised as 'top-down' and donor driven.[36]

The complexities faced in the implementation of co-management in Africa and other regions and the ambivalence of central fisheries management authorities in defining their position vis-à-vis fisheries communities may be ascribed in part to opposing views on the nature of small-sale fisheries. It has been argued that policy prescriptions for small-scale fisheries governance have stemmed largely from a view of fisheries, and particularly small-scale fisheries, as inefficient, implying the loss of revenue opportunities that could otherwise be used to create economic growth.[37] This viewpoint has been summarised by Sumalia as 'too many fishers chasing too few fish make too little income'.[38] This perspective leads to an emphasis on the reinforcement of fishing rights, their concentration

in fewer hands, and the efficient generation of economic surplus from the sector as the main ways by which fisheries can contribute to poverty reduction. These interventions aim to unlock the wealth represented by fisheries' resources, which is seen as being diluted through overcapacity and inefficient capture, processing and trade activities in the small-scale sector. Hence, this set of policy prescriptions is often described as the 'wealth-based approach' to fisheries management. In a similar fashion, the 'rights-based approach' has emphasised the need to allocate access rights to historically open-access fisheries in order to establish incentives for effective management of fish stocks.[39]

The inefficiency narrative is not without its critics. Béné, Hersoug and Allison have emphasised the 'welfare function' of small-scale fisheries.[40] They argue that the main contribution of small-scale fisheries to development and poverty reduction is not in the resource rent that can be extracted from the sector, but rather in the capacity of the sector to absorb labour and support livelihoods, particularly among the rural poor, as well as the 'safety-net' function of small-scale fisheries in providing alternative or additional sources of income, employment and food for poor and vulnerable households during periods of individual or collective economic crisis. This perspective tends to be critical of restricting access, and notes that efforts at greater efficiency may lead to the marginalisation of particularly vulnerable groups, such as subsistence fishers.

SMALL-SCALE FISHERIES AND INDUSTRIAL FISHERIES

The expansion of industrial fisheries in African waters, including IUU fishing by industrial vessels, has often led to conflict with the small-scale fisheries sector. Conflicts are particularly acute where small-scale fishers and industrial fisheries compete for the same stocks and overfishing has led to reduced catches.[41] Industrial fishing vessels are frequently accused of damaging or destroying nets of small-scale fishers, either intentionally or inadvertently as a result of increased boat traffic. In response, many national fisheries authorities have implemented near-shore zones for exclusive use by the small-scale sector, generally ranging from 2–10 nautical miles. In many cases, however, these zones are poorly enforced and frequent allegations of encroachment by industrial fishers continue to be made. Pomeroy *et al.*[42] emphasise that increased competition between the small-scale and industrial sectors resulting from the effects of overfishing and diminished stocks is often at the heart of these conflicts.

Effective institutions for engagement among fisheries authorities, small-scale fishers and industrial operators are central to resolving these disputes. Small-scale fishers, however, often claim that their interests are not protected by fisheries officials. Small-scale fishers may be excluded from dialogue forums between government and industrial fishing interests or their engagement in such forums may be limited owing to barriers such as limited resources for travel. A lack of enforcement of regulations aimed at protecting small-scale fishers or institutional support by fisheries officials may lead to further breakdown of relationships among different fisheries sectors. The rise of piracy on the coast of Somalia has been linked to rampant illegal fishing by foreign trawlers,[43] while small-scale fishers in West Africa have recently claimed that they too will turn to piracy if their governments do not act against foreign trawlers fishing illegally in their waters.[44]

CONSERVATION AND BENEFIT-SHARING

The 2002 World Summit on Sustainable Development highlighted the role of marine protected areas (MPAs) as a mechanism through which to pursue conservation and management of the oceans. The Durban Action Plan, developed at the Fifth World Parks Congress in 2003, also called for the expansion of protected areas, recommending the establishment of MPA networks across 20–30% of the world's oceans.[45] There are currently about 5 000 MPAs globally, including a significant number in the EEZs of developing countries. MPAs are primarily established for three objectives, namely biodiversity conservation, fisheries sustainability, and the promotion of non-extractive activities such as recreation and tourism, which allow economic value to be built on conservation benefits.[46] Although MPAs have the potential to respond to all these objectives, a lack of clarity on how the objectives are to be prioritised and implemented can lead to conflicts between stakeholders. The intuitive ideal of achieving 'synergy between development and conservation' has in many cases proven difficult to achieve.[47] In part, these challenges may be ascribed to differing viewpoints of 'natural' marine systems. A notion of oceans as wilderness, which sees humans essentially as intruders in marine systems, tends to promote the establishment of large, permanent and completely protected (no-take) MPAs. In contrast, a perspective of marine environments as 'peopled seascapes', in which humans have a long history of integration with marine ecosystems, often favours collaborative approaches with fishers through mixed-use areas, rotational closures and other mechanisms.[48]

In many cases, opposition by local user groups arises due to the process through which MPAs are established rather than the principle of conservation itself, which users often acknowledge as necessary. Centralised, 'top-down' approaches, with limited community participation, often lead to mistrust and opposition by fishers. Research has shown that community participation is crucial to the success of MPAs, as well as the inclusion of local knowledge regarding breeding areas and other behavioural attributes of marine life in the protected area.[49] A recent analysis of MPA governance undertaken through the UN Environment Programme (UNEP) suggests that the effectiveness of governance depends on institutional diversity. This argument is based on a comparison of 20 MPAs worldwide that shows the effectiveness of combining top-down, bottom-up, and economic-incentive approaches to governance. For example, local community participation can provide detailed knowledge, but top-down structures are often essential for taking account of knowledge of ecological linkages across larger areas and more time.[50]

LARGE-SCALE EXTRACTIVE INDUSTRIES AND SMALL-SCALE FISHERIES

Africa's current oil and gas production is dominated by a small group of countries, namely Libya, Nigeria, Algeria and Angola. In recent years, however, a number of significant new discoveries have been announced. Ghana began commercial oil production in December 2010, while production of Uganda's oil reserves in the Albertine Graben area are likely to begin before 2015. Sierra Leone, Liberia and Guinea-Bissau in West Africa; and Kenya, Tanzania and Namibia in Southern and East Africa have been noted as potential new oil

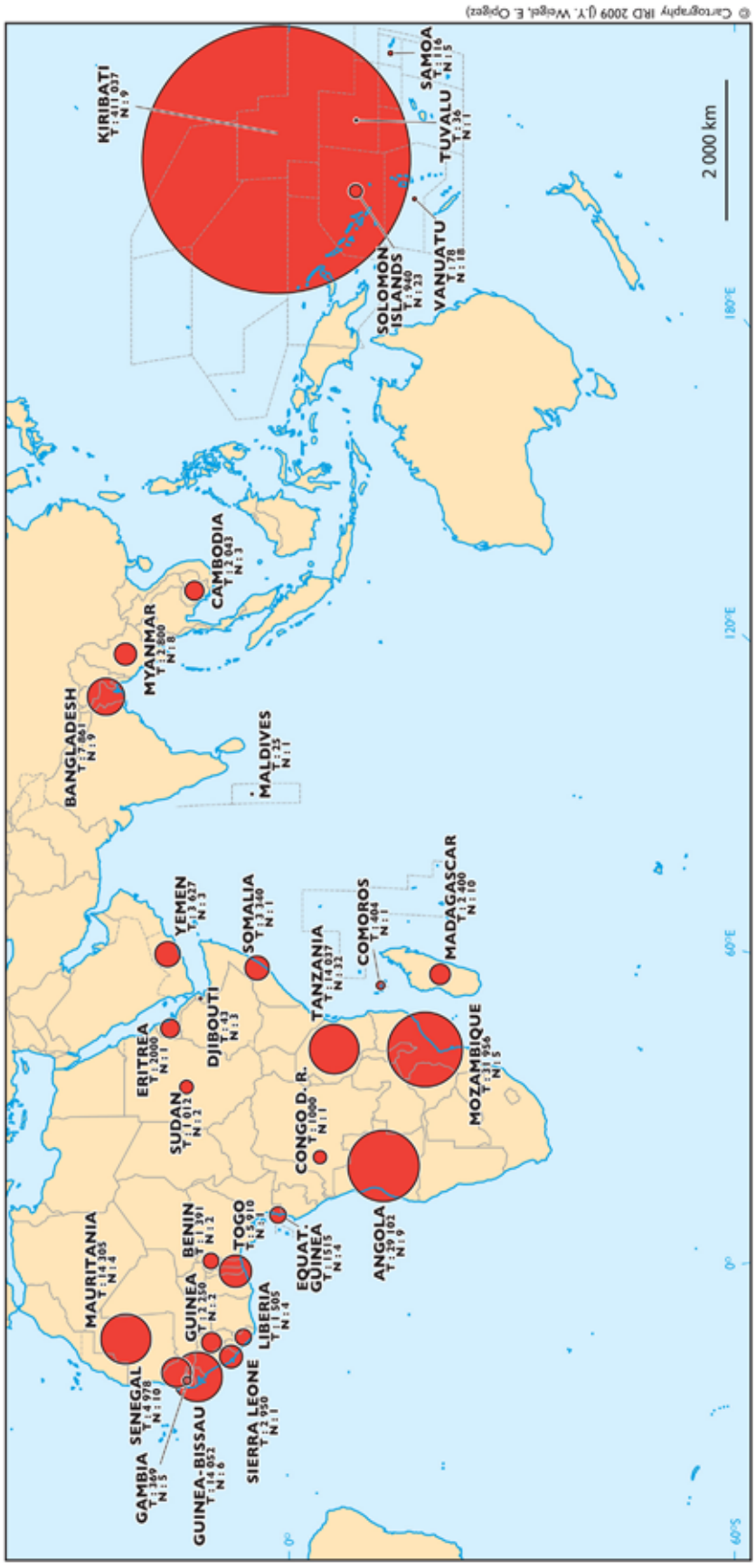


Figure 1: Total area and number of marine-protected areas in least-developed countries

Note: T = Total marine area protected, km²; N = Number of marine protected areas.

Source: Wiegel JV, Féral F & B Cazalet, 'Introduction', in Wiegel JV, Féral F & B Cazalet (eds), *Governance of Marine Protected Areas in Least Developed Countries – Case studies from West Africa*, FAO Fisheries and Aquaculture Technical Paper, 548. Rome: FAO, 2011.

producers.[51] Significant gas discoveries have also been made, particularly in Tanzania and Mozambique. Exploration activities and investments in oil and gas infrastructure have grown significantly, and references to Africa as 'the next oil and gas frontier' abound.[52]

The expansion of Africa's oil and gas sector is likely to lead to increasing interaction, and potentially, conflict between oil and gas operators and small-scale fishers. In Ghana local fishers have claimed that oil-supply vessels frequently damage nets and that oil exploration activities have been associated with the death of large numbers of marine mammals. The exclusion of fishers from large areas in the vicinity of offshore oil and gas wells has also raised concerns, as fishers are barred from accessing traditional fishing grounds. The development of large-scale mineral and energy resources may also have a significant impact on marine ecosystems through the expansion of ports and increase in shipping traffic associated with these developments.

Oil spills and related pollution pose significant threats to local fishing communities. In 2011 UNEP released a landmark report assessing the extent of oil pollution in Nigeria's Ogoni region.[53] The report noted various direct impacts on fishing activities, particularly the destruction of mangrove habitats and creeks, which have destroyed fishing and aquaculture operations. The report notes that the wetlands around Ogoniland are 'highly degraded and facing disintegration'. In addition to these direct impacts on fishing activities, oil pollution has a number of negative impacts on the health of communities. The assessment identified numerous cases of polluted wells, including exposure to dangerous levels of benzene, a known carcinogen.

CLIMATE CHANGE AND SMALL-SCALE FISHERIES

Climate change has an impact on fisheries through a variety of channels, including ocean warming and acidification as well as a range of impacts on freshwater systems due to shifting rainfall patterns, increased evaporation levels, more frequent and severe floods, and droughts and other mechanisms. These geophysical changes will in turn have diverse ecological impacts, for example, by interfering with the growth, distribution, reproduction and survival of fish, crustaceans and other marine fauna. Ocean warming is already leading to changes in the distribution of various fish stocks as well as an increase in coral bleaching events, while ocean acidification is likely to disrupt the life cycles of various marine crustaceans through its impact on calcification rates. In addition to numerous ecological impacts, climate change will also threaten fisheries communities and coastal infrastructure directly through increased frequency and intensity of tropical storms, droughts and floods, as well as sea-level rise, coastal erosion and other geophysical processes.

These changes are likely to have significant social and economic implications for fisheries communities in Africa and elsewhere in the world, particularly as they interact with existing pressures on fisheries stocks such as overfishing, habitat destruction and IUU fishing. African states are especially vulnerable to climate change impacts on fisheries as a result of high levels of exposure to climate change impacts, high vulnerability owing to the importance of fisheries as an economic activity and source of nutrition, and relatively low levels of adaptive capacity owing to resource constraints.[54] At the socio-political level there are also important differences in the level of vulnerability of different fisheries sectors.

Small-scale fishers are particularly exposed to tropical storms, sea-level rise, floods and other climate-related threats.[55] Limited access to health facilities, poor road networks and inadequate sanitation infrastructure exacerbate the risks associated with extreme weather events. Natural disasters therefore have a disproportionate impact on developing countries and vulnerable groups. About 262 million people are affected annually by disasters related to weather and climate, of whom more than 98% live in developing countries and the vast majority are dependent mainly on agriculture and fisheries for their livelihoods.[56]

Natural fluctuations in weather patterns and the availability of fish stocks are not new to small-scale fisheries communities. Traditional adaptation strategies include changes to fishing gears or target species, migration to more productive fishing grounds, shifts to alternative livelihoods such as agriculture, or temporary conservation measures such as the establishment of closed seasons or gear restrictions. Climate change impacts, however, may overwhelm traditional adaptive strategies, particularly in cases where overcapacity in the fisheries sector, depleted stocks and other factors limit the effectiveness of traditional adaptation strategies. Small-scale fishing communities are often among the poorer and more marginalised groups in society and may therefore lack the economic and technological resources required to effectively respond to climate change-related impacts.

Fisheries governance systems may limit the available adaptive responses of small-scale fishers, particularly where rights-based approaches impinge on the ability of fishers to migrate to new areas or adopt alternative fishing gears and techniques. Governance systems may also limit the potential of fisheries to serve as a social safety net during times of economic crises, for example, when droughts lead to agricultural failures and the subsequent growth in the number of fishers as farmers seek alternative sources of income and food. The changes associated with climate change provide insight into the challenges facing small-scale fisheries governance in Mozambique and other African countries. Although there is a need to manage fishing pressure in the face of overfishing, growing coastal populations and advances in fishing technology and fisheries management systems need to retain a degree of flexibility that will allow for adaptive, locally appropriate strategies in ways that support the social safety-net function of fisheries for numerous rural communities.

THE LARGE MARINE ECOSYSTEM APPROACH

The challenges facing small-scale fisheries outlined above serve to emphasise the complexity of managing both the biological and socio-economic aspects of small-scale fisheries. Small-scale fisheries are an often neglected component of the larger fisheries sector, while the fisheries sector itself is influenced increasingly by dynamics in other economic sectors as well as larger geophysical processes, such as climate change. The framework of analysis in addressing such governance challenges must be at an appropriate scale to encompass diverse influences and highlight the interdependence of various components of the system. The large marine ecosystem (LME) approach offers a framework through which such systemic challenges may be addressed. The LME approach was developed initially by the US National Oceanic and Atmospheric Administration as a framework through which to address conservation challenges at the ecosystem level. LMEs are large ocean ecosystems, generally exceeding 200 000 km^2, with distinct

bathymetry (depth), hydrography (tides, currents, and physical conditions of ocean waters), and biological productivity.[57] A total of 64 LMEs have been identified throughout the world's oceans. In order to structure the analysis of LME dynamics, a framework of five information modules has been established – the *productivity module* describes the availability of nutrients and primary productivity; the *fish and fisheries module* covers the status and changes in fish populations and their biomass; the *pollution and health module* covers the types and degree of pressure from pollutants like sediments and excessive nutrients; the *socio-economic module* covers the size and scope of activities of surrounding human populations and the various ways that humans exploit or manage the resources; and the *governance module* covers the laws, regulations and the various entities responsible for managing the resources and enforcing laws.[58]

The LME approach has received significant support from the international donor community. The Global Environment Facility, World Bank and the UN Regional Seas Programme all use LMEs as the basis for their marine projects. Despite the growing prominence of the LME approach, it has been recognised that the socio-economic and governance modules have not received the same focus as the remaining three modules. Although the LME approach has thus proved an important tool for the co-ordination of scientific research into geophysical and biological processes, the role of the LME approach in supporting co-ordinated and holistic governance will require further development. In March 2013 the Benguela Current Convention was signed by representatives of the member countries of the Benguela Current LME (Angola, Namibia and South Africa). Although joint research efforts had been undertaken through the Benguela Current Commission for a number of years, the signing of the convention marked the establishment of the commission as the first permanent intergovernmental institution to be based on the LME approach.[59] The Benguela Current Commission has undertaken a consultative process through which it has developed a Strategic Action Programme outlining the principles, policies and actions with which it seeks to address the challenges facing the Benguela Current LME. This approach has allowed the commission to respond to emerging concerns such as the impact of marine mining and mineral exploration activities and the effects of climate change on marine ecosystems.

On Africa's eastern coastline, the Global Environment Facility and the UN Development Programme have supported the Agulhas and Somali Current Large Marine Ecosystems (ASCLME) project since 2008. Much like LME projects in other coastal regions, the ASCLME has focused on identifying and analysing threats to the marine and coastal environment using the Transboundary Diagnostic Analysis methodology that was developed as part of the LME approach. Although such tools have proven to be an effective means through which to ensure cross-sectoral assessment and analysis of threats to marine systems, a recent review of global LME projects has noted that the assessment process is often protracted, in some cases lasting more than 10 years, and the transition to co-ordinated interventions that address the identified challenges has often proved problematic. The review calls for more co-ordination between LME commissions and existing regional fisheries bodies or other regional structures, as well as the establishment of mechanisms that would reduce the dependency of LME initiatives on donor funding.[60] Despite these difficulties, the LME approach is likely to become an increasingly important framework through which the regional complexities and dynamics of ocean governance may be addressed.

Despite their socio-economic importance, historically small-scale fisheries have been marginalised with regards to both governance and research efforts. Although small-scale fisheries are receiving increasing recognition, the sector continues to face a variety of challenges, particularly with regards to the relationship between small-scale fisheries and other economic activities that lay claim to marine resources and constrain access to fishing grounds. The following chapter provides an overview of the Mozambican economy, including the important socio-economic role of fisheries in Mozambique.

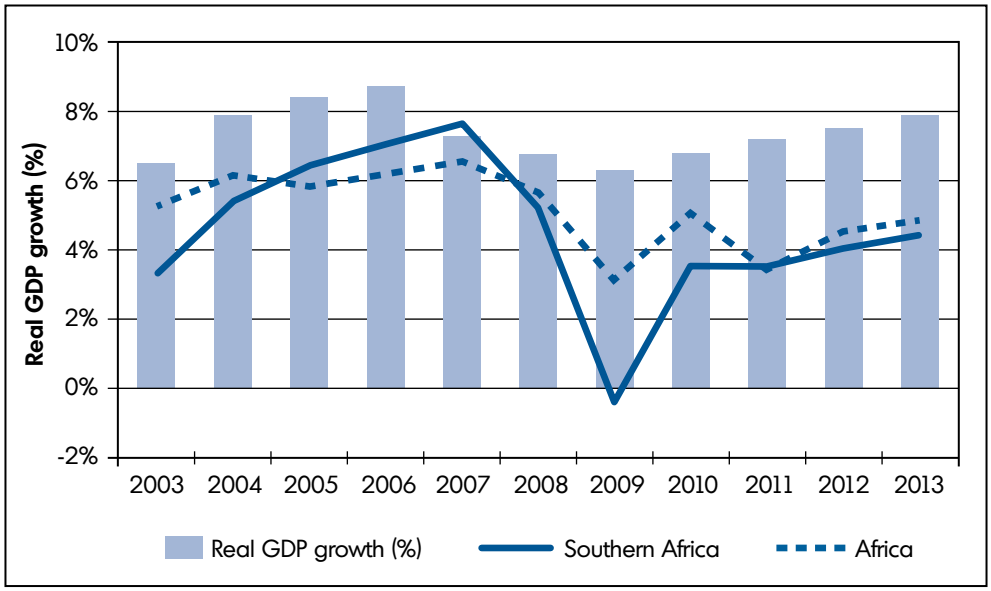
CHAPTER 3

FISHERIES AND THE MOZAMBICAN ECONOMY

THE MOZAMBICAN ECONOMY

In 2011 the Mozambican economy reached a number of significant milestones: the country's first major shipments of coal were transported from the country's coal fields in Tete province via the Beira port, and gas discoveries in the Rovuma basin were announced by Anadarko and the Italian energy group, ENI. The discovery and development of major coal and gas reserves in the past decade have generated significant investment inflows, fuelled economic growth and led to a sense of excitement about the country's economic future as transnational extractive companies move from early development activities to the full production phase. Growth over the past decade averaged 7.2% per year and is forecasted to increase to 7.8% per year by 2014.[61]

Figure 2: Mozambican real GDP growth (%), 2003–13



Source: African Economic Outlook, *Mozambique*, 2012, http://www.africaneconomicoutlook.org/en/countries/southern-africa/mozambique.

Existing infrastructure has proved wholly inadequate to support the pace of growth in extractive industries – in December 2011 an international company was forced to truck its first shipment of over 10 000 tonnes of coal from Tete province to the Beira port, as the Sena rail linking these areas had no excess capacity.[62] Both the public and private sectors

are making significant investments to expand the country's electricity, road, rail and port infrastructure. The capacity of the Sena rail line has been doubled to 600 tonnes per year, while Vale is pursuing the construction of a 500 km connection between Moatize and the rail line connecting to Nacala port. The port itself is the site of a planned $1.5 billion coal terminal, and both the Beira and Maputo ports will undergo significant expansion. Road networks and airports are also being expanded, with work beginning on the Milange–Mocuba ($100 million) and Nampula–Cuamba ($250 million) road projects, new airport hubs are planned for Pemba and Tete, and multimillion dollar upgrades of the Maputo and Vilanculos airports are already complete.

Despite Mozambique's recent history of strong economic growth and its impressive future growth prospects, the country continues to face a number of significant challenges. As recently as 2010 more than half the government's budget was accounted for through aid flows.[63] In the same year Mozambique experienced riots linked to rising wheat prices, which caused a number of deaths and injuries. The IMF has observed that economic growth in Mozambique has not been as pro-poor as countries with a similar growth performance and, moreover, has become less pro-poor over time. The lack of pro-poor growth is ascribed to structural rigidities and the narrow productive base of the economy, low production and inefficiency in the agricultural sector, and slow progress in reforming the business environment to induce private-sector activity.[64] Foreign direct investment into Mozambique has been focused primarily on large extractive industries and infrastructure projects, but more than 75% of Mozambique's population is engaged in small-scale agriculture, and progress in this sector has been limited. Mozambique's population of 23.4 million is growing at a relatively high rate of 2.8%, with about 300 000 new entrants into the labour market every year. The overall unemployment rate stands at 27%, while about 54% of the population live below the national poverty line of about $0.65 per day. Poor education levels are a significant challenge to labour absorption in the formal economy – about 80% of the workforce has not completed upper primary school and only 13% have completed secondary school.[65]

These concerns are reflected in the Mozambican government's Action Plan for Reducing Poverty (PARP 2011–14), which focuses on increased agricultural production, higher employment through the promotion of small and medium-sized enterprises, and investment in human and social development. The PARP also promotes the strengthening of social safety nets through direct cash transfer mechanisms to the most vulnerable groups coupled with the maintenance of subsidies to urban public transportation and productive public works programmes.[66] The PARP explicitly states that its primary goal is to reduce the incidence of poverty, emphasising that government action must first of all promote 'pro-poor' growth.[67]

MOZAMBICAN FISHERIES

Mozambique's coastal geography is strongly influenced by the southward flowing Agulhas Current and variations in the country's continental shelf. In the northern coastal provinces the continental shelf is narrow, resulting in a rocky, coral-bearing seabed that deepens rapidly, with a number of sheltered islands and bays. The central coast possesses a much wider continental shelf and weaker ocean currents. Deposits from the region's numerous

large rivers have shaped sandy banks, while estuaries and deltas form important breeding grounds for fish and crustaceans. The region contains numerous mangrove stands, including those of the Zambezi Delta, which form the largest mangrove forest in East Africa. The region also contains the Sofala Bank, Mozambique's most productive fishing grounds. The southern coast is characterised by extended beaches, sheltered bays and barrier lakes.[68]

Figure 3: The Mozambique Channel

Source: Google Earth.

Mozambique has one of the longest coastlines in Africa and possesses abundant fisheries resources, particularly in the marine sector, which accounts for 90% of Mozambique's total fish production. Fisheries contribute 3–4% of GDP and the country's shrimp fishery is an important source of foreign-exchange earnings. The growth of Mozambique's coal and gas exports as well as broader diversification of the economy is likely to reduce the contribution of fisheries to the country's GDP in coming years; however, the social and economic benefit of Mozambique's fisheries resources will remain substantial, particularly in the small-scale fisheries sector.[69] Fisheries play a crucial role in food security and contribute to the economies of rural areas, where the majority of Mozambicans live and where poverty and lack of access to resources remain significant challenges.

Mozambique's fisheries sector is divided into the industrial, semi-industrial and small-scale sectors. A recreational sports fishery also exists, which is linked to the country's

tourism industry. Mozambique's aquaculture sector is relatively small, although the government aims to support strong growth in the sector in coming years. The sector is dominated by freshwater aquaculture, primarily based on the farming of tilapia. A handful of marine aquaculture ventures have been established for shrimp farming, but these have struggled to achieve commercial viability.

Mozambique's small-scale fishery includes subsistence and commercial activities. Fishing craft in the small-scale sector are smaller than 10 m and are generally powered by oar and sail, although motorised boats are increasingly common. The sector also includes beach seine fishers and shore-based collectors. The small-scale sector targets a wide range of near-shore fish stocks, including small pelagics, crustaceans, molluscs and linefish. The semi-industrial fishery includes vessels of intermediate size (10–20 m), which target shrimp and linefish. The industrial fishery consists of vessels larger than 20 m. The majority of the industrial fleet is based in Beira, while a smaller industrial fishery operates out of Maputo harbour. The industrial fishery primarily targets shrimp, but there are also deepwater fisheries for tuna and other stocks.[70] Although Mozambique's international fisheries trade is dominated by the shrimp fishery, over 80% of total fish landings are accounted for by the small-scale sector based in about 600 landing sites spanning the length of the coastline, which trade almost entirely within the local economy.

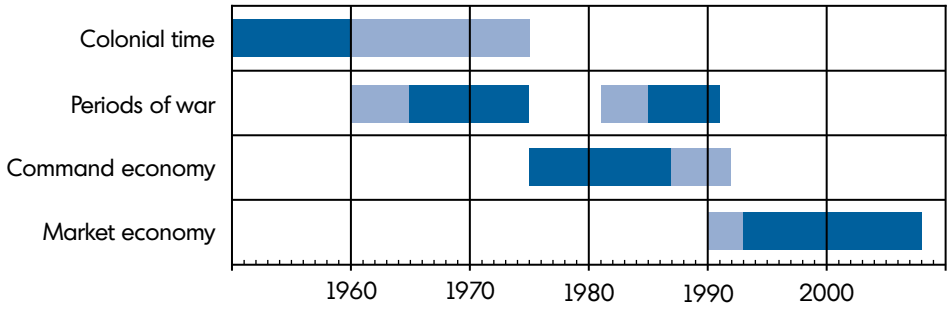
About 334 000 Mozambicans depend directly or indirectly on small-scale fishing (marine and freshwater). About 280 000 are fishers, while the rest are processors, carpenters, net makers, mechanics and sellers of fishing gear. Among the fishers only about 41% use boats of various types, while the remainder are collectors or use shore-based fishing gears such as beach seines. The most common fishing gears are gill nets (42%), hand lines (23%) and beach seines (18%).[71] About 39 400 boats are used in small-scale fishing activities, of which about 77% are canoes made from tree trunks, 9% Moma-type canoes, 6% rafts and 6% skiffs, together accounting for 97% of the total small-scale fleet. It is estimated that the percentage of motorised boats remains below 10%.[72]

There is some concern about overfishing of certain pelagic stocks by small-scale fishers, particularly in areas with heavy concentration of beach seines. Harmful fishing practices, such as the use of mosquito nets or fine-mesh seine nets, are still common in certain areas. Scientific studies have tended to focus on Mozambique's lucrative shrimp fishery, and Lopes and Gervasio[73] note that there is little data available on the potentials and sustainability of the stocks targeted by small-scale fishers. However, fieldwork interviews conducted for this study revealed widespread reports among fishers of decreasing catches.

Small-scale fisheries, although based on traditional practices, have undergone significant changes in recent years. The number of fishers participating in the small-scale fisheries sector has grown considerably, while there has been an ever-greater use of motorised boats, improvements in fishing gears and more intensive use of these fishing gears. The Mozambican government has implemented various governance initiatives with the dual aim of promoting socio-economic development through greater efficiency and productivity in fisheries activities and ensuring the sustainability of fish stocks. A review of fisheries management interventions conducted in 2001, however, concluded that despite a wide array of development activities in Mozambique's fisheries sector, the implementation of planned activities within the small-scale sector has been modest, except for credit support.[74]

Many of the changes experienced within the small-scale sector have been driven from dynamics external to the fishing industry. Mozambique's colonial period, which ended with a colonial war (1964–74), was followed by civil war (1981–92) that became the main constraint on economic development in Mozambique. After the peace agreement in 1992 and a constitutional reform in 1994, economic development in Mozambique has been characterised by structural adjustment, market liberalism and heavy dependence on foreign aid. Although data on internal population movements is scarce, the civil war is believed to have led to widespread internal migration towards coastal areas, as rural communities sought to escape from warring factions and maintain food security. About 60% of Mozambique's population currently live in the coastal zone. The instability of the colonial war and civil war periods resulted in the disintegration of rural infrastructure, widespread social instability, a significant decline in the skilled workforce and limited government resources for rural development and natural resource governance. These factors had a significant impact on the development of fisheries communities and the ability of officials to implement effective fisheries management systems.

Figure 4: Periods of change affecting resource use and fisheries management in Mozambique



Periods	Utilisation of natural resources	Fisheries management
Colonial time	Subsistence economy	No management. Local rules.
Periods of war	Security valve, increased coastal population	Joint venture companies in industrial fisheries. Extension services.
Command economy	Policy of small-scale and semi-industrial fleets	Fisheries combines. Stock assessment. Fisheries regulations.
Market economy	New types of interest in the coastal zone	Co-management committees. MPA.

Source: Menezes A, Eide A & J Raakjaer, 'Moving out of poverty: Conditions for wealth creation for small-scale fisheries in Mozambique', in Jentoft S & A Eide (eds), *Poverty Mosaics: Realities and Prospects in Small-Scale Fisheries*. London: Springer, 2011, p. 409.

Following the end of the civil war, donor-supported fisheries development projects were particularly important in the development of Mozambique's fisheries governance institutions, and continue to play an important role in the further development of the country's fisheries governance system. One of the earliest projects was the Nampula Artisanal Fisheries Project (NAFP), which was implemented from 1994–2001. The overall objectives of the project were to improve the level of income, contribute to employment generation and improve food security for fishing communities in the Nampula province in northern Mozambique.

Other important fisheries development projects include the Sofala Bank Artisanal Fishing Project (2002–11), the Artisanal Fisheries Promotion Project (a follow-up project to the Sofala Bank Artisanal Fishing Project with a broader geographic range focusing on specific coastal growth poles), the Cabo Delgado and Northern Nampula Artisanal Fishing Project (2003–09), and the Inhambane and Gaza Coastal Fishing Development Project (2008–12).

The NAFP and other development projects have tended to take a broad view of development in fisheries'

Small pelagic species are targeted by gill net fishers

Grouper and other larger fish species at a local market on the outskirts of Beira

communities. In addition to targeted fisheries interventions (access to market, more efficient gears and processing), they also invested in water quality improvement, feeder roads and support for health posts and schools. The projects also established numerous micro-credit schemes in order to allow fishers to upgrade their fishing and fish processing equipment, thereby contributing to greater efficiency in the sector.

A variety of boats and gears are employed by small-scale fishers

FISHERIES MANAGEMENT IN MOZAMBIQUE: POLICIES AND INSTITUTIONS

The Mozambican Ministry of Fisheries was established in 2000, prior to which the mandate for fisheries governance had formed part of the combined Ministry of Agriculture and Fisheries. The Ministry of Fisheries plays a central role in the establishment of fisheries development policies and strategies, implementing these policies and strategies and co-ordinating the roles of the various central and subnational fisheries institutions. These fisheries institutions may be divided into a fisheries management subsystem and a fisheries development and promotion subsystem.[75]

The *fisheries management* subsystem consists of the:

- National Institute of Fisheries Research (IIP), whose task is to look after the sustainability of resources;
- National Directorate of Fisheries Administration (ADNAP), which is still an integral part of the Ministry of Fisheries and whose objective is to monitor, license and supervise fishing activity; and the
- National Institute of Fish Inspection, whose objective is to ensure that the quality of fisheries produce, exported or imported for domestic consumption, is in accordance with the health standards stipulated in Mozambican legislation and in international provisions.

The *fisheries development and promotion* subsystem consists of the:

- National Institute for the Development of Small-Scale Fisheries (IDPPE), which seeks to promote the development of small-scale fishing, with particular attention to reducing levels of poverty and promoting the well-being of communities of small-scale fishers;
- National Institute for the Development of Aquaculture (INAQUA), which has the objective of promoting aquaculture;
- Fisheries Promotion Fund (FFP), whose objective is to manage the financial resources intended for public investment in the sector and to grant loans intended for development; and the

- Fisheries School, which provides basic and mid-level specialist training required for the development of the sector, as well short-duration training courses.

The fisheries development policy in force has its reference points in a series of policy and strategy documents, which express a major part of the national efforts to develop the sector. At a national level the reference instruments include the following.

- The *Government's Five Year Programme for 2005–09* is the reference point for all policy and strategy instruments and national development plans during the current legislature. It considers objectives that are achievable in the short, medium and long terms, which are later enshrined in development plans.
- The *Action Plan for the Reduction of Absolute Poverty (PARPA II) for 2006–09* is the national plan laid down by the Government to attain the great national objective of poverty reduction.
- The *Food Production Action Plan (2008–11)*, starting from the finding that the national food balance notes there is a deficit in certain basic foodstuffs, defines objectives and specific actions, so that the food production sectors, such as fisheries, may gradually overcome this deficit.
- *Agenda 2025* is a long-term vision, approved in 2003, drawn up through an expanded participatory process at national and provincial levels. Its objectives are focused on eradicating poverty and accommodated in the national planning instruments with a view to economic and social development.

Sector instruments for the development of fisheries and aquaculture are as follows.

- The *Fisheries Master Plan 1995–2005* is the oldest of all the sector reference documents. In 2010 the updated and revised Fisheries Master Plan 2010–2019 was adopted.
- The *Strategic Plan for the Artisanal Fishing Sub-Sector for 2007–11* (PESPA) comprises a strategic approach having in view the artisanal fishery subsector in a perspective that could exceed five years.
- The *Strategy for the Development of Aquaculture in Mozambique* seeks to ensure sustainable use of the aquaculture potential, respecting the environment and promoting economic and social development through the creation of a sustainable, competitive and diversified aquaculture sector.
- The *Small-Scale Aquaculture Development Plan 2009–13* seeks the implementation of the above-mentioned strategy. The key provinces initially prioritised for immediate aquaculture development are Manica, Zambezia, Tete and Niassa, where good-quality water and soil exist.
- The *Fisheries Research Development Strategy 2008–12* envisages nine strategic objectives that may eventually imply reformulating the current organic structure of the IIP so as to implement the strategy better.
- The *Monitoring, Control and Surveillance Policy and the Implementation Strategy* are based on the principle enshrined in the Fisheries Law, according to which 'fisheries resources are owned by the state, which is responsible for ensuring that fishing activities do not threaten the sustainability of the resources, and that the benefits for the country resulting from these activities are maximized'.

- The *National Plan to Combat Illegal, Unreported and Unregulated Fishing.*
- The *2009 Economic and Social Plan* (PES) is the annual instrument to implement the government's Five Year Programme and the national plan (PARPA II).
- The Sofala Bank Shrimp Fisheries Management Plan.[76]

The institutional and policy structure governing Mozambique's fisheries is relatively well developed. Central policy documents, such as the country's Poverty Reduction Action Plan, recognise the important role of fisheries in addressing poverty and identify key challenges – including a lack of access to markets, limited credit availability and relatively inefficient processing and trading systems – as hurdles to be addressed in improving the contribution of fisheries to poverty alleviation. Moreover, the action plan emphasises the importance of the sustainable use of natural resources, noting that greater community involvement is essential in order to prevent overfishing and other unsustainable practices. The Strategic Plan for the Artisanal Fishing Sub-Sector further identifies a number of priority interventions, emphasising in particular the importance of improving infrastructure and services in fisheries communities (health, education and the supply of potable water), increasing access to credit, improving marketing systems for fishery products, and increasing efficiency of the sector generally. The challenge for Mozambique's small-scale fisheries governance system lies in the effective implementation of the various planning and strategy documents that have been developed for the sector, as well as the efficient operation and collaboration of the range of fisheries management institutions, including the IDPPE, ADNAP, IIP and the National Directorate of Fisheries Law Enforcement. The issue of effective collaboration also extends to other sectors of the economy that have an increasing impact on the small-scale fisheries sector, particularly tourism and large-scale extractive industries. The challenges facing Mozambique's small-scale fisheries sector are discussed in greater detail in the following chapter.

CHAPTER 4

CHALLENGES IN MOZAMBIQUE'S SMALL-SCALE FISHERY SECTOR

CO-MANAGEMENT IN MOZAMBIQUE'S SMALL-SCALE FISHERIES

After the end of colonial rule in 1975 the Frelimo (Mozambique Liberation Front) government initiated efforts at rural development, including support for small-scale fisheries, but these efforts were undermined by the mass emigration of Mozambique's skilled workforce following independence; the political instability of the war with Renamo (Mozambican National Resistance); the neglect of rural infrastructure, including roads, schools and health facilities; and an influx of people to coastal areas to avoid the worst of the fighting in the interior. Despite these challenges, the Frelimo government developed fisheries co-operatives, Combinados Pesqueiros, which sought to supply fishing inputs and services to small-scale fishers and to market surplus production. The fisheries co-operatives had little lasting impact, however, owing primarily to implementation challenges arising from a lack of consultation with small-scale fishing communities as well as funding challenges. Ultimately, the initiative was discontinued during Mozambique's structural-adjustment period.

Following the end of the civil war in 1992 the fisheries sector received renewed attention as a potential source of employment and food security. The Fisheries Master Plan, adopted in 1996, was the central instrument for the expression of government strategy and objectives in the sector. The Fisheries Master Plan outlined three key priorities in the small-scale fisheries sector.

- Increased exploitation of the fish resources, by reduction of post-harvest losses through improved traditional means and use of ice and refrigeration.
- Increased volume of production through improved vessels and fishing techniques, and incentives to invest in means of production.
- Development of co-management mechanisms to resolve problems of over-exploitation.[77]

The Fisheries Master Plan emphasised collaboration between fisheries management authorities and the small-scale fishing industry in defining and controlling the enforcement of fishing regulations and 'defining and applying sustainable solutions for management and conservation of the artisanal fishery resource'. It further emphasised that:[78]

> the State will promote involvement of coastal communities in live aquatic stock management and its respective exploitation so as to take advantage of local management know-how, with the purpose of facilitating the introduction of biologically sustainable natural resource usage patterns which are at the same time socially and economically efficient.

The co-management approach outlined in the Fisheries Master Plan was first implemented in 1997–98 through the Nampula Artisanal Fisheries Project (Projecto de Pesca Artesanal em Nampula). The project was funded by the International Fund for Agricultural Development (IFAD) and implemented in collaboration with Mozambique's IDPPE. Initially the co-management committees established by the project focused on addressing harmful fishing practices, particularly the use of mosquito nets, as well as developing structures for conflict resolution, fisheries data collection, and the establishment of credit schemes. Small-scale fishers were able to lobby the government successfully for an expansion of the exclusive-use zone for small-scale fishing to three miles from the shoreline, which was codified in the Marine Fisheries Regulation of 2003.[79]

A 2011 review of fisheries governance interventions in Mozambique noted that although there has been extensive support for the establishment of CCPs, many require further support in order to fulfil their functions effectively. The organisational and institutional capacity of many CCPs is still weak, requiring further training, and there is little knowledge of legislation covering small-scale fisheries and the rights outlined therein.[80]

The fieldwork conducted in Beira and Bazaruto revealed significant differences in the capacity of CCPs. Those in close vicinity to major urban markets, particularly the Praia Nova landing site on the outskirts of Beira, were relatively well developed, with detailed records of catches, fishers and traders. Although record keeping was not equally formalised in all landing sites, CCPs generally had good knowledge of the number of fishing boats and traders operating in the area. CCPs charged fishers and traders an annual fee for use of the landing site and in certain cases, such as Praia Nova, these fees had been raised in an effort to limit catch effort in the area. At the Njalane landing site about 20 km north-east of Beira, the CCP had also tried to limit fishing pressure. A member of the CCP observed, however, 'we don't allow any more fishers into the area, but the sons of the [registered] fishers also want to fish, so the numbers grow'. Efforts by CCPs to limit catch effort through adjusting fees for migrant fishers, limiting access to new entrants or establishing a closed season are fairly common, but the success of these efforts varies. Certain CCPs approached during the fieldwork indicated that no limits were placed on the entrance of migrant fishers to the landing site as long as the new entrants pay the fees exacted by the CCP. In Mozambique's northern provinces it is common for fishers to leave their home areas to fish along the coast and islands during the dry season (May–November) for periods of time that vary from a few days to a few weeks. Consultations in this area have revealed increasing tensions between local and migrant fishers, particularly as migrant fishers are perceived to use larger boats and nets and, as reported by local fishers during a workshop consultation, 'the outsiders fish non-stop night and day'.[81]

One of the key challenges in the small-scale sector has been the rapid increase in the use of '*chicocota*' nets. These are passive nets which are set in estuaries, relying on tidal flow to drive fish and shrimp into the nets. *Chicocotas* are typically constructed from discarded shrimp nets and consist of sections of netting of ever-smaller mesh size sewn together, often with mosquito netting in the cod-end. Fishing in estuaries is banned by Mozambique's fisheries regulations, yet *chicocotas* are increasingly common due to the fact that the nets are relatively cheap to construct, require little manpower and can be used in estuaries without the need for boats. *Chicocotas* have been seized by fisheries officials, but consultations with fishers indicate that these efforts have been insufficient to curb the

growth of *chicocota* use, often succeeding only in driving *chicocota* fishers to more isolated estuaries. CCPs indicated that they do at times carry out patrols independently of fisheries officials to combat *chicocota* netting and other illegal practices, but claim that confiscating gear is at times difficult, as fishers often claim ignorance of regulations. Moreover, it is often subsistence fishers with very limited resources who engage in illegal practices such as *chicocota* netting or using mosquito nets in estuaries. A CCP member observed that 'we have to be sensitive, even when we find fishers with mosquito nets, we must look at their economic position […] why are they breaking the law? That is why our first priority is education and sensitization'.[82]

THE RELATIONSHIP BETWEEN MOZAMBIQUE'S SMALL-SCALE AND INDUSTRIAL FISHERIES

The development of Mozambique's industrial fishing sector during the 1980s and 1990s was associated with frequent conflict between industrial and small-scale fishers. With the establishment of co-management structures and more frequent engagement of fisheries officials with small-scale fishers in the 1990s, one of the key issues raised by fishers was the encroachment of industrial shrimp trawler vessels near shore, competing with stocks targeted by small-scale fishers and causing damage to their nets. The establishment of an exclusive zone for small-scale fisheries within three miles from shore was an important step in addressing the conflict between the small-scale and industrial fishery sectors, yet allegations of encroachment remained common, due in part to the limited monitoring

A CCP meeting in Vilankulo, adjacent to the Bazaruto Archipelago

Fisheries officials display chicocota nets that have been confiscated from local fishers

capacity of fisheries authorities. In recent years a vessel monitoring system (VMS) has been implemented that allows fisheries officials to monitor the movements of the industrial fleet. Fieldwork interviews in Beira and Maputo indicate that the implementation of the VMS system has largely resolved the encroachment problem, with small-scale fishers and fisheries officials expressing satisfaction with the system.[83]

Although the implementation of a VMS system appears to have resolved the challenge of encroachment by registered industrial fishing vessels, the system is not able to monitor illegal fishing vessels that are not registered with Mozambican fisheries authorities. In the past Mozambique possessed a single patrol vessel, which was primarily used to monitor activities in the prawn fishing grounds. In July 2011 the *Antillas Reefer* was placed into service as Mozambique's second patrol vessel. The vessel had been confiscated in 2008 for illegal fishing, primarily of shark, in Mozambican waters and subsequently refitted to serve as a patrol vessel. Mozambique has also engaged in joint patrols with South African maritime authorities to address illegal fishing in its waters. Although it is extremely difficult to assess the prevalence of IUU fishing in Mozambique's waters, it is widely believed that IUU catches are significant. In 2010 Mozambique's Fisheries Minister, Victor Borges, noted that IUU fishing was estimated to cost Mozambique $30–$35 million per year.[84]

A shrimp trawler leaves port at Beira

TOURISM, CONSERVATION AND SMALL-SCALE FISHERIES IN MOZAMBIQUE

Mozambique is a signatory to the Convention on Biological Diversity, which includes resolutions that promote the expansion of marine-protected areas and the effective conservation of at least 10% of each of the world's marine and coastal ecological regions.[85] Until recently Mozambique's MPAs covered only 3% of its territorial waters, but the establishment of the 10 500 km^2 Primeira and Segundas Islands MPA off the coast of the Zambezia and Nampula provinces in northern Mozambique in November 2012 substantially increased the total area under protection. Mozambique's other MPAs include BANP (1 430 km^2), the Inhaca and Portuguese Island MPA (10 km^2), and Quirimbas National Park (1 522 km^2). The Vilanculos Coastal Wildlife Sanctuary (80 km^2) and the Northern Quirimbas (230 km^2) are privately managed marine conservation areas.

The establishment of MPAs is viewed as an important mechanism for the conservation of Mozambique's marine biodiversity as well as supporting the country's tourism sector, reflected in the fact that the institutional responsibility for creating and managing protected areas belongs to the Ministry of Tourism, through an agency created for that specific purpose, the National Directorate for Conservation Areas.[86] The tourism industry in Mozambique currently employs 42 000 workers and is expected to grow by 6.4% per year over the next 10 years. The link between conservation, tourism and development is emphasised in the Strategic Plan for the Development of Tourism (2004), which states that 'conservation is a valuable and compatible form of land-use that, when correctly administered, provides sustainable socio-economic goods and services for the well-being of communities, contributing to poverty alleviation'.[87]

Despite strong support from government and civil-society organisations (particularly the World Wildlife Fund), reactions among local communities have been mixed. A series of workshops conducted in 2010 to assess community responses to the establishment of MPAs revealed that the key concern of local fishing communities was that the establishment of MPAs would block access to fishing grounds.[88] In the town of Ndelane in southern Mozambique, for example, local communities were critical of MPAs because of negative experiences with nearby protected areas, which are a source of longstanding conflicts over restrictions on resource use, namely Inhaca Island Marine Reserve and the Maputo Elephant Reserve.[89]

A separate review conducted in 2011 noted that the establishment of MPAs in Mozambique had essentially followed a top-down approach with limited community consultation, which had led to conflicts and difficult relations between communities on the one hand and conservation authorities and tourism operators on the other. Despite the fact that communities acknowledged the positive impact of no-take zones in protected areas, such as the increase in size and abundance of fish in adjoining waters, the review noted that communities 'are suspicious about the ultimate goal of these sanctuaries and feel left out'.[90]

Consultations with tourism operators in BANP revealed that significant tensions exist between operators and local fishers. Much of the conflict arises from different perceptions regarding the 'appropriateness' of certain species targeted by the fishers. Fishers widely acknowledged that certain species are protected and recognised the need to avoid capture of these species, particularly dugongs, turtles, dolphins, manta rays and whale sharks. However, tourism operators were also strongly opposed to the capture of

BANP officials request fishers to move outside the park's boundaries

various additional species that were viewed as important from a conservation perspective, particularly sharks, rays, eels and large groupers (especially large grouper species such as potato grouper and brindle bass). There has been little formal engagement among the tourism sector, fisheries officials and the fishing community to resolve these conflicts. Moreover, park officials have undertaken very limited engagement with local CCPs. Fishers reported being uncertain of park boundaries and regulations.

Scenes such as these often cause conflict between small-scale fishers and tourism operators, who have different conceptions of what constitutes appropriate target species for fishing efforts

CLIMATE CHANGE AND FISHERIES LIVELIHOODS IN MOZAMBIQUE

Mozambique ranks third among African countries most vulnerable to climate change, where it is expected to result in more frequent droughts and cyclones, and higher flooding. These hazards will compound challenges for communities largely reliant on natural resources and burdened with chronic poverty and endemic disease.[91] In 2000–01 Mozambique experienced significant flooding, which was estimated to have caused 800 human deaths and over $750 million worth of property damage and directly affected about 4.5 million people.

The government of Mozambique recognises that the country is vulnerable to catastrophes and that the hazards resulting from climate change are some of the factors that aggravate the situation of absolute poverty in Mozambique. The Mozambican government's Five Year Plan (2005–09) placed particular emphasis on the prevention of damage through natural disasters and the implementation of early-warning systems. The country's relief agency, the National Disaster Management Institute, and Mozambique's National Meteorology Institute, are spearheading efforts to establish the New Early Warning System/Warning of Tropical Cyclones in Mozambique.

At the community level, many CCPs have developed simple, cost-effective measures to reduce risk associated with cyclones. For example, in the Beira region most CCPs have implemented a simple flag system (red, yellow or green) to indicate the risk of dangerous weather based on updates received through radio or mobile phone technology. Recent studies have shown that such low-cost responses can have the potential to substantially increase the resilience of communities to climate change effect.[92] The incorporation of climate-related risks in infrastructure planning and zoning of coastal development can also substantially mitigate future climate change vulnerability. It has been noted that Mozambique's road infrastructure in the coastal zone is particularly vulnerable to erosion through flooding and sea-level rise, which impacts the ability of communities to trade and access health and other services. Upgrading the country's road infrastructure will therefore significantly improve the resilience of coastal communities.

In addition to the risk of increased extreme weather events, climate change is also likely to result in other long-term changes that may have significant management implications for small-scale fisheries. Rosendo *et al*. note that stakeholder consultation in Mozambican fishing communities revealed a shift from farming to fishing in response to increasing droughts and lowered agricultural productivity.[93] Moreover, fishers noted a correlation between rainfall patterns and the prevalence of near-shore stocks of small pelagic fish species. During periods of low rainfall, estuaries, which serve as important breeding grounds for a variety of economically important stocks such as shrimps and small pelagic fish, reduce in size and may become blocked from the ocean by sand banks, resulting in poor recruitment and reduced catches. Although adaptation to these processes may be difficult, it is essential that research is conducted to better understand the dynamics of the fish stocks that small-scale fishers rely on and to consider the implication of climate change impacts on the life cycle of these stocks. Strengthening co-management institutions will also allow communities to respond more effectively to the environmental stresses that are likely to emerge as a result of climate change.

POTENTIAL IMPACTS OF MOZAMBIQUE'S LARGE-SCALE EXTRACTIVE INDUSTRIES

The rapid expansion of Mozambique's mineral and energy sectors, particularly the country's coal deposits concentrated in the Tete province and offshore gas reserves, have generated significant investments and raised expectations for rapid economic development in coming years. These developments, however, have also raised concerns regarding the environmental and social impact of large-scale extractive operations and related infrastructure projects. The draft Natural Gas Master Plan for Mozambique Offshore observes that:[94]

> gas exploration interferes with the marine environment and the areas of the Rovuma basin are environmentally sensitive areas with the presence of coral reefs and marine mammals. […] The drilling of wells typically does have adverse effects on local marine resources and increased navigation interferes with the normal movement of marine life.

The Master Plan concludes, however, that environmental impacts can be managed within acceptable levels provided appropriate planning and site selection is done, and enforceable environmental management and monitoring systems are developed and implemented.

Mozambique's Ministry of Coordination of Environmental Affairs (Ministério para a Coordenação da Acção Ambiental or MICOA), through the National Directorate of Environmental Impact Assessment, is responsible for regulating environmental impact assessments (EIAs) in the country. Mozambique's primary environmental legislation, Environment Law No 20/97, requires the licensing of activities that are liable to cause significant environmental impacts, which in turn is dependent on the completion and acceptance of an EIA. The EIA process is set out in Regulations on the EIA Process, Decree No 45 of 2004.

The Southern African Institute for Environmental Assessment observes that although the legal framework for environmental management in Mozambique is relatively well developed, its actual enforcement is still weak due to financial and technical constraints, as well as the large size of the country, which makes close surveillance of the use and management of natural resources very difficult.[95] It appears, however, that MICOA has developed strategies to overcome these constraints. In 2011 MICOA approached the Netherlands Commission for Environmental Assessment for a review of the EIA that had been submitted by Rio Tinto in support of plans to barge coal from its operations in Tete province down the Zambezi river. Among other concerns, the review noted that although the EIA states the majority of local fisher communities have been consulted during the public participation process (PPP), 'these sessions are not clearly mentioned in the PPP, as well as the issues raised and the measures undertaken to take these issues into account'.[96] In March 2012 the Mozambican government rejected Rio Tinto's proposal, citing the potential for environmental damage and a lack of mitigation planning.

In addition to the EIA process, capacity to monitor large-scale extractive projects for potential environmental harm and effectively respond to cases of pollution is often limited. Mozambique's Gas Master Plan proposed an office within MICOA to specifically co-ordinate natural gas-related projects and to be empowered with the tools and resources needed to monitor and enforce the agreed Environmental and Social Management Plans.

Community-based institutions such as CCPs can also play an important role in monitoring and reporting on potential environmental damage, yet their effective participation in such processes will require engagement and training by officials.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

Mozambique has long recognised the importance of small-scale fisheries. State-led efforts to support the sector were initiated following the country's independence in 1975, yet owing to various challenges these efforts achieved limited results and were dismantled during Mozambique's structural adjustment period. The importance of the sector was highlighted in Mozambique's Fisheries Master Plan, which was published just a few years after the end of the civil war in 1992, and the potential of small-scale fisheries and related industries to contribute to poverty alleviation received attention in the country's development plans.

During this period a number of significant achievements were realised. A system of co-management structures has been established. First initiated in the late 1990s through the Nampula Artisanal Fisheries Project, there are currently 600 CCPs along the country's coastline. The CCPs have played a central role in reducing some of the most damaging fishing practices, such as the use of mosquito nets and fishing in estuaries. They have also raised awareness of conservation measures that have been put in place to protect various species such as turtles, manta rays and marine mammals, particularly dugongs.

Mozambique's fisheries management institutions are relatively well developed and include support specifically for the small-scale sector through the Small-Scale Fisheries Development Institute. Fishers have also been supported through a variety of financing mechanisms in order to support improved fishing gears and technologies, such as the more widespread use of motorised boats and improved post-harvest infrastructure, in order to increase efficiency in the sector. The implementation of a three mile exclusive-use zone for small-scale fisheries and the monitoring of the industrial fleet through the VMS has resolved the worst conflicts between the small-scale and industrial fishing sectors. Finally, although significant challenges remain, progress has been made in improving rural infrastructure such as roads and sanitation, which has improved market access and quality of life in fishing communities.

This report has shown, however, that Mozambique's small-scale fisheries continue to face numerous challenges arising both from internal and external socio-economic and environmental dynamics. Although data on the fisheries stocks targeted by small-scale fishers is scarce, fishers themselves acknowledge that catches have declined considerably in recent years. Stocks are threatened by overfishing and illegal fishing practices such as the use of *chicocota* nets in estuaries, but external factors such as pollution, poor land use management practices and climate change also pose significant threats. Management strategies for small-scale fisheries have tended to focus on improving market access and fishing technologies, arguing that these constraints, rather than overfishing, are limiting the ability of fishers and fish processors to escape poverty. Although these interventions can contribute significantly to reducing poverty in fishing communities, overfishing is affecting stock levels and is likely to continue to do so as fishing pressure increases with growing numbers of fishers and improvements in fishing technologies.

Recommendation 1: Reduce illegal fishing practices in the small-scale sector, particularly the use of *chicocota* nets.

Despite the progress made in reducing certain forms of illegal fishing gears, illegal practices still occur in the small-scale sector. The rapid increase in the use of *chicocota* nets in Mozambique's estuaries was highlighted as the key threat to the country's fisheries by most fishers (small-scale and industrial) surveyed during this study. Co-operation between CCPs and fisheries officials is essential if the increase in *chicocotas* is to be halted.

Recommendation 2: Improve financial management to support fisheries co-management and marine conservation.

A lack of financial resources is a common complaint within African fisheries governance institutions at both the national and local level, making it all the more important that financial resources that are generated by the sector are managed efficiently and transparently to ensure that funds reach the intended beneficiaries. Mozambique has provisions to ensure that 10% of fishing licence fees are returned to local communities, yet most CCPs consulted during this study claim that these fees are not reimbursed. A similar situation is found at national parks, where 20% of park fees are required to be provided to local communities and a further 20% to support the park's management. Lack of transparency regarding the distribution of these funds has lead to a breakdown of trust between tourism operators and park officials in BANP and limited the ability of park officials to address illegal fishing in the park's boundaries.

Recommendation 3: Improve information sharing and co-operation between park officials and fisheries communities.

Improved information sharing among fisheries and park officials, tourism operators, and fishing communities is likely to achieve a significant improvement of compliance with park regulations and reduce the pressure on park officials to enforce compliance through patrols and punitive measures, such as the confiscation of fishing gear. Low-cost, simple interventions, such as visibly displaying park regulations and boundaries at CCP offices and major landing sites, would further facilitate compliance.

Recommendation 4: Ensure planned resilience and adaptive governance in fisheries communities.

Mozambique has prioritised disaster risk preparedness, yet existing community structures such as CCPs should be more closely integrated with such strategies. Community support for low-cost adaptation efforts, such as mangrove rehabilitation to combat coastal erosion or the implementation of early-warning systems in coastal settlements, can significantly improve the resilience of coastal communities and infrastructure. Further strengthening community participation in fisheries co-management will also assist communities in managing socio-economic and environmental changes resulting from climate change, for example, by establishing and enforcing local measures to manage fishing pressure when drought forces increasing numbers of people to abandon agriculture and turn to fishing.

Recommendation 5: Ensure effective community involvement and information sharing in EIA processes.

Mozambique's mining and energy sectors have expanded rapidly over the past decade and will continue to grow in the near future. Strong environmental governance is essential to guard against environmental degradation and increased risks of pollution. Community consultation is essential in assessing potential social and environmental impacts. However, it is also important that communities are provided with detailed information regarding the processes related to exploration and exploitation of mineral and energy resources. The use of Portuguese as well as local languages is particularly important in this regard. In addition, institutional capacity should be improved for environmental monitoring and risk mitigation related to pollution. Communities should be provided with training to assist in monitoring and reporting of potential environmental damage related to the large-scale extractive industry and infrastructure investments.

APPENDIX 1:

RECORD OF INTERVIEWS

Stakeholder group	Institution	Title	Name	Date
Government/ multilateral organisations	Fisheries Research Institute	Deputy Director	Paula Santana Afonso	23 February 2012
			Osvaldo Ernesto Chacate	23 February 2012
			Lizette Palha de Sousa	23 February 2012
	National Institute for the Development of Small-Scale Fisheries. National Fisheries Administration	National Director	Tome Nhamadinha Capece	24 February 2012
		Deputy Director General	Maria Ascensao R Pinto	24 February 2012
			Armondo Gumbane	24 February 2012
			Hadiya Musugy	24 February 2012
	National Directorate of Fisheries Law Enforcement	Director	Manuel Castiano	22 February 2012
	National Institute of Aquaculture Development	National Director	Maria Isabel Omar	24 February 2012
	Provincial Directorate of Fisheries – Sofala	Director	Jaoa Duarte	3 July 2012
		Fisheries Inspector	David Pinalonga	3 July 2012
			Sergio Maimies	3 July 2012
	Bazaruto Archipeligo National Park	Fisheries Inspector	Mangave	8 July 2012
		Head of provincial Fisheries Law Enforcement	Cassamo Hassane	9 July 2012
		Deputy Chief of Fisheries Research Institute (Beira)	Clark Mauende	9 July 2012
		Head of provincial Small-Scale Fisheries Development Institute	Antonio Renedo Aguste	10 July 2012

Stakeholder group	Institution	Title	Name	Date
Government/ multilateral organisations	Bazaruto Archipeligo National Park	Director	Luis Dos Santos Namanhe	11 July 2012
		Tourism and marketing	Bendito Banzi	11 July 2012
		Ranger	Zacharias	9 July 2012
	Provincial Agricultural Department – Fisheries Officer. Maritime (Beira office). FFP (Beira office)	Fisheries officer	Jossua	12 July 2012
			James	12 July 2012
			Sandra	12 July 2012
			Andre	12 July 2012
Donors/ embassies	International Fund for Agricultural Development (IFAD)	Country officer	Custudio Mucavel	22 February 2012
	Norwegian Embassy		Clarise Barbosa	22 February 2012
Private sector	Casa Rex	Marine biologist		9 July 2012
	SOPESRAL (small-scale fishing company)		Satar Daudo	5 July 2012
	Recanto de Chiloane (semi-industrial)		Dilip Ramgi	5 July 2012
	Cipesca (industrial fishing company)			5 July 2012
	Pescas Mario Adamo Daudo (semi-industrial fishing company)			3 July 2012
	Sail Away	Tourism operator	Dave	9 July 2012
	Odyssey Dive	Tourism operator	Sabrina	10 July 2012
	Marlin Lodge	Charter fishing operator	Jayson	9 July 2012
	Big Blue	Charter fishing operator	Morgan	11 July 2012
	Endangered Wildlife Trust		Karen	8 July 2012
	Care		Hessen	11 July 2012
	IESE		Rogerio	21 February 2012
Civil society/ community	Private fishers – Vilanculos			9 July 2012
	Njalane CCP			3 July 2012
	Praia Nova CCP			2 July 2012
	Estoril CCP			2 July 2012
	Regulo Luis CCP			3 July 2012

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South African Institute of International Affairs
Jan Smuts House, East Campus, University of the Witwatersrand
PO Box 31596, Braamfontein 2017, Johannesburg, South Africa
Tel +27 (0)11 339-2021 • Fax +27 (0)11 339-2154
www.saiia.org.za • info@saiia.org.za

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