



**FISHERS' PERCEPTIONS OF OCCUPATIONAL HAZARDS IN THE OKAVANGO
DELTA, BOTSWANA**

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Abstract

The fishing industry remains one of the most hazardous industries in the world, with fatality rates said to be higher than the national averages of all occupational fatalities. Different researchers disagree over whether fishermen as a whole tend to be risk loving or risk averse. However, due to many factors surrounding the fishing industry, fishermen are continuously faced with making decisions where financial gain or loss is uncertain. Fishing in the Okavango Delta, Botswana, is not only a source of income but also a means of social cohesion. The dissertation identified possible occupational hazards, determined the influence of fishers' socio-economic characteristics on their perceptions of occupational hazards and analysed the psychosocial factors influencing fishers' perceptions about fishing occupational hazards. It also determined the role which culture plays on how fishers perceive occupational hazards. The study used both open ended and close ended interview schedules to collect qualitative and quantitative data from 44 artisanal fishers from 3 villages along the Okavango panhandle to determine factors influencing fisher's perception of occupational hazards. Findings show that most fishers are males (84.1%) and singles (68.2%), who had evenly distributed ages and more than half of them had never been to school. Most (77%) stayed in large families of more than 5 people. A large number (61.4%) of them had at one point or another experienced injuries, most (36.3%) of which are bone pricks and for which most (85.1%) fishers sought medical attention. Though most (77%) of the fishers believed that licensing is important to regulate fishing activities, more than half (54.5%) of them believed that safety adherence regulations would be an unnecessary hindrance to their source of livelihood. Fishing is part of their culture, which teaches them sustainable management practices. Most (97.7) are of the opinion that a fisher should be strong and brave and hence be willing to risk their lives for their families. They believe fishing is dangerous but could be as dangerous as any occupation. The fishers were of the opinion that there was need for safety training in the fishing occupation, whether from other fishers or the government. Most (63.5%) fishers opined that being cautious or not on the job would not make any difference to the enhancement of personal safety and as such most (61.3%) of them were willing to risk their lives for their families. Most (93.2%) fishers, however, indicated that apart from knowing how to take precautionary measures against hazards, they also had the ability to promptly deal with consequences of such hazards lest their families lose their source of livelihood.

Pearson product-moment correlation analyses show that at $p \leq 0.01$ level of significance, there was a positive correlation existing between fatalism and risk acceptance. Conversely, negative correlations existed between fishers' age and government support; as well as fatalism and risk acceptance at 95

percent confidence level. Chi Square analysis at $p \leq 0.01$ revealed strong associations between fishers' perceptions and marital status; fishing experience in years; monthly income; number of dependents; access to fishing information; and risk acceptance.

CHAPTER ONE

INTRODUCTION

1.1 Background Information

Although the fishing industry continues to witness the use of advanced technologies and modernisation, it remains one of the most hazardous industries in the world. According to the FAO/Government Cooperative Programme's (2010) Report on *Safety at Sea for Small Scale Fisheries in Developing Countries*, the International Labour Organisation (ILO) estimated global fatalities in 1999 to be 24 000 deaths. These figures might, however, be higher because there is lack of data in some countries. The fatality rates are said to be much higher than the national averages of all occupational fatalities even in highly industrialised countries (Windle et al., 2008). In the USA, fishing has consistently been ranked the most dangerous occupation with fatality rates for commercial fishers reaching thirty times as high as the overall occupational fatality rate (Levin et al., 2010). Lucas and Case,(2017) noted that although the number of fatalities among fishermen in the United States has generally declined since 2000, fishing continues to have one of the highest occupational fatality rates in the country. A review of literature on health of subsistence fishermen and challenges for occupational health surveillance in Brazil indicated that no clinical or epidemiological studies existed regarding subsistence fishermen (Pena and Gomez, 2014). Internationally published literature does not have sufficient data especially for comparative purposes (Windle et al., 2008). Mayhew (2003) as cited by Brooks (2005) stated that the occupational health ,and safety of fishermen is poorly enumerated, making it difficult to know the exact figures. However, Brooks (2005) in his study on safety management and occupational culture in an Australian commercial fishing port, describes an industry that has become substantially safer in the last 10 years as the available accident data suggests that fishing does not have the same levels of occupational fatality rate generally attributed to it. In spite of the few reports of an industry that has become safer, however, authors like Velvizhi and Gopalakrishnan (2017) concluded that “the profession of the fisher community is considered to be one of the most dangerous and life-threatening professions all over the world”. These high rates of fatalities and injuries in fishing have been partially attributed to the inherently dangerous working conditions involved in the industry (FAO/GOVERNMENT COOPERATIVE PROGRAMME, 2010; Velvizhi & Gopalakrishnan, 2017; Windle et al., 2008). Acheson (1981) notes how fishing takes place in a very heterogenous and uncertain environment, both the physical and the social environment and that the sea is a dangerous and alien environment. An individual enters this environment only with the support of artificial devices and when weather permits and is, therefore, poorly equipped to survive.

According to Tadesse et al. (2016), the number of occupational accidents and diseases are increasing in developing countries. According to Hamalainen et al., (2017)'s global estimates of occupational accidents and work-related illnesses reported 8% increase in fatal occupational accidents in 2014 as compared to 2010. Asian fatal occupational rate was the highest, followed by Africa where a rate of 18.9/100 000 in the agriculture sector (which includes fishing) was reported. Studies done in Asia, West Africa and South Africa show that fishing fatality rates are high (FAO,2010; Windle et al., 2008) though Windle et al. (2008), reports that in the Unites States, New Zealand, Iceland and South Africa the fatalities were reported to have reduced after the implementation of national policies that were explicitly designed to improve occupational health and safety. In places like the Bahai state, Brazil and Cape Town, South Africa, Lerer and Myers (1994) noted that none of the fatal occupational injuries in agriculture and fishing was reported in terms of statutory regulations. In Uganda, drowning fatality rate among four lakeside fishing communities was reported to be 502 deaths per 100 000 population (Kobusingye et al., 2016). Regarding global subsistence/small-scale fisheries, Pena and Gomez (2014) noted that “the morbidity picture remains invisible from an epidemiological point of view, not only because of the under-notification of illnesses, but also because of the absence of adequate records relating to this mode of non-waged work”.

In Botswana, the Okavango Delta system provides perennial water sources which support livelihood activities such as farming, fishing and gathering of other veld products. Although fishing in Botswana does not have a significant impact on the overall economy, it has local importance in the Northwest area because 65% of the population in the area depends on fish directly as either part of their diet or a source of income(Mosepele & Ngwenya, 2010).

1.2 Statement of the Problem

The majority of studies conducted worldwide on industrial-scale fishing, and with a few on small-scale fishing, show that fishermen tend to deny and trivialise occupational hazards (Davis, 2012; Eklöf and Törner, 2002). However, McDonald and Kucera's (2007) study on understanding non-industrialised workers' approaches to safety concluded that the independent commercial fishermen's approach is in contrast to the reported approach of the industrial scale fishermen. This has been attributed to the fact that their working conditions are not the same; they work in smaller groups, are not formally organized and their work environments change seasonally based on what they fish. Different researchers disagree over whether fishermen as a whole tend to be risk-loving or risk averse (Davis, 2012; Smith & Wilen, 2005). What is clear though, is that due to many factors surrounding the fishing industry, fishermen are continuously faced with making decisions where the financial gain or loss is highly uncertain.

Previous studies on fishermen's attitudes towards occupational risk suggest that various social and cultural norms have impact on what is perceived as dangerous or risky (McDonald and Kucera, 2007).

It has been suggested that it is critical to know the beliefs and practices of a group before developing interventions targeted at the program beneficiaries. Factors that influence fishermen's perceptions of hazards in a particular way should, therefore, be considered in order to ensure successful implementation of occupational health and safety programs or policies/guidelines or regulatory instruments. Lack of knowledge on these factors might necessitate the possibility of failure to adopt or effectively use whatever measures are put in place. The measures may also be inappropriate and thus yield no or opposite results.

Fishing in the Okavango Delta is regarded as an important activity among the fishing communities, not only as a source of income (for the riparian communities) but also because they have developed emotional as well as utilitarian ties with the environment. Fishing is said to also contribute to social cohesion (Mosepele and Ngwenya, 2010). Currently, neither are there studies already conducted on the occupational hazards faced by fishermen in the Okavango Delta nor those on their perceptions about occupational hazards and what shapes those perceptions. This study, therefore, intends to investigate those factors that may have influenced fishermen's perceptions of occupational hazards associated with fishing activities in the Okavango Delta, Botswana.

1.3 Research Questions

General Question

- i. What are the factors influencing fisher's perceptions of occupational hazards in the Okavango Delta, Botswana?

Specific Questions

- i. What are the possible occupational hazards associated with fishing activities in the Okavango Delta?
- ii. How do fishers' socio-economic characteristics influence their perceptions of occupational hazards associated with fishing in the study area?
- iii. What are the cultural or community factors influencing fishers' perceptions about fishing occupational hazards?
- iv. Are there any psychosocial factors affecting the relationship between fishers and the way they perceive fishing occupational hazards?
- v. How do institutional factors (e.g. policy) affect fishers' perceptions of the hazards related to fishing activities?

1.4 Objectives of the study

General Objective

- i. To analyse factors influencing fisher's perceptions of occupational hazards in the Okavango Delta, Botswana

Specific Objectives

The specific objectives are to:

- i. Identify possible occupational hazards associated with fishing activities in the Okavango Delta;
- ii. Determine the influence of fishers' socio-economic characteristics on their perceptions of occupational hazards associated with fishing in the study area;
- iii. Analyse the psychosocial factors affecting the relationship between fishers and the way they perceive fishing occupational hazards;
- iv. Determine the role, which culture plays in the way fishers perceive hazards in their work place; and
- v. Determine if there is any legislature that might be affecting fisher's perception of the hazards in their work place.

1.5 Hypotheses of the study

The following hypotheses are formulated in the null form:

- i. There is no association between fishers' socio-economic characteristics and their perceptions of fishing occupational hazards;
- ii. There is no association between fishers' psychosocial factors and their perceptions of fishing occupational hazards
- iii. There is no association between fishers' culture and their perceptions of fishing occupational hazards.
- iv. There is no association between institutional factors and fishers' perceptions of occupational hazards associated with fishing

1.6 Significance of the study

The study provided useful data or information on occupational health for different stakeholders such as policy makers (especially in the Occupational Health Division and the Department of Wildlife and National Parks), researchers, academics, students, community Trusts and riparian communities. It,

therefore, provided a veritable platform on which these stakeholders could operate to consider all the factors associated with the subject-matter when working with fishers and devising measures to overcome the problem. Indeed, co-management is now seen as a mainstream approach to small-scale fishing management (Department of Agriculture Forestry and fisheries, 2012; Shipton, 2011).

1.7 Assumptions of the study

- i. The study assumes that not all stakeholders involved in fisheries management in the Okavango Delta are well informed of the different factors influencing fishers' perceptions about associated occupational hazards, making them to seemingly overlook those factors especially when making environmental legislations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Fisheries and fishers

The fishing and fish processing industry has experienced tremendous growth in recent years. In 2005, the Food and Agriculture Organisation (FAO) estimated that 38 million people were engaged in fishing and related activities worldwide, and the majority (90.0%) of them were small scale or artisanal fishermen in developing countries (Allison and Ellis, 2001). Some authors (Natale et al., 2015) have noted that defining small-scale fisheries is a recurring issue in policy, management and research and the interchangeability of the terms associated with small-scale like artisanal, traditional and subsistence indicates the many characteristics and values underpinning their definition. Nonetheless, the FAO (2010) defines small-scale fisheries as the type that can be generally regarded as a dynamic sector employing labour-intensive harvesting, processing and distribution technologies to exploit marine and inland water fishery resources. Natale et al. (2015) noted that the European Parliament Committee on Fisheries (2012), following the approval of the reformed common fisheries policy, argued in favour of a definition that considers boat size, the impact on the marine ecosystem, time spent at sea and the characteristics of the economic unit exploiting the resource. Guyader et al., (2013), in their study aimed at obtaining a comprehensive description of small scale fleets compared them (small fleets) with the large-scale fleets and surmised that smaller vessels travel lower distances to fishing grounds, have lower extraction rates, use mostly passive gears and have lower fuel consumption. The term ‘small-scale’ fisheries is usually used to distinguish between the low-technology, labour-intensive fishing activities usually carried out as one of several livelihood activities as compared to the capital-intensive, commercial fishing activities (Sowman, 2011). The South African Department of Agriculture, Forestry and Fisheries policy for small-scale fisheries further identifies a small-scale fisher as:

‘...persons that fish to meet food and basic livelihood needs; are directly involved in harvesting; operate on or near the shore or in coastal water bodies; traditionally operate on/near the fishing grounds and predominantly employ traditional low technology or passive fishing gear; undertake single (24 hour) fishing operations; and subsist from (sic) their catch; are engaged in the sale or barter or are involved in commercial activity’.

Although export-oriented production has increased because of greater market integration and globalization, the activities of small scale fishers, conducted either full-time, part-time, or seasonally, are often aimed at supplying fish and fishery products to local and domestic markets, and for subsistence consumption (FAO, 2010). The development of fisheries in some parts of the world like

the Pacific Islands is seen as a means to provide economic, social and cultural benefits to individuals, communities, societies and nations and national governments in those regions make financial commitment to develop it (Preston, 1993). In Africa, marine and inland fisheries contribute towards the food security of 200 million Africans and the income of 10 million engaged in production, processing and trade (Sowman, 2011). The significance of sustaining small-scale fisheries is therefore being progressively recognised within fisheries management and development policy and its value has been acknowledged to address food insecurity and contribute to the livelihoods of millions of people (SADC, 2001).

Not many studies have been conducted on the interaction between commercial and small-scale subsistence fisheries. Commercial fishing has been widely criticized for overexploitation and unsustainable use of the resources. However, Atcheson (2016) noted that large commercial fishing with larger boats is not necessarily worse for the environment than using multiple small boats to catch fish, This is because large fishing vessels can stay out at sea for longer, fishing greater areas of ocean and therefore reducing the overall intensity of fishing. Also, large, commercial fishing operations are often more capable of implementing technological advances which support sustainable fishing (Atcheson, 2016). Furthermore, access to experts in fisheries management and marine science, means that large commercial fisheries can act in response to the latest science and information to ensure a sustainable level of fishing (e.g. careful management of fish stock and self-imposed restrictions).

Fishing is commonly thought of as a man's occupation despite the involvement of women in the industry. According to Fraser (1998) as cited by Yodanis (2000), and the U.S Census Bureau (1999), 95% of fishers are men. Different reasons given for this gender role segregations include but are not limited to gender role socialization, established traditions, or discrimination and exclusion by men. Whatever is the reason, Yodanis (2000) argued that these factors do indeed work to block women from fishing; women's lack of fishing can also be viewed from a different angle—that of gender construction. That is, women are women because they do not fish. Many studies have, however, concluded that women's role in fishing is vital to the industry. In fact, Thompson (1985) believed that fishing is dependent on the work of women and this dependence gives them not only more responsibilities but the possibility of more power. In the Pacific Islands, men are perceived to occasionally belittle women's fishing efforts and the fish they catch as not worth any man's attention and this is attributed to the fact that women fish everyday while men less often but with 'great fanfare and ritual secrecy' (Matthews, 1993). Women's fishing knowledge is also in most times overlooked while men's has been noted to be extensive and greater than those of researchers who have all the books and training (Johannes, 1981). Matthews (1993) noted that women fishers also possess the same level of knowledge; otherwise they would not be as proficient in finding food in

shallow reef waters or deep sea. Women's contribution to the fishing industry cannot be ignored as Thompson (1985) outlined the three principal ways in which they contribute to include (i) direct contribution of women's labour; (ii) the creation of the next generation both in a physical and in a moral sense; and (iii) carrying out responsibilities in lieu of men as the latter are away at sea.

In the Okavango Delta, Botswana, a gradual increase in the number of subsistence fishers has been observed with women and children constituting the highest proportion of subsistence fishers (Mosepele and Ngwenya, 2010). Despite the introduction of modern fishing gear, the fishery has retained its traditional flavour and remained artisanal, with its features of basic, 'undeveloped' and relatively inefficient fishing gear. This buttresses the claim that 'Regardless of the degree to which they have embraced modernity, local people continue to prefer concrete knowledge, which belongs to them in time and space, and which they deem suitable for particular purposes' (Kolawole, 2001; see also Kolawole 2012). While fishing baskets are used by women and young girls, men and young boys use barrier traps and hook and line. Fishers are divided into three categories; commercial, (entailing an all year round activities); seasonal (indicating active fishing activities during other parts of the year); and occasional, (entailing active fishing activities only during years of good floods) (Mosepele & Ngwenya, 2010).



Fig 1: Fishers in Samochima going for an excursion

Source: Field Survey 2016

2.2 Occupational hazards

Previous research focusing on fishermen safety indicates that fishing occupational fatalities and injuries occur at rates much higher than the national averages for all occupational fatalities and injuries in the United States and the United Kingdom (FAO, 2010; Windle et al., 2008). Multiple sources of risk have been identified in the fishing health and safety literature. These include the physical and biological environments, fishing location as well as a broad range of socio-economic, cultural and human factors that include fatigue, inexperience, and failure to use safety practices. Regulations aimed at promoting occupational attitudes and perceptions of risk among fishermen are also said to have potential consequences for risk (Windle et al., 2008). Some of the health problems associated with fishing include but are not limited to penetrating wounds, sprains, falls, chronic musculo-skeletal illnesses, losses of life, asthma etc. What is of concern though is that Marshall et al. (2004) ethnographic research demonstrated that fishers have a low level of utilisation of medical services and are usually reluctant to take time off to get care for and recuperate from injuries.

Although a lot of attention has focused on commercial fishing safety studies (Kaplan & Kite-Powell, 2000; Levin et al., 2010; Windle et al., 2008) other researchers like McDonald and Kucera (2007) conducted a study on understanding non-industrialised workers' approach to safety and argued that the work environment for small-scale independent fisheries is entirely different from that of industrialised, capital intensive fisheries. Small-scale fishermen do not work in big groups, they either work alone or in groups of two or three; are not formally organized; and their work environments change daily or seasonally due to the weather and what they fish, respectively. The study revealed that the small-scale fishermen's appreciation of the importance of everyday work habits shows that they have a broad concept of safety. These fishermen recognized safety as a fundamental part of the day-to-day fishing process which enables them to relate to the philosophy of staying safe as well as practising safe work habits. Fishermen who work in the industrialised commercial fisheries on the other hand tended to deny and trivialize the dangers of ocean fishing. This has been attributed to an adaptation mechanism, which fishermen make as a way to cope with their high-risk occupation, which in turn hampers safety training efforts.

2.3 Risk and risk perceptions

Studies of risk perception attempt to describe attitudes and behaviours of people towards a particular risk. They examine the judgments people make when they are asked to describe and evaluate hazardous activities (Slovic 1987; Arezes and Miguel, 2008). An intellectual discipline called risk assessment was created and designed to aid in identifying, characterizing and managing risk. Whereas intellectual analysts employ risk assessment to evaluate hazards, the majority of citizens rely on intuitive risk judgments, typically called "risk perceptions" (Slovic, 1987). Literature shows that the

concept of 'risk' means different things to different people. According to Po et al. (2003), experts and lay people perceive risk differently. While the experts define risk in terms of probability of an event, the public tends to capture a broader concept of risk by incorporating attributes such as uncertainty, dread, controllability etc. Peoples' perceptions on risk are, therefore, often inaccurate and those hamper effective communication not only from the side of receivers but also from the side of the sources (Slovic, 1987).

Research in risk communication emphasizes that while it is important to look at the accuracy, detail and clarity of the message, it is also important to look at how it is going to be interpreted by the recipients. Risk communication recipients play a critical interactive role in the process of risk communication. Risk information can vary not only from community to community but also from various publics within any community and through time. Slovic (1987) in his article on perceptions of risk stated that:

“Perhaps the most important message from this research is that there is wisdom as well as error in public attitudes and perceptions. Lay people sometimes lack certain information about hazards. However, their basic conceptualization of risk is much richer than that of the experts and reflects legitimate concerns that are typically omitted from expert risk assessments. As a result, risk communication and risk management efforts are destined to fail unless they are structured as a two-way process. Each side, expert and public, has something valid to contribute. Each side must respect the insights and intelligence of the other.”

Slovic (1987) acknowledged contributions from different sources to shape the current understanding of risk perception. These are geography, sociology, political science, anthropology, and psychology. Geographical research focuses on understanding human behaviour in the face of natural and technological hazards. Sociological and anthropological studies have shown that perception and acceptance of risk have their roots in social and cultural factors. Psychological research on risk perception, Slovic (1987) stated that risk perception originated in empirical studies of probability assessment, utility assessment, and decision-making processes. In many cases, risk perceptions may form afterwards, as part of the ex post facto rationale for one's own behaviour.

Kaplan and Kite-Powell (2000) noted that findings emphasize that fishermen's perceptions regarding safety can vary greatly from those in management, and that there needs to be a better understanding of the fishing culture and ways in which safety is viewed. Despite this, no research has investigated the different factors that influence fishers' perceptions of occupational hazards and how these factors mediate people's decision-making processes in the Okavango Delta, Botswana.

2.4 Theoretical framework

Modern theories in risk perception indicate that there are two fundamental ways in which human beings comprehend risk. The “analytic system” uses logic, reason and scientific deliberation in risk assessment. It is relatively slow, effortful, and requires conscious control. The “experiential system” is intuitive, and instinctive reaction to danger, and is sometimes referred to as the *affect heuristic*. The analytic system is reason oriented and the behaviour is mediated by conscious appraisal of events. It requires justification through logic and evidence. It largely ignores the role played by emotions during the decision-making process. It rather considers the effects after the decision elicited by good or bad outcome. The analytic theory is according to Loewenstein et al., (2001), sensitive to two variables being probabilities and outcome. Considerable processing of information has to take place before a decision can be made. Once this analytic task has been completed, a computation of the components can generate an overall affective judgment (Zajonc et al., 2008). The experiential system on the other hand is associated with the experience of affect and relies on images and associations. Finucane et al. (2003) defined affect as goodness or badness both as a state of feeling and as demarcating a positive or negative quality of a specific stimulus. The experiential system considers the impact of emotions experienced during the decision-making process and is sensitive to imagery and time. It is pleasure-pain oriented and behaviour is mediated by past experiences. Slovic et al.,(2004), noted that both systems are continually interacting and influencing each other. They explain that though we are able to “do the right thing” without analysis, it is unlikely that we analytically think without affect assisting somewhere along the line. Affect is therefore essential to rational action and in some circumstances, risk as feeling may outperform risk as analysis (Slovic et al., 2004).

People also use their social and moral values to evaluate situations that are poorly defined. According to Po et al. (2003), people do not use the same underlying frames of reference when making judgements of risky situations and people might use different judgement strategies to determine the acceptability of risky decisions. A number of theories of risk perception have been brought forward to try to explain who fears what and why as Wildavsky and Dake (1990), referred to the notion of risk perception. A few theories that are believed to be influencing fishers’ perceptions of occupational hazards are discussed as follows:

2.4.1 Social trust and knowledge

Social science research has demonstrated that technical experts and lay people often differ in their conclusions about the risks and benefits of hazards (Po et al., 2003). This is because they differ in the way they make conclusions about risks and benefit (Siegrist and Cvetkovich, 2000). Most lay people do not have the detailed knowledge necessary for a rational assessment of risks and benefits associated with a particular phenomenon. When forced to make risk or hazard assessments they therefore often rely on the experts or authorities. If they believe that they possess adequate knowledge to assess the risks and benefits of an activity for example, they will make their own judgments. In

instances where knowledge is lacking, most people do not directly assess the risks and benefits associated with an activity. Rather, the public has to rely on information provided by experts. Experts themselves often differ in their assessments of a risk or hazard. The public therefore will not be able to evaluate the accuracy or reliability of information about risks and benefits when given by different sources. In the absence of sufficient knowledge, decisions and judgments are guided by social trust (Earl & Chetkovich, 1995).

Trust has been identified as of paramount importance in determining how individuals perceive risks. Social trust is employed to select experts who are trustworthy and whose opinions can be believed as being accurate. People's trust in an institution is built on an understanding of the institutions' goals, motives, and actions in relationship to the person's values. It has been suggested that people have trust in experts who share the values that they believe are important in a given situation (Siegrist and Cvetkovich, 2000). It is important to maintain the trust relationship through full participation in agency decision making before the trust is lost as suggested by Earle and Cvetkovich (1995). Where neither party trust each other, maybe due to conflicting interest, the same authors insist that all interested parties must be open to persuasion and change. Risk assessment at this point depends on both technical knowledge and cultural values.

According to Slovic (1987), research indicates that differences about risk should not be expected to dissolve in the presence of evidence. The initial views that people have are usually strong and resistant to change, and often influence the way subsequent information is interpreted. If the new evidence is consistent with one's initial beliefs, it will then appear trustworthy and informative. New evidence that is contrary to initial beliefs tends to be dismissed as unreliable and inaccurate.

2.4.2 Cultural Perception Theory

This theory was first developed by Douglas & Wildavsky (1982), when they started a discussion about the impact of values and cultural settings on the perception of risks. In their view, risk perception and concern about environmental or social issues are socially and culturally framed. This means that the values and worldviews of certain social or cultural contexts shape the individual's perception and evaluation of risks. Douglas and Wildavsky (1982) stress that individuals are embedded in a social structure and that social context of individuals shapes their values, attitudes, and worldviews. According to this perspective, the most important predictors for selecting what people fear or do not fear are socially shared worldviews – so-called cultural biases that determine the individual's perceptions (Wildavsky and Dake, 1990). This result can be interpreted as an indication of the relevance of socialized cognitive schemata that work like a filter in evaluating information. In this sense, values frame the interpretation of information. Cultural theory proposes that individuals choose what they fear in relation to their way of life—that is, in relation to the 'culture' they belong to.

(Rippl, 2002). This may imply that sources of fear and subsequently risk perception, are pre-determined and just abided with.

Other authors like Oltedal et al., (2004) and Sjöberg(2000), have criticized the cultural theory on different grounds. Oltedal et al. (2004) suggested that cultural adherence is unimportant for how people perceive and understand risks other than through more or less coincidental connections. According to them, the study that they carried out to evaluate the theory has shown that theory is not a good predictor of risk perception. The theory according to Sjöberg (2000) has not been adequately tested according to the right conditions and quantitative methods used in the study were informal.

2.4.3 Risk and benefit perception

This theory states that there is an inverse relationship between perceived risk and perceived benefit of an activity or technology. When people perceived many benefits associated with an activity, they will assess the activity to have less risks. When on the other hand they perceived an activity to be less beneficial, the risks will be more severe. Frewer et al., (1998) when doing a study on understanding public attitudes to technology, asserted that technologies viewed as beneficial were associated with less risks than those not viewed as beneficial.

Different explanations for the inverse relationship have been offered by Siegrist and Cvetkovich (2000). The first being the need for consistency in beliefs and the tendency to avoid cognitive dissonance. For technologies (or activity) perceived as good, there is pressure to devalue the risks and elevate benefits. If they are viewed as bad, the benefits are devalued, and risks elevated. The other explanation is that social trust simultaneously influences both perceived risks and perceived benefits. For most technologies, the associated risks and benefits are not directly visible; therefore, people rely on risk-benefit information provided by sources they trust. Frewer et al., (1998) argued that based on the inverse relationship, it may be possible to change perceived risk by changing the perception of benefits. When people are made to see more benefits of an activity, then they will see it as less risky.

2.4.4 Social network contagion theory

Contagion theory suggests that those individuals who are most connected to each other through interpersonal contacts are also most likely to share similar information, attitudes, beliefs, and behaviours on controversial topics (Scherer and Cho, 2003). The strength of the network tie was significantly related to similarity of perceptions about the risk of adverse health effects from a hazardous place (Scherer and Cho, 2003). Different studies like the one done by Christakis and Fowler (2013), on examining dynamic social networks and human behaviour noted that studies and others suggest that individual perceptions are influenced by the perceptions of individuals in their social, or friendship network.

Social units, resulting from self-organizing systems, function as attitude knowledge and behavioural functions that either ease or restrain the flow of information and influence to individuals in the network. Douglas and Wildavsky (1982), assert that people, acting within social groups, downplay certain risks and emphasize others as a means of maintaining and controlling the group. Social influences facilitate responses to hazardous situations.

A study done by Christakis and Fowler (2013), examining dynamic social networks and human behaviour suggests that a phenomenon like obesity may spread in social networks in a quantifiable and distinct pattern that depends on the nature of social ties. They further noted that social distance appears to be more important than geographic distance within these networks. In the case of obesity that they were studying, exposure to common environmental factors was ruled out as an explanation to the observations they made. Other friends and siblings who were not part of the network were not gaining weight as members of the network though they were geographically close. People sharing the same 'phenomenon' had a tendency to form ties amongst themselves (Christakis and Fowler, 2013). Thus, the theory suggests, it is not just the information or the sources of information that are important in forming perceptions or transferring knowledge, but it is the structure itself that forms a cultural system of norms, expectations, knowledge, and behavioural support (Scherer and Cho, 2003).

2.5 Conceptual framework

Classification of risk perspectives shows that all perspectives have their specific function in the analysis of risk. While technical analysis provides society with a narrow definition of undesirable effects, the other perspectives (social and cultural) broaden the scope of undesirable elements (Renn, 1992). Otway and Von Winterfeldt (1982), when discussing the social acceptability of technologies, state that technical analysis of risk is too narrow to help understand the social acceptability of technologies. It is therefore necessary to integrate all the perspectives for both the analysis of risk and the prescription of risk policies. Renn (1992), stated that many feel that risk policies should be based solely on technical and economic consideration because the observed risk behaviour of individuals and group is puzzling enough to get the social and cultural involved. This he says, would be appropriate if society were only concerned about risk minimization. Society is however not only concerned about risk minimization as demonstrated in Otway and Von Winterfeldt (1982), who argued that

'People are willing to suffer harm if they feel it is justified or if it serves other goals. At the same time, they may reject even the slightest chance of being hurt if they feel the risk is imposed on them or violates their other attitudes and values'.

Social amplification conceptual framework has been offered by Kasperson et al., (1988) to connect all the different aspects of risk. It believes that hazards interact with psychological, social, institutional, and cultural processes in ways that may amplify or lessen public responses to the risk or risk event. Social amplification therefore seeks to link the technical assessment of risk with psychological, sociological, and cultural perspectives of risk perception and risk-related behaviour. The following factors that may influence fishers' perception on occupational hazards are discussed.

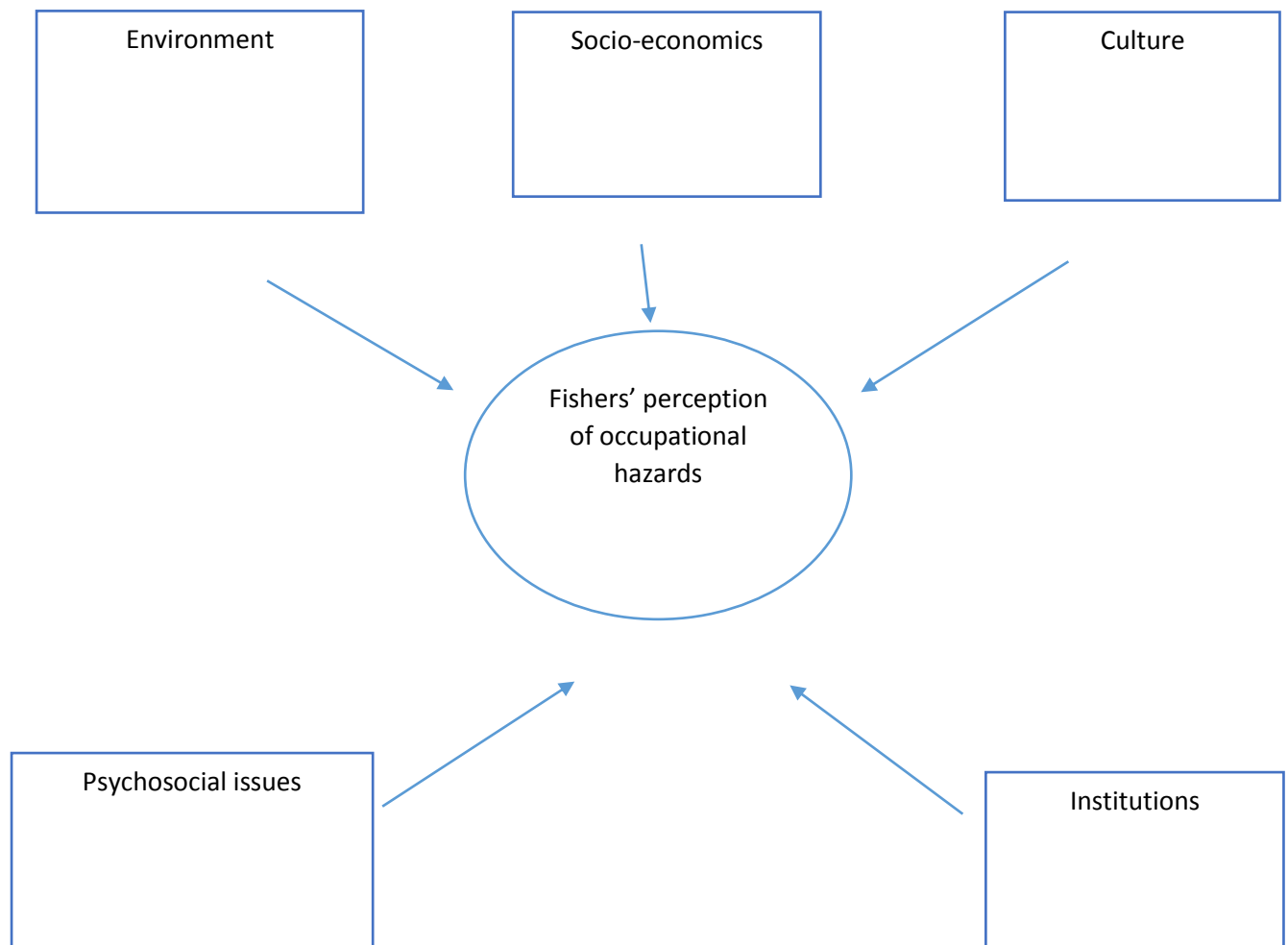


Fig 2: A conceptual framework showing the interaction between factors influencing fishers' perceptions of occupational hazards

2.5.1 Institutional factors

Over the past two decades, there has been increasing recognition that many aspects of the conventional fisheries management approaches developed for large-scale fisheries are not appropriate in the small-scale fisheries arena. The Southern African Development Community Fisheries Protocol of 2001 (SADC 2001) highlights the need to recognise, support and protect small-scale fishers. This is in recognition that the small-scale fisheries systems are complex social-ecological systems that need a different management approach. Fishermen need to be given legitimate power in the management process and work with relevant authorities in the formulation of policies and regulations that guide their lives (Kaplan and Kite-Powell, 2000). Although the actions and behaviours can be influenced by management regulations, it was noted that the majority of national and international fisheries policies have traditionally been developed without regard for their potential impacts on health and safety. Co-management has now been established as a mainstream approach to small-scale fisheries management and has been implemented around fisheries world-wide. According to (Mosepele et al., (2014), management of the Okavango Delta Fishery was based on a centralised approach that excluded traditional management, which failed to resolve conflicts in the delta, consequently affecting the most vulnerable members of the society. It was then that the initiative tagged Building Local Capacity for Conservation and Sustainable use of Biodiversity in the Okavango Delta (BIOKAVANGO) was formed.

As in the social trust and knowledge theory, there is need to maintain a trusting relationship with the riparian communities for risk messages to be received and accepted. If fishermen believe that they are being deliberately side-lined and not given an opportunity to participate in the decision-making processes, trust might be lost. When trust is lost, compliance will be diminished, but participation will bring ownership and willing compliance.

2.5.2 Cultural factors

Cultures of small-scale fishing communities are usually the result of considerable accumulated adaptive experience to specific ecosystems and therefore the nature of the ecosystem that is being exploited is an important determinant of many of the cultural characteristics of small-scale fishing communities (McGoodwin, 2001). These include, social and economic organization and the fishing gear and technologies that are utilized. Bock (1998) noted that it is widely recognised that people's relationship with their environment is a major feature of culture and tradition. Many fishermen come from families with a strong fishing heritage and a known sense of cultural identity. According to McGoodwin (2001), they take deep pride in their occupational identity as fishers and are usually as dedicated to the fishing way of life.

Some of the reasons fishermen gave for liking their work is because of the independence/autonomy, challenge and income derived from the occupation (Acheson, 1981; Matthews, 1991). Indigenous people including fishermen often have extensive, unique, intimate and functionally oriented knowledge of their environment that is contained in experience and oral history (Bock, 1998; Gadgil et al., 1993; Thompson, 1985). According to Johannes (1981), this knowledge is greater than that of researchers that are equipped with scientific books and university training. Fishermen typically acquire their occupational skills on the water without any formal job training but rather from older members of the family as they pass the knowledge to younger generations. Small-scale fishers develop cultural adaptations to the risks and uncertainties associated with fishing activities, including taking a conservative approach to fishing, maintaining occupational pluralism and ritualised behaviours. Most fishing communities have other sources of livelihood like agricultural production (animal husbandry and crop production), craft production and hunting (McGoodwin, 2001; Mosepele & Ngwenya, 2010; FAO, 2010). While fishers can reduce risk and uncertainty, they cope with irreducible risk through ritual and magic (Acheson, 1981; McGoodwin, 2001; Yodanis, 2000). When fishers receive messages, they bring cultural assumptions and inputs of individual knowledge and experience to the risk messages that might be communicated with them. It is important to appreciate indigenous knowledge and take into account cultural values for the riparian communities. Such acknowledgement can also be empowering to local fishing and result in risk management cooperation.

2.5.3 Socio-economic factors

Fisheries literature, have characterised small-scale fishing communities as being among the poorest socio-economic groups in the developing countries (David et al., 2011), conveying an idea of structural chronic poverty. Other authors (Béné, 2009) however, argue that such communities are not necessarily the poorest of the poor in monetary terms. They may instead, be amongst the most vulnerable socio-economic groups, due to their particularly high exposure to certain natural, health-related or economic shocks and disasters (Bene, 2009).

Even though fishery is one of the most accident stricken occupations (FAO, 2010; Windle et al., 2008), Aasjord (1992), cited by Eklöf and Törner (2002), stated that fishermen often do not give priority to preventive safety work. Economic reasons are given for not giving safety work priority. In order to maintain an acceptable income, the fishermen go to sea in increasingly severe weather conditions or may overload their boats to secure a large catch. Preventive safety measures are often considered as incurring additional costs (Eklöf and Törner, 2002) and probably counterproductive.

Households within the Okavango Delta are prone to risk as they depend on natural resources, which in turn depend on erratic rainfall and the variable water flow of the Okavango River (Wolski and Murray-Hudson, 2005). Since fish is available throughout the year and it is an open resource, most households reported that they turn to fishing as a major strategy during livelihood shocks (Mmopelwa

et al., 2008). It is therefore important to then analyse the factors influencing fishers' perception of the occupational hazards in light of their livelihoods.

2.5.4 Environmental factors

Fishermen are engaged in an activity that has inherent dangers, some of which, like sudden changes in weather and conditions at sea, are not easily predicted (Kaplan and Kite-Powell, 2000). While the physical environment might pose lots of dangers, it is the same environment that provides a source of livelihood to them and their families. Fishers would benefit from being 'taught' the importance of sustainability concerning fishing. Conservation literature indicates the need to focus on specific attitudes towards the environment rather than general attitudes. People might have positive attitudes towards the environment but differ in their specific concerns e.g. wildlife management versus fishing management (Po et al., 2003)

2.5.5 Psychological factors

Individual attitudes and risk perceptions among working people were seen as significant factors in relation to safety. The importance of assessing the role of psychological factors in accident research concluded that safety work should focus on both structural and psychological change (Eklöf and Törner, 2002). Risk perceptions in fisheries safety studies have been associated with fatalism and risk acceptance. Fatalism is the belief that risks are unmanageable hence an individual cannot personally control his or her circumstances. People then do not make any attempts to cope or apply adaptation strategies. Coping refers to the intentional efforts we engage in to minimize the physical, psychological, or social harm of an event or situation. There are many different frameworks for understanding coping and many different ways of classifying coping strategies, but one such classification is problem-focused coping vs. emotion-focused coping (Carroll, 2013).

Problem- focused coping refers to the degree to which the individual copes with stressful/hazardous situations through attempts to control risk factors and increase his competence to exercise such control. Emotion-focused on the other hand, is aimed at managing the emotions associated with a situation. The degree of active problem-focused coping is influenced by primary appraisal (perceived personal risk), secondary appraisal (perceived manageability of the threat) and individual coping resources (Eklöf and Törner, 2002). A study conducted on perception and control of occupational injury risks in fishery by Eklöf and Törner (2002), the results did not support earlier findings of low risk awareness and risk acceptance among fishermen. They suggested that more efforts should be made towards developing fisher's understanding of how the development of hazardous situations can be prevented or managed rather than towards strategies for increasing risk awareness.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter outlines the methodology used in the study. It identifies the study area and establishes an appropriate and suitable design for the study. The chapter further addresses the data collection procedure and the data collection instruments. Finally, the collected data will be analysed using both qualitative and quantitative methods. The methods section describes the rationale for the application of specific procedures or techniques used to identify, select, and analyse data.

3.2 Study area

The Okavango Delta is located in Ngamiland District of north-western Botswana. In this wetland, water is the primary factor controlling the environment and associated life of flora and fauna. This wetland has been of significant international importance since 1997 when it was declared a Ramsar site. In June 2014, the delta became the 1000th UNESCO World Heritage Site. It sustains rich wildlife resources and is a habitat for diverse species of plants, and birds. The Okavango river inflow varies from year to year in response to rainfall levels at the highland regions of Huambo and Kuito in Angola (Mosepele and Ngwenya, 2010). The wetland provides perennial water sources, supporting different livelihood activities such as farming, fishing, hunting and gathering of veld products, international tourism and wildlife management. It is home to about 150,000 people who live within and around it and who directly or indirectly depend on the extraction of the natural resources found in it. Majority of fishing villages are situated in the panhandle area of the delta, which begins at Mohebo where the river enters Botswana. The permanent waters of the panhandle support slightly higher fish species diversity and a larger concentration of fishermen than the lower delta, being a direct relationship between the hydrological status and the productive potential of the water body (Mosepele et al., 2011).

Data was collected in Shakawe, a village north west of Botswana along the Okavango panhandle. Shakawe's fishing activities contribute approximately 90% of Botswana's fish production (Ministry of Agriculture, 2002 cited by Mmopelwa et al., 2005). A cost benefit analysis of commercial fishing in Shakawe done by Mmopelwa et al., (2005) showed that commercial fishing is a viable enterprise which can offer positive investment opportunities.

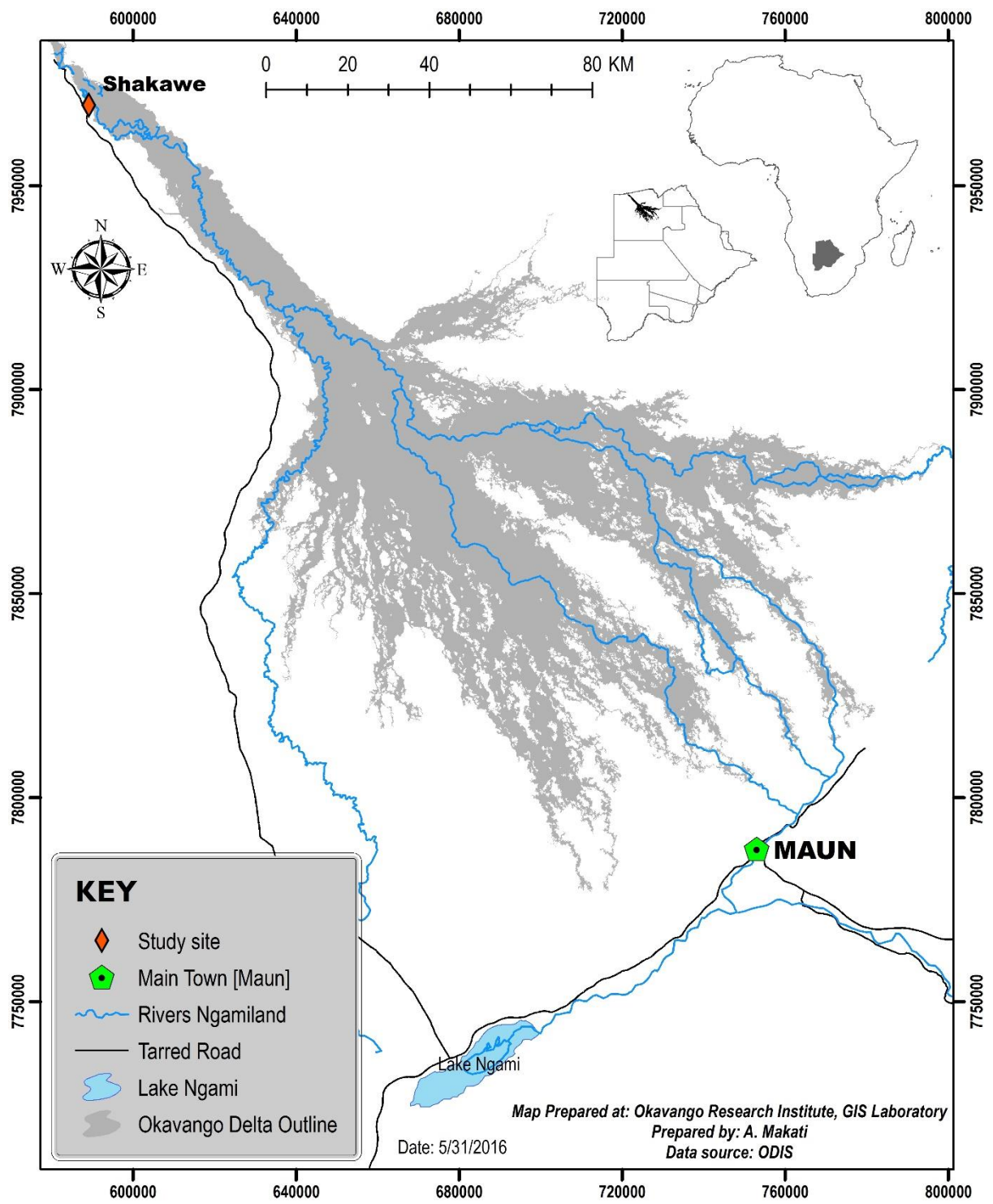


Fig 3: Map showing the study area, Shakawe



Fig 4: Picture showing Mohembo river bank, one of the villages along the pan handle

Source: Field survey 2016

3.3 Study population

The Okavango Delta is home to many ethnic groups, including but not limited to the following: BamBukushu, BaYei, BaSarwa, BaHerero and BaTawana (Bock, 1998). According to Mosepele and Ngwenya (2010), the BamBukushu is the main fishing group. The national census of 2011 estimated the population of Shakawe at 6,510 people (CSO, 2011). Other economic activities include livestock husbandry and arable agriculture, basket making, and grass and reed collection. The growing tourism industry and conservation sector have now become a pivotal part of the Okavango Delta. Presently there is a reduction in the traditional agricultural, fishing, hunting and gathering activities of the riparian communities along the delta that had previously depended on the land which is now being used for developing the relatively new sectors. Except for the tourism industry, the Okavango Delta and the rest of Ngamiland District, has in the past experienced shocks that affected the livelihoods of the communities. Common shocks include animal diseases like contagious bovine pleuropneumonia (CBPP), African animal trypanosomiasis (nagana) and foot and mouth disease (FMD), human diseases like HIV/AIDS and malaria, recurrent droughts and changing flood distribution patterns. Fidzani et al. (1999), noted that although livestock farming was once the most important livelihood activity in Ngamiland before the eradication of livestock in 1995/96, it is now significantly less

important. Fishing therefore has an increased local importance to the riparian communities for sustenance.

3.4 Sampling

A comprehensive survey of fishermen is challenging because they often work across a broad geographic area, and are not centrally located (Davis, 2012). A population of fishers with a valid fishing licence provided by the department of fisheries in the Shakawe sub district was used in the study. A total of 13 villages along the panhandle were all included because fishers are highly mobile. The first participants were randomly picked from the list provided by the fisheries department and then snowballing technique was used to cover the required number of fishers. The total number of fishers from the list provided was 92.

The total sample size was calculated using online survey sample size calculator software. Thus, the total sample size obtained was 48 at 95% confidence level and a standard deviation of 0.5 and a margin of error of 0.3%. The formula used was Cochran's sample size for continuous data and is given below;

$$n = (t^2 * s^2) / d^2$$

where t = value for selected alpha level

where s = estimate of standard deviation in the population

where d = acceptable margin of error for mean being estimated

Value for selected alpha level (0 .05) =1.25

Estimate of standard deviation = $\frac{5(\text{number of points in the scale})}{6(\text{number of standard deviations})}$ =0. 833

Acceptable margin of error for mean=0.15

Therefore, sample size $n = \frac{(1.25 \times 0.833)^2}{(0.15)^2}$

=48.18

~48

3.5 Data collection

Close and open-ended interview schedules were used to collect both quantitative and qualitative data from 44 respondents. Focus group discussion was conducted to collect in-depth qualitative information in relation to how fishers perceive their world and the subject.

3.5.1 Focus group discussion

One focus group discussion of eleven fishers was conducted to collect qualitative data. The objective was to get an understanding of the participants' perspective on different factors influencing fishers' perception on occupational hazards. According to Wong (2008), a focus group creates an accepting environment that puts participants at ease allowing them to thoughtfully answer questions in their own words and add meaning to their answers. The participants were asked questions on the occupational hazards they know, and the role culture plays in the way they perceive hazards associated with fishing. They were asked about legislature on safety for fishers, how they relate with the fisheries management and if they believe that the government supported them as fishers.



Fig 5: Picture of the yard where the Focus group discussion was held

Source: Field survey 2016

3.5.2 Interview schedule

The interview schedule was constructed to ensure that the research objectives were attained. Data on demographic and socio-economic as well as information about their knowledge of occupational hazards were collected. Closed-ended questions and those placed on a 5-point Likert scale was used to gather information on different factors contributing to fishers' perceptions of the occupational hazards associated with fishing.

3.6 Instrumentation

The interview schedule covered the different areas that are guided by the need to integrate the technical, economic, cultural and social aspects of risk perception in order to analyse risk and guide policies well as per the social amplification theoretical framework (Kasperson et al., 1988).

3.6.1 Measurement of variables

- *Demographic and socio-economic information:* Demographic and socio-economic variables such as sex, age, level of education, income, access to information, marital status, ethnicity, etc. were measured. Age was measured by the number of years an individual has lived; income measured by the amount of money (in Pula), which an individual receives every month; level of education measured by the number of years an individual fisher has had formal education.
- *Occupational hazards exposure:* Statements or items on exposure to occupational hazards included: Length of fishing experience, access to safety training, personal exposure to accident or injury making medical care attention necessary and knowledge of someone else who was exposed to accidents during fishing. Fishing experience was measured by the number years in which an individual has been a fisher; access to safety training by whether they have been trained and how easy it is for them to get the training if they need it.
- *The government support factors:* Government support factors were measured by asking questions that included the importance of association membership, trust issues with authorities, whether government assisted individual or collective fishers with funds, the need for safety legislation etc. These were placed on a 5-point Likert scale ranging from 1-5, with 1 being strongly disagree and 5 being strongly agree.
- *Cultural factors:* Statements or items on cultural issues (e.g. how much fishers identify with fishing as a part of their culture, whether or not culture teaches certain management practices in relation to ensuring the sustainability of fishing resources in the river) were placed on a 5-point Likert scale ranging from 1-5, with 1 being strongly disagree and 5 being strongly agree.
- *Fatalism:* Some of the statements or items to establish if the respondents had fatalistic tendencies included the following: No amount of safety information can keep you safe; Regardless of human effort and intervention, what will be will still be; Fishing accidents and fatalities are an act of God or the gods. The statements were placed on a 5-point Likert scale ranging from 1-5, with 1 being strongly agree and 5 being strongly disagree.
- *Risk Acceptance:* Fishers were asked questions on risk acceptance to establish how they had accepted the occupational risks involved in the fishing industry. Some of the statements included the following: 'I have to learn to live with the risks associated with fishing'; 'I have to be able to take care of myself'; 'I should be able to challenge the forces of nature'; 'I

cannot abandon fishing for the sake of safety'. The statements were placed on a 5-point Likert scale ranging from 1-5, with 1 being strongly disagree and 5 being strongly agree.

- *Perception of fishers towards occupational hazards associated with fishing:* Some of the statements or questions on how fishers perceive fishing and the occupational hazards included the following: 'I think fishing is a dangerous activity'; 'I think fishing is just like any other occupation in terms of its level of risk'; 'There is no weather condition that would stop me from fishing', 'I know how to discern when not to fish in relation to adverse weather conditions and adhere to weather signs when embarking on fishing expedition'. These were placed on a 5-point Likert scale ranging from 1-5, with 1 being strongly disagree and 5 being strongly agree.

3.7 Data analysis

Descriptive statistics such as frequencies, percentages, measures of central tendency (such as mean, standard deviation, etc.), charts, etc. were used to summarize the data obtained from respondents. Statistical Package for Social Science (SPSS) version 20 was used to carry out the analysis. Analysis of the associations between socio-economic, demographic and psychosocial attributes of fishers and their perceptions of occupational hazards was determined using Chi Square test at five percent significance level. Correlation between independent variables and perception of fishers was tested using Pearson correlation. Thematic analysis was used in summarising the results of the focus group discussions (FGDs).

3.8 Ethical consideration

The respondents were firstly informed that their participation was on voluntary basis and were assured of the confidentiality of the information they provided and that their anonymity would be protected. Prior to administering the interview schedules the respondents were informed about the purposes of the study and how it would benefit their community and other stakeholders. They were made aware that the findings might be published in relevant scientific outlets in which the respondents' identities would be excluded. The researcher also promised to respect the values of the communities involved.

CHAPTER FOUR

DISCUSSION AND ANALYSIS

4.1 Introduction

This chapter present data analysis and discussions. The aim of the study was to analyse factors influencing fisher's perceptions of occupational hazards in the Okavango Delta, Botswana. The following hypotheses are formulated in the null form:

- i. There is no association between fishers' socio-economic characteristics and their perceptions of fishing occupational hazards;
- ii. There is no association between fishers' psychosocial factors and their perceptions of fishing occupational hazards
- iii. There is no association between fishers' culture and their perception of fishing occupational hazards.
- iv. There is no association between institutional factors and fishers' perception of occupational hazards associated with fishing.

The chapter starts by outlining the demographic and socio-economic attributes of the fishers and summarising the results through descriptive analysis. A summary of the results is given at the end of the chapter.

4.2 Demographic and socio-economic information

4.2.1 Demographic information

The study seeks to determine the influence of fishers' demographic characteristics on their perceptions of occupational hazards associated with fishing in the study area. Different characteristics including sex, age and age group, level of education, ethnicity, marital status, monthly income, other income generating activities and fishing experience in years were looked in to.

Data in Table 4.1 show that the majority of fishers were males (84.1%) while the rest (15.9%) were females. Besides the physical strength required at the fish harvesting point, social roles in small-scale fishing may be influenced by a number of factors. According to McGoodwin (2001), social norms in a majority of the world's small-scale fishing communities prescribe that the primary producer be men, while women perform other key supplementary roles in the households. Case studies on the socio-economic characteristics and lifestyles of subsistence and informal fishers in South Africa showed that there was a greater overall propensity for men and not women to be fishers (Branch et. al., 2002). Ayotunde (2012) also found out that fishing is not exclusively the right of men. The ages of the

respondents ranged from 18 to 79 years and the mean age was 42 years. Most (36.4%) of the fishers were in the age bracket of 31-40 years. Thirty one percent of them were still actively involved in fishing at a relatively old age (i.e. 50+ years), which is typical of many fishing communities (Branch et al., 2002) . Approximately 21% of the fishers fell within the age bracket of 15-30 years while 11.4% were in the bracket of 31-40 years. Although the age distribution varies, it is representative across different ages.

As is typical of most fishing communities, a relatively large proportion (50%) of the fishers had no formal education while 20% attended only primary school and 29.6% had secondary education. This is consistent with Ngwenya and Mosepele's (2008) findings, in which the majority (42.1%) had no formal education while 42% had received some level of primary education. Elsewhere outside Botswana, (like in South Africa and The United States of America), it has also been found that fishers have low levels of education as well (Davis 2012; Branch et. al. 2002). In some instances, almost two-thirds of the fishers who aged 20 and above had either attended primary school or had no schooling at all. It is instructive to note that none of them had any form of tertiary education. According to the BFTU (2007), policy on education in Botswana, it is now well acknowledged that education (knowledge), not per capita, is the most important resource and ingredient for socio-economic development for any country. Education improves a person's capacity to use existing assets and to create new opportunities. From this perspective, fishing households tend to have a weak human capital base which may constrain people's ability to work. The lack of education may also limit the fishers' capacity to innovatively transform the fishing trade and make it more profitable.

In terms of the ethnic group to which participants belonged, the BaMbukushu constituted the majority (77.3%) of respondents. Mosepele and Ngwenya (2010) and Ngwenya & Mosepele (2008) found that the BaMbukushu were the most subsistence and commercial fishers around the Okavango Delta. The BaSarwa are the next at 11.4% and the BaYei constituted only 2.3%, with others including BaKalanga and BaTawana constituting 9.1% of the fishers' population. Mmopelwa et al. (2008) also found the same ethnic distribution among small-scale fishing communities in the Okavango delta when studying the dynamics of fishing as a natural safety net in the Okavango Delta.

Most (68.2%) of the respondents were single and those married constituted 22.7% of the fishers. Only 9.1% were widowed. Forty-eight percent of the respondents were commercial fishers and thirty-two practised subsistence farming. Some 20% of them were occasional fishers who used hook and line and baskets. Mosepele and Ngwenya (2010) categorised fishers according to the main reason for fishing and the intensity of fishing. Based on Mosepele and Ngwenya's (2010) findings, fishers indicated that the extent and intensity of the flood regime regulates their fishing behaviour, having a high likelihood of not fishing during low flood. As this study (methodology) was designed to use the register of licensed fishers and a snowball technique in identifying them, the likelihood of getting

more commercial fishers was always going to be high (because they are the ones registered with the department).

Table 4.1: Distribution of fishers by demographic attributes

Variable	Frequency	Percentage	n=44
Sex			
Male	37	84.1	
Female	07	15.9	
Age group			
15-30	9	20.5	Central Tendencies for age Mean=41.77
31-40	16	36.4	Median=38.5
41-50	5	11.4	Std deviation=14.23
50+	14	31.8	Min=18, Max =79
Level of Education			
No schooling	22	50	
Primary school	09	20.5	
Secondary school	13	29.6	
Tertiary school	00	0	
Ethnic Group			
BaMbukushu	34	77.3	
BaSarwa	05	11.4	
BaYei	01	2.3	
Others	04	9.1	
Marital Status			
Single	30	68.2	
Married	10	22.7	
widowed	04	9.1	
Fishing Group			
Subsistence	13	31.6	
Commercial	20	47.5	
Occasional	11	20.0	

Source: Field Survey 2016

4.2.2 Socio-economic Information

This section analyses the socio-economic status of fishers in the delta. Most (45.5%) fishers get a monthly income of more than P900, 6.8% earned between P700-P899. Nine-percent earned between P500-P699 while 13.6% earned below P499. The not applicable is linked to the occasional fishers who do not sell. The majority (40.9%) of the fishers had more than 20 years of fishing experience and 34.1% of the fishers had 1-5 years of fishing experience. While those who had 6-10 years' experience constituted 13.6%, some 9.1% of them had 16-20 years' experience. The remaining 2.3% accounted for fishers having 11-15 years' experience. In many fishing communities, fishers were found to have a substantial number of years of fishing experiences (Branch et al., 2002; Olatunji & Olah, 2012). Most (52.3%) fishers are involved in arable farming as another strategy of generating income. As noted by Kgathi et al. (2007) although the traditional means of support activities like agriculture still play a substantial livelihood role, their importance has been reduced because of land use change occurring in the delta; a significant portion of land is now being used for other activities such as tourism. The pastoralists have also had their fair deal of the repeated livestock disease outbreak and they don't find the need to continue their pastoralist lifestyle anymore. Forty-three percent of the fishers reported not to be involved in any other activity. Mmopelwa et al. (2008) had noted that a number of economic activities are pursued in the villages along the panhandle include fishing, arable and livestock farming, basket making and collection of veld products. The authors believe that a strategic way of dealing with vulnerability and uncertainties in the environment is for people to diversify their means of livelihoods. Nonetheless, 2.3% of the fishers were involved in hawking and craft production.

While a majority (77%) of the respondents had more than 5 people depending on them for sustenance, 9.1% of them had 4 dependants. Although there was no direct question on the size of the household, this shows that fishing communities have relatively big households as a significant majority had more than 5 people living and feeding with them under the same roof. Mmopelwa et al. (2008) found the average household size of the same area to be about 6 persons. Approximately 71% of the fishers were sole income earners in their households. While 25% of the fishers' population had at least one other person in the family who earned income, only 4.5% of them had more than two family members who earned income.

Table 4.2: Distribution of fishers by their socio-economic attributes

Variable	Frequency	Percentage	n=44
Fishing experience in years			
1-5yrs	15	34.1	
6-10yrs	6	13.6	
11-15yrs	1	2.3	
16-20yrs	4	9.1	
20+	18	40.9	
Monthly income in Pulas			
Below P499	6	13.6	
P500-P699	4	9.1	
P700-P899	3	6.8	
P900+	20	45.5	
N/A	11	25.0	
Other income generating activities			
Farming	23	52.3	
Craft Production	1	2.3	
Hawking	1	2.3	
Nil	19	43.2	
Number of dependents			
Only me	4	9.1	
2 people	1	2.3	
3 people	1	2.3	
4 people	4	9.1	
5 people +	34	77.3	
Number of other working family members			
None	31	70.5	
1 Person	11	25.0	
2 people	2	4.5	

Source: Field study 2016

4.2.3 Access to Information

Table 4.3 shows the distribution of fishers based on their access to different sources of information. Most (70.5%) of the fishers indicated they obtained information from the Department of Wildlife and National Parks (in which the Fisheries sub-division is housed). While 56.8% of them had access to the radio, 6.8% had access to both local newspapers and television. While lack of physical infrastructures and remoteness may have influenced the small percentage of respondents who had access to the TV,

lack of education may have been largely responsible for the low population having access to newspapers. The level of economic development could also mean that the average household is not able to afford television sets, or do not even have houses which are connected to the national grid. Only 2.3% of the fishers had access to cell phone.

Table 4.3: Distribution of fishers based on their access to different information sources

Information medium	Yes (%)	No (%)
Radio	56.8	43.2
Local Newspaper	6.8	93.2
Cell phone	2.3	97.7
Television	6.8	93.2
Dept. of Wildlife & National Parks	70.5	29.5

Source: Field Survey 2016

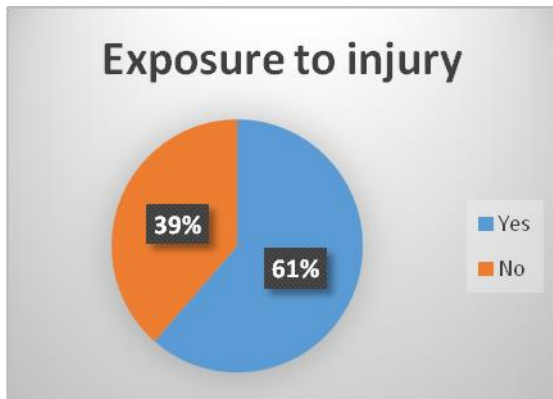
4.3 Knowledge of the occupational hazards and safety

This subsection analyses the extent of fishers' exposure to injuries and their medical seeking behaviour. This highlight how fishers define or perceive injuries related to their occupation and the safety precautions they take to minimise exposure to such injuries.

4.3.1 Injuries experienced by fishers and their medical seeking behaviour

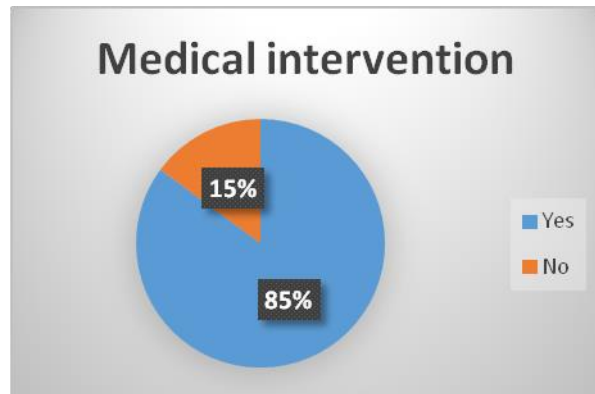
The pie chart in Figure 2 shows that 61.4% of the fishers had at one time or the other experienced injuries associated with fishing activities. While 85.1% of those who recorded injuries while fishing sought medical attention thereafter, 14.9% did not (Figure 3). This finding contradicts those of Marshall et al. (2004) who demonstrated that fishers had a low level of utilization of medical services. The fishers in the Okavango panhandle do seek medical intervention by taking time off work to get care for, and recover from injuries. Amongst those who sought medical attention (61.4%), about 34.1% of them got treated in a health care facility while 20.5% engaged in self-treatment. Others (6.8%) sought treatment from a traditional doctor.

Fig 6: Level of exposure to injuries



Source: Field Survey 2016

Fig 7: Percentage of those seeking medical intervention



Source: Field Survey 2016

4.3.2 Causes of injuries experienced by fishers

Data in Table 4.4 reveal that 36.3% of the fishers indicated that most of the injuries experienced by them were a result of fish bone pricks. According to the fishers, the pricks could be very dangerous as they might cause an infection, which could eventually lead to finger losses. Some 20.5% of the fishers indicated falling into the water which mostly causes blunt traumas to the body as the second largest cause of injuries. An elderly fisher in Mohembo explained that *“The falls are however very dangerous and they can not only result in one drowning but also exposes one to risks of being attacked by animals in the water like hippos and crocodiles”*.

Snake or fish bite (4.3%), was indicated by the fishers as another cause of bodily harm. A woman fisher in Mohembo added to this by saying *“This happens mostly to us basket fishers as we go into the water with our bare feet and have to handle the fish with our bare hands”*.

Table 4. 4: Distribution of fishers according to the causes of injury they experience

Causes of injury	Frequency	Percent (%)
Fall	9**	20.5
Bite(Fish/Snake)	1	2.3
Bone Prick	16**	36.4
Others	2	4.5
N/A	16	36.4
Total	44	100.0

Source: Field Survey 2016

** Multiple Response

4.3.3 Common known injuries and possible hazards

Table 4.5 shows distribution of fishers based on the injuries or hazards commonly known to them.

Most (61.4%) of the fishers affirmed boat capsizing as the commonest accident in their region. The focus group discussion revealed that:

“Boat capsizing can be due to numerous factors that include colliding with animals like hippos, weather changes during fishing, unstable river topography that younger fishers may fail to ‘navigate’ but mostly they are caused by failure to obey cultural taboos”.

Animal attacks /bites were mentioned as the second common injury by 29.5% of the fishers. Different animals are said to use different strategies to attack the fishers. An example, while the hippo is notorious for hiding under the water and capsizing the boat then launching its attack, the crocodile just springs on unsuspecting victims while they are in the boat or in close proximity to water. Some (20.5%) indicated falling into water as a hazard and other (9.1%) getting bitten by a snake or fish. A small (4.5%) each mentioned (fish) bone prick and getting hurt by fishing equipment.

Table 4.5: Distribution of fishers based on the injuries or hazards commonly known to them

Known injury	Yes (%)	No (%)
Falling into water	20.5**	79.5
Getting bitten by snake/fish	9.1	90.9
Being hurt by fishing equipment	4.5	95.5
Boat Capsize	61.4**	38.6
Animal attack and bite	29.5**	70.5
Fishbone prick	4.5	95.5

Source: Field Survey 2016

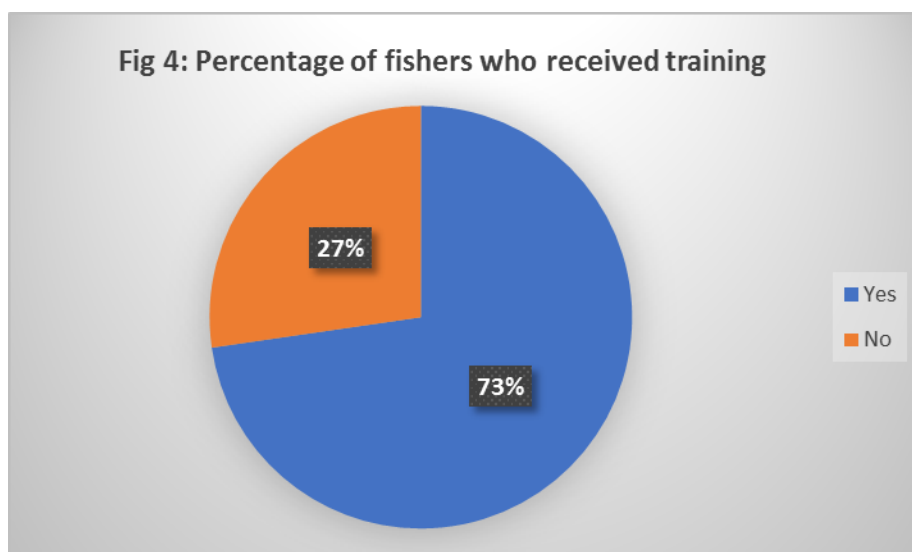
** Multiple responses

The most possible hazards are environmental. Hippos and crocodiles and elephants, though seldom, pose the biggest threat to fishers' lives by attacking them. The hippo is especially said to be very dangerous as it is not often easily seen from afar, and can not only capsize the boat, but also bite the people falling into the water. The wind and the rain are also environmental hazards associated with fishing. This happens especially when the weather changes when the fishing has already begun or when one is in the river. The fishers sometimes get entangled with the fishing nets or the trees in the region. Culturally, failure to obey cultural taboos and witchcraft are believed to be among the major causes of accidents in fishing.

4.3.4 Safety training and providers

The pie chart in figure 4 shows the percentage of fishers who received safety training versus those who did not. It shows that most (72.7%) fishers did receive safety training. Table 4.6 shows the distribution of fishers based on who provided their safety training. Those who did receive the training, most (56.8%) of them were trained by other fishers while a government entity trained 29.5% of them. They were no community-based organisations or private companies that provided any safety training to the fishers.

Fig 8: Percentage of fishers who received safety training



Source: Field Survey 2016

Table 4.6: Distribution of fishers based on who provided their safety training

Safety Training Provider	Yes	No
Government entity	29.5%	70.5%
Other Fishers	56.8%	43.2%
Private Organisation	0	0
Community Based Organisation	0	0

Source: Field Survey 2016

4.3.5 Safety Precautions

Table 4.7 shows the distribution of fishers based on the safety precautions they take. Data shows that a majority (~80%) said they stay safe by obeying cultural taboos. These according to fishers include:

- Burning certain types of trees or hanging them around your neck
- Preparing certain foods outside the yard (like mabele) prior to fishing
- Not eating specific fish species prior to fishing like tiger fish
- You can't dispose of ash from the fire place outside the yard once others have gone fishing

- Those who are left at home are not supposed to engage in any form of disagreement, quarrel or fight.

Some (36.4%) fishers avoid certain spots known to not be safe, others (4.5%) wear safety clothing and only (1.3%) will not get into water from the boat.

Table 4.7: Distribution of fishers based on the safety precautions they take

Safety Precautions	Yes (%)	No (%)
Never get into water	1.3	97.7
Wear safety clothing	4.5	95.5
Avoid certain/dangerous spots	36.4**	63.6
Obey/adhering to cultural taboos	79.5**	20.5

Source: Field Survey 2016

** Multiple Responses

4.4 Government Support

Data in Table 4.8 show the distribution of fishers based on their perceptions on government support for fishing activities. A majority (59%) of the fishers either strongly agreed or agreed that they had trust the fisheries authorities while 31.8% either strongly disagreed or disagreed. While most (61.4%) of the fishers either strongly agreed, or agreed with the statement “Fisheries management is concerned with our health”, 27.3% of them disagreed. About 56.8% of the fishers either strongly disagreed or disagreed that legislature on safety precautions should be available. Only 29.5% of them either agreed or strongly agreed with the statement. While a majority (54.5%) of the fishers either strongly agreed, or agreed with the statement “legislature would be an unnecessary hindrance to their source of livelihood”, only 22.7% disagreed with the statement. Despite believing that legislature would be an unnecessary hindrance to their livelihoods, a significant majority (88.6%) of the fishers agreed that fisheries legislations would be welcome if there is participatory decision making when such legislature is being considered. Public participation is a key ingredient of good governance and many advantages of involving stakeholders in the fisheries management process have been identified by authors (Gelcich et al., 2008; Mackinson et al., 2011; Pita et al., 2010). The advantages include but are not limited to facilitating common understanding; establishing trust; increasing stakeholders’ responsibility and accountability; and enhancing the legitimacy and acceptance of management policies and decisions. Most (59.1%) of the fishers either strongly disagreed or disagreed with the

statement that the government provides financial assistance to individual fishers when there is need. Only 27.3% either agreed or strongly agreed with the statement. Although a majority did not agree that government gives financial support to individual fishers, 50% agreed that government supports the training of fishers. About 34% did not agree with the statement. While a majority (81.8%) of fishers strongly disagreed with the statement that “reasons why the government imposes fishing ban are good enough”, only 15.9% of them agreed with it. About 65.9% of the fishers disagreed with the statement “Fishing ban is necessitated by need to protect environment and fish”. Only 22.7% of the fishers agreed with the statement. This is exemplified by a comment made by one old man during the focus group discussion who noted that:

“For us in Shakawe, fishing is not only about making money, but a livelihood issue where sustainable practice is important for the whole community. Unlike in some areas like Lake Ngami where there have been issues with sanitation, Shakawe fishers have never had such challenges”.

Despite not agreeing with reasons for the ban, most (63.3%) fishers either strongly agreed or agreed that government should regulate fishing season while 27.3% strongly disagreed. Regulation through licensing was supported by a majority (77.4%) of the respondents by either strongly agreeing or agreeing that licensing is a necessary measure for sustainable fishing while 20.5% strongly disagreed. Although they agreed that fishing licensing should be ensured, 61.4% of the fishers strongly disagreed with the statement that “licensing is done effectively, openly and transparently”. Some 4.5% of them disagreed with the statement. Nonetheless, about 18.2% of the fishers either strongly agreed or agreed with the statement.

One of the issues raised during the focus group discussion was that fishers expressed a belief that the current way of issuing licenses was designed to exclude them as it was not only costly but also not done openly. For example, one of the respondents in Samochima said “Fishing licensing was previously P200/3years as against the current cost of P500/year”,

According indicated by one fisher in the same village:

“Department of Wildlife and National Parks used to inform us of the dates in time in the past. But at the moment, there are many instances that we only hear that licenses have been issued when the period has long elapsed”.

Some of the fishers who are part of the Mohembo fisheries also remarked:

“We used to be involved in co-managing the delta resources but it has since changed. There is high level of suspicion that this has everything to do with the tourism resort owners. They are our competitors as they have their ‘prestigious’ clientele who do sport fishing in the same waters as us and we are a sore sight to the tourists”.

The resultant friction means the less economically empowered become disadvantaged as they cannot convince the government to get them involved in the management as before. In many instances,

Fisheries management in different countries have been perceived not to involve fishers in the management of fisheries and accused them of focusing on the fish resource and very seldom considering safety for fishermen. The regulations are perceived to be primarily designed to reduce pressure on fish stocks. This approach may also result in increased pressure on fishermen which can result in higher risk-taking (FAO, 2010; Kaplan and Kite-Powell, 2000).

Table 4.8: Fishers’ perceptions about Government support

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
I trust fisheries management authorities around the delta	13(29.5%)	1(2.3%)	4(9.1%)	1(2.3%)	25(56.8%)	44(100%)
The Fisheries management and government are concerned with my health	12(27.3%)	0	5(11.4%)	5(11.4%)	22(50%)	44(100%)
There is a legislature ensuring that safety precautions are adhered to when fishing	22(50%)	3(6.8%)	6(13.6%)	2(4.5%)	11(25%)	44(100%)
Safety adherence legislature is an unnecessary hindrance to our source of livelihood	9(20.5%)	1(2.3%)	10(22.7%)	3(6.8%)	21(47.7%)	44(100%)
I would welcome any safety-oriented legislature if I participate in the decision-making process when it is being considered	3(6.8%)	0	2(4.5%)	6(13.6%)	33(75%)	44(100%)
The government gives individual fishers financial assistance when there is need	25(56.8%)	1(2.3%)	6(13.6%)	6(13.6%)	6(13.6%)	44(100%)
There is support from the government to train fishers in their work	13(29.5%)	2(4.5%)	7(15.9%)	9(20.5%)	13(29.5%)	44(100%)
The reasons why the government imposes fishing ban are good enough	33(75%)	3(6.8%)	1(2.3%)	2(4.5%)	5(11.4%)	44(100%)
Fishing ban is necessitated by need to protect environment and fish	27(61.4%)	2(4.5%)	5(11.4%)	2(4.5%)	8(18.2%)	44(100%)
Government should regulate when we should do fishing	12(27.3%)	0	4(9.1%)	3(6.8%)	25(56.8%)	44(100%)
Fishing licensing is a necessary measure to ensure sustainable fishing lifestyle	9(20.5%)	0	1(2.3%)	2(4.5%)	32(72.7%)	44(100%)
Fishing licensing is done effectively, openly and transparently	27(61.4%)	2(4.5%)	7(15.9%)	3(6.8%)	5(11.4%)	44(100%)

Source: Field Survey 2016

4.5 Culture

Studied on the influence of culture on perception show that perceptual processes are influenced by culture and therefore human cognition and perception information-processing is not fixed and universal (Kastanakis & Voyer, 2012; Nisbett & Miyamoto, 2005). Participating in cultural practices

therefore shapes cognitive and perceptual processes. Fisher's response to how culture interacts with fishing is shown in Table 4.9. The data shows that a majority (90.9%) of the fishers strongly agreed that fishing is indeed part of their culture and identity, while 2.3% agreed and 2.3% strongly disagreed, respectively. Though fishing is a part of their culture, 45.4% of them either strongly disagreed or disagreed with the statement "I fish just because it is a cultural thing". Some 38.7% either strongly agreed or agreed. Those who did not agree said that fishing was a source of livelihood for them rather than just a cultural practice as they needed to provide food for their families. While most (65.9%) of the fishers either strongly agreed or agreed that if they were to stop fishing it would be shameful, 29.4% either strongly disagreed or disagreed.

A majority (81.8%) of the respondents agreed with the statement "most of my family members are involved in fishing". Only 13.7% of them did not agree. A majority (79.5%) of the fishers also agreed that they were brought up with an expectation to be fishers. Almost all (97.7%) of them strongly agreed that fishing is not a taboo in their community. Most (95.5%) of them strongly agreed with the statement "our culture teaches us when to engage in fishing and when not to". Only 2.3% disagreed with the statement. Most (93.2%) fishers either strongly agreed or agreed that their culture teaches them certain management practices to ensure sustainability of fishing resources. As revealed in the focus group discussion, the different management practices taught encompass both safety issues and environmental management strategies. One elderly fisher in Mohembo gave an example as follows:

"There are times when the floods are too high and it is not advisable to engage in fishing and it is also during those same times that most fish are breeding and should therefore be given the chance to do so such that the young fish can grow into useful sizes. The flooding and breeding times also coincide with ploughing season and this therefore means that there should be no conflicting priorities".

This finding contradicts what some literature says about fishers brought up by fishing families. Coming from a fishing family is considered to make fishermen more likely to underrate the occupational risks associated with fishing, which is thought to be the result of psychological adaptation and desensitization to the daily hazards (Davis, 2012). The fishers in this region believe that safety cultural practices like taboos should be incorporated in the overall fishing management practices designed at national level. The importance of traditional knowledge for the protection of biodiversity and the achievement of sustainable development has been recognized internationally and advocated for by various authors (Gadgil et al, 1993; Mazzocchi, 2006). An example is Article 8 of the Convention on Biological Diversity urges development practitioners to:

"...respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity...."(United Nations, 1992)

Mazzocchi (2006), further explained that traditional knowledge has developed a concept of the environment that emphasizes the symbiotic character of humans and nature. As noted by Kolawole

(2015), knowledges need to complement one another to provide holistic solutions to different development problems because no knowledge can exist on its own.

Table 4.9: Fishers responses to how their culture interacts with fishing

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Fishing is part of my culture and identity	1(2.3%)	0(0%)	2(4.5%)	1(2.3%)	40(90.9%)	44(100%)
I fish just because it is a cultural thing	10(22.7%)	10(22.7%)	7(15.9%)	8(18.2%)	9(20.5%)	44(100%)
If I were to stop fishing, it would be shameful	9(20.5%)	4(9.1%)	2(4.5%)	2(4.5%)	27(61.4%)	44(100%)
Most of my family members are involved in fishing	1(2.3%)	5(11.4%)	2(4.5%)	1(2.3%)	35(79.5%)	44(100%)
My family expects me to be a fisher	4(9.1%)	2(4.5%)	3(6.8%)	3(6.8%)	32(72.7%)	44(100%)
Fishing is not a taboo in my community	0(0%)	0(0%)	1(2.3%)	0(0%)	43(97.7%)	44(100%)
Our culture teaches us when to engage in fishing and when not to	1(2.3%)	0(0%)	1(2.3%)	0(0%)	42(95.5%)	44(100%)
Our culture teaches us certain management practices in relation to ensuring the sustainability of fishing resources in our rivers	0(0%)	0(0%)	3(6.8%)	2(4.5%)	39(88.6%)	44(100%)

Source: Field Survey 2016

4.6 Fatalism

Fatalism as a form of value orientation acquired by certain people who believe that all events are predetermined and therefore unpredictable, has been used in explaining risk perception of certain groups of people and fishers are generally believed to be fatalistic. The fatalist are quite indifferent about risk and would rather be unaware of dangers, since it is assumed to be unavoidable to them anyway (Oltedal et al., 2004). In general fatalists are said to try not to know or worry about things they think they can't do anything about. The aim of this section was to establish if indeed the fishers in the Okavango Delta have fatalistic tendencies or not. Data in Table 4.10 shows fishers' responses on fatalism. The data shows that most (68.2%) of the fishers disagreed with the statement that "[n]o amount of safety information can keep you safe while you are in the river". Only 25% agreed with the statement. Fifty percent of them did not agree agreed that "regardless of human effort and intervention, what will be, will still be". Some 43.1% agreed with the statement. A majority (81.8%) of fishers agreed that "fishing accidents and fatalities are an act of God or the gods". Some 11.4% of them strongly disagreed. Most (52.3%) of them believe that "[t]here is no use trying to change a situation that appears irredeemable". Some 31.8% of them disagreed. While fifty percent of the fishers

disagreed with the statement “nothing can be done about what happens once in the river fishing”, 43.2% of them agreed with the statement. Fishers were almost equally distributed regarding the need to exert energy on what they think they can’t influence as 45.4% agreed and 43.2% disagreed with the statement. Only 11.4% of them were neutral. As 45.4% disagreed with the statement “[i]t is good to remain quiet and accept our fate as it comes”, 34.1% agreed while the remaining 20.5% were neutral. While a majority (63.6%) of the fishers believe that “it does not make a difference whether I am cautious or not, as I cannot protect myself”, only 22.7% of them agreed while 13.6% remained neutral.

Table 4.10: Fishers’ responses on fatalism

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
There is no amount of safety information that can keep you safe once you are in the river	6(13.6%)	5(11.4%)	3(6.8%)	7(15.9%)	23(52.3%)	44(100%)
Regardless of human effort and intervention in preventing fish accidents/fatalities, what will be will still be	13(29.5%)	6(13.6%)	3(6.8%)	3(6.8%)	19(43.2%)	44(100%)
Fishing accidents / fatalities are an act of God or the gods	33(75%)	3(6.8%)	3(6.8%)	0(0 %)	5(11.4%)	44(100%)
There is no use trying to change a situation which appears irredeemable	18(40.9%)	5(11.4%)	7(15.9%)	7(15.9%)	7(15.9%)	44(100%)
We cannot do anything about what happens once in the river fishing	16(36.4%)	3(6.8%)	3(6.8%)	6(13.6%)	16(36.4%)	44(100%)
I do not think I want to exert my energy on what I think I cannot influence	15(34.1%)	5(11.4%)	5(11.4%)	5(11.4%)	14(31.8)	44(100%)
It is good to remain quiet and accept our fate as they come	14(31.8%)	1(2.3%)	9(20.5%)	7(15.9%)	13(29.5)	44(100%)
It does not make a difference whether I am cautious or not, I cannot do anything to protect myself	7(15.9%)	3(6.8%)	6(13.6%)	6(13.6%)	22(50%)	44(100%)

Source: Field Survey 2016

4.7 Risk acceptance

Risk acceptance implies making an informed decision to accept the probability and impact of a particular risk Table 4.11 shows fishers’ response to level of risk acceptance. Almost all (97.7%) the fishers confirmed that they have to learn to live with risks associated with fishing. This was buttressed by all (100%) of them agreeing that they should be able to take care of themselves. On the same note, the majority (95.5%) agreed with the statement “I should be able to challenge forces of nature”, while

a paltry 2.3% both disagreed and were neutral. All the fishers agreed that they cannot be seen to be cowardly and that they should be able to keep up with their peers and prove that they are men/women. A good number (61.3%) of the fishers either strongly agreed or agreed that they should be willing to risk their lives for their families while 35.3% either strongly disagreed or disagreed. Most (59.1%) of the fishers either strongly agreed or agreed with the statement “I cannot abandon fishing for the sake of safety” while 31.4% either strongly disagreed or disagreed. A majority (97.7%) of them strongly agreed that “A fisher has to be strong and brave”. The results show that almost all the fishers did accept the risks associated with fishing activities.

Table 4.11: Fishers’ responses to level of risk acceptance

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
I have to learn to live with the risks associated with fishing	0(0%)	0(0%)	1(2.3%)	1(2.3%)	42(95.5%)	44(100%)
I should be able to take care of myself	0(0%)	0(0%)	0(0%)	3(6.8%)	41(93.2%)	44(100%)
I should be able to challenges forces of nature	1(2.3%)	0(0%)	1(2.3%)	2(4.5%)	40(90.9%)	44(100%)
I cannot afford to be seen to be cowardly	0(0%)	0(0%)	0(0%)	2(4.5%)	42(95.5%)	44(100%)
I should be able to keep up with my peers and prove that I am a man/woman	0(0%)	0(0%)	0(0%)	3(6.8%)	41(93.2%)	44(100%)
I should be willing to risk my life for my family	14(31.8%)	2(4.5%)	1(2.3%)	2(4.5%)	25(56.8%)	44(100%)
I cannot abandon fishing for the sake of safety	12(27.3%)	4(9.1%)	2(4.5%)	1(2.3%)	25(56.8%)	44(100%)
A fisher has to be strong and brave	0(0%)	0(0%)	1(2.3%)	0(0%)	43(97.7%)	44(100%)

Source: Field Survey 2016

4.8 Perception of Occupational Hazards

The aim of this section was to determine how fishers perceive occupational hazards associated with fishing. Table 4.12 shows fishers’ perceptions about occupational hazards associated with fishing. The table shows that most (65.9%) of the fishers strongly agreed that fishing is a dangerous activity while 31.8% either strongly disagreed or disagreed. Despite agreeing with the above statement, most (65.9%) of them strongly agreed with the statement that “...fishing is like any other occupation in terms of its level of risk” while 34.1% of the respondents either strongly disagreed or disagreed with the statement. During the focus group discussion held in Shakawe, it became apparent that fishers

believe that life in general is not safe and many activities put a person's life at risk. One of the fishers commented that *"whether you are fishing, just living or driving a car, you are not safe. Anything could happen to anyone engaged in something else as much as it could happen to a fisher"*.

This finding contradicts some studies like those of Davis (2012) and Branch et al. (2002) that show that fishers do not believe fishing is dangerous and, those from fishing communities tend to see fishing as less risky than most occupations. A majority (88.6%) of the fishers strongly agreed that safety training is important, while only 2.3% agreed and 9.1% strongly disagreed. While most (90.6%) fishers strongly disagreed with the statement "there is no weather condition that would stop me from fishing", only 4.5% of them disagreed. Nonetheless, only 4.5% strongly agreed with it. On the same note, most (84.1%) of them either strongly agreed or agreed that they would not fish if there is equipment failure. Only 13.6% either strongly disagreed or agreed with the statement. The fishers during the focus group discussion, Shakawe, indicated that *"we believe that it is a delicate balance act though. When it's your livelihood and your family depends on you for food, a lot of times you take chances"*.

As noted by McDonald and Kucera (2007), fishermen make decisions concerning staying safe by balancing weather conditions, value of the catch, and concerns about risk. A majority (93.2%) of the fishers either strongly agreed or agreed that they know how to take precautionary measures against any fishing hazard without depending on anybody or government official's guidance on how to protect themselves. Almost all (97.7%) of the fishers either strongly agreed or agreed that when embarking on fishing expeditions, they know how to discern when to fish in relation to adverse weather conditions while only 2.3% disagreed. A majority (95.5%) of the fishers either strongly agreed or agreed that they know they have to promptly deal with consequences of fishing hazards whenever they occur because otherwise their family's livelihood would be jeopardized.

Table 4.12: Perceptions of fishers about occupational hazards associated with fishing

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
I think Fishing is a dangerous activity	13(29.5%)	1(2.3%)	1(2.3%)	0(0%)	29(65.9%)	44(100%)
I think Fishing is like any other occupation in terms of its level of risk	14(31.8%)	1(2.3%)	0(0%)	0(0%)	29(65.9%)	44(100%)
I think safety training is important in fishing	4(9.1%)	0(0%)	0(0%)	1(2.3%)	39(88.6%)	44(100%)
There is no weather condition that would stop me from fishing	40(90.9%)	2(4.5%)	0(0%)	0(0%)	0(0%)	44(100%)
I would not fish if there is equipment failure	5(11.4%)	1(2.3%)	1(2.3%)	1(2.3%)	36(81.8%)	44(100%)
I know how to take precautionary measures against any fishing hazards without depending on anybody or government official's guidance on how to protect myself	0(0%)	1(2.3%)	2(4.5%)	4(9.1%)	37(84.1%)	44(100%)
I know how to discern when to fish in relation to adverse weather conditions and adhere to such weathers signs when embarking on fishing expeditions	1(2.3%)	0(0%)	0(0%)	1(2.3%)	42(95.5%)	44(100%)
I know I have to promptly deal with consequences of fishing hazards whenever it occurs. Otherwise my family's livelihood would be jeopardized	1(2.3%)	0(0%)	1(2.3%)	2(4.5%)	40(90.9%)	44(100%)

Source: Field Survey 2016

4.9 Pearson's correlation of independent variables and fishers' perception

Table 4.13 shows Pearson correlation matrix showing the relationships between independent variables and fishers' perceptions. The data shows that there is a negative correlation between government support and age of fishers ($r=-0.365$ at $P\leq 0.05$ level). This means that the older the fishers get, the less they trust the government or believe the government is helpful. This could be because the older ones have been working with the government for a while and trust might have been eroded during the different interactions with the authorities. The data also show a negative relationship between fatalism and age ($r=-0.319$ at $P\leq 0.05$). This could be explained on the ground that the older the fishers, the less fatalistic they become. This is in contrast with most studies that show that older, less educated people tend to be more fatalistic (Powe, 2001; Powe et al. 2006). A study on perception of cancer fatalism and cancer knowledge that compared older and younger African American women showed that older women at health centres had higher cancer fatalism and lower cancer knowledge compared to the college students (Powe et al., 2006).

At $p \leq 0.01$, the results show a positive correlation between fatalism and risk acceptance ($r=0.435$). This may imply that the more fatalistic a fisher is, the more they are willing to accept risk and the consequences associated with risk. As they become more fatalistic, the more they believe there is not much they can do to change whatever happens to them; they tend to readily accept and are willing to go ahead and risk their health and or lives. Risk acceptance is about being aware of the risk and the impact of that risk if it happens. Hence, the individual is ready to accept the consequences.

Table 4.13: Pearson correlation matrix showing the relationships between independent variables and fishers’ perceptions

Variable	Age (1)	Government support (2)	Cultural Factors (3)	Fatalism (4)	Risk Acceptance (5)	Perceptions (6)
1. Age	1.00	-0.365*	0.220	-0.319*	-0.060	0.202
2. Government Support	-0.365*	1.00	0.012	0.132	0.207	-0.047
3. Cultural Factors	0.220	0.012	1.00	-0.131	0.046	-0.243
4. Fatalism	-0.319*	0.132	-0.131	1.00	0.435**	-0.054
5. Risk Acceptance	-0.060	0.207	0.046	0.435**	1.00	-0.104
6. Perceptions	0.202	-0.047	-0.243	-0.054	0.104	1.00

Source: Field Survey 2016

* Correlation (r) is significant at the 0.05 level (i.e. 95% confidence level)

** Correlation (r) is significant at the 0.01 level (i.e. 99% confidence level)

4.10 Associations between selected explanatory variables and fishers’ perceptions

Table 4.14 provides the Chi square analysis showing the associations between socio-economic, demographic and psychosocial attributes of fishers and their perceptions of occupational hazards.

1. Marital status: Data in Table 4.14 show that marital status ($\chi^2 = 25.27$; $p \leq 0.01$) has a strong association with fishers’ perceptions. Marital status has been associated with perception of risk in varying fields of study. A study on awareness of occupational hazards and associated factors among welders in Addis Ababa, Ethiopia, showed that higher odds of hazard awareness were observed among married and single workers compared to those who were divorced (Tadesse et al., 2016). Other studies have linked marital status not to perception but the risk itself. For example, Whitlock et al., (2004)) in their studies concluded that after taking age, sex, and other variables into account, never married people had a substantially higher risk of driver injury than married people. Fishers who are married may perceive risk differently as they stand to lose more by risking their lives when conditions do not allow for fishing. However, single fishers might be a bit more daring and willing to take risks.

2. *Fishing experience in years:* Data in Table 4.14 show that years of fishing experience ($\chi^2 = 24.41$; $p \leq 0.01$) has a strong association with fishers' perceptions. The length of experience in any occupation has also been associated with perception, awareness and knowledge of hazards involved. One of the possible explanations offered is that the workers who have longer experience may probably have good knowledge and skills on tools in use and become familiar to the work environment. The same study by Tadesse et al. (2016) noted that the odds of hazard awareness among employees who had longer work experience were nearly six times higher compared to those who served for less than five years. The other reason for the association between years of experience and perceptions is that those with longer working experience might be exposed to different safety training sessions that may probably have improved their awareness. Although length of experience is perceived to increase the odds of hazards awareness, a study by Horswill et al. (2013) revealed that even highly experienced (10 years+) drivers' perception of risk is suboptimal compared to expert police drivers and that they benefited from a brief hazard perception training. The reasons adduced for the suboptimal perception of risk are that there is lack of or non-existent performance feedback and there may be the absence of self-insight leading to lack of motivation to improve their hazard perception skills. In the case of fishers, training is also offered by older fishers on cultural principles and taboos that must be adhered to. If perception of risk is to be optimised, then training should not be taught as a one off training but rather on a continuous basis. The important factor to note is that the fishers need to be convinced that the training would be beneficial and hence be willing to participate in it.

3. *Monthly income:* Data in Table 4.14 show that monthly income earned by the fishers ($\chi^2 = 22.14$; $p \leq 0.01$) has a strong association with fishers' perceptions. Fishers who get more money from fishing might perceive risk as worthwhile and therefore be more comfortable in risky situations compared to those who would not get much.

4. *Number of dependents:* Data in Table 4.14 show that number of dependants ($\chi^2 = 91.23$; $p \leq 0.01$) has a very strong association with fishers' perceptions. The strong association between fishers' perceptions and number of dependents could be two-fold. A fisher could be risk averse because they have a higher number of dependents and is therefore not willing to risk too much lest their family losses them. Some fishers may, however, be willing to accept risk because if they do not risk their lives, their dependents might starve.

5. *Access to fishing information:* Data in Table 4.14 also show that access to information ($\chi^2 = 51.10$; $p \leq 0.01$) has a strong association with fishers' perceptions. Fishers who are able to access fishing information from many sources are likely to be more knowledgeable than those who do not. Ordinarily, they better able to access important information concerning their occupational hazards and safety. The more varied the sources, the better it is for an individual to make informed decisions concerning occupational safety.

6. *Risk Acceptance*: Chi square results in Table 4.14 indicate that risk acceptance ($\chi^2 = 65.47$; $p \leq 0.01$) has a strong association with fishers' perceptions. People who have already accepted the risks involved in the fishing industry would perceive hazards in a different way from those who are risk averse. Risk may be seen as a normal part of fishing and hence cannot be avoided.

Table 4.14: Chi square analysis showing the association between socio-economic, demographic and psychosocial attributes of fishers and their perceptions of occupational hazards

Variable	χ^2 -Value
Marital Status	25.27**
Fishing experience in years	24.41**
Monthly income	22.14**
Number of dependants	91.23**
Access to fishing information	51.10**
Risk Acceptance	65.47**

χ^2 significant at $P \leq 0.01$

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusion

The study describes the factors influencing fishers' perceptions about occupational hazards in the Okavango Delta, Botswana.

Most of the fishers were male. Having evenly distributed ages, most of the fishers are single and more than half of them had not gone to school at all. The fishers are mostly of the BaMbukushu ethnic extraction and had more than twenty years of fishing experience. Most fishers have large families of more than five people and also engaged in farming. They mainly obtained fishing information from the Ministry of Wildlife and National Parks. Most (61/4%) of them had at one point or the other experienced injuries, most of which are fish bone pricks (81.5%) and they sought medical attention thereafter. The data for most common occupational hazards suggest that fishers do not consider water borne diseases like malaria to be an occupational hazard. Fishers spend a lot of time in the river, exposed to the malaria vector, mosquito. They do not use treated nets when camping out during the fishing trips despite being exposed for long durations on those trips. This makes them more susceptible to mosquito bites than an average person who does not spend as much time in the river. The reasons why they would not consider malaria as being one of the major occupational risks, vary from failure to connect the disease with time spent exposed to the malaria vector, to trivialising it as it is a common or known disease in the region. Such an attitude may present familiarity as a contributor to the disregard for major occupational hazards.

Although they do not believe fishing licensing is transparently, openly and effectively issued, most fishers do trust the Department of wildlife and National Parks and they believe licensing is important to regulate fishing activities. They believe that safety adherence regulation would be an unnecessary hindrance to their source of livelihood. Fishing is a part of their culture and most of their family members are fishers. They however do not just fish because it is cultural but because it is also a source of their livelihood. Their culture teaches them sustainable management practices and they believe their cultural taboos should be included in the national safety regulations. The study also revealed that fishers in the Okavango pan handle have accepted the risks involved in their occupation. The fishers believe that they have to learn to live with the risks involved in fishing and would not abandon fishing for the sake of safety. They are also of the opinion that a fisher has to be strong and brave and hence be willing to risk their lives for their families. They believe fishing is dangerous but could be as dangerous as any occupation. Fishers, therefore, opine that there is need for safety training in the fishing occupation, whether from other fishers or the government. They however indicate that

they not only know how to take precautionary measures against hazards but also how to promptly deal with consequences of such hazards lest their families lose their source of livelihood.

Pearson product-moment correlation analyses conducted show negative correlations, between fishers' age and government support; and fatalism. It is then deduced that the older they become, the less trust they have in the government, and the less fatalistic they become. A positive correlation exists between fatalism and risk acceptance, meaning that the more fatalistic they are, the more they are willing to accept risks associated with fishing. Chi Square analysis revealed strong associations between fishers' perceptions and marital status; fishing experience in years; monthly income; number of dependents; access to fishing information; and risk acceptance. Some studies have been conducted to either establish or explain associations between some variables and risk perception. These include marital status and relevant working experiences. As with other occupations, married fishers may perceive risk differently from those who are never married as they have a family, which is dependent on them for sustenance. Fishers who have many dependents may either accept risks involved in fishing or be risk-averse. Those who have various access to fishing information may also be able to make important safety decisions based on their sources.

5.2 Recommendations

The effectiveness of occupational hazards prevention strategies and programs depends on the successful transfer of knowledge to the intended recipients in the face of the behavioural balance between concern for safety and resignation to accepting hazards and risks as inherent to their livelihood activities. Findings from the workshop on people, society and pacific island fisheries development and management (1991) showed that in many cases, the failure of small-scale fisheries development projects has been attributed to a failure to consider prevailing social circumstances and to implement development activities in a way that reinforces the goals and aspirations of the community that should draw benefit from the project. There is, therefore, need to involve fishers in management of the delta and the resources as it is part of their livelihood. As Kaplan and Kite-Powell (2000) opined, "fishermen need to be given legitimate power in the management process and work with the government in the formulation of the regulations that guide their lives". Relevant authorities, therefore, need to establish guidelines for reducing the likelihood of failure or conflict when developing any health and safety activities by incorporating existing social and traditional value systems into them.

There is also a need to keep adequate and valid statistics on occupational accidents and fatalities and fishers need to be encouraged to report incidents of occupational injuries to the relevant people. This will help in designing educational, safety training programs that are specific to the most prevalent types and causes of injuries. Moreover, it will help to advance the political will to enact the

occupational safety regulations in fisheries while fishers also need to be trained on occupational hazards and safety. Although keeping statistics will not necessarily ensure that political leaders consider safety training to be an issue worthy of their sustained attention, it will help to create awareness in the policy-making circle. Political will is central to the successful implementation and sustainability of any program and statistics is one way of ensuring this. According to Shiffman (2007), policymakers in developing countries are burdened with thousands of issues and have limited resources to deal with them, as well as conflicting political imperatives. This then means that goals targeting improved occupational health and safety must compete for policy attention and resources in these difficult political circumstances.

There is need for further studies with a broader scope and objective. A comparative study with other social-ecological contexts where the culture and the environment are different can bring about important insights necessary for inclusion in the future development of policies on safety regulations for the fishing industry. There is a growing trend towards indigenising development to make it culturally sensitive. This is where the programs are put to work on behalf of indigenous people instead of putting them to work for a model of development that is not only alien to them but that frequently does violence to their culture (Ramos et al., 2009). Area specific research also needs to keep going as population dynamics keep changing over time. Offering flexible services that take into consideration different the dynamics that shape communities is vital for uptake of such services and sustainability of such. It is important to keep an open mind to new and upcoming strategies, technologies while keeping people at the centre of any services.

5.3 Suggestions for further Research

The time allocated for data collection was limited and the sample size was small. The targeted sample size of 48 participants was not possible due to time limitation. During the data collection, the researcher also observed that the study participants were sceptical about the objective of the research; some of them were, therefore, not forthcoming with their responses. This may also have had a negative effect on the statistical outputs of the study. They tended to give answers that they believed were 'right'. They also seemed to doubt if indeed it was purely an academic fulfilment research or research from a government department. Fishers suspicion was heightened because most of them do fishing without a fishing license and were afraid of being found out by the authorities.

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APPENDIX

INTERVIEW GUIDE FOR FOCUS GROUP DISCUSSION



Dear Respondent,

Thank you for agreeing to be a part of this study. My name is Kabo Bolobilwe, a student at Okavango Research Institute, University of Botswana, Maun campus. I am conducting a study on fishers' perceptions on occupational hazards related to their fishing activities in the Okavango Delta.

I would like to explore some of the factors that influence participants' perceptions about occupational hazards associated with fishing.

The information gathered from the survey will be treated with outmost confidentiality. In the results, personal information will no longer be identifiable as only the sum or average will be mentioned. You are encouraged to respond as honestly as possible. While this study may not immediately benefit you in the short-run, it will eventually contribute to government policies on providing safety measures for fishers in the Okavango Delta in the long-run. If you have question about this study, please feel free to ask.

Thank you in advance for your cooperation and understanding.

Ke lebogela gore obo o dumetse go tsaa karolo mo tshekatshekong e. Leina lame ke Kabo Bolobilwe, moithuti ko Okavango Research Institute, University of Botswana, Maun campus. Ke leka go batlisisa gore batshwara ditlhapi ba akanya jang ka pabalesego le itshereletsego ya tiro ya bone ya go tshwara ditlhapi mo Okavango Delta.

Ke eletsa go sekaseka dintlha tse di amang dikakanyo tsa batho mabapi le bodiphatsa jwa go tshwara ditlhapi.

Se re tlaa buang ka sone mo tshekatshekong e, se ya go helela mo go nna le wena hela. Mo maduong, karolo ee buang ka ga gago re tlaabo re sa tlhole re e itse ka gore go tlaabo jaanong go gobokantswe. Re go rotloetsa go araba ka boammaaruri jotlhe jo o bo kgonang. E re ntswa le ha tshekatsheko e eka nna ya seka ya go sologela molemo mo bogauhing, e tlaare mo tsamaong ya nako e thuse ha go dirwa

mela o ya tsa ipabalesago ya batshwara ditlhapi mo Okavango Delta. Ha o na potso ka tshekatsheko e, tswee tswee phuthuloga o botse.

Ke lebogela tirisano mmogo ya gago le kutlwisiso.

INTERVIEW GUIDE FOR FOCUS GROUP DISCUSSION

Questions

1. What are your opinions and perceptions about the occupational hazards related to fishing?
2. How do you value fishing as a community?
3. Does the government support the fishing industry, financially and technically?
4. Do you have any fishing management practices that are peculiar to you?
5. Is the indigenous and local knowledge in fishing fully explored and incorporated in the current system
6. Do you believe that the government is concerned about your safety?
7. Do you have the same view on management with the government?
8. Do you believe there is need for the government to impose a fishing ban?
9. Is there a participatory approach in the management of the fishing industry?
10. What are the barriers encountered in understanding government expectations in you as a fishing community?
11. What do you think can be done to overcome the barriers?
12. What recommendations do you have for future efforts regarding fishers 'safety'?

Thank you so much for your participation, your time and your input.

Le kamoso le kamoso o mongwe.

INTERVIEW SCHEDULE FOR INDIVIDUAL FISHERS IN THE OKAVANGO DELTA



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The information gathered from the survey will be treated with outmost confidentiality. In the results, personal information will no longer be identifiable as only the sum or average will be mentioned. You are encouraged to respond as honestly as possible. While this study may not immediately benefit you in the short-run, it will eventually contribute to government policies on providing safety measures for fishers in the Okavango Delta in the long-run. If you have question about this study, please feel free to ask.

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Ke lebogela tirisano mmogo ya gago le kutlwisiso.

INTERVIEW SCHEDULE FOR INDIVIDUAL FISHERS IN THE OKAVANGO DELTA

Section 1: Demographic and socio-economic information characteristics of fishers

Number	Question	Response Codes	Responds
1	Sex (Cross-check and tick the appropriate option) (Bong)	Male.....01 Female.....02	
2	Age: how old are you?		
3	Age: how old are you in years? [Group] (Dingwaga tsa gago di kae?)	15-30.....01 31-40.....02 41-50.....03 50+.....04	
4	Level of education: How many years did you have in formal education? (O feletse ha kae mo go tseneng sekolo)	No schooling.....01 Primary.....02 Secondary.....03 Tertiary.....04	
5	Ethnicity: To which ethnic group do you belong? (O Motswana wa letso lefe)	Motswana.....01 Mombukushu.....02 Moherero.....03 Moyei.....04 Mosarwa.....05 Other(Specify).....06	
6	Marital status: Are you married? (A o nyetse/nyetswe kana o nnyaa)	Single.....01 Married.....02 Divorced.....03 Widowed.....04	
7	Fishing group (O tshwara ditlhapi go rekisa, go itshetsa kana nako nngwe hela)	Commercial.....01 Seasonal.....02 Occasional.....03	
8	Income: how much do you earn per month? (O amogela bokae mo kgwedding?)	Below 499.....01 Between 500-699.....02 Between 700-899.....03 More than 900.....04 Other (specify).....05	
9	Access to fishing information: Do you have access to the following? (A o na le tse di latelang tsa ditlhaeletsano?)	Radio.....01 Local newspaper.....02 Cellphone.....03 Television.....04	
10	Fishing Experience: How long have you been a fisher? (O na le lobaka lolo kae o tshwara ditlhapi?)	1-5 years.....01 6-10years.....02 11-15 years.....03 16-20 years.....04 20+ years.....05	

11. What other income generating activities do you do besides fishing? Farming (temo thuo).....01
 Craft production (Go loga ka lotlhaka...02
 Tourism related (Tsa bojanala).....03
 Hawking (Go rekisa).....04
 Others(Specify)[Tse dingwe(tlhalosa)]..05

(O dira ditiro dife ko ntle ga go tshwara ditlhapi?)

12. How many people in your family are dependent on you? Only me.....01
 2.....02
 3.....03
 4.....04
 5+.....05

(o tlhokomela batho ba le kae ko lwapeng/)

13. How many other members of your family work besides you? 1.....01
 2.....02
 3.....03
 4+.....04

(Ke ba le kae ba lelwapa la gago ba berekang ntle ga gago?)

Section 2: Knowledge of the occupational hazards and safety

Number	Question	Response codes	Responds
1	Have you ever been injured while fishing? (A o kile wa gobala o tshwara ditlhapi)	Yes.....01 No.....02	
2	If Yes did you seek medical attention? (Ha ele ee, a one wa kopa thuso ya bongaka)	Yes.....01 No.....02	
3	From who? (Mo go mang)	Health Facility.....01 Traditional doctor.....02 Self-treatment.....03 Other(Specify).....04	
4	What was the cause of your injury? (One o gobaditswe ke eng?)	Fall.....01 Hurt by fishing equipment.....02 Got bitten (Fish/Snake etc).....03 Other (Specify).....04	
5	Do you know anyone who has been injured while fishing? (A o itse mongwe yoo kileng a gobala a tshwara ditlhapi)	Yes.....01 No.....02	
6	Which injuries are the most common in fishing? (Ke dikgobalo dife tse di tlwaelesegileng thata mo go tshwareng ditlhapi)	Falls.....01 Getting bitten by fish/snakes.....02 Hurt by fishing equipment.....03 Boat capsize.....04 Other (Specify).....05	
7	Have you received safety training in fishing? (A o kile wa rutiwa ka tsa itshireletso mo tirong ya go tshwara ditlhapi)	Yes.....01 No.....02	
8	If Yes, From who? (Ha o rutilwe, ke mang)	Government entity.....01 Community based Organisation.....02 Other Fishers.....03 Private Organisation.....04 Other (Specify).....05	
9	What safety precautions do you take while or before fishing? (O dira eng go babalesega pele ga o tshwara ditlhapi kana o setse o ditshwara)	Never get in to the water.....01 Wear protective clothing.....02 Never fish alone.....03 Avoid certain/dangerous spots...04 Other (Specify).....05	

10. What are the possible hazards associated with fishing that you know? [categorize them according to socioeconomic, cultural, institutional and environmental]. (Ke ahe mabaka a o itseng aa ka go tsenyang mo diphatseng ha o tshwara ditlhapi?).....

.....

.....

Section 3: Institutional factors influencing fishers' perception

Number	Question	Response codes	Response
1	I trust fisheries management authorities around the delta (Ke tshepha bagogi ba tsa go tshwara ditlhapi)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
2	The fisheries management and government are concerned with my health (Bogogi jwa batshwara ditlhapi le puso ba a kgathala ka botsogo jwame)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
3	There is a legislature ensuring that safety precautions are adhered to when fishing (Go tshwanetse ga nna le molao wa pabalesego ha go tshwara ditlhapi)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
4	Safety adherence legislature is an unnecessary hindrance to our source of livelihood (Molao o ka tloga wa re senyetsa se re itshetsang ka sone)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
5	I would welcome any safety-oriented legislature if I participate in the decisionmaking process when it is being considered (Ke ka lebogela molao wa pabalesego ha ke ka rerisiwa ka patlomaikutlo)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
6	The government gives individuals to fisher's financial assistance when there is need (Goromente o kgona go thusa batshwara ditlhapi baba ikemetseng ka nosi ka madi ha go tlhokahala)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
7	The government gives grouped fishers financial assistance when there is need (Goromente o kgona go thusa batshwara ditlhapi baba ipopileng setlhopha ka madi ha go tlhokahala)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
8	There is support from the government to train fishers in their work (Go na le thotloetso ee tswang mo go goromente go ruta batshwara ditlhapi)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
9	The reasons why the government imposes fishing ban are good enough (Mabaka aa dirang gore goromente a emise go tshwarwa ga ditlhapi aa utlwala)	1 2 3 4 5 Strongly Disagree.....Strongly agree	

10	The fishing ban is necessitated by the need to protect the environment and the fish (Go emisiwa ga go tshwara ditlhapi go dirwa ke bothokwa jwa go tlhokomela tikologo le ditlhapi)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
11	Government should regulate when we should do fishing (goromente o tshwanetse go laola gore re tshwara ditlhapi leng)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
12	Fishing licensing is a necessary measure to ensure sustainable fishing lifestyle (Go ha tseletso ya go tshwara ditlhapi go bothokwa gore go tshwara ditlhapi go kgone go tseledisiwa le mo nakong ee tlang)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
13	Fishing licensing is done effectively, transparently and openly (go ha tseletso ya go tshwara ditlhapi go dirwa sentle, go sena sepe sese bothabetsi)	1 2 3 4 5 Strongly Disagree.....Strongly agree	

Section 4: Cultural Factors

Number	Question	Response code	Response
1	Fishing is part of my culture and identity (Go tshwara ditlhapi ke ngwao ya me)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
2	I just fish because it is a cultural thing (Ke tshwara ditlhapi hela ka gore ke ngwao ya rona)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
3	If I were to stop fishing, it would be shameful (Ha kene ke ka emisa go tshwara ditlhapi, ke ka nyatsega),	1 2 3 4 5 Strongly Disagree.....Strongly agree	
4	Most of my family members are involved in fishing (Bontsi jwa lesika lame ba tshwara ditlhapi)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
5	My family expect me to be a fisher (Ba lelwapa lame ke solohela gore ken ne motshwara ditlhapi)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
6.	Fishing is not a taboo in my community (Go tshwara ditlhapi ga se moila mo motseng o ke nnang mo go one)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
7.	Our culture teaches us when to engage in fishing and when not to (Ngwao ya rona e re ruta gore re tshwara ditlhapi leng, re seka ra di tshwara leng)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
8	Our culture teaches us certain management practices in relation to ensuring the sustainability of fishing resources in our rivers (ngwao ya rona e re ruta mekgwa ee haphegileng go tlhomamisa gore go tshwara ditlhapi ha go hetse ditlhapi ebile go babalela tikologo)	1 2 3 4 5 Strongly Disagree.....Strongly agree	

Section 5: Effects of fatalism on perception of occupational hazards

Number	Question	Response code	Response
1	There is no amount of safety information that can keep you safe once you are in the river (Ga gona kitso epe ya tsa ipabalelo ee ka go sireletsang ha o setse o le mo nokeng o tshwara ditlhapi.)	1 2 3 4 5 Strongly agree.....Strongly Disagree	
2	Regardless of human effort and intervention in preventing fishing accidents/fatalities, what will be will still be (Ha gona sepe sese ka dirwang goka kganela dikgobalo tsa tiro ya go tshwara ditlhapi, sese nnang sea nna.)	1 2 3 4 5 Strongly agree.....Strongly Disagree	
3	Fishing accidents/fatalities are an act of the gods or God (Dikgobalo le dintsho tsa go tshwara ditlhapi di bakwa ke Badimo kana Modimo)	1 2 3 4 5 Strongly agree.....Strongly Disagree	
4	There is no use trying to change a situation, which appears irredeemable (Ga gona mosola wa go leka go fetola dilo tse go lebegang re ka seke ra di hetola.)	1 2 3 4 5 Strongly agree.....Strongly Disagree	
5	We cannot do anything about what happens once we are in the river fishing (Ga gona sese ka dirwang ha re setse re tsene mo metsing re tshwara ditlhapi.)	1 2 3 4 5 Strongly agree.....Strongly Disagree	
6	I do not think I want to exert my energy on what I think I cannot influence (Ga ke akanye gore ke ka senya matsapa ame mogo se ke ka se hetoleng.)	1 2 3 4 5 Strongly agree.....Strongly Disagree	
7	It is good to remain quiet and accept our fate as they come (Go molemo go itidimalela, o amogela dilo jaaka di ntse.)	1 2 3 4 5 Strongly agree.....Strongly Disagree	
8	It does not make a difference whether I am cautious or not, I cannot do anything to protect myself. (Ha go dire pharologanyo le ha ke ka nna kelotlhoko jang, ha gona se ke ka se dirang go itlhokomela.)	1 2 3 4 5 Strongly agree.....Strongly Disagree	

Section 6: Effects of risk acceptance on occupational hazards associated with fishing

Number	Question	Response Code	Response
1	I have to learn to live with the risk associated with fishing. (Ke tshwanetse ka ithuta go tshela le bodiphatsa jwa go tshwara ditlhapi).	1 2 3 4 5 Strongly agree.....Strongly Disagree	
2	I should be able to take care of myself (Ke tshwanetse ka kgona go ithokomela)	1 2 3 4 5 Strongly agree.....Strongly Disagree	
3	I should be able to challenge forces of nature (Ke tshwanetse go kgona go emelelana le diemo tsa tlhologo)	1 2 3 4 5 Strongly agree.....Strongly Disagree	
4	I cannot afford to be seen to be cowardly (Ga ke a tshwanela go lebega ke le legatlapa)	1 2 3 4 5 Strongly agree.....Strongly Disagree	
5	I should keep up with my peers and prove that you are a man (ke tshwanetse ka tswana le balekane bame ka supa gore ke monna)	1 2 3 4 5 Strongly agree.....Strongly Disagree	
6	I should be willing to risk your life for my family (Ke tshwanetse ka kgona go tsenya botshelo jwame mo diphatseng go tlhokomela lelwapa lame.)	1 2 3 4 5 Strongly agree.....Strongly Disagree	
7	I cannot abandon fishing for the sake of safety. (Ga ke kake ka tlogela go thwara ditlhapi hela ka mabaka a tshireletsego)	1 2 3 4 5 Strongly agree.....Strongly Disagree	
8	A fisher has to be strong and brave. (Motshwara ditlhapi o tshwanetse go nna le maatla ebile a le pelokgale/a se boi)	1 2 3 4 5 Strongly agree.....Strongly Disagree	

Section 7: Perception of fishers on the occupational hazards associated with fishing

Number	Question	Response codes	Response
1	I think fishing is a dangerous activity (Ke dumela gore go tshwara ditlhapi go borai)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
2	I think fishing is just like any other occupation in terms of its level of risk (Ke dumela gore go tshwara ditlhapi go tswana le ditiro tse dingwe ka borai)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
3	I think safety training is important. (Ke dumela gore go rutiwa ka tsa pabalesego go bothokwa)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
4	There is no weather condition that would stop me from fishing (Ha gona maemo a loapi aa ka nkitsang go tshwara ditlhapi)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
5	I would not fish if there is equipment failure (Ke ka se tshware ditlhapi ha didirisiwa di sa bereke sentle)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
6	Regardless of what precautions I take, what will happen will happen- I have no control over circumstances (Le ha ke kare ke a ipabalela, se se tlaa diregang se tlaa direga- ga kena thata epe.)	1 2 3 4 5 Strongly Disagree.....Strongly agree	

7.	I know how to take precautionary measures against any fishing hazards without depending on anybody or government officials' guidance on how to protect myself (Ke itse go ithokomela kgatthanong le dikgobalo dipe le ha ke sa thusiwe ke ope kana badirela puso.)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
8.	I know how to discern when to not fish in relation to adverse weather conditions and adhere to such weather signs when embarking on fishing expeditions (Ke itse go lemoga seemo sa loapi sese borai go ka tsema mo nokeng le go obamela sone seemo sa loapi ha sesa letle gore ke tshware ditlhapi.)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
9.	Avoiding fishing activities because of possible hazards could be seen as being lazy amongst community members. (Go sa tshware ditlhapi ka mabaka a tsa tshereletsego go ka bonwa ele botshwakga mo motseng wa rona.)	1 2 3 4 5 Strongly Disagree.....Strongly agree	
10.	I know I have to promptly deal with the consequences of fishing hazards whenever it occurs. Otherwise, my family livelihood will be jeopardized. (Ke tshwanetse ka itse go itlamela ha ke nnile le kotsi kana kgobalo ha ke tshwara ditlhapi. Go sa nneng jalo go tshetsa lwapa lame go ka amega.)	1 2 3 4 5 Strongly Disagree.....Strongly agree	

Section 6: Recommendations

Is there anything you would like to add to the study for future consideration regarding fishers 'safety?

We have come to the end of our interview. Thank you so much for your time.

Re tsile ko bokhutlong jwa potsolotso. Ke lebogela nako ya gago, le kamoso.

