



# Shallow water shrimp fishery in Mozambique

## Who benefits from fiscal reform?

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Elisio Nhantumbo and Baiba Gaile

Working Paper

May 2020

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**Fisheries; Economics**

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*Keywords:*

Fiscal reform, shallow water shrimp, livelihoods,  
artisanal fishers, equitable benefit sharing

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## Acknowledgments

The authors of this study, undertaken on behalf of IIED, would like to express their gratitude to all of the institutions and individuals who provided the information and data on which the analysis, conclusions and recommendations rest.

Our appreciation is also extended to IIED for stepping forward with this initiative, which we hope will help to inform development policies in Mozambique, particularly those of the fishery sector. The contribution of this study should help to improve policy design that aims to improve the livelihoods of fishing communities, and as a result fight poverty in Mozambique.

Published by IIED, May 2020

Elisio Nhantumbo and Baiba Gaile (2020) Shallow water shrimp fishery in Mozambique: who benefits from fiscal reform? IIED Working Paper, IIED, London.

<http://pubs.iied.org/16670IIED>

ISBN: 978-1-78431-794-2

Printed on recycled paper with vegetable-based inks.

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In Mozambique, fisheries are important to the national economy and individual livelihoods. Shallow water shrimp fisheries (SWSF) provide an important source of income for many coastal communities. Yet the sustainability of SWSFs is under threat due to overfishing, the rapid and uncontrolled expansion of the artisanal fishing subsector, and the use of destructive fishing techniques, coupled with habitat destruction (in particular mangroves) and pollution. This also negatively impacts on the livelihoods of fishing communities and government revenues. Urgent measures are required to halt the depletion. This study analyses current fiscal policies for sustainable and fair fisheries in Mozambique, focusing on small-scale fisheries, particularly shallow water shrimp fisheries. In the SWSF, artisanal fishers are important both economically and socially. The working paper includes a series of policy recommendations linked to fiscal reforms to further support these efforts while promoting environmental goals. The recommendations are grouped into two main areas: equitable fiscal reforms, and expenditures and revenues for sustainable resource management.

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# Abbreviations and acronyms

CCPs	Community fishing councils
Ha	Hectare
IDEPA	National Institute for Fisheries and Aquaculture Development
IIP	National Institute of Fisheries Research
MEF	Ministry of Economy and Finance
MIMAIP	Ministry of Sea, Inland Waters and Fisheries
MIREME	Ministry of Mineral Resources and Energy
MoLE	Ministry of Land and Environment
MT	Mozambique metical (unit of currency)
PCR	Rotating savings and credit
ProAzul	Blue Economy Development Fund
SDGs	Sustainable Development Goals
SWSF	Shallow water shrimp fishery
TAE	Total allowed effort (formerly total allowed catch)
WTO	World Trade Organization

# Summary

In Mozambique, fisheries are important to the national economy and individual livelihoods. About two thirds of Mozambique's population lives in coastal areas, a fifth of whom rely on fisheries for income generation and food security. In 2012, Mozambique's artisanal fishery subsector generated about 355,000 jobs.

Shallow water shrimp fisheries (SWSF) provide an important source of income for significant parts of the coastal population, accounting for 3–5% of the total fisheries harvest. However, the sustainability of SWSFs is under threat. This is due to overfishing, the rapid and uncontrolled expansion of the artisanal fishing subsector, and the use of destructive fishing techniques, coupled with habitat destruction (in particular mangroves) and pollution. This also negatively impacts on the livelihoods of fishing communities and government revenues. Urgent measures are required to halt the depletion.

## Why fiscal reform is needed in the fisheries sector

This study is a diagnostic analysis of fiscal policies for sustainable and fair fisheries in Mozambique, focusing on small-scale fisheries, particularly shallow water shrimp fisheries. It also has a specific focus on the social impacts of fiscal policies, particularly on artisanal fishers. The purpose of this study is to provide an understanding of:

- The current winners and losers of SWSF fiscal policy
- How policy could be reformed for a more inclusive and sustainable fishery, and
- What the distributional impacts of this reform would be.

Fiscal reforms can help stimulate better fishing practises to protect fish resources. The government must also adopt policies that limit harvests to more sustainable levels, include habitat protection and restoration, and improve law enforcement in fisher communities. This should increase revenues both for general government programmes as well as for local development initiatives. However, fiscal reforms must be implemented carefully to avoid negative impacts, including impacts on more marginalised groups such as women, youth and poorer fishers.

Fiscal instruments have unequal impacts across different types of fishers – industrial, semi-industrial and artisanal fishers – and other stakeholders along the value chain. Therefore, we have used a value chain analysis as the basis for this study, using a literature review of secondary sources complemented by interviews with key informants and focus group discussions.

## Main findings and policy recommendations

The analysis in this working paper confirms that in the SWSF, artisanal fishers are important not only economically but also socially. Employment (including for women) throughout the value chain in this fishing subsector is significantly higher than in the industrial subsector. Therefore, support to the artisanal subsector is expected to deliver higher social benefits than to the industrial subsector, at least in the short term.

The following policy recommendations are linked to fiscal reforms to further support these efforts while furthering environmental goals. The recommendations are grouped into two main areas: equitable fiscal reforms, and expenditures and revenues for sustainable resource management.

Many of these interventions go beyond the fishing sector itself and will require close coordination between different stakeholders, such as the Ministry of Sea, Inland Waters and Fisheries (MIMAIP), the Ministry of Land and Environment (MoLE), the Ministry of Mineral Resources and Energy (MIREME) and the Ministry of Economy and Finance (MEF) as well as stakeholders such as the Blue Economy Development Fund (ProAzul), the National Institute of Fisheries Research (IIP), and community fishing councils (CCPs).

## Equitable fiscal reforms

### Reform the discount on fuel tax

This option is likely to have the highest economic, social and environmental impact. The current 50% reduction in fuel tax disproportionately benefits industrial and semi-industrial fishers, not artisanal fishers (as few have boats with engines). It also has negative environmental

impacts and reduces state revenues (estimated at US\$1.1 million in 2018). An in-depth assessment is needed of the impacts of this subsidy, including whether and how best to reduce or even remove it. It could also assess how to ensure the profitability of industrial fishing in absence of the fuel tax exemption.

## Reform subsidies for procuring boats and engines

Subsidies for the procurement of boats and engines for Mozambican artisanal fishers aim to build capacities of the fishers by ensuring that prices are more affordable. However, current tax exemptions have resulted in an increase in fishing effort, putting further pressure on depleted SWSF stocks. Currently, any increase of employment in the fishing stage of the SWSF value chain or increase in fishing effort should not be encouraged.

Although we do not suggest removing this subsidy, a critical assessment is needed of the wider impacts on artisanal fishers in relation to any increased fishing capacity. For example, reforming these subsidies could have a positive effect – such as providing artisanal fishers with affordable fishing gear – if reforms are coupled with strict adherence to the use of legal fishing gear. This could lead to greater benefits for artisanal fishers as well as environmental benefits. For example, the National Institute of Fisheries Research in Mozambique (IIP) recommends two options. One is to increase the minimum-allowed mesh size to limit motorised artisanal fishers to catching fish only (not shrimp). The other is to impose requirements similar to those for semi-industrial shrimp fishing (duration of seasonal closures, fishing to a maximum distance from the coast and limiting the total allowed catch).

## Modify tax exemptions for imported inputs

There are significant opportunities to increase employment in the pre-harvest and post-harvest stages of the SWSF. Currently, local employment to produce fishing inputs is limited. To boost the local supply of fishing inputs, the government could review the current tax exemptions on imported inputs in a way that favours supplies that could be produced locally. However, any measures should not result in the reduced accessibility of legal fishing gear and the increased use of illegal fishing gear. In addition, development initiatives could be funded to strengthen the participation of women and youth in pre-harvest and post-harvest stages of the SWSF value chain, for example supplying ice and packaging produce.

## Encourage increases in payments for artisanal fishing licences

Many artisanal fishers do not possess proper fishing licences, so there is significant potential to increase government revenues through better collection of licence payments (estimated at around US\$48,000) without increasing licence fees. Evidence shows that government campaigns encouraging artisanal fishers to apply for a fishing licence done in cooperation with district authorities and community fishing councils (CCPs) have a higher success rate. In addition, the government should consider options to simplify the requirements for artisanal fishers to acquire licences (such as being able to pay by instalments). Increased revenues could then be used to fund improved law enforcement and community development.

## Expenditure and revenues for sustainable resource management

### Improve current incentives to reduce shrimp losses along the value chain

Artisanal fishers, including those working in shrimp fisheries, face significant losses of their shrimp catches during the harvesting and post-harvesting stages equivalent to US\$3–4 million. Projects such as ProAzul aim to help fishers and merchants purchase inputs to prevent such losses (such as cooling equipment), which would be particularly important for disadvantaged women merchants or poorer fishers. Such financing schemes should be continued as they are clearly beneficial in terms of environmental and social impacts.

### Channel investment into programmes halting mangrove ecosystem destruction

One of the threats to SWSF stocks is habitat destruction, in particular mangroves, which are an important breeding ground. On average, the value of mangroves for income generation through fisheries could be US\$855/ha, while mangrove destruction leads to an income loss of between US\$1.1 million and US\$1.6 million per year. Causes of mangrove destruction are linked to demands for land, timber and fuel. Poorer members of fishing communities are also likely to be more dependent on mangroves for their livelihoods.

Therefore, the government should increase investment in programmes which address the underlying causes of mangrove destruction and promote mangrove reforestation, such promoting low-cost building materials, and alternative energy and cooking fuels, with a particular focus on poorer and vulnerable community members. This type of intervention could improve shrimp stocks in the long term, with additional economic and social benefits.

### Promote higher local commitment to sustainable fisheries management

The experience of introducing fisheries co-management schemes has highlighted the importance of local engagement and ownership by community fishing councils (CCPs). The government could stimulate this by defining clear rules for the use of funds earmarked for community development, law enforcement and

managing fisheries and implementing these rules accordingly. It is also important to define clear mandates, roles and responsibilities for CCPs in general, and to encourage community-developed management plans such as supporting local job creation (training and initial investments) along the pre-harvest and post-harvest stages of the SWSF value chain. Revenues for these activities should be channelled to the local level. Rules, roles and responsibilities should be clarified in Ministerial Decree 60/2018.

## 1

# Introduction

Mozambique is endowed with innumerable natural resources, both on land and at sea. These two environments house various species of flora and fauna that if utilised sustainably could lead the country and its people towards inclusive growth and sustainable development. However, achieving this goal implies the adoption of an inclusive development approach, where people take ownership of the natural resources through an understanding of the value it represents for national and household economies, while at the same time being aware of its exhaustibility.

Fisheries play an important role in terms of both national economy and individual livelihoods, in particular for those living along the 2,700km of the country's coast (66% of the total population), of whom 20% rely on fisheries for income generation and food security. A significant part (27%) of animal protein intake comes from fish and other marine resources (World Bank 2018). Fisheries are also an important source of revenue and employment. In 2012, Mozambique's artisanal fishery subsector generated about 355,000 jobs (MIMAIP 2013). In 2018, it contributed about 1.2% to gross domestic product (INE 2018) and generated close to 372 million Mozambique metical in revenues through fisheries licensing (MIMAIP 2020), equivalent to more than US\$6 million.

Shrimp capture constitutes 3–5% of the total fisheries harvest (MIMAIP 2017) and is a relatively important export commodity. In the 1980s and 1990s, shrimp was a leading export product. During the last decade, shrimp has lost its importance in the country's economy

to products such as aluminium, electricity, gas and sugar (INE 2018). In 2018, shrimp accounted for 0.88% of total exports, amounting to US\$37 million and was the ninth main export product that year. Apart from the ongoing diversification of the economy, this could also be related to the fact that Mozambique's shallow water shrimp fishery (SWSF) is under pressure and overfished.

Overfishing, the use of harmful fishing gears such as mosquito nets, dredging, the rapid and uncontrolled expansion of the artisanal fishing subsector, and the use of destructive fishing techniques, coupled with habitat destruction (in particular mangroves) and pollution are challenges and threats to the sustainability of shallow water shrimp and to the livelihoods of fishing communities, not to mention the impact on government revenues.

Fiscal reforms can help the government to address these challenges facing the fishery sector and shallow water shrimp fisheries. Through fiscal reforms, the government can stimulate better fishing practices that help protect fish resources. Such reforms can help to implement policies that limit harvests to more sustainable levels and include habitat protection and restoration and improve law enforcement in fisher communities. The reforms can be designed in a way that they increase revenues for both general government programmes as well as for local development initiatives. However, fiscal reforms must be implemented carefully to avoid negative impacts, including impacts on women and poorer and more marginalised groups.

## 1.1 Purpose and scope of the study

This study is a diagnostic analysis of fiscal policies for sustainable and fair fisheries in Mozambique, focusing on small-scale fisheries, particularly the SWSF. The SWSF has been chosen as the focus of this study for three main reasons. First, shallow water shrimp is an important source of income for significant parts of the coastal population. Second, shallow water shrimp shows clear signs of being overexploited and urgent measures are required to halt the depletion. Third, shrimp is intimately linked with the 'way of life' and image of Mozambique both locally and internationally and is promoted as a tourism attraction.

The purpose of this study is to provide an understanding of:

- Who the current winners and losers are of SWSP fiscal policy
- How policy could be reformed for a more inclusive and sustainable fishery, and
- What the distributional impacts of this reform would be.

Fiscal instruments are known to have unequal impacts across different types of fishers and other stakeholders along the value chain. Therefore, in order to understand these impacts we have used a value chain analysis as the basis of our analysis.

### 1.1.1 Delimitation of the SWSF

As for shallow water shrimp delimitation, Mozambican fisheries management and statistics classify shrimp in two categories: shrimp (*camarão* in Portuguese) captured in shallow waters, mainly by artisanal fishers, but also by industrial and semi-industrial; and *gamba*, which is a deep water shrimp captured by semi-industrial and industrial fishers and enterprises, and primarily export oriented. This study focuses only on shallow-water shrimp (*camarão*) and not deep-water shrimp (*gamba*).

The study also has a specific focus on the social impacts of fiscal policies. Because of this focus and because of the nature of the artisanal fishing subsector, the study will focus more on this subsector, although as and when necessary we also reflect on semi-industrial and industrial fishers (see Section 2 and Box 1 for descriptions of the main characteristics of the different types of fishers).

## 1.2 Methodology

We carried out a desk-based literature review of secondary sources, including government statistics, research and assessment reports, as well as academic papers, including studies carried out by individuals and organisations working in fisheries or in environment and natural resources protection.

This information was complemented by structured and unstructured interviews with key informants and focus group discussions. The interviews relied on a guiding questionnaire, with open questions that were directed to government officials from the Ministry of Sea, Inland Waters and Fisheries (MIMAIP); Customs and the National Revenue Authority; the Ministry of Economy and Finance (MEF); fisher associations (focus group discussions) and key informant interviews with individuals in the provinces of Maputo, Sofala and Zambezia.

The questionnaire was prepared for a 30-minute interview. However, on some occasions, interviews lasted longer, according to the details needed or the willingness of the interviewees to further elaborate their answers. Focus groups discussions involved on average six people and a specific questionnaire was used. These lasted more than the initially allocated time of 30 minutes. The focus groups consisted of members of community fishing councils (CCPs).

## 1.3 Limitations

One of the main constraints of this study is related to the limited availability of up-to-date data concerning different aspects of artisanal SWSFs, and to the unwillingness of some interviewees (mostly fishers) to provide detailed information. For example, interviewees and focus group discussion participants were more than willing to complain about the cost of fishing licences, but less comfortable discussing the details of selling their shrimp catches.

This study was also constrained by scarcity of data and information in Mozambique, since very few studies are available and those that are rarely focus specifically on artisanal shallow water shrimp fisheries. Instead, these studies examine the fisheries sector as a homogeneous whole. This limited vision of the sector is the main obstacle to decision and policy making with regard to small-scale fisheries, since the poor data can lead to inappropriate policies and management strategies. For example, it would be useful to have detailed information on the fishing efforts for each species for fisheries in general to allow adequate preservation measures to be taken according to each species.

## 1.4 Structure of the report

We start our report by providing background information on key elements of this study: shallow water shrimp fisheries of Mozambique (Section 2) and the fiscal instruments used in shallow water fisheries in Mozambique (Section 3). After that, we discuss which aspects we have found to be most important when analysing the impacts of fiscal instruments on SWSF and why are they important in the Mozambican context (Section 4). We then analyse the impacts of fiscal instruments along the various stages of the SWSF value chain (Section 5). Based on our analysis, we identify the main fiscal, social and environmental opportunities linked to fiscal reforms in Mozambican SWSF (Section 6) and present our recommendations linked to fiscal policy (Section 7).

We have included several appendices, which provide additional details. Appendix 1 lists the people interviewed for this study. Appendices 2 and 3 provide additional background information for sections 2 and 3 (longer-term trends in shrimp captures by industrial and artisanal operators and a list of currently ongoing projects to support artisanal fishers). Finally, Appendix 4 provides explanations for a number of estimates presented in our analysis of the impacts along the SWSF value chain.

## 2

# Characteristics of the shallow water shrimp fishery in Mozambique

In this section, we present a brief overview of the SWSF in Mozambique. We first explain the three main fishing operator types in Mozambique who fish for shrimp. In Section 2.1, we present key statistics of SWSF (such as the dynamics of catches) and the main reasons behind the recent trend in decreasing shrimp catches. After that, we explain the main institutions involved in the management of fisheries (Section 2.2) and the main fisheries management tools (Section 2.3). In Section 2.4 we describe the fisher communities, focusing on the main socioeconomic features. The characterisation of the SWSF and the description of the main fiscal tools in SWSF outlined in Section 3 provides background that will enable the reader to understand the analysis of the impacts of the fiscal tools on SWSF and on fishers (Section 5).

There are three main operator types of commercial fishing in Mozambique and all three fish for shallow water shrimp: artisanal, semi-industrial and industrial (Box 1). The main differences between the three main operator types are related to the means of fishing and how they are regulated. Shallow water shrimp is also fished by subsistence fishers, but due to limited availability of reliable data we have excluded this group of non-commercial fishers from our assessment.

According to IIP (2018), the three fishing subsectors compete for two main shrimp species, *Penaeus indicus* (white shrimp) and *Metapenaeus monoceros* (brown shrimp). The industrial fleet has a monopoly over two nocturnal species that occur in deep waters: *Penaeus japonicus-tiger* and *Penaeus latisulcatus-marfil*.

## BOX 1. CHARACTERISTICS OF DIFFERENT TYPES OF FISHERS

**Artisanal fishing:** Fishing is carried out using simple means, either with or without a vessel (motorised or non-motorised). The boat is less than 10 metres in length and the gear is operated manually. Only about 5% of artisanal fishers use motorised boats (IDEPA 2019). Simple systems are used to conserve fish aboard (sun protection and ice). Artisanal fishing is limited to 3 nautical miles from the coast and administrative licensing requirements are relatively simple. Fishers mainly use a type of net known as a beach seine. It is used to catch fish and shrimp is mostly harvested as a bycatch. The nets tend to have small meshes and some are made from stitched-together mosquito nets (illegal but still widely used). The catch is usually landed at beach sites and is mostly consumed locally.

**Semi-industrial fishing** is carried out using motorised fishing boats (350hp or 259Kw) using

long-line or hand-line gear, bottom trawling and mechanical trawling, encircling, and other authorised fishing methods. Generally, fish are conserved on board using ice or other means. Most of the semi-industrial fishing harvest is sold locally (WWF 2017).

**Industrial fishing** is fishing beyond 3 nautical miles from the coast in the maritime waters of the country or on the high seas with motorised fishing boats (1500 hp or 1110 Kw) using technologically advanced mechanical fishing methods. Fish are processed on board and then conserved by freezing, ice or other means. The harvest is sold mainly to export markets.

Both industrial and semi-industrial fishing are able to target shrimp (with still some by-catch), constituting between 84% and 93% of the shrimp catches (IIP 2017), unlike artisanal fishers, who mainly catch shrimp as a bycatch.

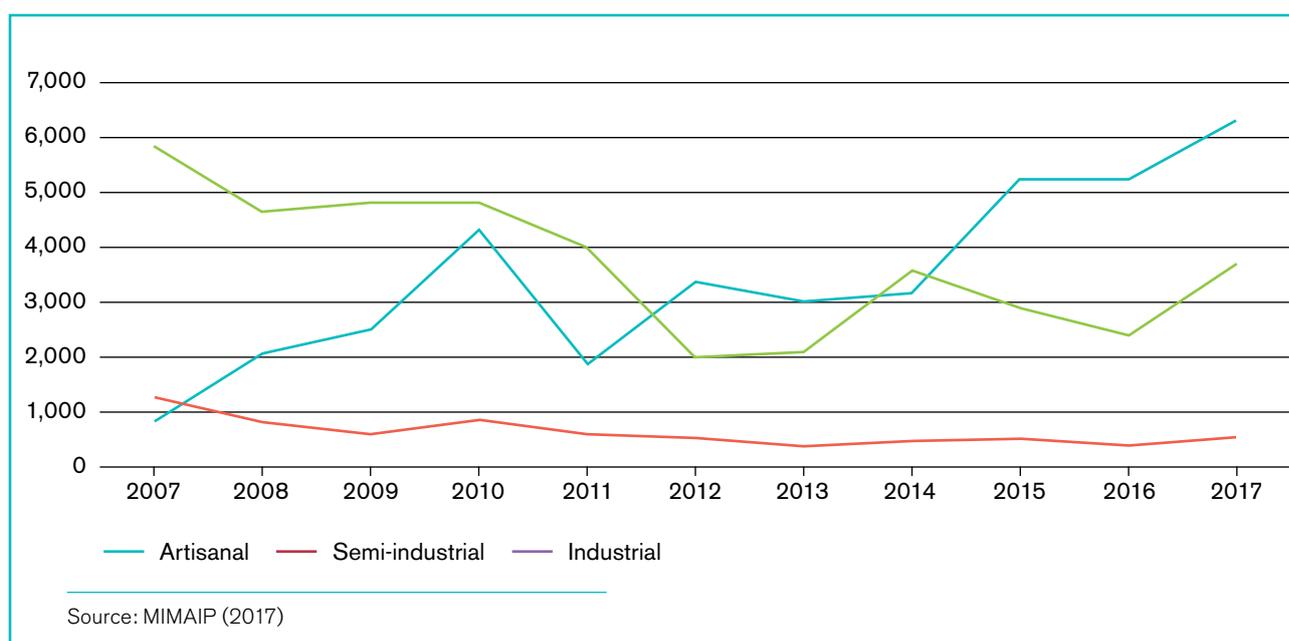
## 2.1 Catches and status of the SWSF

During the period 2008–2017, shrimp captures represented approximately 3–5% of the total fisheries harvest (MIMAIP 2017). Looking at historically longer periods, shrimp captures are declining. For example, along the Sofala Bank (one of the main SWSF areas in Mozambique), catches were around 9,000 tonnes per

year from 2000 onwards but by 2016 had declined to approximately 6,000 tonnes (total by all three operator types), while fishing effort had increased (IIP 2017).

Artisanal fishers harvest a significant share of SWSFs. Figure 1 presents the trend from 2007 to 2017 for shrimp catch by operator type. It shows that shrimp production was led by industrial fishing from 2007 to 2011. Since then, artisanal fishing has taken the lead (see also Appendix 2). Historically, shrimp has not been the main target of artisanal fishers, but rather

Figure 1. Shrimp production by operator type (tonnes), 2007–2017



their bycatch (IIP 2018), until shrimp market prices began to make it an attractive target. The recent increase in shrimp captures by artisanal fishers may be an indication that they are increasingly using fishing gear and techniques that allow them to target shrimp specifically. That has enabled them to catch shrimp for sale rather than just fish for their own and local consumption (IIP 2017).

A recent study by Pereira et al. (2019) on the artisanal fishing subsector in Gaza and Inhambane provinces, Maputo Bay and Sofala Bank indicates that shrimp is overfished and is reaching the stage of exhaustibility. This is also confirmed by research carried out by the National Institute of Fisheries Research (IIP), such as the study of shrimp in Sofala Bank in 2017 (IIP 2017). From these and other sources (for example Wingqvist 2011; WWF 2017; Luis 2011) we can summarise the main reasons behind the decline in shrimp stocks:

- Excessive capacity of the industrial fleet and increasing fishing pressure from the artisanal fishing subsector (linked to the absence of significant livelihood alternatives for coastal communities and an increase in coastal community populations).
- Use of illegal fishing gear (in particular mosquito nets and dredges). Due to the use of nets with small mesh sizes, artisanal fishers tend to catch young shrimp before they are able to move to deeper waters to grow and reproduce. As a result, the number of shrimp able to reproduce is insufficient.
- Destruction of habitats (mangroves in particular), which is a common problem in the major shrimp fisheries: along Sofala Bank and the provinces of Sofala, Zambezia, Nampula, Inhambane and Maputo. Mangrove destruction is driven by a number of factors, including using mangrove timber for housing construction and making canoes, producing charcoal and firewood, and establishing saltpans. Some techniques used by the industrial fishing subsector (such as heavy trawling gear) can threaten deeper water habitats.
- Pollution (industrial, mining, domestic and agricultural).
- Natural disasters and climate change. Droughts may temporarily reduce the areas suitable as habitats for young shrimp and these can even be blocked from the sea by sandbanks. More droughts may also lower agricultural productivity and as a result, farmers may decide to shift to fishing, putting further pressure on shrimp stocks. Climate change is also a major threat to fisher households, particularly those more vulnerable such as rural households. Training will be required for these communities in the use of mitigation and adaptation mechanisms.

## 2.2 Institutional framework in Mozambique fisheries

There are a number of institutions involved in/ responsible for the management of fisheries. While most of the institutions belong to the Ministry of Sea, Inland Waters and Fisheries (MIMAIP), for the purposes of our assessment we have also identified several other important institutions.

**MIMAIP** is the central state body responsible for designing policies and strategies to make fishing activities profitable and sustainable, with economic gains for the country and for individuals engaged in fishing and selling fishery products. The ministry and the institutions that it supervises are represented at the provincial and district level by provincial and district services to enforce fishery legislation, as well as provide the necessary support to fishers and traders of marine products.

Among the various bodies that make up MIMAIP, the following are worth mentioning for their direct support to artisanal fishers:

- **National Fisheries Administration (ADNAP)**, with the mission of contributing to the conservation of living aquatic resources susceptible to fishing through efficient and sustainable management, based on scientific and legal precepts and on the participation of all beneficiaries in order to optimise present and future economic and social benefits.
- **National Institute for Fisheries and Aquaculture Development (IDEPA)**, which promotes actions leading to the development of fisheries and aquaculture, contributing to the improvement of living and working conditions of small aquaculture communities through the production of food.
- **Blue Economy Development Fund (ProAzul)**, which promotes and coordinates the financing of fishing and aquaculture activities considered a priority, so that they contribute to sustainable and rational economic and social development in the country.<sup>1</sup>
- **National Institute of Fisheries Research (IIP)**, which carries out fisheries and agricultural research studies to promote the sustainable development of fishing and aquaculture activities.

<sup>1</sup> In 2019, the government created ProAzul to provide loans to fishers, and particularly to artisanal fishers, who are given special conditions. For example, no warranties are required and there are no interest rates.

The responsibility for licensing and revenue collection from licensing in fisheries falls under different entities according to the territorial unit where the fishing takes place and the type of fishing operator (artisanal, semi-industrial or industrial):

- **MIMAIP** (industrial fishing)
- **Provincial bodies** (semi-industrial fishing, coastal artisanal fishing and recreational fishing)
- **District bodies** (local artisanal fishing)

**Community fishing councils (CCPs)** are community-based organisations comprising of fishers who assist the government in ensuring the sustainable management of fisheries. They also assist with licensing processes and limiting illegal fishing. There has been a shift towards greater decentralisation of local fisheries management and empowering CCPs. However, there are still a number of challenges to be addressed before CCPs can truly lead local fisheries management. For example, the current legislation does not clearly define the role, mandates, responsibilities or rights of these organisations. Meanwhile, the experiences of establishing co-management schemes in Mozambican fisheries highlight the need to clearly outline procedures for community involvement and their legal status for co-managed areas (Jerneck 2019). There is also the possible risk of elite capture of resources at the level of CCPs.<sup>2</sup> One indication of this possibility is the under-representation and very weak organisation of women traders in the CCPs (Brugere 2014).

In addition, there are a number of other bodies whose decisions and policies have a direct impact on SWSF:

- The **Forestry Directorate** of the Ministry of Land and Environment (MoLE) has the primary responsibility for designing and implementing policies for the sustainable management of forests. As such, they are an important player in the protection and restoration of mangroves, an important habitat for shrimp.
- The **National Administration of Conservation Areas (ANAC)** is a state institution responsible for the conservation of biodiversity and the sustainable development of ecotourism in Mozambique. Its tasks include planning, coordination and execution of activities in conservation areas that include marine protected areas, important for protection of marine resources, including shrimp.
- The **Ministry of Economy and Finance (MEF)** guides the formulation of economic and social development policies, coordinates the planning process and oversees the management of public finances and definition of fiscal policies.

- The **National Tax Authority** implements tax and customs policy.

## 2.3 Management of the fishery

In Mozambique, the fishery sector applies mixed management techniques: effort control measures (licences, fishing rights and seasonal closures); catch control measures (individual quotas, fishing gear requirements such as minimum mesh size) and spatial measures (territorial user rights).

As part of the shrimp fishery management, since the 1990s the government of Mozambique has applied seasonal closures. The duration varies from year to year and is based on stock assessments. They have increased from an initial two months to six months in some years. Total allowed catch (TAC) for industrial and semi-industrial shrimp operation licences was introduced in 2012 and modified into total allowed effort (TAE) in 2013 (TAE is based on the length of master cable and the number of days open for fishing) (IIP 2016). The establishment of territorial user rights for fisheries for community-rights-based fishery management is a relatively new initiative, being piloted as part of the South West Indian Ocean Fisheries Governance and Shared Growth Project (SWIOFish) launched in 2015 (World Bank 2018).

Fisheries require comprehensive management plans to assist the sector in dealing with the numerous challenges it faces. The ownership of the management measures adopted by the fishing communities is perhaps one of the most critical elements in the management of fisheries and has the potential to produce positive results. According to the World Bank (2018), drawing on the Mozambique context, CCPs must be empowered to devise and implement their own fisheries resource-management plans. These plans may include definitions of no-take reserves and catch limits, instead of top-down determined closure seasons that local people may feel less committed to.

Fishery resource-management plans must not only focus on fishing activity, but must also aim to diversify livelihoods to divert pressure on the resource. For example, such plans can include training in skills like carpentry, electricity and sewing. Moreover, such measures must prioritise the most vulnerable groups such as women and youth in terms of access to employment outside of fishing.

<sup>2</sup> Elite capture is a situation where more privileged members of a community control the decision-making processes, which allows them to benefit at the expense of other community members. In particular, women and poorer and more marginalised community members are most affected by elite capture. Elite capture poses a risk to the very essence of community management as it triggers corruption, undemocratic and non-transparent decision-making, and prevents achievement of the expected goals of sustainable resource use.

## 2.4 Characteristics of fisher communities

As explained previously, a significant share of SWSF is fished by artisanal fishers. In order to understand the impacts of fiscal instruments on this group (on which our study is focused), we first need to understand who these fishers are and their main characteristics.

According to the 2012 artisanal fishery census (MIMAIP 2013), at that time there were approximately 285,000 artisanal fishers (including those working without boats and as crew members). In addition, the subsector created jobs for almost 67,000 people in producing and repairing fishing inputs and commercialisation. It is likely that these numbers are now higher due to population growth (currently estimated by INE at 2.8% (INE 2020)).

The World Bank describes Mozambique's fishery communities as often being small, isolated and poor. Fisher households consist of an average of five people, in some cases reaching nine or more (MIMAIP/IDEPA 2018a-d), particularly in rural areas of Mozambique.

In terms of schooling, data from the Survey on Fishers and Aquaculture Households (MIMAIP/IDEPA 2018a-d) suggest that a significant proportion of fisher households have not concluded any level of education (55% in Nampula province, 42% in Sofala, 33% in Cabo Delgado and 23% in Gaza) or have completed only primary education (first to seventh grade: between 29 and 48% in these provinces). Only 0.1% of respondents claimed to have a tertiary education degree. The survey points to this low level of education as one of the main challenges facing the fishery sector, because it inhibits fishers from adopting new fishery techniques and technologies to increase productivity.

Looking into the average income and spending of artisanal fishers in the four provinces, it is notable that during the high season, when catches are abundant, the average monthly income is around 37,000 Mozambique metical (equivalent to around US\$610). Monthly spending, mostly for the acquisition of fishing gear, is around 13,000 Mozambique metical (approximately US\$210). This gives a positive balance of 24,000 Mozambique metical (US\$400). Based on these figures, it is fair to conclude that a fisher made a monthly profit equal to nine times the national minimum salary in the fishery sector in 2016–2017 (2,600 Mozambique metical or approximately US\$43).

The yields and incomes reduce during the lower season, probably during the four-month closure season from December to April. The drop in income and spending is consistent with the drop in yields according to the season. On average, during the higher season the average yield is around 564 kg/month per fisher and drops to 163 kg/month in the lower season, causing a reduction in yield of 71% and in income of 60%. The higher season lasts between five and six months and the lower, four to five months. However, according to the same survey this does not lead to a critical situation for the fisher households, because even during the lower season, the monthly net profit (income minus spending) is still approximately 3.5 times above the minimum national salary for the sector set by the government. In addition, fisher households do not rely exclusively on fishing for their income, but also other sources (mainly agriculture).

The most used remuneration modality for crewmembers is payment in specie, where the catch is equally shared (known as the 50/50 modality) between the owners of the means of production (acting as the master) and the crewmembers. In turn, crewmembers share the remaining half according to their internal organisation. According to the 2012 artisanal fishery census, the 50/50 modality represented 43.6% of all forms of income sharing among the fishery communities (MIMAIP 2013). In some cases, a monthly salary is agreed upon. This modality of income sharing among the fishers is mainly utilised in Sofala (30.2%).

Although the main source of income for fishers is fishing (87% of income in 2012), they have alternative sources of income that allow them to cope with the closure season and avoid any loss of livelihood. According to MIMAIP/IDEPA (2018a-d), fishing is the second major activity for fishers and aquaculture households, after subsistence and commercial agriculture. Though women mainly practice agriculture, reaching almost 98% in Gaza province, there is considerable male participation (average 60%). In relation to the seasonal closure of shrimp fishing it should be emphasised that fishers can still catch and sell other marine resources.

In all four provinces, fishing absorbs between 14% in Gaza (lowest) and 22% (highest)% in Cabo Delgado of the total labour force. Almost all fishers are men. Women represent less than 6% (highest in Cabo Delgado) and 1% in Gaza (lowest).

In terms of consumption of fish, 60% of fisher households eat fish from their own catch, 38% buy from the market and less than 1% eat offered or donated fish.

## 3

# Fiscal instruments linked to fisheries management in Mozambique

In this section, we present the fiscal instruments that in our assessment have the highest influence on SWSF and on fishers. An analysis of the impacts will be presented along the analysis of the SWSF value chain in Section 5. Before analysing the impacts, we discuss the main issues we need to consider when analysing impacts of fiscal instruments on SWSF and why are they important (Section 4).

Broadly speaking, fiscal instruments can be linked to how the government collects its revenues (based on what) and how it spends them (for what). We refer to the former group of fiscal instruments as taxes and charges and the latter as subsidies.

**Taxes and charges** refer to an amount of money paid to the government. That could be based on income (for example income tax), or the cost of goods or services bought (for example, value added tax). This group also includes fees paid to the government to cover cost of a certain service (for example, fishing licences) and fines for infringing existing legislation.

**Subsidies** refer to the amount of money given to help or encourage something. It has to be emphasised that in the context of this analysis the term 'subsidy' is used in a much broader sense than when applied in the annual budgets and plans and in the medium-term fiscal framework of Mozambique. Subsidies in fisheries can include:

- Direct payments, including price support, grants, buy-back programmes and income compensation, which increase fishers' income and are paid directly to them.
- Cost-reducing subsidies, including fuel tax exemptions, subsidised loans and tax deductions, which reduce input costs for the fleet.
- General services, including investments in management, research and infrastructure, which reduce capital and operating costs via indirect transfers to the fishing industry (Merayo 2019, based on OECD 2000).

In Mozambique, the fishery sector applies a number of fiscal instruments, as summarised in Table 1.

Table 1. Main fiscal instruments used to manage the fisheries sector in Mozambique

<b>TAXES AND CHARGES</b>	
Fishing licence: commercial fishing	Covers the licensing for artisanal, semi-industrial and industrial fishing, as well as activities related to fishing. Licence fee is based on the gear used and species targeted. Subsistence fishers are exempt from payment of any licence fees but are required to register their gear.
Fishing licence: non-commercial fishing	Covers the licensing for fishing for scientific research, experimental fishing, training, recreation and sports.
Fishing rights	In addition to the fishing licence, industrial and semi-industrial fishing is subject to obtaining fishing rights.
Fines	Imposed for violations of fisheries legislation.
<b>SUBSIDIES</b>	
<b>Direct payments.</b> No evidence found of this fiscal instrument in Mozambique	
<b>Cost-reducing subsidies</b>	
Subsidies for inputs: fuel	Fishers may request a 50% discount on tax for fuel that they use in the process of fishing (different maximum limits are set for different operator types).
Subsidies for inputs/modernisation: ice, gear, vessel construction and engine purchase	Project <i>Mais Peixe Sustentável</i> (More Sustainable Fish), in implementation since 2018, helps fishers to reduce losses (by funding the acquisition of individual and collective freezers to store stocks) and helps them to modernise (by funding acquisition of boats, engines, nets and other authorised fishing gear). The project covers 80% of the costs in the form of a grant, while the fishers are required to pay only 20% and must return their old fishing gear for controlled destruction so that the number of fishers or fishing gear in use does not increase.
Subsidies for inputs: import tax exemption	To increase productivity in agriculture and fisheries, fishing gear benefits from partial or complete exemption from import tax.
<b>Subsidies for general services</b>	
Fisheries-related infrastructure	Investments through state budget expenditure programmes and projects for common infrastructure used by fisheries, including ports and landing sites, fish storage, and modernisation of markets.
Fisheries management and enforcement	Investment and current expenditure for law enforcement and sector management, including resource protection and marine protected areas.
Research	Investment and current expenditure for fisheries-related research

Source: compiled by the authors

In addition to these sector-specific instruments, the fisheries are linked with a number of other fiscal instruments applied in Mozambique, most notably income tax (*imposto sobre o rendimento de pessoas singulares* or IRPS) and corporate income tax (*imposto sobre o rendimento de pessoas colectivas* or IRPC).

The market fees, waste management fees (managed at municipal level) and other similar instruments are not included in this assessment because we consider them to have relatively less impact and the information required to analyse them is too scarce.

## 4

# Development, poverty reduction and fiscal instruments in Mozambican SWSF

As explained in Section 1, we sought to understand the current ‘winners and losers’ of fiscal policy in the SWSF and how policy could be reformed for a more inclusive and sustainable fishery. Fiscal instruments are known to have unequal impacts across different types of fishers and other stakeholders along the value chain. They also have different impacts on different priorities linked to economic development and poverty reduction (which sometimes may even be contradictory). Therefore, before analysing impacts, we need to have a common understanding of the main aspects that we need to pay attention to. How can fiscal reform be used to optimise the balance among the different priorities and different interests of different stakeholders? In this section, we present the main arguments that will form the basis of our analysis in Section 5.

Mozambique has committed to greening its economy as evidenced by the adoption of the Green Economy Roadmap for Mozambique (Republic of Mozambique 2012) and by committing to the implementation of

the Sustainable Development Goals (SDGs). These commitments include, among others, the conservation and sustainable use of the oceans, seas and marine resources (SDG 14). There are significant ongoing reforms in the Mozambican fisheries sector aiming to enhance its performance and increase its contribution to poverty reduction, food security, employment and inclusive growth. These reforms cover a range of areas such as legislation<sup>3</sup> to strengthen fisheries governance and sustainable management; improving access to financing for modernisation and improving the business climate to engage more with the private sector; and linking sustainable community fisheries to markets. They also intend to promote inclusion and ownership among fishing communities through co-management schemes.

Fighting poverty using wealth generated from fisheries raises the question of who should benefit. Only those who exploit these resources or live in the vicinity, or the wider population? The answer will have direct influence on where poverty reduction investments are

<sup>3</sup>In 2017 the fishery law was updated to adjust to the new fisheries challenges, among them the need for sustainable fisheries in the context of the ‘blue economy’.

directed and how effective they are. In the Mozambican fiscal system, the government collects revenues from fishers, (individuals or companies) and redistributes them in terms of priority interventions. The challenge to be addressed lies with collection and distributive mechanisms and to what extent they ensure inclusion.

Bostock et al. (2003a and b) indicate that there are three key ways that poverty can be reduced:

- Broad-based economic growth may reduce the poverty gap across the board
- Increased wealth and income may be redistributed to reduce the gap between the rich and the poor elements of society, or
- Targeted investments may be made in areas where the main beneficiaries are known to be poor.

The latter option is likely to be more effective in addressing poverty among fishing communities, since it attempts to shift away from supply-side policies. Therefore, revenues generated by the sector should at least partly be reinvested to reduce poverty by enhancing the current low capacity to generate income through profitable participation in the entire value chain. For the same reason the mechanisms used for SWSF revenue collection should be such that they do not create obstacles to (or rather even stimulate) income generation through profitable participation in the entire value chain.

Also, poverty alleviation programmes in fisheries should consider other income-generation activities and abandon the assumption that the poor must be helped to become better exploiters of fisheries resources. This is particularly important in light of the fact that shallow water shrimp is overexploited and any increase

in harvesting may have a devastating effect on this resource. At the same time, population numbers are growing, including in coastal areas. A better way to help the poor may not be for them to become better fishers, but to use the wealth of the fishery to create alternative employment opportunities for them.

The experience of introducing co-management schemes in the management of local fisheries indicates that the households need support to diversify livelihoods through initiatives such as savings clubs, matching grants and vocational training like carpentry, electricity and sewing. These activities not only improve living standards at household level, but also reduce pressure on fisheries resources. These activities would need to pay particular attention to the needs of more vulnerable groups such as women and youth who often lack employment opportunities.

Another option to reduce poverty using fisheries is through the reallocation of use rights and adopting a co-management system where use rights are devolved to fisher organisations (de Soto 2000; Bostock et al. 2003a, b). Mozambique has recently begun piloting such schemes.

Subsidies, though a strategic fiscal tool to promote economic growth, need to be scrutinised from time to time in order to verify whether they serve their intended purpose or are causing adverse effects. As described in the Section 3, the SWSF subsector benefits from a number of subsidies. While the aim of these subsidies is definitely noble, they do not necessarily bring the desired economic results and may have adverse social and environmental effects. Merayo et al. (2019) divides subsidies into 'good' and 'bad' subsidies according to the impact they can have over fisheries (see Box 2). In

## BOX 2. WHAT IS THE PROBLEM WITH FISHERIES SUBSIDIES?

Global marine fisheries are in crisis. As many as 90% are fully fished or overfished. Yet many governments have allocated capacity-enhancing subsidies to the fishing sector, encouraging further overfishing, which places fish stocks at even higher risk and threatens the livelihoods and food security of millions of people.

The World Bank and the Food and Agriculture Organization of the United Nations (FAO) estimate that reducing overexploitation could increase the benefits from global fisheries by between US\$53 billion and US\$83 billion annually. In comparison, global fisheries subsidies in 2018 reached US\$35.4 billion, of which capacity-enhancing subsidies accounted for US\$22.2 billion.

Negotiations are currently underway at the World Trade Organization (WTO) to prohibit harmful

subsidies or economic incentives that contribute to overfishing and overcapacity. Fisheries subsidies have become a specific target of the United Nations 2030 Agenda for Sustainable Development.

Specifically, Target 14.6 states the intention to 'By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognising that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation'.

Sources: Arthur et al. (2019), World Bank (2017), Sumaila (2019), Merayo (2019).

fisheries, subsidies are 'good' when they have positive externalities such as the enhancement of resource management capacity and sustainability (eg, monitoring, enforcement, stocks).

Therefore, in order to analyse the impacts of fiscal instruments in Mozambican SWSF, we can say that a subsidy is beneficial when it enhances shallow water shrimp management capacity and sustainability, and when it is socially just and contributes to improvement of living conditions for those who are less-well off along the SWSF value chain. On the other hand, we can say that a SWSF subsidy is 'harmful' if it has a negative impact on fish stocks and therefore on the economy of the fisheries and other related sectors and if it has negative impacts on social groups who are currently less advantaged along the whole value chain. We can extend the same logic to analysing the impacts of other fiscal instruments (taxes and fees).

Of course, there always will be a certain level of trade-off between economic, social and environmental goals, which need to be taken into account in any fiscal reform. In order to optimise the trade-offs among these (sometimes conflicting) targets, the government may consider several strategies, such as better pricing of fishery resources (for example, increasing the cost of fishing licences) or taking action to reduce and even eliminate harmful subsidies to halt over-extraction. The decisions on appropriate action need to take into account their impacts on not only the fisheries, but also wider social impacts. For example, increasing fishing licence fees may push fishers into illegal fishing. Therefore, the introduction of measures to reduce the fishing effort must consider alternative livelihood opportunities or compensation packages.

## 5

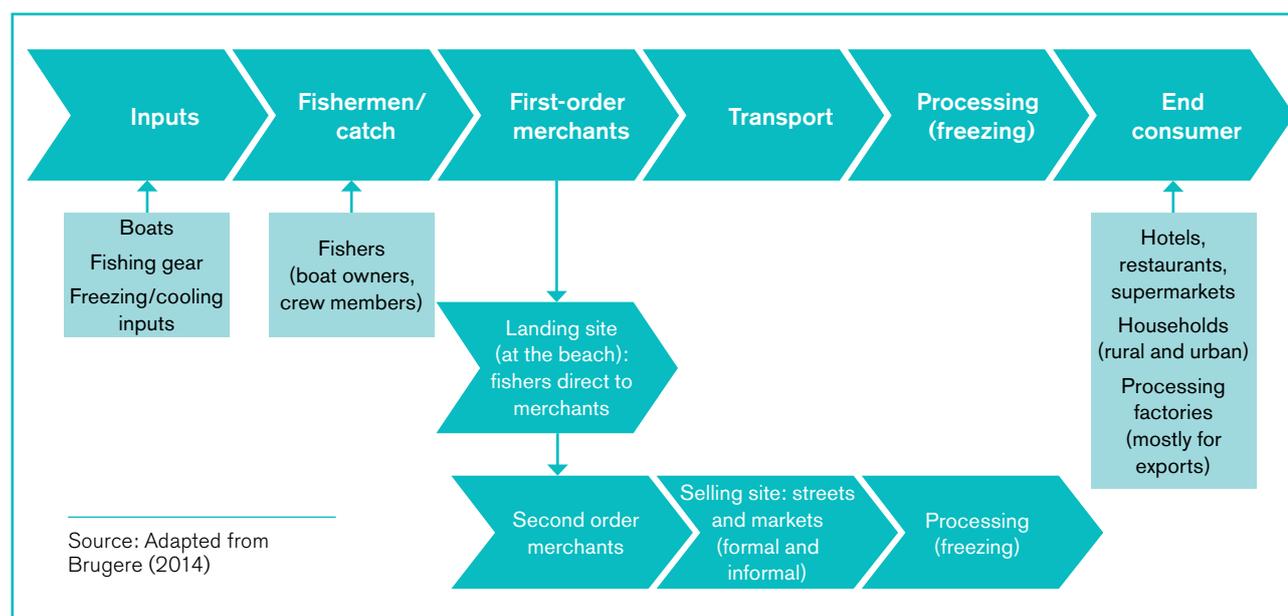
# The SWSF value chain and fiscal instruments

Using the argument and logic explained in Section 4, here we discuss the different impacts of the fiscal instruments on SWSF and on the different stakeholders along the value chain. We first look at the impacts through the main stages of the value chain (Section 5.1 to 5.3). After that, we focus on topics not necessarily linked to any specific stage of the value chain but which are important for SWSF management: shrimp losses along the value chain (Section 5.4), access to finance for the different stakeholders in the value chain (Section

5.5), general services such as common infrastructure used by fisheries, law enforcement, research (Section 5.6) and licensing revenue generation and sharing in SWSF (Section 5.7).

The SWSF value chain starts with inputs (such as boats, fishing gear and other equipment), followed by fishing and then by commercialisation for use by the final consumer. In the following sections, we discuss these stages in greater detail (see also Figure 2).

Figure 2. Artisanal fishing value chain



## 5.1 Inputs for SWSF

The SWSF value chain begins with the **inputs**:

- **Boats:** Mostly supplied locally by naval carpenters, known as *mestres* (masters or experts). For industrial operators, boats are imported. Naval mechanics are engaged in repairing the boats.
- **Fishing gear:** Fishing nets, fishing lines, ropes, buoys, weights and other types of gear are mostly supplied by specialist stores and imported from the European Union, China, United Arab Emirates and Tanzania (IDEPA 2019). There is some local production and repair of sails and nets for artisanal fishers (mostly by sail and net makers at fishing centres or on the informal market) (IDEPA 2019).
- **Freezing equipment and ice:** Information on production and supplies of these inputs was insufficient for the purposes of our analysis.

The data on actual employment at this stage of the value chain are scarce. Using data from the 2012 artisanal fishing subsector census (MIMAIP 2013), we can estimate that naval carpenters constitute around 1% of the total number of people employed through the artisanal fishing subsector, sail and net makers account for around 2% and naval mechanics around 0.1% (see Appendix 4). As revealed in IDEPA 2019, there is a shortage of locally produced supplies of artisanal fishing inputs; this allows us to conclude that the artisanal fishing subsector has the potential to contribute to employment (including among women and youth) in the production of inputs.

The government of Mozambique applies tax exemption for importing inputs and provides project-based support for the procurement of boats and engines under significantly more favourable conditions. The purpose of tax exemption for imports of inputs is to support primary production in Mozambique by ensuring that the prices of production inputs are more affordable. In principle, this instrument is not limited to any specific category of fishers. However, direct access is more difficult for artisanal fishers because they are unable to meet the administrative requirements because of their informal character. On the other hand, when buying inputs from a formal Mozambican supplier, which has imported the supplies, they benefit from this instrument through a price reduction made by the formal supplier. At the same time, the tax exemption for imports of inputs may have an adverse effect by discouraging local production of such inputs. This could be one of the factors contributing to the currently extremely low levels of employment at this stage of the value chain. It should also be observed

that a significant proportion (almost a third) of artisanal fishers still use illegal fishing gear (IDEPA 2019). This suggests the need for increased effort to improve accessibility of legal fishing gear. This also supports the conclusion that artisanal fishers are less likely to benefit from this instrument.

The support to artisanal fishers to procure boats and engines may result in a further increase of the fishing effort and thus also increase the pressure on the SWSF. On the other hand, it can have a positive effect if this can be coupled with strict adherence to the use of legal fishing gear. However, according to IIP (2017), increased use of motorised boats by artisanal fishers (largely due to government support programmes) has already led to undesirable competition for (scarce) shrimp resources between artisanal and semi-industrial fishers. If such support continues, IIP recommends two options. One option is to increase the minimum allowed mesh size to limit motorised artisanal fishers to fishing only fish (not shrimp). The other option is to subject such motorised artisanal fishers to requirements similar to those imposed on semi-industrial shrimp fishing (seasonal closures, fishing to a maximum distance from the coast and limiting the length of the master cable).

## 5.2 Fishing stage of the SWSF value chain

The second stage of the value chain is fishing. Fishers are socially and economically divided into two main groups according to the ownership of the means of production (boats and fishing gear). The first group comprises boat owners with modern fishing gear. The second is made up of fishers who lack the means of production but are knowledgeable about fishery techniques. They are usually employed as crew members by the former group. Using data from the 2012 artisanal fishing census (MIMAIP 2013), we can conclude that most employment is concentrated at this stage of the value chain (some 80%). Using this data and other data on shrimp licensing for industrial fishing operators, we estimate that employment in this stage of the SWSF value chain is noticeably higher in the artisanal fishing subsector than in the industrial fishing subsector (see Appendix 4 for an explanation of this estimate). Most of those employed at this stage of the value chain are men. When it comes to the ownership of fishing gear, men also dominate: they own 98.86% of all fishing gear, with only 1.14% owned by women, putting women in a secondary and dependent role (Brugere 2014).

High production costs are a key concern for fishers, which the government is trying to address through fiscal instruments. Despite the fisheries management measures being implemented, research by IIP (2017) clearly points to the trend of increasing fishing effort per unit of catch among industrial fishers. This is likely to increase the production costs for this operator type. Reduced availability of shrimp is also likely to increase the production costs for artisanal fishers.

In order to reduce production costs, the government has granted fishers a 50% reduction on fuel tax. Currently, and predominantly, only industrial and semi-industrial operators benefit from this fuel subsidy. As only 5% of artisanal fishers use motorised boats (IDEPA 2019) and the requirements for obtaining this subsidy are complex, it remains almost **inaccessible to artisanal fishers**. Research suggests that this subsidy is likely to have negative environmental impacts because it encourages increased fishing activity, placing an even higher pressure on the shrimp fishery that is already being overfished. Fuel subsidies are also linked with higher CO<sub>2</sub> emissions and contribute to climate change. Moreover, this subsidy comes at a cost of lost revenue for the state budget. It has been estimated that in 2018 the cost of this subsidy may have exceeded US\$1.1 million (some 66 million Mozambique metical) (Sumaila et al. 2019).

### 5.3 Post-harvest stage of the SWSF value chain

Before reaching the consumer at the last stage of the value chain, the shrimp goes through first and second order **merchants**. The distinction between the two has to do with where they buy and sell the shrimp.

First order merchants (acting as brokers) normally buy the shrimp fresh directly from fishers on the beach at the landing sites, with pre-order agreements in some cases. Second order merchants buy smaller quantities to resell to both formal and informal markets in the cities. Second order merchants and consumers can buy shrimp directly from the fishers at fishery centres, where accessible due to distance.

We observed interesting dynamics in terms of bargaining power at this stage of the value chain. Those with limited access to resources have weaker bargaining power and we find such actors both among fishers and among traders. For fishers, their bargaining power is reduced when they do not have suitable cooling equipment and access to storage, and therefore they are under pressure to sell to the first buyer. The bargaining power of merchants is reduced when they do not have enough funds to buy larger quantities of shrimp

or to store it properly. This is typically the case with female traders. Brugere (2014) emphasises that access to fish-preservation equipment is more difficult for women because women traders are underrepresented in CCPs (typically run and headed by men). These organisations are also normally responsible for the management of savings and rotating credit. As a result, the trading activity by women (compared to men) is weakened. This makes it almost impossible for them to expand their activity or increase their income.

Shrimp processing in the artisanal fishing subsector is done by both first and second order merchants. It normally consists of freezing and packing the shrimp into small boxes before selling the catch. In the cities of Quelimane, Nampula and Beira along the Sofala Bank, this modality is widespread and normally headed by women. Sometimes before freezing, the shrimp is treated with sodium metabisulfite, used as a preservative and antioxidant.

Brugere (2014) indicates that although Mozambique is a seafood-producing country, the distribution of seafood is limited. She emphasises that the national distribution system, particularly for fresh seafood, is not well developed. Most of the fish harvest by artisanal fishers is distributed close to the landing sites, except for seafood bought by wholesalers with trucks to sell at markets like Maputo.

Using data from the 2012 artisanal fishing census (MIMAIP 2013), we can estimate that this stage creates between 5 and 10% of the total employment in artisanal SWSF (see Appendix 4). We could not source data on employment through commercialisation in industrial shrimp fisheries. However, most of the produce is immediately frozen and packed on board ships for export, so it is reasonable to assume that employment generated through the commercialisation of shrimp in the industrial subsector must be significantly lower than in the artisanal subsector.

Though the markets for shrimp are mostly informal, there are also formal markets in the so-called '*casa de peixe*' or fish houses whose core business is selling seafood. Women visibly dominate informal markets, but in formal and more structured markets, both women and men play an important role. The final consumers include hotels and restaurants, supermarkets and individuals as well as shrimp-processing companies that mainly buy shrimp from artisanal fishers to process for export.

The export of shrimp is currently not subject to any export surcharge (as is the case with cashew nuts and unprocessed wood, for example). The introduction of such a surcharge has the potential to generate additional revenues. However, such a surcharge may have a negative impact on more vulnerable workers employed in the industrial subsector and possibly also

on artisanal fishers. Mozambique is a relatively small player in the global shrimp trade and therefore it is not able to 'dictate' global prices. This means that the costs of an export surcharge would not be passed on to the final consumer in the export country, but would rather push down the prices of shrimp in Mozambique. If we look at the power distribution among the 'players' in the industrial fishing subsector of Mozambique (the main subsector producing shrimp for exports), then less-educated (and lower-paid) crew members will have significantly reduced bargaining power compared to, for example, boat owners. This means that any reduction in prices will also have an impact on them (for example, by reducing salaries which are already low). Similar dynamics are likely to take place in factories buying shrimp for processing for exports from artisanal fishers. In addition, the introduction of such a fiscal instrument will inevitably create an additional administrative burden with associated costs.

## 5.4 Losses along the SWSF value chain

Although no specific assessments are available for losses along the SWSF value chain, our interviews suggest that the losses of shrimp in the fishing and post-harvest stages could reach up to 25%. This is a significant amount; using the available statistics of the current shrimp catches we can estimate that this leads to the loss of more than 1,500 tonnes of shrimp per year (based on data for 2017 from MIMAIP 2017), equivalent to 252 million Mozambique metical or between US\$3 and 4 million. Assuming that investments to increase the availability of cooling equipment and inputs could reduce these losses from 25% to 10%, this would increase the value generated by this subsector significantly. Only accounting for shrimp, it would constitute some 150 million Mozambique metical (more than US\$2 million). See Appendix 4 for the explanation of these estimates.

## 5.5 Access to finance

The main source of funding for artisanal fishers are friends, neighbours and parents (62%), followed by microfinance institutions and state institutions (MIMAIP/ IDEPA 2018a-d). Fishery activities are also funded by government and non-governmental organisations (NGOs). The government's Fishery Development Fund (FFP) is used by 33% of fisher households, while another 30% use District Development Funds (FDDs). Alternatively, fishing communities have their own self-funding systems, such as the rotating savings and credit (PCR) system. With PCR, fishers make monthly

savings over 12 months, after which they can take out a small loan. However, in most cases this is not enough capital to start a viable business as the loan must be repaid in two to three months. Brugere (2014) indicates that it is more problematic for women to access these funds because they have difficulties in making monthly savings and because of their weaker decision-making position in PCR systems. Access to PCR groups is also particularly difficult for rural and poorer traders.

Recently, the government established ProAzul to promote and coordinate financing for fishing and aquaculture activities it considers a priority, to enable these activities to contribute to the economic and social development of the country in a sustainable way. It is expected that once it becomes fully operational ProAzul will improve access to finance for artisanal fishers.

## 5.6 General services in the SWSF

As presented in Section 3, the government uses a number of fiscal instruments aimed at providing general services required for better operation of the sector. These include subsidies to support the establishment/modernisation of common infrastructure used by fisheries, including ports and landing sites, fish processing and storage, and markets; investment and expenditure for law enforcement and sector management; and investment and expenditure for fisheries-related research. Expenditure under these subsidies for 2018 is summarised in Table 2. This type of support is undoubtedly important for the long-term sustainability of SWSF. But to ensure that artisanal fishers benefit from this support for modernising infrastructure, these support programmes must take into account the specific needs of artisanal fishers. In addition, keeping in mind the current significant losses in the SWSF, investments in fish storage facilities and the modernisation of markets have the potential to improve the sector's performance and the status of fishers and merchants.

Despite mangrove destruction having a significant impact on the performance of SWSFs, we found little evidence of significant interventions to reduce mangrove destruction or support restoration. Investments in these types of interventions could potentially have important positive environmental and social impacts. Nhabinde (2013) estimates that the average value of mangroves for income generation through fishing could be in the range of US\$855/ha, while mangrove destruction leads to an income loss of between US\$ 1.1 million and US\$ 1.6 million per year for artisanal fishers. In addition to fisheries, mangroves perform other important ecosystem services, for example the protection of coastal villages

Table 2. Subsidies for general services required for optimum operation of the fisheries sector (2018)

SUBSIDY TARGET	EXPENDITURE (US\$ THOUSANDS)	EXPENDITURE (MT THOUSANDS)
Common infrastructure (ports)	11,923	716,339
Common infrastructure (processing and storage)	383	23,030
Law enforcement and fisheries management (including Marine Protected Areas)	14,529	872,883
Fisheries related research	525	31,553

Source: Sumaila et al. (2019)

from floods and storms. Poorer members of coastal communities are likely to be more dependent on these ecosystem services.

## 5.7 Revenues from fishing licences and revenue sharing

Fishing licences and fishing rights are key tools that the government can use to regulate the fishing effort in SWSF. In addition, they generate revenues. Depending on the type of gear used, the values for artisanal marine fishing licence fees range from 410 Mozambican metical (approximately US\$7) to 108,000 Mozambican metical (approximately US\$1,800). The national industrial, semi-industrial and artisanal licences generated a total revenue of close to 305 million Mozambique metical in 2018 (approximately US\$5 million) and almost 400 million Mozambique metical in 2019 (approximately US\$6.3 million) (MIMAIP 2020). According to the provisions in the Ministerial Decree 60/2018, these revenues are supposed to be shared among different levels and for different purposes (Republic of Mozambique 2018; see also Figure 3).

As Figure 3 shows, licence payments have the potential to generate additional resources at the local level (districts and fishing communities) and for the management of fisheries (including SWSF). Our estimates on these revenues are presented in Table 3.

According to the available information, transfers to the local level are not yet being implemented. The reasons are not fully clear but could be due to the lack of clear implementation modalities. This may discourage CCPs from playing a more significant role in the management of local fisheries.

The estimated revenues could be increased further without increasing the licence fees but by increasing the payment rates instead. An assessment of artisanal fishing in Sofala Bank (IDEPA 2019) suggests that only 50–70% of artisanal fishers possess a fishing licence. The main reasons cited by the fishers are related to incorrect assumptions about their duty to obtain such licences and financial constraints. Assuming that the number of fishers with licences could be increased to for example 90%, we can estimate that the revenues from artisanal fishing licensing could be increased by some 3 million Mozambique metical (US\$48,000). To increase licensing rates in the artisanal fishing subsector, MIMAIP is leading regular licensing campaigns throughout the country.

Interestingly, the experience indicates that the strong engagement of district authorities and CCPs in MIMAIP's licensing campaigns have had substantially higher success rates than those that do not engage local stakeholders (MIMAIP 2020). This is an example of the positive impact of engagement with and ownership by local CCPs. The ownership by CCPs is likely to increase if clear 'rules of the game' are created in terms of the roles and responsibilities of CCPs, as well as their rights and income. In relation to the latter, Ministerial Decree 60/2018 (which establishes the percentage of revenues shared from artisanal licensing) is not clear about exactly who will be the recipients of funds earmarked for 'financing of activities of fishing communities in the respective district' nor how decisions will be made about the use of these funds (Republic of Mozambique 2018). This ambiguity may lead to future conflicts. Similarly, conflicts may arise in relation to the uses of revenues earmarked for law enforcement and the development of fisheries. As fisheries management functions are being decentralised, transparent rules should be developed and implemented relating to the use of these funds (outlining who will make what decisions, with clear accountability).

Figure 3. Sharing of revenues from licensing and fishing rights

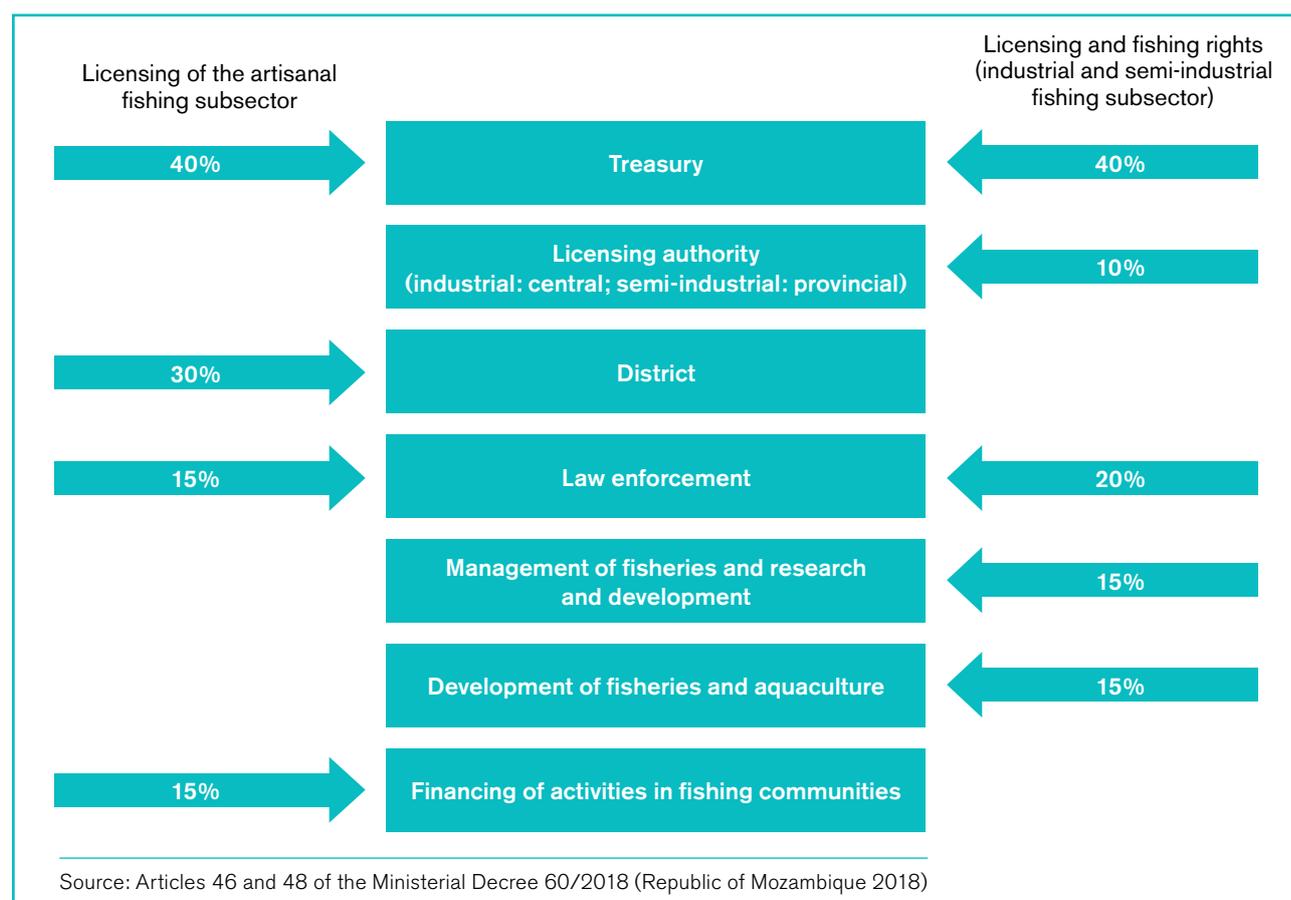


Table 3. Estimated revenues at local level (district and fishing communities) and for fisheries management

LICENCE TYPES	REVENUES (MT THOUSANDS)	
	2018	2019
Industrial fishing operators	244,799	326,678
Foreign industrial (tuna)	65,734	16,197
Semi-industrial	54,752	53,685
Artisanal	5,398	11,294
Sports fishing	2,036	2,335
<b>Calculated amounts for use at local level</b>		
For transfer to provinces	5,475	5,368
For transfer to districts	1,619	3,388
For financing fishing community activities in the respective district	810	1,694
<b>Calculated amounts for fisheries management</b>		
Law enforcement	59,910	76,073
Management of fisheries, research and development	44,933	57,054
Development of fisheries and aquaculture	44,933	57,054

Source: Based on MIMAIP (2020)

## 6

# Closing the gap: opportunities linked to fiscal reforms

Our analysis confirms that in the SWSF, artisanal fishers are important not only economically but also socially. Employment (including for women) throughout the value chain in this subsector is significantly higher than in the industrial subsector. Therefore, support to the artisanal subsector is expected to deliver higher social benefits than to the industrial subsector, at least in the short term (see also Box 3). The opportunities described below largely stem from this.

The artisanal fishing subsector presents significant opportunities to increase the employment in the pre-harvest and post-harvest stages of the SWSF. Currently, employment through the production of fishing inputs is very limited. To boost the supply of fishing inputs, the government applies tax exemptions to fisheries inputs. Exemption of import tax for imported inputs currently benefits all operator types and is assessed to be beneficial for fishers and in terms of environmental sustainability as it increases the availability of legal fishing gear. However, it is likely that such exemptions discourage the development of local capacities for the production of inputs. Therefore, a better solution could be to look into the option of gradually removing tax exemptions for the import of inputs for those supplies that could be produced locally.

Special care should be taken to ensure that any such measures do not result in the reduced accessibility of legal fishing gear and the increased use of illegal fishing

gear. In addition, funds could be directed towards development initiatives to strengthen participation of women and youth in pre-harvest and post-harvest stages of the SWSF value chain, for example supplying ice and packaging produce.

The government is also offering a reduction on fuel tax for fishers to reduce production costs. Our analysis suggests that this form of support disproportionately benefits industrial and semi-industrial fishers. First, very few artisanal fishers have boats with engines (only 5%); and second, the administrative requirements are prohibitive for mostly informal artisanal fishers. The subsidy is likely to have negative environmental impacts and would reduce revenues to the state budget (estimated as more than US\$1.1 million or almost 71 million Mozambique metical in 2018). Therefore, we conclude that there is a need for an in-depth assessment of the impacts of this subsidy, on the feasibility of reducing or even removing it, and the optimal way of doing so.

Such a study could also assess how to ensure the profitability of industrial fishing in the absence of the fuel tax exemption – for example, whether a reduction in the number of boats licensed for shrimp fishing and the total admitted effort (master cable length) could sufficiently reduce production costs by reducing the fishing effort per unit of catch.

## BOX 3. DO INDUSTRIAL FISHERS CONTRIBUTE MORE TO LOCAL DEVELOPMENT AND POVERTY REDUCTION THAN ARTISANAL FISHERS?

You might assume that because industrial fishing operators are formalised, this subsector should be able to provide a higher fiscal contribution to the state budget and therefore to development objectives. Industrial operators make a substantially higher contribution than artisanal fishers in terms of revenues from fishing licences and fishing rights. In contrast, artisanal fishers and those engaged in production and commercialisation in the artisanal value chain pay little income tax because of their informal character.

However, the answer is not straightforward. First, the artisanal subsector is more significant in terms of employment throughout the value chain. Second, salaries paid to those employed by industrial operators are relatively low, so their contribution to

state budget revenues through income tax are also likely to be low (Ernst & Young 2013). For example, in the four companies surveyed by Ernst & Young (ibid) only 33% of workers paid income tax and none of the companies paid corporate income tax due to recorded losses.

At the same time, industrial operators enjoy substantial subsidies in the form of reduced fuel taxes (estimated to be around US\$1.1 million in 2018 and basically not available to the artisanal subsector) as well as import tax exemptions for imported inputs. If the fuel-tax subsidies and import tax exemptions were revised, could the revenues raised be spent on other programmes with a higher poverty reduction impact?

Artisanal fishers, including those working in shrimp fisheries, face significant losses during the harvesting and post-harvesting stages equivalent to 252 million Mozambique metical (US\$3–4 million). The government is implementing a number of projects and has established ProAzul to help fishers and merchants to purchase the required cooling equipment and inputs. A significant proportion of merchants in the artisanal fishing subsector are women who are currently less advantaged, partly because of the difficulties they face in accessing funds to obtain better cooling/storage equipment. Another less-advantaged group are poorer fishers who lack cooling/storage equipment, which places them in a very weak position when negotiating sales of their catches. Therefore, we conclude that these and other favourable financing schemes that improve access to and use of cooling/storage equipment should be continued. Special attention should be paid to the needs of women traders. Such measures are clearly beneficial both in terms of environmental and social impacts.

Payment rates for artisanal fishing licences are noticeably low; an increase in these rates could generate additional revenues for the national treasury and for law-enforcement and local development initiatives without increasing licence fees (estimated additional revenues are in the range of 3 million Mozambique metical or US\$48,000). MIMAIP is implementing annual artisanal fishing licensing campaigns; experience indicates that campaigns implemented in cooperation with district authorities and CCPs have significantly higher success rates. Therefore, we conclude that these positive experiences of close engagement with district authorities and CCPs

should be applied more widely. To ease the financial burden that a once-a-year payment may impose on fishers, the government may consider options to simplify the requirements to acquire licences including licence-payment by instalments.

The higher success rate of licensing campaigns involving the cooperation of district authorities and CCPs is another example of the positive impact of engagement with and ownership by local CCPs. Ownership by CCPs is likely to increase if clear rights, roles and responsibilities are created, including rights to generate income. However, the Ministerial Decree 60/2018 is ambiguous about who should receive the funds earmarked for 'financing activities of fishing communities' and how decisions should be made about the use of these funds (Republic of Mozambique 2018). This may lead to future conflicts once the government decides to initiate the transfers. Therefore, we conclude that there is an urgent need to clarify the Ministerial Decree 60/2018 in relation to recipients of and decision-making processes for the use of these community funds.

To increase the ownership by CCPs, they should play a key role in decision making once their rights, roles and responsibilities have been clarified. As decentralisation of fisheries management is expected to increase, it will be necessary to clarify also the use of revenues earmarked for law enforcement and fisheries development. If CCPs are expected to play an increasing role in performing these functions, it is logical that part of the revenues for these activities should be channelled to the local level.

Artisanal fishers are relatively well-off and do not face substantial financial difficulties during the closure of the shrimp fishing season. Shrimp is not necessarily the main species targeted by artisanal fishers and fisher households are not fully dependent on fisheries and carry out other activities to support their income (mainly agriculture). Therefore, we can conclude that the seasonality of artisanal fishing is not a cause for introducing specific compensatory measures.

However, support to diversify livelihoods for fisher household members through initiatives such as savings clubs, matching grants and vocational training like carpentry, electricity and sewing can be used to address the needs of more vulnerable groups and to reduce pressure on depleted fishing resources. Diversification of livelihoods should not focus on creating alternative employment for the existing experienced fishers, but rather aim to reduce the entry of new fishers (especially taking into account the pressure on the SWSF due to population growth). Therefore, livelihood-diversification activities need to pay special attention to youth and should also pay particular attention to the needs of other more vulnerable groups including women, who often lack employment opportunities.

The export of shrimp is currently not subject to any export surcharge (as is the case with, for example, cashew nuts and unprocessed wood). We assess that the introduction of an export surcharge is not beneficial (at least in short term). First, such a surcharge may have negative impacts on the workers who are less educated and more vulnerably employed in the industrial subsector. Taking into account the limited bargaining power of this group compared to company owners/managers, it is likely that the costs of an export surcharge to industrial fishing companies will be passed onto crew members instead (for example, by reducing their salaries which already are low). Second, the introduction of any new fiscal instrument will inevitably have an administrative cost. In order to increase revenues, it would be more effective to first reduce/remove any harmful subsidies (such as the fuel subsidy) and to improve law enforcement (to increase licence-fee payment rates) and possibly to increase licence fees/fees for fishing rights. These measures taken together are likely to result in higher fiscal and environmental gains and possibly also social gains as compared to the introduction of an export surcharge.

There is little doubt that SWSFs are currently overfished and stocks are under increasing pressure. While a number of interventions can be used to increase stocks, in the short term any increase of the fishing effort should not be encouraged. Therefore, we can conclude that the increase of employment in the fishing stage of the SWSF value chain or increase in fishing effort should not be encouraged. We suggest a critical assessment of the wider impacts of current support for the procurement of boats and engines for artisanal fishers in relation to increased fishing capacity.

While these measures undoubtedly have a positive impact on the well-being of individual fishers who benefit from such interventions, they may push the stocks into further depletion, which would ultimately negatively affect the well-being of fishers as a group. In order to address the negative environmental effect, the suggested assessment should look into different options of how to mitigate such negative environmental impacts in a manner that would still benefit artisanal fishers (for example, by introducing limits such as a largest minimum mesh size or limits to allowed fishing locations).

One of the threats to SWSF stocks is habitat destruction, in particular mangrove destruction. At the same time, mangroves can be seen as the basis of the SWSF value chain. Mangroves produce the single indispensable 'input' of the chain – the shrimp itself. Nhabinde (2013) estimates that on average the value of mangroves for income generation through fisheries could be in the range of US\$855/ha, while mangrove destruction leads to an income loss of between US\$ 1.1 million and US\$ 1.6 million per year. Causes of mangrove destruction are linked to both demand for land and for timber for construction and fuel. Poorer members of fishing communities are likely to be more dependent on mangroves for their livelihoods. Interventions to address these causes of destruction go beyond the fishing sector itself and will require close coordination with the Ministry of Land, Environment and Rural Development (MoLE) (forestry, land-use planning) and the Ministry of Mineral Resources and Energy (MIREME) (energy). Interventions that could be supported by targeted investments could include mangrove reforestation and promoting the use of low-cost construction materials and alternative energy and cooking fuels for communities, with a particular focus on poorer and vulnerable community members.

## 7

# Policy recommendations

Shallow water shrimp fisheries are clearly overfished in Mozambique. This is already having an impact on key indicators of the fisheries sector's performance and is likely to also impact on socioeconomic indicators and the welfare of the local population.

The causes of overfishing of shallow water shrimp lie in different spheres. The most notable ones include overfishing, use of harmful fishing gear, habitat destruction (in particular mangroves) and pollution. The limited capacity to enforce fishing-sector legislation further exacerbates shallow water shrimp depletion. The CCPs, though playing a supporting role to the government in fishery law enforcement, do not seem to be fully motivated to perform the task they have been commissioned with.

The government of Mozambique has embarked on reforming the fisheries sector through various initiatives to improve the sector's performance and bring development opportunities to fishing communities. The following policy recommendations are linked to fiscal reforms within the fisheries sector in order to further support these government efforts while furthering environmental goals. The recommendations have been prepared in response to the opportunities that this study has identified and are grouped into two main areas: equitable fiscal reforms, and expenditures and revenues for sustainable resource management.

## 7.1 Equitable fiscal reforms

The government of Mozambique could consider the following options to reduce the fiscal pressure of the subsidies, while improving social and environmental outcomes.

### 7.1.1 Reform the discount on fuel tax

The government is offering a 50% reduction of fuel tax for fishers in order to reduce production costs. However, this instrument benefits disproportionately industrial operators, because it is out of reach for the majority of artisanal fishers. It leads to lost revenues (in 2018 these may have exceeded US\$1.1 million and close to 71 million MT) and it is likely to have a negative effect on productivity if measured as fishing effort or production per unit of inputs. It is likely to have negative environmental effects. Therefore, we recommend that this discount on fuel tax be reformed.

Our analysis suggests that this option is likely to have the highest economic, social and environmental impact. However, a more in-depth assessment of the effects of the current 50% discount on the fuel tax for artisanal, semi-industrial and industrial fishing operators would be required as well as an assessment of the most appropriate measures (such as abandoning or reducing the rate of exemption coupled with other measures to reduce operating costs, such as reducing the number of boats licensed for shrimp fishing or reduced TAE).

**Responsible:** MIMAIP in close collaboration with industrial operators and MEF.

### 7.1.2 Reform subsidies for procuring boats and engines

Subsidies for the procurement of boats and engines for Mozambican artisanal fishers aim to build capacities of the fishers by ensuring that prices are more affordable. However, current tax exemptions have resulted in an increase in fishing effort, putting further pressure on depleted SWSF stocks. Currently, any increase of employment in the fishing stage of the SWSF value chain or increase in fishing effort should not be encouraged. Therefore, we recommend reforming these types of subsidies.

Our analysis suggests that this option is likely to have environmental benefits. However, the social benefits would depend on how this support would be reformed. Because of social considerations, we do not recommend the removal of this support. Instead, it should be combined with certain conditions for fishers. For example, IIP recommends two options. One option would be to increase the minimum-allowed mesh size to limit motorised artisanal fishers to fishing only fish (not shrimp). The other option would be to subject motorised artisanal fishers to requirements similar to those for semi-industrial shrimp fishing (seasonal closure, fishing to a maximum distance from the coast and limiting the length of the master cable).

**Responsible:** MIMAIP in close collaboration with IIP and CCPs.

### 7.1.3 Modify tax exemptions for imported inputs

There are significant opportunities to increase employment in the pre-harvest and post-harvest stages of the SWSF. Currently, local employment to produce fishing inputs is limited. To boost the local supply of fishing inputs, the government could review the current tax exemptions on imported inputs in a way that favours supplies that could be produced locally. Our analysis suggest that this option could have positive social impacts in terms of local employment. However, it should be implemented with great care to ensure that any such measures do not result in the reduced accessibility of legal fishing gear or the increased use of illegal fishing gear. Therefore, we would recommend to first undertake an in-depth study of economic, social and environmental effects of gradually reducing or removing import tax exemptions on selected fisheries inputs (those that can be produced locally) and how this could be compensated through local production of the respective inputs.

**Responsible:** MIMAIP in close collaboration with the private sector, industrial, semi-industrial and artisanal operators, MEF and the National Tax Authority.

### 7.1.4 Encourage increases in payments for artisanal fishing licences

Many artisanal fishers do not possess proper fishing licences, so there is significant potential to increase government revenues through better collection of licence payments (estimated at around US\$48,000) without increasing licence fees. Part of this increase in revenue could be used to fund improved law enforcement, as well as activities at the level of respective districts and fishing communities. Evidence shows that government campaigns encouraging artisanal fishers to apply for a fishing licence done in cooperation with district authorities and community fishing councils (CCPs) have a higher success rate.

Our analysis suggests that this measure has clear benefits in terms of increasing revenues, as well as resource management and community participation. In addition, the government could consider simplifying the requirements to acquire licences including licence payment methods (payments in instalments). It will be important to closely engage with CCPs if such measures are to be successful.

**Responsible:** MIMAIP, district authorities, CCPs.

## 7.2 Expenditure and revenues for sustainable resource management

Our study confirms the need to continue the various resource-management programmes currently being implemented by the government, such as improving port and storage infrastructure, law enforcement, protected areas and research. Our study shows there are two particular areas linked to fiscal policy for more sustainable resource management along the SWSF value chain: investments to reduce losses along the value chain and investments to halt mangrove ecosystem destruction. Our study also highlights the need to clarify the role of CCPs in general and in managing the revenues from fisheries licensing in particular.

### 7.2.1 Improve current incentives to reduce shrimp losses along the value chain

Artisanal fishers, including those working in shrimp fisheries, face significant losses of their shrimp catches during the harvesting and post-harvesting stages, which are equivalent to US\$3–4 million. Even in the absence of exact data related to shrimp losses along the value chain, our study indicates that simple investments in cooling and freezing equipment could

significantly help reduce shrimp losses after they have been harvested. We estimate the value generated through such interventions could constitute some 150 million Mozambique metical (more than US\$2 million) annually in the artisanal SWSF value chain. This would have a clear environmental benefit. In addition, it would increase the bargaining power of fishers when selling their catch. Therefore, as a way to strengthen more sustainable fisheries management the government could increase its support for investments for this type of equipment. Projects such as ProAzul aim to help fishers and merchants purchase inputs to prevent such losses (such as cooling equipment), which would be particularly important for disadvantaged women merchants or poorer fishers. It is important to focus on the accessibility of such incentives for female traders who are currently less likely to be able to access them. Such financing schemes should be continued as they are clearly beneficial both in terms of environmental and social impacts.

**Responsible:** MIMAIP, ProAzul, CCPs

### 7.2.2 Channel investment into programmes halting mangrove ecosystem destruction

One of the threats to SWSF stocks is habitat destruction, in particular mangroves, which are an important breeding ground. On average, the value of mangroves for income generation through fisheries could be US\$855/ha, while mangrove destruction leads to an income loss of between US\$1.1 million and US\$1.6 million per year. Mangrove destruction is linked to demands for land, timber and fuel. Poorer members of fishing communities are also likely to be more dependent on mangroves for their livelihoods.

To strengthen sustainable fisheries management, the government should increase investment in programmes that halt mangrove destruction. It is important

address the underlying causes that lead to mangrove destruction and promote low-cost building materials and alternative energy and cooking fuels. This type of intervention is likely to lead to the long-term improvement of shrimp stocks with additional economic and social benefits.

**Responsible:** MIMAIP, ProAzul, MoLE (forestry directorate), MIREME, provincial and district administrations, CCPs

### 7.2.3 Promote higher local commitment to sustainable fisheries management

The experience of introducing co-management schemes has highlighted the importance of true local engagement. Engagement is not just about participation, but also about ownership. The government could stimulate a greater degree of ownership by CCPs by defining clear rules for the use of funds earmarked for community development, law enforcement and managing fisheries, and implementing these rules accordingly. It is also important to define clear mandates, roles and responsibilities for CCPs in general, and to encourage community-developed management plans. Once these are clearly established it is likely the revenues shared with CCPs will be used also for locally important activities that in turn will have positive effect on fisheries. For example, this could include supporting local job creation (training and initial investments) along the pre-harvest and post-harvest stages of the SWSF value chain and in areas not related to fishing, such as carpentry, sewing and other activities relevant to the local context. Revenues for these activities should be channelled to the local level. Rules, roles and responsibilities should be clarified in Ministerial Decree 60/2018.

**Responsible:** MIMAIP with district authorities and CCPs

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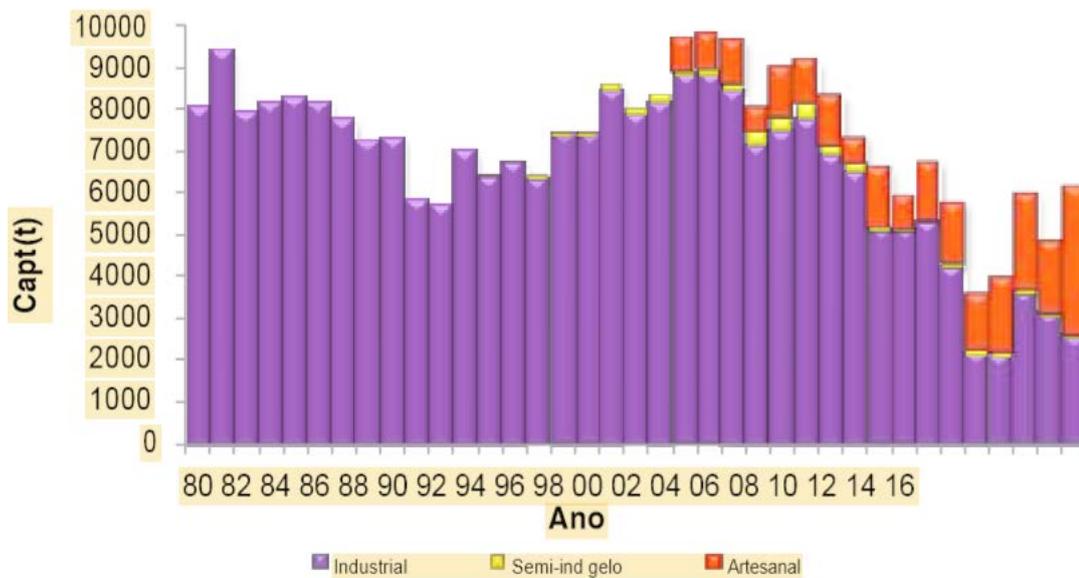
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# Appendix 1. Shrimp captures by type of fisheries

This is an image extracted from IIP (2018) to demonstrate a longer-term trend in shrimp captures by industrial and artisanal operators. The bars represent captures in tonnes for industrial operators (purple), artisanal operators (red) and semi-industrial operators (yellow). The vertical axis represents captures in tonnes. The horizontal axis represents years (1980–2016). Please note there is a shift in the placement of the bars representing the captures and respective years along the horizontal axis.



Source: IIP (2018)

# Appendix 2. Current projects supporting fishers

PROJECT NAME	OVERALL OBJECTIVE
Artisanal Fishing Promotion project (ProPESCA)	Improve income and living conditions for households dependent on fishing by increasing the amount of fish caught and the value of marketed production.
Strengthening Artisanal Fishers' Resource Rights project ProDIRPA (2014–2016)	Contribute to improving living conditions for fishing communities by strengthening security of access and natural resource management through community empowerment in natural resource management, linking natural resource management planning processes between macro and local levels and co-management of natural resources involving stakeholders.
Artisanal fishing and Climate Change project (PPAMC/FishCC): 2015–2019	<p>Strengthen Mozambique's capacity to manage access to fishing resources and reduce poverty for coastal artisanal fishers, with the support of policies and institutions at national, provincial, district and local levels.</p> <p>Demonstrate a scalable (gradual) approach to reducing vulnerability to climate change through improved fisheries and natural resource management.</p>
Strengthening Resilience in Vulnerable Communities in the Coastal Zone in Mozambique project (Projecto de Reforço da Resiliência em Comunidades Vulneráveis na Zona Costeira em Moçambique)	Strengthen the capacity of men and women from local coastal communities and national authorities to sustainably govern and manage their natural resource base as well as strengthen and restore the function and value of coastal and marine ecosystems of goods and services to enhance social, economic and ecological resilience to climate change.

# Appendix 3.

## Calculations and estimates used in this report

This section explains the calculations and estimates presented in this report.

### From Section 5.1

'Using data from the 2012 artisanal fishing census (MIMAIP 2013), we can estimate that naval carpenters constitute around 1% of the total number of people employed through the artisanal fishing subsector, sail and net makers around 2% and naval mechanics around 0.1%.'

### Explanation

	NUMBER*	CALCULATED % OF TOTAL**
Fishers without boats and who are not crew members	128,044	36.35%
People engaged in providing services related to fisheries	66,743	18.95%
Naval carpenters	4,040	1.15%
Merchants (fresh produce)	18,068	5.13%
Merchants (dried produce)	18,380	5.22%
Buyers of shells	633	0.18%
Processors	18,030	5.12%
Naval mechanics	396	0.11%
Sail and net makers	7,195	2.04%
Crew members	157,465	44.70%
Total	352,252	100%

\* Source: MIMAIP (2013)

\*\* Calculated by the authors

## From Section 5.3

'Using data from the 2012 artisanal fishing census (MIMAIP 2013), we can estimate that this stage creates between 5 and 10% of the total employment in artisanal SWSF.'

### Explanation

	NUMBER*	CALCULATED% OF TOTAL**
Fishers without boats and who are not crew members	128,044	36.35%
People engaged in providing services related to fisheries, of which:	66,743	18.95%
naval carpenters	4,040	1.15%
merchants for fresh produce	18,068	5.13%
merchants for dried produce	18,380	5.22%
byers of shells	633	0.18%
people performing processing	18,030	5.12%
naval mechanics	396	0.11%
sail- and net-makers	7,195	2.04%
Crew members	157,465	44.70%
<b>Total</b>	<b>352,252</b>	<b>100%</b>

\* Source: MIMAIP (2013)

\*\* Calculated by the authors

As shrimp is not dried, it is clear that only merchants of fresh produce are engaged in the commercialisation of shrimp. As shrimp processing demands relatively less labour (eg compared to drying fish), we do not have sufficient basis to narrow the percentages specifically related to shrimp processing. Therefore, we put the estimated employment in the post-harvesting stage of SWSF value chain as a range between 5 and 10%.

## From Section 5.2

'Using the data of the same census and the data on shrimp licensing for industrial fishing operators, we estimate that employment in this stage of the SWSF value chain is noticeably higher in the artisanal fishing subsector than in industrial fishing subsector.'

### Explanation

To compare the contribution to employment from these two fishing subsectors, we first tried to attribute total employment to the employment generated through shrimp fishing. To do so, we assumed that employment among artisanal fishers that can be attributed to shrimp is directly proportional to the share of shrimp in the artisanal fishing subsector. For catches, we are using data from the 2012 artisanal fishing census (MIMAIP 2013) because also the data on employment in the artisanal fishing subsector is from 2012 (census).

SHRIMP (T 2012)*	TOTAL CATCHES (T 2012)*	CALCULATED SHARE (%)**
3,360	18,6214	1.8%

\* Source: MIMAIP (2013)

\*\* Calculated by the authors

We then calculated what share of artisanal fishers (both crewmembers and also fishers who do not own boats and are not crewmembers) are 'employed' by harvesting this share of the total fisheries.

	TOTAL*	'EMPLOYED' BY HARVESTING 1.8% SHARE OF SHRIMP IN THE TOTAL FISHERIES**
Fishers without boats and who are not crewmembers	128,044	2,310
People engaged in providing services related to fisheries	66,743	1,204
Crew members	157,465	2,841
Subtotal: crew members and fishers who do not own boats and are not crew members		5,151

\* Source: MIMAIP (2013)

\*\* Calculated by the authors

This brings the total of fishers to more than 5,000. We do not have data on employment in the industrial fishing subsector, but we know that the number of boats licenced for shrimp fishing typically varies at around 50. Assuming a crew of 20 people per boat, it is reasonable to conclude that employment through fishing for shallow water shrimp in the artisanal fishing subsector is substantially higher than the employment through industrial shrimp fisheries.

## From Section 5.4

Although no specific assessments are available for losses along the value chain, our interviews suggest that the losses of shrimp in the fishing and post-harvest stages could reach up to 25%. This is a significant amount; using the available statistics of the current shrimp catches we can estimate that this leads to the loss of more than 1,500 tonnes of shrimp per year (based on data from MIMAIP 2017), equivalent to 252 million Mozambique metical or between US\$3–4 million. Assuming that investments to increase the availability of cooling equipment and inputs could reduce these losses from 25% to 10%, this would increase the value generated by this subsector significantly. Only accounting for shrimp, it would constitute some 150 million Mozambique metical (more than US\$2 million).

### Explanation

	SHRIMP CATCHES IN 2017	CALCULATED LOSSES ASSUMING THE LOSSES ARE 25%**	CALCULATED LOSSES ASSUMING A REDUCTION TO 10%**	DIFFERENCE**
Tonnes	6,295*	1,573	629	944
Value (MT thousands)	1,008,497*	252,124	100,850	151,274
Value (US\$ thousands)	15,640**	3,910	1,564	2,346

\* Source: MIMAIP (2017)

\*\* Calculated by the authors

## From Section 5.7

'These amounts could be increased further without increasing the licence fees but instead increasing the payment rates. An assessment of the artisanal fishing subsector in Sofala Bank (IDEPA 2019) suggests that only 50–70% of artisanal fishers possess a fishing licence. The main reasons cited by the fishers are related to incorrect assumptions about their duty to obtain such licences and financial constraints. Assuming that the number of fishers with licences could be increased to for example 90%, we can estimate that the revenues from the artisanal fishing subsector licensing could be increased by some 3 million Mozambique metical (US\$48,000).'

### Explanation

	MT (THOUSANDS)
Current revenues (2019)*	11,294
Calculated potential revenues assuming 100% payment rate and assuming that the payment rate for the current revenues is 60%**	15,812
Calculated potential revenues assuming 90% payment rate**	14,230
Calculated increase in revenues assuming increase from current 60% (assumed) to 90%**	2,936

\*Source: MIMAIP (2020)

\*\* Calculated by the authors

In Mozambique, fisheries are important to the national economy and individual livelihoods. Shallow water shrimp fisheries (SWSF) provide an important source of income for many coastal communities. Yet the sustainability of SWSFs is under threat due to overfishing, the rapid and uncontrolled expansion of the artisanal fishing subsector, and the use of destructive fishing techniques, coupled with habitat destruction (in particular mangroves) and pollution. This also negatively impacts on the livelihoods of fishing communities and government revenues. Urgent measures are required to halt the depletion. This study analyses current fiscal policies for sustainable and fair fisheries in Mozambique, focusing on small-scale fisheries, particularly shallow water shrimp fisheries. In the SWSF, artisanal fishers are important both economically and socially. The working paper includes a series of policy recommendations linked to fiscal reforms to further support these efforts while promoting environmental goals. The recommendations are grouped into two main areas: equitable fiscal reforms, and expenditures and revenues for sustainable resource management.

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Funded by:



This working paper has been financed by the Swedish International Development Cooperation Agency, Sida. Responsibility for the content rests entirely with the creator. Sida does not necessarily share the expressed views and interpretations.



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