

**AN ASSESSMENT OF THE IMPACT OF DECLINING WATER QUALITY ON
TOURISM: A CASE STUDY OF LOSKOP DAM, MPUMALANGA, SOUTH AFRICA**

by

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DISSERTATION

Submitted in fulfilment of the requirements of

Master of Science

in

Geography

in the

FACULTY OF SCIENCE AND AGRICULTURE

(School of Agricultural and Environmental Sciences)

at the

UNIVERSITY OF LIMPOPO

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2022

DECLARATION

I declare that the an assessment of the impact of declining water quality on tourism: a case study of loskop dam, mpumalanga, south africa thesis/dissertation heareby submitted to the University of Limpopo, for the degree Master of Science in Geography has not previously been submitted by me for a degree at this or any other university; that this is my work in design and in execution, and that all material herein has been duly acknowledged.

Makwela, TR

Date

DEDICATION

This research is dedicated to my parents, PT Makwela and MM Makwela, and to my brothers DC Makwela, NW Makwela, and MP Makwela.

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude and appreciation to the following individuals and organizations:

- i. My Family
- ii. My supervisor Prof M.R. Ramudzuli (Department of Geography and Environmental Studies, University of Limpopo)
- iii. Ms Fonda Lewis (Institute of Natural Resources)
- iv. Ms Michelle Browne (Institute of Natural Resources)
- v. Prof Wilmien Luus-Powell (Department of Biodiversity, University of Limpopo)
- vi. Nomvula Shakwane (Department of Biodiversity, University of Limpopo)
- vii. Nosipho Makaya (Institute of Natural Resources)
- viii. Mangana Rampheri (Department of Geography and Environmental Studies, University of Limpopo)
- ix. Makgabo Mashala (Department of Geography and Environmental Studies)
- x. INR - Institute of Natural Resource
- xi. NRF - National Research Fund
- xii. RVSC - Risk & Vulnerability Science Center

ABSTRACT

Various studies have indicated problems of water pollution in South Africa, with some of them highlighting the high concentrations of chemical pollutants in the Loskop Dam. These reports show how pollution in the dam has affected aquatic life and poses a health risk. However, limited studies have been conducted on the impact of declining water quality on tourism in Loskop Dam. These studies focus more on the ecological aspect of the dam. Therefore, the main objective of the current study is to explore how tourism is affected by the declining water quality in Loskop Dam by examining the impacts of water pollution on the tourism sector linked to Loskop Dam and associated socio-economic effects. A questionnaire-based survey was conducted to collect information from small and medium-scale enterprises (SMEs) employees and freshwater tourists, and interviews were conducted with SME managers to get more information on tourism activities, water pollution in Loskop Dam, as well as information on the impacts of decreased water quality. The outcome is that a decrease in water quality affects tourism negatively, inclusive of recreational activities, business operations, and subsequently having a negative social and economic impact on Loskop visitors and employees.

Keywords: Pollutants, Water quality, Tourism, Pollution, Loskop Dam

TABLE OF CONTENTS	PAGES
DECLARATION	i
DEDICATION	ii
ACKNOWLEDGEMENT	iii
ABSTRACT	iv
LIST OF FIGURES	viii
LIST OF TABLES	ix
ACRONYMS	x

CHAPTER ONE: STUDY BACKGROUND

1.1. Introduction	1
1.2. Conceptual framework	1
1.3. The rationale of the study	2
1.4. Problem statement	3
1.5. Research question	4
1.6. Aim and objectives	4
1.6.1. Aim	4
1.6.2. Objectives	4
1.7. Hypothesis	4
1.8. Significance of the study	4
1.9. Definition of terms	5
1.10. Conclusion	6

CHAPTER TWO: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1. Introduction	7
2.2. A general overview of tourism	7
2.3. The importance of tourism	9
2.4. The relationship between tourism activities and freshwater resources	15
2.5. South African tourism situation	16
2.6. The impact of tourism activities on the environment	18
2.7. The impact of water pollution on tourism	24
2.8. Waterborne sports and their benefits	26
2.9. Conclusion	28

CHAPTER THREE: RESEARCH METHODOLOGY AND DESIGN

3.1. Introduction	29
3.2. Description of the study area	30
3.3. Research design process	31
3.4. Sampling frame	32
3.5. Sampling procedure	32
3.6. Data collection methods	34
3.6.1. Interview	34
3.6.2. Questionnaire	36
3.6.3. Observation	37
3.6.4. Internet search	38
3.7. Data analysis and presentation	38
3.8. Ethical considerations	39
3.8.1. Permission	39
3.8.2. Confidentiality	39
3.8.3. Consent	40
3.8.4. Data anonymity	40
3.9. Conclusion	40

CHAPTER FOUR: PRESENTATION OF RESEARCH FINDINGS AND DISCUSSION OF RESULTS

4.1. Introduction	41
4.2. Demographic characteristics	41
4.2.1. Gender of respondents	41
4.2.2. Age group of respondents	42
4.2.3. Education level (SMEs employees)	43
4.2.4. Occupation of respondents (tourists)	44
4.2.5. Annual household gross income per annum (tourists)	44
4.2.6. Number of household earners (SMEs employees)	45
4.3. Types of tourism activities that are affected by a decline in water quality	46
4.4. Cause and effect relationship by identifying how tourism and tourism activities are affected by declining water quality in the Loskop Dam	47

4.4.1. SMEs managers' perception on the effect of declining water quality on tourism activities	49
4.4.2. Tourists' (recreational fishers) perception of the effect of declining water quality on tourism activities	51
4.4.3. SMEs employees' (community residents) perception on the effect of declining water quality on tourism activities	54
4.4.4. The frequency of trips made to loskop dam by tourits	56
4.4.5. The association between the impact of poor water quality and tourism using the chi-squared test	59
4.5. Considerations on the mitigation and avoidance measures of the negative impacts of poor water quality, and ways to promote sustainable tourism	62
4.6. Conclusion	70

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

5.1. Introduction	71
5.2. Summary of the study	71
5.3. Summary of findings	72
5.4. Recommendations for further studies	74
5.5. Limitations	75
5.6. Conclusion	75

REFERENCES	77
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APPENDICES	93
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Appendix A: Interview guide for business owners / enterprise managers	93
Appendix B: Questionnaire for freshwater tourists	97
Appendix C: Questionnaire for employees	102
Appendix D: Observation checklist	107
Appendix E: Consent form for participants	108
Appendix F: Information sheet	109

LIST OF FIGURES

Figure 3.1: Loskop Dam (25° 26' 57. 05" S 29° 19' 44. 36)	30
Figure 4.1: Gender of freshwater tourists (left) and SME employees (right)	42
Figure 4.2: Age groups of freshwater tourists (left) and SMEs employees (right)	43
Figure 4.3: Education level of SMEs employees	44
Figure 4.4: Occupation of freshwater tourists	44
Figure 4.5: Tourists' annual household gross income per annum	45
Figure 4.6: A decline in water quality will affect tourists' willingness to fish at Loskop Dam or not	54
Figure 4.7: A diagram showing a cause-and-effect relationship between declined water quality and tourism (A)	48
Figure 4.8: SMEs managers who think that water quality in Loskop Dam has changed	49
Figure 4.9: Proportion of managers who believe that tourism and linked business are affected by a change in water quality	50
Figure 4.10: Significance of changed water quality's impact on businesses	50
Figure 4.11: A diagram showing a cause-and-effect relationship between declined water quality and tourism (B)	50
Figure 4.12: Freshwater tourists' view on whether water quality in Loskop Dam has changed or not	51
Figure 4.13: The proportion of tourists who believe that the change in water quality was positive or negative	51
Figure 4.14: Proportion of tourists who feel that a change in water quality in Loskop Dam influences their fishing activities or not	52

Figure 4.15: A diagram showing a cause-and-effect relationship between declined water quality and tourism (C)	54
Figure 4.16: SMEs employees who think that water quality in Loskop Dam has changed	54
Figure 4.17: Employees' view on whether the change in water quality was positive or negative	55
Figure 4.18: Significance of the impact of change in water quality on SMEs employees and their communities	55
Figure 19: Respondents' years of recreational fishing	57
Figure 20: Number of trips respondents make in a year to do recreational fishing	57
Figure 21: Average number of fishing competition respondents enter per year	58
Figure 22: Days respondents spend away from home on a single fishing trip at Loskop Dam	58
Figure 23: The number of days respondents spend on a fishing trip per year	59
Figure 4.24: A board showing fish quantity restrictions at Loskop Dam (Photograph credit: T.R. Makwela, 2018)	69
Figure 4.25: A conceptual model of mitigation and avoidance measures of the negative impacts of poor water quality	70

LIST OF TABLES

Table 3.1: The population and sample sizes of the study participants	34
Table 4.1: The average age group of freshwater tourists	42
Table 4.2: Average age group of SMEs employees	43
Table 4.3: Tourists' average annual household gross income	45
Table 4.4: Contingency table of the observed values	60

Table 4.5: A contingency table showing both the observed and expected values 61

Table 4.6: The determination of the χ^2 62

Table 4.7: Mitigation and avoidance measures to reduce and manage the negative impacts of water pollution 68

ACRONYMS

AMD - Acid Mine Drainage

BCA - Biological Control Agents

DOT – Department of Tourism

DWA - Department of Water Affairs

DWAF - Department of Water Affairs and Forestry

DWS - Department of Water and Sanitation

FAO - Food and Agriculture Organization

GCIS - Government Communication and Information System

KNP - Kruger National Park

MSW - Municipal Solid Waste

NTU - Nephelometric Turbidity Unit

OECD - Organization for Economic Co-operation and Development

SAT - South African Tourism

SMEs - Small and Medium-Scale Enterprises

SPSS - Statistical Package of Social Sciences

TWQR - Target Water Quality Range

UNEP - United Nations Environmental Programme

UNESCO - United Nations Education, Scientific and Cultural Organization

USA – United States of America

USEPA - United States Environmental Protection Agency

WET - Watersports Enhanced Together

WHO - World Health Organization

WWTPs - Waste Water Treatment Plants

WWTWs - Waste Water Treatment Works

CHAPTER ONE

STUDY BACKGROUND

1.1. INTRODUCTION

This chapter explains the background of the study, the problem statement, the rationale of the study, the aims and objectives of the study, the hypothesis, the area of study, significance of the study, the limitation encountered while conducting this research, finally, the chapter closes off by defining the terms that were used in this study.

1.2. CONCEPTUAL FRAMEWORK

Water pollution in South African water bodies is a serious concern since South Africa is a nation experiencing water shortages (Donnenfeld *et al.*, 2018). Pollution is caused by different factors in different areas (Musingafi & Tom, 2014) such as the use of pesticides which is a concern for Greek rivers (Srivastava *et al.*, 2018), wastewater in the El Bey watershed of Tunisia (Samia *et al.*, 2017) sewage and industrial waste in Nigeria, (Owa, 2014), and agriculture and industrial waste in Letaba river (South Africa) (du Preez *et al.*, 2018).

Industrial, mining, agricultural activities, and wastewater treatment facilities are the factors that impact the upper catchment of the Olifants River (Lai, 2013). Withdrawals for domestic or for irrigation purposes affect Loskop Dam's dam water levels. These activities have an impact on water quality and quantity (le Roux *et al.*, 2012) since Loskop Dam is fed by the Olifants River (Seopela *et al.*, 2020), which is considered as one of the most polluted rivers in South Africa (le Roux *et al.*, 2012), rendering Loskop Dam as one of the most polluted dams fed by the Olifants River Lebepe *et al.*, (2020 a). The pollution can be seen through the appearance of algae on the surface of the water due to increased levels of nutrients as well as the death of aquatic species such as fish and crocodiles (Ashton & Dabrowski, 2011). This deems the dam water not safe for use as it poses a health risk for both humans and aquatic species (Dabrowski & de Klerk, 2013). This notion is supported by Lebepe *et al.*, (2020 b).

Since the Loskop Dam is surrounded by a nature reserve and is used as a tourist attraction (Lai, 2013), tourism revenue and the local economy may be affected. This

will affect people's livelihoods, socially and economically, as some businesses will have to be closed as the situation worsens.

Previous studies in Loskop Dam indicated how pollution affects aquatic life and poses a health risk to humans (Dabrowski & de Klerk, 2013; Lebepe *et al.*, (2020 a)), but not much has been said about the socio-economic impacts of pollution. Amongst multiple uses, the dam serves as a tourist attraction. Therefore, the study aims to explore how tourism is affected by water pollution in Loskop Dam, whether the impact is positive or negative, and the strategies that can be adopted to mitigate the negative impacts.

1.3. THE RATIONALE OF THE STUDY

Increased water demand from population and economic growth, environmental needs, and change in rainfall patterns worldwide are some of the factors that create water shortage-related problems (FAO, 2012). The construction of dams has been recognized as one of the solutions for sustainable water supply (Zare & Kalantari, 2018). Dams are constructed to capture and store surface runoff from a river's watershed and release it as needed to control floods, generate electricity, improve navigation, supply freshwater for irrigation, industrial use, and for use in human settlements (Makururu *et al.*, 2018). Dams also provide water for recreational activities such as swimming, boating, and fishing (Makururu *et al.*, 2018).

Whilst dams can be of benefit to human development, they are sometimes characterized by drawbacks such as the impairment of ecosystems when dams fill up, large losses of water through evaporation, risk of dam failure and downstream flooding, the occurrence of water-borne diseases such as malaria and bilharzia, and the accumulation of pollutants (Kuun, 2009). The presence of pollutants in water bodies makes the water unfit to for fishing, drinking, or cooking and may affect human health (Kuun, 2009) and disturb water-related activities such as fishing, boating, and other waterborne sporting activities (Sharma, 2015).

Loskop Dam is one of the main water bodies along the Olifants River Catchment in South Africa (Botha *et al.*, 2011). The dam was constructed in 1938 (WRC, 2008) for the main purpose of providing water to irrigate cultivated lands downstream (Ledwaba, 2010). This area covers places such as the Olifants, Moses, and Elands river valleys (Ledwaba, 2010). The dam is now a significant component of the tourism industry in

Loskop (Wade, 2009) as it is also used for recreation purposes (Ledwaba, 2010), which contributes greatly to local economic development.

The various academic studies regarding the water quality of the Loskop Dam suggest that there is a good understanding of the ecological impact of the dam. However, few studies have investigated the impact of water pollution on tourism or tourism-related activities. Some of them include a study by Yao *et al.* (2016) on eutrophication of U.S freshwaters and Dodds *et al.* (2009) on the economic estimation of losses caused by surface water pollution accidents in China. Therefore, since the construction of dams also has an impact on tourism activities, it is of importance to pursue an investigation on the impact of poor water quality in the Loskop Dam on tourism and associated socio-economic effects on local communities.

1.4. PROBLEM STATEMENT

Frone & Frone (2013) conducted a study in the Danube river basin, and they found that the tourism industry is greatly affected when ecosystems are impacted by the contamination of water resources caused by wastewater and insufficient wastewater treatment. Another study by Dokulil (2014) found that lake tourism is mostly impacted by water quality influenced by eutrophication. It was found that tourists (swimmers) are affected by algal blooms caused by the accumulation of nutrients in water resources (Dokulil, 2014).

Several studies indicate that high concentrations of chemical pollutants in the Loskop Dam have been observed (Oberholster *et al.*, 2010). The reports show how pollution in the dam has affected aquatic life and poses a health risk (Lebepe *et al.*, 2016). Some of them include, amongst others, the impact of different land-use activities on water quality in the upper Olifants River catchment (Dabrowski & de Klerk, 2013), and chemical characteristics and limnology of Loskop Dam on the Olifants River (Dabrowski *et al.*, 2013).

However, even though there are reports on the declining quality as a result of pollutants in Loskop Dam, no studies have been conducted on the impact of declining water quality on tourism in Loskop Dam, as most studies indicate how pollution in the dam has affected aquatic life and pose a health risk (Lebepe *et al.*, 2016). These studies were focusing more on the ecological aspect of the dam. Therefore, the current

study will help in bridging this gap by exploring how tourism is affected by declining water quality in the Loskop Dam.

1.5. RESEARCH QUESTION

- What are the impacts of declining water quality on tourism in Loskop Dam?

1.6. AIM AND OBJECTIVES

1.6.1. AIM

The study aims to examine the impacts of decreasing water quality on the tourism sector linked to the Loskop Dam and associated socio-economic effects.

1.6.2. OBJECTIVES

The objectives of the study are to:

- i. Identify the types of tourism activities that have been affected by declining water quality
- ii. Establish a geographic element of cause-and-effect relationship by identifying how the tourism activities have been affected by declining water quality in the Loskop Dam
- iii. Develop a suitable model for future considerations on how to mitigate the negative impacts of poor water quality on tourism in Loskop Dam, and promote sustainable tourism at Loskop Dam

1.7. HYPOTHESIS

When the quality of water deteriorates, water-related tourism will be affected.

1.8. SIGNIFICANCE OF THE STUDY

The findings of the study will add to the current knowledge and significant information about the Loskop Dam, and the way it is related to tourism and the surrounding environment. Additionally, the results of this study may lead to the creation of new ideas and innovations relating to managing water quality and dams to maximize tourism opportunities and associated socio-economic development benefits. This will help the tourism sector in Loskop Dam to continue operating and growing, and be of help to the local communities in terms of socio-economic development, through the creation of jobs and income generation.

1.9. DEFINITION OF TERMS

Tourism: Tourism refers to activities that tourists engage in while they are away from their homes (Camilleri, 2018).

Tourists: A tourist is an individual who travels to a place outside their home or work place and stay there for a period of 24 hours or more while pursuing leisure or business (Dilek & Dilek, 2018).

Eutrophication: The excessive occurrence of nutrients in water bodies is referred to as eutrophication (Biswas *et al.*, 2018).

Algal blooms: Algal bloom is the overaccumulation of phytoplankton in water resources (Assmy & Smetacek, 2009).

Pollution: Pollution is the discharge of unpalatable substances into the natural environment that can cause harm to the natural environment or living organisms (Appannagari, 2017).

Pollutants: Pollutants are substances found in waste material that causes damage when introduced into the environment (Appannagari, 2017).

Water quality: Water quality refers to the state of water, looking at whether it is suitable to be used for a certain purpose or not (Bartram & Ballance, 1996).

Recreation: The engagement of an individual in activities outside their work environment, which bring them pleasure or enjoyment, is referred to as recreation (Harshaw & Meitner, 2005).

Local economic development: Local economic development is the improvement of an area's employment, economic, and social status through the progress of and cooperation between locally-owned economic activities (Meyer, 2014).

Sustainable tourism: Sustainable tourism refers to tourism that is mindful not to damage or change the state of the resources used and protects the natural environment to ensure future use (UNESCO, 2009).

Small and medium-scale enterprises: Businesses that hire a small number of employees are known as small and medium scale enterprises (SMEs). Different

countries around the world have varying limits to the number of employees they hire, with 200 employees being the most common (OECD, 2000).

1.10. CONCLUSION

This chapter gave an outline of what the research is about and what it entails to achieve. Also highlighted is the issue that led to the execution of this study, and the importance thereof. Included as well are the factors that are anticipated to be a challenge while carrying out this study. Chapter 2 will provide a detailed background on the link between tourism and water quality by reflecting on literature that is concerning this concept.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1. INTRODUCTION

This chapter is twofold, namely the literature review which locates the topic of the study in the broader scholarly discussion, and the theoretical framework, a section that unpacks the subject of inquiry through the lens of critical realism as a theoretical framework. The aspects that are addressed in the chapter include the general overview of the tourism concept, types of tourism water resources and tourism in South Africa, the relationship between tourism and water resources, the importance of tourism, water-based sports activities and their benefits, the impact of tourism on the environment, and the impact of water pollution on tourism. The discussion about such issues follows below.

2.2. A GENERAL OVERVIEW OF TOURISM

Tourism is known as the movement of people to and from certain areas for different purposes (Camilleri, 2018; Fonseca, 2012; Skripak *et al.*, 2016). Traveling and staying in a foreign country for less or equal to twelve months while pursuing those purposes is part of international tourism (SESRIC, 2018; Wyllie, 2011). Tourists travel and visit places for leisure, business commitments, migration (UNWTO, 2018; Wyllie, 2011), and visiting friends and relatives (Camilleri, 2018). The different types of tourism include relaxing tourism, relaxing and health care tourism, visiting tourism, transit tourism, reduced-distance tourism, and professional tourism (Tureac & Turtureanu, 2010).

People's decision to travel to other places is influenced by an area's capability to attract tourists (Eric *et al.*, 2020), as well as the affordability and accessibility aspects. According to (Jeaheng & Han, 2020), local or street food in Thailand is one aspect that is used to attract tourists from all over the world. This is a country where tourists make food experience a part of the reasons for their visit. This is different from Africa and Austria where nature tourism is an attraction vehicle (World Bank, 2017).

The tourism sector is one of the biggest and most important economic sectors in the world (Bazargani & Kiliç, 2021; SESRIC, 2018; Shukla & Goswami, 2015; Sofronov, 2018; World Bank, 2017)). Tourism is a sector that provides different goods and

services to tourists (SESRIC, 2018). This sector is connected to other sectors which provide transportation, communication, accommodation, food and beverage, recreation, entertainment, financial, marketing (SESRIC, 2018), and the convention and event management services (Skripak *et al.*, 2016).

Fayisa *et al.*, (2018) show that tourism is a rapidly growing industry by indicating that between the years 1950 and 2005, global tourist arrivals have increased from 25 million to 808 million. Between 2011 and 2016, the number of international tourist arrivals increased from 998 million to 1.235 million international tourist arrivals (SESRIC, 2018; UNWTO, 2017). This is equivalent to a world average annual growth rate of 4.4% (SESRIC, 2018; UNWTO, 2017). The number of international tourist arrivals continued to grow and reached 1.322 billion in 2017 (Sofronov, 2018) and 1.4 billion in 2018 (Bazargani & Kiliç, 2021).

The region that received the most tourist arrivals (444 million) in 2005 was Europe whilst Africa received the least arrivals (37 million) (Fayissa *et al.*, 2018). In 2011, the top three regions with the most tourist arrivals in the world were Europe, Asia and the Pacific, and the Americas, respectively (SESRIC, 2018). France, the USA, Spain, China, and Italy were the top five international tourist destinations in 2015, respectively recording 84.5 million, 77.5 million, 68.5 million, 56.9 million, and 50.7 million arrivals (UNWTO, 2017). Other frequently visited countries in the world are UK, Germany, Mexico, Thailand, and Turkey (Sofronov, 2018).

Asia and the Pacific region have many developing countries where there is a continuous growth of new tourism destinations (SESRIC, 2018). However, with 303 million international tourist arrivals in Asia and the Pacific, this region was still the second most visited region in the world in 2016, and Europe still occupying the top spot for the most visited region in the world (UNWTO, 2017). Over 50% of the international tourist arrivals occur in Europe (Bizzarri, 2016).

Host countries generate revenue from earning foreign exchange (Shukla & Goswami, 2015; World Bank, 2017). The revenue generated from international tourism has been increasing together with the number of international tourists (SESRIC, 2018). With an average annual growth rate of 2.6%, international tourism revenue has shown growth from \$1.073 billion in 2011 to \$1.220 billion in 2016 (SESRIC, 2018). The majority of the international tourism receipts (67%) and tourist arrivals (76%) were in Europe and

Asia and the Pacific in 2016 (SESRIC, 2018). In 2017, international tourists spent about \$1.22 trillion on services such as accommodation, food and drink, entertainment, shopping, and others (Sofronov, 2018).

International tourism is usually one of the main economic activities in developing countries (SESRIC, 2018; UNWTO, 2018). Developing countries have focused on tourism development because they earn foreign exchange and get employment opportunities from international tourism (SESRIC, 2018). It is projected that by 2028, 100 million new jobs could be created by the tourism industry (Sofronov, 2018).

The ability of tourists to travel from one place to another through the aid of different transportation modes is one of the reasons the tourism industry exists and is thriving (Camilleri, 2018). Most tourists like to use air transport to travel to tourist destinations (Eric *et al.*, 2020; Sofronov, 2018). That is 54% of tourists (Eric *et al.*, 2020). The use of air transport also helps with the creation of jobs in the aviation industry and contributes to economic growth and good welfare. The number of jobs that are created when tourists travel and spend their money in different countries is 285 million (Eric *et al.*, 2020).

Just like international tourism, domestic tourism is also important, especially when it comes to economic growth (UNWTO, 2018). Traveling within the national borders of the traveller's home country is referred to as domestic tourism (Camilleri, 2018). Domestic tourism is more prominent in developed countries than in developing countries (UNWTO, 2018). Domestic tourism development brings about economic, social, and political benefits. It creates job opportunities and generates revenues (Chavan & Bhola, 2014). The tourism sector promotes sustainable livelihoods, peace, and environmental protection (UNWTO, 2016). Economic growth influenced by the development of the tourism industry improves people's lives (Skripak *et al.*, 2016) and leads to reduced poverty (Sofronov, 2018).

2.3. THE IMPORTANCE OF TOURISM

Tourism is regarded to have socio-economic, political, and cultural importance in tourist destination areas (Donyadideh, 2010). However, economic gain is the most significant value of the tourism industry for many countries in the world (Archer, 1995; Bunghez, 2016; Eruotor, 2014; Proença & Soukiazis, 2008; Rita, 2000; Zaei & Zaei, 2013). The tourism industry contributes to national, regional, or local economies (Zaei

& Zaei, 2013) by creating employment opportunities (Meyer & Meyer, 2015), generating revenue from supplying goods and services to tourists (Donyadideh, 2010; Eruotor, 2014; Lemma, 2014; Moisă, 2015; Naidoo *et al.*, 2016; Proença & Soukiazis, 2008; Rita, 2000; Zaei & Zaei, 2013), providing the opportunity to establish tourism businesses (Meyer & Meyer, 2015), generating revenue from charging tax and levy on goods and services (Lemma, 2014; Zaei & Zaei, 2013), and by attracting investments from both private and public sectors (Lemma, 2014; Moisă, 2015; Zaei & Zaei, 2013).

Donyadideh (2010) reckons that tourism is the biggest industry in the world. For some countries, this sector is bigger than other economic sectors such as agriculture and industries. These are countries where their economy is particularly dependent on the tourism sector for development (Archer, 1995; Bunghez, 2016). In Slovenia, other economic sectors are diminishing, whilst tourism is becoming more prominent (Sirse & Mihalic, 1999). Other countries where tourism plays an important role in the economy are Bermuda (Archer, 1995), Panama (Lemma, 2014), Greece, Italy, Portugal, Spain (Proença & Soukiazis, 2008), and Jordan (Shunnaq, 2010).

The socio-economic benefit of tourism is usually in the form of increased job opportunities in tourism destinations (Bunghez, 2016; Greiner *et al.*, 2004) and a contribution to the Gross Domestic Product (GDP) (Bandoi *et al.*, 2020). This sector contributes the largest percentage of employment in the world (Bandoi *et al.*, 2020; Dinu, 2017; Zaei & Zaei, 2013). These jobs can be both directly or indirectly linked to tourism services or activities. Some of the jobs are offered in hotels, cafes and restaurants, stores, and transportation services (Bunghez, 2016; Greiner *et al.*, 2004).

The tourism industry is labor-intensive (Forsyth, 2006; Meyer & Meyer, 2015; Proença & Soukiazis, 2008; SNV East & Southern Africa 2007), it requires a large amount labor force, hence it employs a large number of people (skilled or unskilled) (Zaei & Zaei, 2013). Over 200 million people around the world have been employed by the industry (Rita, 2000; SNV East & Southern Africa 2007). According to Donyadideh (2020), in 1995, 120 million jobs in the world were linked to the tourism industry. 20 years later, in 2015, 284 million jobs were linked to the tourism sector (Dinu, 2017). That number had more than doubled.

Poor people living in local areas benefit from tourism through the creation of jobs (Meyer & Meyer, 2015). This in turn improves their livelihoods (Bunghez, 2016), and

may lead to poverty alleviation (Meyer & Meyer, 2015; Zaei & Zaei, 2013). More of the benefits that local economies and communities accrue from the tourism sector include economic growth, foreign investment, trade balance, and diversification (Zaei & Zaei, 2013).

Jones & Munday (2004) found that in Wales there is an increase in income generation for skilled or unskilled people through employment created by the tourism sector. In 1999, Wales hosted a world popular event, the Rugby World Cup, and every year tourists visit Wales to attend the Brecon Jazz festival. During this time, tourists spend their money on various goods and services (Jones & Munday, 2004), benefiting the retail sector, accommodation, and restaurants and bars. Wales' economy was positively impacted and the employment and income increased during these events (Jones & Munday, 2004).

In Romania, there is a large number of tourists who visit the country in the summer. As a result, this positively impacts the local communities and the country's economy (Bunghez, 2016). Taxes and fees sourced from the tourist destination area raise revenues (Bunghez, 2016). In Mamaia and the Holiday Village, stakeholders pay a tax that contributes towards promoting the resort in Mamaia as a tourist destination (Bunghez, 2016). Tourism linked activities like accommodation, transport, attractions, and entertainment services, shopping and food expenses, investments, and incomes contribute to the GDP of the country (Dinu, 2000).

A large number of tourists in Romania also leads to the creation of employment in hotels, restaurants, and transportation services (Bunghez, 2016). In 2012, 1.376 people in Alba County were employed in the tourism sector, working mainly in hotels and restaurants. This number increased to 2.500 tourism employees in 2013. This shows that the tourism sector continues to create jobs for people in the area (Moisă, 2015). In 2014, the tourism sector in Romania contributed about 672.500 jobs, 7.3 billion Ron of revenue earnings from international tourism, and investment attraction of about 10.8 billion Ron (Moisă, 2015).

Akkemik (2012) conducted a study in Turkey to find out the contribution of international tourism to GDP and employment growth. It was shown in the study that between the years 2002 and 2006, GDP and employment increased as a result of international

tourist expenditure. The study shows that the tourism sector is as important as other economic sectors in Turkey.

In Slovenia, the foreign exchange contributed massively to tourism economic gains as tourists spend a lot of money in casinos, by shopping, through transport, and other tourism activities when they are in the country (Sirse & Mihalic, 1999). Just like in Turkey, tourism in Slovenia caused the growth of the GDP and increased employment creation. The tourism sector created about 35.000 jobs in 1997 and contributed 9.5% to the country's GDP in the same year (Sirse & Mihalic, 1999).

In Kenya, tourism provides benefits such as employment, earning salaries and wages, business profits, revenue generation, donation, and an improved standard of living to the people living in or near tourism areas (SNV East & Southern Africa 2007). Concerning employment opportunities, the tourism sector in Kenya directly or indirectly employs about 498 000 people. Most of these jobs are in hotels and lodges located in or near those tourism areas (SNV East & Southern Africa 2007). The state also benefits from tourism through revenue generated mostly from tax and travelling (by airplane) fees (Bunghez, 2016; SNV East & Southern Africa 2007).

In the Brazilian Amazon, there exist two tourism-influenced lodges called Ariau Amazon Towers and Acajatuba Jungle Lodge, located in a forest, and associated with nature-based tourism activities. These lodges benefit local communities in the form of employment, transportation services, and assistance to the community. Other benefits from tourism in the area are in the form of salaries or income accrued from tourist expenditure on handicrafts, food and drinks, and donations to the local clinic (Simpson, 2008).

Tourism in Australia has grown over the years and it makes a good contribution to the country's GDP (Australian Government, 2005). About 350,000 small and medium scale enterprises linked to the tourism sector have been established in Australia (Australian Government, 2005). People that do not have any or good skills are employed in the tourism sector (Australian Government, 2005). In 2002-2003, 540,700 people were employed in the tourism sector in Australia. Most of the occupations are in retail trade, and the accommodation and catering sector (Australian Government, 2005).

Tourism-related businesses have employed 16% of the working population in the Shire, Australia (Greiner *et al.*, 2004). In the Shire, even though employment creation is important, tourist expenditure is the biggest benefit that is obtained from the tourism sector. The area accumulated about 11.3 million USD from tourist expenditure in 2002/2003. The high number of visitation and overnight stays in Normanton and Kurumba were the main contributors to this monetary injection. In total, tourism in Normanton and Karumba contributed about 11.3 million-14.1 million USD to the economy between 2002 and 2003 (Greiner *et al.*, 2004). Tourism also improves people's livelihoods in the area (Greiner *et al.*, 2004).

The tourism sector was very crucial to the economic development of ethnic minority areas in China (Tu & Zhang, 2020). The Chinese government reckoned that tourism is a more suited sector to develop the economy of these areas at a fast pace to close the gap between ethnic minority areas and the more developed regions in the country. Ethnic minority areas boast cultural, historical, and geographical resources that helped with the development (Tu & Zhang, 2020). As a result of the introduction of tourism, the ethnic minority areas have experienced economic growth (Tu & Zhang, 2020).

Another area in China that enjoys the benefits culminated from tourism and its activities is the Jiuzhaigou area, which is where the declared World Heritage site, the Jiuzhaigou Biosphere Reserve, is located. The reserve has many natural and cultural resources that are good enough to support tourism in the area. The benefits that are associated with tourism in this area are employment opportunities, the development of enterprises, and an improved environment (Simpson, 2008).

Economies and local communities of coastal-bound nations benefit from water-related tourism (Zimmerhackel *et al.*, 2019). In the Maldives, tourism is the biggest economic sector in the region (Zimmerhackel *et al.*, 2019) and it contributes about 44.3% of employment. This shows that tourism is an essential source of income in the Maldives (Lemma, 2014). A large body of water surrounds the Maldives and the most popular tourism activities in this country are diving and snorkelling. People engage in these activities to observe sharks and manta rays. Other regions where shark diving is and has been pivotal to economic growth include French Polynesia, Palau, Australia, and the Bahamas (Zimmerhackel *et al.*, 2019).

Shark diving as a tourist activity generates revenues for businesses, including other sectors that are not directly linked to tourism such as accommodation, food and beverages, transportation, and gift and souvenir service providers. In the Maldives, it is estimated that shark diving tourism generates around US\$60 million each year. Communities in the Maldives where shark diving tourism takes place benefit through employment opportunities and income generation (Zimmerhackel *et al.*, 2019).

In Nigeria, tourism contributes to the country's GDP. Tourism further increases production, attracts investments, and leads to infrastructure and facility development (Eruotor, 2014). Businesses such as hotels and bars generate a lot of revenue from international tourist expenditure during the holiday seasons in Nigeria. Other economic benefits that local people received from tourism activities on the coast of Lagos are in the form of job creation, income generation, and the development of infrastructure (Eruotor, 2014).

Proença & Soukiazis (2008) sees tourism as a potential solution to the problem of unemployment at a regional level and it also helps with the development of marginalized or underdeveloped regions. By providing a source of income, creating employment, generating foreign earnings, developing regional areas, and promoting small businesses, tourism can lead to increased income generation and as a result, alleviate poverty and reduce unemployment (Zaei & Zaei, 2013).

Eruotor (2014) shares the same view that tourism leads to reduced unemployment because the sector creates job opportunities for both skilled and unskilled workers, and in turn result in improved lives of residents (Eruotor, 2014; Moisă, 2015; Zaei & Zaei, 2013). Furthermore, rural-urban migration can be reduced due to the development of tourism because tourism creates job opportunities for local people (Zaei & Zaei, 2013). Therefore, there will no longer be a need for local people to move to other areas in the pursuit of employment.

In addition to socio-economic importance, tourism has social, cultural, and environmental importance. Tourism contributes to the sustainable use of resources, preservation of the environment (Bandoi *et al.*, 2020; Moisă, 2015), and helps to forge relationships between different cultures and people from different regions (Bandoi *et al.*, 2020; Moisă, 2015; Zaei & Zaei, 2013). Other positive impacts related to tourism development include a better education system (Moisă, 2015; Zaei & Zaei, 2013),

better health care services, spiritual satisfaction (Moisă, 2015), development of infrastructure, and safety and security (Simpson, 2008).

According to a study by Yetim (2017), adventure tourism provides benefits such as experience, fun and excitement, interaction with the environment and people, self-fulfillment, physical and health fitness, and mental and physical stimulation for tourists. These benefits are similar to the ones obtained from forest tourism (Song *et al.*, 2020; Chung & Simpson, 2020). These types of benefits were identified to be of significance to cancer patients and their families. They help cancer patients and their loved ones to strengthen their relationship bonds, to create memories, and to forget about the stress and fear attached to cancer (Chung & Simpson, 2020).

Tourism development in Nigeria has helped to strengthen relationships between tribes that live along the coast and promote cultural exchange (Eruotor, 2014). In Kenya, tourism leads to the building of new relationships (SNV East & Southern Africa 2007). In Soshanguve, some people believe that tourism fostered friendliness amongst them, made their culture better understood, and promoted safety and security in the community (Nkemngu, 2012).

Wildlife tourism is an important form of tourism, especially in developing countries. This tourism contributes to the generation of revenue (Zimmerhackel *et al.*, 2019), which can be further used for conservation activities (Tisdell, 2012). Businesses that provide accommodation, food, and other services generate revenue from wildlife tourists' spending activities and use the revenue earned to support wildlife tourism and advocate for its conservation (Tisdell, 2012).

According to Dwyer & Forsyth (1997), tourism helps to create awareness of the environment and culture amongst the locals. It also promotes resource conservation, preserves wildlife, and generates revenue and foreign exchange. Tourism contributes to the well-being of residents of that area through economic activity and increased job opportunities (Forsyth, 2006).

2.4. THE RELATIONSHIP BETWEEN TOURISM ACTIVITIES AND FRESHWATER RESOURCES

The natural environment and the tourism sector are connected in a way that one needs the other to thrive. Freshwater resources are considered an important factor in the development of the tourism industry (Gössling *et al.*, 2012; Litschauer *et al.*, 2018).

Several regions around the world use freshwater resources as a tourist attraction and as a tool for generating income (Lehmann, 2009). Surface and coastal waters are used for leisure and recreational activities (Bartram & Rees, 1999) in the tourism industry.

Nature-based tourism activities have become popular among tourists, and these activities are significant to the economic development of areas where they take place (Uyduran, *et al.*, 2017). These activities usually take place in mountainous or wilderness areas, water bodies, and forested areas (Lundmark & Müller, 2010). Some of the most popular activities that take place in freshwater resources such as lakes and dams (Jennings, 2007) include swimming, sailing, kayaking, canoeing, diving, fishing (Bazin *et al.*, 2011; Gössling *et al.*, 2012; Hurma *et al.*, 2016; Jennings, 2007), river tours, kite surfing, rafting (UNEP, 2007), angling, and scuba diving (Dokulil, 2014).

In Burkina Faso, the government has promoted the use of the Bagré Reservoir for tourism purposes. The tourism activities eligible to take place on that reservoir include fishing, game and bird watching, relaxing on the banks, and tourism education (Bazin *et al.*, 2011). Tourists can also watch game animals in Arly and Singou protected areas on a boat in the Bagré Reservoir (Bazin *et al.*, 2011).

The Ash River in the Eastern Cape (South Africa) as a tourist attractions offers activities such as white water rafting and kayaking for tourists. This is where even the top water sport athletes in the world train. Other places amongst many others in South Africa that offer water sport activities include the Orange River, the Sabie and the Vaal River (Mckay, 2014).

Some tourism activities are non-water recreational activities but are linked to the resource in some way. These non-water tourism activities include trekking, hiking, visiting local villages and learning about the local people's culture and history, camping, and golfing (Hurma *et al.*, 2016). This validates/supports the notion that tourism is a water-dependent sector (Cavagnaro, 2017). Besides water use for recreational purposes, water in tourism is used for preparing food, spas, washing (Gössling *et al.*, 2012), gardening, drinking, and laundry. These are all important features of a vacation.

2.5. SOUTH AFRICAN TOURISM SITUATION

South Africa is a country that attracts visitors with the beauty of people's history and cultures, and exceptional natural landscapes (DOT, 2015). All these elements ensure a good experience for visitors; hence both international and regional tourists frequent the country, with the tourist numbers going up every year. The world is still traveling to South Africa to experience the vast and wonderful mixture of people, culture, heritage, scenic beauty, and city life that South Africa has to offer (SAT, 2017).

South Africa is marketed domestically and internationally as a tourist destination by South African Tourism (SAT) (DOT, 2015). SAT ensures that South Africa is a destination of choice for tourists, maintains a high standard of facilities and services provided to tourists, and manages the tourism sector. One of the medium-term goals that the organization aims to achieve is the contribution of tourism to economic growth. The organization also aims to market South Africa on an international level as a leisure and business destination, increase the number of international tourists visiting the country, and increase tourists' expenditure and impact on economic development (GCIS, 2016).

The tourism industry is an economic sector that is rapidly growing (DOT, 2015; DOT, 2016), both on a global and national/local scale. In the past years, the arrival of international tourists in the country has massively increased (DOT, 2015). The number of international tourists who visited South Africa in 2015 was 8.9 million (GCIS, 2017), and in 2016 that number had increased to 10 million people (SAT, 2017). The 10 million international tourists who visited the country in 2016 represent a 12.8% increase from the 8.9 million tourists in 2015 (GCIS, 2017). This led to the growth of the country's international tourist revenue in 2016 of R75.5 billion, from R68.2 billion in 2015. This is equivalent to a 10.8% growth in revenue (SAT, 2017).

The number of people traveling domestically increased from 25.2 million in 2013 to 28 million people in 2014; this is a growth of 11%. The increased number of trips made domestically together with the increased average spend per trip has led to the generation of R26.8 billion revenues in 2014 compared to the R24.3 billion made in 2013 (DOT, 2015). The revenue took a dip to R23.6 billion in 2015 but went up again to R26.5 billion the following year, showing a growth of 12% (SAT, 2017). In the year 2016, tourism contributed R102 billion of revenue to the economy of the country (SAT, 2017).

Tourism is an important component of the economy of South Africa because it generates foreign exchange and thousands of job opportunities (GCIS, 2016; DOT, 2015). Employment in the tourism industry increased by 1.5% in 2014 (DOT, 2015). In 2015, approximately 4.5% of employment in South Africa was contributed to by the tourism sector. It was projected that 225 000 jobs would be created by the tourism sector in 2020 (GCIS, 2016). This shows the significance of the tourism sector to economic development (Hurma *et al.*, 2016) and employment creation.

2.6. THE IMPACT OF TOURISM ACTIVITIES ON THE ENVIRONMENT

Economic benefits that are obtained from the development of tourism go hand in hand with the negative socio-economic and environmental impacts (Davenport & Davenport, 2006). The tourism industry is forever growing, and the environment in destination areas is bound to suffer to some extent as a result of extensive tourism activities (Schussel & Schussel, 2012). Zhao & Li (2018) ascertain that there are cases where tourism development leads to environmental degradation.

Some of the impacts occur during the early developmental stages (Zhao & Li, 2018). This refers to the degradation of the environment through a parking lot and road construction, the building of bridges and cableways (Chen, 2020; Zhao & Li, 2018), stone blasting (Zhao & Li, 2018), construction of resorts, fuel consumption from buildings and the use of transport modes, overconsumption of water resources, and pollution (Davenport & Davenport, 2006). Due to these activities, vegetation is damaged and ecosystems are disturbed (Chen, 2020).

Environmental problems begin when the number of tourists in an area is much higher than the environment's capacity (GhulamRabbany *et al.*, 2013; Šimková & Kasal; Sunlu, 2013; Zhao & Li, 2018). In addition, tourism has negative impacts on the environment when it is not sustainable (GhulamRabbany *et al.*, 2013). The development of artificial resources, urbanization, and commercialization to cater to large numbers of tourists puts more pressure on the natural environment (Sunlu, 2013; Zhao & Li, 2018). Environmental problems related to tourism development are beach, sand, and soil erosion (Sunlu, 2003), loss of habitat (Mikayilov *et al.*, 2019), water pollution, littering, and waste disposal (Singh & Upadhyay, 2011).

Vegetation and soils are destroyed by the trampling of tourists when they trek in tourist destinations (Chen, 2020; GhulamRabbany *et al.*, 2013; Humphreys, 2019; Lemma,

2014; Sunlu, 2003). For example, the large number of tourists visiting Lake District National Park in England has caused the occurrence of soil erosion in the Park. A gully has formed in the Park as a result of soil erosion (Humphreys, 2019). A similar situation is happening in Pynnikki, Finland (Semenova, 2013).

Nature-based tourists who are interested in activities like visiting the wilderness, camping, and hiking cause environmental destruction when they make fires on their campsites. They destroy vegetation to get the wood they use to make a fire, which leaves a mark on the ground when all is done (Humphreys, 2019). Plants in the Xavi Bird Watching Sanctuary in the Akatsi District, Ghana, and the Bucegi Mountains in Romania are also destroyed as a result of tourist activities in those areas (Ciangă & Sorocovschi, 2017; Kuuder *et al.*, 2013). Loss of biodiversity is likely to result from this kind of impact (GhulamRabbany *et al.*, 2013; Lemma, 2014; Sunlu, 2003).

Tourists in America like to drive SUVs. The use of these vehicles has threatened wilderness areas in Utah. These vehicles can also lead to the destruction of sparse scrubland and cause landscape erosion (Humphreys, 2019). In inland water bodies, soil erosion next to river banks can be caused by speed boats that wash up the banks when passing by. This causes the riverbanks to be damaged (Humphreys, 2019).

There are areas in China whereby the development of tourism was put first before the health of the environment. Even though tourism development in China has led to economic growth, it has subsequently caused environmental problems (Zhao & Li, 2018). Environmental impacts of tourism in China include air and water pollution (Zhao & Li, 2018). The energy that is consumed in accommodation properties (through heaters and air conditioners) and carbon emissions from the use of transport contributes to increased air pollution in destination areas (Ciangă & Sorocovschi, 2017; Humphreys, 2019; Lemma, 2014; Mikayilov *et al.*, 2019; Singh & Upadhyay, 2011).

Self-driving tourism is an industry that is growing every year in China. This type of industry caters to tourists who prefer to drive themselves to tourist destinations. The negative side of this type of tourism is that it contributes to increased production and emission of carbon (Zhao & Li, 2018). Self-driving tourism consumes a lot of energy, increases exhaust emissions from cars, takes up space, and as a result continues to negatively affect the environment (Zhao & Li, 2018).

Carbon emissions from the use of vehicles to transport tourists around increase the greenhouse effect. Facilities such as heaters and air conditioners also contribute to the greenhouse effect because they consume a lot of energy (Ciangă & Sorocovschi, 2017). In Pyynikki, the air that people breathe is contaminated due to carbon emissions from vehicles that result from vehicle carbon emissions (Semenova, 2013).

The biggest environmental impact of tourism comes from the use of air transport (Zhao & Li, 2018) because the common type of transport that tourists use when travelling to destination areas is aircraft (Humphreys, 2019). The problem with this transportation mode is that it produces a great amount of carbon emission which contributes significantly to air pollution (Humphreys, 2019). Most of the people who travel by air are tourists, which means that the majority of the emission that is produced from aircraft is related to the tourism industry (Sunlu, 2003).

Energy-efficient aircraft and short trip aircraft are the biggest contributors to carbon emissions in the air. Short-distance aircraft produce more carbon emissions because they burn a lot of energy when they land and take off. Due to the short distance, the planes make multiple trips, which means they burn more energy each time they make a trip (Humphreys, 2019). Acid rain, global warming, and photochemical pollution are the consequences of air pollution (Sunlu, 2003).

Coastal ecosystems are threatened by tourism development. Construction activities along the coast, sand erosion, and unstable beaches affect coastal fauna and flora such as monk seals and *Caretta caretta* turtles (Burak *et al.*, 2004). In Greece, tourism activities have disturbed and negatively impacted the local sea turtles (*Caretta-caretta*) in Zakynthos. These species are threatened by the tourism activities in coastal zones (Kousis, 2000) such as the construction of roads and walkways along the coast or on beaches (Davenport & Davenport, 2006).

The development of tourism in the Mediterranean Sea has added to the problems that cause land degradation in the area. Tourism activities that harm the ecosystem include the construction of roads along the coast and the construction of hotels, resorts, and marinas. A large number of people visiting coastal beaches tramp on them (Davenport & Davenport, 2006). The effects of these activities are the disappearance of wetlands and the reduction of biodiversity. Environmental disturbance has greatly impacted sea turtles and has driven them close to extinction (Davenport & Davenport, 2006).

Tourism sports activities that can cause damage to the aquatic environment or disturb marine ecosystems include snorkeling, sport fishing, scuba diving, and boat rides (Sunlu, 2003). Trampling of coral and other vegetation by tourists when they are snorkelling destroys ecosystems, especially if there is too much tourism activity in those areas (GhulamRabbany *et al.*, 2013). Sportfishing and scuba diving damage the environmental integrity of tourist areas (Lemma, 2014).

The Mediterranean and Caribbean are popular destination areas for tourists who travel by ships (Davenport & Davenport, 2006). Cruise ships or boating contributes to water pollution (GhulamRabbany *et al.*, 2013). The contamination of the aquatic environment from cruise ships affects coastal ecosystems (marine fauna and coral reefs) (Ciangă & Sorocovschi, 2017). Wetlands, coral reefs, and seagrass beds are some of the most fragile ecosystems. They are under the threat of being degraded, partly because of tourism activities and developments related to tourism (Sunlu, 2003).

From time to time, cruise ships discharge solid waste, wastewater, and sewage waste into water bodies (Davenport & Davenport, 2006; Humphreys, 2019). Cruise ships produce a large amount of sewage and solid waste on a single trip (Davenport & Davenport, 2006). This negatively affects aquatic ecosystems (Humphreys, 2019). The discharge of sewage waste from boats and large ships into water bodies damages aquatic ecosystems like coral reefs and seagrass beds. Shellfish are also contaminated by this pollution (GhulamRabbany *et al.*, 2013).

Ships also cause water pollution through fuel and oil spillage (Humphreys, 2019). When large ships and vessels touring polar waters collide with icebergs, they may cause oil spill pollution. The toxic nature of fuel oils threatens aquatic ecosystems in oceans and seas (Davenport & Davenport, 2006).

Aquatic vegetation is damaged by the propellers of boats and cruise ships (Davenport & Davenport, 2006; GhulamRabbany *et al.*, 2013). This has been a case in Florida coastal waters where the motorboat propellers damaged a large area of seagrass bed. It took more than 3 years for the damaged seagrass to grow back (Davenport & Davenport, 2006). Additionally, powerboats collide with sea turtles and threaten their lives. Turtles are prone to accidents with motorboats because they are slow swimmers. It is not easy for them to avoid impact with these boats because of their pace (Davenport & Davenport, 2006).

Improper waste disposal and littering by tourists when they are hiking cause environmental destruction, especially if there is too much tourism activity in those areas (GhulamRabbany *et al.*, 2013). Tourists in mountainous areas sometimes leave behind waste materials whenever they visit. This pollutes land and water resources and removes the beauty of scenic areas (Sunlu, 2003).

The Santa Marta municipality in Colombia has several beaches which are popular tourist spots. These beaches are important components of the tourism sector in Santa Marta (Garcés-Ordóñez *et al.*, 2020). However, the high number of tourist visitation causes litter pollution on those beaches, whether it is during the high tourist season or not. Tourism activity is considered the main source of litter pollution on the beaches of Santa Marta (Garcés-Ordóñez *et al.*, 2020).

There are some beaches which have less litter than the others. In addition, the amount of litter differs with the change in seasons and the region they are located in (remote, village, or urban area). Urban beaches are usually the ones that are more polluted than the other beaches. The different types of waste material found on these beaches are plastics, metals, paper, cardboard, and glass. Plastic waste contributes a larger percentage than all the other waste materials (Garcés-Ordóñez *et al.*, 2020).

The development of tourist facilities and infrastructures (Ciangă & Sorocovschi, 2017) like tourist hotels and pavements (Sunlu, 2003) affects the land and other natural resources (Ciangă & Sorocovschi, 2017). Tourist hotels cause negative impacts on the environment by disposing of waste into the environment; most of it being in the form of plastic, consuming a lot of energy, discharging wastewater into the environment (Chen, 2020), and gas emissions (Zhao & Li, 2018). Coral reefs, mangroves, and hinterland forests are eroded and destructed due to the extraction of sand that is used in construction activities (Sunlu, 2003).

Tourism development has destroyed agricultural land in the Aegean and Mediterranean coasts as tourism became a more favored economic sector because it generates revenue at a fast rate (Burak *et al.*, 2004). The establishment of resorts and houses for tourists on the western coast replaced agricultural land (Burak *et al.*, 2004). Tourism development in Mersin has contributed to the loss of fertile land and has also caused seawater pollution (Burak *et al.*, 2004).

Tourism development in the Erhai Lake Basin (ELB) in China has led to a massive change of land use zones in the region. The lakeside zone of the ELB was the most impacted by this development. Agricultural land, forests, and grasslands were transformed into a built-up area to cater to tourism goods and services (Li *et al.*, 2020). There has been an increase in nitrogen and soil export from the ELB, reduced carbon storage, and soil retention in the lakeside zone as a result of the changes in land use zones, which result in negative environmental impacts in the basin (Li *et al.*, 2020).

Increased traffic at tourist destinations leads to increased noise pollution (Singh & Upadhyay, 2011). Airplanes make a lot of noise when they land or take off at airports, large ships make noise at the coasts, and motorboats make noise in villages located near rivers and canals. The movement of cars in the Pyynikki protected area causes noise pollution which disturbs animals living in that area (Semenova, 2013). In the Mediterranean, motorboats (jet bikes and water bikes) are the sources of noise pollution at some offshore resorts (Humphreys, 2019). The noise that is produced by vehicles that are used to transport tourists in destination areas disturbs the wildlife (Singh & Upadhyay, 2011) and the noise levels in residential areas (Humphreys, 2019).

Tourists themselves also cause noise pollution which can disturb wildlife in their habitats (Chen, 2020). In Kenya, animals in the Masai Mara National Park are scared away from going to a waterhole by the noise that is made by tourists who visit the Treetops Hotel (Humphreys, 2019). In aquatic environments, human activity such as whale watching on the west coast of North America disturbs whale species. The noise made by boats that tourists use alters the communication system of these aquatic species (Singh & Upadhyay, 2011).

Zhao & Li (2018) has indicated that air pollution is the biggest environmental impact from tourism. However, a different view is shared by Ciangă & Sorocovschi (2017), who states that tourism mostly affects coastal and mountainous areas because these areas are fragile and tourist activity is high in such places. In general, it can be noted that air pollution, water pollution, noise pollution, erosion, land degradation, land-use change, loss of habitat, and loss of biodiversity are the main environmental impacts of tourism development.

2.7. THE IMPACT OF WATER POLLUTION ON TOURISM

The deterioration of the natural environment is not good for tourism (Sunlu, 2003). Tourism relies on the environment to progress, preferably a healthy environment. However, human activities like farming, mining, industrial processes, tourism, and tourism-related activities like the construction of roads, hotels, shops, and marinas tend to cause damage to the environment. The impairment of the environment, therefore, affects tourism (Gössling *et al.*, 2012) because a crippled environment is not fit to support tourism and related activities (Dokulil, 2014).

In addition to the environment not being able to sustain tourism, water resources that are in a bad condition lose their ability to attract tourists. Tourists become discouraged by water resources that are in bad condition (Breen *et al.*, 2018). Dokulil (2014) ascertains that tourists find places that have algal blooms unattractive because of the resultant bad odour and loss of scenic beauty, and therefore they stop visiting such places. Recreational activities such as swimming are affected by the decline of water quality (Breen *et al.*, 2018; Dokulil, 2014) in rivers and lakes because the use of contaminated water resources for swimming can be detrimental to human health (De Stefano, 2004).

Human activities have become a threat to the development of water-based tourism in several regions by causing water pollution (Cullis *et al.*, 2018). It is reported for example that the tourism industry of Texas State (USA) is highly influenced by recreational fishing. The economy of the area is positively impacted by this. Anglers travel from different places to come and fish in the Possum Kingdom Lake in Texas. However, water pollution has put a threat to tourism development in the area (Oh and Ditton, 2005).

In the years 2001 and 2003, there was an algae outbreak in Possum Kingdom Lake. The harmful algal blooms negatively affected economic activities linked to tourism in and around the lake (Oh & Ditton, 2005). Eutrophication declines water quality, decreases the number of species, and changes the colour and smell of water (DWS, 2016). Fishing activities are affected by algal blooms because they result in fish kills (Oh & Dutton, 2005). This happens because algal blooms take up all the dissolved

oxygen in the water, leaving nothing or very little for the fish to rely on (Davies & Cahill, 2000).

Fish mortality results in fewer fishing activities because people cannot fish in polluted water where there are no fish to catch. The number of people visiting the state park declined due to the pollution (Oh & Ditton, 2005; USEPA, 2015) because anglers started considering other alternative lakes to fish at. This consideration only last just until the quality of water at the Possum Kingdom Lake goes back to acceptable conditions (Oh & Ditton, 2005).

Tourism destinations lose income when tourists or visitors change their choice of destination due to pollution (Krelling *et al.*, 2017; Oh & Ditton, 2005). This had a negative economic impact on businesses linked to the lake and tourism industry in Texas (Oh & Ditton, 2005). Indeed, Oh and Ditton (2005) found that the first algal blooms in the lake caused a 5% economic loss during that time. Similarly, in Ohio State (USA) where the algal blooms were reported to have happened at the Grand Lake St. Marys impacted tourism and other economic activities in the area. Revenues were lost by the state park and small-scale businesses, and boat businesses had to close because of the excessive nutrient concentrations in St. Marys Lake (USEPA, 2015).

Recreational activities affected by water pollution that is caused when waste materials like plastics, fishing gear, packaging, food, and other waste materials are discarded in water bodies (Pulford *et al.*, 2017) include recreational shellfishing (Dokulil, 2014) and visitation of beaches (Luk *et al.*, 2019). The presence of waste or debris in water bodies removes the aesthetic value of the resource (Bartram & Rees, 1999). Water pollution also affects wildlife. This is not good especially in an area where wildlife viewing is the main tourist attraction (Dokulil, 2014) or is part of tourist attractions. South Africa is a country where many tourists like to visit game reserves (Oberholster, 2009). However, pollution from a copper mine in Phalaborwa (Limpopo, South Africa) has affected game animals inside the Kruger National Park (KNP), which eventually kills them (du Preez *et al.*, 2018). Since ecotourism is an important factor in the economy of South Africa, wildlife mortality presents a negative impact on the country's economy because this also affects the number of visitors (Oberholster, 2009).

Tourism areas are further affected by pollution caused by poor management of municipal solid waste (MSW). This happens due to excess MSW being generated as a result of an increase in the number of tourists at a trip destination area (Arbulú *et al.*, 2015). The decline of water quality due to solid waste pollution hurts the aesthetic value of water bodies (Viman *et al.*, 2010). This, in turn, declines the economic value of waterfront properties and recreational activities that take place in or near rivers (DWS, 2016).

2.8. WATERBORNE SPORTS AND THEIR BENEFITS

Water is a very important resource for the sustenance of life on earth (Hossain, 2015). According to Jennings (2007), this very precious natural resource has some health importance attached to it. Taking a break from busy cities and a load of work by going somewhere where water is in sight or is the medium in which touristic activities occur, is considered to have some restorative and medicinal benefits (Jennings, 2007). Activities that tourists engage in while they have taken a trip away from home are referred to as touristic activities (Jennings, 2007), activities that take place in or on water resources are known as water sports (WET, 2017), and the act of participating in touristic activities that occur in or near water bodies is referred to as water-based tourism (Jennings, 2007).

There are different types of waterborne sports. Angling, canoe, kayaking, hydro-speed, kite surfing, swimming, rowing, sailing, stand-up paddleboarding, and surfing are all types of water-based sports (WET, 2017). A study by Papathanasopoulou *et al.* (2016) identified sailing, kayaking/canoeing, fishing/angling, boating, and floating (Mimbs *et al.*, 2020) as some of the most popular aquatic activities or physical activities. Other types of water-based sports activities include body boarding, drag boat racing, skimboarding, wakeboarding, wakeskating, rafting, cruises, diving/snorkelling, powered boating, and water-skiing (Jennings, 2007).

Each year in America, millions of people take part in angling, floating, and swimming activities (Mimbs *et al.*, 2020). Sportfishing is an expensive activity, but it is still able to attract a lot of participants. This was a popular sport activity decades ago, and it still is to this day (Jennings, 2007). There has been a growth in angling for leisure purposes in Africa. Because this is a very expensive sports activity, those who participate in it are the ones who can afford it (African Development Bank Group, 2015). People find

enjoyment from this sports activity; they enjoy the satisfaction they get from catching fish; hence, its popularity continues to grow (Bergstrom *et al.*, 2004). People also like sport fishing because of its competitive nature (Jennings, 2007).

Water tubing is one of the most popular tourist activities in the Santirah River in western Pangandaran Beach, Indonesia (Rahmafitria *et al.*, 2017). Tourists enjoy the adrenaline rush they get from participating in this activity. The experience of river tubing is more pleasing during the rainy season as there is more water in the river (Rahmafitria *et al.*, 2017). This activity is recommended for tourists who like sports and are adventurous (Rahmafitria *et al.*, 2017). Other touristic activities that take place in rivers include swimming, body rafting, water sliding, and water jumping (Rahmafitria *et al.*, 2017).

In Africa, water sports that take place in rivers include sailing, boat cruising, canoeing and kayaking, surfing, jet skis, power boating, rafting, swimming, and scuba diving in lakes. These are activities that are most popular amongst domestic tourists (African Development Bank Group, 2015). River and lake cruising is popular in African rivers such as the Nile, Chobe/Zambezi, and Gambia Rivers, and Lake Kariba. In Lake Tanganyika and Lake Malawi, there are tourist activities such as white-water rafting, sailing, windsurfing, and scuba diving (African Development Bank Group, 2015).

Taking part in water sports involves being in contact with the natural environment (WET, 2017), and this has been shown to have some health rewards for the participants (Folgado-Fernández *et al.*, 2018; Papathanasopoulou *et al.*, 2016) such as psychological benefits like mental wellbeing (WET, 2017) and gaining self-esteem (Jennings, 2007). Folgado-Fernández *et al.* (2018) ascertain that water-based activities are important for people's psychological well-being. Tourists feel that taking part in water-based tourism activities makes them feel happier and improves their quality of life (Folgado-Fernández *et al.*, 2018; Papathanasopoulou *et al.*, 2016).

Tourists find water-based touristic activities fun and interesting, and these types of activities also bring them enjoyment (Folgado-Fernández *et al.*, 2018). Rowing as a water sport provides benefits such as having fun, being physically active, having social relations, improved mental wealth and feeling empowered (WET, 2017). Participating in water-based touristic activities helps tourists to forget about their daily lives' routine for some time and helps to reduce their stress levels (Folgado-Fernández *et al.*, 2018).

For young people, participating in water sports can be a way of keeping away from anti-social behaviour or activities (WET, 2017). Because water sports are usually done in groups, it also helps to strengthen or build social relations (WET, 2017).

2.9. CONCLUSION

This chapter provided a literature review of the studies that are related to this current study. The chapter sought to provide some evidence in the field by critically looking at literature published in scholarly journals in recent years. Literature gathered set out to assess the general overview of the tourism concept, types of tourism water resources and tourism in South Africa, the relationship between tourism and water resources, the importance of tourism, water-based sports activities and their benefits, the impact of tourism on the environment, and the impact of water pollution on tourism. It has been found that there is very little information that is depicted in the literature concerning the main aim or topic of this study, especially nationally and locally. Therefore, it was mentioned in chapter 1 that there is a gap; the gap that this study seeks to fill. The following chapter, chapter three is a presentation of the research approach and methodology chosen for this study. It highlights the research methodology and approach that informed the research as well as data collection and analysis techniques that were used to analyse collected data from the field.

CHAPTER THREE

RESEARCH METHODOLOGY AND DESIGN

3.1. INTRODUCTION

This chapter presents the research approach and methodology that was adopted in the study on the impact of water quality on the tourism activities in Loskop Dam. The chapter begins by underlying the philosophical foundations which guide the study followed by a detailed explanation of the research design and methodology that was adopted during the collection and analysis of data on the phenomenon under investigation. It covers the step-by-step procedures that were used to collect from the sources of information who were the interview and questionnaire participants and internet searches. Not only does this chapter provide a logical flow of the data collection process, but it also furnishes the reader with a detailed description of the mixed-method (triangulation) approach as it was implemented. The goal is to ensure that the readers have detailed knowledge and understanding of the methods and techniques which guided the study.

A full description of data in terms of how it was collected, stored, and analysed is also provided in detail in the sections that follow. Included are full details of the study population, sampling procedures, a full description of respondents, the variables investigated, quantitative and qualitative instrumentation used as well as treatment and analysis of data. The adopted research methods are in line with the objectives of the study. The research questions and objectives guiding this study as they link to the research problem under investigation are provided in detail as follows: (i) identify the types of tourism activities that have been affected by declining water quality, (ii) establish a geographic element of cause-and-effect relationship by identifying how the tourism activities have been affected by declining water quality in the Loskop Dam, and (iii) develop a suitable model for future considerations on how to mitigate the negative impacts of poor water quality on tourism in Loskop Dam, and promote sustainable tourism at Loskop Dam. Lastly, the chapter discusses ethical guidelines that were followed while conducting the study.

3.2. DESCRIPTION OF THE STUDY AREA

This geographic study was undertaken in the Loskop Dam region. The location of the study area is shown in figure 3.1. The dam is one of a series of dams along the Olifants River (Dabrowski & de Klerk, 2013), which originates in the eastern part of the country in Mpumalanga province, and drains into the Indian Ocean after flowing through Mozambique (Dabrowski *et al.*, 2013).

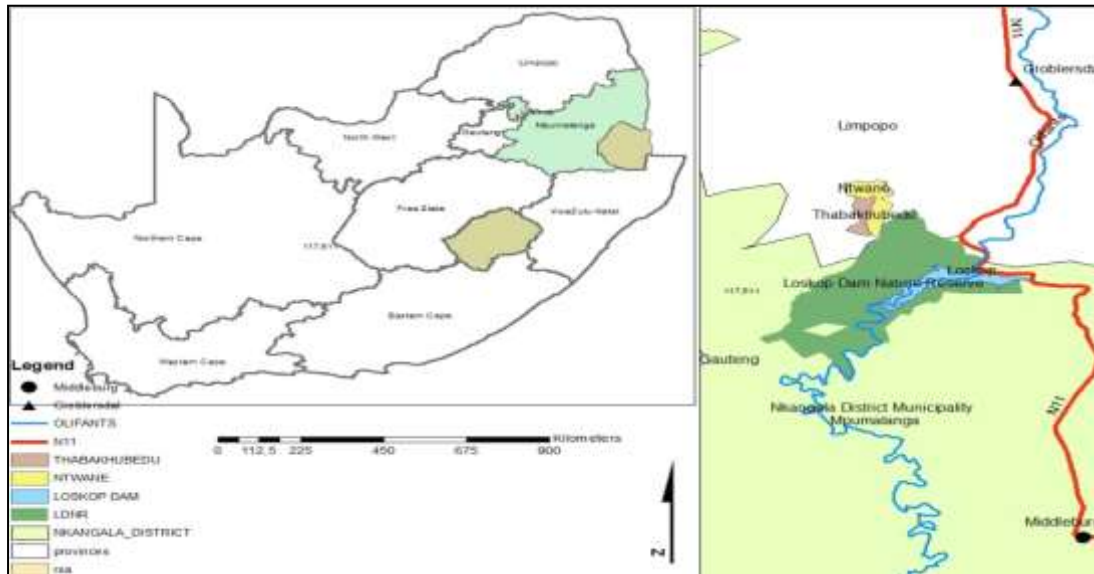


Figure 3.1: Loskop Dam (25° 26' 57. 05" S 29° 19' 44. 36 E (Oberholster *et al.*, 2010)).

The physical characteristics of the study region are typical of a Central Highlands eco-region, which include the hilly and mountainous area with an average height of approximately 1000 m above sea level (Botha, 2010). The area experiences an average annual rainfall of about 700 mm (Van Veelen & Dhemba, 2011), a maximum summer temperature of over 30°C, and winter temperatures which range from a minimum of 10°C to a maximum of 26°C (Filmater, 2010). The main vegetation types in the Loskop area are Loskop Mountain Bushveld and Loskop Thornveld (Filmater, 2010).

The economic activities around the Loskop Dam environs are commercial farming, small-scale subsistence farming activities, and tourism activities (Crafford *et al.*, 2011). The tourism activities that occur in and around Loskop Dam include fishing, boating, game viewing, and bird watching. The dam is situated inside a the Loskop Dam Nature Reserve, where the wild animals can be found.

3.3. RESEARCH DESIGN PROCESS

Data for research purposes has been collected and analysed using a mixed-methods approach (Walliman, 2011). Both qualitative and quantitative approaches were chosen for this study since this study aims to look at the impact of declining water quality on tourism, focusing on the social and economic aspects. A mixed approach was seen as an appropriate method for this study (Neville, 2007; Kothari, 2004).

The qualitative research method does not make use of any statistical data (Rahman, 2017). The qualitative research method thoroughly describes and examines the study of participants' feelings, opinions, and experiences regarding a particular issue or topic (Rahman, 2017). In qualitative research, data is collected in the form of pictures and words (Eyisi, 2016), not numbers, as this is the case with quantitative research.

Quantitative research methods have to do with the measurement of some information that can be quantified (Rahman, 2017). This research method is time and resource-efficient because it makes use of statistical data, making the process of analysing and describing the research findings faster than it would be with qualitative research (Eyisi, 2016).

Retrieval of existing data (Rahman, 2017), observation, questionnaire, interview, and field notes are tools that are used to collect data in qualitative research (Eyisi, 2016). This implies that most of the time there is a direct interaction between the researcher and the participants during data collection (Rahman, 2017). In this current research study, data collection tools like questionnaires, interview guides, observation guides, and retrieval of existing data were used to obtain information. These data collection tools apply to both qualitative and quantitative research approaches.

Questionnaires were used to collect data from tourists and small and medium-scale enterprise (SMEs) employees in the study area. The close-ended questions included in the questionnaires represented the quantitative characteristic of data. Besides the questionnaires that were used to collect data from tourists and SMEs employees, interview guides were used to obtain information from the SMEs managers. In addition to these methods, data was also collected through field observations and secondary sources, for example, journal articles and reports. The open-ended questions in the

questionnaires and interviews represented qualitative data, including observations and existing data obtained from secondary sources.

Observation and interviews were used to achieve objectives one and three, existing information was retrieved and used to achieve objective two, questionnaires (semi-structured) and interviews, as well as the retrieval of existing data, were used to achieve objectives four and five.

3.4. SAMPLING FRAME

The sampling frame of this study comprises tourists, small and medium-scale enterprise managers, and employees. The tourists involved in this study are mainly those who are interested in fishing and the annual fishing competitions that take place in Loskop Dam. SMEs managers refer to the owners or managers of any type of business establishment that cater mainly to visitors of Loskop Dam. SMEs employees refer to those who work in businesses that are involved in tourism or are dependent on tourists. For this study, these were the employees of Loskop Dam Forever Resorts.

3.5. SAMPLING PROCEDURE

Sampling is done usually when the participants are common (Mathers *et al.*, 2007) or when the sampling frame is too big and there is little time or resources to cover the entire population (Taherdoost, 2016). Therefore, this process of sampling helps with the selection of a smaller number of participants who will represent the entire population (Mathers *et al.*, 2007). There are two types of sampling procedures, probability sampling and non-probability sampling (Taherdoost, 2016). Both probability and non-probability sampling techniques were used in this study.

In probability sampling, the chance of being selected is equal amongst all the individuals or items included in the sample (Taherdoost, 2016). Using this sampling technique minimizes situations of biases in research. This is what makes this sampling type the most ideal.

There are different types of probability sampling techniques available. These are systematic random sampling, simple random sampling, stratified random sampling, disproportionate sampling, and cluster sampling. For this study, systematic random sampling was used. Systematic random sampling is a method of selecting participants

systematically, for example, selecting every third or fifth person (sampling interval) in the sample until the entire sample is covered (Mathers *et al.*, 2007). The first number to start from is picked randomly (Taherdoost, 2016). This sampling method is simple (Taherdoost, 2016); therefore, it is common in research (Mathers *et al.*, 2007).

The calculated sampling interval for this study was five. Therefore, a random number was selected between one and five, and two was the chosen number. This means that the researcher started by approaching the second person they met on the day and thereafter approached every fifth person. In cases where an individual refused to take part in the study, the researcher moved on to the next person they meet.

The type of non-probability sampling used for this study was purposive sampling. Purposive sampling is a non-probability sampling where the participants are chosen based on the qualities they possess; this may be knowing information regarding a certain topic or issue (Taherdoost, 2016), which was the case for this study. The researcher used purposive sampling to select the SME managers because there were not too many of them and they may have data that the research is looking to find. The researcher reckoned that the managers' responses will help to answer some of the research questions. Additionally, purposive sampling was used because it is a cost and time-effective method.

Additionally, the respondents were sampled using different sampling methods depending on the respective population sizes. Where the populations are small, purposive sampling was applied, and random sampling was applied where the population sizes are bigger. The entire Loskop Dam area has about 15 small and medium-scale enterprises. On average the Loskop Dam region's most popular tourism area (Loskop Dam Forever Resorts) receives 300 visitors on weekends where fishing competitions are taking place. Approximately 100 employees report to work during those weekends.

An online survey software called Raosoft was used to obtain the sample sizes, with a confidence level of 90% and a margin of error of 10%. Table 3.1 shows the population and sampling sizes, as well as the method of sampling that was used to select the participants.

Table 3.1: The population and sample sizes of the study participants

Participants	Population size	Sample size	Data sampling method
SMEs managers	15	13	Purposive sampling
Freshwater tourists	300	56	Systematic random sampling
SMEs employees	100	41	Systematic random sampling

The information that was required for this study includes information about. Secondly, information on types of tourism activities in Loskop Dam that are affected by poor water quality. Furthermore, information on the cause-and-effect relationship between tourism activities and poor water quality in the Loskop Dam. Lastly, information on a suitable model for future considerations of mitigating the impacts of poor water quality on tourism and promoting sustainable tourism in Loskop Dam was required.

3.6. DATA COLLECTION METHODS

Data can be collected using various methods (Peersman, 2014) which include reviewing existing documents, observation, and conducting interviews and questionnaires (Abawi, 2013). The type of methods used to collect data varies accordingly with different types of research (Abawi, 2013). In addition, choosing a type of method to use for data collection is determined by different factors such as access to participants, participants' level of literacy, the issue or topic being investigated, and the availability of resources (Mathers *et al.*, 2007). In this study, the sources of primary data were the SMEs managers and employees, and tourists. The sources of secondary data included documents and reports obtained from the internet.

It took only one week for the data collection process to be finished. Because the data was collected during the day, some of the participants, especially the employees, were interviewed while still on duty. Only a few people were interviewed after work hours. There was no pilot data collection done before the actual study.

3.6.1. INTERVIEW

According to Mathers *et al.* (2007), the best way of collecting sufficient amounts of data is by conducting face-to-face interviews. This way the interviewer is more likely

to get more information, clear answers, and understand the issue being investigated because the interviewer gets to interact with the respondents (Alshenqeeti, 2014).

In his study, Alshenqeeti (2014) cited Schostak (2006: 54) defining an interview as a conversation between parties where the interviewer aims to obtain information from the interviewee regarding a certain issue. During an interview, the researcher obtains information by asking the participants questions (Abawi, 2013).

For this study, an interview was used to collect data from the SME managers. One of the advantages of using an interview method is its ability to result in a high response rate (Alshenqeeti, 2014). This is one of the reasons this data collection method was used.

The four types of interviews usually used for data collection are structured interviews (close-ended), open-ended (unstructured) interviews, semi-structured interviews, and focus group interviews (Abawi, 2013). This current study employed a semi-structured interview, found in appendix A. This type of interview was chosen because it allows the interviewer room to ask further questions in addition to the original ones, and to elaborate further where the interviewee does not understand (Alshenqeeti, 2014). This allows for the accumulation of in-depth data.

The interviews were conducted in a face-to-face manner with the interviewer asking all the questions. This was done to save time and to allow the interviewer to simplify questions that were difficult to understand for the interviewees. The interviewees' answers were written down on paper during the interview. Before interviews were undertaken, the verbal and written consent of the participants was confirmed first.

The interviews were conducted with seven SMEs managers to find out information about activities that are affected by declining water quality, to determine how tourism has been influenced by water pollution and the resultant effects, and to find out ways in which poor water quality in the Loskop Dam can be mitigated. The examples of questions asked were on the importance of Loskop Dam on tourism and whether their businesses depend on tourism. The questions were both close ended and open ended in order to give the respondent room to explain further. All the interviews were concluded in one day with each interview taking approximately ten minutes. All the interviews were done at the managers' premises.

3.6.2. QUESTIONNAIRE INSTRUMENT

A questionnaire instrument was used to seek information from tourists and small and medium scale enterprise (SMEs) employees in the study area. This technique is used by researchers around the world. A questionnaire is a tool that is made up of several questions for obtaining information from participants (Abawi, 2013). Some of the advantages of using a questionnaire are that participants are allowed to remain anonymous, and also this data collection tool can be utilized to collect both qualitative and quantitative information (Abawi, 2013).

One of the easiest ways of approaching participants is by handing out the questionnaires directly to them. This is how there is a high chance of getting a high response rate (Mathers *et al.*, 2007). For this study, the questionnaires were given to the participants by hand. Some of the participants answered the questions in the presence of the researcher. This was done just in case there was something that required clarification. However, there were a few other respondents who preferred to take the questionnaires with them, answer them at their own time, and return them later.

When administering the questionnaires, most of the employees were approached during their working hours. Others were approached after work; this was a time when they were not busy and they had a few minutes to talk freely. The tourists were approached at any time of the day. Some of them were found tending to their fishing rods by the shore, while others were sitting by the campsite. Some of them even approached the researcher out of curiosity and asked to take part in the survey.

There were two different questionnaires for the two groups, found in appendix B and appendix C. The questions in both the surveys were both close-ended and open-ended; to give the participants room to explain or elaborate further where required. The questionnaires were written in English. For those who could not read or write, the researcher read and wrote for them. This group consisted of mostly older people. This is one of the reasons why the questionnaires were self-administered. Participants who are still in their youths had no problem with reading and writing for themselves.

The first questionnaire (appendix B) was conducted with 47 freshwater tourists to find information on how tourism has been influenced by water pollution, the resultant effects, and to find out ways in which poor water quality in the Loskop dam can be mitigated. The second questionnaire (appendix C) was conducted with 39 SMEs employees to find information on how tourism has been influenced by water pollution and the resultant effects. The survey took a period of five days.

3.6.3. OBSERVATION

Information about people, processes, and cultures has been collected using the observation method (Kawulich, 2012), amongst many other techniques. The same notion is shared by Driscoll (2011) as he states that observation refers to the act of watching and studying things, people, processes, behaviours, or cultures (Kawulich, 2012). The observation method is usually associated with taking photographs of what is being observed (Kawulich, 2012). Some researchers use observation as a way of verifying the data they have gathered (Kawulich, 2012).

One of the best things about the observation method is that it can be applied in both qualitative and quantitative approaches (Kawulich, 2012). Hence, the observation method was also used in this study. According to Kawulich (2012), researchers who use observation as their method of data collection have two types to choose from, direct observation and participant observation. The type of observation used in this study was direct observation. When using this type of observation method, the researcher does not interact with the objects while observing the setting (Kawulich, 2012). With participant observation, the researcher becomes both the observer and the participant at the same time (Kawulich, 2012). In this study, there was no interaction between the researcher and the objects and activities being observed.

When collecting data using the observation method for this study, a checklist (appendix D) was developed and used. The checklist items were in line with tourism activities, so the checklist helped the researcher to focus on activities that were occurring in the study area (Kawulich, 2012). The checklist consisted of two sections, one which had items related to the types of tourism activities that are practiced in Loskop Dam, and the other which had items that were related to tourism activities affected by declining water quality. The observation method was used to obtain

information on the types and number of tourism activities that are practiced in Loskop Dam and to identify activities affected by declining water quality. A few photographs were taken of the things that were observed.

3.6.4. INTERNET SEARCH

Internet research is part of secondary data. This is a type of data that is not collected by researchers themselves; instead, they obtain from other sources such as books, journals, documents, etc. Secondary data in this study was mostly used in chapter two. This is data obtained from journals and books that were obtained from the internet. In chapter four secondary data was used as well.

The journals and search engines that were used in this study include the African Journals Online (AJOL) and Water SA, Science Direct, Google Scholar, and Research Gate. Some of the phrases that were used while searching for information include tourism in South Africa, the importance of tourism, overview of tourism, the relationship between tourism and water resources, the relationship between tourism and the environment, and water pollution and tourism. From this internet search, more than a hundred articles were used for reference in this study.

3.7. DATA ANALYSIS AND PRESENTATION

Analysing data consists of scrutinizing the data and making sense of what is included in the data. Data analysis is further explained as the application of procedures or methods to get more defined results (Migrant & Seasonal Head Start Technical Assistance Center, 2006). There are different methods for analysing quantitative and qualitative data.

When analysing quantitative data, summary measures and variance measures are the main types of, or most common, statistical measures that are used by researchers. Information obtained using quantitative research methods can be generalized to represent the entire population (Rahman, 2017). When analysing qualitative data, the researcher tries to understand the data, identify important patterns, and then explain what the results mean (WHO, 2014). This is where the data is assigned codes and grouped into themes (Migrant & Seasonal Head Start Technical Assistance Center,

2006). At times, the problem under investigation can be better understood when using a mixed-method approach (WHO, 2014).

A mixed-method approach was used for this study. The summary and variance measures of the descriptive statistical analysis were used to analyse quantitative data. This was done by using the statistical software called the statistical package of social sciences (SPSS). From this software, the relationship between various variables, variances, frequencies, percentages, and significances was determined. This made it easier for the researcher to generalize to the entire population. A Chi-square test was used to measure the association between declined water quality and tourism and tourism activities. Qualitative data, on the other hand, was analysed by grouping similar responses into the same themes, which were later subjected to detailed interpretation.

The analysed data were subjected to in-depth interpretation (Migrant & Seasonal Head Start Technical Assistance Center, 2006) before conclusions and presentations. According to WHO (2014), data must be presented in the form of texts and visuals. This refers to diagrams, maps, graphs, tables (WHO, 2014), and charts. Using visuals helps with the identification of existing trends (WHO, 2014). For this study, the results obtained from the statistical analysis were presented in the form of charts, graphs, photographs, and tables; and the results of the qualitative approach are presented in text form.

Charts and graphs were mostly used to present data on the demographic characteristics of the respondents. The findings on the types of tourism activities that are affected by a decline in water quality are presented in the form of text and charts. Findings on the effect of declining water quality in Loskop Dam on tourism and tourism activities are presented using text form and charts. Lastly, findings on the mitigation and avoidance measures of the negative impacts of poor water quality are presented in the form of text and a table.

3.8. ETHICAL CONSIDERATIONS

3.8.1. PERMISSION

Permission was given by the owners and managers of the SMEs in Loskop to conduct a research study on their premises.

3.8.2. CONFIDENTIALITY

All the participants in this study- this includes tourists and SMEs managers and employees- were ensured of confidentiality and anonymity. However, participants who wanted to reveal their identity could do so of their own free will. That information is going to stay between the researcher, supervisor, and that specific participant.

3.8.3. CONSENT

Consent was obtained from both the SMEs managers and employees in verbal form and the tourists in written form. Because the SMEs managers and employees gave their consent in verbal form, they did not sign anything on paper. Even though they did not sign the consent forms (appendix E), the tourists wrote their details at the end of the questionnaire to show that they were willing to participate and that they are interested in the study as well as the outcome of the research, while the employees wrote their names at the beginning of the questionnaire.

An information sheet (appendix G) explaining the purpose of the study was given to the participants. This was in addition to the researcher or survey administrator explaining the aim of the study verbally. The information sheet included more details of the study. This was done so that the participants understand what they are giving consent for.

3.8.4. DATA ANONYMITY

The data collected will not be available to anyone other than the researcher or the supervisor. All the information the participants provided to the researcher was promised to remain confidential.

3.9. CONCLUSION

The focus of this chapter was on the methodology that was used in this study. The study employed both qualitative and quantitative approaches. The main tools used when collecting data were questionnaires and an interview. Information was gathered using both primary and secondary data sources. A small sample of the entire

population was used. Permission and consent were obtained before data could be collected, and the participants were ensured anonymity. Post-data collection, the data is analysed, discussed, and then presented as the results of the study. The study findings are presented in the next chapter.

CHAPTER 4

PRESENTATION OF RESEARCH FINDINGS AND DISCUSSION OF RESULTS

4.1. INTRODUCTION

In this chapter, the focus is to report on the results of the research that was undertaken to investigate the relationship between water quality and tourism at Loskop Dam. The results were obtained from information provided by enterprise managers or operators in and around Loskop Dam, individuals who fish at Loskop Dam for recreational purposes; hereafter referred to as tourists or freshwater tourists, and nearby community residents who are also employees at the Loskop tourism area. One tourism establishment, the Loskop Dam Forever Resorts, is an area where most of the information was gathered. This is where most of the people who come from nearby communities are employed and where the freshwater tourists were found. This information was obtained as described in chapter three. The results will be represented in the form of tables, graphs, and pie charts derived from descriptive statistics and frequency distributions.

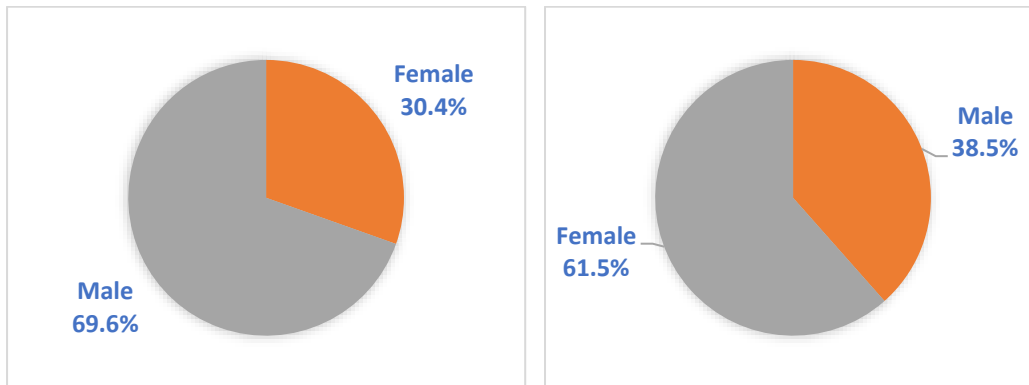
4.2. DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

The demographic characteristics of freshwater tourists (recreational fishers) and employees (nearby community residents) were obtained. This was done to get a background overview of the respondents looking at social and economic aspects. The demographic information includes gender, age, occupation, education, employment, and income factors.

4.2.1. GENDER OF RESPONDENTS

Figure 4.1 shows the gender of freshwater tourists. The results show that 69.6% of the people who participate in recreational fishing activities at Loskop Dam are male, while 30.4% are female. Male respondents dominated the survey conducted in the study area and this implies that recreational fishing is predominantly a male activity.

Figure 4.1 shows the gender of SMEs employees. The majority of the respondents were female, representing 61.5% while their male counterparts constitute 38.5%. This implies that the majority of the residents who come from nearby communities and work at Loskop Dam are females. This may be influenced by the type of jobs available at Loskop as most of the businesses are skewed towards accommodation and hospitality services, which is usually a female-dominated type of employment.



Figures 4.1: Gender of freshwater tourists (left) and SME employees (right).

4.2.2. AGE GROUP OF RESPONDENTS

Figure 4.2 (left) shows the age of freshwater tourists categorized into five age groups. The results indicate that the majority of the tourists fall within the age group 35 – 44. The age group 15 – 24 constituted 2.1%, age group 25 – 34 constituted 25.5%, age group 35 – 44 constituted 27.7%, age group 45 – 54 constituted 25.5%, and age group 55 and above constituted 19.1%. The proportion of respondents increased with the increasing age, but eventually declined as the age increased further. The results show that a minimal amount of the youth takes recreational fishing as a sport and that most tourists were in their 30s, 40s, and 50s.

Table 4.1 shows the average age group of freshwater tourists being 35 – 44. These are the people who have been fishing and coming to Loskop Dam for a long time.

Table 4.1: The average age group of freshwater tourists.

	N	Minimum	Maximum	Mean
Age group	47	1.0 (15 – 24)	5.0 (55 and above)	3.340 (35 – 44)

As seen from the results (Table 4.2), most of the employees fall within the age groups 26 – 35 and 36 – 45, both consisting of 14 respondents each. The minority age group is age group 46 – 55 with only 1 respondent. Figure 4.2 (right) shows that respondents who are in the age group 15 – 25 constitute 20.5%, age groups 26 – 35 and 36 – 45 both constitute 35.9% each, age group 46 – 55 constitute 2.6%, and age group of above 55 constitute 5.1%. This means that the majority of the SMEs employees are aged between 26 and 45. It is further found that on average most employees fall within the age group 26 – 35. Table 4.2 also shows the mode which indicates that the majority of respondents are aged between 26 and 35 years.

Table 4.2: Average age group of SMEs employees.

	Mean	Mode	Minimum	Maximum
Age group	2.36 (26 – 35)	2 (26 – 35)	1 (15 – 25)	5 (Above 55)

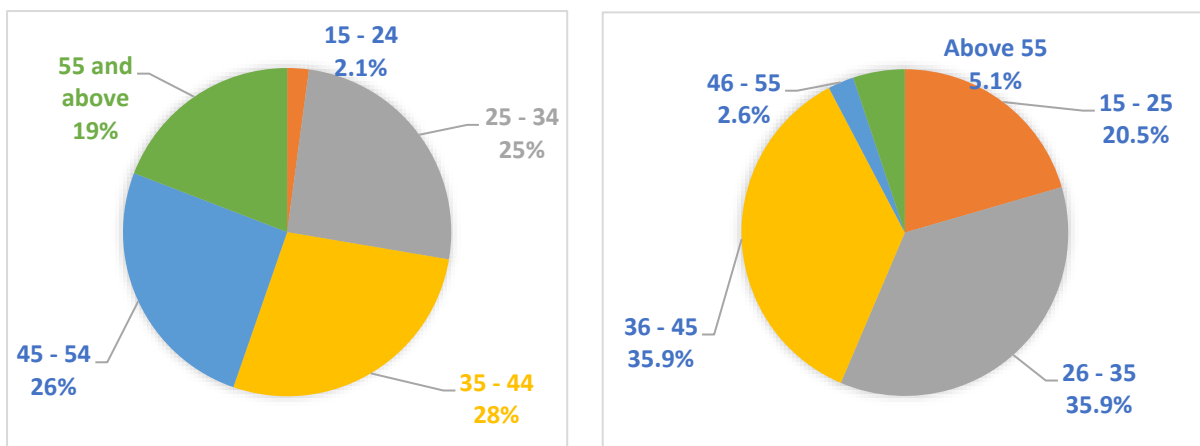


Figure 4.2: Age groups of the freshwater tourists (left) and SMEs employees (right).

4.2.3. EDUCATION LEVEL (SMEs EMPLOYEES)

Figure 4.3 shows that out of the 39 employees, the majority of them, that is 33, went to school until the secondary level. Only one respondent dropped out of school at the primary level, four went to tertiary, and one did not go to school at all. Respondents who received primary level education only constitute 2.6%, those who finished at secondary level constitutes 84.6%, tertiary education affiliates constitute 10.3%, and those who never went to school constitute 2.6%.

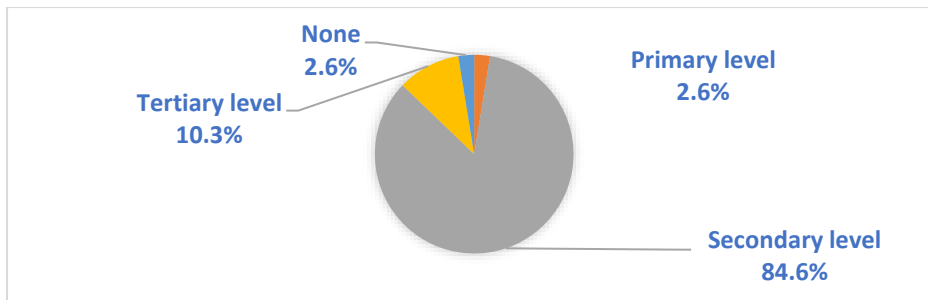


Figure 4.3: Education level of SMEs employees.

4.2.4. OCCUPATION OF RESPONDENTS (TOURISTS)

Figure 4.4 shows the occupation of freshwater tourists and it indicates that most of them are employed in the private sector (30 respondents). The results further show that only one respondent is not employed, whereas 5 of the respondents are employed by the government, and 3 are pensioners. The remaining respondents' occupations include agriculture, housewife, and logistics. Most of the respondents are in the working class, meaning that they have a satisfactory source of income. This is expected because the fishing sport is one of the few recreational activities that require participants to spend a large amount of money, with tourists' expenses consisting of fishing equipment, fuel, food, and accommodation.

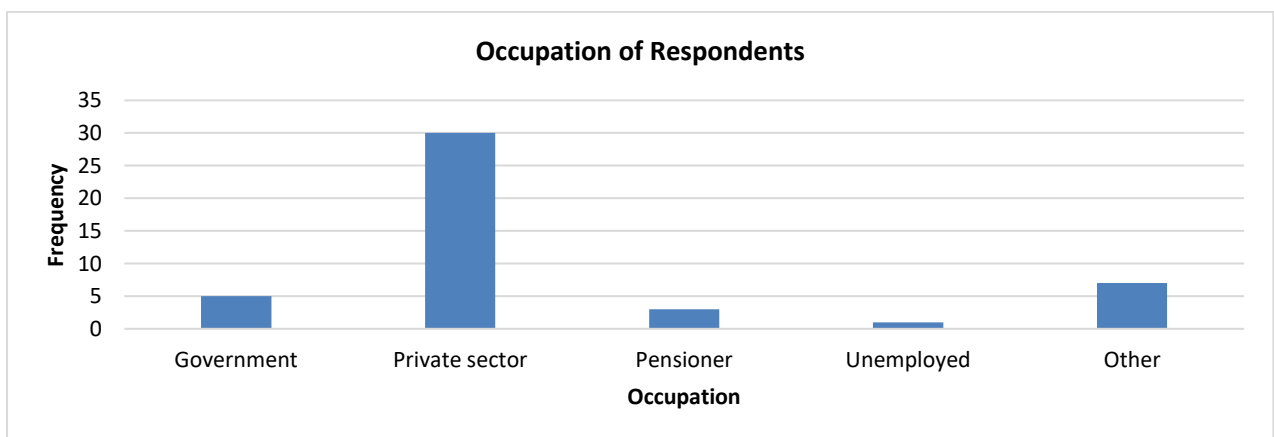


Figure 4.4: Occupation of freshwater tourists.

4.2.5. ANNUAL HOUSEHOLD GROSS INCOME PER ANNUM (TOURISTS)

Figure 4.5 shows the annual household gross income per annum organized into seven categories. According to the results, the majority of the tourists, that is 25%, earn an annual household gross income ranging between R500 000 and R750 000. The findings further indicate that 22.7% of the respondents earn less than R100 000 annual

household gross income, 13.6% earn between R100 000 and R250 000, 20.5% earn more than R250 000 but less than R500 000, and another 13.6% earn within the range of R750 000 and R1 000 000. Those who earn more than R1 000 000 but less than R1 500 000 and more than R1 500 000 per annum constitute 2.3% each.

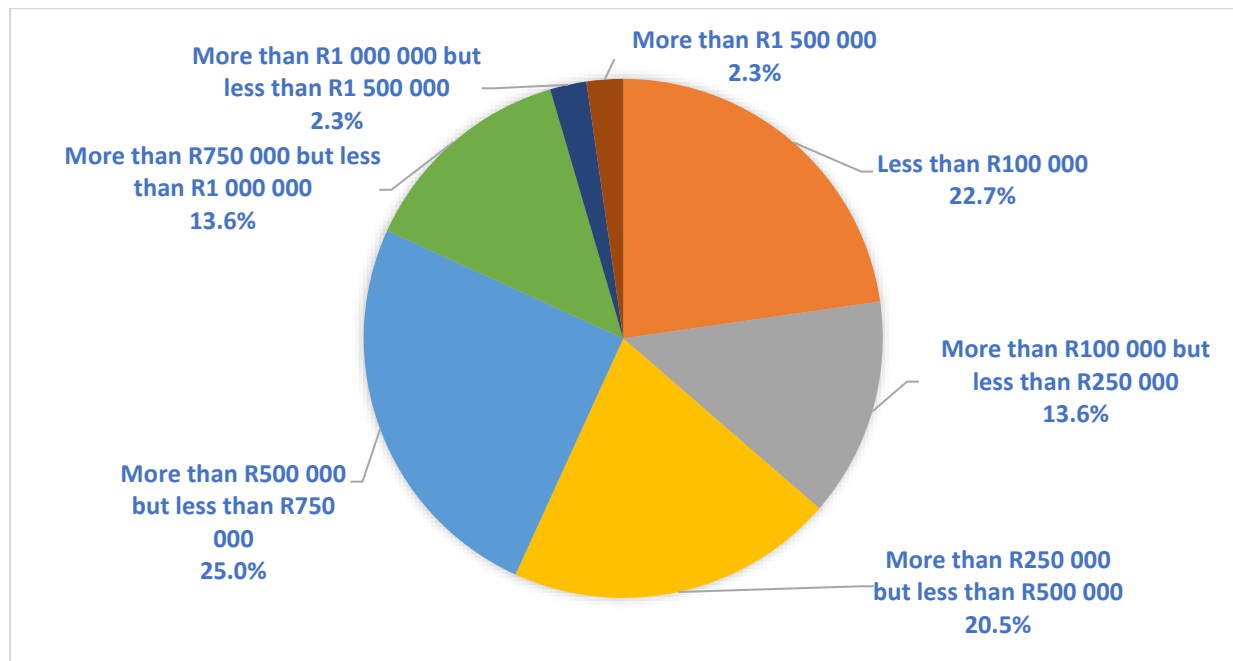


Figure 4.5: Tourists' annual household gross income per annum.

Table 4.3 shows that the mean annual household gross income is more than R250 000 but less than R500 000. These figures are not surprising as recreational fishing or angling is rather a costly activity, especially enrolling in the fishing competitions, hence those who participate in the sport are employed and earn incomes within these ranges.

Table 4.3: Tourists' average annual household gross income

	N	Minimum	Maximum	Mean
Annual household gross income	44	1.0 (Less than R100 000)	7.0 (More than R1 500 000)	3.091 (More than R250 000 but less than R500 000)

4.2.6. NUMBER OF HOUSEHOLD EARNERS (SMEs EMPLOYEES)

92.1% of the SMEs employees mentioned that members of their households who generate a portion of their total household income are employed in the tourism sector. Respondents with household members who receive government grants constitute

15.8%, and respondents with household members occupied in other sectors like the government and private sectors constitute 52.6%. This suggests that most of the employee's families depend on the tourism sector for income generation.

The average monthly income for household members working in the tourism sector is R3 685 while the average monthly income for household earners working in other sectors is R654. There was no data available to calculate the average monthly income for other sectors. The reason is that some respondents were reluctant to disclose their families' financial information.

4.3. TYPES OF TOURISM ACTIVITIES THAT ARE AFFECTED BY A DECLINE IN WATER QUALITY

Activities that are directly linked to or are dependent on water resources are the ones more likely to be impacted by a decline in water quality. One of the managers mentioned that due to the change in water quality, fewer people will come to Loskop for fishing. This is expected because fishing occurs directly in or on a water body and polluted water is not a suitable environment for certain fish species to survive in. This was shown by the terrible incidence of fish and crocodile mortality that occurred in Loskop Dam over a decade ago. Organisms that inhabit Loskop Dam were found to contain some metal contaminants like aluminium and iron (Dabrowski *et al.*, 2013). DWA (2011) states that Loskop Dam has experienced massive fish deaths due to high concentrations of aluminium. It, therefore, appears pointless to continue fishing in a polluted dam knowing there is no fish to catch or the fish is contaminated with chemicals.

Additionally, when the tourists were asked whether a decline in water quality will affect their willingness to fish at Loskop Dam or not, the majority (84.8%) gave a positive response (Yes), and the remaining 15.2% replied with a 'No' (figure 4.6). These findings indicate that fishing is the main tourism activity that is affected by a decline in water quality at Loskop Dam. This is highly due to the fact that fishing is a waterborne activity, therefore, it is susceptible to the negative impacts of poor water quality. This causes people to no longer see the dam as a suitable place for fishing activities and could cause them to stop visiting the area, and subsequently have an impact on camping, which is highly associated with fishing.

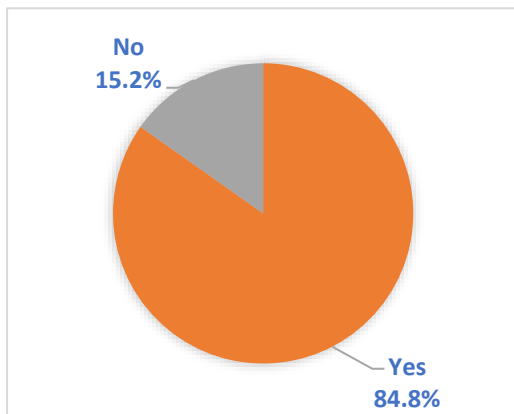


Figure 4.6: A decline in water quality will affect tourists' willingness to fish at Loskop Dam or not.

4.4. CAUSE AND EFFECT RELATIONSHIP BY IDENTIFYING HOW TOURISM AND TOURISM ACTIVITIES ARE AFFECTED BY DECLINING WATER QUALITY IN THE LOSKOP DAM

A cause-and-effect relationship is a type of relationship whereby one event is the reason for another event to happen. This relationship shows how one thing can affect another. In this case, this kind of relationship is determined between dam water quality and tourism activities. The cause is in most cases associated with the water of low quality, whereas the results or the effects vary.

There are some constituents, which when they exceed the TWQR, can present a threat to the environment by occurring at high levels (DWA, 2011). During the DWS' sampling period (2005-2020) in Loskop Dam, pH levels ranged from 6.65 to 9.41 (DWS, 2020), whereas the TWQR standard for pH is 6.5-8.5 (DWAF, 1996). This implies that there was a time when pH levels were higher than the recommended levels. These are not desirable levels for activities that involve people submerging in water. This can refer to activities such as swimming, diving, or even getting into the water to haul boats to the deck or to remove fishing nets from the water. The recommended pH level for swimming is between 6.5-7.6 (Ratajczak & Piotrowska, 2019). Being in contact with water not within this range can cause a health risk as it exposes people to some irritation (DWAF, 1996), and this may result in restrictions being put on these water-related activities.

Concerning clarity in water, Secchi disc depth samples were ranging from 0.001 m to 28 m (DWS, 2020). The Secchi disc depth samples being recorded at low levels means that the clarity level in the dam is low, making the dam water not suitable to be used for activities like swimming (DWAF, 1996) or diving. This is the case with turbidity as well. Clarity goes hand in hand with turbidity. The turbidity levels measured in the dam during the same period ranges from 0.5 to 70.6 NTU (Nephelometric Turbidity Unit) (DWS, 2020). These are fairly low to slightly high turbidity levels, and they suggest an interchange between high to low visibility of the dam water.

Lack of clarity or low visibility poses a danger to the safety of swimmers as they might get injured by suspended materials or objects in the water (DWAF, 1996). Fishing equipment (e.g. fishing rod) is likely to get damaged by suspended materials or objects (DWAF, 1996) when fishing in unclear water, and subsequently, increase the trip costs or take away the purpose or enjoyment factor of visiting Loskop.

Additionally, one of the employees at the Loskop Dam Nature Reserve mentioned that there was a foul smell coming from the dam a couple of years ago. This foul smell lasted for two months. It is not known what could have triggered the smell. The employee has no idea what was done to eradicate the smell; she thinks that the smell just disappeared on its own. The bad odour made the reserve less popular with tourists. The smell was so bad that it led to a reduced number of people visiting the reserve during that time. Had this foul smell continued for a longer period surely other economic activities as well as other tourism-based enterprises would have been affected and eventually would have had an impact on their economic activity.

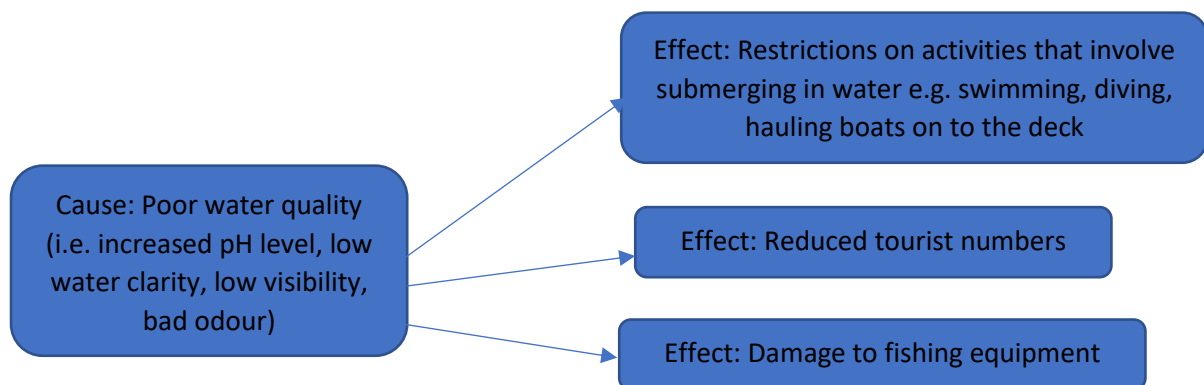


Figure 4.7: A diagram showing a cause-and-effect relationship between declined water quality and tourism (A).

4.4.1. SMEs MANAGERS' PERCEPTION ON THE EFFECT OF DECLINING WATER QUALITY ON TOURISM ACTIVITIES

Most business managers (71.4%) in and around Loskop Dam believe that the quality of water in Loskop Dam has changed over the last decade (figure 4.8), and very few of them think that this change was positive.

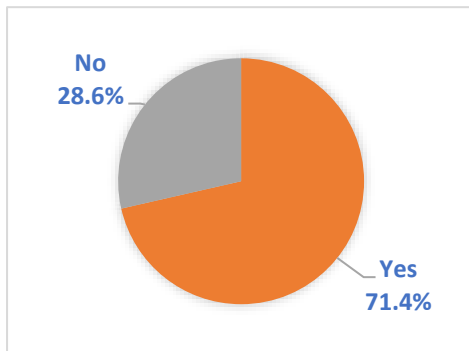


Figure 4.8: SMEs managers who think that water quality in Loskop Dam has changed.

As depicted in figure 4.9, 40% of the business managers have pointed out that the change in water quality in Loskop Dam affects tourism in the area, with their businesses included. One manager mentioned that the impact is felt when people stop coming to Loskop due to the fish die-offs caused by water pollution. Another manager noted that due to the change in water quality, fewer people come to Loskop for fishing, and as a result, equipment is not bought. This can only imply a negative change in water quality and shows that poor water quality is bad for the growth of both tourism and business operations around Loskop.

Every business is unique and the way that they are impacted also differs. The magnitude of how they are affected depends on a few aspects like the type of business and the location of the business. In this way, there will be some businesses that are greatly impacted while others are not impacted at all. Figure 4.10 shows that 66.7% of the businesses are significantly affected by the change of water quality in Loskop Dam, whilst 33.3% of the businesses are impacted very significantly. Either way, the impact that is felt by these businesses would leave businesses in a devastated state.

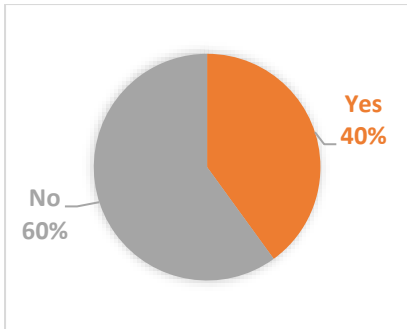


Figure 4.9: Proportion of managers who believe that tourism and linked business are affected by a change in water quality.

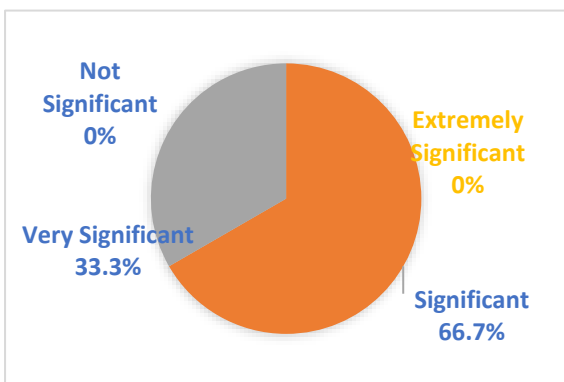


Figure 4.10: Significance of changed water quality's impact on businesses.

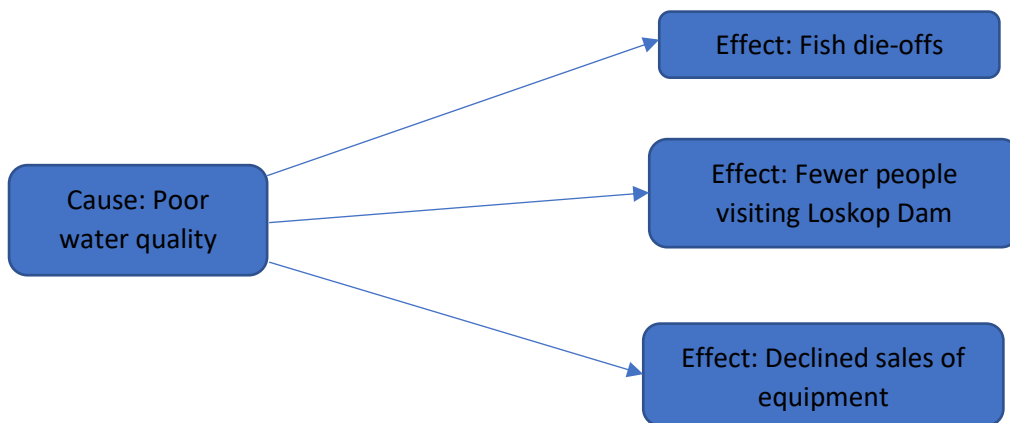


Figure 4.11: A diagram showing a cause-and-effect relationship between declined water quality and tourism (B).

4.4.2. TOURISTS' (RECREATIONAL FISHERS) PERCEPTION OF THE EFFECT OF DECLINING WATER QUALITY ON TOURISM ACTIVITIES

77.3% of the tourists think that the quality of water in Loskop Dam has changed over the last decade, while the remaining 22.7% do not share the same view (Figure 4.12). From the results, it was found that out of the total number of tourists who think that water quality in Loskop Dam has changed, 69.4% of that total believes that the change was positive, that water quality has improved, whilst 30.6% think that there has been a decline in water quality. This is shown in figure 4.13. Almost one-third of the total number of tourists believe that the quality of water in the Loskop Dam has declined.

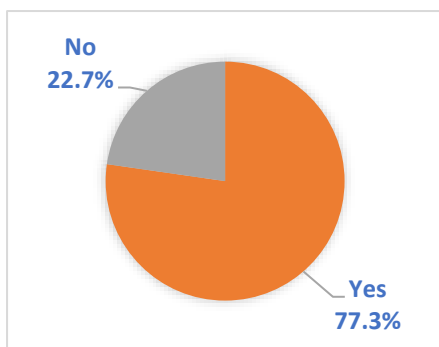


Figure 4.12: Freshwater tourists' view on whether water quality in Loskop Dam has changed or not.

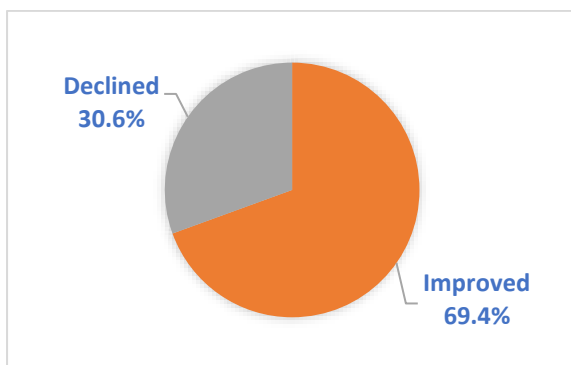


Figure 4.13: The proportion of tourists who believe that the change in water quality was positive or negative.

The majority of the tourists feel that their fishing activities are influenced by a change in water quality in Loskop Dam. Figure 4.14 shows that respondents who are affected by the change of water quality constitute 88.2% and those who are not affected constitute 11.8%. The respondents have explained how a negative change in water

quality in Loskop Dam affects their fishing activities. Below are some of the explanations from the respondents:

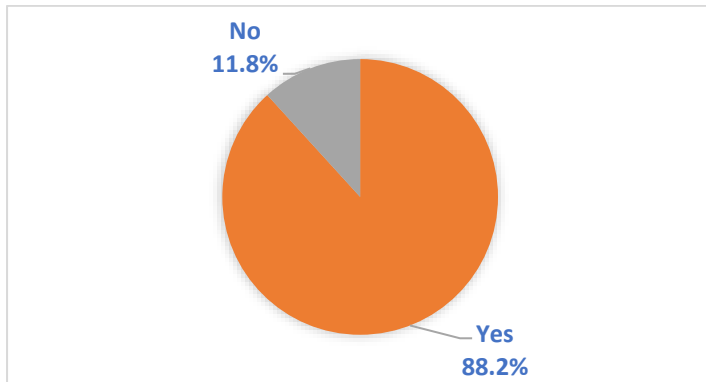


Figure 4.14: Proportion of tourists who feel that a change in water quality in Loskop Dam influences their fishing activities or not.

“When the quality is low, we don’t fish at Loskop”

Female aged between 45 – 54 years

“Pollution is decreasing oxygen in the water, there are now fish die-offs”

Female aged between 35 – 44 years

“Quantity of blue and red Tilapia is much less. Size of fish gets smaller every year”

Male aged 55 and above

“The dirtier the water, less fish; temperature also affects the amount of fish”

Male aged 55 and above

“If the water is polluted, the fish will die, meaning less fish to catch”

Male aged between 35 – 44 years

The tourists’ inputs highlight that a decline in water quality causes fish mortality, and subsequently a decline in the fish population. This is not good for their fishing activities because it results in the tourists catching smaller and fewer fish. Because of this, the tourists feel that a decrease in water quality in Loskop Dam will further affect their willingness to come to Loskop Dam for fishing in the future. This decision is further influenced by the fact that pollution also poses a health risk, and that it removes the

attractiveness of the natural resource. Below are more of the reasons why the tourists would decide to not fish in Loskop Dam anymore due to poor water quality.

“All the fish will die. No fish, no fishing for me and my family”

Female aged between 35 – 44 years

“Why would you bring your family to a polluted place?”

Male aged between 25 – 34 years

“It removes the attraction to visit”

Female aged between 45 – 54 years

“I actually would like to catch a fish, not lose it due to the line getting stuck”

Male aged between 35 – 44 years

“People will eventually get sick and with the less and small fish available it does not make sense to spend this amount of money to come to Loskop anymore”

Male aged 55 and above

“Bad conditions will scare away fishermen as it is unpleasant to fish in bad quality water. Bad smell.”

Male aged between 45 – 54 years

“If the quality decline it might lead to a health risk, especially for our baby”

Male aged between 35 – 44 years

With the most popular activity, which brings in a lot of tourists to the area being fishing, a decline in water quality does not look good for Loskop tourism and the surrounding businesses. A bulk of the tourists in Loskop Dam are interested in fishing and they are an important part of tourism in Loskop. However, water pollution is a threat to tourists and tourism, and will eventually lead to a reduced number of visitors in the area. If the situation is prolonged, tourism in Loskop will suffer.

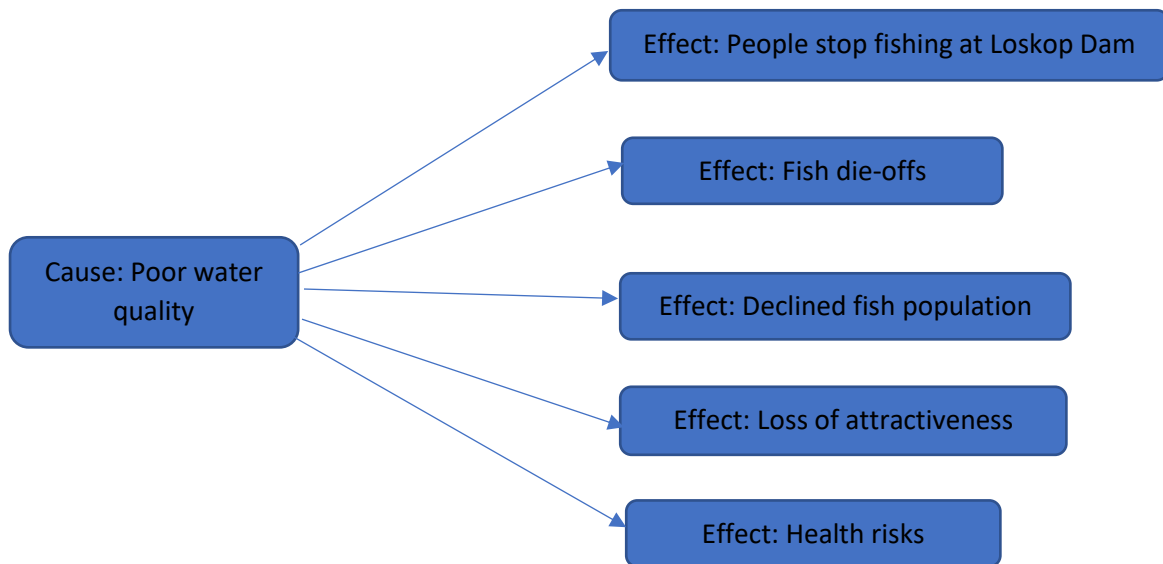


Figure 4.15: A diagram showing a cause-and-effect relationship between declined water quality and tourism (C).

4.4.3. SMEs EMPLOYEES' (COMMUNITY RESIDENTS) PERCEPTION ON THE EFFECT OF DECLINING WATER QUALITY ON TOURISM ACTIVITIES

Figure 4.16 indicates that most of the employees think that the quality of water in Loskop Dam has remained the same over the last decade. This majority is represented by 55.3%, whilst 44.7% believe that there have been some changes in water quality in Loskop Dam during that period. This is a different view from that of the managers and tourists. Amongst the employees who think that water quality in Loskop Dam has changed, 76.5% think that the change was positive (improved) whilst the remaining 23.5% think that it has rather declined. This is shown in figure 4.17.

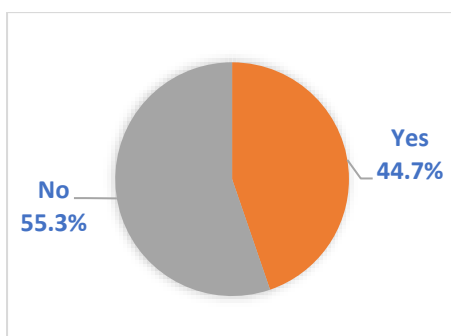


Figure 4.16: SMEs employees who think that water quality in Loskop Dam has changed.

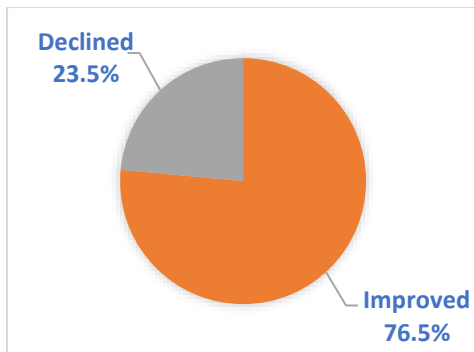


Figure 4.17: Employees' view on whether the change in water quality was positive or negative.

The change in water quality at Loskop Dam (good or bad) affects nearby communities to a certain extent. Figure 4.18 shows that 37.5% of the employees believe that the community was significantly affected by the change in water quality, another 25% said the effect was very significant, and 12.5% said the effect was extremely significant. This means that 75% of the respondents believe that a decline in water quality affects the community. This is likely to apply to individuals or families who depend on the tourism sector for a living.

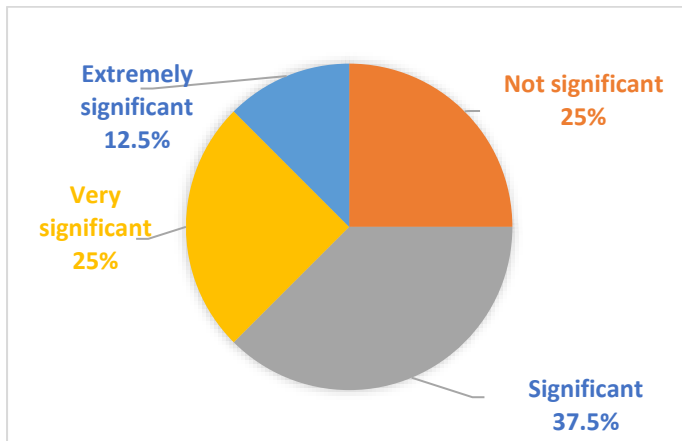


Figure 4.18: Significance of the impact of change in water quality on SMEs employees and their communities.

The employees have provided different reasons why they believe that a change in water quality, whether positive or negative, has a significant impact on their community. Below are some of their views.

“People will get employed if tourism is good”

Male aged between 36 – 45 years

“They hire the youth as casual workers”

Female aged between 36 – 45 years

“Loss of jobs – makes it hard to sustain our livelihoods”

Female aged above 55 years

“The community does not get water”

Female aged between 36 – 45 years

“Increased job opportunities and income”

Female aged between 36 – 45 years

A change in water quality affects tourism, therefore if the change is positive, tourism will continue to develop whereas a negative change in water quality causes tourism to lose its value. For example, the respondents highlighted that infrastructure deteriorates and tourist numbers are dwindling due to a decline in water quality. The deterioration of infrastructure likely happens due to neglect or being unattended when the business is operating at a slow rate. This will cause properties to lose their value and attractiveness.

The people from nearby communities are employed in different tourism businesses around Loskop, so any change affects them and their livelihoods. Improved water quality is good for business, and this means more jobs will be created and incomes will be generated, and with declined water quality, jobs are lost due to businesses facing difficulties.

4.4.4. THE FREQUENCY OF TRIPS MADE TO LOSKOP DAM BY TOURISTS

Figure 4.19 shows that majority of the respondents (41.3%) have been fishing recreationally for the longest time, that being more than 25 years of recreational fishing. Those that have been fishing for less than 5 years and between 6 – 10 years constitute 8.7% respectively, 11 – 15 years of recreational fishing constitute 10.9%, 16 – 20 years constitute 17.4%, and 21 – 25 years constitute 13.0%. This indicate that most of the tourist at Loskop Dam have been fishing recreationally for many years. On average, respondents have been fishing recreationally 16 – 20 years.

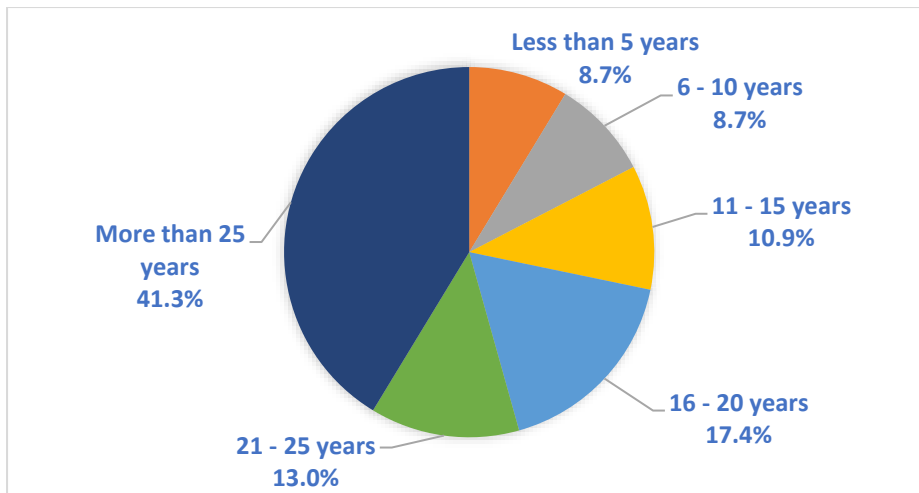


Figure 4.19 Respondents' years of recreational fishing

Most of the respondents make more than 10 trips in year to do recreational fishing. Figure 4.20 shows that 15.2% take between 1 and 3 trips per year, 21.7% take 4 to 6 trips in a year, 17.4% makes 7 to 10 trips in a year, and 45.7% travels more than 10 times per year. On average, respondents make 7 – 10 trips in a year to do recreational fishing. The respondents who do not travel much usually travel when they have entered a fishing competition.

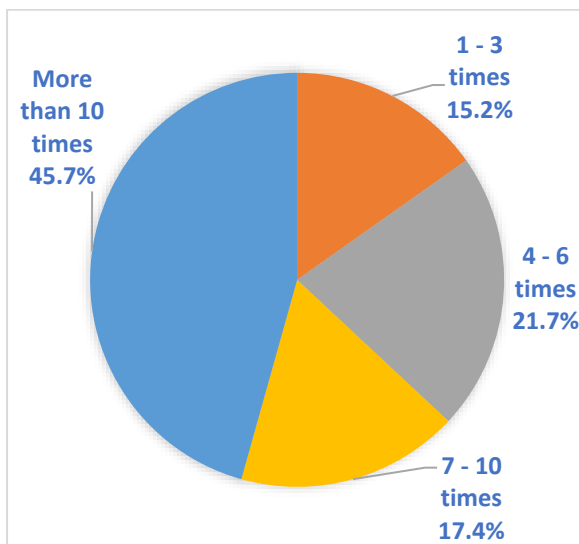


Figure 4.20 Number of trips respondents make in a year to do recreational fishing

The findings as shown in figure 4.21 indicate that respondents who enter fishing competitions two and three times in a single year constitute the highest percentage. Those respondents make up 24.4% each. Respondents who enter fishing competitions once a year constitute 8.9%, whereas 17.8 % enter fishing competitions

four times per year, 4.4% enter five times per year, and 20.1% of the respondents enter the competitions more than five times.

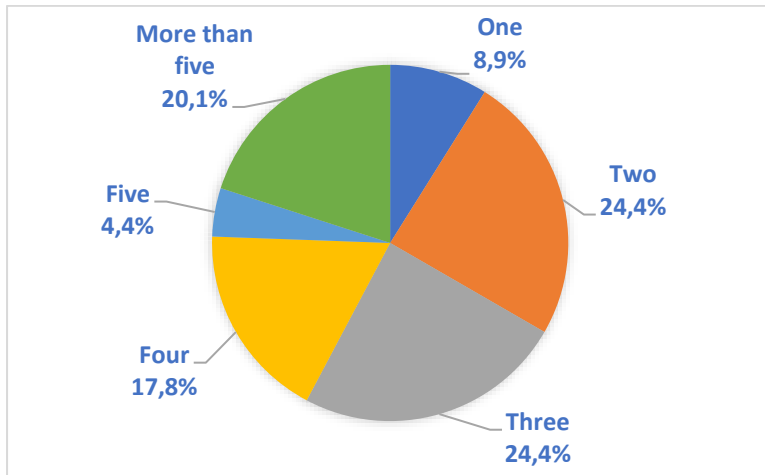


Figure 4.21 Average number of fishing competition respondents enter per year

While visiting Loskop Dam for fishing, the respondents spend more than just one day. It is found that 13.0% spend between one to two days, 23.9% spend two to three days, 30.4% spend three to four days, 10.9% spend four to five days, and 21.7% spend more than five days away from home on a single fishing trip at Loskop Dam. Those who spend more than one day at Loskop Dam usually do so when there is a fishing competition. They arrive at Loskop Dam days before the competition starts and stay there until the prize giving or a day after the prize giving (Figure 4.22). The average number of days respondents spend at Loskop Dam is 3 – 4 days in a single fishing trip, with a minimum of 1 – 2 days and a maximum of more than 5 days.

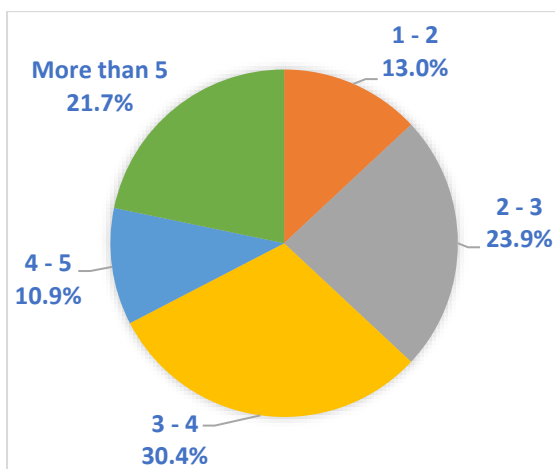


Figure 4.22 Days respondents spend away from home on a single fishing trip at Loskop Dam

The results show that most of the respondents spend more than 10 days in a year on all their fishing trips, in that particular year. This majority is constituted by 57.8% of the respondents. Only one respondent spends between 1 and 2 days a year on all their fishing trips. This might mean that they make only one or two fishing trips per year. The findings as shown in figure 4.23 indicate that 2.2% spend 1 – 2 days, 6.7% spend 3 – 4 days, 4.4% spend 5 – 6 days, 8.9% spend 7 – 8 days, 20.0% spend 9 – 10 days, and 57.8% spend more than 10 days on a fishing trip per year. On average, respondents spend 9 – 10 days per year on a fishing trip.

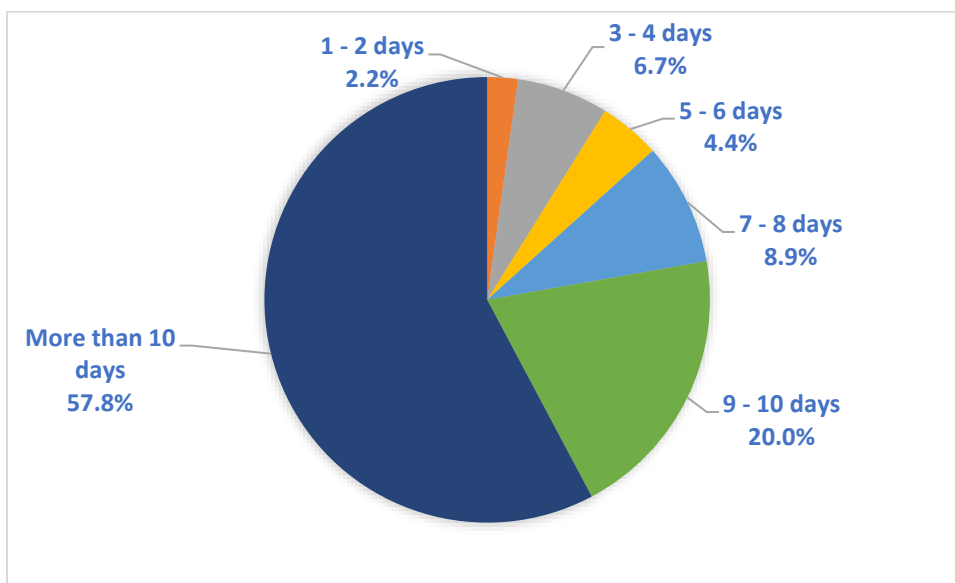


Figure 4.23 The number of days respondents spend on a fishing trip per year

This information on trips made to the Loskop Dam by tourists indicates that these respondents are frequent visitors of the area and that they have been visiting for a long time. This makes them the relevant people to give reliable information about Loskop Dam activities.

4.4.5. THE ASSOCIATION BETWEEN THE IMPACT OF POOR WATER QUALITY AND TOURISM USING THE CHI-SQUARED TEST

The association between water quality and tourism was measured using the Chi-square test. This was done by looking at the effect of poor water quality on tourism and tourism activities, obtaining this information from two of the Loskop Dam

stakeholders; this is the tourists and managers. The aim is to know whether there is a significant association between Loskop Dam’s poor water quality and tourism.

The two groups made of managers and tourists constitute 315 stakeholders and a random sample size of 39. The null hypothesis is that tourism is independent of declined water quality. All the stakeholders were asked whether a decline in water quality affects tourism. For Tourists, 30 replied ‘Yes’ and 4 replied ‘No’, and for managers, 2 replied ‘Yes’ and 3 replied ‘No’.

Null hypothesis: Tourism and tourism activities are independent of the declined water quality in Loskop Dam.

Alternative hypothesis: Loskop tourism is dependent on water quality.

The hypothesis is tested by comparing what would be expected if the hypothesis were true, against what was observed. What was observed is that 32 respondents (both tourists and managers) opine that tourism is affected. This is 32 out of 39, or 82.1%. Again, 7 respondents (both tourists and managers) opine that tourism is not affected. This is 7 out of 39, or 17.9%. Thus, if there is no association between tourism and water quality, 82.1% of tourism operations or activities are expected to be affected regardless.

Table 4.4: Contingency table of the observed values

Affected			
	Yes	No	Total
Tourists	30	4	34
Managers	2	3	5
Total	32	7	39

The total of rows is divided by the overall total to estimate what proportion of the 315 are tourists and managers who believe that tourism is affected by poor water quality

or not. The expected values are calculated under the assumption that the null hypothesis is true. The expected values follow below: -

Expected values

$$\text{Expected Value} \approx \text{row total} \times \frac{\text{column total}}{\text{grand total}} \quad 1$$

Table 4.5: A contingency table showing both the observed and expected values

Affected			
	Yes	No	Total
Tourists	30 (27.9)	4 (6.1)	34
Managers	2 (4.1)	3 (0.9)	5
Total	32	7	39

The expected number of tourists who believe that tourism is affected by water pollution is 27.90, whilst the expected number of tourists who do not believe that tourism is affected by water pollution is 6.10. On the other hand, the expected number of managers who believe that tourism is affected by water pollution is 4.10, whereas the expected number of managers who do not believe that tourism is affected by water pollution is 0.90.

The value of x^2

$$x^2 = \sum \frac{(O_i - E_i)^2}{E_i} \quad 2$$

x^2 = Chi-squared

O_i = Observed value

E_i = Expected value

Table 4.6: The determination of the χ^2

Observed	Expected	Obs-Exp	(Obs-Exp) ²	(Obs-Exp) ² /Exp
30	27.9	2.1	4.41	0.16
4	6.1	-2.1	4.41	0.72
2	4.1	-2.1	4.41	1.08
3	0.9	2.1	4.41	4.9
				6.86

Thus, the value of $\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i} = 6.86$

Degree of freedom

$$df = (\text{number of rows}-1) (\text{number of columns}-1) \quad 3$$

$$df = (2-1) (2-1) = 1$$

From the chi-squared table, the critical chi-squared at 0.05 significance level is given by 3.84. Hence null hypothesis is rejected if χ^2 is greater than 3.84, and accepted if χ^2 is smaller than 3.84.

$\chi^2 > 3.84$; therefore, the null hypothesis is rejected.

The above chi-square test suggests that there is an association between declined water quality and tourism in Loskop Dam. This means that tourism in Loskop Dam is affected by a decline in water quality.

This can be taken to mean that tourism in the area flourishes when the water quality is good and that it declines when the water quality is bad. The respondents' opinion that the water quality in Loskop dam has improved could be in comparison to the last time they witnessed the dam in a devastating state. That does not mean that the water quality is in a desirable state yet.

4.5. CONSIDERATIONS ON THE MITIGATION AND AVOIDANCE MEASURES OF THE NEGATIVE IMPACTS OF POOR WATER QUALITY, AND WAYS TO PROMOTE SUSTAINABLE TOURISM

The tourism sector plays a huge role in the world's social and economic growth through the creation of jobs and income. This sector is arguably one of the most important economic sectors (Nepal *et al.*, 2019; Michailidou *et al.*, 2016). However, environmental degradation has become a threat to the progression of this sector. Therefore, it deems fit for tourism establishments to at least be at the centre or be the leaders of pollution reduction practices (Muhanna, 2006), more so because they rely on the environment, a clean environment for that matter, for their businesses to flourish. Deteriorated water quality is usually associated with economic, social, and some health impacts. The development of mitigation measures seems to be necessary if these impacts are to be dealt with.

Concerning Loskop Dam, the owners of the dam, and all the entities that benefit from using the dam, should work together to help clean the dam and ensure proper and reliable management of the dam. Half the number of business operators or managers in this study mentioned that they are involved in water pollution management and impact mitigation actions. Their efforts consist of cleaning up the dam, working with authorities to clean up hyacinth, pulling plants out of the dam by hands, and working on projects that aim to eradicate hyacinth. Enterprises linked to tourism must contribute to the management or prevention of water pollution in Loskop Dam since the dam plays a major role in tourism and businesses in and around the area. This would eventually contribute to a reduction in water pollution.

The tourists interviewed in this study shared ideas of what they think could be done to prevent further deterioration of water quality in Loskop Dam. Some of them opine that good management and awareness are the solutions, while others think that clean-up and maintenance will prevent or solve the issue of deterioration of water quality in Loskop Dam. Written below are some of their opinions:

“Good monitoring of the dam”

Male aged 55 and above

“The pollution from upstream should be stopped or minimized”

Male between aged 35 – 44 years

“Management on the mine effluents”

Male aged between 25 – 34 years

“Clean up Olifants River and Middelburg sewage streaming into the river”

Male aged between 45 – 54 years

“Legislation to stop pollution. Stop licensing of water rights and mining in water-sensitive areas. Stop municipal sewage to flow into rivers and streams”

Male aged 55 and above

“Stricter rules, better conservation, implementing fines for littering”

Female aged between 45 – 54 years

“People need to change (more aware of pollution). Proper disposal of waste materials”

Female aged between 25 – 35 years

“Hyacinth – remove it”

Male aged between 45 – 54 years

Seeing that tourists care about the tourism area, maybe it would be a good idea to incorporate them into plans and strategies that aim to combat the problem of water pollution. Having more people from different backgrounds with different perspectives will help to broaden the sphere of ideas that could be explored.

These ideas can be obtained by asking every tourist on their arrival to write down things to avoid doing that will lead to contamination of the dam, and also write down the things that will contribute to improving/sustaining the quality of the dam water. This can also be a way of making sure that they do not forget to have the best interest of the dam before, during, and after their visit. To motivate cooperation, prizes could be given to those who came up with the best idea and did what they said they would do.

Different measures exist across the world and a few of these existing measures could be used to work for the betterment of the Loskop Dam. The following measures as

proposed by Bakibinga-Ibembe *et al.*, (2011) can be applied or implemented to minimize pollution and resultant impacts in Loskop Dam:

Biological Control Agents

The growth of algal blooms makes tourism areas appear unattractive to visitors. If the blooms are severe, the odour that develops from them can drive visitors away. This will hurt the tourism industry. To avoid this from happening, biological control agents (BCA) such as viral pathogens and bacterial agents can be used to control algal blooms. BCAs are a better option compared to chemical control measures because they do not pose a threat to the environment or the safety of other organisms (Gumbo *et al.*, 2008). The introduction of control agents will assist in reducing the number of algae that covers the dam water and will eventually eliminate eutrophication problems and improve the aesthetic value of the dam.

Awareness Campaign

According to Muhanna (2006), some of the causes of the deterioration of natural resources are poor environmental practices and lack of public participation in pollution and waste management practices. An awareness programme was implemented in Malaysia to rehabilitate and reduce or alleviate the pollution of the Lakes in Kelana Jaya Municipal Park. This awareness programme included community residents, students, parents, and teachers. The programme helped to restore the quality of the Lakes and reduced the number of contaminated substances being discharged into the lakes (Leendertse *et al.*, 2008).

The programme initiated in Malaysia has enabled the Lakes to be used again for fishing and recreation activities. The people are now enjoying the benefits of a healthy environment. This programme has shown that involving people in environmental management is of great importance. People need to know the role that the environment plays in their lives, how important it is, and what is it they need to do to protect it, and what the consequences of neglecting it are.

Therefore, to minimize environmental concerns, an awareness campaign on environmental protection and preservation targeting the public, visitors, private organizations, and maybe government organizations need to be implemented in

Loskop Dam. People also need to be made aware of the repercussions of incorrect disposal of wastewater through these awareness campaigns (DWS, 2018b). This will help to relieve some of the pressure that is inflicted on the dam and enable the dam to be useful also to future generations.

Polluter-Pays Principle

The polluter-pays principle is one of the good strategies that is used to reduce pollution and its impacts. Muhanna (2006) states that this principle forces parties who cause pollution to take full responsibility in remediating the effects of pollution. Pollution emanating from firms or industries can be minimized if the firms are made to pay for the remediation of the impact caused by their operations (Zhang *et al.*, 2019). By implementing this principle, most industries will become reluctant to discharge waste into water resources. They would not want to do something they know will cost them in one way or another.

The polluter-pays principle is somewhat similar to the waste discharge charge whereby the perpetrators bear the cost of their inappropriate actions. Operational mines, industries, or power stations' reduction of the waste load is influenced by the implementation of this charge (DWA, 2011) and the polluter-pays principle. By forcing the perpetrators to pay for the betterment of the environment, these principles will eventually result in reduced contamination of water resources and also ensure that the impact of pollution is less felt. It would make a huge difference if the remediation occurs immediately after the pollution.

A recurring charge or payment should be implemented for industries that are known to continuously release wastewater into water resources. This money will be used specifically to maintain the good quality of affected or threatened water resources. This could be a monthly or quarterly payment and the fee will be dependent on the amount of waste that is projected to be released. If the amount of waste discharged is greater than it was anticipated to be, then the charge or fine should be topped up.

Controlled Wastewater Release

The controlled release of mine water is a strategy that helps to maintain good water quality (DWS, 2018). With this strategy, water is released at a certain time and to a

certain limit as opposed to mines and industries releasing any amount of wastewater at any time. This strategy was introduced in Bronkhorstspuit (South Africa) and it was a success (DWS, 2018). Controlling how and when waste material enters water resources affords the affected resource time to filter or dilute pollutants as they would be in small and manageable amounts. The adoption of this strategy contributes to keeping water resources in a good and healthy state.

Proper Infrastructure

Reducing the amount of waste that is being discharged into water resources from dysfunctional infrastructures helps to minimize the level of acidity in water resources. To reduce waste load, defunct mines, sanitation systems, and WWTPs have to be renewed or upgraded to a state whereby they will be able to manage the load they are designed to take (DWA, 2011), and they should always be inspected (DWA, 2011) to ensure continuous good management of waste loadings.

Additionally, the construction of mine water reclamation plants is a good initiative for treating excess water coming from mines before it can be discharged into water resources (DWS, 2018). In addition, contamination from industrial runoff can be reduced by implementing retention ponds (DWS, 2018b). Retention ponds help to manage stormwater. Rainfall water is stored in retention ponds to prevent surface runoff (DWS, 2018). These structures help to avoid events of flooding or a situation whereby harmful chemicals and minerals are drained into nearby water resources. They further contribute to a decrease in pollution and turn to promote water of good quality in river systems and other water resources. The same notion is shared by Cullis *et al.* (2018) who expressed that clean technology plays a big role in the reduction of water pollution at the source.

Table 4.7 presents a summary of the mitigation and avoidance measures of water pollution. In part with minimizing water pollution and its impacts, these measures present a way of promoting sustainable and prolonged use of water resources. The best measures must be implemented to avoid wasting resources and time on measures that are not effective and do not produce desirable results. Protecting water resources enables their continuous use and ensures the safety of living organisms

using that resource. This is further demonstrated in the form of a conceptual model in figure 4.25.

Table 4.7: Mitigation and avoidance measures to reduce and manage the negative impacts of water pollution.

Problem	Impact	Goal	Measure
Water pollution or declining water quality	Damage to fishing equipment	Reduced water pollution or improved water quality	Establishment of projects to remove and eradicate hyacinth; clean up rivers and sewage streaming into the river; pollution from upstream should be stopped or minimized; limit or control the use of fertilizers or other chemicals in agricultural activities; proper reclamation and rehabilitation of closed and non-functional mines; management of mine effluents; proper disposal of materials; prohibit or limit the disposal of mine waste into freshwater systems; people need to change (be more aware of the pollution); awareness or education on keeping the environment clean; good management and monitoring of the dam health; continued maintenance of infrastructure; practice catch and release; reduce water contact; the use of BCAs to control algal blooms; the construction of wetlands; enforcement of the polluter-pays principle; controlled release of mine wastewater; Sustainable use of the resource needs to be promoted.
	Reduction in the number of visitors		
	Declined fish population/fish mortality		
	Disturbed fishing activities		
	Business slows down		
	Loss of attractiveness		
	Loss of jobs		
	Health scare/risks		



Figure 4.24: A board showing fish quantity restrictions at Loskop Dam (Photograph credit: T.R. Makwela, 2018)

All these measures can ensure that the quality of water resources in the Olifants River Catchment is maintained to a good standard. With Loskop Dam being the centre of attraction, tourism businesses are likely to suffer economically due to water pollution, which might lead to business shutdowns, thereafter resulting in job losses and loss of income generation; but if the quality of water resources that feed into Loskop Dam is of good quality, then tourism in the area will not be threatened. When the aquatic ecosystem is in a good state of health, businesses run smoothly, tourists' and reserve animals' health will not be put at risk, and this will promote successful tourism industry.

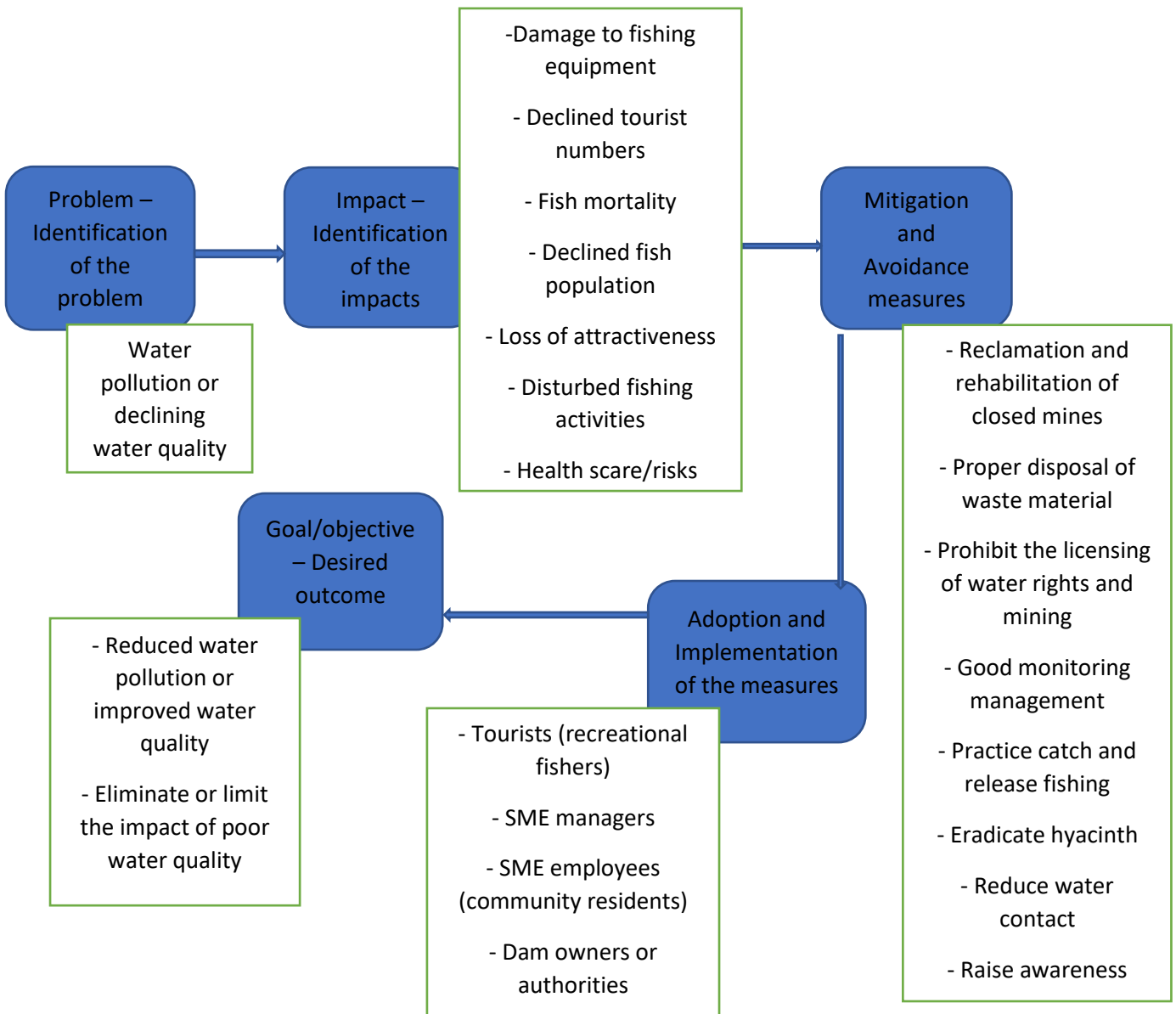


Figure 4.25: A conceptual model of mitigation and avoidance measures of the negative impacts of poor water quality.

4.6. CONCLUSION

This chapter focused on the analysis, presentation, and discussions of the results of the data that was collected using questionnaires and interviews. The results included information on the demographic attributes of the respondents as well as their perspectives on the relationship between the Loskop Dam, tourism, and water quality. The discussion was aided by the presentation of findings using charts, a graph, photographs, and tables. The next chapter will summarise and conclude the whole research.

CHAPTER 5

SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

5.1. INTRODUCTION

This chapter presents a summary of the findings of the conducted study. Research of this dissertation was motivated by an academic interest to evaluate the impact of water quality on water-borne recreational activities in Loskop Dam. This is because besides the provision of water to agriculture, mining, household activities, and industrial activities, dam water is also used for recreation, and the quality of water may have an impact on the development of such activities.

5.2. SUMMARY OF THE STUDY

In light of the aim of the study, objectives that were pursued include:

- Identification of the types of tourism activities that have been affected by declining water quality
- The establishment of the geographic element of cause-and-effect relationship by identifying how the tourism activities have been affected by declining water quality in the Loskop Dam
- The development of a suitable model for future considerations on how to mitigate the negative impacts of poor water quality on tourism in Loskop Dam, and promote sustainable tourism at Loskop Dam

Both qualitative and quantitative methods were applied in this study. The research participants consisted of SMEs managers and employees, and tourists. The number of participants who took part in this study was 93; 7 managers, 39 employees, and 47 tourists. The sampling methods that were used were purposive sampling for the managers and systematic random sampling to select the employees and tourists.

Data collection methods that were employed include two different questionnaires for the employees and tourists, an interview that was conducted with the managers, an extraction of secondary data, and an observation method. Ethical codes were considered and followed when the study was being carried out. The data were

analysed through the use of SPSS and later presented in the form of texts, tables, graphs, and charts in chapter four.

5.3. SUMMARY OF FINDINGS

Tourism is a sector that is for the most part dependent on water resources. The findings showed an overview of the relationship between tourism in Loskop and the water quality of the Loskop Dam, as this was the aim of the study.

Factors such as gender, age, and education level of the respondents did not have that much of an impact on the results. It was expected that respondents who did not finish school or have a lower level of education would not be able to answer some of the questions, but that was not the case. Most of them were able to answer the questions, given that the researcher explained the questions to make them clearer. They were surprisingly knowledgeable about what is happening around Loskop Dam.

The findings are as follows:

Objective 1: Identify the types of tourism activities that have been affected by declining water quality

The findings revealed that the main tourism activity that is vulnerable to a decline in water quality in Loskop Dam is fishing. A decline in water quality results in a decrease in the fish species population. This negatively affects tourists' fishing activities because fish mortality means there would be no fish to catch. This supports a notion by Oh & Ditton (2005) that poor water quality affects fishing activities. Some tourists indicated that they would stop coming to Loskop Dam for fishing in the future because of water pollution. No one appreciates the sight of a polluted water resource. Polluted water is not aesthetically appealing and is not conducive to human health. Therefore, it is not surprising that tourists would no longer see a reason to visit or engage with such phenomena. The findings reveal that a low number of tourism activities are affected by a decline in water quality in Loskop Dam. These affected activities comprise mostly water-based activities. In addition to fishing, other water-based activities that are vulnerable to a decline in water quality include swimming and boating.

From this finding, it can be said that water-based tourism activities are the ones that stand to be impacted by a decline in water quality.

Objective 2: Establish a geographic element of cause-and-effect relationship by identifying how the tourism activities have been affected by declining water quality in the Loskop Dam

The results indicate a high level of pH in the dam. This is not suitable for swimming activities because it leads to some irritation. The fact that poor water quality exposes people to health risks aligns with De Stefano (2004). The results also show low clarity and turbidity in the dam. Low clarity and turbidity of a water resource may result in an individual being injured while swimming. In addition, fishing equipment might get damaged by suspended objects in unclear waters. Furthermore, a bad odour leads to a reduced number of visitors in the tourism area. This is in agreement with Dokulil (2014) who mentioned that bad odour keeps tourists away.

A decline in water quality affects the fishing activities of tourists because low water quality results in fish mortality. Some tourists feel that they will stop coming to Loskop for fishing in the future due to a decline in water quality. Lack of aesthetic value, decreasing fish population, and health risks are the factors that influence the tourists' decisions. In the Possum Kingdom Lake, in Texas, the anglers also considered stopping fishing in the Lake as a result of water pollution (Oh & Ditton, 2005). The findings further show that business managers in Loskop Dam indicated that a decline in water quality negatively affects their businesses; they get fewer customers as a result of the reduced number of tourists visiting the area. This is similar to what was experienced by businesses in Possum Kingdom Lake (Krelling *et al.*, 2017). From the SME employees' perspective, a decline in water quality results in job losses and subsequently disturbs their livelihoods.

The findings reveal that a decline in water quality harms tourism; businesses linked to tourism or businesses that offer tourism-related services, tourists, as well as people who are employed in the tourism sector are affected.

Objective 3: Develop a suitable model for future considerations on how to mitigate the negative impacts of poor water quality on tourism in Loskop Dam, and promote sustainable tourism at Loskop Dam

In an attempt to tackle the issue of poor water quality, first, the problem has to be identified, followed by the identification of the potential impacts that could arise from the problem. Next, establish the mitigation and avoidance measures to deal with those impacts, then have those measures implemented to realize the ultimate objective of seeing a reduction in water pollution or improved water quality.

The following are measures that can be implemented through the collaboration between all the stakeholders of the Loskop Dam to minimize the impact of declined water quality and contribute to tourism development.

- Establishment of projects to remove and eradicate hyacinth
- Pollution from upstream should be stopped or minimized; limit or control the use of fertilizers or other chemicals in agricultural activities;
- Proper reclamation and rehabilitation of closed and non-functional mines; management of mine effluents; proper disposal of materials; prohibit or limit the disposal of mine waste into freshwater systems;
- People need to change (be more aware of the pollution); awareness or education on keeping the environment clean;
- Good management and monitoring of the dam health;
- Practice catch and release; reduce water contact;
- The use of biological control agents to control algal blooms;
- Sustainable use of the resource needs to be promoted;
- The construction of wetlands;
- Enforcement of the polluter-pays principle;
- Controlled release of mine wastewater.

5.4. RECOMMENDATIONS FOR FURTHER STUDIES

- i. Research should be done on the dam regularly so that information about the health of the dam is always updated and available to interested parties.
- ii. Research on this topic could be done in other areas around the country to make comparisons with the current study or to add more information relating to this topic
- iii. More research is needed to determine the relationship between tourism in Loskop and the Loskop Dam

5.5. LIMITATIONS

A few restrictions or limitations were encountered while conducting this study. It is almost inevitable for a research study to come out without having at least one restriction. For this study, the scarcity of previous research that aligns with the topic of the current research, or lack thereof, and not having enough time to collect data were the deficiencies. Previous research would have made up a big part of the literature review section. Due to time constraints, the researcher was limited to access only the respondents (tourists and employees) of one tourism establishment, and this might not yield a general response from these groups. In addition, some of the participants were reluctant to take part in the study, making it hard for the researcher to obtain data. Therefore, due to these restrictions, the sample size calculated for the study was not fully covered, as a result, raising the question of whether the sample size represents the population or not.

5.6. CONCLUSION

Loskop Dam is surrounded by other economic activities like agriculture and mining. Together all these activities have been found to have an impact on the quality of water in Loskop Dam. There are traces of different types of pollutants in the dam. The presence of pollutants is an indication of unprecedented activity, and even though the low levels of constituents seemed to imply no alarming threat to tourism operations in the area, that does not take away the potential negative impact on tourism if the poor quality of water was to upsurge. From the research, it is apparent that tourism and tourism operations in the area are affected by a decline in water quality. Recreational tourism activities that are affected are fishing, swimming, and boating. In other words, this means that water-based activities like fishing, swimming, or boating become suspended as a result of water pollution.

The research aimed to find out the impact of declining water quality on tourism in Loskop Dam, which negatively influences tourists to visit the Loskop Dam tourism area. Businesses also suffer and employees could end up losing their jobs and a source of income. Thus, the hypothesis is accepted. The mainstream impacts are socially and economically embedded. Tourism-linked businesses mostly feel the

impact economically, whereas the social impact is felt by the tourists, and employees are impacted both socially and economically.

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APPENDICES

APPENDIX A

RESEARCH PROJECT ON THE IMPACT OF DECLINING WATER QUALITY ON TOURISM IN LOSKOP DAM

Interview Guide for Business Owners / Enterprise Managers

1. Type of business

Travel Services	1
Transportation	2
Accommodation	3
Food and beverage services	4
Recreation and entertainment	5
Other (Specify)	6

2. How long has your business been operating?

Less than 5 years	1
5 – 10 years	2
10 – 15 years	3
15 – 20 years	4
More than 20 years	5

3. How many people do you employ?

Permanent	1
Seasonal (additional to permanent e.g. peak holiday season)	2
Casual (additional to permanent and seasonal e.g. short periods overfishing competition)	3

4. How would you describe the state of tourism in Loskop?

Very poor	1
Poor	2
Good	3
Very good	4
Extremely good	5

5. Why do you think this?

6. How important is Loskop Dam to local tourism in general?

Not Important	1
Important	2
Very Important	3
Extremely Important	4

7. Please tick the most important / biggest tourism activities that are practiced in Loskop Dam area?

Fishing	1	Hiking	5
Boat rides	2	Camping	6
Bird watching	3	Water sports	7
Game viewing by boat	4	Other (Specify)	8

8. Does your business depend on tourism in Loskop Dam?

Yes	1
No (if no please go straight to Q13)	2

9. If yes, how important is Loskop Dam to your business?

Not Important	1
Important	2
Very Important	3
Extremely Important	4

10. How much does your business increase by on average during the fishing competitions taking place in Loskop Dam?

Less than 10% more	1	30 – 40% more	5
10 – 20% more	2	40 – 50% more	6
20 – 30% more	3	More than 50 more	7

No difference	4	Business decreases	8
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11. Please estimate your gross turnover per month outside of the fishing competitions (i.e. in months no fishing competitions in Loskop Dam)?

12. What other benefits (non-monetary benefits) does your business receive from tourism activities linked to Loskop Dam?

13. What is your view on the state of water quality in Loskop Dam? Has there been any change over the past 10 years?

Yes	1
No (if no please go straight to Q22)	2

14. If Yes, please explain how

15. If Yes, has the change in water quality in Loskop Dam affected tourism and your business?

Yes	1
No (if no please go straight to Q18)	2

16. If Yes, please explain what the impact has been

17. How significant is the impact for your business?

Not significant	1
Significant	2
Very Significant	3
Extremely significant	4

18. If No, what did you do to manage or avoid any impact to your business?

19. Have you ever been involved in activities that aim to manage water pollution in Loskop Dam and mitigate the impacts on tourism?

Yes	1
No (If No, Go straight to Q22)	2

20. If yes, please describe the activities

21. What are the challenges or barriers that you encounter in managing water pollution and mitigating the impacts?

22. Do you think a decrease in water quality in future will affect your business?

Yes	1
No	2

23. If Yes, please explain why and how

APPENDIX B

RESEARCH PROJECT ON THE IMPACT OF DECLINING WATER QUALITY ON TOURISM IN LOSKOP DAM

Questionnaire for Freshwater Tourists

1. Gender

Female	1
Male	2

2. Age Group

15 - 24	1
25 - 34	2
35 - 44	3
45 - 54	4
55 and above	5

3. Occupation (Tick, if relevant)

Tourism Industry	Government	Private Sector	Pensioner	Unemployed	Other (Please Specify)
1	2	3	4	5	6

4. Annual household gross income per annum (Tick relevant category)

Less than R100 000	1
More than R100 000 but less than R250 000	2
More than R250 000 but less than R500 000	3
More than R500 000 but less than R750 000	4
More than R750 000 but less than R1 000 000	5
More than R1 000 000 but less than R1 500 000	6
More than R1 500 000	7

5. How long have you been fishing recreationally (years)? (Tick relevant category)

Less than 5 years	1
6 – 10 years	2
11 – 15 years	3
16 – 20 years	4

21 – 25 years	5
26 – 30 years	6
More than 30 years	7

6. In a year, how many trips do you make to do recreational fishing (other than competitions)?

1 – 3 times	4 – 6 times	7 – 10 times	More than 10 times
1	2	3	4

7. On average, how many fishing competitions do you enter per year?

One	Two	Three	Four	Five	More than 5
1	2	3	4	5	6

8. How many days do you spend away from home, on a single fishing trip in Loskop Dam?

Number of Days	1 - 2	2 - 3	3 - 4	4 - 5	More than 5
	1	2	3	3	4

9. How many days do you spend on a fishing trip per year?

1 – 2 days	3 – 4 days	5 – 6 days	7 – 8 days	9 – 10 days	More than 10 days
1	2	3	4	5	6

10. How far is Loskop Dam from your home? (in KM) _____

11. On average, how much money do you spend during a single fishing competition at Loskop Dam?

Expenses per trip	Total Spend (including purchases and expenditure at home before you come to Loskop)	% Spend specifically in Loskop home area (i.e. excluding purchases before your arrival)
Accommodation (Lodges, hotels, B&B, etc.)		
Food (Restaurant, shops)		

Fishing Equipment (Rods, lures, bait, etc.)		
Transportation (Fuel, car rental,		
Shopping (Souvenirs)		
Other (please specify)		

12. How do you benefit from holidays/fishing competitions at Loskop Dam (what motivates you to visit)?

Enjoying nature and outdoors	1	Spending time with friends	7
Rest and relaxation	2	Spending time alone	8
Challenge and competition	3	Family cohesion	9
Learn new fishing skills	4	Catch big fish	10
Catch and eat fish	5	Catch many fish	11
Creating friendships	6	Other (please specify)	12

13. What do you do with the fish that you catch in Loskop Dam?

Keep and eat	1
Catch and release	2
Give away	3

14. Do you think the water quality in Loskop Dam has changed over the past 10 years?

Yes	1
No (If No please go straight to Q19 below)	2

15. If Yes, how has it changed?

Improved	1
Declined	2

16. What do you think is the cause of this change?

17. Does the change in water quality in Loskop Dam affect your fishing activities?

Yes	1
No	2

18. If Yes, how does this change affect you?

19. Do you think a decrease in water quality in future will affect your willingness to come to Loskop Dam to fish?

Yes	1
No	2

20. If Yes, please explain why and how

21. What do you think could be done to prevent/fix the deterioration of water quality in Loskop Dam?

22. What non-fishing tourism activities do you take participate in while you are visiting Loskop Dam?

Activity	Tick, if yes	Average spend /cost per visit to Loskop	Activity	Tick if yes	Average spend /cost per visit to Loskop
Conservation activities			Game viewing by boat		
Game reserve visit			Bird watching		
Camping			Biking		
Visiting restaurants			Buying crafts and curios		
Hiking			Other (Specify)		

23. Do you have any suggestion of other new non-fishing tourism activities that can be introduced in Loskop Dam that would increase the attraction to visit the area?

24. Do you contribute to conservation of Loskop Dam and surrounding environment?

Yes	1
No	2

25. If yes, how do you contribute to conservation of Loskop Dam and surrounding environment?

APPENDIX C

RESEARCH PROJECT ON THE IMPACT OF DECLINING WATER QUALITY ON TOURISM IN LOSKOP DAM

Questionnaire for Employees

1. Name of Respondent _____

2. Name of Residential Area _____

3. Number of household members _____

4. Gender:

Male	1
Female	2

5. Age Group:

15 - 25	1
26 - 35	2
36 - 45	3
46 - 55	4
Above 55	5

6. Education Level

Primary Level	Secondary Level	Tertiary Level (Degree/Diploma/Certificate)	None
1	2	3	4

7. Occupation

Tourism	Government	Private Sector	Pensioner	Unemployed	Other (specify)
1	2	3	4	5	6

8. Number of household earners

Activity	Number of household members	Average amount per month
	earning income	in total (R)

Tourism Sector:		
Provide goods and services (specify)		
Tour guide		
Provide labour		
Property rental		
Other (specify)		
Agriculture sector (farming)		
Government grant		
Other (Specify)		

9. Do you think tourism in Loskop dam has changed over the last decade?

Yes	1
No (If No, go to Q14)	2

10. If yes, has it deteriorated or improved?

Deteriorated	1
Improved	2
Don't Know	3

11. If there has been a change, what do you think could be the cause?

Deteriorated		Improved	
Water pollution	1	Good infrastructure	1
Deteriorated infrastructure	2	Increased tourist numbers	2
Declined tourist numbers	3	Good service provision	3
Poor service provision	4	Ensured security	4
Other (Specify)	5	Water quality	5
		Other (Specify)	6

12. Has the change affected your household?

Yes	1
No	2

13. If Yes, How?

14. Do you participate in tourism-related activities as a tourist, employee, or entrepreneur (self-employed)? (can answer more than one)

Tourist	1
Employee	2
Self-employed	3

15. If you participate as a worker/entrepreneur in the tourism sector, what is the type of work you do?

Transportation (e.g. taxi driver, bus driver, chauffeurs)	1
Lodging (e.g. owner, manager, housekeeper)	2
Entertainment (e.g. tour guide, event planner, recreation attendant)	3
Food and catering (e.g. food outlet owner, manager, cook)	4
Other (Specify)	5

16. How long have you been working in that business?

Less than 5 years	1
5 – 14 years	2
15 – 24 years	3
25 – 34 years	4
Above 35 years	5

17. If you are an employee in the tourism business, what is your individual employment type?

Permanent	1
Temporary	2
Self-employed	3
Seasonal	4
Other (Specify)	5

18. What sorts of benefits do you get from the tourism sector at Loskop Dam?

Job Opportunities	1	Food Security	5
Employment	2	Poverty Alleviation	6
Income	3	Nothing	7

Economic Security	4	Other (Specify)	8
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19. What is the impact of tourism activities at Loskop Dam on the community as a whole?

20. Do you think the quality of water in Loskop Dam has changed over the past ten years?

Yes	1
No (If No, go to Q26)	2

21. If yes, how has it changed?

Improved	1
Declined	2

22. If there has been a decline, what caused it?

Agricultural land use	1
Increasing population from business around the dam	2
Development of the tourism area	3
Human and other waste disposals (Sewage)	4
Mining waste in the upper catchment (AMD)	5
Other (Specify)	6

23. How is tourism in Loskop Dam affected by the change in water quality?

24. What is the significance of this effect on the community?

Not Significant	Significant	Very Significant	Extremely Significant
1	2	3	4

25. Why do you think this?

26. Do local authorities, tourism organizations or fishing groups help economic development among local communities?

Yes	1
No	2
Don't know	3

27. If Yes, how

28. Are the local people involved in the conservation of the natural areas that support tourism around Loskop Dam?

Yes	1
No	2

29. If Yes, how

30. What new opportunities do you think there are for small-scale tourism enterprises in the Loskop Dam area to benefit the local communities?

31. What are the challenges/barriers that prevent local residents from establishing these businesses in the tourism sector at Loskop Dam?

Education	1	Lack of social connections	5
Lack of skills	2	Policies	6
Distance	3	Other specify (might be more than 1)	7
Lack of capital	4		

APPENDIX D

RESEARCH PROJECT ON THE IMPACT OF DECLINING WATER QUALITY ON TOURISM IN LOSKOP DAM

Observation Checklist

1. Types of tourism activities that are practiced in Loskop.

- 1.1. Fishing
- 1.2. Boat riding
- 1.3. Camping
- 1.4. Bird watching
- 1.5. Game viewing by boat
- 1.6. Hiking
- 1.7. Water sports

2. Tourism activities affected by declining water quality.

- 1.1. Fishing
- 1.2. Boat riding
- 1.3. Camping
- 1.4. Bird watching
- 1.5. Game viewing by boat
- 1.6. Hiking
- 1.7. Water sports

APPENDIX E

Consent Form for Participants

I hereby agree to participate in research on the impacts of declining water quality on tourism in Loskop Dam conducted by Miss Makwela. I understand that I am not forced to participate, and I can stop participating at any point I feel like not continuing. I understand that this is a research project whose purpose is not necessarily to benefit me personally. I understand that my participation and the information I provide will remain confidential.

.....

Signature of participant

.....

Date

APPENDIX F

Information Sheet



Institute of
Natural Resources



EXPLORING THE RELATIONSHIP BETWEEN WATER QUALITY, RECREATIONAL FISHING AND TOURISM AT LOSKOP DAM

This survey is being undertaken by the Institute of Natural Resources in collaboration with the University of Limpopo, to investigate the relationship between freshwater systems and tourism linked to Loskop Dam. The survey forms part of a South African Water Research Commission funded research project titled “The inland water related tourism in South Africa by 2030 in the light of global change”. The project explores the links between the environment (e.g. dams, rivers, wetlands), tourism and global change (e.g. climate change, ecosystem transformation, and pollution), and the influence this has on the development potential of the tourism sector and its contribution to generating economic benefits and supporting development.

This survey is an important component of the Loskop Dam case study, to explore the relationship between water quality, recreational fishing and tourism. A second case study is also being undertaken on the Dusi/Umgeni River system (in KwaZulu-Natal).

The information and understanding gained from the project will be used to:

- Provide information to inform the identification of risks to the tourism sector, and its development potential, driven by water quality and quantity in our river systems
- Describe water based tourism potential as a driver of small and medium scale enterprise development
- Identify policy gaps and mitigation measures necessary to support tourism (in the context of threats to freshwater systems)

The final output will be a report to the Water Research Commission which will be shared with all stakeholders.

Recreational fishing is an important part of the tourism economy at Loskop Dam. Therefore your support by completing this survey questionnaire will be a valuable contribution to this study and we thank you in advance for your assistance. Providing your name and contact details is optional and you are welcome to remain anonymous. If you provide your contact details we will be happy to share the final project report with you. If you would like more information about the survey or the larger project please feel free to contact us:



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