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Sustainable Co-Management of Freshwater Fisheries and Local Livelihoods:

The Case of Sikunga

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Sustainable Co-Management of Freshwater Fisheries and Local Livelihoods:
The Case of Sikunga

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Abstract

This master's thesis focuses on the case of a recently established fish reserve, called Sikunga Channel Fish Protection Area (FPA), at the upper Zambezi in Namibia. The aim is to investigate the socio-economic significance of fisheries, the impact of the FPA on the local communities and how fisheries co-management is implemented on site. The underlying purpose is to identify room for improvement at Sikunga and make the case for establishing more FPAs elsewhere in the region, thereby supporting efforts by the Namibia Nature Foundation (NNF). The research conducted is oriented towards the concept of ecosystem services (ES) and common property theory. A mixed-methods approach was chosen with an emphasis on qualitative fieldwork. The findings show that the role of fisheries as livelihood activity, source of food provision and cultural tradition has declined surprisingly. However, there are notable benefits generated through recreational angling. The impact assessment of the FPA yielded a more ambiguous picture, especially regarding catches and income of fishermen and the local food situation. Nevertheless, the FPA is generally viewed positively by the communities and contributes to local employment. It is emphasised though that it is still early to judge its impact with reasonable certainty. Lastly, financing and enforcement are identified as key issues that need to be solved to increase the benefits and acceptance of the FPA and make it self-sustaining in the long run. In addition, enhanced information-sharing, stakeholder communication and cross-border cooperation with Zambian authorities are advocated.

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List of Abbreviations

AGM Annual general meeting

CBNRM Community-based natural resource management

CDSGF Conservancy Development Support Grant Fund

CPR Common pool resource

ES Ecosystem service

EU European Union

FAO Food and Agricultural Organization of the United Nations

FPA Fish Protection Area

GIZ Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH

GM General meeting

HDI Human Development Index

IFRA Inland Fisheries Resources Act

IIED International Institute for Environment and Development

IRDNC Integrated Rural Development and Nature Conservation

KAZA Kavango-Zambezi Transfrontier Conservation Area

MCA-N Millennium Challenge Account Namibia

MET Ministry of Environment and Tourism

MFMR Ministry of Fisheries and Marine Resources

NACSO Namibian Association of CBNRM Support Organisations

NGO Non-governmental organisation

NNF Namibia Nature Foundation

NUST Namibia University of Science and Technology

RQ Research question

SADC Southern African Development Community

SAPA Social Assessment for Protected Areas

SOP Standard Operating Procedure

TA Traditional Authority

UFZ Helmholtz Centre for Environmental Research

UNAM University of Namibia

WWF World Wide Fund For Nature

WeD Wellbeing in Development Countries Research Group

WTP Willingness to pay

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1 | Introduction

Fisheries are under increasing pressure due to conflicts arising over access, space and markets, competing resource uses and overexploitation, in particular in developing countries. One might expect that globalisation of fishing activity and the markets for fisheries products would generate new opportunities for fishing communities. However, substantial financial and organisational inputs and security of access to these resources are needed to truly take advantage of these opportunities. Sadly, this is rarely the case in fishing communities in developing countries. As a consequence, new opportunities mostly turn into exclusion and many fishing communities encounter themselves in a precarious situation. They lose access to and control over local fisheries resources and other users, such as more powerful fishing industries, take over. Furthermore, fisheries are often in conflict with freshwater use for other purposes, including irrigation, hydropower and aquaculture. The resulting environmental changes in the ecosystem lead to lower productivity of the resource and the progressive exclusion of fisheries. Similarly, overexploitation leads to less production per fisher, therewith enhancing potential for conflicts (Viswanathan et al., 2003).

History has shown that secure rights and local management capacity generally lead to more sustainable resource management practices in the long term. It is evident that resource rights are of fundamental importance to provide user groups with the incentive to conserve a resource. Thus, it seems reasonable that governments should allow for more local decision-making and strengthen local management institutions (CAPRi, 2010). Fisheries co-management has evolved as a promising approach to promote environmentally sound resource management involving local fishing communities. It can be understood as a sort of partnership arrangement that incorporates the knowledge and interests of local resource users complemented by the capacity of the government to provide enabling legislation, enforcement mechanisms and other types of assistance (Pomeroy & Berkes, 1997). Interestingly, this approach seems to bear some resemblance to the concept of nature conservancy, which is based on the recognition of local people's rights to

wildlife in their area. The rationale behind a conservancy is to enable locals to benefit from living with wildlife and ensuring its protection in order to create an incentive for them to use resources sustainably (Purvis, 2002b). The conservancy model, albeit in different forms, can be observed more and more on the African continent where it is a frequently adopted strategy to promote biodiversity and wildlife conservation and sustainable rural development (Bandyopadhyay et al., 2004). The analysis of both fisheries co-management and nature conservancies belongs to the area of common property theory: questions such as who holds which kinds of property rights, who has decision-making power and how benefits are distributed are crucial in this context.

The concept of ecosystem services (ES) has gained increasing prominence over the past decade by contributing significantly to illustrating humanity's reliance on the biosphere. Nowadays, it is often used to understand how alternative options for nature conservation, ecosystem use and modification impact human well-being. As a conceptual lens, it helps to understand the different ways in which people benefit from intact ecosystems and how these benefits are affected by resource management regimes and nature conservation measures. The benefits range from provisioning to regulating to cultural ES and can be expressed in quantitative (biophysical or social) units, qualitative descriptions or monetary value estimates. In the case of fisheries, for instance, this perspective can help to show that fish does not only constitute a source of animal protein, but also often an important element of cultural traditions. Despite considerable debate surrounding this field, ES valuation can be a powerful instrument to give more weight to environmental protection in political decision-making and enhance sustainable land-use planning. In addition, the potential of ES assessments for poverty alleviation in developing countries has been frequently emphasised (Daw et al., 2011).

This master's thesis project aims to investigate the socio-economic significance of freshwater fisheries and associated benefits and the impact of Fish Protection Areas (FPA) on the residents at the upper Zambezi in Namibia. In addition, the possibilities for co-management in the framework of an FPA as an instrument of nature conservation shall be explored. More specifically, this thesis focuses on the case of the fish reserve at Sikunga Conservancy, which is one of thus far two pilot projects in Namibia intended to address the problems of overexploitation and cross-border resource use conflict. The FPA has recently been established at a side channel of the Zambezi River (called Sikunga Channel) on the area of the Conservancy to enhance fish stocks and increase revenues to the community from angling tourism. It is led by the same management body as the Conservancy and controlled by members of the local communities appointed as Fish Guards. Given

that the fisheries co-management approach suggests that resources are managed by and to the benefit of the local community, it shall be investigated whether and how this is implemented at Sikunga and what can be learned from this case. Here, the ES perspective helps to systematically examine the role that fisheries play in the livelihoods of the local population, whereas common property theory guides the assessment of (fish) resource governance at Sikunga. In terms of methodology, this thesis combines qualitative research methods with quantitative data analysis, whereby an emphasis is placed on expert and semi-structured household interviews conducted in the field.

This thesis is structured as follows. Firstly, the theoretical framework is presented based on a brief literature review on ES, common property theory and fisheries co-management (Section 2). Secondly, the three overarching research questions guiding this study are outlined (Section 3). Thirdly, information is given contextualising freshwater fisheries at the Zambezi Region and the research setting at Sikunga (Section 4). Fourthly, the methodological approach taken during the fieldwork and the analysis stage is explained (Section 5). Fifthly, the findings of this research project are examined in detail and structured according to the three research questions (Section 6). Sixthly, the main results are discussed, reflected on and embedded into the broader context (Section 7). Lastly, concluding remarks and an outlook are given briefly (Section 8).

This project is carried out in close collaboration with the Namibia Nature Foundation (NNF) and the Helmholtz Centre for Environmental Research (UFZ). The underlying purpose is to scientifically underpin the need to protect freshwater ecosystems in the Zambezi Region due to the strong dependence of rural communities, therewith justifying the existence of the Sikunga Channel FPA and making the case for establishing more FPAs based on co-management elsewhere. Accordingly, the author of this thesis aims to make a contribution to efforts by NNF to promote sustainable fisheries management in Northeast Namibia and the ValuES project of UFZ, which supports the integration of ES into policy, planning and practice.

2 | Theoretical Framework

The theoretical framework of this thesis comprises three different concepts that shall be introduced in the following sub-sections. Firstly, the concept of *ecosystem services (ES)* which provides a useful taxonomy of the different ways in which individuals and whole societies depend on ecosystems (2.1). Hereby, the focus lies on aspects and attributes of natural environments that are relevant to society. Secondly, the concept of *common property or common pool resources (CPR)* that addresses the rights, rules and processes which shape the use of collective goods and landscapes (2.2). Thirdly, the concept of *fisheries co-management* which can be viewed as a specific sub-type of CPR governance (2.3). Whereas the ES concept facilitates the identification and characterisation of exploited goods, such as fish stocks in a river, the CPR concept helps to analyse the governance of collective resources. In this context, nature conservancies and fish reserves constitute just one type of possible resource management regimes and nature conservation instruments. The case of Sikunga Channel FPA is analysed in this thesis as a practical example of fisheries co-management.

2.1 Ecosystem Services

Natural processes sustain and enrich human lives and make a fundamental contribution to economies in many different ways. Unlike normal goods and services which are traded on markets, the provision of these benefits is for free, hence there is no price that could indicate their value. As a consequence, they tend to be undervalued by conventional economics and are easily overlooked in decision-making processes. The concept of ES helps to conceptualise these benefits. It is frequently used to make the economic case for nature conservation and is intended to promote the efficient use of ecosystems to secure human wellbeing (Daw, 2014).

The crucial role of ecological systems has been causing growing concern as evidence points to the high pressures on these systems resulting from human activity and associated risks. Accordingly, there have been major efforts undertaken

recently to assess the status of the services delivered by ecosystems (Bateman et al., 2011). Arguably one of the most influential studies thus far is the Millennium Ecosystem Assessment (MA, 2005). The MA drew attention of the international community to the profound processes of modification of ecosystems worldwide and the resulting impact on the portfolio of ES (ibid.). The study has triggered an impetus for further assessment and valuation of ES and their increased communication to political decision-makers, e.g. by The Economics of Ecosystems and Biodiversity (TEEB).

The conceptual framework offered by the MA has been widely adopted in the bulk of ES literature and, thus, shall be briefly presented here. An ecosystem is defined as "a dynamic complex of plant, animal, and microorganism communities and the nonliving environment interacting as a functional unit" (MA, 2005, p.v). An ES is understood as "the benefits people obtain from ecosystems" (ibid.). These benefits can be further classified into four sub-categories: (1) provisioning services, such as food or timber; (2) regulating services which impact climate, disease, floods, water quality and wastes; (3) cultural services that provide aesthetic, spiritual and recreational benefits; (4) supporting services, e.g. nutrient cycling and soil formation. People are viewed as integral parts of ecosystems, hence there is a dynamic interaction between them and other parts of ecosystems (see Appendix A). Here, it is significant to consider that the specific definition of benefits and services varies depending on the question of interest and the perspective of the beneficiary (Daw, 2014).

Academic literature concerned with estimating values of ES makes use of a wide range of economic valuation tools. The application of economic analysis in ES assessments is mostly justified with the fact that it allows for the quantification and valuation of ES and therewith for their significance to be incorporated in decision-making processes. When provisioning services, such as fish, generate goods that are traded, it is assumed that market prices reflect people's willingness to pay (WTP) for the respective good and hence its value to society. In the case of non-marketed goods, the WTP may be inferred for instance from the observed behaviour of people, called revealed preferences, or by directly asking people in surveys, called stated preferences. A variety of methods has been developed for estimating the value of goods whose market prices are either non-existent or imperfectly reflect their value. These methods have been widely applied already, but are still subject to various limitations. They often require many assumptions, large amounts of data and intensive statistical analysis. Moreover, not all benefits delivered by ES are necessarily amenable to methods of monetary valuation. Fish as a provisioning service is not only a source of income and animal protein but

also has a strong cultural dimension for many societies, for instance in terms of traditional practises or bequest value. Evidently, this gives rise to much debate and uncertainty regarding valuation (Daw, 2014; Bateman et al., 2011).

Critics of the ES approach are essentially against the neoliberal commodification of nature. They claim that the reduction of complex bundles of natural processes to single market prices fails to do justice to the true value of ES to people. Some conservationists are concerned that its utilitarian and anthropocentric perspective leads to a 'crowding out' of intrinsic values of nature and makes conservation subject to unstable market conditions and technological change (Daw, 2014). McCauley (2006), for instance, argues that "market-based mechanisms for nature conservation are not a panacea for our current conservation ills"; for significant improvements and long-lasting impacts "we must strongly assert the primacy of ethics and aesthetics in conservation" (p. 27). The author essentially challenges the popular view that the best strategy to engage policy-makers is to translate the intrinsic value of nature into the language of economics (ibid.).

Even though the ES approach is a fast evolving discipline and seems to be part of today's mainstream policy, it is still confronted with considerable scientific and conceptual challenges. Especially the complex interdependencies between natural capital, ES and human wellbeing require further investigation and understanding, which is necessary to promote the contribution of ES to poverty alleviation (Daw, 2014). Daw and colleagues (2011) criticise that much of the recent ES literature adopts an aggregated view on humans and their wellbeing, thereby possibly disregarding critical issues for poverty alleviation. They claim that aggregated assessment of ES contributions to welfare will remain limited in their ability to inform about poverty alleviation as long as subgroups are not taken into account. Thus, the authors call for a disaggregated analysis which concentrates on who derives which benefits from an ecosystem and how these benefits enhance the wellbeing of the poor (ibid.).

The ES concept is of relevance to this thesis mainly for two reasons. Firstly, the ES perspective helps to demonstrate the significance of the local freshwater ecosystem and to characterise the incentive structure and distribution of benefits for resource users. This is fundamental to support the legitimacy of the Sikunga Channel FPA and associated efforts by NNF with both economic and social arguments vis-à-vis competing resource uses and political agendas. Nature conservation measures are inextricably linked to certain resource use restrictions which require justification to political decision-makers and those directly affected. Secondly, a disaggregated ES perspective helps to explore different facets of livelihood strategies in the ecosystem under study and to understand which groups depend on it

in which way. As a next step, this can be related to the rules of an FPA regime to find out what have been the effects on ES flows and the people relying on them. Amongst other things, this is crucial to ensure that less obvious ES flows that might be influenced unwittingly or unintentionally by the FPA are not simply overlooked. Above all, combining the ES and CPR concepts can essentially help to design and improve resource management schemes and foster the empowerment of fishing communities.

2.2 Governance of Common Property

When a relatively large number of individuals impose high demands on a natural resource, such as fish, do not communicate and act independently in pursuit of their own short-term interest, the situation is likely to turn into a downward spiral of resource degradation. A lack of rules constraining resource access and defining rights and duties tends to nourish this sort of dilemma (Ostrom, 1992). This is what Hardin (1968) famously termed 'the tragedy of the commons'. According to Hardin's narrative, an open-access situation of resources will inevitably result in loss for everyone and is best solved by government ownership or privatisation. However, this has not always been confirmed by history. Over the past centuries people have achieved to sustainably manage their commons based on self-organisation and often developed long-term institutional frameworks. Consequently, many scholars have challenged the generality of Hardin's theory and claim that there are more solutions than originally proposed by the author. Even though tragedies of the commons are real, they are not always inevitable (Ostrom et al., 1999; Berkes, 1996).

Ostrom and colleagues (1999) state that the solution to the commons problem must be based on two central elements: the restriction of resource access and the creation of incentives for users to invest in the resource rather than overusing it. In line with this, external authorities or participants must design, monitor and enforce rules which define who is entitled to use a resource, how much and when such use will be permitted. Moreover, they shall establish and provide for the financing of formal monitoring systems and sanctions for breaking the rules. In the authors' point of view, whether users are capable of overcoming the resource dilemmas they are confronted with essentially depends on the perceived benefits resulting from the changes and the expected costs. Evidently, perceived benefits are bigger when valuable products can be derived from the respective resource. In addition, the authors stress that there needs to be some autonomy for

users to devise and enforce their own rules. Collective-choice rules determine who participates in the decision-making and how and which interests are represented and translated into policies (ibid.). Ostrom (1990) suggested eight design principles for effective commons governance that have subsequently been adopted by many common property scholars:

1. *Clearly defined boundaries*
2. *Congruence between appropriation and provision rules and local conditions*
3. *Collective-choice arrangements*
4. *Monitoring*
5. *Graduated sanctions*
6. *Conflict-resolution mechanisms*
7. *Minimal recognition of rights to organise*

For CPRs that are parts of larger systems:

8. *Nested enterprises* *(Ostrom, 1990, p.90)*

Commons, common property or common-pool resource (CPR) are terms used by the scientific community to refer to a natural resource which is shared by a group of producers or consumers. It can have a fixed location or constitute a 'fugitive' resource, such as fish or wildlife. The resource can be renewable or non-renewable and exploited through varying patterns of organisation (Oakerson, 1992). The commons are natural or human-constructed resource systems, in which excluding beneficiaries by physical or institutional means is only possible at high costs (difficulty of exclusion) and the exploitation by a single user reduces the availability of the resource for other users (subtractability) (Ostrom et al., 1999). In this context, Ostrom (1992) points to the need to distinguish between the 'flow of resource-units' and the 'resource system', that is producing the flow, to avoid confusion. Resource-units are what individual users produce or withdraw from a resource system, such as fish harvested from a fishing ground. As fish caught by one boat is not available anymore for other fishermen, subtractability is a characteristic of the resource-unit that is received from a CPR. The resource system of a commons, however, is characterised by jointness, meaning that it is possible for more than a single boat, for instance, to harvest fish simultaneously on the same river. Being non-excludable and subtractable by nature, fisheries are a classic CPR (ibid.).

Property rights determine incentives for people to engage in sustainable and productive management strategies and influence the levels and distribution of ben-

efits from natural resources. Unfortunately, they are often undervalued or misinterpreted. Property rights, as defined by Bromley (1991), can be understood as "the capacity to call upon the collective to stand behind one's claim to a benefit stream" (p.15). It should be borne in mind that these rights are not necessarily equivalent to full ownership or sole authority to use a resource. On the contrary, there are often several actors possessing different and overlapping kinds of rights over the same resource. Therefore, property rights are better conceived of as a 'bundle of rights'. Here, a useful distinction can be made between user rights, i.e. the rights to access a resource, withdraw from it or exploit it for economic benefit, and control or decision-making rights, meaning the rights to management, exclusion or alienation. The definition of property rights is decisive for determining who is included and who is excluded from resource use and who has the authority over how the resource is to be managed (CAPRi, 2010).

There are four basic property rights regimes generally identified in the literature on common property theory. These are ideal analytical types that do not exist like this in the real world. Usually, an overlapping combination of these regimes can be observed. Firstly, the open-access regime, characterised by the absence of well-defined property rights and free access open to all. Secondly, private property, i.e. an individual or corporate body has the right to exclude other users and regulate resource use. Thirdly, state property or governance, implying that resource rights are exclusively vested in a government for access control and use regulation. Fourthly, a communal property regime, where an identifiable community of users are holding resource rights, able to exclude others (who are not members of a defined group) and regulate the use (Berkes, 1996).

It appears that there is a general consensus among academics that an open access situation is not conducive to sustainability. It is assumed that the three other types of property rights arrangements can potentially lead to sustainable resource use under certain circumstances (Berkes, 1996; Pomeroy & Berkes, 1997). However, in the management of fisheries these three also seem to have serious limitations: private ownership often involves high enforcement costs and leads to unequal distribution; direct state control involves high information costs and often lacks necessary monitoring mechanisms, trained staff or financial resources; community control, in turn, sometimes excludes the poorest from access to a CPR, thereby increasing inequality. As a result, a combination of state, private and community control over fisheries could be considered the most promising way to provide for more equitable, efficient and sustainable fisheries management (CAPRi, 2010).

2.3 Fisheries Co-Management

Fisheries are complex and interdependent socio-ecological systems which require integrated management approaches. These need to be based on conscious efforts by a number of different stakeholders to set up rules that allow for an equitable and sustainable use of the resource that benefits everyone (CAPRi, 2010). Traditional institutions regulating resource access had been existent in most of the cases long before the adoption of modern concepts of fisheries management. Problems for fishing communities today arguably result from the inadequacy of these institutions to cope with new forces rather than from the absence of management institutions. Therefore, simply revitalising such institutions is not likely to solve current problems (Viswanathan et al., 2003).

Modern approaches to fisheries management are essentially based on a top-down structure and centralised government intervention; the involvement of fishing communities is relatively limited. The management goals that are given priority are linked to the conservation of the fish resource rather than the livelihoods of fishing communities and exclusively founded on biological science regardless of the experiences of local fishers. Viswanathan et al. (2003) sharply criticise the narrow focus of this approach, thereby pointing to significant flaws and knowledge gaps. In their view, this type of management is insensitive to the conditions on the ground and fails to do justice to the main concerns of communities. Given past experiences and recent challenges, there seems to be general acceptance that a reform of governance structures for fisheries is needed (ibid.). At the same time, resource users are increasingly claiming formal powers to participate in the decision-making and management process (Berkes, 1996).

The concept of co-management has been recognised among governments, development agencies and academics as a promising way to provide for more equitable, efficient and sustainable systems of fisheries management. Fisheries co-management can be defined as a power-sharing arrangement between the government and local fishing community for the sake of managing a fishery, thereby representing somewhat of a middle course between pure state property and communal property regimes. It could be viewed as a more democratic governance system as resource users are given a voice in determining rights over the fishery and are endowed with certain decision-making authority (CAPRi, 2010; Viswanathan et al., 2003). Co-management covers different kinds of institutional and organisational arrangements defining cooperation and the degree of integration of centralised and local management systems (Pomeroy & Berkes, 1997). It shall be emphasised though that the concept is still rather vague and lacking substance due to wide

and varying adoption. Accordingly, it may have different meanings to different actors (Viswanathan et al., 2003).

Not surprisingly, governments play a key role in the context of co-management. They must support the development of co-management systems and authorise fishermen to organise themselves and give their input. Governments need to provide legitimacy and accountability for local arrangements and establish enabling legislation so that communities can enforce resource rights. In addition, they can help to manage conflicts, prevent abuses of local authority and offer valuable assistance. Fisheries co-management usually requires some impetus, often triggered by the recognition of a resource management problem, for instance linked to depletion or a conflict between stakeholders. Pomeroy and Berkes (1997) elaborate on the power struggle that can emerge when decision-makers are reluctant to share authority over resource management and sceptic about the management capacities of fishermen. Effective co-management is only possible when the government is clearly committed to decentralisation and to sharing power with local governments and communities. It must be accepted that the empowerment process of co-management actors is inextricably linked to the disempowerment of government actors that had full control before (ibid.; Viswanathan et al., 2003; CAPRi, 2010).

Besides, Viswanathan and colleagues (2003) differentiate between co-management arrangements based on their relative emphasis on democracy and efficacy elements. 'Instrumental co-management' means that the involvement of communities is perceived by the government merely as a tool to achieve management goals more efficiently and hence limited to the implementation process. In contrast, in 'empowering fisheries co-management' communities are involved in the setting of management goals on equal terms with government actors. In a similar vein, Pomeroy and Berkes (1997) suggest a hierarchy of co-management (see Figure 2.1), ranging from systems in which fishermen are merely consulted before the introduction of regulations by a government to systems in which they are involved in the design, implementation and enforcement of laws and regulations assisted by the government.

Interestingly, different groups of scholars have reviewed Ostrom's principles for sustainable CPR institutions and applied them to the field of fisheries co-management. Two academic works were found particularly useful as a baseline for this thesis, namely by Pomeroy et al. (1999) and Purvis et al. (2003). It should be mentioned though that both works are based on an extended version with eleven instead of eight principles as listed in Section 2.2. Pomeroy and colleagues (1999) used Ostrom's criteria as a starting point for examining the evolution and institutional sustainability of co-management regimes and reassessed them based on

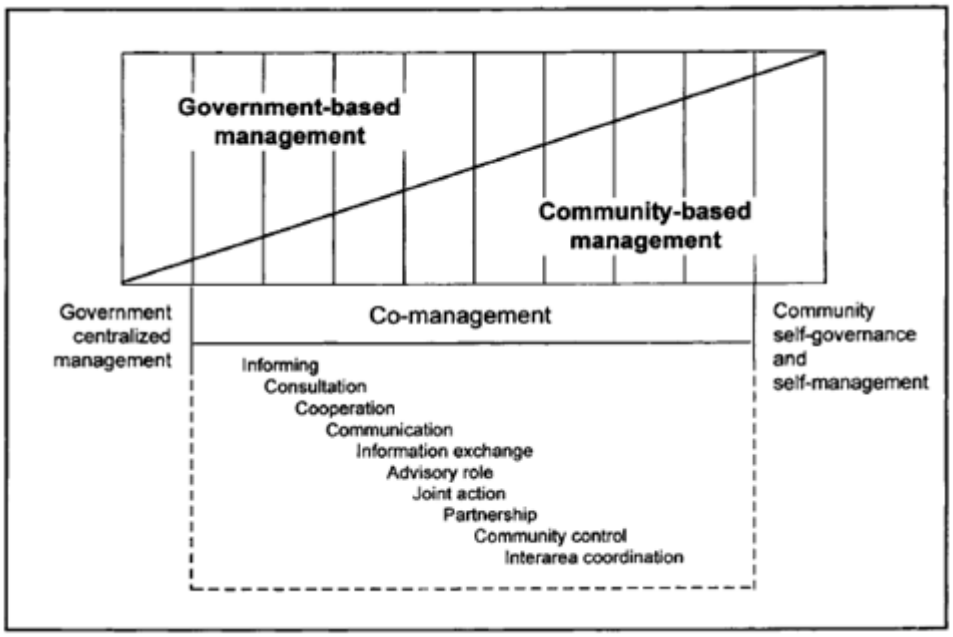

Figure 2.1: Co-management hierarchy (Pomeroy & Berkes, 1997)

experiences gained from their research on fisheries co-management in Asia. In addition, they rated the conditions required for successful fisheries co-management on a scale of high, medium and low (with 'high' meaning critically important for success, 'medium' meaning important for success and 'low' not important for success) (ibid.). Purvis and colleagues (2003), in turn, analysed existing systems of fisheries management and prospects for future management in Northeast Namibia. In this context, the authors applied Ostrom's criteria to the situation on the eastern floodplains in the Zambezi Region to assess the suitability or potential for co-management (ibid.). Relevant information from both works is combined in Table 2.1.

Table 2.1: Ostrom's principles applied to the field of fisheries co-management

Criteria[1]	**Conditions required**[2]	**Importance**[2]	**Conditions on Zambezi floodplains**[3]
1) Clearly defined boundaries	The boundaries of the area to be managed should be distinct so that the fishers can have accurate knowledge of them; they should be based on an ecosystem that fishers can easily observe and understand.	High	Existing management unit boundaries are the *silalo* (administrative area in the traditional system) and the *silalanda* (lowest level of resource management used in the current system); these are based on family and (sometimes) ethnic differences, so there will always be some dispute; boundaries of the family-owned streams are well known and recognised locally although not documented.
2) Clearly defined membership	The individual fishers or households with rights to fish in the bounded fishing area and participate in the area management should be clearly defined; their number should not be too large so as to restrict effective communication and decision-making.	High	Access rights under the existing system depend on residence within the borders of the *silalo* and the *silalanda*, distinguishing between members and outsiders but no written lists; family rights are clearly defined groups; family groups (extended) can be quite small; the population in the *silalo* may be up to 2,000 people and it is estimated that around 30 per cent are fishermen – so possibly 600 people.
3) Group cohesion	The fisher group or organisation permanently resides near the area to be managed; there is a high degree of homogeneity, in terms of kinship, ethnicity, religion or fishing gear type, among the group.	Medium	Some settlement components move with the water level, so at flood time the settlements may be grouped far from the main stream (though at this time fishing is open), but with low water settlements move to the banks of streams or main channel; population is still relatively homogeneous with no significant groups of 'outsiders', unlike the conditions on the Zambian side; the *silalo* is the unit already for some degree of collective action in natural resource use (forests, grazing); issues and objectives are not very well understood (apparently) outside of a small group of leaders.

[1]Criteria for successful CPR governance based on Ostrom's principles as used in Neiland et al., 1994
[2]Relevant information from Pomeroy et al. (1999)
[3]Relevant information from Purvis et al. (2003)

Criteria[1]	**Conditions required**[2]	**Importance**[2]	**Conditions on Zambezi floodplains**[3]
4) Existing organisation	The fishers have some prior experience with traditional community-based systems and with organisations, where they are representative of all resource users and stakeholders interested in fisheries management.	Medium	*Silalo* and sub-*khuta* (village-level advisory council) is already the functioning unit for the management of fisheries, forests, grazing land and other land use; other possible institutions (e.g. conservancy committees in some areas) have experience in resource management; officials in the traditional authority system (*induna*, i.e. village headmen, at some levels) are based on family groups, and do not include women; institutional operation allows for the participation of all members of society (including women) although decision-making power of non-*indunas* is limited.
5) Benefits exceeding costs	Individuals have an expectation that the benefits to be derived from participation in and compliance with community-based management will exceed the costs of investments in such activities.	High	Mixed, although for the implementation of management tools it appears the benefits are clear (for some stakeholders) but the potential for unbearable costs may not have been fully considered from all angles.
6) Participation by those affected	Most individuals affected by the management arrangements are included in the group that makes and can change the arrangements; the same people that collect information on the fisheries make decisions about management arrangements	High	The sub-*khuta* is an institution open to all, but decision-making group can be limited; often young fishermen are under-represented in group meetings and traditional authority activities, as are vendors; some of the fishermen are involved in Ministry-supported research activities collecting information on the fisheries.
7) Enforcement of management rules	The management rules are simple; monitoring and enforcement are able to be effected and shared by all fishers.	High	The existing access rules are still largely enforced, but technical measures (e.g. gear restrictions) are still confused and there is very little enforcement; this lack of enforcement may be due to the complexities and details of such rules, or the lack of enforcement support from government and others; current enforcement is seen as the responsibility of the *induna* and/or the government and there is little enforcement or assistance by other fishers at this stage but this may well change with the new Act.

8) Legal rights to organise	The fisher group or organisation has the legal right to organise and make arrangements related to its needs; there is enabling legislation from the government defining and clarifying local responsibility and authority.	Medium	The legislation governing fisheries is in flux – there is a new Bill currently going through Parliament; it is still uncertain what is exactly included in the Bill, but it is hoped that it will provide enabling legislation should a local or regional group wish to take the legal right for fisheries management in a specified area (e.g. local fisheries committees).
9) Cooperation and leadership at community level	There is an incentive and willingness on the part of fishers to actively participate, with time, effort and money, in fisheries management; there is an individual or core group who takes responsibility for the management process.	High	Apparent willingness to become involved in certain activities (e.g. workshops, meetings) but still to be tested in pilot fisheries management efforts. Some 'leaders' and representatives of Traditional Authorities accept responsibility but leadership needs testing.
10) Decentralisation and delegation of authority	The government has established formal policy and/or laws for decentralisation of administrative functions and delegation of management responsibility and/or authority to local government and local group organisation levels.	Medium and low	The government has stated the intent to actively encourage the process of decentralisation in the country; at present some aspects have moved further than others, and in terms of natural resource management progress has been slow.
11) Coordination between government and community	A coordinating body is established, external to the local group or organisation and with representation from the fisher group or organisation and government, to monitor the local management arrangements, resolve conflicts, and reinforce local rule enforcement.	Medium and low	Possibilities of establishing a Regional or Area Fisheries Council or Agency which could take some responsibility for it; this is dependent on the final contents of the Inland Fisheries Resources Act.

[1,2,3] see page 13

3 | Research Questions

Three overarching research questions (RQ) will be guiding this thesis. Whereas the focus lies on the FPA as resource management regime, the whole area of Sikunga Conservancy is considered the ecosystem under study.

Research Question 1:

What is the socio-economic significance of fisheries for the Sikunga Community?

Sub-questions:

- What is the economic value of fisheries for the local communities?
- What is the role of fisheries for the livelihood strategies and food security of the local communities?
- What is the cultural value of fisheries for the local communities?

For the purpose of answering this RQ, different fishing-related ES that are relevant to the local communities shall be considered. Accordingly, the ES approach is used as conceptual lens to better grasp the benefits that local people derive from fisheries and to explore patterns of dependence. The rationale of RQ1 is to describe and better understand the dimension of the resource use conflict and problem of overfishing at hand as well as to assess the need to preserve local fish resources.

Research Question 2:

What is the socio-economic impact of the FPA on the Sikunga Community?

The assessment of the FPA impact shall partly draw on the approach suggested by the International Institute for Environment and Development (IIED) in the Methodology Manual for Social Assessment for Protected Areas (SAPA) Facilitators, which is briefly outlined in Section 5.1.3. Here, the different benefits that are

discussed under RQ1 are picked up again where appropriate. RQ2 is crucial to find out whether the FPA, which is meant to address the problem with fisheries at Sikunga, has actually led to an improvement and serves its purpose.

Research Question 3:

How is CPR governance exercised at Sikunga Channel FPA?

Sub-questions:

- How is the fisheries co-management concept implemented at Sikunga?
- Does the FPA correspond to Ostrom's principles for effective commons governance?

The analysis of this RQ shall be embedded in the broader context of common property theory and the fisheries co-management approach as elucidated in Section 2. The underlying purpose is to reflect on explanatory mechanisms for local problems or conflicts that are examined under RQ1 and RQ2 and on the prospects for success of the FPA. In particular, the robustness and sustainability of the FPA regime shall be evaluated based on Ostrom's principles.

4 | Regional Context and Research Setting

4.1 Freshwater Fisheries in the Zambezi Region

The Zambezi Region

The Zambezi Region (until 2013 known as Caprivi Region) in Northeast Namibia is one of 14 administrative regions, comprising six constituencies and bordered by Angola, Botswana, Zambia and Zimbabwe (see Figure 4.1). It is characterised by high poverty, the highest HIV/AIDS infection rate and one of the lowest Human Development Indexes (HDI) in the country. Despite comparatively high levels of literacy, high unemployment remains a major challenge in the region (Stephanus et al., 2002). At the same time, however, the Zambezi Region is often described as one of the most resource-rich areas of Namibia (Purvis, 2002a). Moreover, the Zambezi is one of Namibia's most significant perennial rivers. The river system consists of extensive seasonal floodplains, backwaters and seasonal and permanent swamps that together form an extremely rich aquatic environment. The annual flood cycle reflects seasonal rainfall: peak water level is reached during March until May, whereas the water level is low during September until November. This, in turn, has an impact on the concentration and migration of fish resources (Naesje et al., 2001).

Fishing as livelihood activity and source of food

As stated by Purvis (2002b), "[i]t is the complex and varied pattern of land and water interfaces in the natural environment which is the underlying source of so much complexity in the pattern of natural resource exploitation which makes up the floodplain livelihood system" (p.7). Fishery is one of several interlinked activities with the purpose of achieving a positive livelihood outcome for the local communities (see Figure 4.2). Other typical livelihood support activities are, for instance, livestock and crop production, horticulture, off-farm activities, wildlife

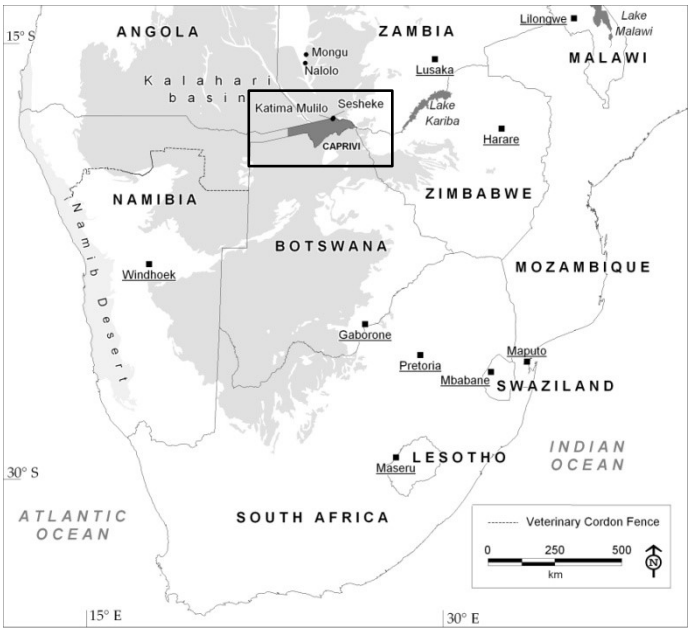

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Figure 4.1: Position of the Zambezi Region in Southern Africa

and tourism (Stephanus et al., 2002).

Despite the multiple and flexible livelihood strategies of the floodplain communities, many scholars have pointed to the significance of inland fisheries in the region, both as a source of income and animal protein (see for example: Abbott et al., 2003). According to a household survey by Stephanus et al. (2002), it is estimated that about 30% of the households in the Zambezi and Chobe river systems directly depend on fishery for economic survival. In addition, the authors argue that rates of formal employment are very low in fishing households and that their livelihood base is narrower than in non-fishing households. In their view, this points to a clear reliance on fisheries by those involved. Interestingly, this survey revealed that at that time most of the participants in fishery were between 25 and 35 years. A joint frame survey by Abbott et al. (2003) yielded similar findings, for instance that most of the fishers at the upper Zambezi were between 20 and 30 years, with a decline in the number of fishers as age increases. In addition, the authors reported a growing importance of fishing as livelihood since the 1990s (ibid.). Beyond that, it seems that the fish consumption by all households in the region is high and constant throughout the year, with a preference for fresh fish. Consequently, fish is regarded as an important component of the local diet and a major item for subsistence in periods of drought and stress (Stephanus et al., 2002). Similarly, Purvis (2002a) claims that many families in the Zambezi Region are highly dependent on fish as protein source.

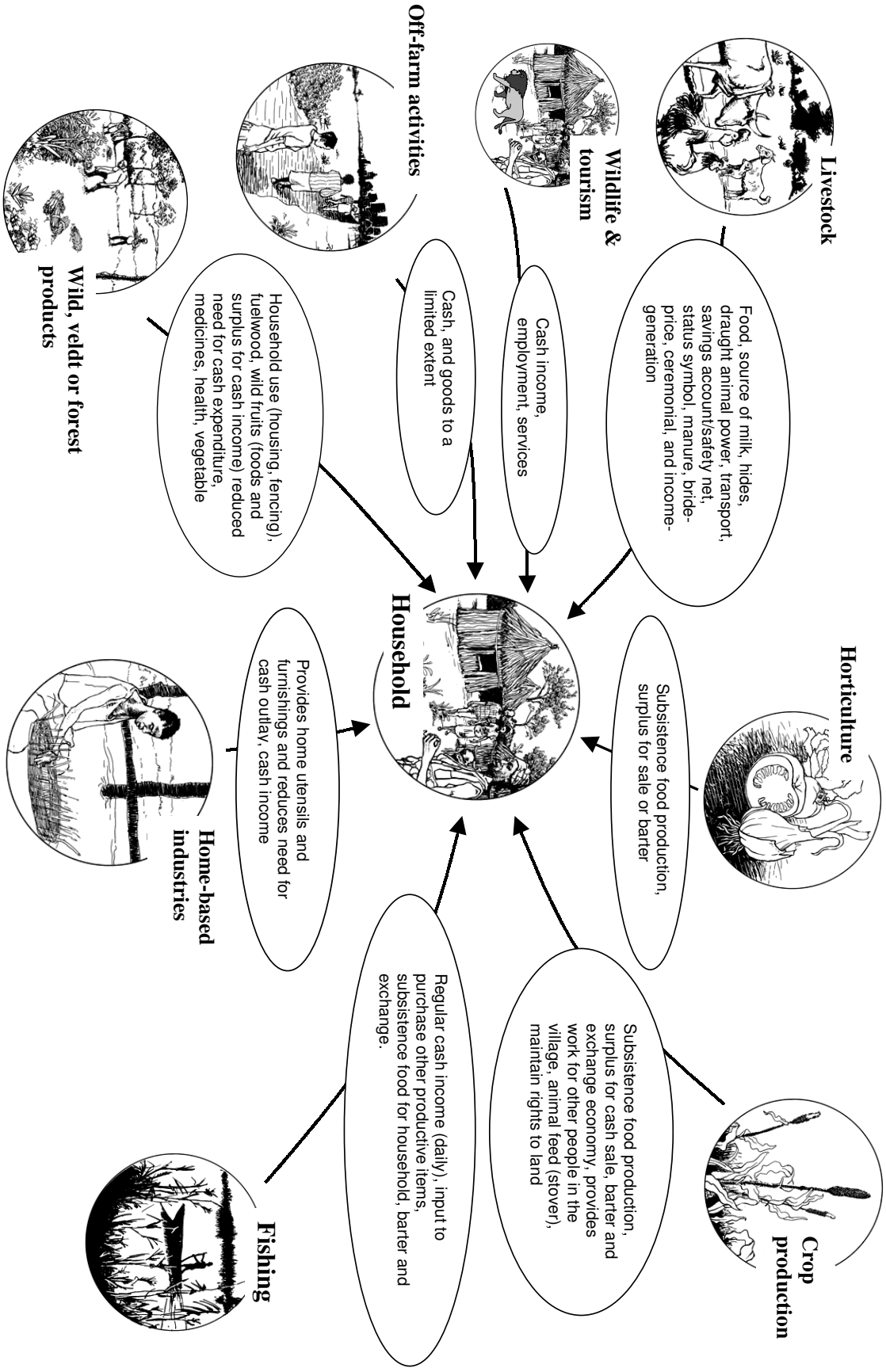

Figure 4.2: Multiple livelihood components (from: Purvis, 2002b, p.11)

Mokoros (wooden dugout canoes)

Nowadays, the most common fishing gears in the region are gill nets and canoes (Stephanus et al., 2002). In addition, drag netting is a widely used fishing method even though it is generally banned in Namibia and most people are aware of its destructive impact (Purvis et al., 2003). In the past, traditional gears, that could be constructed with locally available materials and could be operated without canoes, were more common. Importantly, these gears allowed for more involvement of women in catching fish. The use of nets, however, is generally confined to men, seemingly because the steering of canoes and the hauling of nets can be physically demanding. As a consequence of the commercialisation of fishing and the increasing replacement of traditional by modern gears, there has been a notable specialisation of labour. Today men are mostly in charge of fishing and women responsible for marketing the catch. Moreover, canoes which are mostly imported from Zambia and presumably cost up to N$1,000, have become a necessary item for fishing households (Purvis, 2002b). In light of this, it is not surprising that fishing households are said to make considerable investments in fishing gears (Naesje et al., 2003).

Post-harvest fisheries sector

The post-harvest fisheries sector, i.e. the activities between the catching and selling of fish to the final customer, constitutes a significant component of the livelihood system outlined above and appears to be mainly dominated by women. Fish sale is considered a flexible livelihood activity as vendors adapt to natural and social variability in fish supply by having a fluid relationship with fishermen, transporters and the market (Purvis, 2002a; Abbott et al., 2007a). In this context, some scholars argue that vending can have an empowering effect in particular on women with restricted livelihood options as it allows them to get access to a largely male-dominated economy (see for example: Abbott et al., 2007a). The regional market in Katima Mulilo is the destination of most of the fish caught on the Zambezi and Chobe floodplains which is either directly delivered to the market or dried in the villages. If a fisherman is part of a traditional household, his wife or a female relative is the most common entry point into the marketing chain. Despite this, it seems that most of the vendors buy their fish from a fisherman (Purvis, 2002a).

According to Abbott and colleagues (2007a), it is a simple accumulation and distribution system and informal network that link the fish from the floodplains with the regional market and the consumers. In general, fluctuating but usually high numbers of vendors come to the market to sell, but the amounts of fish per vendor are rather small. Accordingly, getting sufficient amounts of fish in the village or riverbanks nearby seems to be the most important factor constraining a person's ability to sell fish. Nevertheless, the little investments required and higher, more regular and immediate revenues than with other livelihood options allegedly provide a strong incentive for locals to be a fish vendor (ibid.).

The stalls in the fish vending section at the regional market could allegedly accommodate at least 96 vendors. Even though dried fish is sold at lower prices than fresh fish, dry fish vendors tend to outnumber fresh fish vendors. Based on interviews conducted by Abbott et al. (2007a), vendors' preference of selling fresh fish is due to the perception of quicker sales and higher profits but sometimes also related to the excess time needed for drying fish. Vendors' preference for selling dry fish, in turn, can be explained by the lower risk of spoilage and the possibility to stay longer at the market. The general development over time described by these authors includes an increase in fish market prices and the number of both fishermen and fish vendors, paralleled by improved market infrastructure and more efficient fishing gears (ibid.). Besides, transport problems resulting from floods and the poor quality of road networks across the floodplains as well as storage problems due to the lack of ice and cooling facilities are frequently mentioned in the literature as major problems for fish sale (Stephanus et al., 2002; Purvis, 2002a).

Recreational fishing

Apart from artisanal fisheries, tourism and recreational angling along the great African rivers have become an important new source of income for residents of rural areas and are particularly significant in the eastern Zambezi Region. Together with wildlife viewing, angling is regarded as one of the foundations for tourist attraction due to the large number of excellent local fish species for recreational fishermen. Evidently, this hints at an increased potential for resource use conflict as subsistence, commercial and recreational fishing compete for the same fish resources (Naesje et al., 2001). However, some scholars argue that recreational angling, especially when practised on a catch-and-release basis, seems to have very little impact on the resource (Naesje et al., 2003).

Cross-border tensions

Namibia's relationship with neighbouring Zambia seems to be more complicated and strained than the one with Botswana, for instance, due to increased conflict over fish resources. Whereas in the past, backwaters of the main Zambezi stream both on the Namibian and the Zambian side were shared, now everyone must stay on his side of the river. According to Purvis et al. (2003), there has always been some sort of synergy between the nationals of both countries, some positive, others negative, including cross-border marriages and labour migration. In this context, it is crucial to consider the strong cultural affinity between many inhabitants that belong to the Lozi ethnic group and the resemblance of TA structures on both sides of the upper Zambezi (Abbott et al., 2007b).

Nowadays, reported complaints by Namibian fisherman about Zambians coming to fish in Namibia or stealing their nets abound in the literature (see for example: Stephanus et al., 2002; Purvis, 2002b). This is also underpinned by Abbott et al. (2007b) who claim that most of the conflicts take place when fishermen from the more densely populated Zambian side of the river come to Namibian waters to take advantage of the allegedly more abundant habitat and fish there. Interestingly enough, a survey by Abbott et al. (2003) revealed a higher proportion of Namibians with multiple livelihoods in the region than Zambians. In light of this, one could assume that the reliance on fishing is generally higher among Zambians than Namibians at the upper Zambezi.

Fisheries management

In Namibia the central government or, more specifically, the Ministry of Fisheries and Marine Resources (MFMR) is endowed with the overall responsibility for inland fisheries management. Importantly, the lack of effective management measures and stringent enforcement of national fisheries legislation has been criticised by different scholars (see for example: Purvis et al., 2003). The household survey by Stephanus and colleagues (2002) indicated low levels of knowledge of formal rules governing fisheries management among the majority of fishing households at that time. It appears that in the absence of a strong formal fisheries management system, informal or traditional management structures have persisted in the country. In line with this, traditional leaders are said to be responsible for inland fisheries in the floodplain area. Instead of intentional fisheries management, there seem to be more a series of established practices and traditions with ownership and access rules mainly based on kinship and family groups. Apparently, fisheries constitute only one part of a broader resource management system based

on the traditional *khuta* structure. The Zambezi Region is divided into two separate administrations with nested systems of responsibilities and communication channels presided by the Senior Chief in Mwandi: the Masubia administration led by the Bukalo *khuta* and the Mafwe grouping led by the Chinchinmane *khuta*. These *khuta*s are the highest legislative, administrative and judicial body in the administrative unit. One of the main roles of the Traditional Authority (TA), mostly performed by the *induna* (headman) at different levels, is mediating and facilitating local-level civil dispute resolution (ibid.; Purvis, 2002b).

In light of the rising number and magnitude of both intra- and interregional fisheries-related conflicts and the widespread perception of the declining condition of fish stocks, calls for a better and more effective system of fisheries management are increasing. In this context, community-based natural resource management (CBNRM) and the related concept of co-management have been receiving considerable attention, especially due to their potential of promoting both environmental conservation and development. As claimed by Abbott et al. (2007b), this is a result of the perceived failure of conventional natural resource management as undertaken by African government agencies, based on restricting the use of particular resources by local inhabitants while keeping them out of decision-making processes. Accordingly, new community-based approaches strive for enhanced involvement of local resource users, thereby allowing for more resource access and enabling locals to benefit financially from sustainable resource use (ibid.). This idea is also at the heart of the nature conservancy model as promoted in Namibia which aims to create institutional arrangements under which communities can directly benefit from protecting wildlife (Purvis, 2002b).

However, according to Abbott and colleagues (2007b), the success of attempts in southern Africa to devolve management authority and promote fisher involvement has been rather modest thus far. Possible explanations are challenges related to varying fishing activity, conflicts between TAs and government actors and ambiguous management goals (ibid.). Additional problems for fisheries co-management could be local level conflicts, heterogeneous attitudes of communities, lack of representation of stakeholders in community institutions or the reluctance of actors to accept certain power redistribution (Purvis et al., 2003).

Here, it is crucial to underline that - besides local-level requests on behalf of fishing communities in the Zambezi Region (ibid.) - there is also a clear mandate for fisheries co-management both at the international level by the Southern African Development Community (SADC) and the Food and Agriculture Organization of the United Nations (FAO), and at the macro level by the MFMR. Article 12 on 'artisanal, subsistence fisheries and small scale commercial fisheries' of the SADC

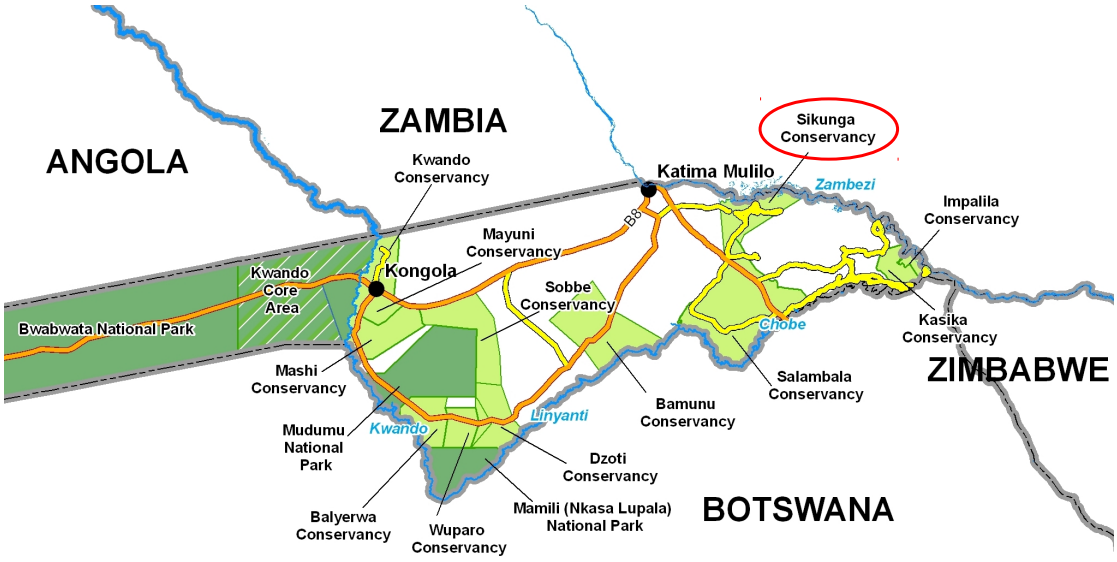

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Figure 4.3: Nature conservancies in the Zambezi Region

Protocol on Fisheries from 2001 includes a number of statements that explicitly endorse co-management, such as Paragraph 6: "State parties shall facilitate broad based and equitable participatory processes to involve artisanal and subsistence fishers in the control and management of their fisheries and related activities." (ibid., p.15). Similarly, the Technical Guidelines for Responsible Fisheries adopted by the FAO in 1997 comprise a number of specific references to the development of co-management systems for fisheries. The MFMR White Paper 'Responsible Management of the Inland Fisheries of Namibia' completed in late 1995 essentially aims to ensure the sustainable and optimal use of freshwater resources, thereby supporting the idea of empowering local communities and involving TAs (Naesje et al., 2001; Purvis et al., 2003).

4.2 Sikunga Conservancy and Sikunga Channel FPA

Sikunga Conservancy, located about 30 km east of the regional capital Katima Mulilo in Kabbe Constituency, comprises an area of 287 km with approximately 2,473 inhabitants in total (see Figure 4.3 and Figure 4.4). The natural environment is mainly characterised by floodplain grassland along the Zambezi and broad-leafed woodland on higher grounds further away from the river (NACSO, 2016). Observing the continuous decline in their natural resources, especially wildlife, and recognising the benefits that other conservancies were deriving from sustainably

managing their resource with the aid of external organisations, the local communities agreed on establishing the Conservancy in 2004. After a lengthy process, Sikunga Conservancy was formally gazetted in 2009 in line with the Nature Conservation Amendment Act of 1996, and started to fully operate in 2010 (Tweddle & Hay, 2011).

As the main management body, the Conservancy Committee plays a key role in Sikunga. The Committee currently consists of eleven women and six men, including the Conservancy Chairperson and Vice-chairperson, the Conservancy Manager, two representatives of the local TA and seven Area Representatives. Whereas the Chairperson has mainly a supervisory function and calls the Committee meetings, the Manager is responsible for the day-to-day activities in the Conservancy. In contrast, the TA, represented by the area headman and deputy headman, plays only an advisory role in this context. Besides, there is one Area Representative democratically elected per village that is supposed to represent his or her respective village in the Committee and to communicate Conservancy-related issues in the local communities (Expert Interview No. 9, 13). As stipulated by the Constitution of Sikunga Conservancy (signed in October, 2006), membership is open to all adults above the age of 18 who reside permanently within the boundaries of Sikunga or who were born at Sikunga but reside outside for employment reasons. This may also include, for instance, Zambian immigrants in the case of marriage to a registered member and acquired citizenship (ibid.).

The Sikunga Channel Fish Protection Area was established within the boundaries of Sikunga Conservancy under Section 22 of the Inland Fisheries Resources Act (IFRA) that allows for the set-up of fish reserves upon request by local communities. The initiative was mainly motivated by the recognition of declining fish stocks and the urgent need to protect them to ensure long-term sustainability of local fisheries. Another influential factor has arguably been the high influx of illegal fishermen from neighbouring countries, especially Zambia. The management agreement for the FPA has been set up by the Conservancy Management Committee in collaboration with the TA in Bukalo, MFMR, the Zambezi Regional Council in Katima Mulilo and adjacent tourist lodges (see Appendix B). Its long-term objective is to be fully self-sustaining by means of earning revenue from fee-paying local and tourist catch-and-release-anglers. Although the FPA was only gazetted in late 2015, the rules have been implemented already (backed up by the TA) and collaboration with the MFMR has been in place since 2012 (Tweddle & Hay, 2011).

The FPA encompasses the southern side channel of the Zambezi from the point where it leaves the river to where it exists back into the main river, ex-

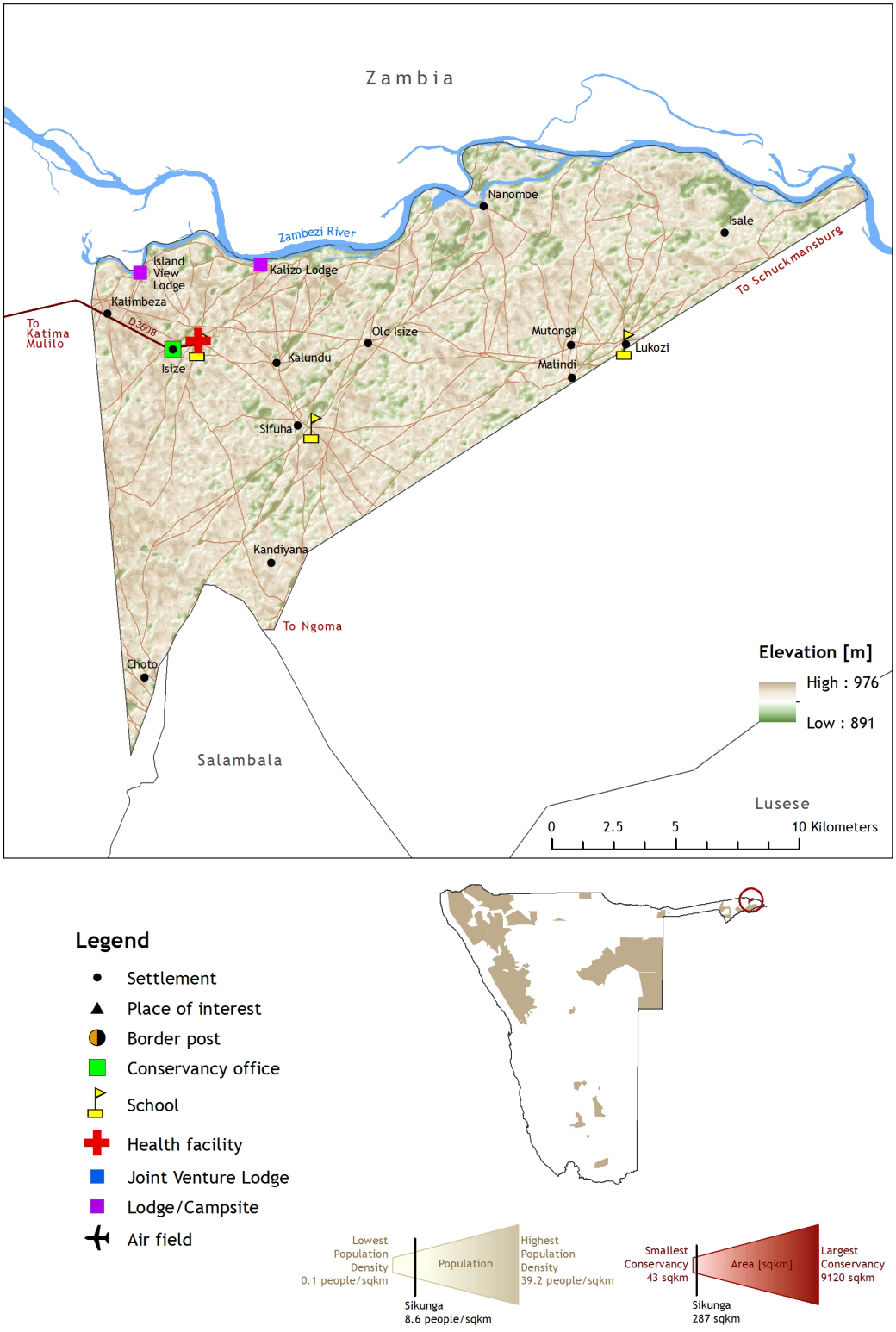

Figure 4.4: Sikunga Conservancy Profile Map (from: NACSO, 2016)

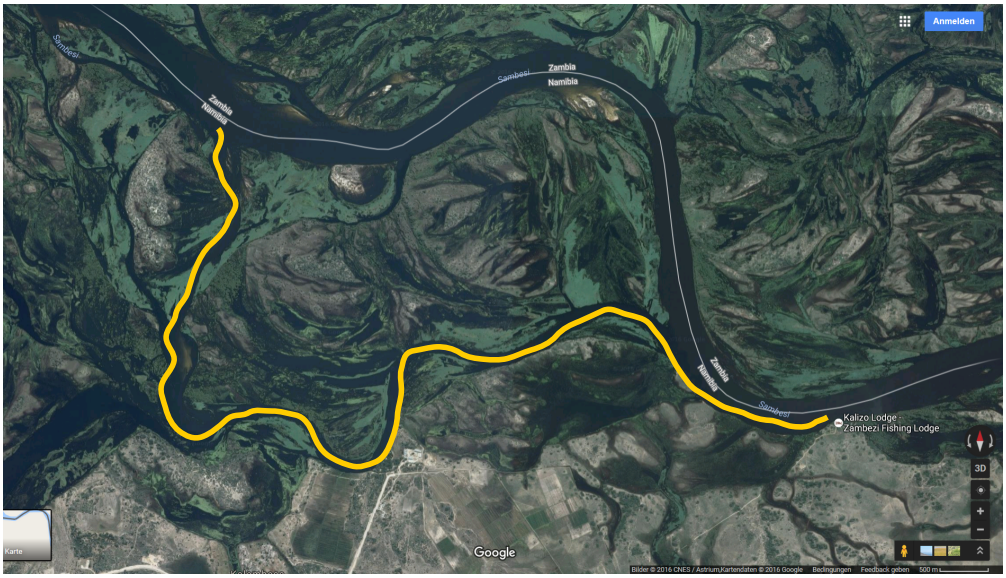

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Figure 4.5: Location of Sikunga Channel FPA (highlighted in yellow)

tending another 50 m into the Zambezi to the eastern boundary of Kalizo Lodge (see Figure 4.5). This means that the channel itself is closed for netting while the backwaters in the channels' surroundings are still open for local fishermen. Recreational angling is allowed on the channel as long as it is on a catch-and-release basis.

Sikunga Channel

The instalment of the Sikunga Channel FPA can be viewed as a first and significant step towards the empowerment of local communities to actively participate in the co-management of their fish resources. This case has been selected as a valuable practical example illustrating resource use conflict and co-management efforts in an ecologically rich environment where locals directly depend on ES flows for their livelihoods. Moreover, the selection has been motivated by the fact that NNF requires a socio-economic assessment of the Sikunga Channel FPA as well as local fisheries, and offered the great opportunity to conduct field research to contribute to their work.

5 | Methodology

5.1 Qualitative Research

5.1.1 Types of methods used

This research project applies a mixed-methods approach combining qualitative and quantitative research. Qualitative methods are of particular importance here as they are especially effective in producing culturally and context-specific information about opinions, values and behaviours of population groups. Moreover, they can help to provide complex descriptions of how actors perceive a certain research issue and to identify intangible factors, e.g. gender roles, social norms or socio-economic status. Therefore, when combined with quantitative methods, qualitative research can aid the interpretation and better comprehension of complex situations and the implications of quantitative results (Mack et al., 2005). More specifically, the methods that were used for qualitative data collection are expert and semi-structured household interviews, focus groups and participant observation.

Semi-structured interviews are typically based on the premise that the interview questions are specified to a certain extent but that the researcher is given more leeway to delve into certain topics to achieve clarification or elaboration on the answers provided by interviewees. Key information about gender, age, occupation etc. can still be collected in a standardised format (May, 2011). An interview guide is usually developed prior to the interviews with a number of topics and questions that shall be addressed in every interview. The exact formulation and order of the questions are not binding though which allows for flexibility and a more natural course of conversation (Gläser & Laudel, 2009). Importantly, this type of interview is expected to allow participants to reply more on their own terms than a standardised interview format does. At the same time, it still provides a greater structural basis for comparability than the focused or unstructured interview. The quality of information generated by the interviews will naturally

vary, but comparing them will help to understand the significance of each of them and, eventually, they will all add to the general picture (May, 2011).

Focus groups constitute a method within the broader category of group interview techniques. Unlike answering questions of each person in turn as in a typical group format, in focus groups participants are encouraged more explicitly to speak to one another. This can yield crucial insights into social relations, norms and dynamics. Despite this, the researcher should refrain from automatically attributing the viewpoints of a group to a whole community or population. Moreover, when combining individual and group interviews, it is important to bear in mind that they may simply generate different perspectives and the same issue, given that interaction in groups always influences the opinions and actions of the ones involved (ibid.).

Participant observation refers to the engagement in and the experience of a social scene with the aim to empathetically understand and explain it and the researcher being the medium through which this happens. The researcher can adopt different roles during the fieldwork which will influence the data gathered. In the case of this thesis, the role adopted on-site by the author is best described as 'participant as observer'. This overt approach implies that both the presence and the intentions of the researcher are revealed to the group. The aim is to learn more from the people within a certain setting without trying to act as a member of the group under study. Consequently, acceptance of the researcher is necessary, at least to a certain degree, to allow for participation in the social setting (ibid.).

5.1.2 Procedure during fieldwork

The author of this thesis spent a total of 11 weeks in Namibia for field research between April and June 2016. An overview is shown in Figure 5.1. Financial support for travel expenses was obtained from the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. As collaborating non-governmental organisation (NGO), NNF played a key role as facilitator throughout the fieldwork. The procedure that was followed during this timeframe shall be explained in the following.

Expert interviews

After the arrival in Namibia, the author spent a short time period in Windhoek to discuss the way of proceeding with the staff from NNF and to get started with the expert interviews. This is in line with the originally intended two-step approach that envisaged a number of expert interviews for explorative purposes to

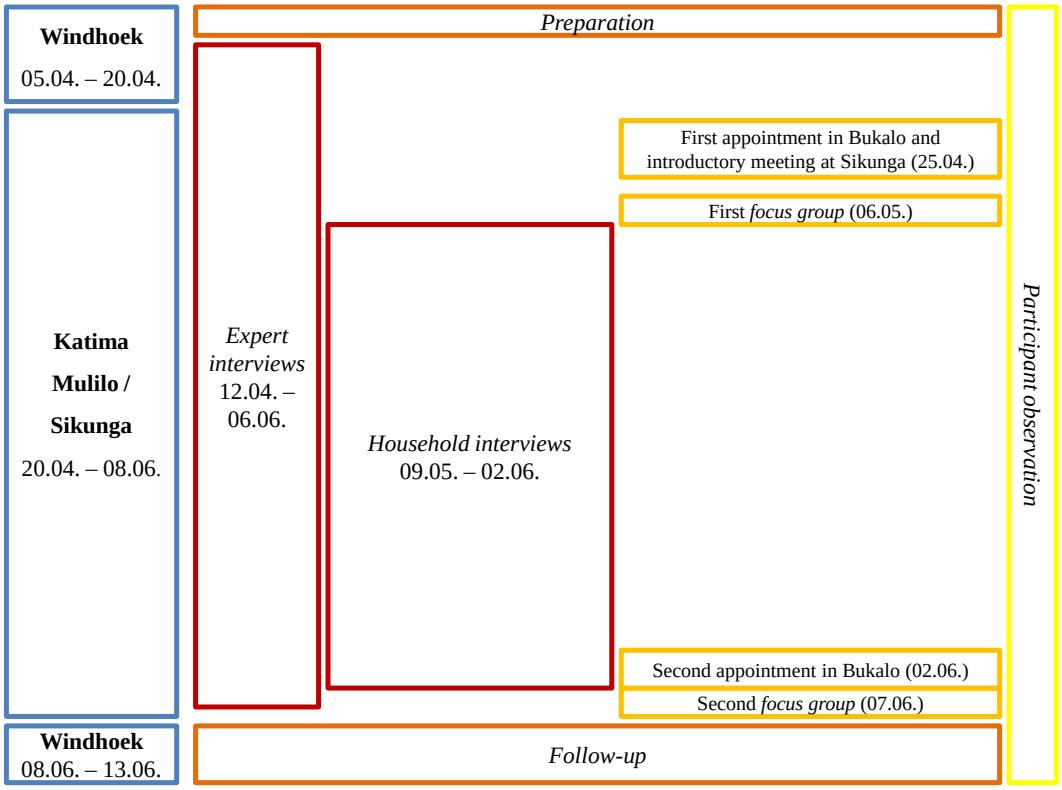

Figure 5.1: Overview of procedure during field work

better grasp the context before proceeding with the household interviews. NNF helped to establish contact with most of the experts. As suggested by Gläser and Laudel (2009), any person who can act as source of particular knowledge about the research subject can be considered an 'expert'. A full list of the experts interviewed is given below.

- Government representatives
  - Ministry of Fisheries and Marine Resources (MFMR)
  - Ministry of Environment and Tourism (MET)
  - Zambezi Regional Council
- Staff of local NGOs that closely collaborate with Sikunga
  - Namibia Nature Foundation (NNF)
  - Integrated Rural Development and Nature Conservation (IRDNC)
- University lecturers
  - University of Namibia (UNAM)
  - Namibia University of Science and Technology (NUST)
- Conservancy staff members

  - Conservancy Chairman
  - Conservancy Manager
  - Fish Guards
- Tourist operators in Sikunga
  - Island View Lodge
  - Kalizo Lodge
  - Shamwari Houseboat
- Recreational anglers in Sikunga
  - Nwanyi Angling Club
- Member of the TA in Sikunga
  - Village headman of Kalimbeza

The originally planned number of 8-10 expert interviews was exceeded by far. In total, 21 expert interviews could be conducted to gain further insights into the research subject, including representatives from the Namibian government, local NGOs and universities, the tourism sector and members of the Conservancy Management. Importantly, all actors that had been envisaged originally for the expert interviews in the research proposal of this thesis could be approached. Especially the interviews with experts from NNF, IRDNC and the Conservancy Management contributed to the iterative triangulation process of the data gathered during the household interviews. The duration of the expert interviews varied between 45 minutes and two and a half hours. Almost all of the experts could be interviewed in person, either in Windhoek, Katima Mulilo or Sikunga. Only two interviews occurred via e-mail because they could only be arranged after the end of the fieldwork in Namibia. Most of the expert interviews were conducted in English and by the author alone; only the interviews with the Fish Guards and the village headman of Kalimbeza required support by a translator.

Contact with TA and focus group discussions

Before personal contact with the Sikunga Community was established, an appointment was made with high-level representatives of the TA at the *khuta* (advisory council/tribal assembly) in Bukalo, where the formal permission for the interviews in the local communities was obtained. Thereafter, a brief meeting with representatives of the Conservancy Management Committee and the local TA took place at Sikunga. The author was introduced, presented the research plans and, again,

First focus group meeting

could obtain the official approval for the household interviews. This was the formal procedure that had to be followed to show respect for cultural norms and associated hierarchies in the local context and to ensure the legitimacy of the field research. On both occasions, the author was supported by a staff member of NNF and a local NNF employee who performed as a translator.

Acting on the advice of a social scientist in Katima Mulilo who has long worked with local communities in the region, a focus group meeting was organised with the members of the Management Committee to get more familiar with the local context before starting with the household interviews. Different participatory appraisal tools were used to engage the participants of the meeting in the discussion and to learn more about the history of the Conservancy and the FPA as well as some pressing issues. On this occasion, the researcher was assisted by this particular scientist and the translator mentioned above.

After the household interviews were deemed as completed, another appointment at the *khuta* in Bukalo was made to present preliminary findings. This gesture of respect was taken up positively and some comments on the findings could be obtained from the TA representatives present. Given that two high-ranking members of the *khuta* are from the area of Sikunga and, hence, highly familiar with the context, it can be argued that this formed part of the triangulation of results. In addition to this, a second focus group meeting with the members of the Management Committee was held. The purpose of this meeting was to discuss preliminary findings with the Committee members to enhance data triangulation and to thank them for their support. Again, the author received valuable assistance by the translator and the social scientist mentioned earlier. Amongst participatory appraisal tools, the participants of the meeting were confronted with various subject-related exaggerated hypotheses and asked to indicate whether they agree

or disagree with the statement and why. This approach proved particularly useful to spark discussion among the participants.

The villages in Sikunga

It needs to be stressed that the villages in Sikunga Conservancy are portrayed in this thesis based on information provided by the participants of the first focus group meeting. The participants were asked to sketch a map of the Conservancy in the sand to indicate the names and rough location of the main villages (see Figure 5.3). Each of these seven villages can be further divided into sub-villages, but, according to the participants, they are the main administrative entities in Sikunga. Surprisingly, the villages notably differ from the ones that are identified on the map available on the NACSO website that is referred to in Section 4.2 (Figure 4.4). Nonetheless, the information provided by the locals was found more accurate and appropriate as basis for the household interviews. Moreover, it corresponded to the information that was gathered at the local communities and expert interviews throughout the field work.

Road from Katima Mulilo to Sikunga

Six out of the seven main villages in Sikunga were covered with the household interviews. The accessibility of the villages played an important role as not all villages could be reached easily; whereas Kalimbeza, for instance, could be accessed within 30 minutes by car from Katima Mulilo, it took an hour's drive to get to the most distant village, Malindi. Moreover, some of the villages are more affected by the annual flood cycle and hence less accessible than others due to their location. As a consequence, the number of interviews conducted per village differs. Besides, no interviews could be conducted in Oldisize, the smallest village in Sikunga, which was not accessible for the researcher due to flooding.

In addition, slight preference was given to Kalimbeza, Keena and Nasisangani in the household interviews as these are the villages that are directly affected by the FPA (due to their proximity to Sikunga Channel) and their residents were generally able to provide more information on the research subject. Here, 'directly affected by the restrictions of the FPA' means that the fishermen residing in these three villages are limited in their resource access due to the FPA as they are the ones that typically used to go fishing at and around Sikunga Channel. Fishermen from

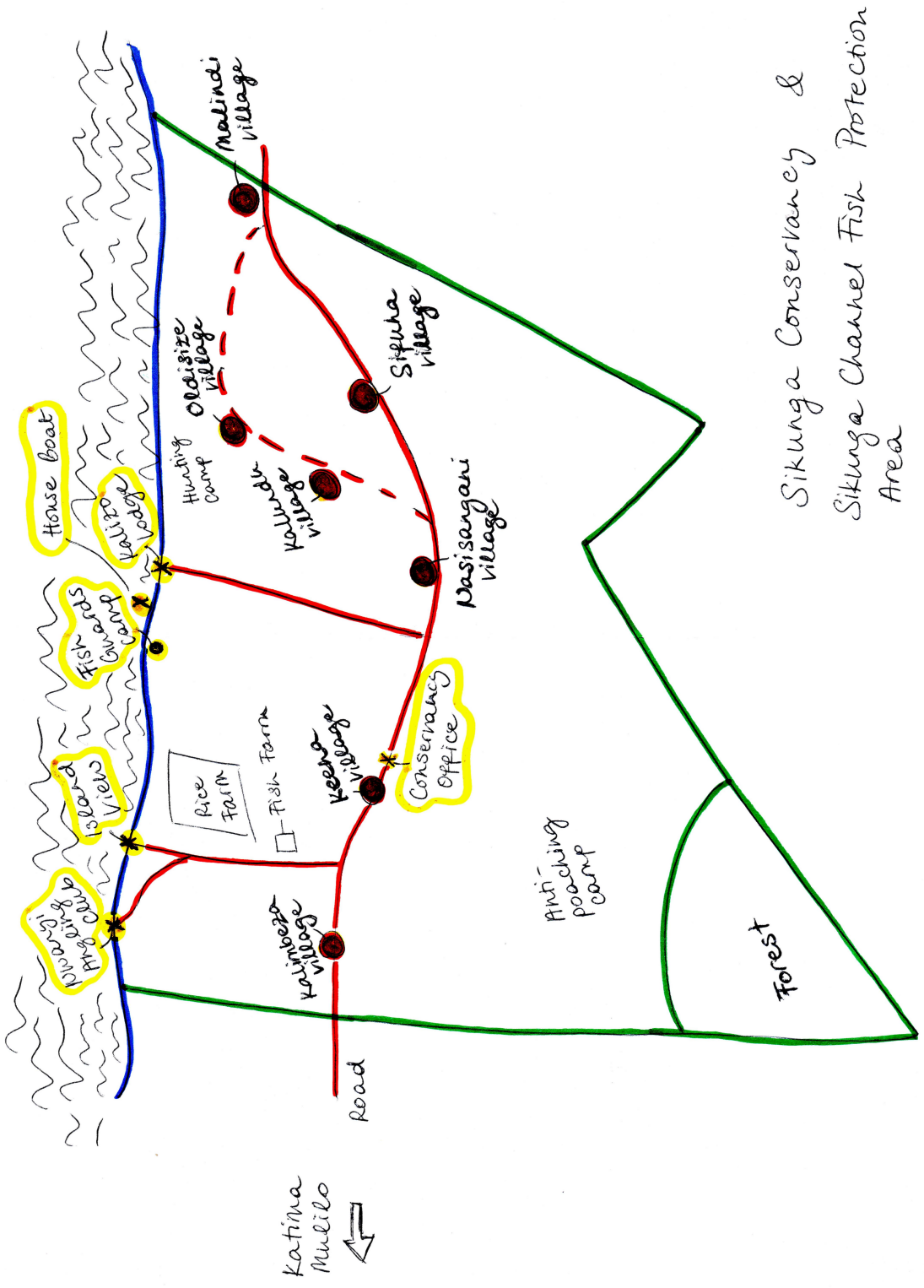

Figure 5.3: Sketched map of Sikunga Conservancy

other parts of Sikunga have traditional fishing grounds that are more proximate to their respective village and not part of the fish reserve; hence, these fishermen can access their fish resources as usual. Given that the fish reserve is managed by a body that is representative of and accountable to the entire Conservancy, the author of this thesis decided to also interview members of the local communities that are not directly affected by the FPA in order to provide a full picture. In this context, it is important to find out whether, how and why the significance of fisheries and perceptions of the FPA differ among the villages in Sikunga.

Household interviews

For the purpose of conducting the household interviews, the author followed the recommendation by the Management Committee according to which the Area Representatives (the democratically elected members of the Committee representing each of the seven villages in Sikunga) facilitated the interviews in the local communities. Before going to a village for interviews, the respective Area Representative was contacted to search in advance for people willing to participate and to inform them about when they would be interviewed. The researcher usually spent an entire day at the respective village with the Area Representative who directly took her to the courtyards of the interviewees.

Both the transport from Katima Mulilo to the villages in Sikunga and translation for the interviews was facilitated by NNF. Most of the household interviews required translation for Silozi/Subia as the level of English of the interviewees was not sufficient to conduct an in-depth interview. Furthermore, the interviewees generally seemed much more comfortable speaking in their mother tongue. Translation was done by the local employee of NNF mentioned above who is familiar with the regional context and often performs this role at group meetings with conservancies. It should be emphasised though that this person, despite being a native speaker, is not a professional interpreter. Nonetheless, his assistance during the interviews proved to be indispensable as the amount and quality of information that could have been gathered in English only would have been severely limited. Moreover, he often helped to clarify ambiguities concerning the cultural environment. The only household interviews that were conducted without the presence of the translator and an Area Representative were the ones with employees of the tourist lodges in Sikunga. They took place at the lodges and were facilitated by the lodge operators. Given their employment situation, it could be expected that their level of English would be sufficient for the purpose of an interview. The household interviews usually took between half an hour and one and a half hours, mostly depending on the interviewee's knowledge about fisheries.

Table 5.1: Overview of the household interview sample

Main Villages in Sikunga	**Households**		**People**
	registered[2]	interviewed	interviewed
Kalimbeza[1]	190	13	14
Keena[1]	150	7	7
Nasisangani[1]	76	9	10
Sifuha	155	8	9
Kalundu	94	5	5
Oldisize	NA	NA	NA
Malindi	88	6	6
In total	753	48 (6.4%[3])	51

[1]directly affected by the restrictions of the FPA
[2]as reported by the Village Development Committees (VDC)
[3]of all registered households

The originally planned sample size of 40-50 households was achieved: In total, 51 members of the local communities in Sikunga participated in the household interviews. An overview of the number of interviews conducted per village is given in Table 5.1. In the case of three households both the husband and the wife were interviewed because they had different opinions or backgrounds, e.g. being a non-Conservancy member, that were of interest for the research. As pointed out in the research proposal of this thesis, both fishing and non-fishing households were approached for the interviews to ensure a full picture. To provide for more transparency, the general characteristics of the household interview sample are presented in Section 6.1.

Contentwise, the household interviews evolved mainly around the socio-cultural dimension of fisheries and the different livelihood strategies of the locals (see Appendix C). Particular attention was paid to understand the problem perception that originally motivated the establishment of the FPA and the levels of awareness, compliance with and enforcement of the FPA rules. The interview guiding questions (that had been prepared beforehand and were subject to revision during the first phase of the fieldwork) were intended to provide an impetus for participants to reflect on how they perceive the changes induced by the establishment of the FPA and where they see remaining challenges and conflicts.

Difficulties and potential limitations

Even though the approach taken during the household interviews to get in touch with interview partners arguably increases the risk of bias in the interview sample, it proved to be extremely valuable. It made the field research more efficient and

allowed the author to conduct such a high number of interviews. Moreover, the company by the Area Representatives made the researcher's presence in the villages, which often met with obvious suspicion, more legitimate. It quickly became clear that it would have been very difficult and time-consuming if the researcher had done this without any assistance and approached locals spontaneously in the villages to insist on a 'random' sample. Furthermore, this did not seem appropriate in the local context. It should be noted though that not all Area Representatives were equally committed to this task. Therefore, not all of them were equally well-prepared when the author came to their village. Amongst other factors, this resulted in the diverging numbers of interviews per village.

The idea of the household interviews was to pose questions as openly as possible in order to give interviewees the possibility to construct their own causal chains and give their subjective view on the issue. In practice, however, this turned out to be quite tricky. It appeared that very open-ended questions were too difficult for many of the interviewees. For instance, the question 'Has the FPA caused any conflicts or problems in the local communities?' was often answered with 'no'. However, if the researcher asked more specifically, for instance about an issue that had already come up in other interviews, most of the times it became clear that there was indeed a 'conflict' or a 'problem' in the view of the interviewee. Another major challenge during the interviews resulted from the contradictory answers given by many interviewees and the difficulty to get concrete information about numbers, especially income or years. As a consequence, the researcher was obliged to strike a balance between asking open-ended and more specific questions without steering the conversation into a certain direction to trigger more informative replies by the interviewees. In addition, some questions had to be reformulated and to be posed several times in different ways during the same interview to get a clear answer. Accordingly, the interview guide (Appendix C) was only used as basic support, whereas the order and formulation of the questions were handled rather flexibly, depending on the respective interviewee, to account for these challenges.

Interview documentation

During the household interviews, the researcher took detailed hand-written notes of the information generated. This was feasible given that the translation that was required for most of the interviews slowed down the pace of the conversation considerably, thereby providing sufficient time for note-taking. Here, it is important to mention that the citations from the interviews that are referred to in the results section are paraphrased quotes because of potential minor distortions through the lack of professional verbatim translation. During the expert inter-

views hand-written notes were taken, as well; in addition, the ones that did not require translation were recorded on tape as a back-up. A complete transcription of the interviews was considered but, eventually, foregone due to time and resource constraints.

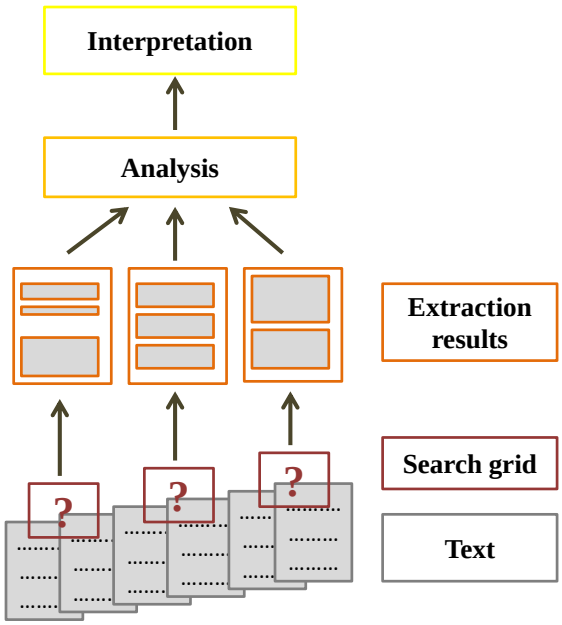

Figure 5.4: Principle of qualitative content analysis (Gläser & Laudel, 2009)

5.1.3 Analytical approach

Qualitative content analysis

The analysis of the qualitative data collected during the fieldwork is oriented towards the principle of qualitative content analysis (see Figure 5.4). According to Gläser and Laudel (2009), qualitative content analysis basically refers to the action of extracting raw data from texts, processing and subsequently analysing these data. Importantly, this serves to create a basis of information that is distinct from the original text sources and structured according to the categories of a search grid, that was designed to extract information. The process of extraction is at the heart of qualitative content analysis as it serves to take out information that is relevant to the study, thereby systematically reducing the wealth of information. The system of categories is typically based on theoretical considerations prior to the data collection. However, it is essential that the system remains open to revision and can be adjusted later if the defined categories turn out to be inadequate or too limited (ibid.). In this thesis, the extraction categories are based on the key aspects that were explored during the interviews, such as the impact of the FPA, local conflicts or the group of beneficiaries.

Impact assessment

As indicated in Chapter 3, the assessment of the FPA impact is oriented towards the approach suggested in the Methodology Manual for SAPA Facilitators recently published by the IIED (Franks & Small, 2016). An impact analysis as attempted in this thesis bears considerable challenges that must not be disregarded, namely: the explicit attribution of impacts to the FPA (impacts often have several causes); the possibility that an impact affects different actors in different ways; the evaluating character of an impact description (by designating impacts and non-impacts, the researcher in a way judges the severity of a change). This is why the use of a methodologically sound and proven analytical framework is highly recommendable here.

The SAPA approach draws on a three-dimensional concept of human wellbeing that is advocated by the Wellbeing in Development Countries Research Group (WeD) and aims to integrate material, relational and subjective dimensions. Here, the 'material' concerns the 'stuff' of wellbeing, i.e. food, shelter, physical environment etc. Evidently, this refers to income and economic assets, but not exclusively. In contrast, 'relational' refers to social interaction, involving power, identity and both the connections and differences between people. 'Subjective' concerns how people perceive the situation, belief systems, cultural values and ideologies. This concept emphasises the interdependence and interplay between the economic, social and psychological domain out of which wellbeing emerges (White, 2009). In the SAPA Methodology, this concept is adapted and social impact defined as "the impact of a policy, programme, project or another initiative that directly affect one or more of the three dimensions of wellbeing" (Franks & Small, 2016, p.4).

As argued by the authors of the Manual, the wellbeing concept is recommendable as a basis of social assessment in the context of biodiversity conservation rather than a poverty framework as some of the key conservation benefits contribute to relational and subjective wellbeing and may be missed from a poverty perspective (ibid.). Given the information generated by the household interviews, the focus of the impact assessment in this thesis lies on the material and the subjective dimensions of wellbeing. All fishing-related benefits that are discussed under RQ1 are taken up again under RQ2 where appropriate. Particular weight is given to the subjective views expressed by the interviewees as they feature prominently in the qualitative data collected and the local communities are the ones affected the most by the fish reserve. The rules governing resource access, decision-making and the distribution of benefits, i.e. important facets of relational wellbeing, are dealt with under RQ3 in Section 6.4.

5.2 Quantitative Research

Quantitative analysis is conducted in this thesis with the purpose of complementing the qualitative research. Available quantitative data shall be compared, where possible, with the qualitative findings from the interviews to support or contradict certain statements and give more weight to relevant findings. Given that the focus of this project lies inter alia on the socio-economic significance of fisheries, it is particularly important to contemplate some fisheries-related numbers. It needs to be emphasised though that the quality of the results of this analysis evidently depends on the usefulness and quality of the given data situation. The quantitative data that shall be analysed in this thesis are provided by the fisheries management project of NNF. Three different data sets have been made available that are briefly described below. All of the three data sets were provided as files in Excel and were analysed by the author of this thesis in Excel and R.

ES valuation: market price method

Part of the quantitative analysis is oriented towards ES valuation, which can help to understand the situation and resource-related problem at hand, provide a powerful argument for conservation measures in the fisheries sector and give more weight to FPAs as a political instrument. As fish is considered a provisioning service, market prices and yield data, if available, can act as a proxy for estimating its monetary value. Using prevailing prices of ecosystem goods or services that are traded in commercial markets is referred to as market price method. The major benefits of this method are arguably its simplicity in application, the data needed which are relatively easy to obtain, and its ability to identify 'winners' and 'losers' of the ES, which is crucial for the analysis of benefit distribution patterns. Moreover, the method is based on observed data of actual consumer preferences and well-established economic techniques (TEEB, 2010; King & Mazzotta, 2000; Bateman et al., 2011).

However, it should be taken into account that if market data are only available for a limited number of goods and services delivered by an ecosystem, they might not reflect the value of all productive uses of the resource under study. Furthermore, the method does not deduct the market value of other resources that may be used to bring ecosystem products to the market, which might result in an overstatement of benefits. Lastly, it is essential to consider potential market imperfections, seasonal variations or other factors that are likely to impact market prices and might distort economic value estimates (ibid.).

Katima market data

Since 2009 data have been recorded at the regional market in Katima Mulilo on a weekly basis (from now on: Katima market data). The recording takes place on (supposedly) two days per week and on different days every week. The people in charge monitor the total amounts of fish going into the market on the respective day and record the weights, the origin, the type of container and usually the condition of the fish (fresh or dried). In addition, data are collected from a random sample of stalls at the market, supposedly five stalls selling fresh and dried fish respectively. At each of the selected stalls, all the fish that is being sold is measured and the species, length, weight and price per fish of each of them is recorded. Lastly, the total number of occupied stalls for fresh and dried fish sale is collected.

The Katima market data constitute a very extensive data set containing a lot of details about the fish that are delivered to the regional market. It is relevant to this thesis mostly because of the information on amounts of fish that stem from the area of Sikunga and the corresponding market prices. Ideally, this information can be used to roughly estimate the income that fishermen and fish vendors from Sikunga derive from fish sale in Katima Mulilo and to suggest, at least a partial, monetary value of fish as provisioning service. Moreover, the data might point to a diverging significance of fisheries and associated fish sale in the different villages of Sikunga. Lastly, developments over time can be explored in the data set as they possibly indicate an impact of the FPA on fish supply or prices.

However, the analysis of this data set involved a couple of difficulties that shall be addressed briefly. Firstly, it is not specified which fish species are contained in the recorded fish weights that enter the market. This is problematic when trying to link the weights with the prices given that prices differ depending on the species. Secondly, even though the origin of the fish entering the market is recorded, it is not clear by how many fish vendors it is sold subsequently. Therefore, only assumptions can be made about how many people from Sikunga benefit from the income generated by fish sale in Katima Mulilo. Thirdly, on a number of occasions salted fish entering the market was recorded. However, no prices are available for salted fish as market prices are only monitored for fresh and dried fish. Here, it should be added though that seemingly most of the salted fish is meant for export (Expert Interview No. 2). Lastly, two major inconsistencies in the data set essentially limit the usefulness of the gathered information. For long time periods the condition of the fish entering the market (fresh or dried) is not specified at all and, thus, cannot be linked reasonably to the daily market prices. Furthermore, the method of recording the amounts of fish entering the market changes over time;

sometimes only the number of fish containers is recorded, but information about the weight is lacking completely. As a consequence, the information on the fish amounts entering the market was found consistent enough to be processed only from October 2014 onwards which significantly limits the leeway for analysis. In contrast, the information on the market prices was found consistent enough to be used throughout the whole data set.

Fish monitor data

The second data set comprises data from two fish monitors from Sikunga that are employed by NNF (from now on: Fish monitor data). These fish monitors have been recording the catches of a random sample of fishermen at different spots at the river banks and backwaters in the area of Sikunga Conservancy since 2010. This is also done (supposedly) twice per week with changing days every week. The monitors are instructed to go for a patrol of their designated area and record any catches they see. The whole fish catch that is landed by a fisherman is recorded, including information about the fish species, length and weight per fish, and the fishing gear, net length and mesh size used. Most of the data set is anonymous, except for the most recent data (since July 2015) that contain the names of the fishermen, whose catches were recorded.

In theory, these data could be used to calculate average fish catches of local fishermen and explore developments over time, for instance in the size and species composition of catches and the size of individual fish. This information could be indicative of overfishing or possibly point to a positive effect of the fish reserve. Nevertheless, it shall be emphasised that this data set is not based on high-quality stratified random sampling. Besides, a major difficulty in the analysis of this data set is the mostly anonymous collection of data, meaning that it is not easily discernible by how many fishermen the recorded fish were landed. As a result, it is only the information about the fishing gear, i.e. net length or mesh size, and the place where the data were collected that give a hint on when the data at hand concern a different fisherman. To deal with this, a more complex analysis would be required that goes beyond the scope of this thesis.

A valuable next step in the quantitative data analysis conducted in this thesis could be a 'consistency check' of the Katima market and fish monitor data sets, i.e. an attempt to link the two to see whether they match. It would be interesting to examine to what extent the data from the regional market reflect what is de facto caught in Sikunga. This would be feasible with the available information on species, length and weight in both data sets. An average species composition and fish size/weight per species per day could be calculated with the data from

the random sample of stalls at the market and cross-checked with the information in the fish monitor data. Importantly, this could enhance the understanding of how many and which of the fish caught at Sikunga get to the regional market and which are sold locally or consumed by the fishing households themselves. For this purpose, however, the time lag between the moment when the fish is caught and when it is sold at the market and the dynamics between fishermen and fish vendors would have to be explored further. This additional analysis was taken into consideration by the author of this thesis but found infeasible due to time and resource constraints.

Fish export data

The third data set contains information about the fish that are exported through the Wenela border post with neighbouring Zambia (from now on: Fish export data). It is not as extensive as the recording was only initiated last year. The data include information about the conditions of the fish (usually fresh, dry or salted), the weight, the dimension of the containers, the origin and the destination of the exports.

This data set could be a valuable starting point to explore regional fish trade dynamics. This seems particularly interesting in the case of the Zambezi Region given its geographical location at the heart of Southern Africa bordering several countries. Unluckily, the usefulness of this data set for this thesis is relatively limited as it contains only little information on fish that originates from Sikunga. In most of the cases, Katima Mulilo is listed as the origin of the fish exports, presumably because the fish were purchased at the regional market. Consequently, it mostly cannot be discerned whether some of this fish was originally supplied from the area of Sikunga or not to draw meaningful conclusions.

6 | Results

6.1 The Household Interview Sample

In order to enhance the transparency and comprehensibility of the interview findings and the local context, the general characteristics of the household interview sample shall be outlined briefly. This is particularly important given that the sample is not completely random. Out of 51 interviewees in total, 30 were male and 21 were female. As illustrated in Figure 6.1, a broad age range was covered with the youngest interviewee being 22 and the oldest one being 86 years old (average age of the interviewees: 46.6 years). Most of the people interviewed (35 people) are married, nine are single, five are widows and one is divorced; for one interviewee no information is available (probably married or a widow). As shown in Figure 6.2, the size of the interview households varied between 2 and 15, with an average size of 6.3. The majority of the interviewees claimed to be the head of the household. Five of the interviewees reported to be the wife, four the daughter and two the granddaughter of the respective head of household.

In terms of education level (illustrated in Figure 6.3), four of the interviewees did not attend school at all, six reported 1-4 years of school attendance, 17 allegedly had 6-9 years and 21 of the interviewees reported 10-13 years of school attendance. What can be noted here is that there seems to be a clear link between

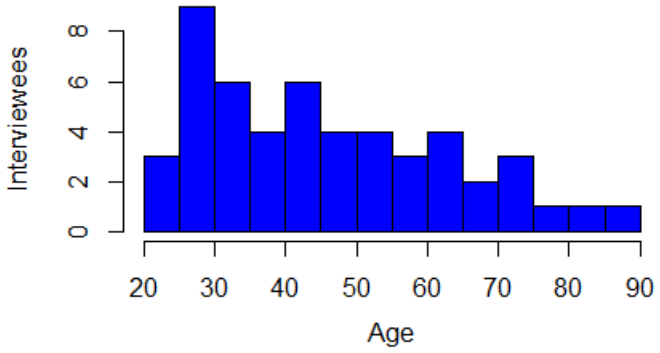

Figure 6.1: Age distribution of the interviewees

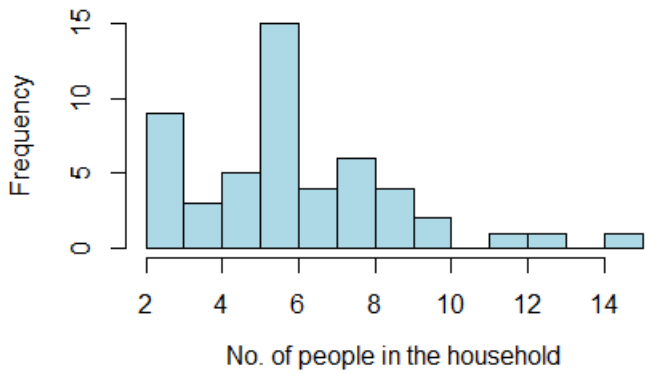

Figure 6.2: Size of the households interviewed

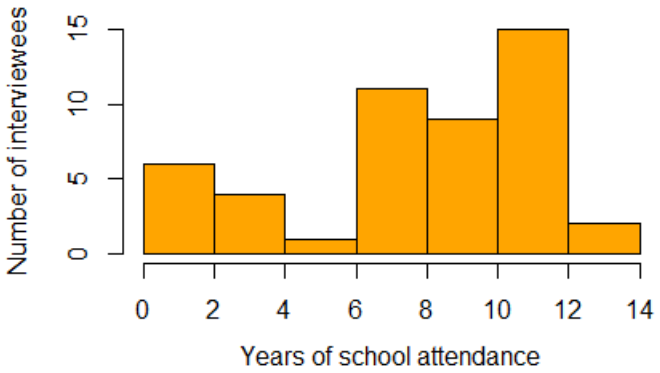

Figure 6.3: Level of education of the interviewees

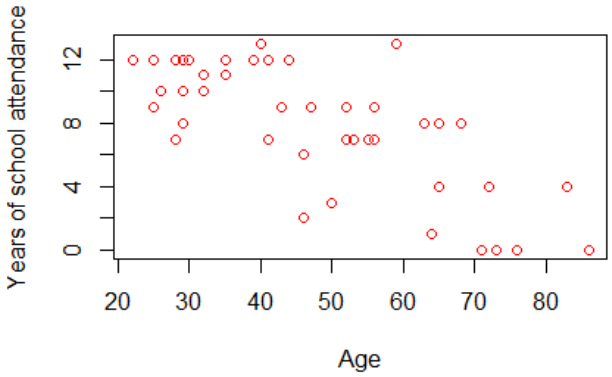

Figure 6.4: Link between age and level of education of the interviewees

the age and the level of education of the interviewees (see Figure 6.4). Whereas the four interviewees who did not attend school are all above 70, most of the interviewees who attended school for nine years or more are below 45 years. For three interviewees no information is available with regard to this. Four of the interviewees claimed to have a professional background in addition to school education, although only two of them completed the training/degree.

Table 6.1: Overview of a selection of salaries and prices

Type of Income Source	**Salaries & Revenues (in N$)**	**Interview No.**
Work at the rice farm	60 per day	14
Work at the road construction	12 per hour	17
Work at house constructions	400-800 per week	34, 40
Cleaner at the school	1,500 per month (full-time)	21
Reeds	80 per mat (village) 100-150 per mat (town) 20-30 per bundle (village)	22, 25, 38, 45
Cow meat	4,000-5,000 per cow (village)	13
Maize	300 per bag	45
Sikunga Conservancy Manager	2,100 per month (full-time)	13[2]
Sikunga Conservancy Chairman	1,500 per month (part-time)	13[2]
Type of Expense	**Price (in N$)**	**Interview No.**
Gill net	500 (town)	29, 37
Taxi drive[1]	50-100 per person	25, 38, 39
Cattle meat	10 per kg (village)	13[2]

[1] from Sikunga to Katima Mulilo
[2] Expert Interview

The majority of the people interviewed claimed to be crop farmers. Besides, about half of the interviewees allegedly have cattle. 20 of the interviewees grow vegetables, 17 usually harvest forestry products, usually reeds or grass. Moreover, 16 of the interview participants reported to be fishermen, in addition two are fish vendors. 12 of the interviewees receive a pension of N$1,000 per month (everybody above 60 years), seven claimed to receive remittances sent by their children. 11 of the people interviewed earn money with temporary jobs on a regular basis (i.e. more than just once). These temporary jobs are usually at the local rice farm, the road construction or house construction sites. Ten of the interview participants are currently employed at one of the two tourist lodges in Sikunga Conservancy (Island View Lodge and Kalizo Lodge). What needs to be considered here is that these livelihood activities are not mutually exclusive, but that locals usually engage in a

combination of different activities. Amongst other things, this has to do with the seasonal character of many of the activities, such as farming or reed harvesting. A number of examples of different salaries and prices based on the information from the interviews are given in Table 6.1. The income of fishing households and lodge employees and fish prices at the regional market are examined in more detail in Section 6.2 and 6.3.

Three of the interviewees were non-members of Sikunga Conservancy (one of them is a registered member of Dzoti Conservancy; one is from Lisikili village and moved to Kalimbeza only recently; one is permanently residing in Katima Mulilo). A couple of members of the TA participated in the household interviews, including three village headmen and the former area headman.

6.2 The Socio-Economic Significance of Fisheries

While the ES concept was not explained during the field work to the interview participants, it proved crucial as analytical perspective because a number of fishing-related ES and associated benefits emerged when examining the qualitative data collected. These ES encompass both provisioning and cultural services and shall be discussed in the context of three key aspects that were identified: fishing as a *source of income* (6.2.1), a *source of food* (6.2.2) and a *cultural tradition* (6.2.3). This is followed by a brief summary of the key findings of RQ1 (6.2.4).

6.2.1 Fishing as a source of income

Number of fishing households

It appears that fishing does play an important role as source of income, but only for a relatively small share of the local communities. Table 6.4 displays the approximate number of active fishermen and a rough estimate of how many of them sell their fish in Katima per village. If it is assumed that on average one fisherman belongs to one household respectively, it can be estimated that in total less than 8% of the households registered are actively involved in fishing. Furthermore, it seems that in most of the cases it is the wife or a female relative of a fishermen that sells his catch, especially when it is sold at the regional market in Katima Mulilo (see for example: Interview No. 1, 25, 29, 38). Therefore, it could be conjectured that the total number of fishing households in general, i.e. households that are either involved in fishing activity or fish sale (or both), is unlikely to be much higher than the total number of active fishermen. However, this assumption is to be treated with caution as it is not clear how many local fish vendors draw from

Kalimbeza

Keena

Nasisangani

The local villages

Table 6.4: Estimated number of active fishermen and fish vendors per village

Main villages in Sikunga	**Households** registered[1]	**Fishermen** active[2]		selling fish[2]
		absolute	relative	in Katima
Kalimbeza	190	14	7.4%	1
Keena	150	5	3.3%	1
Nasisangani	76	5	6.6%	0
Sifuha	155	14	9%	8
Kalundu	94	6	6.4%	3
Oldisize	NA	NA	NA	NA
Malindi	88	13	14.8%	1
In total	753	57	7.6%	-

[1] as reported by the Village Development Committees (VDC)
[2] as suggested by the Area Representatives

the supply by fishermen from outside Sikunga. One of the experts interviewed, who is originally from Sikunga and, thus, highly familiar with the local context, claimed that, in fact, the majority of Namibians selling fish in Katima Mulilo get their fish from Zambian fishermen (Expert Interview No. 17).

What is particularly striking when contemplating this table is the high share of fishermen in Malindi in comparison to the share of fishermen in the much bigger villages Kalimbeza, Keena and Sifuha. On the one hand, this might be due to the remote location of Malindi and the resulting distance to Katima Mulilo, but also, for instance, to the local meat markets and the rice farm nearby Kalimbeza, where locals sometimes have the chance to get employed temporarily. This assumption seems to be substantiated by the information provided by a TA member from Kalimbeza, who pointed to the advantageous location of his village for young people due to the proximity to the rice farm and construction site of the tar road that is currently being built (Expert Interview No. 7). On the other hand, the participants of the second focus group at the Conservancy also emphasised the favourable conditions for fishing nearby Kalundu, Oldisize and Malindi due to deep floodplains and extensive swamps.

However, several of the interview participants affirmed that the situation has not always been like this in the area. The general message that has been conveyed throughout the interviews on this matter was that in former times there used to be more fishermen in the villages, albeit the majority was fishing for their own consumption (see for example: Interview No. 9, 11, Expert Interview No. 8, 17). The generally declining number of fishermen was also confirmed by the participants

of the second focus group. It seems that nowadays there are 'few' fishermen left in the villages (see for example: Interview No. 20, 33, 47). This development was often associated with the lifestyle change described in Section 6.2.3, but also with the worsening fish catches that seemed to have discouraged many from fishing (see for example: Interview No. 33, 34, 47, Expert Interview No. 8). The latter was, in fact, confirmed by two of the interviewees: One of them used to fish and sell his catch in Sifuha and in Katima Mulilo, but stopped already in 2002 (Interview No. 31). The other one gave up fishing around 2010 (Interview No. 30). Both of them declared the bad fish catches to be the reason for their decision.

Similarly, several of the active fishermen that were interviewed complained about worsening fish catches (see for example: Interview No. 37). One of them claimed to have noticed the declining fish stocks back in the 1990s already (Interview No. 12). Another one explained that his family used to sell his fish catch in Katima Mulilo until 1998. Afterwards his catches became too small and were only sufficient to cover the consumption of his own household (Interview No. 37). In line with this, one of the fish vendors interviewed claimed that her income from fish sale has been declining since 2000 (Interview No. 38). Importantly, the worsening catches were underpinned by all the tourist operators at Sikunga and members of the local angling club (Expert Interview No. 4, 6, 11, 14, 15).

Among the 51 participants of the household interviews, 16 were active fishermen and two were female fish vendors. Given the small size of this part of the sample, these interviews are considered exemplary cases for the purpose of better understanding and describing the situation on the ground rather than representative of the whole group of fishermen and fish vendors in Sikunga. Nonetheless, the fishing household sample is of key importance to the analysis of this thesis as it indicates relevant patterns and issues that are at the heart of the research subject.

Age distribution of fishermen

The age distribution of the fishermen who participated in the interviews, displayed in Figure 6.6, seems to underpin the general change of local lifestyle that is described in Section 6.2.3. Even though two of the fishermen interviewed were 28 and 30 years respectively, fishing generally does not seem to be a popular activity for male adults under 40. The average age of the fishermen interviewed in the two biggest villages, Kalimbeza and Sifuha, is between 54 and 55 years. The same applies to Malindi. The average age of the fishermen interviewed in Keena and Nasisangani, the two villages with the supposedly lowest number of active fishermen, is between 49 and 50 years.

What is striking here is that the average age of the fishermen interviewed

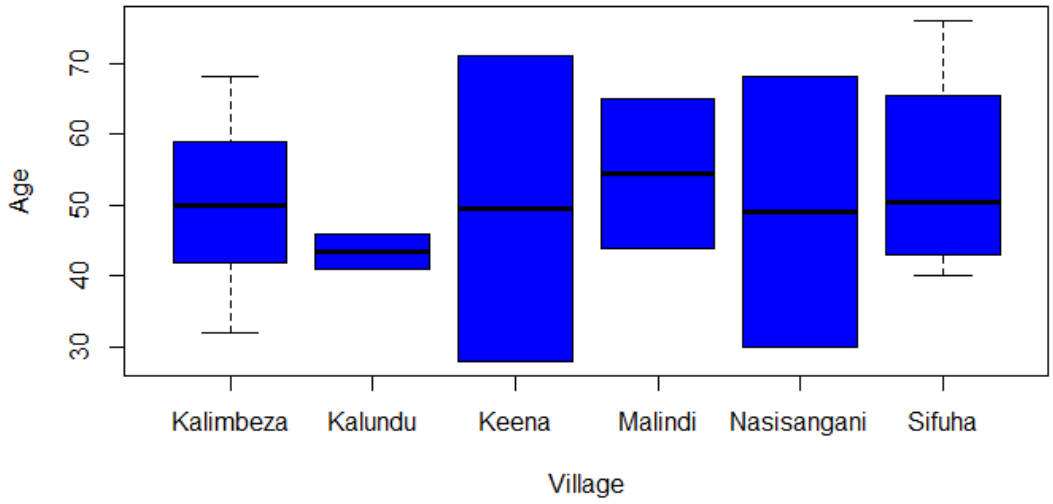

Figure 6.6: Age distribution of fishermen interviewed

in Kalundu (43.5 years) is considerably lower than in the other villages. This seems to be in line with the statement by one of the fishermen from Kalundu, who reported to know more 'young' fishermen in his villages than 'old ones'. In his view, this is because there are not so many elderly people in Kalundu in general. It might also be related though to the village's location and the resulting distance to the rice farm, for instance (hence lower chances of getting a job there and a higher incentive to engage in fishing to earn money), and the favourable conditions for fishing in the surrounding environment (Interview No. 22). A similar problem was described by one of the fishermen from Sifuha, who claimed that it is more difficult for residents of his village to get temporary jobs at the rice farm or road construction because sometimes they come too late or do not receive the message that the operators are looking for new employees (Interview No. 26). However, this was contradicted by another interviewee from the same village (Interview No. 30) and is also not reflected in the average age of fishermen interviewed from Sifuha.

Livelihood strategies of fishing households

Based on the interviews, it can be stated that fishing rarely constitutes the only livelihood activity of an adult. The typically multiple and complex livelihood strategies, which are characteristic for the Zambezi floodplain communities (Purvis, 2002; Stephanus et al., 2002), seem to apply to the fishing households in Sikunga, as well. However, fishing and the associated fish sale constitute the most important, if not the only, actual source of income for at least eight of the 16 fishermen interviewed (see for example: Interview No. 7, 29, 37, 50). This also applies to the case of one of the two fish vendors interviewed (Interview No. 38). In terms

of livelihood strategies, of the 16 fishermen interviewed, only four claimed to own cattle. Two of them use it for their own consumption only; two use the cattle to cover both their own consumption and to sell milk or meat (Interview No. 1, 19, 24, 39). This might indicate that local fishermen are more likely to belong to the less affluent households in the villages, as the ownership of cattle is often considered a sign of wealth (Expert Interview No. 13).

In contrast, 13 of the fishermen reported to engage in crop farming, albeit most of them only for their subsistence needs. Only four out of 13 usually sell some of their crops when they have a surplus (Interview No. 1, 19, 24, 37). This seems to be in line with the broader picture of all the household interviews as presented in Section 6.1, which suggests that crop farming is the most common livelihood activity in the local communities. Furthermore, seven of the fishermen also grow vegetables, all of them (except for one) for their own consumption (see for example: Interview No. 23, 40, 51). Three of the fishermen claimed to harvest forestry products, such as reeds and poles; two of them sell these occasionally to earn some additional money (Interview No. 22, 50). Four of the fishermen interviewed are above 60 and, thus, receive a pension of N$1,000 per month. In addition, three out of these four claimed to receive money from some of their children who have a regular job (Interview No. 1, 7, 19). Lastly, four of the fishermen that do not receive a pension, claimed to occasionally carry out temporary jobs, typically at the rice farm nearby Kalimbeza, at the road construction or house construction sites in the villages (Interview No. 28, 33, 40, 51).

Similar to many of the fishermen, for the two fish saleswomen interviewed fish sale does constitute a significant source of income but not their only livelihood activity. One of them also grows crops for own consumption, harvests and sells forestry products and has worked at house construction sites occasionally. In addition to fish, she also sells ducks at the market in Katima Mulilo (Interview No. 25). The other fish vendor claimed to have cattle, crops and vegetables; the cattle are only for subsistence needs, whereas the crops and vegetables are also sold. Moreover, she also harvests and sells forestry products (Interview No. 38).

What regards the frequency and intensity of fishing activity, there appears to be quite some variation among fishermen according to the information provided in the household interviews. Only four of the fishermen interviewed usually go fishing everyday throughout the whole year (Interview No. 1, 22, 37, 50). Those fishermen using gill nets, seemingly the most common fishing gear, typically put their nets in the evening and take them out to get the catch in the morning (see for example: Interview No. 1, 7). Two of the fishermen interviewed also go fishing throughout the whole year, but only every second day or everyday during two weeks per month

Local fishermen

respectively (Interview No. 29, 40). Another two fishermen claimed to go fishing everyday during ten to eleven months during the year, one of them from March until December, the other one from December until September (Interview No. 12, 23). Four of the fishermen interviewed affirmed to go fishing during six to eight months per year, typically between January and August; three of them do so on a daily basis, one of them two to three times per week (Interview No. 7, 26, 39, 51). In contrast, three of the fishermen only engage in fishing activity everyday during two to four months per year, usually between March and June or June and August (Interview No. 24, 28, 33). Besides, one of the elderly fishermen nowadays only goes fishing occasionally when he is free, which is approximately a few times per month (Interview No. 19). Importantly, this corresponds to what is stated by Purvis (2002b) about the varying nature and intensity of fishing activity throughout the year.

Fish sale activity

Of the active fishermen interviewed, ten claimed to sell their catch locally on a regular basis and occasionally at the regional market in Katima Mulilo (see for example: Interview No. 1, 22, 40). Four of the fishermen only sell fish in the villages (Interview No. 33, 39, 50, 51), whereas two reported to have given up selling fish due to insufficient catches (Interview No. 12, 24). In general, it seems that the local fishermen are only able to sell in Katima Mulilo when they get a big catch and, thus, a sufficient surplus. According to statements by fishermen from Kalimbeza, Keena and Sifuha, this happens perhaps once or twice per month between June and October (Interview No. 7, 29, 40). Similarly, the two fish vendors interviewed claimed to sell in Katima once or twice per month during five to six months per year (Interview No. 25, 38). However, at the same time some of the fishermen from Sifuha, Kalundu and Malindi claimed to sell fish in Katima Mulilo on a more regular basis, i.e. 1-3 times per month throughout most of the year (Interview No. 23, 26, 28, 37).

Here, it should be emphasised that the information provided by the fishermen interviewed regarding the frequency of their fishing and fish sale activity and the income generated often differed considerably. Moreover, it was often stressed by the fishermen that whether they sell fish locally or in Katima Mulilo or whether they sell at all depends heavily on the size of their catch, which, in turn, depends on the respective season and flood level (see for example: Interview No. 7). As a result, it is difficult to draw general conclusions on these aspects (for an overview of the information provided by the fishermen interviewed regarding fishing and fish sale activity see Appendix D).

Local fish vendors

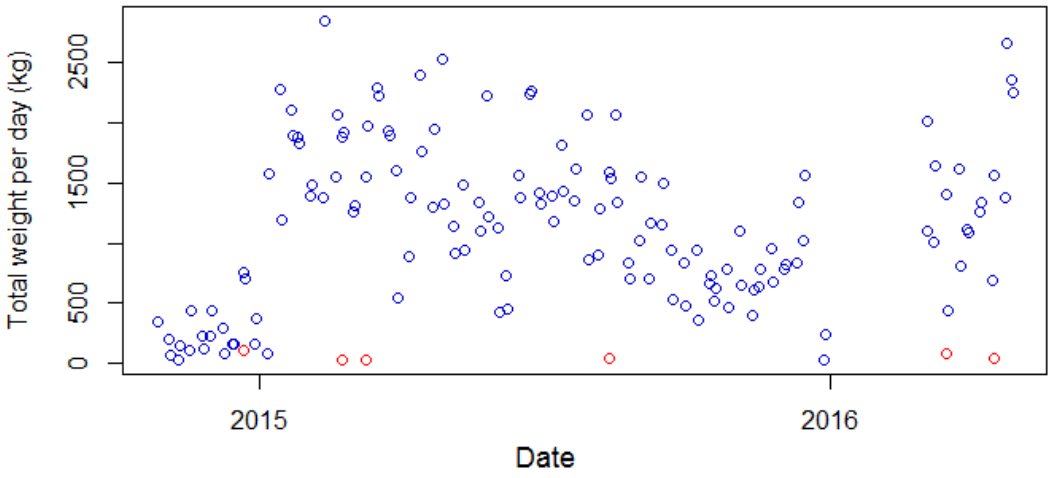

Figure 6.9: Total estimated market weights per day (in kg) recorded in the Katima market data

This information shall be compared to the Katima market data to see to what extent the reported fish sale activity is reflected in the data set. Moreover, this is useful to get an idea of the share of Sikunga's fish supply at the regional market. Figure 6.9 illustrates the total daily market volumes at Katima Mulilo (blue dots) and the recorded amounts of fish originating from the area of Sikunga (red dots). As explained earlier, this type of information was only consistent enough to be used from October 2014 onwards, which is why earlier years are not displayed here.

What is particularly puzzling in this figure are the seasonal differences. The high season for fishing on the floodplains in the region is typically when the water level is low, i.e. between August and November/December depending on when the flood arrives. Consequently, one would assume that the daily market volume is the highest during these months. Interestingly enough, the opposite seems to be the case, at least for the time period displayed in the figure. Especially the numbers recorded for October and November 2015 are surprisingly low in comparison to early 2015. Yet, this seems to correspond to some extent to the statements by at least half of the fishermen interviewed, according to which they do not engage in fishing activity at all between September and November. Another possible explanation might be that large amounts of the fish entering the regional market originate from places, especially nearby Lake Liambezi, that are not located directly at the Zambezi riverbanks and, thus, might be subject to different flood cycle patterns. However, a more profound analysis of this issue goes beyond the scope of this thesis.

What can be inferred from the figure though is that the recorded fish deliveries originating from the area of Sikunga are very few and, in most of the cases, constitute a rather small share of the overall market volume. Out of 139 days between October 2014 and April 2016, on which data were collected at Katima Mulilo, fish from the area of Sikunga was only recorded on six days. The specific origin and total weight of the fish deliveries and their share of the total market volume on the respective day are displayed in Table 6.7.

Nan'ombe (an area between Sifuha and Malindi) and Sifuha seem to play a prominent role in Sikunga as source of fish supply for sale at the regional market. All fishermen interviewed in Sifuha claimed to go fishing at Nan'ombe, whereas the two fishermen from Kalundu reported to go fishing at Kalundu channel. Therefore, it may be assumed that fish originating from Nan'ombe is most likely to be supplied by fishermen residing in Sifuha, Malindi or perhaps Oldisize.

Furthermore, it is interesting to observe here that most of the fish originating from Sikunga and sold at the market is dried. Only a small share of the recorded

Table 6.7: Fish supply from Sikunga recorded in the Katima market data

Date	Origin	Condition of the Fish	Total Weight of Fish Delivery in kg[1]	Share of the Total Market Weight[1]
22.12.2014	Nan'ombe	dry	112.0	14.89%
23.02.2015	Nasisangani	fresh	26.5	1.41%
10.03.2015	Nan'ombe	dry	31.0	2.01%
13.08.2015	Sifuha	dry	44.5	2.8%
15.03.2016	Sifuha	fresh dry	55.4 30.6	6.23%
14.04.2016	Sifuha	dry	43.0	2.75%

[1] on the respective day

fish from Sifuha and the fish stemming from Nasisangani were fresh. This seems to be in line with the statements by the two fish saleswomen interviewed at Sifuha and Malindi, who reported to sell only dried fish at the regional market. According to one of them, this has the advantage that there is no need to lower the price when the offer at the market is big because the dried fish can be conserved easily (Interview No. 25, 38). Moreover, the preference for selling either fresh or dried fish is likely to depend on the location of the villages, considering that fish vendors from the more distant villages face higher transport costs when going to Katima Mulilo. These costs might be an incentive to dry the fish and accumulate more of it over a longer period of time to then take everything to town at once instead of going there more often with smaller amounts of fish. Whereas, according to one of the fishermen, a taxi from Nasisangani to town costs about N$50 for one way (Interview No. 39), the saleswomen from Sifuha claimed to pay N$70-100 to get to town (Interview No. 25). The fish vendor from Malindi, in turn, claimed to pay N$50 for herself but, in addition to this, up to N$250 for the fish when she intends to transport everything to the market in Katima Mulilo (Interview No. 39). Besides, the possibility to store fresh fish in a refrigerator is likely to play an influential role, as well. As pointed out by the participants of the second focus group, electricity supply differs among the villages. Whereas in Keena, Nasisangani and Sifuha about half of the residents have electricity, in Kalimbeza and Malindi only a few do. In Kalundu and Oldisize allegedly nobody has electricity.

Income from fish sale

When looking at the income generated by fish sale, it becomes clear that local fishermen and fish vendors have a strong incentive to sell their fish at the regional market in Katima Mulilo rather than in the village. Two of the fishermen from Kalimbeza who are used to selling their catch locally several times per week reported an income of N$40-100 per day (Interview No. 50, 51). Similarly, a fisherman from Keena claimed to earn N$150-200 per day when selling in the village, albeit he only does so a few times per month depending on his surplus (Interview No. 40). In addition, a fisherman from Nasisangani affirmed to earn only N$20-30 per day with fish sale in the village due to bad catches (Interview No. 39). In contrast, according to some of the fishermen, it is possible to earn between N$300-600 per day when selling in Katima Mulilo (Interview No. 37, 40). This seems to be due to the generally 'better' market prices for fish in town, as confirmed by several of the fishermen interviewed (Interview No. 19, 22, 23, 24). Two of them claimed that prices for bream, for instance, are more or less double in Katima Mulilo in comparison to the villages in Sikunga (Interview No. 19, 22). This was confirmed by one of the local experts interviewed who stated that prices for fish have become low in the village (Expert Interview No. 13).

Nevertheless, these numbers should be treated with caution as it is not clear to what extent they are accurate and comparable. Whereas the daily income generated by fish sale in the village might be much smaller than in town, those people selling locally usually sell fresh fish and can do this on a weekly basis. Those selling in Katima Mulilo, in turn, can only do so when their catch is big enough and it is worth it to pay the transport costs to town (transport is usually by taxi). From the household interviews it appeared that only a few fishermen are able to do this on a weekly basis. Here, it should be noted as well that it seems to be common for fishermen, especially in the more remote villages, to dry their catch and to store bulks of dried fish over the month to then take a big amount to the regional market (see for example: Interview No. 26, 29, 37).

Interestingly, the picture looks slightly different when considering the information provided by the two saleswomen interviewed. Their daily income from fish sale seems to be significantly higher than what has been reported by the fishermen. The fish vendors claimed to earn between N$1,500-3,000 per day, depending on how much fish is being offered at the market on the specific day (Interview No. 25, 38). This is probably due to the fact that they do not only sell the catch of a single fisherman (in their cases the husband and the brother respectively) but often also from other fishermen in the village. One of the women indicated that local fishermen usually sell fish in bulks, which allows her to make a good bargain.

For instance, she buys three fish for N$10 from one of them and then sells each fish for N$10 in town (Interview No. 25). When the catch is low, these women also sell fish in the villages. One of them estimated that she earns about N$50 per day when she sells in Malindi (Interview No. 38).

Again, these findings shall be compared with the Katima market data. Table 6.10 lists in more detail the recorded fish deliveries from Sikunga and the average market prices per kg for dried and fresh fish on the respective day. This information can be used to suggest an income that was possibly received by fish vendors from Sikunga in this context. It shall be emphasised though that the numbers displayed here represent rough estimates. More accurate numbers could only be obtained if information was available on the specific fish species sold by the different fish vendors. Moreover, these calculations are based on the assumption that the entire fish delivery is sold on the same day at the price recorded in the data set. However, this might not always be the case, considering that dried fish can be stored. In the case of fresh fish, being a perishable good, it is likely that fish vendors will lower the price if their fish is not sold yet by the end of the day. Lastly, it is not clear whether each recorded fish delivery (represented by one row in the 'Fish weight' column) is sold by only one or several vendors. Hence, it cannot be inferred whether the estimated income is distributed among several persons or not.

When looking at the estimated income from fish sale, the numbers derived from the Katima market data are slightly higher than the ones reported by the interviewees. Some of the fishermen interviewed claimed to earn between N$300-600 per day when selling their fish in town, whereas the fish saleswomen reported an income between N$1,500-3,000 per day. In contrast, the income estimates here range from N$500-3,340 per day. However, if transport costs of N$50-300 are assumed (depending on the amount of fish transported and the distance to town) and subtracted, the income estimates arrive at similar values as the ones reported by the interviewees.

Even though the calculations presented above are oriented towards the market price method as outlined in Section 5.2, the author of this thesis refrains from suggesting these income numbers as monetary value for fish as provisioning service. Considering the few occasions on which fish originating from Sikunga could be recorded, in this case this approach seems to be too limited and, hence, inappropriate to account for the whole group of beneficiaries and the benefits associated with this ES. In order to make the application of the market price method justifiable and ensure a more complete picture, more data would be required on local fish supply, prices at the village markets and the value chain of fisheries.

Table 6.10: Income estimates for fish vendors from Sikunga derived from the Katima market data

Date	Origin	Average market price per kg in N$		Condition of the Fish	Fish Weight (Delivery) in kg	Income derived in N$
		dried fish[1]	fresh fish			
22.12.2014	Nan'ombe	69.34	26.20	dry	11.5	796.95
					11.0	762.30
					18.5	1282.05
					12.5	866.25
					51.0	3534.30
					7.5	519.75
23.02.2015	Nasisangani	80.98	19.40	fresh	26.5	514.10
10.03.2015	Nan'ombe	75.92	26.09	dry	11.0	834.90
					20.0	1518.00
13.08.2015	Sifuha	71.51	22.22	dry	44.5	3181.75
15.03.2016	Sifuha	77.55	22.78	dry	30.6	2374.56
				fresh	22.0	501.60
					33.4	761.52
14.04.2016	Sifuha	77.55	23.13	dry	43.0	3336.80

[1] fish loses ca. 2/3 of its weight when being dried (Expert Interview No. 2)

The only timeframe in the fish monitor data during which the fish catches of different fishermen are easily distinguishable is between July 2015 and March 2016. Based on these data, an average catch per fisherman of ca. 12.6 kg was calculated. This roughly corresponds to the statement by one of the experts interviewed who suggested an average catch of approx. 14 kg per day per person (Expert Interview No. 2). Nevertheless, it is not clear to what extent the calculated number is representative as the size of a catch will not only depend on where and when a person goes fishing, but also on the number and type of fishing gears used. Monofilament gill nets are the most common gear and local fishermen presumably have two nets on average (ibid.), but some fishermen also use traditional gears that naturally generate a different catch.

Fishing activity by women

Lastly, it should be added that in the context of fisheries there seem to exist relatively strong gender roles in the local communities. As the household interviews have shown, fishing is usually an exclusively 'male' livelihood activity, whereas it is very common that the sale of the fish catch is done by women. This corresponds to what is outlined in Section 4.1 regarding the specialisation of labour and the post-harvest fisheries sector. When questioned about this, one of the fishermen suggested that 'women are more responsible with money than men', which is why they are normally in charge of selling fish in Katima Mulilo (Interview No. 29).

Nonetheless, there seems to be one notable exemption from this general gender-based task division between fishing and fish sale. It appears to be common practice for many of the female community members to fish with mosquito nets in the shallow floodwaters around the villages (Interview No. 43). Here, it shall be noted that mosquito nets are obtainable fairly easily for the locals, as they are commonly sold and sometimes even given out for free in the context of government measures to combat malaria. Therefore, this 'low-cost fishing method' is to be contrasted with monofilament nets that are mostly used by fishermen and bought for approx. N$500 in town (Interview No. 29, 37). However, the fishing in shallow floodwaters evidently depends on the flood cycle and is only feasible during a few months per year. Furthermore, the interviewee who addressed this topic indicated that the purpose of this activity is mainly to provide fish for own consumption and village-based sale. According to her, a bag of 50 kg with small dried fish can be sold locally for approx. N$250-300 (Interview No. 43).

Importantly, two entries (shown in Table 6.12) could be found in the fish export data in which two of the villages at Sikunga are explicitly named as the origin of the fish delivery and that can arguably be linked to this issue. Both are

Table 6.12: Fish exports originating from Sikunga (fish export data)

Date	Origin	Destination	Condition of the fish	Weight of Fish Delivery in kg
25.03.2016	Nasisangani	Kasumbalesa, DRC	Salted dry	77
29.04.2016	Kalimbeza	Lusaka, Zambia	dry	54 55 55 56 56 56 55 54 55 In total: 496

villages that are directly affected by the FPA and were much less prominent in the Katima market data discussed above. Here, particular attention needs to be paid to the time period during which these exports were recorded as March and April are considered 'low season' for fishing due to the high water level. In light of this, it is likely that these fish exports contain the small fish species (called *Labeo cylindricus*) that are caught with mosquito nets in shallow floodwaters around the villages in Sikunga. As indicated above, this type of fishing activity is seasonal and usually takes place around April or May. One of the experts explained though that the time span strongly depends on the height and longevity of the flood wave (Expert Interview No. 3).

Sun drying of fish catch

It should be added that these data do not correspond to the statement by the interviewee according to which the purpose of this fishing activity is mainly for own consumption and sale in the village. It may be worthwhile to further explore this type of fishing activity and export pattern in the context of future research endeavours. It points to an interesting aspect of fishing as a source of income that particularly empowers the female community members who normally depend on their male counterparts for the supply of fish for sale. Furthermore, mosquito nets constitute a low-budget

fishing gear (still illegal though in Namibia) that are more easily accessible for poorer members of the local communities than, for instance, monofilament gill nets.

Income generated through recreational angling

Even though recreational angling, usually classified as cultural ES, might not have any significance for the local communities as a leisure activity per se, it sure does as a source of income. Hence, it could be argued that the income generated through recreational angling is a benefit for the locals that results from the cultural ES utilised by anglers. Importantly, the two lodges located in Sikunga Conservancy essentially rely on angling tourism for their business and employ a considerable number of local community members (Expert Interview No. 6, 11). In comparison, Shamwari Houseboat is a much smaller and mobile enterprise without a permanent landing stage, which explains why only one local person is employed by the operators (Expert Interview No. 15).

In spite of not being a tourist business, the local angling club also plays a certain role because its campsite is located nearby Kalimbeza, where it permanently employs four members of the local communities. Moreover, every year in August on the occasion of a big fishing competition the angling club employs additional people from the villages to help out (Expert Interview No. 14). Table 6.14 summarises the numbers of local community members employed by the different local stakeholders in the context of recreational angling. What is particularly striking here is that the total number of these employees is similar to the total estimated number of active fishermen and the associated number of fishing households as suggested earlier. This might be an indication that recreational angling is similarly significant as a source of income in the local communities as fishing/fish sale.

Table 6.14: Number of local employees in the recreational angling sector

Employer	No. of local employees
Island View Lodge	27
Kalizo Lodge	24
Shamwari Houseboat	1
Nwanyi Angling Club	4
In total	56

In total, ten of the local community members who work at one of the two lodges participated in the household interviews, more specifically five women and five men. They provided useful information on the income that is generated by angling tourism in the area. The specific income of an employee not only depends

on his or her function, but also on whether the person receives tip from the lodge guests and whether overtime is paid by the operators. However, based on the household interviews it can be estimated that housekeepers, who are typically women, earn approx. N$1,200-1,400 per month (Interview No. 43, 44, 45, 46). Tourist guides, who are usually male, receive around N$1,500-3,500 per month, depending on their experience and the amount of tip (Interview No. 20, 41, 42, 48).

In terms of livelihood activities, it seems reasonable that not much time is left for other things next to a full-time job at a lodge. The lodge employees typically work six or seven days per week, eight hours per day during the week and mostly part-time during the weekend (ibid.). Nevertheless, seven of the employees interviewed claimed to have cattle for their own consumption and even five of them for sale, as well. Similarly, six of the employees have crops and five of them grow vegetables, albeit the majority only for own consumption. Four of the employees claimed to harvest forestry products occasionally, mainly for their own household. Only one of the employees interviewed indicated to have no other livelihood activity next to the job at the lodge (Interview No. 44). As a result, in can be conjectured that even though the job at the lodge is not the only livelihood activity for the vast majority of employees interviewed, it is likely to be their most significant source of income.

Another interesting observation that can be contrasted with findings about local fishermen concerns age. The age distribution from 22 to 39 and an average age of 30.3 years among the lodge employees that were interviewed indicates that this, unlike the fishermen, is a rather young occupational group. A possible explanation could be that the lodge operators prefer to employ people with a higher level of education which, as shown earlier, seems to be more wide-spread among the younger community members. In addition, it could also be related to the general lifestyle change that is addressed in Section6.2.3, which refers to the eagerness of younger people to get a job and a stable income.

Contributions by the recreational angling sector

In addition to the direct financial benefits that locals, who are employed by one of the tourist operators or the local angling club, derive, there are a number of other contributions generated by recreational angling that flow into the local communities. These include different types of donations by the two lodges and the angling club, such as fuel or maize meal, and fees which they pay to both the customary land owners, i.e. the villages of Kalimbeza (in the case of Island View and the Nwanyi campsite) and Kalundu (in the case of Kalizo Lodge), and the

TA in Bukalo (Expert Interview No. 4, 6, 11, 14). Besides, clients at Island View are required to make a one-off payment of N$10 per client to contribute to the so-called 'Kalimbeza Development Fund', which is supposed to support the local village (Expert Interview No. 11). Kalizo, in turn, supports the pre-primary school in Kalundu with uniforms, stationary and cement to build new classrooms (Expert Interview No. 6). What should be added here is that the two lodges had been in place already before the Conservancy was founded and have long-established relationships with the two villages that are the most proximate (Interview No. 9).

The local angling club has been organising, amongst other things, a 'Mokoro Fishing Competition' based on traditional fishing methods for local fishermen in Sikunga since 2013. During the past two years they managed to get sponsoring amounting to N$50,000 respectively, which went to the participants of the competition. Furthermore, last year the angling club started to host the annual Zambezi Classic at its campsite nearby Kalimbeza. This is a prominent fishing competition with about 50-80 teams of anglers participating. A launching fee of N$100 is demanded from each team; the cheque is later handed over to Kalimbeza (Expert Interview No. 14).

According to an expert interviewed from NNF (Expert Interview No. 3), it is estimated that the total contributions by the lodges and the angling club in 2014 (including wages) amounted to almost N$ 1.2 million. Overall, it is difficult to specify the exact value of the benefits for the local communities that are generated by recreational angling due to the scattered and sometimes contradictory nature of available data. However, it seems clear that recreational angling does play an important role for the local communities through the employment it generates and the support by the stakeholders involved.

6.2.2 Fish as a source of food

Provision of animal protein in the past

Interestingly, it seems that fish is not as important anymore as a source of food as it used to be in Sikunga. According to the historical perspective provided by many of the elderly community members, in the past fish used to be the staple food' of local people. It was usual to eat fish on a daily basis and fish was particularly significant as a source of food in times of drought (Interview No. 9, 11, 12, 21). Statements such as 'fish is our food' or 'fish was our life' were a common occurrence during the household interviews (see for example: Interview No. 10, 19). This is confirmed by fishermen who reported that 'a long time ago' they used to eat much more fish than meat because they got better fish catches (Interview No. 12, 21).

In addition to fish, game meat seemed to be a traditional and easily obtainable source of animal protein for the local communities (Interview No. 10, 11).

Local fisherman gutting his catch

However, it appears that this has changed fundamentally since the 1990s and 2000s. Several of the interviewees attributed these changes to rising pressures on local fish stocks due to the introduction and use of destructive fishing methods, the high number of fishermen and the start of fish trade (see for example: Interview No. 9, 12, 21, 31). Two of the interview participants claimed that before Namibia gained independence in 1990 there had been no real fish trade in the area. At that time, most of the people used to fish only for their own consumption (Interview No. 9, 11). Besides, members of the TA in Bukalo pointed out that today the rural communities have many more options to buy food due to the accessibility of grocery shops and the availability of cattle. As a consequence, there is less need to rely on fishing to provide food in comparison to former times when there was less infrastructure and cattle farming not as common.

Provision of animal protein today

Today the situation seems to be very much different. 27 of the people interviewed in Sikunga claimed to generally eat more cattle meat than fish. These people consume meat everyday or several times per week. In contrast, they eat fish only on a weekly or monthly basis or even less than once per month. The vast majority of them buy the meat locally. Two people purchase meat both locally and at the market in Katima Mulilo (Interview No. 23, 34), one interviewee in Katima Mulilo only (Interview No. 20). Here, it is crucial to consider the geographical location of the different villages in the Conservancy. Given the proximity to the two spots where meat is sold locally (between Kalimbeza and Keena and at Nasisangani), it is not surprising that almost all of the interviewees from Kalimbeza, Keena and Nasisangani rely more on meat than on fish. The household interviews conveyed very clearly that it is generally much easier for residents of these villages to purchase meat locally than fish. This can be related to both the accessibility of the local meat markets and the availability of cattle meat (see for example: Interview No. 3).

Typical fireplace for cooking

One interviewee from Nasisangani, for instance, affirmed that 'there is always someone who slaughters in the village' (Interview No. 14). However, people from this part of Sikunga tend to complain about the difficulty of coming across fishermen that sell their catch in the village. For example, one interview participant from Kalimbeza mentioned that 'you need to be lucky that fishermen come here and still have fish to sell' (Interview No. 2). Similarly, one of the interviewees from Keena explained that even if a local fisherman catches some fish, it is sold out quickly (Interview No. 10). A similar concern was expressed by two of the interviewees from Sifuha (Interview No. 29, 30). Another resident of Sifuha added that it is easier to go to the market at Nasisangani to buy meat than to buy fish locally in the village (Interview No. 27).

21 of the people interviewed in Sikunga, in turn, affirmed that they eat more fish than meat. These people consume fish on a daily or weekly basis, whereas they eat meat rather on a weekly or monthly basis. In this context, it is significant to consider that 15 of these interviewees are fishermen or fish vendors themselves, meaning that they have their own catch or the catch of a relative (e.g. husband or brother) at their disposal and do not depend on other people selling fish locally. Moreover, the location of the villages and the accessibility of the local meat markets seem to play an essential role again. The more remote villages, such as Kalundu and Malindi, do not have a local market for meat. As a consequence, their residents have to cover quite a distance to purchase meat locally at Nasisangani and between Keena and Kalimbeza. According to some of the interviewees, they sometimes face the problem that the meat is already sold out when they get there (see for example: Interview No. 45).

Moreover, it should be mentioned that these are the villages that are usually affected the most by floods during certain times of the year, which makes the access to the other villages in Sikunga even more difficult. As a result, it is easier to buy fish than meat in Kalundu and Malindi, either from fishermen in the village or directly at the riverside (see for example: Interview No. 33, 35, 45). In addition, an interviewee from Malindi reported that it is difficult to buy meat locally because there are only few people who slaughter their cattle (Interview No. 33).

Traditional local dish: grilled bream

Another interesting observation is that out of the six interviewees who mostly feed on fish but are not members of fishing households, three are employees of the tourist lodges in Sikunga. Thus, in contrast to most of the other interview participants, these people have a stable income and can afford to go to Katima Mulilo to buy fish there whenever no fish is available locally (Interview No. 42, 45, 47). It seems that people without a regular salary hesitate to spend money on transport to town and prefer to buy fish locally (see for example: Interview No. 2, 3). Besides, fish is generally more expensive at the regional market than in the village (Interview No. 22, 24, 25, 31).

The issues of the local availability of fish and meat and their significance as a basic source of food for the local communities were discussed extensively at the second focus group meeting with the Management Committee. Despite the differences between fishing and non-fishing households and other influential factors, such as stable income, some general yet cautious conclusions could be drawn about the situation in the villages from the household interviews and the feedback by the Management Committee (see Table 6.15).

Table 6.15: Local availability of basic animal protein sources

Main villages in Sikunga Conservancy	More easily obtainable locally
Kalimbeza	Meat
Keena	Meat
Nasisangani	Meat
Sifuha	Meat
Kalundu	Fish
Oldisize	Fish
Malindi	Fish

Food provision during droughts

Contrary to intuitive assumptions about the role of fish as a 'safety net' for food provision during drought, more than half of interviewees named the food aid ('drought relief') provided by the government as the main source of food they rely on when food provision gets difficult due to weather conditions. Even though crop farmers struggle to plough their fields and get a good harvest and cattle farmers are reluctant to slaughter during periods of drought, it appears that fish does not become more significant as a source of food. In this context, it needs

to be taken into account that not all members of the local communities receive food aid from the government in the event of a natural disaster, such as severe drought or flood. The Zambezi Regional Council conducts annual vulnerability assessments and divides people into a number of different wealth groups, whereby people's purchasing power and access to food is being considered. Based on this, the number of people whose livelihoods will be disturbed and who will be affected the most is determined. These are the households that are entitled to receive assistance, which usually consists out of maize meal and sometimes tinned or dried fish (Expert Interview No. 16). Consequently, people who are employed and receive a certain salary generally do not qualify for food aid from the government.

Tinned fish and milie pap

Apart from this, several interviewees affirmed that it is common to engage in activities, such as searching for temporary jobs, slaughtering a cow to sell meat or harvesting forest products to sell them in order to earn some money to buy food (Interview No. 19, 34, 36, 41). Others mentioned that they depend on their pension or income to be able to purchase food in town (see for example: Interview No. 31). One interviewee claimed that for this purpose he is sometimes forced to borrow money from others (Interview No. 23). 15 of the interview participants reported that during drought periods they usually go to Katima Mulilo to buy food. Again, it seems to make a difference whether someone receives a regular salary or not: seven out of these 15 interviewees are employees of the tourist lodges in Sikunga (see for example: Interview No. 20, 46). Furthermore, a few interview participants mentioned that in times of drought they sometimes gather water lilies to eat or feed on milk, vegetables or other types of 'traditional food' (Interview No. 18, 24, 30, 38).

Food provision during the closed season

In addition to drought periods, it is worthwhile to look at how local people dealt with the recently introduced closed season in Namibia. Given that this policy measure did not allow any fishing activity and, thus, the sale of fresh fish over a period of three months, the extent to which the locals struggled to provide food in this context allows to draw some further conclusions about the significance of

fish. Interestingly, only a few of the interview participants admitted that it makes food provision a little more difficult (see for example: Interview No. 5, 36). When the interviewees were asked what they ate during this time period, vegetables and meat were mentioned six times each, milk five times and fish four times. Fish was bought either frozen or in cans at the supermarket in town, dried from Zambian fishermen or fresh at the local fish farm (Interview No. 1, 7, 13, 23). Only four interviewees were openly negative about the fish ban. Not surprisingly, three of them were fishermen and rely on fishing to feed their families (Interview No. 37, 39, 50), and one of them was a fish vendor whose main source of income is fish sale (Interview No. 38).

6.2.3 Fishing as a cultural tradition

Fishing seems to have a strong cultural dimension in the local communities at Sikunga. 19 of the people interviewed, including residents of all six villages where the interviews were conducted, confirmed that fishing can be considered a tradition in their respective village. Only three of the interviewees did not seem to agree with this (Interview No. 17, 35, 48). Here, it should be noted that from 29 of the interview participants no explicit answer was obtained on this matter. Several of the fishermen interviewed explained that they learnt how to fish from male relatives, usually the father or grandfather (Interview No. 7, 19, 26, 39). Statements such as 'fishing is a gift from our forefathers' were a common occurrence during the interviews at fishing households (Interview No. 7, 40). Some of the older community members emphasised that fishing has long been a traditional source of providing food and earning money. In the past, many people used to live from fishing and caught fish with traditional methods, such as traps or spears (Interview No. 9, 10, 11, 12). In this context, one of the local experts emphasised the subsistence purpose of fishing in the past, saying that people used to catch just enough fish to eat and that surplus was sold locally (Expert Interview No. 17). Moreover, one of the elderly interviewees claimed that before each household had a fisherman, but that in most cases those who used to fish have passed away already (Interview No. 10). In line with this, two other interviewees, one of them a fisherman himself, affirmed that most of the fishermen they know nowadays are rather 'old men' (Interview No. 15, 19).

Even though fishing is considered a local tradition by many community members, it appears that a more general change in lifestyle has taken place over the past few decades related to improved education and employment opportunities. This was confirmed by 11 of the interviewees who explained that the majority of

the younger people are not interested anymore in becoming a fisherman. According to their views, the younger generation is eager to get education, find a job and move to town rather than engaging in traditional rural livelihood activities (see for example: Interview No. 12, 20, 44, 47). This was also underlined by several of the local experts interviewed (see for example: Expert Interview No. 8, 13, 17). Some interviewees mentioned that a stable income plays an important role in this context. Being an activity that is not only seasonal but also weather-dependent, fishing can hardly guarantee a regular salary throughout the year and is, thus, not a preferable livelihood activity for many (see for example: Interview No. 19, 42). As a result, if someone has the choice, he is likely to opt for another way to make a living (Interview No. 48). Interestingly, the youngest fisherman that was interviewed (age 28) maintained that he started fishing in the first place

In addition to this, the risks associated with fishing activity and the river might be a contributing factor, as well. It appears that many members of the local communities have not learnt how to swim properly. Furthermore, one of the interviewees claimed that young people are more afraid of wild animals, especially crocodiles and hippos (Interview No. 19). Interestingly, this statement was underpinned by a young interviewee (age 29) who admitted that he does not like fishing because he perceives it as a risk due to the crocodiles and hippos (Interview No. 35). Two other interview participants, both of them fishermen, further added that whether someone becomes a fisherman or not also depends on the respective family, their wealth and how their children are raised. Despite the seemingly lower popularity of fishing among younger people, some people might consider fishing to provide for their families and to look after their parents who are too old for fishing (Interview No. 23, 24).

It appears that the overarching conclusion on this matter that can be drawn from the interviews is: Fishing does constitute a local cultural tradition, but it is not really being preserved by the younger generation. This issue was discussed at the second focus group meeting with the Conservancy Committee. Importantly, the participants of the meeting unanimously confirmed the impression that was conveyed during the interviews. Furthermore, this finding was addressed at the second meeting at the *khuta* in Bukalo and, again, met with approval.

6.2.4 Summary of key points

Fishing as source of income:

- The estimated percentage of active fishermen is below 8% of the registered households. The general message conveyed during the interviews was that

local fishermen are rather elderly men.

- Allegedly, there used to be more active fishermen in the past. The lower number of fishermen today seems to be attributable to worsening fish catches and the general lifestyle change.
- Fishing or fish sale is rarely the only livelihood activity of a person, but at least half of the fishermen interviewed depend on it for economic survival.
- There is a strong variation in the nature and intensity of fishing and fish sale activity throughout the year.
- The significance of fishing as livelihood activity varies among the villages; Malindi has the highest estimated percentage of fishermen, followed by Sifuha. Possible explanatory factors are: more favourable natural conditions for fishing; no resource access restrictions; longer distances to town, local meat markets and temporary work sites.
- Only few people from Sikunga sell fish at the regional market. Most of the recorded fish supplies from Sikunga originate from the areas of Sifuha and Malindi. Getting a sufficient surplus seems to be the main factor constraining locals' ability to sell fish in town.
- An exception from the strong gender roles in fisheries is the seasonal use of mosquito nets in shallow floodwaters by many women.
- Employment in the recreational angling sector seems to have a similar significance as source of income as fishing at Sikunga. The employees of the lodges and the angling club are a relatively young occupational group. Their job is usually their main livelihood activity.
- Even though the financing arrangement for the FPA through angling tourism is not in place yet, there have been different types of contributions from the angling sector, in particular going to Kalimbeza and Kalundu.

Fish as source of food:

- Fish used to be the 'staple food' of the local communities, but not anymore in all of the villages. Given the availability of other protein sources and the accessibility of grocery stores, there is less need for many to rely on fishing.
- In Kalimbeza, Keena, Nasisangani and Sifuha it seems that meat is more easily obtainable locally. In Kalundu and Malindi, fish is still more important

as source of animal protein (apparently due to the distance to local meat markets and the presumably lower availability of meat.)

- Fish does not seem to become more important as a source of food in times of drought. Drought relief from the government and additional jobs to earn money were mentioned more often as compensatory measures.
- Most of the interviewees did not complain about difficulties to provide food during the closed season.

Fishing as cultural tradition:

- Fishing is considered a tradition in all parts of Sikunga, but the tradition is not upheld by the younger generation.
- Many young men seem to lack the incentive to become a fisherman or fear the threat by wild animals. Getting a stable income seems to have higher priority.

6.3 The Socio-Economic Impact of the FPA

As outlined in Section 5.1.3, the approach taken in this chapter is oriented towards the SAPA Methodology recommended by IIED. Accordingly, the following subsections address the implications for the *material wellbeing* (6.3.1) of the Sikunga Community, focussing on fish catches, fish sale, recreational angling, food provision, employment, financial costs and non-fishing-related ES, and the *subjective wellbeing* (6.3.2) of the Sikunga Community, examining the locals' understanding of the problems with fisheries, their attitude towards the FPA and the benefits they perceive. Again, the chapter concludes with a summary of the key findings of RQ2 (6.3.3).

6.3.1 Material wellbeing

Impact on fish catches

When trying to examine the impact of the FPA on the material wellbeing of the local communities, one of the crucial questions to ask is whether the FPA has actually been fulfilling its purpose of enhancing fish stocks or not. Interestingly, opinions seem to differ on this matter. Being the ones who are most directly affected by changes in the fish stocks (apart from the angling tourists perhaps), the local fishermen are the most likely to be able to provide hands-on information

on this. However, of the 16 active fishermen interviewed, only nine were able to reply to the question of whether they have noticed any changes in their fish catches since the FPA was introduced. Six of them affirmed that their catches have been slowly increasing again with the FPA (see for example: Interview No. 7, 28, 40, 51), whereas three of them stated that there has not been any improvement yet (Interview No. 1, 29, 39). The Fish Guards interviewed underlined the positive impact of the fish reserve, affirming that fish stocks have been increasing (Expert Interview No. 8).

Apart from the interview findings, the fish monitor data might point to changes in local fish catches over the past couple of years. Figure 6.10 (in light green) shows the individual weights of the fish that were recorded. Unfortunately, it seems that during several time periods no data were collected, hence no data are available. Figure 6.11 (in dark green) displays the median of the recorded individual fish weights per day to give a better idea of the expected fish weight. This option was chosen because the mean of the fish weights was found skewed due to the influence of outliers and, thus, an inadequate representation. It appears that most of the fish caught is likely to weight below 1 kg.

Except for a few deviating values, the recorded fish weights seem to remain relatively constant over time; no major change can be denoted for the time period after 2012. Consequently, it can arguably be inferred that the FPA has not had a negative impact on local fish stocks. However, the question of whether the FPA has had a positive impact or not is more ambiguous here as there is no information available prior to 2010. If previously there had been a general downward trend in fish weights and the FPA has contributed to keeping weights more stable, this can be considered a positive impact. On the other hand, it is also possible that there is simply no visible impact of the FPA in terms of fish weight yet due to its recent implementation or other reasons. Besides, the constant fish weights might be an indication that the increase in fish prices at the regional market (as illustrated later in this section) is not related to changing fish quality in terms of weight. However, to substantiate this hypothesis it would be necessary to look at a much broader range of information on fish in the entire region, given that the fish supply from Sikunga only constitutes a small share of the total market volume.

Impact on fish sale activity

Figure 6.12 shows daily market prices for fresh and dried fish recorded in the Katima market data between 2009 and 2016, with one dot representing one recorded fish price and the dark lines illustrating expected prices. Expected prices were used instead of average prices because the price mean was found too skewed and

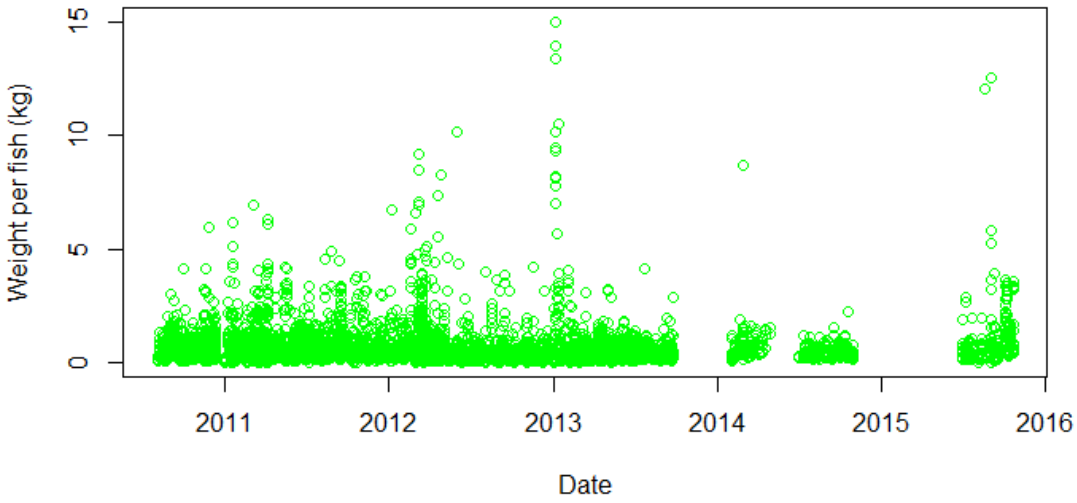

Figure 6.10: Individual fish weights recorded per day at Sikunga (fish monitor data)

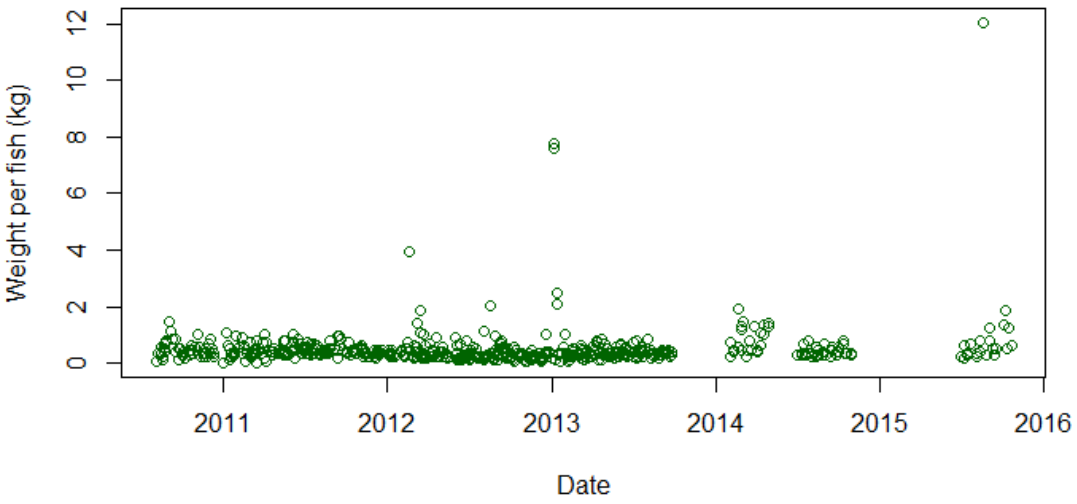

Figure 6.11: Median of individual fish weights recorded per day at Sikunga (fish monitor data)

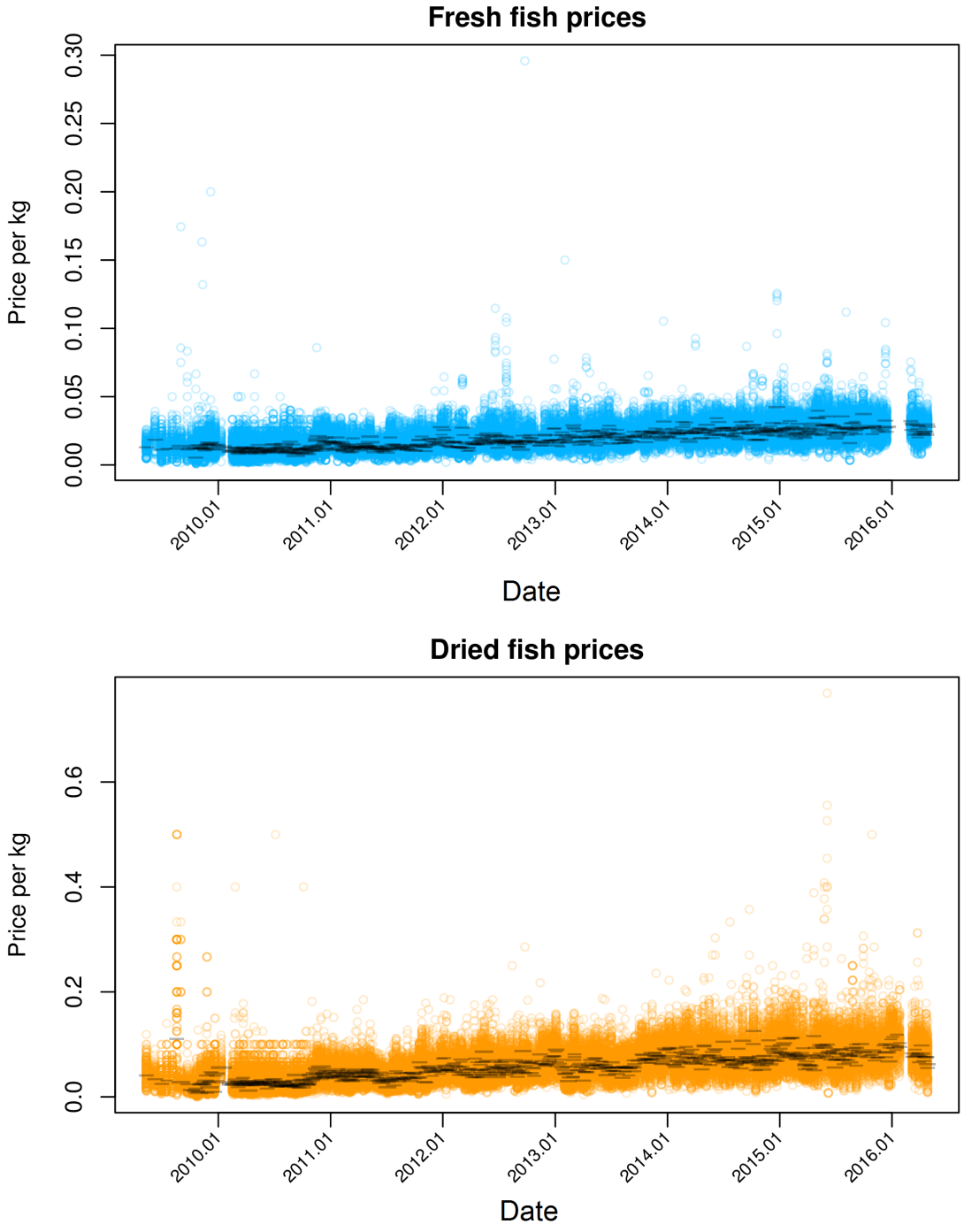

Figure 6.12: Daily market prices per kg for fresh and dried fish recorded in the Katima market data in N$

hence inappropriate here. The gap in the beginning of 2016 is due to the new closed season, during which no fishing activity was allowed in the whole Zambezi Region and, accordingly, the sale of fresh fish was prohibited at the market (the sale of dried fish was not allowed during a shorter time period). Overall, the prices seem to be relatively stable throughout the years, even though a slight but steady increase can be observed. This is likely to be related to inflation in Namibia, which is currently estimated at 5.2% on average for 2016 in comparison to the previous year (Statista, 2016).

It also needs to be borne in mind that the specific daily market prices strongly depend on the total market volume on the respective day, i.e. on how much fish is being offered. This was emphasised by one of the fish vendors interviewed, as pointed out in Section 6.2.1, who reported that she is able to sell her fish at higher prices when less fish is offered at the market. In addition to the market volume, increasing prices over time could also be related to other supply or demand-related factors, such as the quality of the fish sold in terms of length or weight. Therefore, to better understand the developments in market prices a more thorough analysis would be needed that not only adjusts for inflation but also accounts for other influential factors. This, however, goes beyond the scope of this thesis. What can be inferred from this figure is that Sikunga's FPA does not seem to have influenced the general price level at the regional market in Katima Mulilo as no major change can be noted for the time period after 2012. Consequently, it is plausible to assume that the amounts of fish that previously had been supplied from the area of the FPA were not a significant share of the total market volume.

Even though it is not possible to examine the exact fish weights originating from the area of Sikunga and entering the market for the entire timeframe between 2009 and 2016, it is feasible to look at how often and how many fish deliveries from the area were recorded in the data set. For this purpose, the dataset is split into two timeframes: 17.07.2009-27.12.2011, when the FPA had not been in place yet, and 15.05.2012-26.04.2016, with the FPA operating (the Fish Guards started to patrol around April 2012); no information is available in the data set for the time period between 27.12.2011 and 15.05.2012. During the first timeframe data were collected on 218 days in total, during the second timeframe on 261 days. Table 6.16 displays the number of days on which fish from a specific village or area in Sikunga was recorded in Katima Mulilo and the number of entries on fish deliveries. In some cases there are several entries on a single day stating the same village or area as the origin, thus it is assumed that one entry refers to one fish delivery (as explained earlier, no information is available on the number of vendors delivering the fish though).

Table 6.16: Occurrence of fish deliveries from Sikunga recorded in the Katima market data

Village/Area Name in Sikunga	**Timeframe 1: without FPA** (17.07.2009 – 27.12.2011)		**Timeframe 2: with FPA** (15.05.2012 – 26.04.2016)	
	No. of days	No. of entries	No. of days	No. of entries
Kalimbeza	33	79	1	1
Manyonga[1]	1	1	0	0
Nasisangani	24	47	1	1
Kalundu	94	327	1	2
Sifuha	22	39	5	10
Nan'ombe[2]	101	485	7	18
Malindi	19	27	0	0
Isuswa[3]	7	14	0	0
	218 days recorded in total		261 days recorded in total	

[1] close to Keena
[2] between Sifuha and Malindi
[3] close to Malindi

The difference in recorded occurrences of fish deliveries from Sikunga before 2012 and afterwards, as illustrated in Table 6.16, is striking. Without exception, all numbers have decreased, despite the fact that the second timeframe covers a longer period of time than the first timeframe. This general observation arguably underlines the complaints by many of the fishermen interviewed about declining catches and fewer fish sales. In the case of Kalimbeza and Nasisangani the decrease is not as unexpected, given that the fishermen from these villages are directly affected by the restrictions of the FPA. It seems to confirm statements by the fishermen interviewed who claimed that now they do not sell their fish in Katima Mulilo as often as they used to before the FPA was established. What is most surprising though is that a sharp decrease in occurrences of fish deliveries can also be observed for the other villages in Sikunga, where fishermen are not restricted in their fishing activity in terms of space. This decrease is the most remarkable in the cases of Kalundu and Nan'ombe. In addition, the numbers show that the fish supply from the more distant villages (Kalundu, Sifuha and Malindi) played a much more important role at the regional market than the fish from the villages affected by the FPA even before the FPA was established.

These findings appear to be in line with what has been argued in Section 6.2 about the socio-economic significance of fisheries differing among Sikunga's villages. In particular, they underline the higher ratio of active fishermen to the population size of the village in Sifuha and Malindi and the allegedly better condi-

tions for fishing in this part of the Conservancy. The high number of fish deliveries from Kalundu is a bit more astonishing given the smaller estimated number of active fishermen in this village. However, the meaningfulness of the decrease in recorded occurrences of fish deliveries should not be overstated. Local fish catches are marketed through different ways, including local sale and exports, on which consistent long-term data are lacking. Therefore, it cannot be concluded whether the decrease over time is related to other marketing channels, changes in fishing activity (e.g. number of active fishermen or intensity of fishing) or marketing costs (e.g. transport costs) or to the available quantities of fish. Based on what has been argued about the regional market prices for fish above, it can only be suggested that the decrease has not been caused by the market prices.

Of the fishermen interviewed, four were able to give actual numbers on their income from fish sale before and after the establishment of the fish reserve (see Table 6.19). Despite differences in the frequency of their fishing and fish sale activity, these numbers show that all of them used to earn considerably higher amounts of money with selling their fish catch when they were still allowed to fish at Sikunga Channel. In addition to this, two of these fishermen reported that with the FPA they are not able to sell fish as often anymore as they used to before. One of them, who claims to go fishing on a daily basis, allegedly used to go sell his fish catch locally every day, but now only does so about four times per week (Interview No. 50). Another one used to sell fish at the market in Katima Mulilo about four to five times per month (during three months of the year), whereas now he only sells there once per month during the same time period (Interview No. 40). Similarly, one of the fishermen reported that up to 2012 his catches allowed him to sell in Katima Mulilo roughly once per week. Nowadays, he is only selling locally because his catches are not big enough so that it is worth it to take them to town (Interview No. 51).

Even though the numbers shown here seem to paint a relatively clear picture, again, it shall be emphasised that they need to be treated with caution. Firstly, because these interviews are considered exemplary cases of fishermen that are directly affected by the FPA and it is not clear to what extent they are representative of other local fishermen. Secondly, it is very difficult to say whether and to what extent the lower incomes are exclusively attributable to the restrictions of the FPA or whether they can also be linked to the apparent long-term trend of declining fish stocks. As pointed out in Section 6.2, several of the fishermen interviewed stated that they had noticed worsening fish catches as early as in the 1990s and 2000s already. Therefore, it seems likely that a link exists between developments in fish stocks, decreasing fish catches and decreasing income of fishermen.

Table 6.19: Stated income of fishermen interviewed

Village	Fishing Activity	Income from Fish Sale in N$		Interview No.
		without FPA	with FPA	
Kalimbeza	Every day	840-1,120 per week	160-400 per week	50
Kalimbeza	6-8 month per year	840-1,090 per week	350-700 per week	51
Keena	Two weeks per month	4,000-6,000 per month[1]	950-1,200 per month[1]	40
Nasisangani	6-8 month per year	200-400 per day	20-30 per day	39

[1] only during three months of the year

Employment generated by the FPA

In terms of income, the FPA has had a clearly positive effect on those men who had been appointed as Fish Guards. Whereas Game Guards had been in place before already as part of the Conservancy scheme, the position of Fish Guards was only created with the establishment of the FPA. The main function of the Fish Guards is to monitor the FPA on a daily basis and to make sure that there is no illegal netting on the channel. At first, when the FPA was initiated, there were even 15 Fish Guards in total. However, they started off as volunteers because until 2013 there was no money available to pay them. Apparently, this was also the reason why most of them resigned soon thereafter (Expert Interview No. 9). At the time of the author's fieldwork, there were five Fish Guards in Sikunga, who receive a monthly salary of approximately N$1,500 per person and do weekly shifts (Expert Interview No. 8, 13). This means that, in contrast to some of the lodge employees, for example, who work seven days per week and earn the same salary, the Fish Guards are free every second week to focus on other livelihood activities, such as farming (Expert Interview No. 8). Moreover, the value of having a regular job and receiving a stable income should not be underestimated as many members of the local communities are in lack of these. Indeed, one of the two Fish Guards interviewed confirmed that this job has brought an improvement for him because before he had been struggling to get to the amount of money he is receiving now on a monthly basis (Expert Interview No. 8).

Financial costs generated by the FPA

However, the benefits generated by the salary of the Fish Guards are just one side of the coin. At the same time this salary constitutes costs that are currently born by the Conservancy by means of earnings through trophy hunting. The arrangement with the professional hunter at Sikunga is the main source of income for the Conservancy, currently covering all operational costs (Expert Interview No. 9, 10). If the money that is used to pay the Fish Guards could be provided through angling tourism as originally intended, the Conservancy would have more financial resources at its disposal and could increase, for instance, the annual cash benefit that is equally divided among all members. The reason why this is not happening is because, at the time of writing, no agreement has been reached yet between the tourist operators, the angling club and the Conservancy Management about the financing of the FPA. The financial arrangements are under discussion but several of the expert interviews with actors involved gave the impression that there is still some conflict potential on this issue (Expert Interview No. 6, 9, 11, 14). The delay of these arrangements could be related to the fact that both lodges changed ownership and management after the FPA had been established: Island View Lodge in mid-2015 and Kalizo Lodge in late 2012. Similarly, the committee of the Nwanyi Angling Club has changed several times over the past years (ibid.). However, the situation is also complicated by seemingly overlapping structures of ownership and land governance; according to the experts interviewed, the lodges are already paying for the land they occupy to the customary landowners in the respective villages, the Chief of the *khuta* in Bukalo and to the Namibian Ministry of Lands and Resettlement (ibid).

Nonetheless, it shall be emphasised that the lodges and the angling club have played a significant role in the assistance of the Fish Guards through food and fuel donations, sponsorship for the boats etc. In addition, up to early 2014 the servicing of the boats and engines of the Fish Guards was funded through the Conservancy Development Support Grant Fund (CDSGF) by the Millennium Challenge Account Namibia (MCA-N). Since then, the servicing has been covered by a private donation of N$30,000 (Expert Interview No. 3). As a result, it can be assumed that the running costs of the FPA that are currently born by the Conservancy comprise the Fish Guards salary and some of the fuel needed for the patrols. However, due to insufficient data the amounts of fuel which are being provided by the lodges, the angling club and the Conservancy respectively cannot be specified accurately.

Impact on recreational angling

What must not be disregarded in this context is that even though the benefits generated by recreational angling have not necessarily increased yet due to the FPA, the FPA has arguably contributed to maintaining them. Given the significance of recreational angling for the local communities as pointed out in Section 6.2.1, this can clearly be considered a positive impact. This applies especially to those employed in the tourism sector and the residents of the villages that receive additional support from the two lodges and the angling club, i.e. Kalimbeza and Kalundu. The experts from both tourist lodges that were interviewed reported that many of their regular guests who have been coming to Sikunga for ten years or longer have noted and complained about the deteriorating fishing (Expert Interview No. 6, 11). As mentioned before, both lodges are highly dependent on angling tourism, meaning that depleting fish stocks would be a major threat to their business and hence to the employment of their staff and the current support for the local villages.

Similarly, experts interviewed from Nwanyi Angling Club affirmed that the fish caught at the Zambezi Classic have been getting smaller every year and that participating anglers have been struggling increasingly to catch fish within the area of Sikunga. Consequently, participation in the competition has been declining over the past years (Expert Interview No. 4, 14). If the fish stocks were actually depleting at Sikunga, the angling club would not be able anymore to host fishing competitions there and would have no incentive to remain at the campsite nearby Kalimbeza.

Impact on local food situation

As one of the concerns that led to the establishment of the FPA was the food security of the local communities, it is also important to see whether and how the FPA has influenced the food situation on the ground. It has been elucidated in the Section6.2.2 that the significance of fish as a staple food has seemingly declined since the late 20th century due to a number of factors, such as worsening fish catches and a lower number of local fishermen. Nevertheless, there are still parts of the local communities that do not have equal access to the local meat markets and the regional market in Katima Mulilo and still largely depend on fish for food provision.

During the household interviews, altogether ten people attributed a negative impact on the local availability of fish explicitly to the FPA. Five of them claimed that they used to eat more fish before the FPA was established (Interview No. 4, 5,

14, 41, 50). As one of them put it: 'now we eat less because the Conservancy took over and protects the fish' (Interview No. 14). In addition, five of the interviewees indicated that now it is more difficult to find someone who sells fish locally and to put something on the table to eat. Again, this was directly attributed to the restrictions of the FPA (see for example: Interview No. 8, 20,44, 45). This became clear through statements such as 'since the FPA hinders people from fishing on the channel, it is more difficult to buy fish locally' (Interview No. 20) or 'now there are less fishermen selling here, people cannot fish as much as they want anymore' (Interview No. 8). Importantly, most of these interviewees were from the villages that are directly affected by the FPA (six from Kalimbeza, two from Nasisangani, one from Keena); only one interviewee was from Kalundu. However, these statements seem to contradict the information provided by several of the local fishermen about improving catches since the FPA was established. Moreover, it needs to be stressed that the lower local availability of fish is also likely to be related to generally declining fish catches in Sikunga, but also the decreasing number of local fishermen in the context of a changing lifestyle (see: Section 6.2).

Impact on non-fishing-related ES

Last but not least, it shall be added that besides the fish-related ES and benefits that have been addressed under RQ1 the freshwater ecosystem at Sikunga obviously provides a number of other ES that play a significant role in the livelihoods of the local residents. The services that were mentioned most frequently during the household interviews were reeds and grass for harvesting and drinking water and grazing land for cattle, to name just a few (see for example: Interview No. 6, 27, 32). In line with this, it can be assumed that, whereas only a rather small share of the communities directly depends on fisheries, the majority of local residents are likely to depend on the freshwater ecosystem due to the provision of many vital services. However, given this work's focus on fisheries, non-fishing-related ES have not been explored in further depth. Moreover, from the data gathered it can be inferred that there is no visible adverse effect of the FPA on these other ES as the FPA restrictions only concern fishing activity.

6.3.2 Subjective wellbeing

Perceived problems with local fisheries

Before trying to understand how the members of the local communities feel about the FPA, it is worthwhile to contemplate what they believe were the reasons for its establishment to see whether they are actually aware of and agree with its purpose.

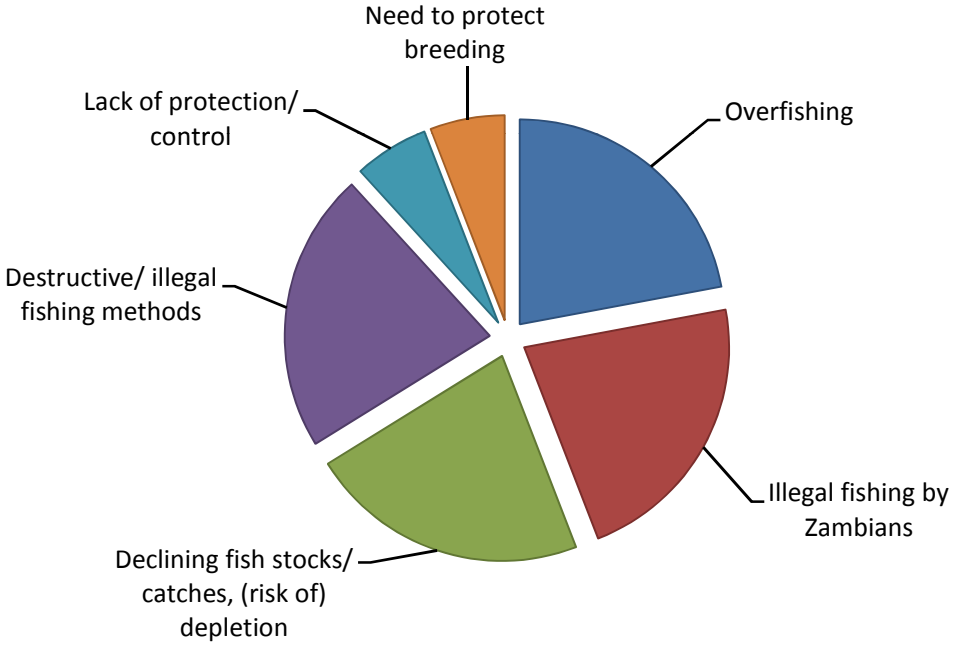

Figure 6.13: Problems with local fisheries as stated by the interviewees

From 39 of the household interview participants an answer could be obtained on this topic. Here, it should be noted that of the remaining 12 interviewees, seven seemed to have little or no knowledge about the FPA. Four of these claimed to know about the presence of the Fish Guards in general, but not really about the fish reserve itself (Interview No. 31, 33, 36, 37). The other three affirmed that they had never heard about the issue before and, thus, were not able to make any statements about it (Interview No. 32, 35, 38). Among these seven interviewees with little or no knowledge, two were from Sifuha and five from Malindi. It seems plausible to assume that the levels of awareness about the FPA tend to be lower in those villages that are not directly affected by its restrictions. However, this might also be related to the more remote geographical location of these villages and the distance to the other villages and key 'information spots', such as the Conservancy Management Office (located nearby Keena).

When looking at the reasons for the FPA and problems with local fisheries in general, four main thematic clusters, which came up repeatedly during the household interviews, can be identified (see Figure 6.13). They seem to be of more or less equal significance as each of them was mentioned between 15 and 17 times respectively. Firstly, the issue of decreasing fish catches, declining fish stocks and the risk of depletion (see for example: Interview No. 5, 15, 29, 48). Secondly, the problem of overfishing, i.e. too much fishing by too many people in general. Importantly, no distinction is made here between local fishermen and foreigners (see for example: Interview No. 9, 20, 34, 41). Thirdly, the widespread use of

destructive/illegal fishing methods, such as drag netting, shade netting, bashing or using small mesh sizes (see for example: Interview No. 4, 7, 21, 36). Fourthly, the high number of Zambian fishermen who come to fish illegally at Sikunga and presumably 'steal the fish' (see for example: Interview No. 11, 19, 26, 46). In addition to these main clusters, several interviewees indicated that there is a lack of protection or control in general (Interview No. 25, 26, 39, 44). In addition, a few interviewees explicitly mentioned that there is a need to protect the fish breeding (Interview No. 4, 13, 36, 42).

From the above it may be concluded that in general there is a relatively widespread understanding of the issues concerning local fisheries among the interviewees. The majority seems to be aware of the declining fish resource and that it is problematic when too many people are exploiting the same resource and use damaging methods. In addition, it can be observed that there is a strong tendency among locals to blame Zambians for the problems with local fisheries. Some of the interviewees even attributed the use of destructive fishing methods or the issue of overexploitation explicitly to Zambian fishermen (Interview No. 7, 19, 30, 47). At the same time, many of the interviewees seemed to be fairly optimistic about the compliance of the fishermen from Sikunga (see for example: Interview No. 5, 17, 30).

Interestingly, there were two interviewees from Kalimbeza who claimed that there had been no problem with the local fisheries beforehand and did not see any need for a fish reserve. One of them was a young employee of one of the lodges who affirmed that due to the FPA there is less fish for them to eat and, thus, had rather mixed feeling about the existence of the reserve (Interview No. 43). The other interviewee was a fisherman who completely relies on fishing to provide for his family. Unlike other fishermen, he claimed that he had not noticed declining catches beforehand. However, the FPA has arguably made it more difficult for him because now he is catching and selling less fish. Therefore, he completely opposed the idea of a fish reserve at Sikunga Channel (Interview No. 50).

Attitude towards the FPA

The majority of the interviewees seemed to feel positive about the FPA with a relatively even distribution among the six villages; this includes the people who did not know about the fish reserve as such, but about the Fish Guards (see for example: Interview No. 21, 33, 36). Here, the general attitude of an interviewee towards the FPA is not to be equated with the impact of the FPA on the respective person as in most of the cases this is not as clear-cut. Moreover, there were fishermen, for instance, that seemed to be negatively affected in terms of income

(as shown in 6.3.1), but who nevertheless claimed to be in favour of the FPA (see for example: Interview No. 40).

Seven of the people interviewed appeared to have rather mixed feelings about the existence of the FPA. Five of these stated that, in their view, the FPA will help to improve the situation but also indicated that the restrictions have considerable disadvantages, such as the supposedly lower local availability of fish (Interview No. 5, 9, 43, 44, 45). In addition, one interviewee from Malindi appeared to be rather indifferent; he only knew about the Fish Guards but affirmed that he never sees them where he usually goes to fish (Interview No. 37). Lastly, there was an interviewee who gave quite contradictory answers regarding the FPA and seemed to be indecisive about whether he is in favour of it or not (Interview No. 39). Only in the case of two interview participants the negative statements about the FPA clearly outweighed the positive ones, which is why their general attitude towards the FPA is rated as 'negative' here. Both of them were fishermen from Kalimbeza and complained about the restrictions that were imposed with the fish reserve (Interview No. 1, 50). In particular, one of them expressed his anger saying that 'the channel is controlled by white people now' (Interview No. 1).

The attitude of the interviewees towards the FPA can be compared to their attitude towards the Conservancy. From 47 of the participants, a general opinion could be determined and categorised. Strikingly, the vast majority of them felt positive about the existence of the Conservancy and being a member, indicating that it has brought an improvement for them (see for example: Interview No. 2, 8, 34, 49). Two of the interviewees seemed to be indecisive about whether the Conservancy has improved anything for them or not, therefore their feelings are considered 'mixed' (Interview No. 33, 35). Four of the interviewees evidently felt negative about the Conservancy as they believe that they do not benefit from it (Interview No. 6, 18, 37, 50). In the case of one of them this seems comprehensible as she is not a registered member of Sikunga and, thus, does not receive the annual cash benefit or the meat share from trophy hunting (Interview No. 6). What can be inferred from this is that most of the interviewees appear to accept the idea of nature conservation and the related restrictions, presumably because they see the benefits of it (or at least the need for it).

Perceived benefits of the FPA

In terms of perceived benefits of the FPA, again, four main themes, that were the most prominent during the household interviews, can be distinguished (see Figure 6.14). Firstly, the protection of the fish or fish breeding in general; this aspect was mentioned by about 15 of the interviewees (see for example: Interview

No. 7, 14, 22, 46). Secondly, the observation that the fish stocks have increased already or the expectation that the fish will breed/ increase/ grow in the near future. This also refers to the potential spill-over effect of increased fish stocks that is expected by some of the fishermen in Kalundu and Sifuha; they affirmed that they are also able to benefit from the FPA as some of the fish will migrate to other areas in Sikunga (Interview No. 23, 24, 28, 30). This whole aspect was clearly the most significant one as it came up during half of the household interviews. Thirdly, the exclusion of Zambians or foreigners that was mentioned by eight of the interviewees. What can be observed here is that this aspect was stated as a benefit only by interview participants from Kalimbeza, Keena and Nasisangani, i.e. the villages directly affected by the FPA (see for example: Interview No. 11, 18, 20, 50). Moreover, the exclusion of foreigners was even mentioned positively by the two fishermen that firmly opposed the fish reserve due to the restrictions (Interview No. 1, 50).

Fourthly, the preservation of fish for future generations (see for example: Interview No. 2, 23, 29, 36). This aspect, mentioned by ten of the interviewees, is particularly interesting as it arguably points to a certain bequest value that the locals attach to their fish resources. When talking about the benefits of the FPA, one interviewee stated that 'future generations will get to know the local fish species physically' (Interview No. 3). Another one affirmed that 'the FPA is good because it ensures that there will be fish for future generations', to name just a few examples (Interview No. 17). This was also underlined by the Fish Guards interviewed (Expert Interview No. 8). These interviewees seem to be aware of the potentially adverse consequences of uncontrolled fishing and, thus, the need for protection: 'if everyone fishes as much as he wants, nothing will be left for future generations' (Interview No. 44).

Seven interviewees from villages that are not directly affected by the FPA claimed that there should be more fish reserves in Sikunga; five of them were from Sifuha (Interview No. 24, 28, 29, 30, 31), one from Kalundu (Interview No. 22) and one from Malindi (Interview No. 34). Interestingly, three of the interviewees from Sifuha were fishermen themselves. One of them reported that fishing has been getting worse and that more FPAs between Sifuha and Malindi could help in this regard (Interview No. 24). Another one affirmed that he would not mind the restrictions of a fish reserve as long as they still have places where they can fish (Interview No. 29). The third fisherman did not see problem with an FPA at their traditional fishing grounds either as 'when the flood comes, people get a good catch in the backwaters' (Interview No. 28). The fourth interviewee from Sifuha, a former fisherman, suggested that more FPAs are needed so that more Fish Guards

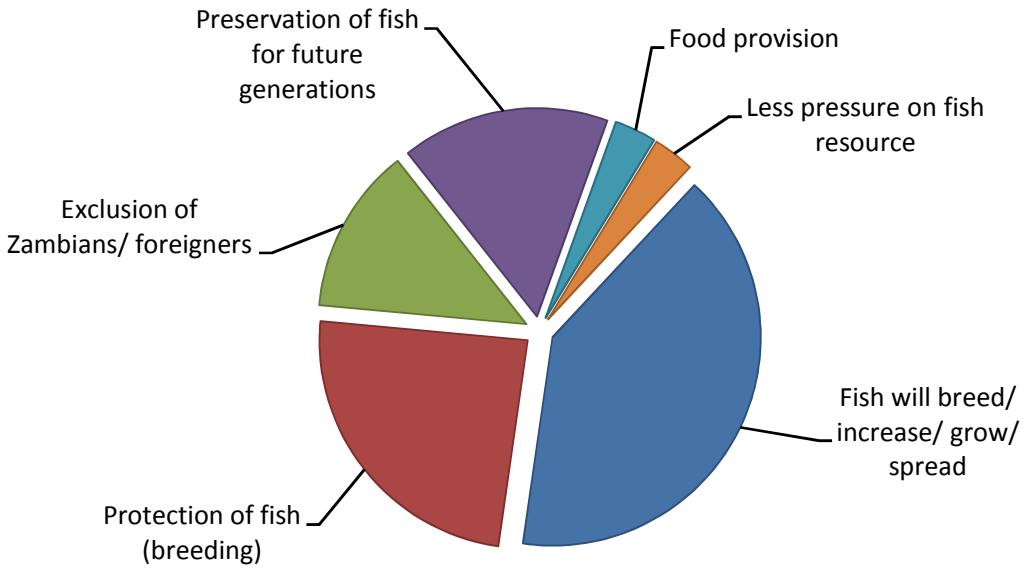

Figure 6.14: Benefits of the FPA as stated by the interviewees

can be employed; then he would consider starting to fish again (Interview No. 30). The interviewee from Kalundu, a fisherman as well, stated that there should be more FPAs, but not at Kalundu Channel where he goes to fish because supposedly there are no backwaters and, thus, there would be no place left for them to fish (Interview No. 22). In addition, one interviewee from Keena claimed that, even though 'fishermen will not be happy about this', the FPA should be extended up to Malindi because it will help to improve the situation and combat the use of illegal fishing methods (Interview No. 9).

In the context of the perceived FPA benefits, it is crucial to also look at how the locals perceive the impact of the Fish Guards, which are a vital part of the fish reserve scheme. What is striking here is the predominantly positive resonance of the interviewees regarding the performance of the Fish Guards. 20 of the people interviewed claimed that they do a good or effective job (see for example: Interview No. 4, 19, 26, 51). As one of them stated, 'without them everything could have been finished by now' (Interview No. 42). Furthermore, in the view of 17 of the interviewees, the number of Fish Guards in Sikunga should be increased as they are currently too few (see for example: Interview No. 2, 9, 15, 47). This was confirmed by the participants of the second focus group; six out of seven agreed that the only way to combat illegal fishing in Sikunga is to employ more Fish Guards.

In terms of impact, seven interviewees claimed that due to the presence of the Fish Guards less Zambians are coming to fish at Sikunga (Interview No. 2, 11, 17, 20, 51). One of them mentioned that 'before locals did not catch anything,

Zambians were fishing there day and night' (Interview No. 17). Similarly, six interviewees attributed the reduction of illegal fishing/ the use of destructive fishing methods explicitly to the presence of the Fish Guards (see for example: Interview No. 4, 17, 23, 36). Here, it is not entirely clear though whether 'illegal fishing' refers to fishing by illegal immigrants, the use of illegal fishing methods, fishing by locals without a license or perhaps fishing inside the FPA. According to two of the interviewees, due to the patrols of the Fish Guards now local fishermen actually get the required licenses for their nets; before they did not bother to as controls by government inspectors seemed to occur rarely (Interview No. 26, 45). This was confirmed by one of the fishermen from Kalimbeza who indicated that people without fishing licenses 'get problems' with the Fish Guards (Interview No. 7). Similarly, a fisherman from Nasisangani underlined that the Fish Guards catch fishermen without licenses (Interview No. 19). A few interviewees from Sifuha, Kalundu and Malindi expressed the wish that the Fish Guards should also come to their fishing areas as they could help to improve the situation there, as well (Interview No. 22, 28, 30, 31, 37).

Impact on fishing as cultural tradition

A negative aspect that came up during the household interviews was that fishing as a local tradition is being restricted through the FPA. This issue was addressed by three elderly community members from Kalimbeza and Keena (Interview No. 1, 9, 10). One of them affirmed that, whereas their forefathers used to fish as they liked, now they are not allowed to fish on the channel anymore (Interview No. 1). In addition, one of them mentioned that the FPA has been 'giving a problem by restricting the way people used to fish' (Interview No. 9). However, this was contradicted by another elderly community member from Keena who did not see any negative impact of the FPA on the local fishing tradition (Interview No. 8). Given that this issue came up only during a few household interviews, it can arguably be assumed that it does not constitute a significant problem in the eyes of the local communities.

6.3.3 Summary of key points

Material wellbeing:

- Opinions on whether the local fish catches have increased yet or not differ. Recorded fish weights seem to have remained relatively stable over the past years.

- The numbers of recorded occurrences of fish deliveries to the regional market from Sikunga have decreased remarkably after the FPA was established. This seems to underline the statements by fishermen and fish vendors about fewer occasions of fish sale in town and lower income. However, as the decrease in numbers also applies to the villages not directly affected by the FPA it is questionable whether this is attributable to the fish reserve. It could also be related to developments affecting other marketing channels, or changes in fishing activity or fish stocks.

- A positive impact of the FPA is the employment generated through the appointment of Fish Guards, which can be considered an attractive job due to the stable income and weekly shifts.

- The Fish Guards' salary also still constitutes a negative impact, as the financial costs are currently born by the Conservancy with money generated through trophy hunting. This money could otherwise be used, for instance, to increase the annual cash benefit for Conservancy members.

- The FPA helps to maintain recreational angling at Sikunga, thereby preserving the employment generated and the contributions made by the tourist operators and the local angling club.

- The impact of the FPA on the local food situation seems quite ambiguous: Several interviewees from directly affected villages suggested a negative impact of the FPA on the local availability of fish. However, it seems likely that this is also related to the long-term trends of declining fish catches and numbers of fishermen.

- There is no visible adverse effect of the FPA restrictions on non-fishing-related ES that are significant for local livelihoods.

Subjective wellbeing:

- Many members of the local communities seem to be aware of the problems with overexploitation and illegal fishing and, thus, understand the need for fish protection.

- The majority of the interviewees felt positive about the fish reserve, including fishermen who are directly affected by the restrictions. The interviewees generally seemed to accept the idea of nature conservation and associated resource use restrictions.

- The main benefits of the FPA perceived by the locals seem to be fish protection and the resulting positive impact on fish stocks. In addition, the exclusion of foreigners and the preservation of fish resources for future generations were recurring themes in the interviews.
- The feedback from interviewees regarding the Fish Guards' performance was very positive, especially due to the reduction of illegal fishing. Many are in favour of appointing more Fish Guards to increase controls, also in other parts of Sikunga.
- Apparently, there is no major impact of the FPA on fishing as a local tradition.

6.4 CPR Governance at Sikunga Channel FPA

In the following, a closer look is taken at how fisheries management is organised at Sikunga with a particular focus on the role of the different stakeholders and potential sources of conflict. Firstly, there is a brief explanation of how and why the FPA actually came about (6.4.1), complementing the information provided in Section 4.2. This is important to look at given that the *establishment process* of a management regime is decisive for its future acceptance; depending on how it is handled, it can either add to its legitimacy or pave the way for conflicts. Secondly, an overview of the *different actors involved*, their positions and interests is provided based on the information conveyed during the interviews (6.4.2). Thirdly, the situation at Sikunga's FPA shall be cross-checked with the *Ostrom's design principles* and the works by Pomeroy et al. (1999) and Purvis et al. (2003) (6.4.3). This shall help to assess whether the FPA has the chance to establish itself and function as a locally accepted regime in the long run or not. Lastly, the key findings of RQ3 are summarised (6.4.4).

6.4.1 FPA establishment process

According to an external expert who had been involved in the process from the very beginning, the idea of establishing the FPA came up in 2007. It resulted from repeated complaints by the former lodge operators and some TA members about the illegal fishing taking place at Sikunga Channel and the Zambezi and the lack of action by the MFMR inspection officers (Expert Interview No. 21). The main reasons why Sikunga Channel was selected as site for the FPA were the dependence of the lodges on angling tourism at the channel, the importance of the

channel as breeding area for cichlids and the convenient conditions of the channel to be managed and controlled (ibid.).

A fisheries committee was formed as initial discussion forum at Kalimbeza consisting of local headmen, other community leaders, such as teachers, and interested fishermen. The expert affirmed that all local fishermen were invited to the meetings (ibid.); hence local participation in the process was explicitly encouraged. This was confirmed by one of the experts from the Conservancy Management (Expert Interview No. 9) and local fishermen interviewed (see for example: Interview No. 12). The expert from the Conservancy stated that local fishermen had also noticed declining fish stocks and that 'awareness meetings' were held in order to inform local community members about the problems with fisheries. He underpinned that local people were consulted through the TA before the FPA was established; however, not everyone attends the community meetings and shows an interest in participating in the consultation and decision-making process (Expert Interview No. 9). Apparently, one of the locals who had worked as a guide at Kalizo Lodge beforehand took a leading role during the establishment process by raising awareness of the risk of fish depletion (Expert Interview No. 21). In addition, the former area headman played a key role as he held the meetings at the villages and requested permission for the FPA at the *khuta* in Bukalo (Expert Interview No. 9).

6.4.2 The actors involved

The case of Sikunga is an illustrative example of how an open-access regime in the context of fisheries has evolved into a combination of state and communal property regime. Figure 6.15 provides a general overview of the most important actors that are involved in the new regime, thereby distinguishing between actors that are part of Sikunga Community (internal) and other stakeholders (external). Based on the information conveyed during the interviews, the different actors involved, their interrelations and positions are outlined in the following.

Government actors

It may seem surprising that MET is explicitly included in the scheme presented here given that the FPA and inland fisheries in general fall under the jurisdiction of MFMR. However, MET plays a central role in the support and monitoring of nature conservancies and their committees in Namibia, and therewith has an indirect influence on the FPA at Sikunga (which is managed by the same body as Sikunga Conservancy). The function of MET in conservancies was described as

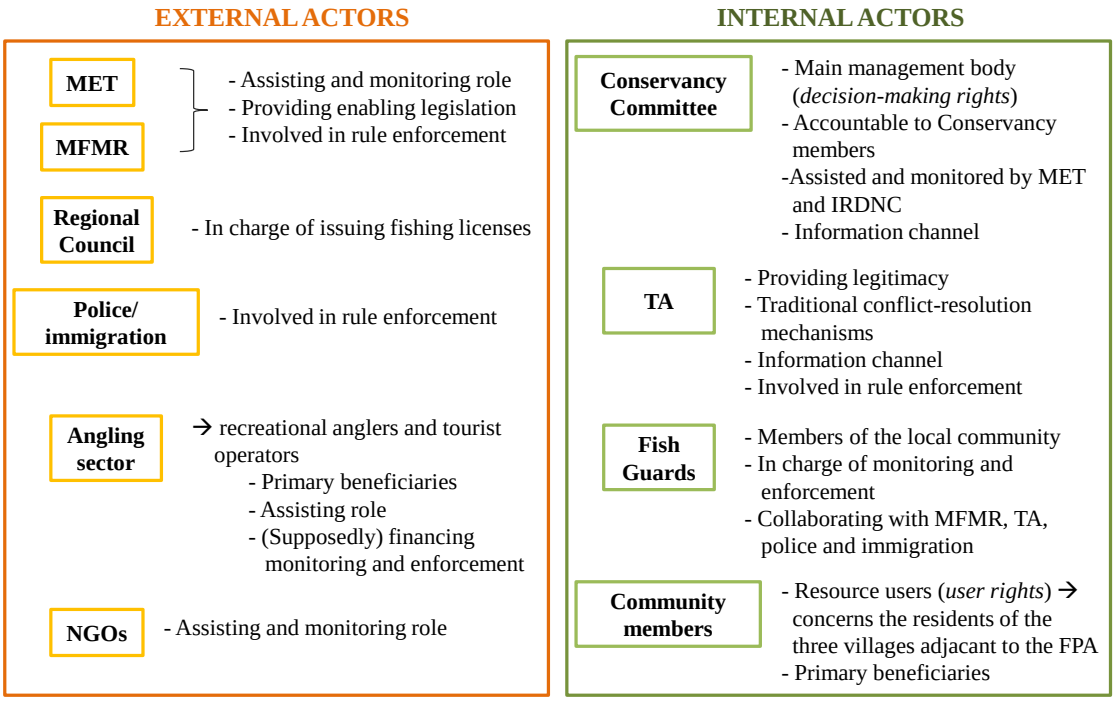

Figure 6.15: Overview of actors involved in fisheries governance at Sikunga

one of a 'parent' or the 'police' that ensures that conservancies abide to the Nature Conservation Amendment Act and follow the Standard Operating Procedure (SOP) as stipulated by MET (Expert Interview No. 19). Amongst other things, this includes the control of decision-making and benefit distribution at conservancies to guarantee that members get a say and that committees comply with what had been agreed with the communities. In this context, the democratic nature of decision-making in conservancies was particularly emphasised by the MET representative interviewed: conservancies are established based on a decision taken by the community and that is also the way they operate. Moreover, the Ministry defines sustainable quotas for trophy hunting (which is still the main source of financing the Fish Guards' salary at Sikunga). According to the expert, conservancies are also viewed as an 'extra eye' of the Ministry as they significantly contribute to the combat of poaching. He further stated that, even though not all authority can be transferred to the local level, it is necessary to devolve some rights so that communities can take ownership and protect their resources, including fish (ibid.).

Both the representatives from MET and MFMR that were interviewed addressed the fact that Namibian CBNRM legislation only explicitly mentions wildlife but not fisheries. Even though conservancies may register for a fish reserve within their territory under IFRA, this legislative issue seems to be a tricky one, causing some confusion regarding the division of ministerial responsibilities and somewhat

hampering progress with effective local-level fish protection. One of the experts from MFMR took a particularly critical stance on this. He affirmed that MFMR cannot get involved at Sikunga, for instance by providing funds for appointing more Fish Guards, because the Conservancy is a structure that was created under the policy framework of a different ministry and does not fall under the responsibility of MFMR (Expert Interview No. 12). In contrast, the other MFMR representative interviewed expressed a very positive view about Sikunga's FPA in light of the community's ownership of managing their fish resources, the potential spill-over effect of enhanced fish reproduction and the reduction of illegal fishing. He emphasised the readiness on behalf of the Ministry to support Sikunga in terms of monitoring, control and research-related activities (Expert Interview No. 20).

In general, as the 'custodian of the fishery' MFMR is in charge of law enforcement anywhere in the country where there are fisheries. Its main functions include the combat of illegal fishing to avoid overfishing. Illegal fishing refers to both illegal immigrants who engage in fishing and locals who fish without a valid license or use illegal methods. The Ministry's fishing inspectors are empowered to demand fishing licenses from recreational anglers and local fishermen and to impose fines where appropriate. Importantly, licenses for nets can only be purchased by Namibians. Moreover, they are not transferable to another person and there is a maximum of four gill nets that are allowed per person (Expert Interview No. 12).

In the Zambezi Region, fishing licenses are issued by the Regional Council situated in Katima Mulilo. The income generated is supposed to be invested into regional development (ibid.). Here, it needs to be added that this can be problematic for fishermen residing in one of the more distant villages in Sikunga. Some of the interviewees stated that they can hardly afford to go to town on a regular basis to make sure they have valid licenses for their nets (see for example: Interview No. 28). Furthermore, there was the exemplary case of a Zambian fisherman, who permanently resides at Kalundu, is married to two Namibian women and a registered Conservancy member. Despite this and the fact that he relies on fishing to sustain his family, he is not entitled to get licenses for his nets nor is he allowed to use licenses purchased by one of his wives (Interview No. 23). Some local interviewees suggested that the Conservancy Management should be entitled to issue those licenses to make them more easily accessible for local fishermen and to enable the Conservancy members to benefit more in monetary terms from the resources they protect. However, it is questionable whether this is legally viable and practically feasible, especially when it comes to recreational fishing licenses. The tourist operators interviewed emphasised that their guests (who are obliged to purchase a license, as well) also go fishing outside Sikunga (Expert Interview

No. 6, 11). Consequently, it would not be sensible to have to charge them twice: once for fishing inside and once for fishing outside of Sikunga (Expert Interview No. 15).

The angling sector

In this thesis, the 'angling sector' includes both the tourist operators that host angling tourists as part of their businesses and the local angling club. Except for Shamwari Houseboat, these actors have been involved in the FPA process from the very beginning in the hope of improving local fishing again. In general, the experts interviewed from this sector appeared to be very positive about being part of the Conservancy and in particular about the FPA initiative. Experts from Kalizo Lodge expressed a positive view on the effectiveness of FPA management and enforcement, underpinning that the Fish Guards have a difficult job and the big difference they have made so far (Expert Interview No. 6). Nonetheless, they advocated a stronger role of the government in managing local fisheries to provide the right guidance for the communities. Whereas they mentioned a good working relationship with some of the Conservancy staff members on the ground, they described the general relationship with the Conservancy as 'strained' and 'poor' due to conflictive discussions about the financial arrangements for the FPA (ibid.).

In a similar vein, the expert interviewed from Island View characterised the relationship between his lodge and the Conservancy as 'disconnected', with not much communication going on currently (Expert Interview No. 11). He viewed the enforcement by the Fish Guards in a much more critical light, questioning whether the Fish Guards are trained appropriately and whether they would detain a friend or a relative when required. In his opinion, punishments should be harsher and the government should assist more with finances, infrastructure and enforcement (ibid.). The expert interviewed from Shamwari Houseboat indicated that there is hardly any interaction between him and the Conservancy Management given that he is usually not in the area, even though some of his clients participate in competitions of the local angling club (Expert Interview No. 15).

The experts interviewed from Nwanyi Angling Club were highly critical about the way rule enforcement is currently done at Sikunga's FPA. Similar to the expert from Island View, one of them criticised the fact that local community members are in charge of this, affirming that strong family ties among local people inhibit rigorous enforcement. Consequently, an external actor should better take over this responsibility (Expert Interview No. 4). Another expert interviewed pointed to the problem that the Fish Guards do not have the authority to arrest people and do not have any weapons if they are threatened, whereas the police often takes too

long to get to Sikunga. He advocated a better operational structure and more strategic planning, e.g. with different zones or a schedule for patrols, to make enforcement more effective (Expert Interview No. 14).

Moreover, these experts were critical about the negotiations about financial issues with the Conservancy Management, underpinning that the angling club (solely relying on its members and sponsors instead of a business) is not able to meet allegedly rising demands for financial contributions on behalf of the Conservancy. In addition, they described the interaction with the Conservancy as rather difficult because decision-making is slowed down by community involvement and complex traditional hierarchies (Expert Interview No. 4). One of them also stressed the importance of building more confidence among the different stakeholders, which could be achieved, for instance, if the Conservancy Management got all of them involved at the AGMs and reported more openly on the contributions and employment provided by the club and the lodges. This would also help to create a generally more positive attitude among the local communities towards the angling club and the tourist operators (Expert Interview No. 14).

Importantly, all of the experts interviewed from the angling sector are firmly supporting catch-and-release angling, both in- and outside the FPA. However, the supposedly harmless catch-and-release fishing activity by tourists and local anglers was called into question by a local fisherman who pointed to the damage that this can cause at the FPA. He claimed that after angling competitions fish are sometimes found dead in Sikunga Channel (Interview No. 1). Evidently, such observations may undermine the acceptance of the restrictions for the same waters that apply to local fishermen. This issue was addressed during the interview with one of the experts from Nwanyi Angling Club. He reasserted that the anglers are aware of the potential damage done to the fish and that efforts are made to reduce the number of dead fish at fishing competitions (Expert Interview No. 9).

What should also be considered in this context is the land use conflict between tourism and trophy hunting and the resulting negative impact on the lodges that was mentioned by some of the experts. They indicated that tourists feel negative about the hunting if they witness an animal being shot or because they are not allowed to access certain areas in the Conservancy (where hunting has priority). Therefore, it is crucial that the hunting areas remain strictly separated from the tourist areas. Furthermore, the experts argued that more wildlife in the area would help to attract more tourists and generate revenue, which could benefit the local communities, as well (Expert Interview No. 6, 14).

Both the experts from the lodges and the angling club were in favour extending the FPA at Sikunga in order to include more of the river system and make

fish protection more effective. In particular, the backwaters of Sikunga Channel were mentioned as they are seen as important breeding areas (Expert Interview No. 6, 11, 14). Moreover, the tourist operators affirmed that their guests would be willing to pay an additional 'angling' or 'Conservancy fee' to support the fish reserve. However, this will only be possible on the condition that the FPA is effectively (and visibly) enforced and catches for tourists are improving again (Expert Interview No. 6, 11).

Lastly, it shall be emphasised that at the point of writing significant changes are under way at Sikunga. Since the author of this thesis conducted fieldwork in the area, both tourist lodges have been put up for sale in the meantime. Consequently, the negotiation process between the tourist operators and the Conservancy will have to be picked up from scratch any time soon; it is not clear how long it will take to finalise an agreement on the financial arrangements for the FPA. On the other hand, this could also be viewed as a chance given that there might be room for discussion that is not burdened yet by prior conflict. In addition, a new lodge is under construction at Sikunga Channel nearby Island View whose owners are now in charge of controlling the Fish Guards' activities. Apparently, they have already gathered a considerable sponsorship for fuel. In light of this development, it seems that there is reason to hope that the impact of rule enforcement by the Fish Guards can be increased in the near future.

Assisting NGOs

Amongst the non-governmental actors that are in one way or another involved at Sikunga Conservancy, IRDNC is the main support NGO and has played a key role in assisting the local communities from the initial stage of the Conservancy onwards. IRDNC essentially provides guidance, training and support, but is also involved in the monitoring of the Conservancy Management, for instance by means of a monthly audit. According to the experts from IRDNC interviewed, Sikunga has been doing very well in comparison to other conservancies in the region, especially in terms of financial management. It was positively highlighted that there has been no embezzlement of funds yet and that the Conservancy staff has been demonstrating willingness and potential to learn (Expert Interview No. 10, 18).

The attitude of the tourist operators towards the financing of the FPA and the fact that negotiations have been fruitless over a long time were viewed rather critically by the IRDNC staff interviewed. One of the experts argued that the payment for land (occupied by the lodges and the angling club) is not handled fairly, given that the idea of conservation implies that resources are brought together and benefits are then distributed among everyone (and not only the land owners

or, in this case, two out of seven villages) (Expert Interview No. 17). Another expert claimed that it would be to the advantage of the lodges and the angling club if the money they pay for the land etc. was channelled through the Conservancy; in this way, the Conservancy members would be informed about their contributions at the AGMs (where the Conservancy Management has to disclose the Conservancy's finances) (Expert Interview No. 10).

IRDNC also participates in a transboundary forum that was formed together with the Namibian *Ngambela* (assistant of the Chief, i.e. high-ranking TA representative), some of the Committee members of Sikunga and Inyambo Community Trust (a community-based organisation on the Zambian side) and is headed by the Barotse royal establishment, i.e. representatives of the Zambian TA. Negotiations started initially in 2004 with the purpose to manage common natural resources and some agreements and joint work plans were reached already in 2005. According to one of the experts from IRDNC, this discussion forum was useful to inform the Zambian actors about Zambians fishing illegally on the Namibian side so that they can try to sensitise their community members (ibid.).

NNF has been playing a significant role as assisting NGO at Sikunga mainly in the context of the FPA. The fish reserve has been promoted in the framework of the MFMR/NNF/WWF Integrated Co-Management of Zambezi/Chobe River Resources Project (2007-2012) and subsequently the NNF/EU Community Conservation Fisheries in KAZA Project (2013-2017). Above all, these projects assisted the Conservancy in drawing up a management plan and facilitated collaboration with MFMR. In addition, the projects assisted MFMR in research-related and capacity-building activities (Expert Interview No. 3). NNF continues to play an important assisting role at Sikunga to date, for instance by acting as a liaison between the Conservancy Management and the tourist operators to promote an agreement on financial matters.

Sikunga Conservancy Management Office

Conservancy Committee

The experts interviewed from the Conservancy Management affirmed that there is a good working relationship between the lodges, the angling club and Conservancy staff, despite disagreement on financial matters. Similarly, the relationship between the Conservancy and the ministries was viewed positively, especially in the case of MET. Even though MFMR has also been supportive of the fish reserve, one of the experts from the Conservancy claimed that still more

support for rule enforcement is needed from the fisheries inspectors (Expert Interview No. 9). In this context, the other expert interviewed admitted that there is no mechanism in place yet to supervise the work of the Fish Guards. Consequently, there is a certain risk that they are more lenient towards relatives or friends, as presumed by some experts from the angling sector (Expert Interview No. 13).

Both experts assured that the Conservancy members were informed about the FPA rules but a fundamental problem is that not everyone attends the Conservancy meetings. According to one of them, sometimes not even 200 community members attend the AGMs (ibid.). This seems surprising considering that the AGMs are the main venue for the Conservancy members to participate in the decision-making, especially by approving the annual budget. Furthermore, the degree to which the locals are informed may also depend to a certain extent on the performance of the Area Representatives who are responsible for communicating Conservancy-related matters. As indicated by one of the experts, the level of education and commitment of the individual Area Representatives varies. Besides, given the influential role of the TA, for successful communication it is crucial that the Area Representatives work 'hand in hand' with the village headmen. Apparently, more people are likely to attend meetings when they are conveyed by the respective headman (ibid.).

Fish Guards

The two Fish Guards interviewed provided useful insights into their working routine and experiences with illegal fishing. The location of their camp shifts from the entrance of the channel nearby Kalizo Lodge to a place nearby Island View in the middle of the channel depending on the water level. They pointed out that they usually patrol within the FPA in the morning and the evening. During August and September, when the water level is low, more people can be found drag netting (an illegal fishing method) during the night; therefore, patrols are allegedly increased during both day and night (Expert Interview No. 8). Interestingly, the Fish Guards claimed to usually reach people fishing illegally in time - this was called into question by the tourist operators interviewed who criticised that illegal fishermen have too much

The Fish Guards interviewed

Confiscated fishing gears

time to escape when they see the Fish Guards' boat approaching (Expert Interview No. 6, 11). However, the Fish Guards indicated that sometimes illegal fishermen indeed manage to escape because the police officers take too long to get there (Expert Interview No. 8).

It seems that the enforcement approach adopted by the Fish Guards is relatively diplomatic: they claimed to try to talk to people first and to caution them; only if three times of warnings are fruitless, they confiscate nets and boats and, in the case of foreigners, call the police. Confiscated gears are brought to the Conservancy Office; subsequently, *mokoros* (dugout canoes) are sold and nets normally burned. If a local fisherman is caught netting in the FPA, the person is taken to the Conservancy Office and sometimes even to the *khuta* (Expert Interview No. 8). This was confirmed by the TA member of Kalimbeza interviewed who mentioned that the respective village headman may be called as well to talk to the person that had fished illegally. If the person continues to break the rules, he or she is fined at the *khuta*. According to the expert, this has happened only once at Kalimbeza thus far (Expert Interview No. 7). In addition to the FPA, the Fish Guards also patrol occasionally in other waters of the Conservancy to enforce the provisions of inland fisheries legislation as originally stipulated in their job description. A similar approach as in the FPA is taken: they talk to people using illegal fishing gear and, if necessary, confiscate. In contrast to many community members, the Fish Guards admit that both Zambians and locals can be found fishing illegally (Expert Interview No. 8).

The main obstacle hampering effective enforcement that was named by the Fish Guards is the lack of a well-defined procedure that is to be followed and clear division of responsibilities when someone is caught fishing illegally. Even though the TA can contribute to enhancing enforcement by imposing fines, they arguably lack the power to fine foreign fishermen. Moreover, it was criticised that illegal fishermen, when arrested by the police, often just spend one night in jail and are released again. This seems to make the Fish Guards' job more difficult

as illegal fishermen can be back on the river the day after and do not take their warnings seriously (ibid.). Importantly, this was also addressed and discussed by other Conservancy staff and TA members at the first focus group meeting. In this context, more rigorous follow-up and stricter punishment, e.g. higher fines, for illegal fishing were advocated to make enforcement more effective.

What was highlighted positively by the Fish Guards is that, in their view, less illegal fishermen from Zambia are coming to fish at Sikunga now which is a significant improvement. Moreover, they emphasised the good working relationship with the two tourist lodges, stating that they call each other if they face a problem. Both of them were in favour of an extension of the FPA to the rest of Sikunga and the employment of more Fish Guards. Similar to other experts, they criticised the general lack of support from MFMR. When approached with this issue, the expert from the MFMR Inspectorate mainly complained about lacking the necessary manpower to support the Fish Guards on the ground (Expert Interview No. 12).

A particular observation made by the author of this thesis is that the Fish Guards interviewed did not seem to be aware of who provided the fuel for their patrol boats. When asked about this, they affirmed that the Conservancy pays for it, even though both the angling club and the tourist lodges have also been sponsoring fuel. This hints at the need to communicate more openly about the contributions by different stakeholders at the Conservancy.

Traditional Authority

The influential role of the TA was frequently emphasised during interviews with both internal and external experts. This also explains why Namibian legislation allows for some involvement of the TA in CBNRM. One of the IRDNC staff members interviewed pointed out that, whereas conservancies are given the mandate to manage resources on their territory, the TA are the traditional 'custodians' of the land which means they own and allocate the land (Expert Interview No. 10). This was confirmed, amongst others, by a Conservancy staff member interviewed (Expert Interview No. 13). Interestingly, it seems that the village-level TA also has traditionally had a say in regulating resource access. In several of the household interviews it was mentioned that before the Conservancy and FPA were established people used to ask for the permission of the respective village headman if they wanted to go fishing at fishing grounds that belonged to another village (the headman was not allowed to reject the request though). Similar rules appeared to apply to the harvesting of forest resources, such as reeds. A few of the TA members interviewed indicated that some locals still do that until today (see for

example: Expert Interview No. 7). This corresponds to what is outlined by Purvis and colleagues (2003) about traditional systems of fisheries management on the Zambezi floodplains.

In addition to this, the local TA fulfils an important function of two-way communication: local community members are both informed and consulted through the TA at meetings. This was also the case before the FPA was established (Expert Interview No. 9). These community meetings are also essential to complement the general Conservancy meetings that are directed to registered Conservancy members, which means that non-members might be excluded from the information-sharing.

What could be observed during the interviews in the context of benefit distribution is that of five household interviewees that claimed the lodges to be the main beneficiaries of the FPA, three are members of the TA. Importantly, one of them was the former the area headman i.e. in a very influential position at the very beginning of the process when the idea of an FPA came under discussion (Interview No. 9). In a news article published by NACSO in early 2014, he was quoted as affirming that "[t]he traditional authority is fully behind the fish guard idea" (NACSO, 2014). As mentioned in Section 6.4.1, back then he had been very supportive of the project and used his authority to push it forward (ibid., Expert Interview No. 9), whereas during the interview he was highly critical about it. He claimed that the lodges benefit from the FPA through the tourists that come for angling but they do not share the money with the Conservancy. However, the locals are the ones who pay the Fish Guards and ultimately protect the channel. Consequently, in his view, the locals are not benefiting yet from the closed channel (Interview No. 9). One of the village headmen interviewed expressed a similar opinion, saying that the lodges are the main beneficiaries and 'must give something to the Fish Guards and share with the Conservancy' so that everyone benefits (Interview No. 19).

Interestingly, another village headman addressed the conflict which he sees between Kalimbeza and Kalundu and the remaining villages in Sikunga, precisely because of the rent and additional support they receive from the two tourist lodges (Interview No. 11). According to him, many people believe that this is unfair because their resources are shared with everyone but these two villages are the only ones that receive money from the lodges for the land they occupy. In his view, the money that currently goes to the villages should go to the Conservancy (ibid.). This was supported by one of the Conservancy staff members who claimed that the lodges should be paying to the Conservancy that would then distribute the money and share it with the respective land owners (Expert Interview No. 9).

These statements stand in sharp contrast with the information obtained during the expert interview with the village headman from Kalimbeza, who affirmed that there are no conflicts due to the FPA and that things have changed for the better (Expert Interview No. 7).

Local community members

Both experts and local community members interviewed repeatedly underpinned the democratic and community-based decision-making at the Conservancy (see for example: Expert Interview No. 7, 8, 19). This also applies to the establishment process of the FPA that was said to be based on a majority decision. Even a local fisherman who was against the FPA and had participated at the initial discussion meetings stated that most of the people had been in favour of establishing the FPA. He opposed the idea because he depends on fishing to provide for his family but did not speak up back then, thinking that his voice would not be important (Interview No. 50). This is an exemplary case of a resource user whose livelihood is likely to be negatively affected by the FPA. He might at one point undermine the FPA rules if he perceives the costs for him personally as higher than the benefits and does not feel that his concerns are adequately addressed at Conservancy level.

More generally, the issue of benefit distribution is fundamental to understand whether and why locals perceive the fish reserve as legitimate and an asset (or not) and where there is potential for conflict. Regarding the question of who benefits from the FPA, an answer could be obtained from 30 of the household interview participants. 18 of them stated that 'everyone' or 'the whole community' forms part of the beneficiaries (see for example: Interview No. 5, 16, 20, 49). Additionally, six interviewees claimed that 'all members', i.e. Conservancy members, benefit from the FPA (see for example: Interview No. 12, 31, 34, 40). This indicates that almost half of all the participants of the household interviews think that they benefit (at least to some extent) from the FPA and that they perceive the distribution as fair.

However, there were also a couple of interviewees who questioned the equal distribution of benefits. Importantly, all of them were from the villages that are directly affected by the FPA. Similar to some of the village headmen, five of these interviewees claimed that the lodges in Sikunga are the main, if not the only beneficiaries of the fish reserve (Interview No. 1, 9, 11, 19, 48). Two of these added though that local fishermen or the local community also benefit in addition to the lodges (Interview No. 11, 48). Moreover, three interviewees named the Zambians as the beneficiaries of the FPA; two of them claimed that they benefit more than the locals (Interview No. 13, 42), whereas the third one claimed that both the

Zambians and the locals benefit (Interview No. 49).

Again, this can be compared to the answers in the household interviews regarding people's opinion about the Conservancy. Of 33 opinions that were obtained on this topic, 20 of the interviewees stated that 'all members' benefit from the Conservancy (see for example: Interview No. 12, 17, 22, 32). In addition, ten interviewees claimed that 'everyone', 'the whole community' or 'the locals' benefit (see for example: Interview No. 10, 24, 44, 48). One interviewee mentioned that both the members and the lodges benefit from the existence of the Conservancy (Interview No. 9); two interviewees indicated that the government might also benefit in addition to the members (Interview No. 44, 49). Overall, it seems that the benefit distribution in the context of the Conservancy is viewed in a slightly more positive light as in relation to the FPA. This could be due to the fact that the Conservancy generates more tangible and direct benefits for its members in the form of an annual cash benefit and meat share from trophy hunting that is distributed in the villages on a regular basis. Accordingly, the cash benefit and meat provision were among the benefits that were mentioned most often by the interviewees when talking about the Conservancy (see for example: Interview No. 11, 20, 35, 48).

What was particularly striking is that the participants of the second focus group almost unanimously agreed when they were presented with the provocative hypothesis "The Conservancy members do not receive any benefits from the FPA". Six out of the seven Committee members present confirmed this statement because no cash has been received from the FPA yet and the Fish Guards are still paid with money from trophy hunting. Only one of the participants contradicted the statements, emphasising that all fishermen everywhere in Sikunga benefit from the fish reserve.

According to the local community members interviewed, the main challenge for the FPA and local fisheries in general is illegal fishing. 22 of the interviewees claimed that there is still a lot of illegal fishing activity at Sikunga by Zambians (see for example: Interview No. 9, 13, 22, 45). At the same time, 15 of the interviewees affirmed that local fishermen usually comply with the rules and regulations for inland fisheries (see for example: Interview No. 5, 17, 28, 30). Seven interviewees named the problem of continuous illegal fishing in general, either by both locals and foreigners or not specifying the culprits (see for example: Interview No. 2, 19, 31, 44). Strikingly, only two of the household interviewees explicitly admitted that local fishermen might not always be abiding by the rules either (Interview No. 7, 29). What can be concluded from this is, again, that there is a strong tendency among the interviewees to make Zambian fishermen into scapegoats. Statements such as 'Zambians are normally the ones causing trouble' (Interview

Local community members

No. 37) or 'Zambians come and disturb the fish' (Interview No. 38) were a common occurrence during the interviews. This attitude was underlined at the second focus group meeting where six out of seven participants agreed that only Zambians are to be blamed for depleting fish stocks in Sikunga. This also underpins the strong transboundary and conflictual character of (fish) resource use in the area of Sikunga.

In line with this, it does not come as a surprise that the majority of the local community members interviewed wish for more involvement of the government to enhance enforcement at Sikunga. Ten of the interviewees stated that there should be more government support for the Conservancy and the FPA in general (see for example: Interview No. 2, 26, 35, 40). Seven interviewees were in favour of an increased presence of the MFMR inspectors at Sikunga and a closer collaboration with the Fish Guards to combat illegal fishing (see for example: Interview No. 5, 24, 31, 42). Similarly, six of the interview participants affirmed that the government should ensure a higher presence of the police at the Conservancy (see for example: Interview No. 10, 13, 21, 30); one interviewee even mentioned the military in this context (Interview No. 11). Furthermore, six interviewees claimed that the government should provide funding so that more Fish Guards can be employed or their salary can be increased (see for example: Interview No. 15, 18, 25, 43).

In a similar vein, several interviewees indicated that there is also potential for

a stronger role of the TA in enforcing the rules for fisheries, either by fining people or confiscating fishing gears (see for example: Interview No. 10, 13, 26, 43). Only a few interviewees seemed to be aware that this is already happening and that the *khuta* has already been supporting the FPA (Interview No. 19) and working together with the police (Interview No. 22). Nevertheless, it was emphasised by some that the TA does not have the power to make people pay a fine if they refuse to do so (Interview No. 31, 39). Interestingly, a few interviewees were quite critical about the role of the TA. One of them complained that all the money generated by the Conservancy, which should go to the local communities, is going to the *khuta* in Bukalo instead (Interview No. 11). Another one accused the TA of being indifferent about problems with local fisheries (Interview No. 30). Similarly, two interviewees stated that the TA does not seem to have control of the situation in the context of fisheries (Interview No. 34, 38). Lastly, three interviewees claimed that there should be closer collaboration between the TA and the government on this matter (Interview No. 12, 42, 44).

In this context, an interesting aspect that came up during several of the household interviews was the need for more education or awareness-raising. Seven interviewees indicated that people should learn more about the advantages of protection and especially how they benefit from the Conservancy and the FPA (see for example: Interview No. 5, 44, 48). This applies in particular to those people who oppose the idea of a Conservancy or fish reserve (Interview No. 13) as they are presumably 'the ones who break the rules and cause conflict' (Interview No. 9). Some of these interviewees emphasised the potentially influential role of the TA in contributing to the awareness-raising by holding meetings and talking to the local people (Interview No. 20, 45). One of them explained that the members of the *khuta* and the village headmen are the most respected people in the local communities; therefore, people listen to them and their support is needed (Interview No. 49).

A second aspect that is worthwhile mentioning is the need for more cross-border cooperation and communication with stakeholders from Zambia. One of the interviewees referred to awareness-raising on the Zambian side to inform people about the FPA at Sikunga (Interview No. 5). Another one suggested that representatives from the government and the TA should sit together with their Zambian 'counterparts' to discuss fisheries issues in general (Interview No. 42). Two interviewees stated that the MFMR should teach Zambian fishermen about 'right' fishing methods and promote the idea of a fish reserve on the Zambian side respectively (Interview No. 48, 49). It was emphasised that the fish protection will not work as long as 'the other side' does not collaborate (Interview No. 48).

Interestingly, one of the lodge employees mentioned that members of the Zambian and Namibian TA in the region met at the lodge once in 2015 to discuss about fisheries. In his view, this has had a positive impact (Interview No. 41). Similarly, the Fish Guards interviewed indicated the positive effect of a meeting with Zambian headmen where they informed them about the fish reserve and the troubles with Zambian fishermen (Expert Interview No. 8). Based on this, enhancing cross-border collaboration and communication seems worth considering as a promising strategy to increase levels of awareness and compliance in the area.

6.4.3 Ostrom's principles applied to Sikunga

Table 6.22 gives an overview of the situation at Sikunga's FPA in comparison with Ostrom's principles and the works by Pomeroy et al. (1999) and Purvis et al. (2003). In line with this, three of the principles listed above were identified where a notable mismatch between Sikunga and the recommendations by these scholars seems to exist. This mismatch arguably indicates where there is particular room for improvement, at least at the local level.

- *Principle 1 ('clearly defined boundaries'):* More information-sharing is needed at the local level to make sure that everyone, including angling tourists and non-Conservancy members, are adequately informed about the boundaries of the FPA. Given that many community members do not attend the Conservancy GMs and AGMs and the influential role of the village headmen, information should also be channelled through the TA in order to reach more people.

- *Principle 5 ('benefits exceeding costs'):* The financing issue will have to be solved so that the Conservancy does not bear the largest share of the costs and the FPA can be sustained through angling tourism as originally intended and agreed. This is absolutely crucial so that the locals perceive the benefits of the FPA greater than the costs. This, in turn, is necessary to ensure the legitimacy of the FPA regime in the eyes of the locals and a good relationship between the tourist operators, angling club and the Conservancy.

- *Principle 6 ('participation by those affected'):* It needs to be tested whether the directly affected resource users, i.e. fishermen and fish vendors, feel adequately represented in the decision-making group and whether they have a sufficient say in the management of the FPA.

Nevertheless, it needs to be added that the conclusions drawn from Sikunga partly deviate from the claims made by Pomeroy et al. (1999) about the 'high'

importance of some of the conditions for successful fisheries co-management. It is important of course to ensure that resource users are adequately represented and involved (Principle 6), but this did not seem to be a major issue at Sikunga. Moreover, clearly defined membership (Principle 2) did not appear to be relevant at all in the case under study because traditional access rights and fishing grounds are still largely maintained. The same applies to Principle 9: Given that the Conservancy Committee is responsible for fisheries management at Sikunga, this is in fact done without the active participation of most of the local resource users. However, this issue did not come up at all during the interviews and does not seem to be a notable source of conflict. Lastly, the simplicity of management rules and enforcement by the resource users themselves (Principle 7) as recommended by Pomeroy et al. (1999) apparently play a rather minor role at Sikunga. On the contrary, most of the locals interviewed advocated more enforcement by government staff. The question of whether enforcement is effective enough or not proved to be essential in this context, but is not explicitly named as condition by these scholars (ibid.).

Table 6.22: Ostrom's principles applied to the case of Sikunga Channel FPA

Criteria[1]	**Situation at Sikunga**
1) Clearly defined boundaries	Sikunga Channel is closed for netting, but the backwaters are still open, i.e. the boundaries of the FPA are not explicitly based on the ecosystem as recommended by Pomeroy et al. (1999). The local fishermen that were interviewed (at least the ones whose fishing grounds are affected) seemed to be adequately informed about the FPA boundaries. Nevertheless, there is a certain risk that not everyone knows about the demarcation of the FPA as the levels of awareness are likely to depend on people's attendance of community meetings (conveyed by the TA or the Conservancy Management). As indicated by some of the local experts, attendance tends to be low at Conservancy meetings. The tourist operators interviewed and an expert from UNAM seriously doubted that the demarcation is clear to everybody (Expert Interviews No. 5, 6, 11). Moreover, there appears to be some confusion regarding the boundaries among angling tourists who are told that the area is protected and thus do not expect to see fishermen or nets anywhere nearby.
2) Clearly defined membership	The group is definitely much smaller than suggested by Purvis et al. (2003) and can thus be considered not too large. However, membership is not clearly defined as stipulated by Pomeroy et al. (1999); resource use still seems to be mostly based on traditional access rights. Fishermen residing in Kalimbeza, Keena and Nasisangani typically go fishing at and nearby Sikunga Channel, whereas fishermen from other villages in Sikunga traditionally have other fishing grounds (such as Nan'ombe). Besides, fishing licenses issued by the Zambezi Regional Council also play a certain role for the regulation of resource use as fishermen need to have valid licenses for their nets and anglers are obliged to purchase recreational angling licenses.
3) Group cohesion	Most of the resource users seem to reside permanently nearby the protected area. In line with what is stated by Purvis et al. (2003), there are some temporary fishing camps with fishermen residing next to the water body during high fishing season (usually when the water level is low). There is a relatively high degree of homogeneity among the resource users in terms of fishing gear, ethnicity and religion. Most of the fishermen seem to use *mokoros* (dugout canoes) and monofilament gill nets; a few also use traditional gears, such as traps or spears. There are also some Zambians (both legal and illegal immigrants, Conservancy members and non-members) that reside permanently in Sikunga Conservancy and are actively involved in fishing. Given the geographical and ethnic proximity between Zambia and Namibia in the region, they are not likely to significantly reduce group cohesion.

[1]Criteria for successful CPR governance based on criteria from Ostrom as used in Neiland et al., 1994

4) Existing organisation	As mentioned by Purvis et al. (2003), the sub-*khuta* and the Conservancy Committee are organisational entities that had existed in Sikunga prior to the establishment of the FPA. The membership of the sub-*khuta* is rather limited given that it is traditionally based on family groups and excludes women. However, most of the members of the Conservancy Committee (both men and women) are elected democratically by the Conservancy members. The Committee already had some experience in managing local resources when FPA was introduced. It appears that both entities were useful to channel information and to facilitate initial discussions about protection measures and later the establishment of the FPA.
5) Benefits exceeding costs	As mentioned in the previous chapter, the household interviews have shown that not everyone understands yet that the local communities also benefit from the FPA or how, including some of the affected resource users. Thus, this condition is not fulfilled (at least in terms of perception). For some the costs of restricted resource access outweigh the benefits they believe to derive. The issue of benefit distribution is addressed in more detail below.
6) Participation by those affected	Some of the village headmen interviewed were active or former fishermen, thus it can be assumed that the some of the sub-*khuta* members are at least to a certain extent familiar with the situation of the resource users affected. Similarly, some of the Committee members are or were previously involved in fishing or fish sale, such as the Vice-chairperson of the Conservancy or the Senior Fish Guard. Generally speaking though, the resource users affected are likely to be under-represented in the decision-making group. The fish monitors collecting information about fish catches are not included in the decision-making group. Nevertheless, the fishermen affected were consulted prior to the establishment of the FPA and offered participation in the decision-making process. Moreover, they can challenge existing arrangements through traditional conflict-resolution channels (TA) or at GMs and AGMs (Conservancy). Based on the data available, however, it is difficult to judge the extent the influence of affected resources users in practice.
7) Enforcement of management rules	The situation at Sikunga generally corresponds to what is described by Purvis et al. (2003); there seems to be a notable enforcement vacuum in terms of fisheries legislation. The FPA management rules can arguably be considered simple, as recommended by Pomeroy et al. (1999). However, monitoring and enforcement are not executed by all affected resource users; only a small group of appointed Fish Guards (who are paid and have some equipment at their disposal) is entitled to do so. Local fishermen may apply for the job as a Fish Guard though and get involved.
8) Legal rights to organise	Under the IFRA local communities have the legal right to apply for a fish reserve. One of the government representatives interviewed indicated that an amendment of the Nature Conservation Amendment Act to also include fisheries is already under discussion at a higher level but that the government decision on this is likely to take more time (Expert Interview No. 19).

9) Cooperation and leadership at community level	The Conservancy Committee took over the responsibility of leadership of the FPA. Initially, the local TA had been cooperative and largely supported the establishment process (now many TA members are more critical about the FPA, mainly because of the financing issue).
10) Decentralisation and delegation of authority	Certain powers and management functions have been devolved to the community level in the context of the available Conservancy structure. The MFMR provided enabling legislation primarily through the Gazette Notice, which, however, took long until it was published. The implementation of the FPA started around mid-2012, whereas the Gazette Notice came out in late 2015 only. Different views on this matter were conveyed during the expert interviews. A high-ranking representative of MFMR in the Zambezi Region emphasised the willingness to support fish protection initiatives and the empowerment of local communities on behalf of the Ministry (Expert Interview No. 20). In contrast, one of his colleagues was highly critical about the devolution of authority to community level, especially when it comes to financial management (Expert Interview No. 12).
11) Coordination between government and community	There is no external representative body in place yet that is in charge of coordinating between the government and the local communities as suggested by Pomeroy et al. (1999). A Regional or Area Fisheries Council or Agency as mentioned by Purvis et al. (2003) has not been established yet. The local NGOs play an important role though by assisting the Conservancy with the management.

6.4.4 Summary of key points

Establishment process:

- There had been a consultation process prior to the establishment of the FPA during which local participation was encouraged.

The actors involved:

- A number of external and community-level actors are involved in the FPA regime:
  - Government-related actors and NGOs fulfil mainly an assisting and monitoring role.
  - Legitimacy is provided by the respective ministries and the TA.
  - The Fish Guards are in charge of enforcement, supported by MFMR, the police and the TA.
  - Stakeholders from the angling sector thus far play mainly an assisting role (as the financing issue has not been solved yet).
  - The Conservancy Committee is the main management body of the FPA.
- The fact that Namibian CBNRM legislation (i.e. the legal provisions for nature conservancies) focuses on wildlife and omits fisheries, while fish reserves fall under different provisions and a different ministry seems to cause confusion regarding ministerial responsibilities.
- The rules regarding fishing licenses are problematic for some local resource users, either because the issuing is done in town or because only native Namibians are entitled to have one.
- The FPA financing issue seems to be the main conflict between the stakeholders from the angling sector and the Conservancy. In addition, there is a land use conflict between tourism and trophy hunting at Sikunga.
- Important changes are under way as both tourist lodges at Sikunga have been put for sale in the meantime and a new lodge is being built.
- Apparently, not everyone residing at Sikunga attends the Conservancy or local community meetings. This makes information-sharing and participatory consultation processes prior to decision-making more difficult and is likely to affect levels of awareness.

- The Conservancy staff complained about the lack of a clear follow-up procedure and division of tasks for the apprehension and punishment of illegal fishermen caught at Sikunga.
- Both experts and household interviewees generally complained about the lack of support from MFMR and wish for more support for the combat of illegal fishing.
- Almost half of the household interviewees perceive the benefit distribution of the FPA as fair. Some view the role of the lodges very critically in this context as the Fish Guards are still paid by the Conservancy and not via recreational angling.
- When addressing the issue of illegal fishing, there is a notable tendency among the community members to make Zambians into scapegoats.

Ostrom's princples applied to Sikunga:

- Ostrom's principles for CPR governance applied to the case of Sikunga indicate need for action at the local level, in particular in terms of information-sharing about the FPA boundaries, the financing arrangement of the FPA and the participation by local resource users in the FPA management.
- Not all experiences from Sikunga confirm the importance ranking of conditions for fisheries co-management suggested by Pomeroy et al. (1999).

7 | Discussion

In this section, both the strengths and limitations of the concepts and methods used are discussed in order to evaluate the validity of the approach taken in this thesis. This is followed by an interpretation of the main findings, which are embedded into the broader context, and reflections on their meaningfulness. Importantly, recommendations for further research and the future management of the FPA are given at appropriate places in the text.

Reflections on the theoretical framework

This thesis essentially drew on the ES concept and ideas developed in common property theory, based on the assumption that combining these is a valuable approach to design but also to improve already existing co-management schemes (see Section 2). The ES concept has proven highly useful as analytical perspective to structure the findings of this thesis, especially when adopting a disaggregated view as recommended by Daw et al. (2011). It helped to better understand how different sub-groups benefit from and depend on the ES under study, what these services mean to them and how they are impacted by the new resource management regime. In addition, the common property literature reviewed provided questions that are crucial to ask in this context, above all regarding decision-making and benefit distribution arrangements, resource access and ownership, and the involvement of local resource users.

It needs to be emphasised that the research conducted in this thesis concentrated on fishing-related provisioning and cultural services. The complex freshwater ecosystem that is partly covered by the FPA evidently provides many ES beyond these, including reeds, grass, drinking water and grazing land for cattle, but also significant supporting and regulating services. However, based on the evidence available no visible conflict or adverse effect of the FPA on these other services could be detected. It appears that - despite the restrictions of the FPA - the whole range of non-fish-related ES provided by the freshwater ecosystem is still available for the locals.

The ES concept is normally used to underpin the multifaceted significance of a functioning ecosystem for society, thereby embracing as many attributes as possible. In line with this, comprehensive ES assessments are mostly intended to present a total economic or utility value of a given ecosystem. Importantly, this thesis has not aspired to come up with an aggregate value of the ecosystem under study or to grasp all ES available for the local residents. On the contrary, here the ES concept has been applied as analytical perspective to develop some sort of heuristic that facilitates the identification of patterns of dependence and potential conflicts of use. This approach is rather new, but it shows that the use of the ES concept is much more varied and flexible than often suggested in much of the ES literature.

Reflections on the methodological approach

In terms of methodology, the qualitative data analysed were gathered during the fieldwork by means of expert and semi-structured household interviews, focus groups and participant observation (see Section 5.1). The interviews were a valuable tool to elicit information on people's subjective views and personal experiences. Furthermore, the use of a basic interview guide allowed for sufficient flexibility during the interviews to deal with the different levels of knowledge of the participants but still provided for an adequate degree of comparability among the findings. The two focus groups that were organised at the beginning and the end of the fieldwork served to embed the interview findings into the local context. For the purpose of participant observation at the Conservancy, the author of this thesis did not try to act as a member of the group but was nevertheless able to get valuable insights into the local setting. The triangulation of results was repeatedly done throughout the fieldwork, mainly during expert interviews but also at the second focus group meeting and the second appointment at the *khuta* in Bukalo.

The main limitations of the approach taken during the fieldwork are arguably the lack of professional verbatim translation for the interviews (and the associated language barrier), the potential bias in the interview sample due to the guidance of the Area Representatives and the limited accessibility of the villages (and the resulting lack of data on Oldisize). In spite of this, it shall be underlined again that - in light of evident time and resource constraints - the collection of this amount of data would not have been possible without the support by the translator and the Conservancy staff. Especially the assistance by the Area Representatives made the household interviews, i.e. the most time-consuming part of the fieldwork, both much more efficient and legitimate. The quantitative analysis conducted in

this thesis has also been subject to certain limitations that have been outlined in Section 5.2. In this context, it shall be emphasised again that the informative value of the findings evidently depends on both the availability and quality of data.

Research Question 1:

Socio-economic significance of fisheries at Sikunga

When investigating the socio-economic significance of fisheries at Sikunga (Section 6.2) it was astonishing to see that it is in fact much smaller than generally described in the available literature on Zambezi fisheries. Whereas Stephanus et al. (2002) suggest that 30% of the households of the Zambezi and Chobe river systems directly depend on fisheries for economic survival, the estimated number of households with an active fisherman at Sikunga was below 10%. Moreover, these scholars argued that fishing households generally have a smaller livelihood base than non-fishing households, which is only confirmed in part by the findings of this thesis. Besides, Abbott et al. (2003) claim that the importance of fishing at the upper Zambezi had been growing since the 1990s, whereas the findings of this thesis indicate an opposite trend, at least since the 2000s. Another interesting observation is that these scholars describe local fishermen as a rather young occupational group with fishers being mostly between 25-35 (Stephanus et al., 2002) and 20-30 years (Abbott et al., 2003) respectively. In contrast, the research conducted in this thesis revealed that at Sikunga fishing is not a popular activity at all for men below 40 - an impression that was widely confirmed by local community members. Four of the fishermen interviewed were even above 60. Therefore, it seems plausible to assume that, while the fishermen questioned back then grew older, not many younger men followed their example and uphold the local fishing tradition.

Surprisingly enough, the common saying 'If you dont fish, you are not a Caprivian' (Naesje et al., 2004) appears to be outdated in the case of Sikunga. Here, however, it is important to differentiate as the significance of fishing and fish sale varies among Sikunga's villages. The Katima market data analysed in this thesis point to a higher fishing activity and more income from fish sale in the more distant villages of Malindi and Sifuha, which corresponds to the higher estimated percentage of active fishermen in these villages. Fish sale activity in general seems to be constrained not only by the amounts of fish available, but also by transport costs and limited storage possibilities that depend on the respective location.

Interestingly, the interviews showed that through the employment generated recreational fishing has a comparable significance as source of income in the lo-

cal communities as fishing itself. As outlined in Section 6.2.1, almost as many locals are employed by the tourist operators and the angling club at Sikunga as locals who are assumed to be actively involved in fishing. This number might even increase when the new lodge at Sikunga starts operating. Unlike local fishermen, the employees in the angling sector seem to be a rather young occupational group. Moreover, they usually have a full-time job with a regular income, whereas the intensity of fishing activity and associated income throughout the year varies among fishermen. From the above it may be inferred that even though there has been an apparent decline in importance of fishing as livelihood activity, this is, at least partly, balanced by the significance of recreational angling and associated employment opportunities in the area.

Regarding the importance of fish as source of animal protein, again, the findings of this thesis stand in sharp contrast to the survey results by Stephanus et al. (2002). The scholars claim that the household consumption of fish in the Zambezi and Chobe river systems is generally high and constant throughout the year. Many community members at Sikunga confirmed that fish indeed used to be their traditional staple food, but apparently things have changed fundamentally since the early 2000s. To date in at least four out of seven villages at Sikunga meat has become more important as a basic source of animal protein than fish because it is said to be more frequently available locally and more easily accessible for many. In these villages, it seems that usually the only households that tend to consume more fish than meat are either fishing households or households that have a member with formal employment and, hence, sufficient money to regularly buy fish in town. Not even drought periods, which constitute a major threat to rural livelihoods in the area, seem to increase the need to resort back to fish; most of the household interviewees claimed to rely on the food aid of the government instead. The villages where fish still plays a bigger role as source of food are located further away, both from town and the local meat markets, and allegedly have better conditions for fishing. At this point, it shall be added though that based on the evidence available no explicit causality can be established; it remains unclear whether the higher consumption of meat in parts of Sikunga is really due to the unavailability of fish or perhaps related to a preference for meat.

Research Question 2:

Impact assessment of Sikunga's FPA

The assessment of the FPA impact on the local communities (Section 6.3) yielded a more complex and ambiguous picture. Whereas some fishermen reported improved

fish catches since the FPA was established, several interviewees complained about lower incomes from fish sale and lower availability of fish to buy in the villages as a consequence of the FPA. However, the decrease in recorded occurrences of fish deliveries from all villages in Sikunga in the Katima market data indicates that these developments are likely to be related to other factors, as well, rather than being solely attributable to the FPA. Unfortunately, based on the available data neither the fish weights from Sikunga sold at the regional market nor local catches by individual fishermen could be compared before and after the establishment of the FPA to cross-check the statements by interviewees with actual numbers. A clearly positive impact of the FPA is the employment generated through the appointment of the Fish Guards, even though their salaries also still constitute financial costs for the Conservancy (until an agreement can be reached with stakeholders from the angling sector). In addition, the FPA significantly contributes to maintaining the benefits generated through recreational angling at Sikunga, especially employment at the lodges, which can also be considered a positive impact.

In terms of subjective perceptions, the level of awareness of the problems with illegal fishing and overexploitation seemed relatively high among the households interviewed. Furthermore, the interviewees' attitude towards the FPA and especially the Fish Guards was overwhelmingly positive. This high local acceptance could be due to the fact that, eventually, the restrictions do not constitute such a problem; the significance of fisheries is comparatively low in the directly affected villages and the access to other vital ES is not affected by the FPA. Another possible explanation could be that Zambians are widely viewed as the cause of the problem among the locals. Consequently, the benefit of excluding Zambian fishermen from resource use may be considered higher than the cost of restricting some local fishermen. Generally speaking, it is still early to judge the FPA impact with reasonable certainty given that it was only introduced a few years ago. It still remains to be seen whether the FPA regime fulfils its originally defined purpose of enhancing fish stocks and increasing revenues from angling tourism to the communities.

At this point, a few things shall be added about the quantitative analysis conducted to complement the qualitative findings of RQ1 and RQ2. It is essential to emphasise that the income estimates suggested for fish sale in Katima Mulilo based on the market price method only represent a fraction of the monetary value of fish for the local communities because information on other marketing channels is lacking. Moreover, as market prices vary among fish species, these estimates could be made more accurately if the species contained in the respective deliveries were indicated in the data set. Above all, more information on the value chain

of fish is needed to better grasp the dynamics of local fisheries and how they are impacted by the fish reserve. This is particularly important to understand the impact on women's livelihoods as they clearly dominate the post-harvest sector and, hence, are affected by fisheries management measures, as well. As mentioned in Section 5.2, a next research step could be a 'consistency check' matching the fish monitor data with the Katima market data. In addition, the interviews conducted in this thesis could be complemented by an in-depth survey to get a larger sample and more robust numbers on fishing households, income, village-level fish supply and local prices. Combined with the findings of this thesis, this would further enhance the understanding of both the significance of fisheries and the impact of the FPA and provide a more complete picture.

Research Question 3:

Fish resource governance at Sikunga

Based on the analysis presented in Section 6.4, it can arguably be concluded that the fisheries co-management arrangement at Sikunga is empowering rather than instrumental, to use the terminology of Viswanathan et al. (2003). Most importantly, the local communities were involved in the setting of the management goals and are in charge of financial management and monitoring. Nevertheless, they still depend on the government for enabling legislation and sanctions. When examining this complex mix of actors and interests, two key issues were identified that will have to be addressed to make the FPA work in the long run: financing and enforcement. As illustrated in Figure 7.1, these two are mutually dependent. The tourist operators are only willing to contribute more financially if they see that the FPA is effectively enforced. Similarly, recreational anglers (both locals and tourists) are only willing to pay an additional fee if they are actually able to catch something. At the same time, enforcement can only be improved significantly if more financial resources are available. Importantly, with more financial resources more Fish Guards could be employed and more of the local fishermen that are affected the most by the FPA regime could be offered a job and, hence, a stable income as compensation. This is likely to enhance the sense of ownership and the acceptance of resource access restrictions for the locals and to reduce the probability of non-compliance by local fishermen. Here, however, it must be considered that the job as a Fish Guard is not an option to compensate female fish vendors who might also be negatively affected by the FPA.

The status quo with the Conservancy bearing an important share of the financial costs of the FPA is problematic for various reasons. Apart from the fact

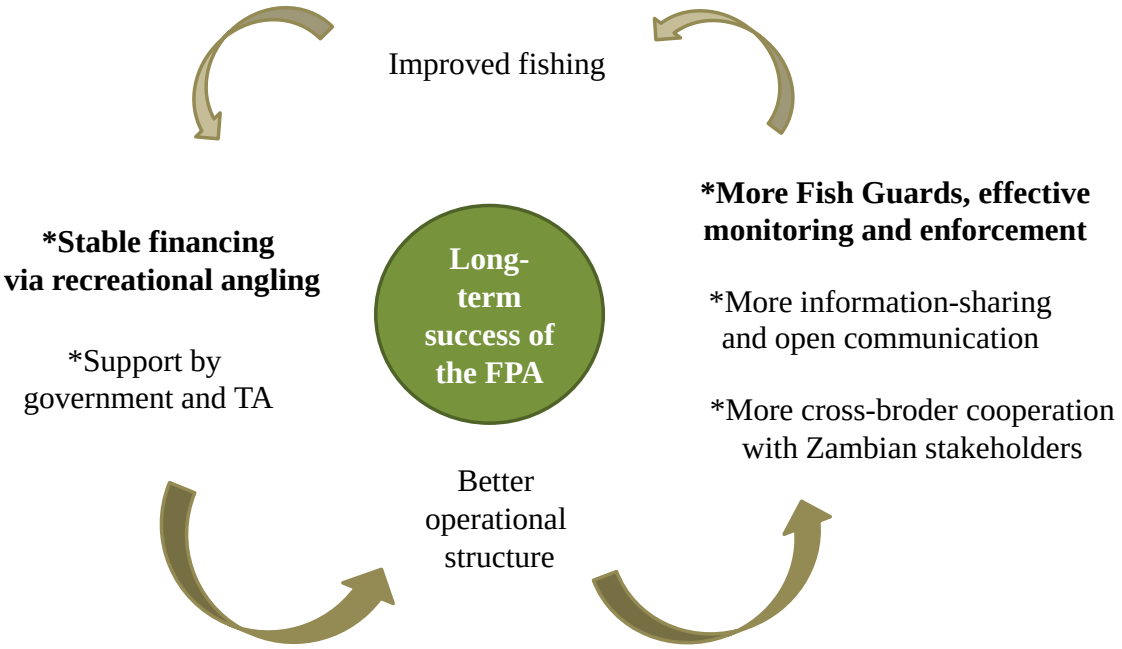

Figure 7.1: Conditions for long-term success of the FPA

that this is not what had originally been laid down in the management plan, it is likely to further nourish resentments of the locals towards the lodges and increase the potential for conflict as some perceive the distribution of costs and benefits as unfair. Moreover, the Conservancy has less money available to distribute among its members or to invest, for instance, in community projects. Therefore, it is crucial that an agreement is reached between the stakeholders from the angling sector and the Conservancy Management on the financing mechanism for the FPA. The fact that new owners will take over the tourist lodges at Sikunga in the near future and negotiations with the Conservancy will begin afresh gives reason for optimism that a sound agreement will eventually be reached. Here, NNF can play a pivotal role as an external mediator facilitating the agreement.

Beyond this, however, it is also important that the Conservancy Management communicates more openly about the contributions by different stakeholders (including the employment generated and donations) as misinformation seems to strongly influence locals' attitude towards these actors. Similarly, enhanced stakeholder communication, in general, is likely to contribute to a climate of cooperation and mutual trust. In addition, continued awareness-raising about the problems of overfishing could also help to further enhance the general understanding of the benefits of conservation among the locals.

The land payment issue (i.e. whether the lodges and the angling club directly pay the customary land owners in Kalimbeza and Kalundu or the Conservancy

Management that then distributes the money and pays the land owners) seems to be more a problem of internal power struggle rather than the lack of cooperativeness of the other stakeholders. Given that the lodge operators and the club claim to not care whom they pay for the land (as long as the payment is 'rational'), the issue is probably discussed and solved best at community level between the TA of the two villages and the Conservancy Management. What regards the land use conflict between tourism and trophy hunting, it is unlikely that the Conservancy will forgo future deals with hunters to allow for more wildlife (and hence game watching for tourists) in the area as advocated by the tourist operators and the locals anglers. Trophy hunting is by far the biggest source of income for the Conservancy and indispensable to provide the annual cash benefit and meat share for the members. Moreover, many household interviewees complained about human-wildlife conflict in the Conservancy, such as crocodiles attacking their cattle or hippos and elephants destroying their crops. Consequently, the chances that the Conservancy members agree to increase wildlife in the area are rather small.

Based on the analysis conducted, it has become clear that both the Namibian government and the TA need to be involved and support Sikunga's FPA to make it work in the long run and ensure its legitimacy. It remains questionable though whether more support for enforcement can be expected from the MFMR inspectors as their under-staffing problem may persist, at least in the near future. Furthermore, continued cross-border cooperation with Zambian authorities is crucial to address the problems of overfishing in the border area and especially to ensure the support by the Zambian TA (ideally for both awareness-raising and enforcement). In any case, to allow for more effective rule enforcement the lack of clarity regarding the follow-up procedure for cases of illegal fishing will have to be addressed; the Fish Guards and Conservancy staff members need to know which steps to take. However, it seems that the current level of punishment by the MFMR and the police for cases of illegal fishing does not always have sufficient deterrent effect which allegedly weakens the enforcement authority of the Fish Guards. Regarding the fishing licenses that are obligatory for both local fishermen and recreational anglers, it seems unlikely that the Regional Council will leave the issuing of a share of the licenses (and hence the revenue) up to the Conservancy. Nevertheless, it could possibly be an option that the Conservancy Management buys books with licenses from the Regional Council on a regular basis to then sell them locally to fishermen; this is also what the lodge operators do to make it easier for their clients. In this manner, at least the problem of fishermen having to go to town to get a valid license could be solved.

Lastly, it shall be underlined that the central issue of sustainable financing

that is decisive for the future of Sikunga's FPA is not really addressed by Ostrom's principles for successful CPR governance as if this was implicitly taken for granted. Evidently, Ostrom's work is not a tailor-made or one-size-fits-all approach for fish reserves, but directed at many different settings and collective resource use. However, based on the experiences from this research, it can be argued that when applying Ostrom's principles to the concrete case of Sikunga they need to be complemented by a fundamental point, namely a sustainable financing mechanism for the FPA. Besides, it may be concluded that defining the conditions and judging the prospects for success of a particular management regime is eventually more context-dependent than a universal list of principles can account for.

8 | Conclusion and Outlook

In view of subsistence, commercial and recreational fishing competing for the same resource at the upper Zambezi, it does not seem surprising that by now freshwater fisheries in the region face a high risk of overexploitation or, to use Hardin's words, a classic 'tragedy of the commons'. At the heart of the problem are the geographical framework conditions of the region, especially the Zambezi River constituting the border between Namibia and neighbouring Zambia, which - in addition to the river's magnitude - makes sustainable fisheries management particularly challenging. In terms of management, the situation is further complicated by overlapping governance structures, including different government-related entities, jurisdictions and various levels of the TA, and an apparent enforcement vacuum regarding fisheries.

Sikunga Channel FPA has been analysed in this thesis as an attempt of exemplary nature to translate an open access regime of a CPR into a hybrid of state and communal property to the benefit of local communities. The research conducted has focused on the significance of fisheries to the local communities, the local-level FPA impact and the implementation of fisheries co-management. Importantly, this thesis has not only aimed to address an information demand on behalf of NNF but also a certain information gap regarding the social dimension of fisheries at the Zambezi that has been identified by different scholars (see for example: Naesje et al., 2003). Given that Sikunga's FPA still constitutes one of only two officially gazetted FPAs in Namibia, this case can clearly be considered a role model for fish protection initiatives in the region and beyond. Accordingly, lessons learnt at Sikunga should be taken into account as valuable baseline for future endeavours. From the findings it can be concluded that there is widespread agreement on the need for fish conservation measures, such as FPAs, at the upper Zambezi. Given its relatively recent implementation, it is still early though to meaningfully judge the impact of Sikunga's FPA. Nonetheless, room for improvement has been identified at Sikunga which, if adequately addressed, will certainly help to maximise the benefits for the communities and make the initiative more sustainable.

Further research on local-level fish supply and sale and different marketing channels is strongly recommended, not only to enhance the understanding of fisheries dynamics and the FPA impact, but also to find a way to compensate negatively affected female resource users. It still remains to be seen whether the Namibian government is willing to devolve fisheries management authority more often and to integrate legal provisions on conservancies and fish reserves to allow for a more holistic approach to nature conservation and resource management. This seems inevitable if the country wants to do justice to its political mandate for fisheries co-management at both the national and international level.

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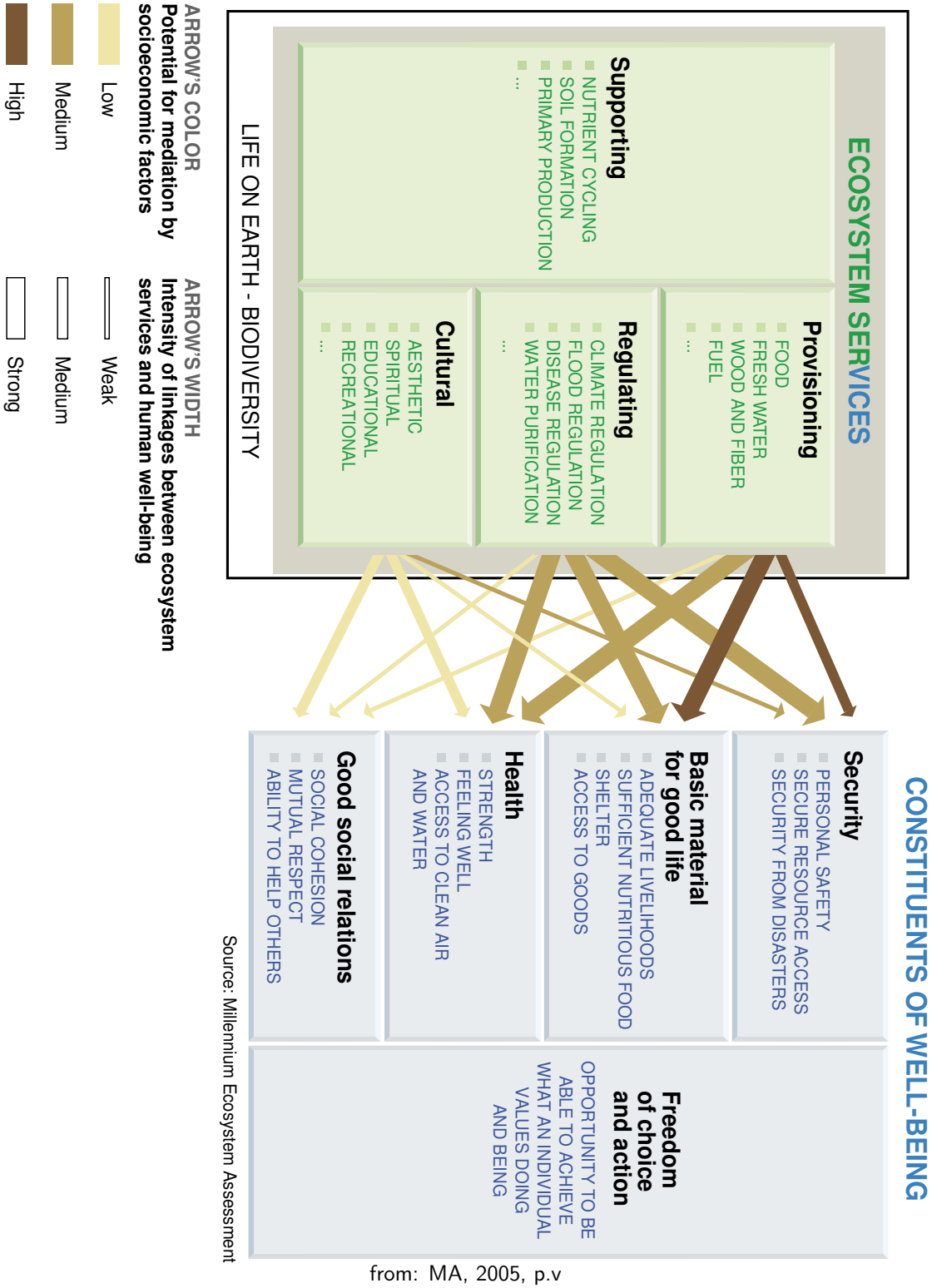
Appendices

Appendix A

Ecosystem Services and Human Wellbeing



from: MA, 2005, p.v

Figure A.1: Linkages between ecosystem services and human well-being

Appendix B

Sikunga Channel FPA Management Plan

Extracts from the Sikunga Channel Reserve Management Target (from: Tweddle & Hay, 2011)

Primary goal
Implementation and management of Fish Protection Area encompassing the Sikunga Channel from point where it leaves Zambezi to where it rejoins the main Zambezi River. From there the Fish Protection Area continues to upstream boundary of Kalizo Lodge, thereby creating protected area effectively extending to downstream boundary of the lodge (Figure 1).

Aims
To establish the Sikunga Channel as a sanctuary for breeding and growth of economically important but over-exploited large cichlid (bream/tilapia) species with a view to the following:

- Enhancing exploitable fish stocks in fishing areas adjacent to the Fish Protection Area because of improved recruitment in, and outward migration from, the Fish Protection Area.

- Improving revenue to the community as a result of increased angling tourism to the lodges in the area. There are two potential major benefits, (a) the lodges are important sources of employment for the local community, and (b) the lodges may pay the community for the rights to fish (strictly catch-and-release angling or trophy fish may be bought by anglers) in the Fish Protection Area.

Actions taken

1. The following steps were completed to establish a Fish Protection Area as a legal entity:

    - Agreed boundaries of the Fish Protection Area were delineated with the Sikunga Conservancy fisheries sub-committee.
    - The Conservancy management and local traditional leaders reached agreement with Traditional Authority on establishing the Fish Protection Area as requested by the conservancy.
    - The request was presented to the Regional Council and was approved.
    - On approval, the documentation was forwarded via MFMR to the Minister for final approval.

2. The Sikunga Conservancy fisheries sub-committee, in association with Traditional Authorities, the Ministry of Fisheries and Marine Resources (MFMR), Regional Council and adjacent tourist lodges, drew up a management agreement for the Fish Protection Area. (e.g. including catch-and-release angling in Fish Protection Area on payment of fees to conservancy).

3. The Sikunga Conservancy fisheries sub-committee will continue with awareness programmes about the implementation of the Fish Protection Area and rules therein.

4. The Sikunga Conservancy fisheries sub-committee appointed fish guards to help in controlling activities in the Fish Protection Area.

Boundaries of Sikunga Channel Fish Protection Area

Summary description: The Sikunga Channel Fish Protection Area includes the southern side channel of the Zambezi River from the point at which it leaves the main river (channel entrance) to the point where the channel exits back into the main Zambezi River, excluding side channels as described below. It then follows the south bank of the river, extending 50 m into the river from the bank, as far as the eastern boundary of Kalizo Lodge.

Rules

1. No netting or the use of any net will be allowed in the FPA.

2. Recreational anglers will only practice catch-and-release when fishing in the FPA.

3. An annual fee as agreed between the lodges and the conservancy (all stakeholders) will be paid to the conservancy by the lodges/angling club(s).

4. An annual fee as agreed between the local angling club(s) and the conservancy will be paid by the angling club(s) to the conservancy.

5. Day visitors fishing in the FPA will pay the daily boat fee as agreed between all stakeholders.

6. Trophy fish caught may be kept at a cost per kg as agreed between relevant stakeholders.

7. Boat movement will only be allowed on the water in the FPA between 05:00 and 20:00.

Control measures

Patrols will be made by the conservancy tour guides, conservancy game guards and conservancy fish monitors, in close agreement with, and through cooperation with, the Ministry of Fisheries and Marine Resources. They will be assisted by the Ministry of Fisheries and Marine Resources, and by the Namibian Police and the Ministry of Environment and Tourism as and when necessary.

Appendix C

Guiding Questions for Household Interviews at Sikunga Conservancy

Interview documentation

- name (optional)
- gender
- age
- household size
- position in the household
- educational background

Questions

- How do you earn your living? For each livelihood activity:
  - How often do you undertake this activity?
  - Is it only for your own use or do you sell the products?
  - How much do you earn with this?
- Only for fishing households:
  - Do you think you have been catching more/bigger fish since the FPA was established?
  - How often do you go fishing?
  - Which type of gears do you use? Do you have your own gears? Where do you get them from?
  - Is the fish only for your own consumption or for selling?

  - If selling: How often do you sell? Where do you sell it? Who sells it for you? How much do you earn?

- Have you experienced any changes after the establishment of the FPA? Does it make a difference for you?
- Why do you think was the FPA introduced?
- Do you think it will help to improve the situation?
- Do you know the rules that have been introduced under the FPA? Do you think everyone complies with them?
- What do you think are the benefits of the FPA/Conservancy?
- Who do you think benefits?
- Are there any fishing traditions here? If yes: Are they affected by the FPA?
- Has the FPA caused any conflicts or problems in the local communities?
- Is there anything you would like to change or improve regarding the FPA/ Conservancy?
- Who do you think should manage the fisheries here? What should be the role of the government and the TA?
- How often do you eat meat/fish? Where do you get it from? What is easier to buy in your village?
- How do you provide food in times of drought?
- What do you think about the closed season that was introduced last year?

Appendix D

The Fishermen Interviewed

Table D.1: Key information of the fishermen interviewed

Interview No.	Village	Age	Livelihood Activities Sources of Income (other than fishing)	Fishing Activity	Fish Sale Activity
1	Kalimbeza	68	Cattle, crops, pension, money sent by children	Every day	Locally, Katima Mulilo
7	Kalimbeza	50	Money sent by children	6-8 months per year	Locally, Katima Mulilo
50	Kalimbeza	59	Vegetables, forestry products	Every day	Locally
51	Kalimbeza	42	Crops, vegetables, temporary jobs	6-8 months per year	Locally
12	Keena	71	Crops, pension	10-11 months per year	(not selling anymore)
40	Keena	28	Crops, vegetables, temporary jobs	two weeks per month	Locally, Katima Mulilo
19	Nasisangani	68	Cattle, crops, pension, money sent by children	Occasionally	Locally, Katima Mulilo
39	Nasisangani	30	Cattle, crops, vegetables, forestry products, meat vendor	6-8 months per year	Locally
24	Sifuha	76	Cattle, crops, vegetables	2-4 months per year	(not selling anymore)
26	Sifuha	40	Crops	2-3 days per week, 6-8 months per year	Locally, Katima Mulilo
28	Sifuha	55	Crops, temporary jobs	2-4 months per year	Locally, Katima Mulilo
29	Sifuha	46	Crops	Every second day	Locally, Katima Mulilo
22	Kalundu	41	Crops, forestry products	Every day	Locally, Katima Mulilo
23	Kalundu	46	Crops, vegetables	10-11 months per year	Locally, Katima Mulilo
33	Malindi	44	Vegetables, temporary jobs	2-4 months per year	Locally
37	Malindi	65	Crops, pension	Every day	Locally, Katima Mulilo