DEPARTMENT OF MARINE SCIENCES

EXPLORING RISKS OF BLUE ECONOMY DEVELOPMENTS TO PEOPLE'S LIVELIHOOD

A case study of Namibia's coastal communities

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Popular Scientific Summary

Hidden problems in society determine how well people are impacted by risks that come from developments in the natural environment. With the Ocean Decade, the United Nations envisions economic development by generating growth through the use of marine resources. For many countries, developing and expanding marine sectors brings great economic potential, but an increase in human use in the ocean also often brings impacts on the marine environment. Communities who live near the ocean, often depend on marine resources to make a living and changes in the marine environment could impact the way they live. To prevent undesired impacts from developing projects, marine planners often conduct a risk assessment to understand in what ways people are using marine resources and how their livelihoods will be changed if the ocean is impacted. However, what is often overlooked, is that people have different positions in society and that their economic, cultural and social situation influences how a change in the environment will impact their lives. Things such as income, occupation and political power can influence the way people are impacted and are able to adapt to change. Therefore, when studying these risks, including information on the background of society and social and economic conditions can create a better picture of how environmental risks and impacts can unfold. This study looks at the coastal communities in Namibia, to see how two groups of marine users are depending on the marine environment and are experiencing changes in the environment where they do their activity. With interviews, these user groups painted a picture of how they live, how they have experienced changes in the environment and how (and if) they are able to adapt to future change. This thesis helps to understand how background information can improve the way we study risks and therefore help marine managers and decision makers to see and prevent impacts that are caused by environmental impacts but intensified by embedded problems in the social and economic environment.

Abstract

Fuelled by the vision of the blue economy, marine sectors are developing and expanding at a fast rate. Though intended to be done in a sustainable matter, such developments often come with a large set of uncertainties and possible impacts on the environment as well as on the coastal communities who are depending on the natural environment to sustain their livelihoods. To understand what risks these developments bring, risk assessments are a commonly used tool to manage these risks at several stages of marine management processes. However, often focussing on the ecological risks, the human dimensions of risks are too often left out. In studies on climate change impact, the importance of addressing the social-economic aspects of risk has been recognized. In these studies, it has become evident that aspects such as risk, livelihood vulnerability and susceptibility to change are highly context-dependent and can determine how courses of risk unfold differently in different communities. Therefore, a social-economic approach to risk assessments can be an effective method to get a full understanding of what risks can lead to impacts on people's livelihood and how these risks are created. With a case study of Namibia's marine development and a risk analysis of perceived risks to the livelihood of two underrepresented marine stakeholder groups, this study demonstrates how embedded socio-economic vulnerabilities are adding to human-induced environmental impacts that come

with development. Contextual risk assessments as such have the ability better inform environmental management to create effective and inclusive decisions.

Outline of thesis

Chapter 1 Introduction

1.1 Introduction and relevance

Encouraged by the Ocean Decade to support the United Nations 2030 Agenda objective of generating sustainable economic growth from the use of marine resources, more and more countries are turning their attention to the aspiration of a 'blue economy'. To facilitate this transition, Marine Spatial Planning (MSP) is an integrative, adaptive, and participatory process that aims to bring together the multiple users of the ocean at various levels, including industry, fisheries, government, conservation, and recreation. It has become a common practice in ocean management in many European countries and is starting to be acknowledged as an essential part of the blue economy process in African countries as well (UN-ECA, 2016, p. 19). Besides the apparent aim of sustainable economic growth, while safeguarding marine biodiversity, the realisation of the blue economy in Africa requires effective inclusion of all societal groups, especially groups such as women, local communities and other marginalised underrepresented groups (UN-ECA, 2016, p. 33). It has been recognized in relation to economic development that these social groups often experience limited access to opportunities and legal services, low benefits, and a lack of recognition of their role in society.

As understood in academic literature, economic development often implies accepting risks that come with development and modernisation, at least to a certain extent (Beck, 1992, p. 23). Considering that ocean development is being characterised by an urgent need for more knowledge on the implications of development for marine spaces, it can be argued that ocean development and blue economy come with a large set of unknown consequences and impacts. However, when speaking about risks there are many types to consider when assessing the impacts of developing projects. Often, risk assessments focus on ecological impacts, but given that the integration of stakeholders is a vital part of sustainable economic growth, the human dimensions and risks to society are just as important. Still, such risks are often left out in environmental assessments. However, studies on the risks of climate change for society have demonstrated the importance of both assessing risks in the context of socio-economic differences within a society, as well as integrating the subjective nature of the notion of risk (Boholm & Corvellec, 2011, p. 178). To get a full understanding of the risks that come with ocean development, including the interconnectivity between these risks and the different ways people can be impacted, a more contextual picture of these risks is needed to present a more inclusive perspective of different risks pathways and therefore the impacts of development.

This thesis will use the case study of risks to the livelihoods of Namibia's coastal communities in light of ocean development. For the coastal communities, livelihoods are in many ways tied to the health of the marine environment and therefore connected to risks to the environment as well. Namibia has a large ocean space which historically has primarily been used for fishing activities, but given the recent shift towards the blue economy, the country sees more maritime industries developing in the ocean space. Namibia has been developing a

Marine Spatial Plan to facilitate this growth and is one of the only countries in Africa in the more advanced stages of marine planning. However, the planners and decision-makers have encountered knowledge gaps and a pressing need for more insights on for example stakeholder needs and values and vulnerabilities. The coastal communities have seen a large increase in coastal and ocean activities in recent years and have experienced changes to their livelihoods in both good and bad ways. Though the need for economic development often seems to outweigh other benefits that are derived from the ocean by individuals, a more contextual study of livelihoods and social-economic aspects can inform the decision-makers and improve processes of environmental management such as MSP. An often-used concept to study human's relationship to the natural environment is 'Ecosystem Services' which, popularised by Millennium Ecosystem Assessment, is a commonly used tool to map ecosystems and the benefits people derive from them and communicate this with the public and decision-makers. However, as the literature discussion in chapter 2 will show, the concept of Ecosystem Services tends to overlook some important aspects of society that determine how risks can cause impacts, who is susceptible to these risks and why some people's livelihoods are more vulnerable than others.

1.2 Objective and research questions
The main objective of this thesis is to explore how risks can lead to impacts from the development of marine sectors to the livelihoods of Namibia's coastal communities. The concepts of Ecosystem Services, risk, vulnerability, and human wellbeing are used to frame this discussion. The main research question is '*What risks to the livelihoods of Namibia's coastal communities in the context of developing maritime sectors have to be considered in marine management plans?*'. Guided by the four supporting questions below, this thesis will present a discussion of a more inclusive approach to risk assessments to explore the importance of the hidden risks that are caused by socio-economic aspects, and their implications for ocean management.

Q1: What socio-economic aspects contribute to the vulnerability of the coastal communities' livelihoods?
Q2: In what ways are risks to livelihoods perceived among the stakeholders?
Q3: How can the identified risks impact the objectives of effective marine management?
Q4: How can the inclusion of the socio-economic aspects of risks enhance environmental risk assessments? And what are the limitations?

Chapter 2 will set the conceptual frame of the thesis by discussing existing literature on the notions of ecosystem services, perceptions of risk and livelihood vulnerability. The theories related to these concepts are all helping to create an understanding of risk, which is needed to study risks to livelihoods and pathways of risks that can lead to impact. The chapter will also briefly discuss the risk assessment framework in which the risks are studied. Chapter 3 will lay

out the methods of this study, introducing the case study of Namibia and discussing some socio-economic and geographical characteristics of the case which are needed to interpret the data, after which the selected stakeholders are motivated and described. The last part of chapter 3 will go into the methods used for data collection and analysing the data. Chapter 4 discusses the findings of the empirical work and places these findings in the theoretical framework from chapter 2 to interpret the findings, after which the data is presented in a cause-effect structured model which will be discussed further on in Chapter 5, Discussion. In this chapter, the analysis is discussed and based on this, treatment options in the shape of prevention and mitigation measures are proposed. The last chapter will draw conclusions from the findings by looking at what the findings of this study imply for theory as well as for management.

Chapter 2 Theoretical framework

In environmental policymaking and marine management, such as Marine Spatial Planning, a common approach to deal with uncertain outcomes is to identify and assess possible risks to mitigate or prevent unwanted outcomes. In this sense, a risk assessment is a vital part of multiple stages of environmental planning processes since the development, ordering and securing of marine space is done within the context of managing the risks and impacts of marine sectors (Cormier et al., 2015, p. 7). Though many forms of risks, this study looks at the risks to people's livelihoods as a result of increasing marine activity in their environment. To get an understanding of how the risks, livelihoods and marine environment are interconnected, the thesis builds on three concepts to construct a framework in which the analysis is conducted: The concepts of *ecosystem services*, the *subjectivity of risks* and *livelihood vulnerability* are all both as separate and interrelated concepts relevant to comprehend the range of social-economic aspects of risk.
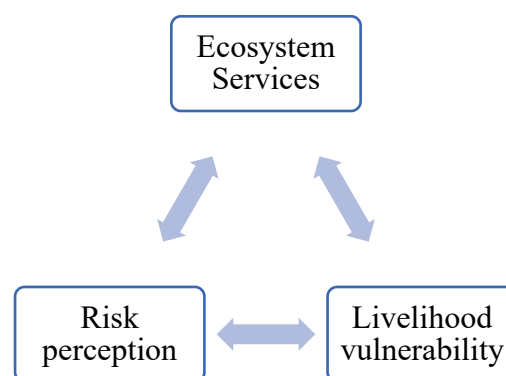

Figure 1 Theoretical framework (own figure)

2.1 <u>The concept of Ecosystem Services</u>

To get an understanding of the relationship between humans and the natural environment, the concept of ecosystem service is an often-used tool to assign human value to ecosystems. Though contested, using ecosystems as the unit of study can result in a tangible approach to use natural resource information and is often used to communicate ecosystem information to decision-makers, ecologists, economists and the wider public. Therefore, for environmental planning and management such as MSP, the practice of using ecosystem service (ES from here on) is a common approach to integrating human dimensions into the process (Zaucha & Gee, 2019, p. 155). Furthermore, it has been recognized that exploring the links between ecosystems, their services to people and changes in these services also gives a more complete set of information on the interconnectivity of these services and therefore the trade-offs, risks, and synergies of for example conservation objectives (Arkema et al., 2015, p. 7393) as well as on the different stakeholder positions and preferences (Mckenzie et al., 2014, p. 334).

ES refers to both goods (such as food and raw materials) and services (such as sediment control and waste treatment) that are derived from the natural environment (Costanza et al., 1997, p. 254). Even though there are various ways of framing these ES, the Millennium Ecosystem Assessment (MEA) is the one most used in literature. Published in 2005, the MEA identified ten ecosystem categories: marine, coastal, inland water, forest, dryland, island, mountain, polar, cultivated, and urban. These systems of studies are not referring to ecosystems in themselves, but they each contain several ecosystems that overlap and interconnect and therefore share biological, climate as well as social factors (MEA, 2005, p. 53). In the MEA, the services that can be derived from these ecosystems, are categorised into four types of services; provisioning services which refer to products that can be directly derived from the ecosystem, for instance in the case of a marine ecosystem, food provisioning such as fish. Secondly, there are the regulating services, which are referring to the broader benefits that are obtained from the regulation of the ecosystem processes, in the case of marine and coastal ecosystems an example would be coastal protection. The third type is the cultural services, which refer to the nonmaterial benefits that are obtained from ecosystems, such as coastal recreation and the fourth type of services is the supporting services, which refer to services that are necessary to produce all other ecosystem services. Like regulating services, they do not have direct value but are needed to sustain all functions, for instance, the nutrient cycling that takes place in coastal and marine ecosystems (MEA, 2005, p. 57).

Though often used, the MEA as it was presented in 2005 has its limitations. One of the main limitations as argued by scholars, is the simplification of very complex ecosystems where different understandings from perspectives on natural, ecological as well as socio-economic values of ES may lead to very different outcomes, depending on whose interests are considered and where (Norgaard, 2010, p. 1221; Setten et al., 2012, p. 307) which hinders effective conservation measures rather than benefiting effective and inclusive decision-making (Setten

et al., 2012, p. 309). Secondly, the assigned values are all centred around the human use value, looking merely at the aspects of the ecosystems that are considered valuable to human needs and desires from an economic perspective (Hauck et al., 2013, p. 15). The strong tendency to value the ES as economic commodities with a value that can be monetized disregards several important aspects of ecosystems such as the social-economic and cultural context in which they are received. This dominant focus on economic value and absence of the inclusion of social values, often caused by a lack of inclusion of stakeholders in ES studies, overlooks aspects such as social needs, perceptions, and preferences towards ES, which presents an incomplete picture of who benefits from which ES and where (Iniesta-Arandia et al., 2014, p. 36). A third critical point from the literature to keep in mind is that though more extensive data on ecosystems is available in the developed world, using ES in projects and policy implementation is more common in developing countries, which might be contributed to the fact that the concept of ES itself is contested among scientists and therefore not a preferred method in developed countries, yet accepted in developing countries (Norgaard, 2010, p. 1222). In addition to this, the spatial variation of the model is an important aspect, given that different societies have different levels of direct dependency on the physical environment. For example, ways of cultivating nature might be practised differently in developing countries or regions compared to developed regions, therefore dependence on technical tools indicates different ways of interacting (Setten et al., 2012, p. 307).

Given the limitations of the framework, other alternatives have been presented to overcome some of these flaws in assessing biodiversity and ES. One of these is the IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services) as presented in 2015, which aims to construct a framework to improve science to policy communication by using ES and biodiversity, building on the ES framework by framing six categories to describe the relationship between human and nature in a broader, more inclusive manner (Díaz et al., 2015, p. 6). In this categorization, 'nature's benefit to people' uses the MEA ES concepts, while the other five categories look at nature, anthropogenic assets, institutions and governance systems and other indirect drivers of change, direct drivers of change, and good quality of life (p. 4), recognizing the context-dependent valuation of natural resources. However, in a critique of the IPBES framework, Maier et al. (2016) argue that the IPBES framework can merely be considered a normative framework rather than a scientific framework (p. 328), since the framework seems to support a structure of values and norms, and the framework is seemingly framing a way of thinking about the 'goodness of nature and the rightness of actions to conserve it', in which regard the framework must be assessed as a normative, rather than as a scientific framework (Maier & Feest, 2016, p. 329). Nonetheless, the IPBES does provide a more inclusive and elaborate framework that incorporates some contextual conditions which are crucial to understanding human's relationship to nature. And while a full assessment incorporating the wider range of studies from different disciplines, institutions and different types of knowledge as prescribed by IPBES is not possible for this

study due to data, resource, and time constraints, the inclusion of theories on risk perception and livelihood vulnerability as emphasises of ES in the theoretical discussion adds to the assertions made in the IPBES framework.

2.2 <u>Risk as a subjective notion</u>

When talking about risks and possible impacts on society, a great deal of literature has been produced on these topics in the context of climate change. Dealing with climate change impacts is about reacting to change, whether it is about reacting to experienced changes or in anticipation of future changes, which essentially deals with similar courses of risk treatment that arise from human-induced risk. One of the most important understandings in the existing literature on risk is the idea that risk is a socially constructed notion and that what constitutes risk is defined by the context in which it is observed. Questions such as 'What is a risk?' and 'What do people perceive as a risk?' will have very different answers, depending on who is asked and where. In their relational risk theory, Boholm and Corvellec argue that risk is constructed and depends on the socio-economic and cultural context. According to this theory, a hazard is referred to as a 'risk object', which essentially describes something that is identified as dangerous (2011, p. 178). Boholm and Corvellec argue that these risk objects are social in the sense that they are part of social practices and representations that determine what is considered a risk. In addition to the risk object, there is the 'object at risk', which refers to the value that is considered at stake (2011, p. 180). Just like risk objects, objects at risk have an assigned meaning, subjected to traits such as value, loss, vulnerability and need for protection. In many studies in relation to climate change, the valuation of an object is approached from an economic and well-fare-based approach, but non-material or contextual aspects are often missing despite being important in determining what is at risk (O'Brien & Wolf, 2010, p. 232). The third part of the relational risk theory describes the 'relationship of risk', which refers to the relationship an observer (this being a scientist, local resident, journalist e.g.) establishes between a risk object and an object at risk (Boholm & Corvellec, 2011, p. 180). This too is socially constructed and fully depends on the observer's understanding of risks, values, and beliefs. Therefore, as Boholm and Corvellec argue, risks and the relationships they provoke, are expressions of 'cultural preferences' and are therefore biassed and thus framed by variables such as what is considered as danger, harm, victim, purpose, exposure, vulnerability, decision, cause, and effect (2011, p. 181; Field et al., 2012, p. 36). The social context that frames these notions is shaped by several things, such as social relations, but also power relations within a society as well as trust in institutions, science, knowledge, experience, practices, and collective memories (Boholm, 2003, p. 175). Some of the processes that shape the understanding of these notions can change over time, and Adger even argues that people's perception of their vulnerability tends to 'escalate' when their knowledge and understanding of a situation increases (2010, p. 284), which would suggest that aspects such as fear, anxiety and loss of confidence are connected to an increased understanding and knowledge about the risk object.

The notion of risk is a social construct subjective to an interpretation which has consequences for different parts of the processes of dealing with risks, such as risk identification, risk communication, risk management and risk treatment which requires social variables to be considered to make socially sustainable decisions (Field et al., 2012, p. 36).

2.3 <u>Risks to livelihoods and social vulnerability</u>
Similar to the concept of risk, the vulnerability of livelihoods is also defined by context. Often considered in climate change literature, is that vulnerability and susceptibility to impact of a social group, as well as the capacity to adapt to change or impact, depends on social-economic and cultural structures. An IPCC report on adaptation to climate change risks presented a broad set of conditions derived from the cultural, social, environmental, political and economic context that determines patterns of social interaction with each other and with organisations which, according to the report are the underlying conditions that determine the vulnerability of a society (Field et al., 2012, p. 71). In other literature on social aspects that increase the vulnerability of a place or a social group, some additional aspects include socioe-conomic status (income, political power, prestige), age, employment loss (which refers to the potential loss of employment following an environmental disaster), race/ethnicity, infrastructure, occupation, access to resources, family structure and education (Cutter et al., 2003, p. 246; McCarthy et al., 2001, p. 8). Examining these factors combined with vulnerabilities in the natural environment can provide an understanding of why some social groups are more vulnerable and susceptible to impacts from environmental hazards. Furthermore, inequality and asymmetric power relations that have led to experiences and perceptions of marginalisation and disempowerment are also aspects of vulnerability (Adger, 2010, p. 276), which in addition to other identified social vulnerability aspects, explains how societies in poorer parts of the world are more vulnerable and therefore having the lesser capacity to adapt to change and impacts (McCarthy et al., 2001, p. 8). This last understanding connects directly to the relational theory of risk, as experiences are subject to one's experience. With this, it becomes evident that underlying structures in society are partly causing the discrepancies between aspects of vulnerability.

When studying risks to livelihoods, the most straightforward way of categorising risks is by dividing them into direct and indirect risks, where direct risks can be predicted based on past events while indirect risks are harder to predict. For example, a spill of a toxic substance, which causes a death event among marine life, diminished fish stocks and lower catches for artisanal fishermen, would be a direct risk. An indirect risk of this toxic spill could be a protein deficit due to diminished or contaminated catches for consumption, which can lead to health problems in the long run. This example of a ripple effect of one threat already addresses how one event could have different pathways since ecosystems, societies and economies are all interconnected and through these links, the impact of one event could lead to a considerable impact on a whole system. This interconnection is referred to as 'systemic risks'. However, the

size of a big threat to a system will be hard to detect, especially since some of the small risks that add to the totality of risk might be hidden in the social-economic structure which makes the severity of an impact context-dependent. This is what Renn refers to as 'insidious systemic risks', which are, as opposed to large catastrophic risks that happen suddenly, small risks that are fuelled by global hazards, which are caused by human intervention in nature. These include climate change (pollutant emissions and the use of land and water); inadequate or ineffective control of central processes in business and politics (capital markets, corruption, capacity deficits; and negative by-products of globalisation and humanization (such as unequal living conditions, lack of security) (2016, p. 30). The severity of these global hazards is strongly linked to the socio-economic structure, wealth, and inequality, which again explains why risks and impacts are unequally distributed, but also why risks are still being produced (Beck, 1992, p. 19). To uncover insidious systematic risks, everyday experiences concerning food, transportation, safety matters relating to the home and its equipment, children, the neighbourhood, traffic, and various risk factors in the local environment are covering risk-related issues (Boholm, 2003, p. 173). Not all of these experiences might directly correlate to the risk object, but they can all be impacted by an act of development or technology which is why studying risks from an insidious systemic risk perspective could be an approach that uncovers a totality of values that contribute to human well-being and vulnerability.

Furthermore, in his theory on risk society, Ulrich Beck demonstrates how, to a certain extent, risks are an accepted consequence of a modernising industrial society, making our society, what he calls, a 'risk society' where despite any risk, visible or not, economic recovery and growth are always prioritised (1992, pp. 23, 45). That being said, the accepted risks are unevenly distributed, and similar to what I have argued earlier in the thesis, social differences within a country are conditions that influence the uneven distribution of risk on a local and national scale, but also international scale between the global south and north. Differences in wealth on both national and international scale also demonstrates that risk for the poor and weaker is much higher due to the social characteristics as outlined by Cutter and McCarthy (2003, p. 246; 2001, p. 8), as the educated and wealthy can 'purchase their safety and freedom' from risk (Beck, 1992, p. 35). Though Beck's theorization of how risks form an integrated part of the 'modern' industrial society is three decades old, the dimensions of his theory remain influential, especially in the context of climate change and environmental risk. Since development is still allowing risks as an accepted consequence, the unequal vulnerability and capacity to adapt within a society is a recurring issue that must be acknowledged in studies assessing risk.

Bringing these risks and vulnerability theories into the environmental context and the idea that human-wellbeing builds on the natural environment, it is a given that the ES as described in the MEA, are all maintained by living ecosystems and changes in these ecosystems, have direct and indirect effects on society and human well-being through a web of causation of social,

economic and political routes which are highly context-dependent (MEA, 2005, p. 6). Therefore, when using ES in risk assessment, an ES becomes the object at risk, since it is the benefit from the environment that is at risk to disappear. However, when speaking of human well-being, it is important to note that well-being is again a subjective notion and that what the MEA describes as what constitutes 'being well' are values that are strongly dependent on the socio-economic context. In newer models, such as the discussed IPBES framework this emphasis has been made by using the notion of 'good quality of life' which entails 'human wellbeing', 'living in harmony with nature' and 'living-well in balance' and 'harmony with Mother Earth', for which values differ among societies and cultures and are therefore aiming to incorporate the context dependency nature of these values (Díaz et al., 2015, p. 7).

This theoretical discussion demonstrates that while the socio-economic and cultural dimensions of ES are key to the process of environmental planning and management, it is also one of the more challenging dimensions to measure and integrate due to the subjective nature of values and risks and impacts. Information and understanding of the distribution of human activities and how different users interact with and value the environment depending on the socio-economic context provides essential information for suitable management (Ruiz-Frau et al., 2013, p. 97). By using ES to understand the direct dependencies on the marine environment, while studying the socio-economic aspects of the stakeholders in order to explore where social vulnerabilities are hidden, this thesis aims to contribute to the discussion on how to effectively approach and integrate social-economic values in risk assessment on environmental impacts to people's livelihoods.

2.4 Assessing risk within a framework

When dealing with environmental planning and management, a common need that is often identified during the planning processes is a better understanding of the pressures and risks of multiple human activities in the same area which is often the case with MSP. Therefore, a risk assessment to map these uncertain outcomes is one of the recommended courses of management in a report on MSP Quality Management Systems published by ICES. The presented methods in the report can be used to integrate a wide range of values and socio-economic data to map different claims of different stakeholders and the potential effects of marine sectors' development (Cormier et al., 2015, p. 7). The process of risk assessment as recommended in this report follows the structure as set in the International Standards Organisation guide on Risk Management, as seen in Figure 2. The assessment consists of three parts: a risk identification part [4.2], in which risks are identified through for example stakeholder interviews; a risk analysis [4.3], in which the identified risks are structured to illustrate a cause-effect relationship to analyse the risk pathways, in order to see where measures would have to be taken to prevent or mitigate undesired outcomes; and a risk evaluation/treatment [5.1], in which the results will be evaluated to see what measures would address the biggest risks.
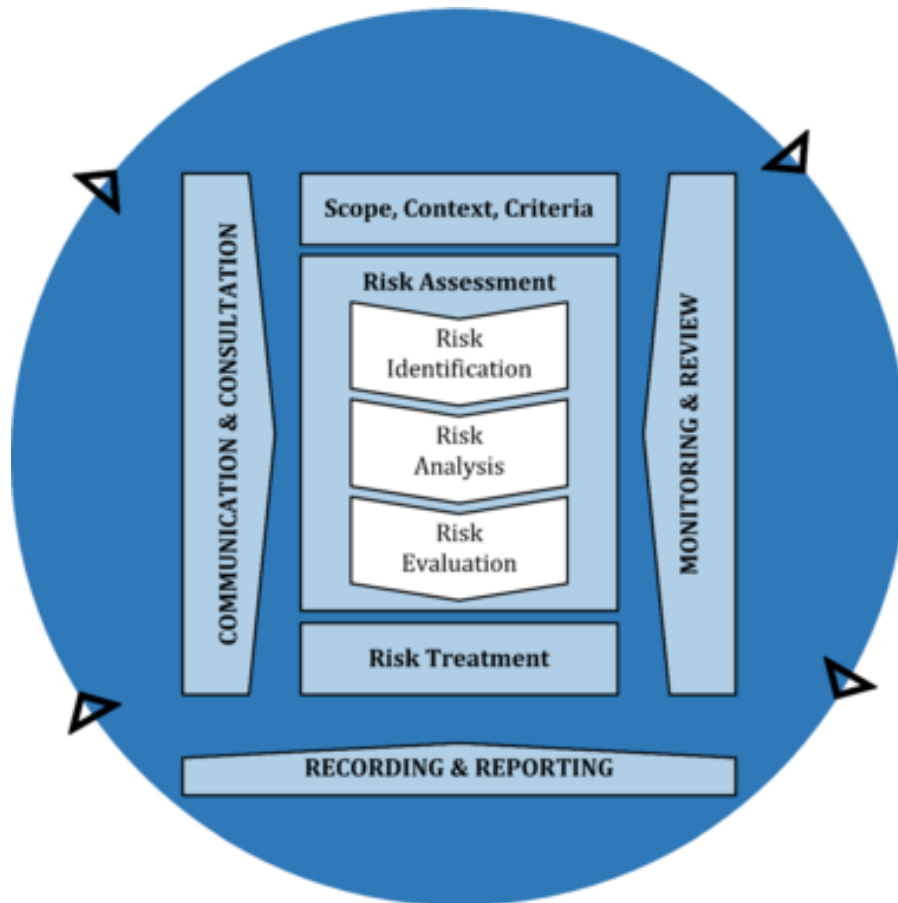
Figure 2 Risk assessment process as described by the International Standards Organisation (ISO, 2018a, p. 9).

The risk identification part looks at 'objects of risk' as well as 'objects at risk' to follow Boholm's relational risk theory (Boholm & Corvellec, 2011), to get an understanding of the problems and risks that might impact the livelihood of the coastal stakeholders. Given that the study is an explorative study that investigates risks that will likely occur if the marine sectors will expand and cause impacts, the identified risks will solely depend on the expectations and experiences of the stakeholders rather than on an assessment of ecological consequences. Moreover, as noted in Cormier et al., risk identification should include all risks, whether caused by known and manageable or unknown and uncertain factors (2015, p. 57) in all levels of society, to recognize the interconnectivity of risk factors and address the cumulative effects. Therefore, the identified risks are the socio-economic aspects in which insidious systemic risks are embedded. These aspects are creating problems to sustain livelihood and are not necessarily directly linked to environmental impacts but are adding to the susceptibility of the stakeholder groups as described in the first paragraphs of chapter 2. This data is structured in a cause-effect model, to be analysed as described in the method chapter. By doing this, the frequently identified concerns and risks are used to represent impacts on a stakeholder group as a whole and as a result, some personal values and preferences will be disregarded. The last part of risk assessment is to evaluate the risks and determine which risk will have to be addressed by the decision makers to avoid or mitigate the impact. Given the subjectivity of the data that the risk

assessment is based on, factors such as the likelihood and severity of these perceived impacts, are not necessarily what will happen, but it merely demonstrates pathways through which impacts can unfold and form threats to livelihood. Therefore, the risk evaluation serves as a tool to demonstrate where further analysis and consultation will be needed, if at all (Cormier et al., 2015, p. 71). The risk evaluation will help to understand which socio-economic aspects of the stakeholder groups are causing vulnerability and which risks need better controls, which risks do not need additional controls and which policy goals should be considered to improve the management processes.

Chapter 3 Methodology

To explore in what ways risks can cause an impact on livelihoods, I use the case study of Namibia to study how developments in the marine environment create risks to the livelihoods of the coastal communities and explore which socio-economic aspects contribute to this. In this chapter, I will discuss why the case of Namibia's coast forms a suitable study area for the purpose of exploring and assessing risks, and which developments and characteristics are important for the interpretation and analysis of the results. This is followed by an overview of stakeholders in the area that are relevant for this study; both stakeholders which are industries responsible for impacting marine space, as well as stakeholders in the coastal communities whose livelihoods are directly dependent on marine resources and therefore vulnerable to environmental impacts. The last paragraph of the chapter will discuss the data collection and analytical methods which are used to carry out this study, as well as some of the limitations these methods bring.

3.1 The case study of Namibia

3.1.1 Developments of marine activity and MSP

Namibia is a country situated in Southern Africa, northwest of South Africa. The country has an EEZ of over 550 000 km^2 which is part of the highly productive Benguela Current Large Marine Ecosystem. An increasing interest in its rich marine resources has led to a growth in coastal and marine activities over the past decades. The Benguela Current currently sees a relatively low intensity of human uses, but mismanagement of fishing resources has led to the collapse of some lucrative species in the past, which is why, with the vision of a blue economy and blue growth, Namibia's government has turned to Marine Spatial Planning in an attempt to manage increasing ocean usage, being among the first African countries to do so (MSP Global, 2020). Marine Spatial Planning is a participative decision-making process that guides where and when human activities occur in marine space, as defined in Namibia's MSP draft (MFMR, 2018, p. 1). The MSP aims to support the developing goals of a sustainable blue economy while safeguarding ecosystem health, social and economic benefits and responsible research and monitoring while practising good spatial governance. The Namibian marine space

has been recognized to be crucial for the well-being of many Namibians. Wildlife such as seals, fishing activities, minerals, maritime trade, nature-based tourism, and recreation provide valuable benefits to many people on the coast as well as inland and a high proportion of the national income is generated in the central coastal area. While developing the first draft of the MSP, researchers and planners in Namibia encountered a general lack of knowledge on the value of marine sources and the impact changes in ecosystems might have on the coastal communities (Finke et al., 2020, p. 9). The first draft of Namibia's Marine Spatial Plan does not address plans for the entire coastline, but only the central part (Map 1), in which a large part of the marine activity is situated. The central MSP area includes the coastal towns of Walvis Bay, Swakopmund and Henties Bay which are places where large parts of Namibia's coastal activity are centred. However, another important hub of marine activity is the southern town of Lüderitz, which is not included in the central MSP area and therefore outside the scope of this study.
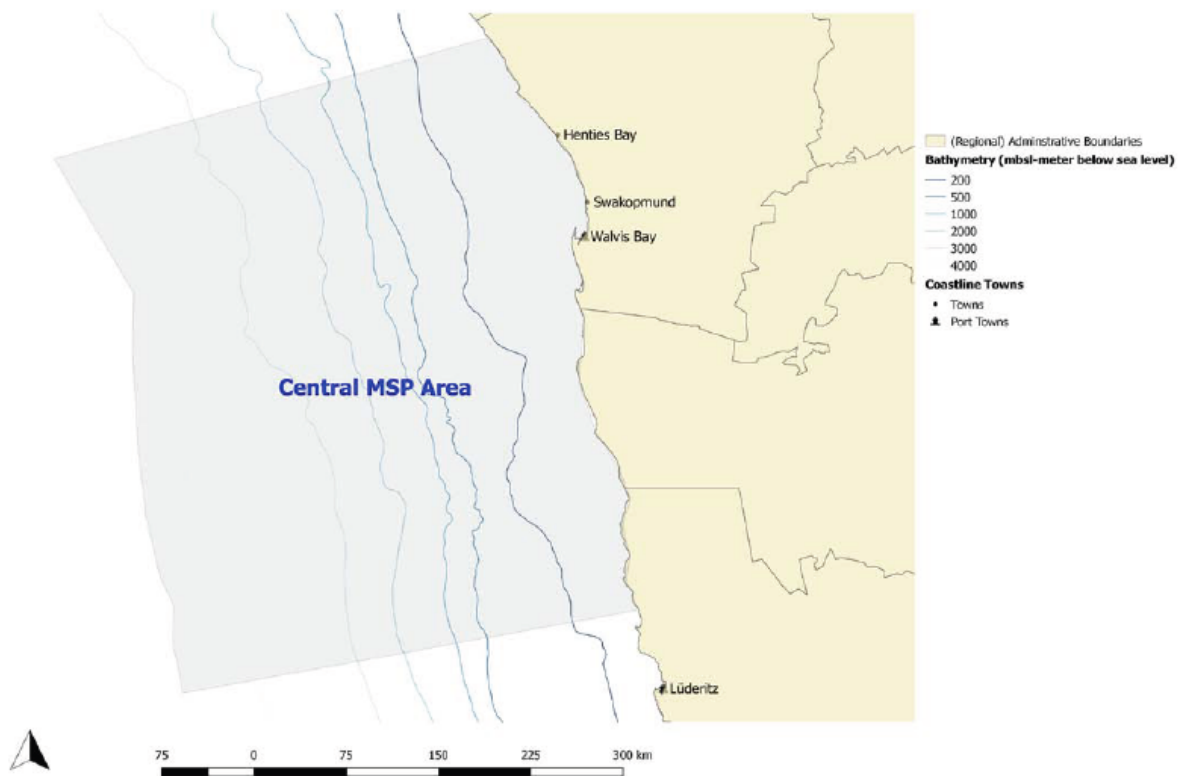
Map 1 The central Namibian MSP Area (MFMR, 2018, p. 6)

MSP in itself has a strong adaptive component, where aspects such as ecological, socio-economic and institutional indicators are to be evaluated, developed, incorporated and monitored throughout the process to improve its effectiveness (Douvere & Ehler, 2011, p. 306). Considering that risk assessments are a vital part of the MSP process, scholars have pointed out that risk studies on human-induced risks still seldom consider human dimensions of impacts (though some connections between the ecological and social are made) (Wassénius &

Crona, 2022, p. 40). Therefore, with the pressing need for a better understanding of the socio-economic values of the marine environment to improve the MSP management process, the developing marine plans in Namibia form an interesting study case.

3.1.2 Socio-economic aspects and geographics to consider

Namibia's marine and coastal environment is unique in the sense that it is one of the only places in the world where the desert transcends directly into the ocean. Due to the arid coastal environment, the marine and coastal environment ecosystems are crucial to marine and coastal biodiversity. The cold waters of the Benguela Current have strong nutrient-rich upwellings, which makes the coastal waters some of the most productive marine ecosystems in the world, supporting high marine biodiversity and an abundance of marine life, as well as mineral deposits (ERC, 2015). This makes fishing one of the most important sectors of Namibia's economy, for both commercial and recreational purposes. Namibia, present-day politically stable with a multi-party government in power, gained independence from South Africa in 1990 and was priorly under German colonial rule. Under South African rule, an apartheid regime was applied to Namibia which, together with the colonial legacy partly contributes to this day to high inequalities in the country. Some of these inequalities include inequality of land ownership since almost 70% of Namibia's land is white owned (NPC, 2019, p. 15), income inequality and other inequalities such as gender inequality, health inequality, education inequality and regional inequality (NPC, 2019, p. 14). Namibia has a population of 2,5 million of which a little over half live in urban areas such as the capital city of Windhoek and coastal towns such as Walvis Bay and Swakopmund. This study focuses on the central part of the coast of which the populated part is concentrated in the Erongo region. Among Namibia's working force is relatively high unemployment (NSA, 2013, p. 32), which is characterised by a large informal employment sector consisting of manufacturing, mining, agriculture, forestry, and fishing (p. 34). Additionally, the coastal population of Namibia consists of many ethnicities speaking different languages, which has implications for communication and for this study for data collection as discussed later. The majority of the population is Namibian, but around 3% of Erongo's population is made up of South Africans and Europeans and despite English being Namibia's official language, Oshiwambo is the most common language in Erongo's household, followed by Damara, Afrikaans and Otjiherero, though many Namibians speak multiple languages.

Though a stable country, there is considerable corruption in the government which affects development and effective decision-making in many ways (Transparency International, 2021). A recent scandal in the fisheries department of the government, known as 'Fishrot', has caused a big blow to trust in the government. In this scandal, ten former politicians, businessmen and lawyers were exposed to have taken large bribes and extorted millions of Namibian dollars from the fishing industry, where the accused sold off fishing quotas for Namibia's lucrative waters to a fishing company in Iceland (Kleinfeld, 2019). The scheme

involved high-ranking politicians such as the Minister of Fisheries and Marine Resources and the Minister of Justice and was exposed just ahead of the re-election of the current government, which has resulted in a decrease in support and trust in the ruling party and the government. The social impact of this scandal on the coastal communities is not yet known, but it is evidence of the vulnerability of the sectors to bad governance as well as deeply embedded corruption.

Map 2 Physical features of Namibia and Southern Africa (Encyclopædia Britannica, 2022)

3.1.3 NAMares project framework

This master thesis is written within a project called NAMares, which is a joint research project between the University of Namibia (UNAM) and Helmholtz-Zentrum Hereon in Germany. The project aims to support Namibia's MSP process by filling knowledge gaps on the value of marine resources and how they contribute to the livelihoods of people living and working on Namibia's coast who are depending directly on the marine resources, looking particularly at the socio-economic and cultural values of these stakeholders. The approach of the NAMares project is to use ecosystem services, as described by the MEA, to map the uses of marine resources for a number of stakeholder groups that are often overlooked in the decision-making process due to various reasons. With data on the benefits derived from the marine ecosystems,

NAMares aims to present the decision makers and planners with a more inclusive picture of stakeholder needs and values. An additional aim of NAMares is to use the generated information to build knowledge capacity among relevant organisations and governmental bodies as well as contribute to ocean literacy in the educational institutions further from the coast. This thesis contributes to the risk assessment measure of the project.

3.2 Selected stakeholders

3.2.1 Impacting marine industries

As mentioned in the case study description, Namibia's marine space has seen relatively low human use, with the fishing industry dominating the space. Other larger sectors using or showing interest in the marine space are naval defence, geological resource mapping and exploitation (such as oil, diamonds, and phosphate), mariculture, environmental protection, seawater abstraction and maritime transports and port activities. However, when drafting the MSP report, it was found that fuelled by blue economy plans, economic growth, urbanisation, and political and public awareness, the three sectors set to develop and expand most in the upcoming decade are commercial fisheries, environmental protection, and phosphate mining. Moreover, in zoning and management plans, these three sectors are also the ones causing key spatial conflicts (MFMR, 2018, p. 2018), having an interest in some of the same areas. In Beck's theorization of risk society discussed in the theory chapter, development and modernization always come with an accepted set of risks and despite these risks, known or unknown, economic development is almost always prioritised (Beck, 1992, p. 23). Therefore, with the considerations of the developments, these three sectors are used in this thesis as 'impacting industries'. The consequences of developing one or more of these sectors (positive and negative) will have impacts on both the ecological as well as the social-economic environment of Namibia and the risks embedded in the socio-economic context will lay out how the impacts of development might impact livelihoods.

Commercial fisheries

The commercial fisheries sector is a pillar of Namibia's economy, responsible for 15% of the exports, directly employing 16,300 people (NPC, 2017, p. 26) and indirectly employing people in supporting industries, such as logistics, retail and supply (MFMR, 2018, p. 38). Despite having a history of overfishing and collapsing fish stocks in the sixties and seventies (MFMR, 2018, p. 11), the fish stocks in Namibia's waters have been more strongly regulated since independence. The Ministry of Fisheries and Marine Resources has set a total allowable catch for eight of the nineteen commercial fish species in Namibia's waters to regulate the fish stocks. The sustainable use and conservation practices are outlined in the Marine Resources Act of 2001 and the Minister of Fisheries and Marine Resources is the responsible party for issuing the fishing quotas and fishing licences, as well as prescribing gear regulations. The majority of Namibia's fishing infrastructure is concentrated around Walvis Bay, as it is the only industrial

harbour of the country and therefore the place where the fishing vessels dock and catches are processed. In the National Development Plan of 2017, the fisheries industry is highlighted as one of the marine sectors with the significant expanding potential to increase jobs and exports, but also to secure fish as a source of protein for the population (NPC, 2017, p. 26). Part of this proposed expansion is to add value to the catch by creating more facilities for the processing part in Namibia before export. Another important aspect of this plan is to improve the ecosystem-based management efforts to regulate the fish stocks, since, despite the TAC, the cumulative impacts of fishing efforts are affecting the marine environment negatively especially in Namibia's benthic environment, as found in a biodiversity study conducted in the Benguela Current (Holness et al., 2014, p. 29).

The commercial fishing sector is considered an impacting stakeholder in this study since historically most of the marine space has solely been for fishing activities, therefore an increase of other marine sectors will have consequences for the commercial fishing grounds. Exploration of marine resources for the purpose of mining has the potential to impact the marine environment and therefore the commercial fish stocks. The expansion of Marine Protected Areas might impact accessibility to current fishing areas. In addition, environmental impacts from commercial fishing activities also have consequences on other coastal and marine activities and the cumulative impact of fishing combined with other sectors will add pressure to the environment that has until now been in a relatively pristine condition. The importance of strong regulation and management of fishing activities have become apparent in the recent Fishrot scandal that has rocked the Namibian fishing industry as briefly mentioned in chapter 3.1, where the mismanagement and corruption surrounding the sought-after Namibian fishing quotas and lack of transparency have led to catastrophic consequences for the fishing industry, resulting in loss of thousands of jobs and expected impacts on fish stocks (Brown, 2022). Proper management and transparency of commercial fisheries are crucial for blue economic development, in order to sustain the sector and limit the impact to the environment.

Geological resource exploitation (phosphate mining)
Though still very much under debate, phosphate mining is a pending marine sector in Namibia with a mapped space allocated for it in the MSP draft (MFMR, 2018, p. 67) . At the moment, the only type of natural resource exploitation that takes place in Namibian waters is diamond mining in the southern parts of the country near Lüderitz, where the Orange River mouths to the Atlantic Ocean and many diamonds are brought down by the river from the diamond mines in-land, are found offshore. Debmarine Namibia, which is a joint venture between the Government of Namibia and De Beers, has been operational in Namibian waters since 2002, with different vessels for the whole operational chain, including exploration, mining and monitoring (Debmarine, 2022). Off the coast, phosphate-enriched sediment can be found and since 2013 companies have shown more and more interest in acquiring licences to mine this. Given that the phosphate deposits have been found in sediment and not in nodules which is the

case in other countries, exploitation of the phosphate sediment would require similar dredging techniques that are being used in diamond mining by Debmarine. Despite the economic value, this could add to Namibia's economy, the phosphate proposal has led to a heated debate, since opposing voices are concerned with severe environmental impacts on the marine environment and therefore fisheries, food safety and marine protected areas. In addition, the limited knowledge and data that is available on the long-term impacts of marine phosphate mining makes the industry risky and would make Namibia a 'guinea pig' for this industry (Swakopmund Matters, 2015). Besides the public, one of the biggest voices of opposition came from the fisheries, who argued that the first planned mining area of marine phosphate mining project called 'Sandpiper', which received their exploration licence in 2011, would severely damage important spawning grounds.

All mining activities in Namibia fall under the Ministry of Mining and Energy, which has always been a prominent pillar of Namibia's economy due to its land-based mining activities. Phosphate mining in the marine environment has the possibility to create hundreds of jobs and adds value to Namibia's economy. Environmental Impact Assessments are mandatory under the Minerals prospecting and mining act 33 from 1992, and an EIA done in compliance with the Environmental Management Act found that the prospected project would have a 'potential low to moderate impact in all categories which does not give an objective reason why dredging should not proceed under carefully monitored conditions' (Midgley et al., 2012, pp. 7-7). If the extraction would be approved, Namibia could be the first country where marine phosphate mining would take place, and the debate emphasises the uncertainties this project would bring. There are currently two licences issued for marine phosphate exploration, but none have them in the fully approved mining stage yet. Phosphate mining is an impacting stakeholder since the potential of the sector for the economy would be great, but the large set of unknown environmental and socio-economic impacts can be severe, which is why the development and operation of the industry as such must be approached with caution.

Environmental Protection

In the National Development Plan, apart from economic growth, one of the focus pillars is creating environmental sustainability, to ensure that the utilisation of natural resources will be done in an environmentally sustainable way (NPC, 2017, p. 83). Most of Namibia's current protection efforts focus on the conservation of the mainland, with 44% of land under conservation measures (p. 82) while only 1.7% of the ocean space is under protection. Namibia Islands Marine Protected Area covering 9,432 km^2 is the only protected marine area (Marine Conservation Institute, 2022). The NIMPA was established with the purpose of conserving the natural seabird breeding space in the area, as well as protecting fish spawning and breeding ground and migration routes of cetaceans (MFMR, 2012).

With plans for marine environmental protection, seven key areas have been identified as Ecological or Biological Significant Areas in Namibia's waters (Map 3), to apply habitat conservation and protection measures. To match globally set targets, such as Aichi target 11 on protecting 10% of the world's marine areas, Namibia's government pledged in 2019 to allocate money for research and protection to work towards this goal of creating marine protection and safeguarding biodiversity and habitats (New Era Live, 2019). These protection measures are crucial considering the developing marine industries. Furthermore, some of the identified EBSA's are in areas that are near zones suitable for other maritime activities, which is why the expansion of marine protection efforts might spatially interfere with other sectors.
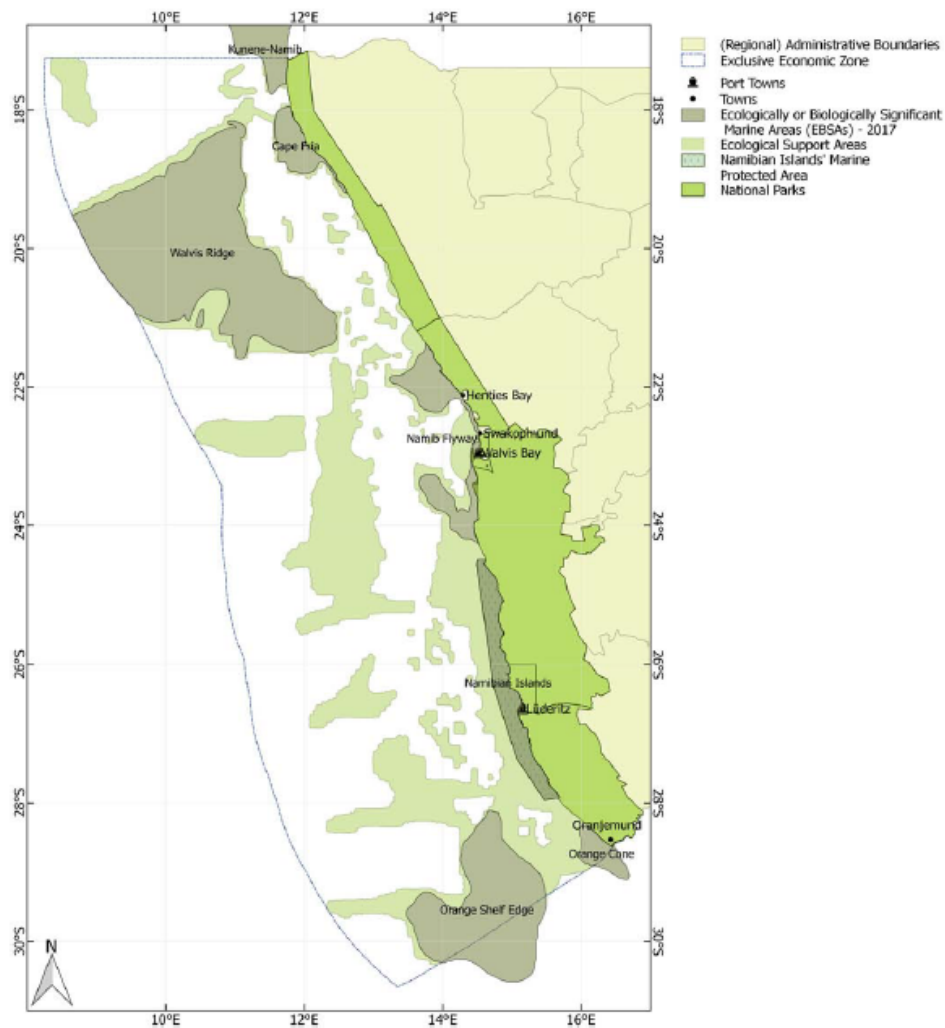
Map 3 Ecological or Biological Significant Areas, identified by government in 2017 (MFMR, 2018, p. 53)

As for the coastal zone, the whole of Namibia's coastline falls under national parks, with the Skeleton National Park in the north and the Dorob National Park in the middle and southern parts of the coast. While these parks enforce relative protection, it also allows activities in the coastal areas, such as desalination plants and salt mining. The responsibility for the protection and conservation of the areas falls under the Ministry of Environment, Forestry and Tourism

which oversees protection measures and exemption licences within the objective to 'prevent and mitigate significant effects of activities on the environment (MEFT, 2007, p. 5). Though environmental protection has the sole objective of safeguarding the natural environment, expansion of protected areas can have spatial consequences for industrial maritime sectors but could also lead to spatial exclusion and no-take zones that are important for the coastal communities, especially when not implemented with proper stakeholder consultation and considerations. For this reason, environmental protection is considered an 'impacting industry' in this study.

3.2.2 Impacted stakeholders

For effective environmental marine management, the integration and recognition of all stakeholder groups is important to the process. As recognized by the MSP planners in Namibia, a lack of knowledge of the values of the ocean and risks to people's livelihood jeopardises effective and inclusive management. Furthermore, as suggested in a report on the realisation of the blue economy in Africa, sustainable growth requires the inclusion of all societal groups, including local communities and under-represented groups (UN-ECA, 2016, p. 33). Therefore, I chose to include two stakeholder groups that are important to Namibia's coastal communities but underrepresented in decision-making processes due to various reasons. By exploring how these two stakeholder groups depend on the marine environment to sustain their livelihoods while experiencing developments and ecological change in their environment of operation, I want to demonstrate how different social-economic contexts in the same area require considerations in risk assessments and management.

Coastal and Marine Tourism Operators

Although most of the tourism activities in Namibia are focused inland, the coastal and marine environment form a popular attraction for tourists. In Namibia, all tourism activities fall under the Ministry of Environment and Tourism which established the Namibian Tourism Board in 2000 as the national authority in charge of tourism operator licence and registration. This Board has the authority to issue operating licences to tourism operators and accommodation operators who have to comply with the requirement as prescribed by the Board. Registration with the NTB and operating licences are needed for operators to conduct their tourism business legally in Namibia. In the National Tourism Act of 2000, the tourism industry is defined as "the businesses, enterprises and activities which provide services and facilities and cater for, attract and meet the needs of international and domestic tourists" (NTB, 2000, p. 3). Marine tourism in this study refers to both the tourism activities in the marine space, as well land-based in the coastal areas such as beaches or the coastal dunes. The majority of Namibia's marine and coastal tourism is concentrated in the cities of Swakopmund and Walvis Bay, where activities such as kayaking, boat tours, 4x4 and self-drive tours, surfing, biking and horse riding as well as recreational fishing (the latter also takes place in the Henties Bay area) take place. In the

National Development Plan of 2017, tourism was named as one of the sectors with great expansion potential, at the time of reporting contributing an estimated N$ 4,682 billion to Namibia's GDP, or 1,8% according to the rapport (NPC, 2017, p. 30) or, looking at the wider economic footprint of the tourism industry as reported in the MSP draft an approximate 10% of the total GDP (MFMR, 2018, p. 107). The differences in these numbers used in various reports can be attributed to the limited available data on the economic contribution of the tourism sector in Namibia in general, and the lack of data on the contribution of coastal and marine tourism operators as a subgroup. At the same time, note that available numbers are from pre-pandemic calculations, therefore the projected plans and growth potential and contribution of Namibia's tourism industry is very different at the moment of this study. The numbers from the NDP report account for the tourism sector for both land and coastal tourism, while the MSP draft notes a number of 50 tourist activity operators registered with the NTB in the Erongo region, of which 18 have sea-based activities (MFMR, 2018, p. 107). Also, for these numbers, the real number of NTB registered marine tourism operators will be different as the public registration of NTB are not up to date and many tourism operators went out of business during the pandemic but have not yet been updated for a while. The CMTO is selected as an impacted stakeholder because of their recognized presence and contribution to the coastal economies, while at the same time not being formally recognized as a subsector of the tourism industry with diverging needs and challenges. Many operators are using the same marine and coastal space, but in decision-making processes and development, they are often overlooked as consulted stakeholders.

Artisanal fisheries

The artisanal fisheries, or subsistence fishery as briefly referred to in Namibia's Marine Spatial Plan, form an important but understudied stakeholder group of the coastal area. While both the Marine Fisheries Act (MFMR, 2000) and the Marine Spatial Plan almost exclusively focus on commercial fisheries and recreational fisheries, the artisanal fisheries sector is completely overlooked in the national documents. Especially the coast between Swakopmund and Henties Bay, but also further up north all the way to where the Kunene Delta mouths into the Atlantic Ocean, is a popular area for sport fishing. On this coastline surf and rock anglers fish for species such as rock lobster, barbel, snoek, kabeljou, blacktail, galjoen and steenbras. This attracts many recreational fishers, but also provides income for local anglers. However, the fisheries act only covers legislation for recreational fishing, setting regulations and bag limits for these fishermen (MFMR, 2000). However, for the artisanal fishermen whose livelihood depends on the catches and sales of these fish, but still fall under the same legal framework as the recreational fishers, the regulations are constraining and preventing them from sustaining their livelihoods from fishing activities. In 2003, facilitated by the Ministry of Fisheries and Marine Resources, the Hanganeni Artisanal Fishing Association was formed by artisanal fishermen in Henties Bay. Hanganeni Artisanal Fishing Association, or HAFA, aims to encourage the self-

employment of artisanal fishermen, while supporting them with fishing gear, transport to fishing spots and buying the fish from the fishermen to sell them in the HAFA fish shops. Moreover, supported by MFMR, HAFA provides its members with an artisanal fishing licence for a membership fee. This licence does not have the same restrictions as recreational licences and allows the fishermen to catch enough fish to feed themselves and legally sell their excess catches, making them artisanal fishermen and not just subsistence fishermen. While getting new registered members every day, at the time of this study, HAFA counts around 100 registered members a month, which is, according to HAFA just a small percentage of the artisanal fishermen community that is still unregistered or fishing on a commercial licence. Over the years, HAFA has been working on expanding its network to Swakopmund and Walvis Bay to provide the same options to the artisanal fishing communities.

In this study, the artisanal fisheries referring to both the registered and unregistered fishermen who are fishing to sustain their livelihood is one of the two stakeholder groups which is considered understudied, yet important in supporting the livelihoods of the coastal communities. Besides HAFA, there is little legal or another type of organised support for the artisanal fishermen, and with the development of the marine sectors in the marine and coastal waters, the available resources they use are subject to change. The informal nature of this stakeholder group makes them an underrepresented group in almost all stakeholder and decision-making processes.

3.3 Data collection methods

3.3.1 Criteria for information selection

For the literature search, I used the database from Gothenburg University Library as well as Google Scholar, using search terms such as 'ecosystem services', 'livelihoods', 'risk society', vulnerability, 'risk assessment', 'social vulnerability', social impact assessment', 'socio-economic values', 'environmental management', 'Marine Spatial Planning/ MSP' and 'climate change'. Starting with the work of Constanza on ecosystem services, Beck on risk society, Cormier on risk assessments and MSP and Boholm on the relational theory of risk, the additional papers were chosen to elaborate on these works in improving theoretical limitations, more recent developments, and spatial differences and present and unbiased discussion. Given the limited academic papers on Namibia's marine as well as social environment, the theoretical part serves as a general basis to understand aspects of the case study of Namibia. It primarily presents generalised information but enables a focus on the theoretical and conceptual aspects of environmental risk assessment and socio-economic values.

3.3.2 Empirical data collection methods

Questionnaire

To collect data from the impacted stakeholder groups about their values and concerns, face-to-face surveys were done with participants from both stakeholder groups. Though quite time-

consuming, the relatively small size of the stakeholder groups made this feasible. Furthermore, the face-to-face technique is most desirable for this study to get the needed data, explore personal experiences, opinions and beliefs and use probes to elicit this information (Donley & Grauerholz, 2012, p. 27). Given that both data on patterns, numbers, and frequencies of attitudes as well as on perceptions, beliefs and behaviours were needed, a mix of qualitative and quantitative methods was used for the data collection. Furthermore, given the contextual approach of this study, qualitative methods, though criticized for not being objective and scientific, are especially suiting since it is used to deepen understanding of views and values, and is based on speaking and involve observing and talking to people (Donley & Grauerholz, 2012, p. 39). The questionnaires functioned as a list of supporting questions, which resulted in the interviews being semi-structured and more following the flow of a conversation (Donley & Grauerholz, 2012, p. 44). This allowed discussions on the topics that were more important for the respondents and avoids spending too much time on topics they did not have too much knowledge about.

Sample selection and limitations

	(Estimated) number	Sample	Source
Coastal and Marine Tourism Operators	50 (18 sea-based activities) according to MSP draft/ 32 after Covid	24 (75%)	(MFMR, 2018, p. 107)
Artisanal fishermen	Unknown	41	-

To determine the sample size of the Coastal and Marine Tourism operators, the NTB list with registered companies is known to be too disorganised, incomplete, and outdated to use as an indicator of the number of operators. In the Marine Spatial Plan Draft, the number of 50 registered tourism operators in Erongo was used, of which 18 had ocean-based activities. I compared these numbers to the outdated list that was available on the NTB website. My findings were that first, many of the registered businesses were registered under multiple registration numbers, due to domain purchases or former mergers. And secondly, several of the tourism businesses on the list had gone out of business during or after the Covid pandemic. After calling and contacting businesses, I brought the list down to a number of 32 tourism operators that were currently operating and were conducting activities in the marine or coastal environment, which was the CMTO population. All these tourist operators were contacted by walking in or by phone call and while some found themselves too busy for an interview, I managed to sit down or call 24 of the CMTO. To study the perceptions of change, development, impacts and experience of the tourism operators, I spoke mainly to the more senior people in the companies, usually the owners, who seemed to have the most complete view of these aspects. By including questions on employee numbers on a permanent and part-time basis, both before and after Covid, we aim to estimate how many people are relying on income from working in these tourism sectors to support their livelihood.

Determining the sample of the artisanal fisheries is challenging since it is an informal sector and there is no data on the size of the artisanal fishermen population. HAFA is now the only formal association with a small number of registered artisanal fishermen and women and though the numbers vary since licences are paid monthly there are usually around 100 registrations a month. However, some of the licences are also used for people who only fish part-time in addition to a day job as an extra source of income or are even purchased by recreational fishermen who fish regularly for leisure. On the coast, especially outside of Henties Bay, most of the artisanal fishermen use a recreational permit which conforms to strict bag limits, or fish without a permit. Because the Skeleton Coast is a popular destination for recreational fishing, the numbers of these licences used for artisanal fishermen are not valid. In the project, it was decided to aim for a sample of 40 interviews with fishermen from different rows of which some were registered with HAFA and some weren't. The first fisherman approached was from the neighbourhood and he gave out some numbers of other fishermen to create a snowball effect. He also listed several popular local fishing spots. Through the course of the next few interviews, we made a list with repeatedly listed fishing spots and when the tide was low and the fishing conditions favourable according to contacts at HAFA, the research group took the car out to visit the fishing spots to find fishermen. In addition, the hotspot closer to town for the local fishermen who did not have transport was usually filled up during the evening, which is when some of us went to visit those sites in the evening to speak with the people who were willing to cooperate. The first question the fishermen were asked was if he was fishing to make a living, to make sure their fishing activity fitted the purpose of the study.

There are some notable limitations to this sampling approach, which can be considered convenience sampling and is not desirable in research (Donley & Grauerholz, 2012, p. 95). The people were not randomly selected but were simply the ones that were available in the known locations. However, given the absence of a list of the population, it was the only option for this study. Here it is also good to note that especially since the pandemic, there has been an increase of artisanal fishermen who have lost their jobs and had to turn to fish as a temporary way of making a living, therefore the present population might differ from two years ago and from a year from now and any estimation we have can be wrong. Another set of limitations is related to communication between the interviewer and the respondents. Not all fishermen speak English, which is why the researchers with different languages all had to work together to conduct the interviews in the fishermen's languages; English, Oshiwambo, Damara, Afrikaans or Otjiherero. Some are fluent in English, but some are not very comfortable in English, so there might be some limitations in how freely some of the fishermen can express their thoughts in the languages that we could speak. A final limitation is that given the history of apartheid in Namibia, and some of the ongoing struggles between the white part of the population and the black part of the population, some fishermen were not very keen to speak to white European researchers like me, since in the past white people asking questions were often linked to law

enforcement, asking questions about permits and checking catches. To overcome this, when we got a sense people were not comfortable speaking to us, we often referred them to our Namibian colleagues.

Additional expert interview

To get more contextual knowledge of the marine developments in Namibia over the past years and prevent an academic bias, four qualitative interviews were conducted with experts from different sectors. The interviews focussed on the experiences and needs from different points of view in the marine industry, while the professional and personal experiences of the interviewees were used to draw a broader understanding of marine development since independence. These interviews were semi-structured, and a list of guiding questions and topics structured the conversation and allowed the interviewees to discuss their knowledge, beliefs and experiences relating to the topics.

- Interviewee 1 shared observations from the artisanal fisheries' point of view
- Interviewee 2 shared observations from the marine spatial planning as well as the ministry of Fisheries and Marine Resources' point of view
- Interviewee 3 shared observations from the environment and tourism point of view, as well as from the environmental assessments' procedures
- Interviewee 4 shared observations from the commercial fisheries point of view

3.3.3 Analytical methods

Social Impact Assessment in questionnaires

Following the risk assessment framework as presented in chapter 2.4, the identified risks are constructed from interviews with the 'impacted stakeholders' [3.3.2]. To get an understanding of the range of aspects that contribute to impacts on livelihoods, a semi-structured survey designed within the guiding principles of a Social Impact Assessment was used to interview the stakeholders. A SIA addresses both the negative and positive effects of a planned intervention (such as blue economy development) by looking at how the human population has ways in which they live, work, play, relate to another, organise to meet their needs and generally cope as members of society; their socio-economic and cultural environment so to say (IAIA, 1994, p. 11). The SIA, as standardised by the International Association of Impact Assessments, uses five categories of variables in order to get a full understanding of the impact of a given project which is population characteristics; community and institutional structures; political and social resources; individual and family changes; community resources (IAIA, 1994, p. 19) which is why the SIA serves as a good framework to apply to the risk identification objective from the stakeholder interviews. Given the anticipatory nature of this study, the surveys are designed to identify experiences of change in the stakeholders' social-economic and natural environment, as well as expectations and perceptions of these factors of change. By structuring the questions loosely within the SIA frame and adding the emphasis on

awareness and communication (to give priority to the stakeholder inclusive nature of MSP processes), experiences and attitudes were used to produce values for risk identifications.

One limitation to note for the SIA approach in the context in which this thesis is developed (NAMares project), is there were several ongoing studies relating to ecosystem services with different aims. Researchers in the project target the same stakeholder groups, which is why the developed questionnaires aim to produce the data for multiple studies simultaneously. To address the multiple angles, the researchers worked together to develop one questionnaire for each stakeholder group, and merge questions and themes to get all the information needed for each individual study from one interview. Some of the studies have used a Livelihood Assessment Framework in the questionnaire which is combined with the Social Impact Assessment that is used for this study. Though it is a more efficient way of using time and resources and not having to ask too much time from the stakeholders, the joint questionnaire is limited in ways that not one single frame could be properly applied to the questionnaires which became a collection of questions merely loosely following the frameworks. Besides, by combining similar questions which had different aims, not all answers from the respondents give the intended direction of the answer. The questionnaires use mixed methods of asking questions, from open questions with a general approach 'What are challenges you encounter in your day-to-day operation?', to more specific questions 'How well do you feel informed about developments in your sector?' and 'What do you think are risks to your activity?' as well as some multiple-choice questions and 'yes' 'no' questions. The questionnaires used in this study are attached in the appendix (I and II).

Qualitative content analysis

To make sense of the data gathered from the empirical work, a qualitative content analysis was used. This method is often used to explore the meaning behind the answers and record themes and patterns in the results to draw larger conclusions from the results. This method is, unlike quantitative methods, inductive rather than deductive (Donley & Grauerholz, 2012, p. 51). Furthermore, preconceived ideas of what the stakeholder groups might think of the developing marine sectors were disregarded even though some of the lines of questions already indicated certain conclusions. But given the semi-structured interviews that resulted in discussions on the topics, the qualitative content analysis shows underlying issues and patterns that are causing the impacts on livelihoods. Connecting this information to the quantitative data retrieved from the studies, the who, what, and where from the analysis paints a clearer picture of the cause-effect relationships in the study. The values and patterns derived from the qualitative analysis form the identified risks and are used in the bowtie analysis, described below. However, by using these derived values for further analysis, there is a risk to overgeneralize the data, since some of the contextual information and personal values will dissolve in creating categorized values from the data. Though unavoidable in studies like this, it is important to keep in mind

that despite the qualitative content analysis, the conclusions will not be representative of all individuals in the stakeholder group.

Bowtie method

For the risk assessment step of analysing the identified risks, the ISO requires a methodological approach to structure the data from the risk identification. In the ISO, the bowtie method is one of the proposed methods for scenario analysis to map and evaluate management controls (ISO, 2018b, p. 60). Adapted to MSP, a bowtie is considered an effective method to analyse risk in an MSP context and is suitable for different types of available data to determine what different consequences of an action may arise (Cormier et al., 2015, p. 65). In this risk analysis method, the cause-effect relationship is demonstrated by structuring the drivers (risk source), a central hazard (event) and consequences/ impacts in a diagram with the event that must be avoided, the hazard, in the centre (ISO, 2018b, p. 61). In this structure, the bowtie integrates multiple causes and consequences in relation to the central hazard and understands the interlinkages between different risks. The tool is a straightforward way of demonstrating where control measures must be taken in order to prevent the hazard or mitigate the effects.

Chapter 4 Main findings empirical work

4.1 <u>Theoretical interpretations</u>

From the stakeholder interviews, several risks and concerns were identified. As can be seen in Table 1, the concerns can roughly be divided into categories relating to spatial issues, legal or institutional issues, economic issues, and environmental issues. Though answers were diverging among stakeholders, the table shows the main identified risk objects and an indication of the frequency of mentions in the interviews. To place the findings in the theoretical context that was discussed in chapter 2, this chapter demonstrates how ecosystem services, risk perceptions and livelihood vulnerability (Figure 1) are forming a basis in which the identified perceptions and concerns can be interpreted.

Table 1 Identified risks derived from stakeholder interviews and indications of frequency (own table)

	Artisanal fisheries	Concern frequency	**Coastal and Marine Tourism Operators**	Concern frequency

Spatial	Private owners and local government restricting fishing spots such as the jetty, despite promises of allowing fishermen, fishermen must go further to find fishing spots	Medium	Property development on coastline without stakeholder consultation. Mining in coastal areas. Rivers blocked, harbour development altering currents	Medium
	Illegal or uncontrolled activity of other fishermen and disadvantaging the fishermen, for example others using worms and ski boats	Medium	Not enough separation between people and animals, for example with the seal colonies	High
Institutional problems/ legislative	Licences are limited for people who depend on it and the fisheries inspectors are finding it too high. HAFA licences are hard to come by, results in having to fish illegally	Medium	NTB restricting businesses due to inflexible rules, hinders growth potential, lacks assistance, lack of communication	Medium
	Harassment from police, inspector and neighbourhood watch make fishing dangerous	Medium	Registration Costs	Low
	Not enough control/ enforcement for the 'big' guys doing illegal stuff	Medium	Lack of enforcement of rules (illegal activity)	High
			Policy change/ actions such as park fees increase not strategic, not thought out, hurting businesses	Medium
Economic	Economic situation challenging, job loss, more fishermen more competition, challenging to sell fish for good prices	Medium/ high	Unstable tourism market	Low
	Increasing operation costs, costly equipment, rising fuel prices	High	Inflation increases operation costs	High

	Lacking infrastructure to sell fish, no markets, no organised structure	Low		
Environmental	Litter and debris on beaches and from coastal development	Low	Pollution/ rubbish on beaches	Medium
	Decrease in fish stocks, size and abundance, decrease catches. Hard to catch enough to make a living	High	Dead and harmed animals on beaches hinders operation/ disappearing animals	Medium
	Coastline and water change, water temperature is warmer, cob runs don't occur anymore, fish stay in deeper waters	Medium	Shrinking/ disappearing beaches	Low

4.1.1 Ecosystem services

From the stakeholder interviews, several ES can be identified. Given the nature of the work of the stakeholders, most of the identified ES are relating to cultural services, especially among CMTO. However, two provisioning services were identified in the matter of *food provisioning* from fishing activities and *biotic materials* from collecting shells and other materials from the beach to produce items such as jewellery. *Symbolic and anaesthetic values* were often cited by stakeholders from both groups, frequently relating to family businesses and growing up near the ocean and developing strong connections with it. *Recreation and tourism* is a given ecosystem service for all CMTO but were benefited from by many of the fishermen, who at times said to bring their families to the beach for recreational purposes. *Cognitive effects* such as education and awareness were considered benefits among both stakeholder groups. AF respondents often noted knowing the local environment which teaches them a lot and in turn, gives them the ability to educate others on the marine environment. For the CMTO, cognitive effects are in the form of educational tours for tourists and sharing local knowledge with the locals and scientists.

Table 2 Identified ecosystem services by the stakeholder groups, following the MES categorization (own table, data adapted from (MEA, 2005))

Marine and Coastal Ecosystem Service	Marine/Coastal specific component		AF	CMTO

Food Provision	Fishing activities (including shell fishing), industrial or artisanal (including subsistence or commercial)	x	x
Biotic materials	Ornamentals (corals, shells) and other commercial and industrial resources (fish meal, seal leather, algal)	x	-
Symbolic and anaesthetic values	Coastal communities have strong bonds to the sea due to local identity. Natural and cultural sites linked to traditions and religion. e.g., coral reefs or marine mammals, family tradition	x	x
Recreation and tourism	Wilderness, kayaking, iconic landscapes and species, sunbathing, sailing, recreational fishing, and whale watching.	x	x
Cognitive effects	Inspiration of arts and applications, research and education, information and awareness	x	x

Though these ecosystem services reflect a part of humans' relationship to nature, the underlying socio-economic context that determines people's values, beliefs and preferences which are crucial in understanding how the loss of these ES can cause risk to livelihoods, is not comprehensible from just these identified ES.

4.1.2 Risk perceptions

From the interviews, a different understanding of what risks to livelihood is, became especially apparent from the diverging answers between the two stakeholder groups, but also from respondents within the same stakeholder group. Open questions such as 'what are your day-to-day challenges to your activity?' were answered by the CMTO with factors such as rising park fees, bad economic situation, and environmental problems. For the AF, the common challenges and concerns were the inability to afford gear, high fuel costs or breakdown of transport and decreasing fish stocks. The differences in these answers can partly be attributed to the different sizes of the stakeholder's activities. The CMTO respondents are considering risks that are causing problems to their operation and therefore to their income and eventually livelihoods, while risks described by the AF are causing a direct impact on their individual ability to catch fish and get food or income from their catches. To relate this to Boholms relational risk theory, the 'objects at risk' for the CMTO are often related to their space of operation and for the AF the risk object would be the fish resource. The 'risk objects' are several factors that are directly or indirectly creating risks for this object, as further illustrated in the risk analysis (Figures 3 and 4). Moreover, especially when discussing awareness of developing marine sectors, Adger's remarks on perceptions of vulnerability and risks being tied to knowledge about a certain topic (Adger, 2010, p. 284) were visible. In both stakeholder groups, when the respondent indicated not to be much aware of any developing sectors, the answers on concerns of impact were all very neutral and there did not seem to be much reason for concern. Many indicated that the marine space was so big, that any type of development would bring no harm

to their direct space of operation. However, the respondents who indicated to have been informed or were aware of any developments, especially of phosphate mining plans (fuelled by a large social media campaign which created a national debate) or had noted other marine sectors in their space, expressed concerns about environmental stressors and debatable political decision making much more frequently.

4.1.3 Livelihood vulnerability

Embedded socio-economic aspects that define the context in which risk is interpreted as well as what influences aspects of livelihood vulnerability, came to light when discussing the backgrounds of the respondents. The highest received education of AF respondents was usually high school (70%) and before making a living from fishing activities, they had other casual professions such as driver, security officer, miner, maintenance, and construction worker. For the CMTO, nearly 65% of the respondents have received some type of higher education degree, in the form of a university or management degree. Some respondents mentioned previous occupations including freelance tourism guide, politician, businessman and working with local authorities. This demonstrates, that when considering aspects such as access to information and institutions, the background of the respondents illustrates why interaction with authorities is experienced differently among the stakeholders. Educational and employment background aspects also affect adaptability to change, for instance in scenarios where respondents are no longer able to sustain their livelihood with their ocean-based activities and they would have to turn to other professions. To relate this to Beck's remarks in his theorization on risk society and the rich being able to 'buy their way to safety', the social differences between these two stakeholder groups indicate that wealthier people with stronger educational backgrounds have more means to secure their livelihood that the less connected, less wealthy, and less educated people in the same society.

Other socio-economic aspects include lack of access to transport and other infrastructure (AF), connection to public facilities such as safety and security (AF/ CMTO), access to permit offices (AF), access to governmental institutions (AF/CMTO), legal representation (AF) and formal representation (CMTO). Demographics such as ethnicity and language, size of households and number of dependents are illustrating vulnerability aspects of the stakeholder groups and their communities. For the Artisanal Fishermen respondents, fishing activities were the main source of income for 83%, and while half of the respondents supported 1-4 dependents, 14% supported 5-6 dependents, 17% 7-10 dependents and some even more than 10 people (10%). As for the CMTO, the number of direct dependents is lower, with three quarters directly supporting 1-4 people in their household and only a quarter larger household, but given the people employed in the sector, there are a significant number of people depending on the CMTO activities. Furthermore, three-quarters of the CMTO indicated carrying out some type of social responsibility to support the local communities, for example

by taking disadvantaged kids to go kayaking, organising beach clean-ups, supporting building houses and organising soup kitchens.

4.2 Risk analysis with bow-tie model

To illustrate how the identified risks and vulnerabilities are creating pathways of impact on livelihoods, Figures X and X show the cause-effect relationships of the values derived from the stakeholder interviews. The central hazard in the bow-tie model is the object at risk and the causes are the risk objects. Given the overlap of perceived threats and the interconnectivity of these causes and effects which are creating pathways of risks, all the causes and effects are presented in one figure for each stakeholder group. The spatial problems are marked in orange, the economic ones in yellow, the environmental in green and the intuitional in blue.

To emphasise the cause-effects, the identified risks are organised into indirect and direct factors. Often in bow-tie figures, links between direct and indirect causes/ drivers are marked with lines but given the interconnectivity or problems I want to demonstrate in the analysis, the lines between indirect and direct causes and effects are left out. For example, indirect environmental causes can lead to direct environmental threats, but also spatial.

Chapter 5 Discussion

5.1 Assessing risks

Coastal and Marine Tourist Operators

As illustrated in Figure 3, most of the identified risks are related to the area of operation. The indirect drivers are caused by human-induced damage to the natural environment, lack of control in the area, rising park fees and permits to access the area and climate change impacts. Therefore, the central hazard or 'object at risk', is a spatial hazard. Many drivers of risk are related to lack of control and ineffective, uninformed decision-making, which can be traced back to flaws on institutional and organizational levels. Social vulnerability aspects that arise from this, are lack of political power, no access to governmental and financial facilities, lack of faith in governmental authority and loss of security. Many of these vulnerabilities in the socio-economic environment became apparent during the pandemic when many CMTO experienced the loss of business and no government support or recognition which resulted in threats to securing their livelihood. These same flaws keep impacting the area of operation, in the sense of lack of control and enforcement of rules and lacking recognition of the needs and the socio-economic position of CMTO.

The identified drivers, fuelled by external drivers such as climate change and a bad economic situation, are pushing CMTO out of their operation area. The areas become inaccessible due to a bad environmental state, or unaffordable due to rising fuel prices and rising park fees. Though many indicated that the vast untouched spaces would allow operators to explore new areas, the high tourist numbers from before the pandemic demonstrated
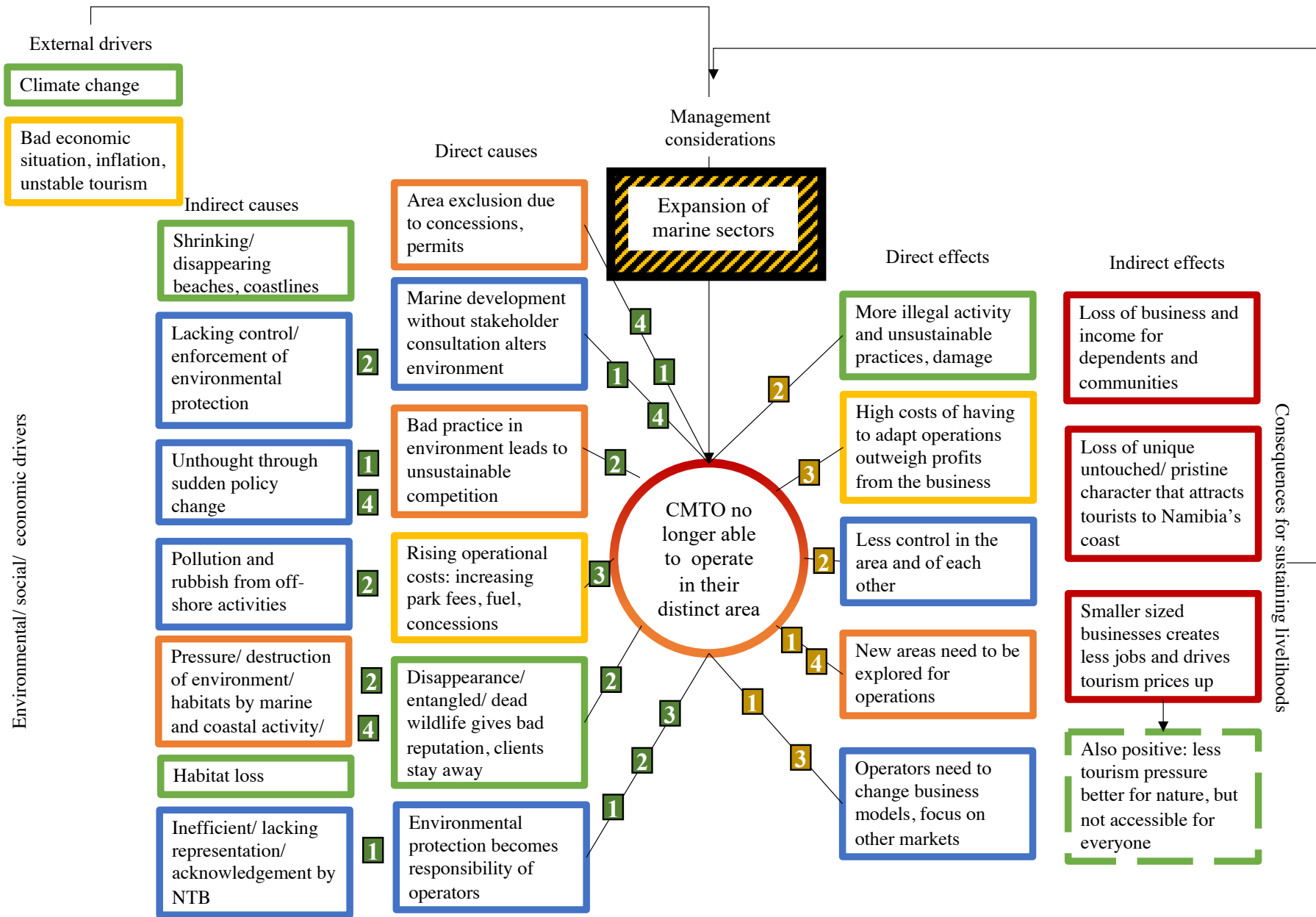
Figure 3 Bowtie analysis of identified risks and concerns of Coastal and Marine Tourism Operators. Numbered boxes are referring to the proposed measures of chapter 5.2 (own figure, adapted from ISO (2018))

External drivers

Effects of climate change, ecological change

Bad economic situation, job loss and inflation

Management considerations

Expansion of marine sectors

Indirect causes

Unregulated/ illegal uncontrolled practices impact fish stocks (eg. bycatch)

Unequal competition from other AF, rec fishermen, ski boats

Pollution and rubbish from off-shore activities

Pressure/ destruction on environment due marine industries

Lacking representation/ acknowledgement of AF

Direct causes

Spatial exclusion due to coastal development/ municipality policy

Lacking infrastructure to sell fish eg. Market spaces, coolers

Decrease in coastal fish stocks: size and abundance

Increase in operational costs: equipment, fuel

Harmful treatment from fisheries inspectors, permit costs, high fines

AF not able to catch enough fish to sustain livelihoods

Direct effects

The few existing market structures not suitable for the decreased supply

Increase in illegal activity, unsafe practices

Costs of fishing outweighs profit

Indirect effects

Loss of income for Artisanal Fishermen and dependents

Loss of knowledge on local fishing practices/ traditions

Environmental/ social/ economic drivers
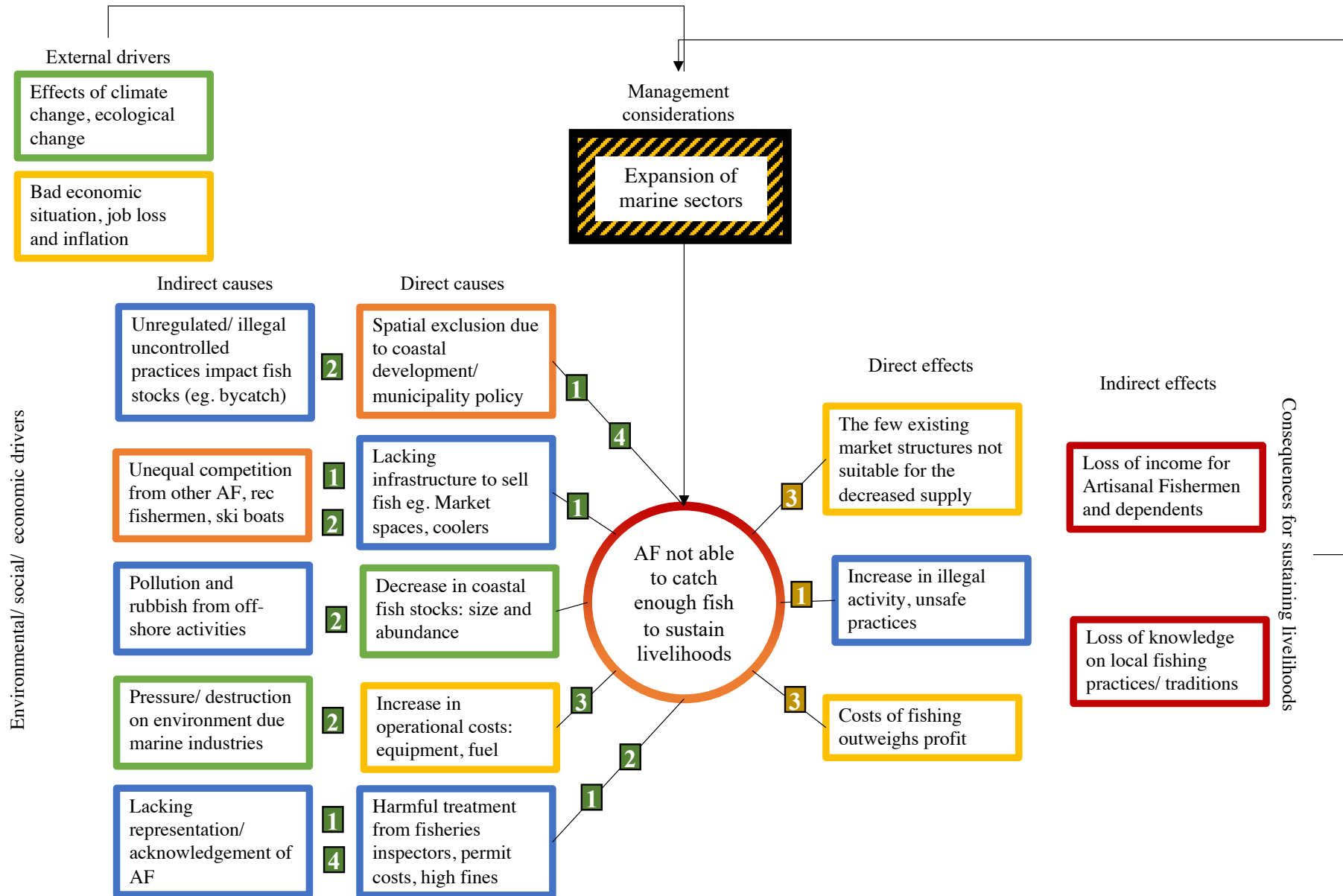
Consequences for sustaining livelihoods

Figure 4 Bowtie analysis of the identified risks and concerns among Artisanal Fishermen. The numbered boxes are referring to the measures discussed in chapter 5.2 (own figure, adapted from ISO (2018))

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additional environmental pressure this activity brings. Many come to Namibia for the pristine, untouched, and unexplored environments and pushing operators outside their zones because of bad spatial management and lack of consideration will merely shift the spatial problems to other areas of operation. Therefore, this analysis indicates that if the sources of risks which are shown on the left side are not addressed properly, the effects on the right side of the bowtie will become frequent problems in the wider area.

To overcome some of the insecurities to the business, some of the operators recognise that a change in their operation would create more sustainability and security for their operations and livelihoods. Decreasing the size of the business and creating more exclusive tours for smaller groups would bring more stability, financial security and less dependence on the mainstream tourism flow while decreasing environmental pressure. Though courses of treatment such as this will bring new negative and positive effects.

Artisanal Fishermen

The identified risks from the AF stakeholders are structured in Figure 4. Though the biggest hazard to the AF's livelihoods is loss of the resource, other problems are adding risks to sustaining livelihoods from fishing activities. The informal nature of this stakeholder group is at the core of many of the indirect and direct causes of social vulnerability aspects such as inaccessibility to governmental institutions and facilities, lack of security, lack of infrastructure, loss of income and no political power which are all embedded in the informality of this sector. The pathways of risks are all characterized by structurally lacking control in the area, and of the other activities that are taking place. However, the fishermen that were employed by the fishing association considered risks in slightly different areas than the fishermen fishing on recreational permits or without. For the AF fishermen with artisanal licences, there were fewer concerns about the organizational and institutional aspects, and impacts and risks to livelihoods for them were often related to the natural environment for example caused by decreasing fish stocks and unfair competition. For the AF with no permit or a recreational permit, the causes of impact were more related to the bad regulation, lack of control or harmful control and inability to sell their catches. Though differences between the stakeholder attitudes are not visible in Figure 4, some of these pathways of risk are known to organizations as HAFA and are addressed on a small scale already. However, the deeply embedded problems relating to inefficient control are creating risk to the AF sector as a whole and illegal practices are recurring in both causes and effects, suggesting a vicious circle of illegality in the area. The decreasing fish stocks which lead to a total loss of resources will be catastrophic for the whole sector, but the current web of existing risks is already causing many problems to the livelihoods of AF.

5.2 <u>Risk treatment: prevention and mitigation</u>

The analysis shows how vulnerabilities are embedded in the socio-economic context and that risks are created through cumulative risk factors. Therefore, the measures to address this do not look at protecting the ecosystem benefits, but rather go beyond the service and address the structural vulnerabilities directly.

5.2.1 Measure 1 Representation and formalisation of the sectors

As can be seen in Figures 3 and 4, a recurring problem among both AF and CMTO is the lack of institutional recognition and formal organisation of stakeholder groups which creates several problems that are adding to risk. Informality leads to insecurity and lack of political power, and it prevents stakeholders' access to institutional facilities. For environmental management, lacking stakeholder representation hinders inclusive stakeholder participation. AF is an informal sector and besides HAFA in Henties Bay, they are not recognized by law as a stakeholder group. Results from the empirical work show that the fishermen from HAFA recognise the benefits an association brings to their activity; being represented, supported, and having access to facilities and better fitting fishing permits. CMTO are formal and registered businesses, but they are not represented as a distinct subgroup of tourism operators dealing with operations in the marine environment. Therefore, a more structured or formal representation would be needed to organise and strengthen this stakeholder group to understand their needs and problems, safeguard their position as marine stakeholders and support their livelihoods. As indicated with boxed measure 1 in Figures 3 and 4, a formal and more organised representation would address several of embedded risks and structural vulnerabilities; it would improve stakeholder consultation and avoid spatial conflicts while making policymakers more aware of their position.

5.2.2 Measure 2 Enforcement of protection measures/ control

Another problem which is recurring in the pathways of risk, is lacking control and effective enforcement of existing measures (measure box 2 in the figures), which leads to bad practice and fuels illegal activity. Both stakeholder groups indicate that the lacking enforcement is disadvantageous to their practices and the environment of operation. It is creating a loss of security, and a lack of trust and adds risk to their occupation and degrades the environent. However, rather than implementing new measures, fines and concessions, the respondents indicated that simply better enforcement of the current set of measures would address a range of problems that are creating risk. The wide area of operation makes more control and patrols challenging since it requires resources that are not always there, but optimising existing structures, such as collaboration with the people on the ground, could improve control. However, effective control through communication with stakeholders on the ground does require a more organised nature of stakeholders which leads back to measure 1.

5.2.3 Measure 3 Fiscal support/ investment possibilities

Many of the problems experienced by stakeholders are caused by financial problems originating from both lacking institutional support and economic problems such as inflation and rising fuel prices. As can be seen in Figures 3 and 4, measure 3 is more a mitigative measure rather than a preventative measure. It would mitigate impacts caused by spatial conflicts in the form of compensation schemes to prevent loss of livelihood for both stakeholders. However, fiscal support and investment possibilities would also address some structural problems that are characterizing the stakeholder groups. Low income, low education and informal employment are preventing especially the AF to attain financial support for their activity, and lack of trust in institutions causes trouble for CMTO to get investments and secure financial stability and support. Factors such as unaffordable equipment and spatial exclusion can be mitigated by fiscal support and prevent negative effects (on the right of the Figures) such as illegal practices. However, this measure is also tied to the other measures, since understanding where mitigation measures are needed requires transparency, communication and a more organised or accessible structure of stakeholder groups, particularly for the AF.

5.2.4 Measure 4 Improvement of information/ communication with stakeholders

From the interviews, it became clear that there was very limited communication between the industries, the government, and the stakeholders. Drivers such as development without stakeholder consultation, sudden changes in policies, area restrictions and other perceived threats from developments can be prevented early on in planning processes (boxed measure 4). Lack of knowledge increases the vulnerability aspects such as perceptions of security, and institutional trust. Furthermore, functioning institutions and transparency in decision-making increase the legitimacy of policies and accountability of industries which would benefit sustainable policymaking, but a certain standard of available and accessible information is needed to achieve this. Therefore, especially when dealing with developing sectors and uncertain outcomes, a good flow of accessible information between government, industries and stakeholders will be crucial in effective marine management.

Many of these measures to be taken go beyond Marine Spatial Planning in the sense that it does not fall under the zoning aspects of the plan, but rather under effective stakeholder participation and the objective of successfully including underrepresented and marginalised groups. Other of these measures should be addressed by the industries, and government or taken up by the stakeholder groups themselves.

Chapter 6 Conclusions

6.1 Answering research questions

To briefly circle back to the research questions that were asked in 2.1, this section will discuss how the analysis (informed by thesis' theoretical framework) have answered the questions.

6.1.1 Which socio-economic aspects contribute to the vulnerability of the coastal communities' livelihoods?

As discussed in the theory in chapter 2, aspects that contribute to the vulnerability of livelihoods are a set of conditions derived from the social, political, cultural, and economic context. Some vulnerability aspects that are influenced by these contexts are income, political power, infrastructure, occupation, education, access to resources and facilities and employment loss. In this study, many vulnerability aspects came visible in the analysis when structuring the identified risks and visualising pathways of risk [4.2 and 5.1]. Evidently, low income, informal occupation, unfinished education, large family sizes and dependents, lacking infrastructure, and inaccessibility to institutional resources and financial support seemed to characterize the coastal stakeholder groups of Namibia's coast. Because of these characteristics, the stakeholder groups experienced underrepresentation in many governmental decisions and with developing industries happening in the environment, these vulnerability aspects make the stakeholder groups less adaptable to change and more susceptible to impacts.

6.1.2 In what ways are risks to livelihoods perceived among the stakeholders?

From the stakeholder interviews with a Social Impact Assessment approach described in chapter 3.3, several perceived risks were identified, as presented in Table 1 in chapter 5.1. Though strongly depending on the natural environment to do their activity, risks to livelihood were perceived in a range of aspects. For the AF, the biggest risk was not being able to catch enough fish to sustain their livelihoods, which indeed relates to the natural environment, but other risks for both stakeholders were perceived in rising operation costs due to inflation, illegal activity in their direct environment of operation as well as lack of control and enforcement. This indicates that some of the biggest risks to sustaining livelihoods are found at institutional and organizational levels in addition to the more obvious environmental causes. Another characteristic, which is why these stakeholder groups were selected in the first place, is the lack of security due to the underrepresentation of both groups, caused by informality as well as lacking organised representation. This resulted in unsustainable decision-making and a flawed information flow, increasing risks to the whole society.

6.1.3 How can the identified risks impact the objectives of effective marine management?

Marine management in this case study is Marine Spatial Planning, which is defined as a participative decision-making process. MSP objectives include developing a sustainable blue economy while safeguarding ecosystem health and social and economic benefits. Moreover, as emphasized by the African vision on how to facilitate blue growth, the inclusion of all social groups is needed to create sustainable growth. Given that the identified risks in this study appear in the socio-economic context of the coastal community, effective marine management will depend on addressing some of these embedded vulnerabilities while ensuring more active

participation and effective representation of all stakeholder groups, as demonstrated by the proposed measures in chapter 5.2. By not addressing these structural risks, the objectives of inclusive and participative decision-making cannot be fully achieved and jeopardize the quality and effectiveness of management.

6.1.4 How can the inclusion of the socio-economic aspects of risks enhance environmental risk assessments? And what are the limitations?

As recognized in the literature on impacts of climate change, a study of socio-economic aspects contributing to livelihoods points out vulnerabilities in aspects of a society that might have otherwise been overlooked. Impacting risks are formed by cumulative small, embedded risks as demonstrated in the analysis in chapter 5.1. By conducting risk assessments from a more contextual approach, the results will be more inclusive and representative of the social group that is being studied and can therefore improve the quality of the assessment, develop better knowledge, and prepare for better outcomes. However, a contextual approach also adds complications, since including values and preferences from stakeholder groups will highlight social differences which could lead to very contrasting answers. Especially when a risk assessment intends to address a large social group, the amount of qualitative data that will be produced by a contextual study will make environmental risk assessments more complicated and will require trade-offs between stakeholder values. Some of the practical limitations of collecting data for a study of a contextual nature were encountered on a smaller scale for this study, as discussed in 3.3.

6.2 Implications for theory

The analysis has shown that a number of risks and vulnerabilities that are or might be causing impacts on the livelihoods are not necessarily caused by the loss of benefits in itself, but caused by vulnerabilities in the socio-economic environment. Of course, loss of an ES would cause a direct effect, but small embedded risks can cause problems that will only become bigger if not addressed and cumulating small risks can cause a significant impact. This makes what is considered a small change in the ecosystem an *insidious systemic risk,* which means that a small change through a web of social vulnerabilities and economic weaknesses can cause big harm. However, given the contextual nature of many of these vulnerabilities, most of the measures to address these are preventative and can, if addressed early in the development, strengthen the community and stakeholders. This thesis demonstrates that a more contextual approach is needed to get a better understanding of how pathways of risks are constructed. By incorporating socio-economic considerations into risk assessments, social vulnerabilities and preferences become visible which influences susceptibility to impacts and the ability to adapt. By placing the risks in a contextual picture, a range of impacts on different people will become better visible, as some risks will be enhanced while some others will be mitigated. Though this emphasis has been recognized in studies on climate change risks, a more contextual approach

to human-induced risks will need more consideration in academia, especially when dealing with societies that tend to have a lot of underrepresented groups and high levels of inequality.

6.3 Implications for management

Considering that any kind of development comes with a certain set of uncertainties and risks, developing a blue economy will come with impacts, both negative and positive and both foreseeable and unforeseeable. To deal with these risks, risk assessments are, and they should be, part, of every step of the planning and developing process of environmental management. This study has demonstrated that a contextual approach to assessing risks will expose social vulnerabilities that can create pathways of risks that might be often overlooked. The discussion proposed measures [5.2] to address these vulnerabilities and to prevent or mitigate impacts. These measures indicate that not all of them seemingly fall within the scope of marine management.

In the discussion, I pointed out that while some of these measures should be addressed by management, some should be addressed by industries, some by the government and some by the stakeholders themselves. MSP aims to facilitate blue growth by safeguarding the natural environment as well as social and economic environment, which might suggest that their obligations only include protecting ecosystem services and the benefits which are derived from them as often suggested in literature and management proposals. However, with the participative nature of MSP in mind, as well as the African Union's appeal for inclusive blue growth with special attention to underrepresented groups, it is, to some extent, up to management to take the lead in addressing these issues. Inclusive and sustainable blue growth does require a complete picture of the social-economic environment in which the developments take place. To ensure inclusivity and stakeholder participation from all sectors, whether formal, organized, represented or not, all stakeholders should be considered. If some sectors are not able to participate in consultation processes or cannot be properly represented, management should assess which stakeholder groups are missing and attempt to include them. This could be to request participation through stakeholder meetings, invite industries and stakeholders for discussions, include law enforcement and inspectors, indicate representation through existing structures (HAFA, NTB) or support people to organize themselves, and make information more accessible, all at the early stages of developing processes. At this point in developing the aspiration of a blue economy in Namibia, the MSP planners are the managing authority and understanding, addressing, and managing the social-economic risks is to a degree, part of their management obligation. Otherwise, their management objectives can never be fully accomplished.

6.4 Conclusion in NAMares framework and contributing parties

The NAMares project looks at ecosystem services for Marine Spatial Planning, focusing on the cultural services which are often understudied. Using ES as a tool to study human's

relationship with nature is a straightforward and therefore common approach in environmental management. However, as discussed in the literature, the concept of ES is limited in the way that the context in which they are studied strongly influences the way benefits are enjoyed. This study demonstrates that in the case of Namibia's coastal communities, socio-economic aspects relating to institutions, government and industries are impacting livelihoods and are adding to impacts from changes in the natural environment. This thesis supports the NAMares measure of assessing risks that come with marine development, and it indicates that a more contextual approach to include the socio-economic environment is needed to address the risks in an effective way since the identified risks appear in aspects beyond the benefits from ES.

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8. Appendices
Appendix I Questionnaire for Coastal and Marine Tourism Operators

> **The aim of the study:** *To assess ecosystem benefits and risks.* **Note:** *Information obtained from this survey will strictly be used for the purpose of the study only. Personal information will remain anonymous and confidential.*
> **This questionnaire will take about 45-60 minutes to be completed.**
> **Honest answers are highly appreciated. The following are guiding questions.**

Date: _____ Town name _____ Questionnaire No _____

I. Can you start by introducing yourself?

II. Interviewee profile
Fill in throughout the discussion, ask remaining questions at the end of the interview.

1. Gender: Female   Male
2. Age (in years)   <20   21-30   31-40   41-50   51-60   >60
3. Home language _____
4. Marital status:
       Single   Married   Divorced   Widowed   Other
5. Highest qualification: _____
6. Role _____
7. Years of experience _____
8. Previous job: _____
9. Is this job your main source of income?   Yes   No
10. If not, what is your other source of income? _____
11. How many people in your household (family size)   1-4   5-6   7-10

III. Business details
Some questions about the business, to get an idea how many people are making a living off this business, and how resilient the business is.

1. Name of organization _____
2. Activities _____
3. Number of years in operation _____
4. Number of employees _____
5. Number of permanent or temporary employees

	Full time/ permanent	Freelance/ temporary

Before Covid		
After Covid		

6. Origin of employees _____
   _____

7. Ownership: Fully Namibian   Foreign owned   Joint Venture
8. Is this a company you established? _____
9. Apart from the financial gains, what motivates you to be in this business?
   _____

10. Do you belong to any tourism association? _____
    If yes, how beneficial is it? _____
    _____
    If no, why not? _____
11. Do you belong to any other type of platform where you share business challenges?
        Yes   No
    If yes, what is it? How beneficial is it? _____
    _____
12. Who are your main clients (nationality)? _____
             Preferred activities _____
    _____
13. From your experience, what draws people to this specific area of Namibia?
    _____
14. Do you cooperate/partner with other service providers   Yes   No
15. When is your good/off season? _____
    How many trips/ clients?_____
    _____
16. How did the COVID-19 pandemic impact your company? _____
    _____
17. What measures/changes did you have to take to stay in business (advertisement, staff, tours) _____
    _____
18. In terms of social responsibility, how is your business contributing to the local community/ society?
    _____
    _____

IV. Problems/ threats/ change
Some questions about a range of changes and developments in the coastal and marine environment and how the sector is impacted and has adapted
   1. What are some of the challenges/ issues/ problems you encounter in your day to day?
      _____
      _____

2. a) As a business in the Marine and Coastal sector, what are some of the threats that your business is faced with? In terms of…*(discuss all, also try to think pre-covid)*
b) (How) Did you have to adapt?
- Economic:_____
  _____
  Adapt:_____
  _____
- Social:_____
  _____
  Adapt: _____
  _____
- Environmental: _____
  _____
  Adapt: _____
  _____
- Other: (political for ex.) _____
  _____
  Adapt: _____
  _____

3. Of these, what would be the biggest threat to impact your business? (Impact can be positive and negative). And why? Have you experienced something similar in the past?_____
  _____

4. And in terms of <u>space</u>, how has the growing activities on Namibia's coast brought change to your direct area of operation in the past 10 years?
  _____
  _____

5. Could a totality of these changes lead to an event where you will not be able to do business anymore (tipping point), where you cannot adapt?_____
  _____

V. Blue Economy impacts
Questions about Blue Economy and MSP, to get a sense of the perception/ awareness and flow of information about these initiatives.

1. What do you know of Marine Spatial Planning and Blue Economy? (How) have you been involved? *(if not familiar, briefly explain the concepts)*
  _____
  If you are familiar with these, in what way will your business be impacted by the ideas?_____
  _____

2. Are you aware of any of the following upcoming or developing marine sectors in the area where you operate? *(if not too familiar, discuss by pointing out the different sectors)*

Transport/ shipping	Seawater extraction

	Commercial		Port activities
	Aquaculture/ mariculture		Environmental protection
	Maritime defence		Offshore mining
	Other		

How do you think this might impact or cause changes to your area of operation (and therefore business?)_____

_____
And why do you think this might impact your area ? Have you experienced something similar in the past? _____

_____
3. How well do you feel informed on the development of other sectors?_____

Where do you hear or read about this? _____

The following will be asked depending on what has or haven't been discussed in question 1-3 of the Blue Economy part.

1. What do you know about the ideas of developing offshore phosphate mining?
   (Maybe only relevant for marine operators, not all coastal sectors)

   _____

   _____
   (How) do you think the development of this industry will impact your activity?

   _____

   _____
2. What are your perceptions on environmental protection efforts in your area?

   _____

   _____
3. What changes in conservation efforts do you think would benefit or harm your job?

   _____

   _____
   (How) do you think increasing commercial fishing in your area might impact your activity? *(Maybe only relevant for marine operators, not all coastal sectors)*

   _____

   _____
4. What are your future prospects for the business? Any plans for joint ventures or diversification to adapt to the changes in your sector/ environment?

   _____

   _____

THE END
Thank you very much for your valuable time!

Appendix II Questionnaire for Artisanal Fisheries

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The aim of the study: *To assess marine ecosystem benefits and risks for artisanal fishermen.* **Note:** *Information obtained from this survey will strictly be used for the purpose of the study only. Personal information will remain anonymous and confidential.*
This questionnaire will take about 45 minutes to be completed.
Honest answers are highly appreciated.

Date: _____   Town name _____   Questionnaire No _____

Would you like to introduce yourself?

Fill in the interviewee profile during/ at the end of the interview

I. Interviewee profile
1. Gender: Female   Male
2. Age (in years)   <20   21-30   31-40   41-50   51-60   >60
3. Home language _____
4. Marital status:
     Single   Married   Divorced   Widowed   Other
5. Educational background: _____
6. How long have you been fishing? /Years of experience: _____
7. Previous job: _____
8. Is this job your main source of income?   Yes   No
9. If not, what is your other source of income? _____
10. How many dependents? (in terms of school fee/ food/ rent/ other)
     1-4   5-6   7-10   >10

     _____
     Where are the dependents situated? (region) _____

II. Social-economic aspects
1. How much time do you spend fishing? Hours, days/wk._____
2. Which species do catch most?

		Comments
Kabbeljou		
Galjoen		
Rock lobster		
Black tail		
Steenbras		
Snoek		

Silver Cobs		
Horse Markill		
Oth.		

3. In what areas/ where do you fish? One location/ varying location

_____

_____

4. How do you know it is a good day for fishing?

_____

_____

5. Is the expected income per catch enough to support livelihood/ cover living expenses?

_____

6. Are you involved with any type of association? _____

Why / why not? _____

If you are a member of HAFA, what type of membership do you have?

   Full time membership   Associate membership   Veterans membership

7. On a good day, how many fish do you catch?

_____

8. Are you involved in any other type of platform to support your activity? (FB, WhatsApp), what do you use it for?

_____

9. Where/ who do you go to when you have issues related to your fishing activity?

_____

III. Problems/ Threats

1. Have you observed any changes in the area where you do your activity in the last 5 years? If yes, what are the changes?

_____

_____

(How) has this affected your activity & livelihood?

_____

_____

2. Has the catch, the amount or species changed over time? What causes these changes?

_____

_____

3. Do you sell your catch? What is influencing the prices? To whom?

_____

_____

4. What are some other day to day challenges you encounter in your activity?
General challenges, otherwise environmental (ex. fish stocks), economic (costs/ profits), regulations etc.

_____

_____

_____

Among the above mentioned, which one is the most concerning to you? Why?
_____

5. Do you see any of these challenges we have discussed as something that will make you stop fishing at some point? (Tipping point)

_____

_____

IV. MFMR plans and development

We would like to get your point of view on the current licensing system provided by MFMR – Ministry of Fishery and Marine Resources

1. How satisfied are you with the current licensing system?

Very satisfied   1   2   3   4   5   Very unsatisfied

How are you affected by the current licensing system? _____

_____

What should be improved? _____

_____

The following questions will be about Marine Spatial Planning and the Blue Economy that the government, more specifically, the Ministry of Fisheries and Marine Resources is developing.

1. Are you familiar with the Marine Spatial Planning & Blue Economy? (How) have you heard about it? (*If not familiar, explain briefly: Blue Economy and MSP are plans from the government, MFMR, to develop and expand the marine sectors in Namibia and with the Marine Spatial Plan they want to manage the area where these sectors operate and give them their own zone to operate, to avoid environmental damage*)

_____

_____

2. Are you aware of any (upcoming or developing) marine sectors in the area where you operate?

	Transport/ shipping		Seawater extraction
	Commercial		Port activities
	Aquaculture/ mariculture		Environmental protection
	Maritime defence		Offshore mining
	Other:		

(How) do you think this might impact or cause changes to the area where you are fishing?_____

And how you do your activity: _____

_____

3. How well do you feel informed on the development of other sectors?

_____

Where do you hear or read about this? _____

The following will be asked depending on what has or haven't been discussed in question 1-5 of the Blue Economy part.

4. What do you know about the ideas of developing offshore phosphate mining?
    _____
    _____
    Do you think the development of this industry will impact your activity?
    _____
    _____

5. What are your perceptions on environmental protection efforts in your area?
    _____
    _____

6. What changes in conservation efforts do you think would benefit or harm your activity?_____
    _____
    (How) do you think increasing commercial or recreational fishing in your area might impact your activity?_____
    _____

7. What are your plans for the future? What (if any) changes/solutions would you like to see?_____
    _____

8. Apart from fish, what other benefits do you get from the ocean?
    _____
    _____

THE END
Thank you very much for your valuable time!