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INYUVESI YASETHEKWINI YEZOBUCHWEPHESHE

The nature and extent of sustainable water management practices in the accommodation sector in Zimbabwe

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DECLARATION

I, Kudzai Norman Ushamba, do hereby declare that this research study is my own work carried out under the supervision of Dr Reshma Sucheran. I solemnly state that to the best of my knowledge, no part of this report has been submitted here or elsewhere in a previous application for award of a degree. All sources of knowledge used have been duly acknowledged.

Signature: **Date:** 23-01-21

DEDICATION

I dedicate this dissertation to my late sister Blessing Netsai Ushamba (14/11/1982 – 14/04/2013). Thank you for loving us. I know God took you earlier because you were His best.

I would also like to dedicate this work to all frontline health workers working tirelessly to save lives. Your sacrifice, commitment, and contribution in managing this virus is invaluable.

To future generations, may this work inspire you to identify and solve your community problems.

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ABSTRACT

International tourism has grown to become one of the largest economic sectors in the world. The growth of tourism is not merely taking place in the so-called developed economies, but also in developing economies. In Africa, the growth of tourism has led to the proliferation of many forms of accommodation and lodging facilities. With a significant number of African nations facing fresh-water problems, water stress has now become a challenge in most destinations. The accommodation sector of the tourism industry has been identified as one of the biggest consumers of water through its various activities and facilities. Tourism, a major fiscus contributor is crucial to the economy of Zimbabwe hence its sustainability is vital especially during this time when world is grappling climate change. The last two or more decades have witnessed the majority of Zimbabwean citizens facing fresh water supply problems, especially in cities and towns which are hotspots for tourism. This study examined the nature and extent of water management practices in the accommodation sector in Zimbabwe. The study examined the level of water use in the accommodation sector in Zimbabwe, and the extent to which water conservation practices are currently being undertaken by this sector. The study further examined challenges facing water conservation in the accommodation sector in Zimbabwe. A 'mixed method' research approach was used in this study. Questionnaires were administered to managers of 203 accommodation facilities in the country. Expert views were sort from key stakeholders whose organisations, regulations and policies affect the tourism industry. The study found that accommodation establishments in Zimbabwe have been reactive to climate change induced water stress and have been applying several water-conservation measures. The study also found that there is non-enforcement of regulations on government policies and lack of proper awareness as to the monetary benefits of practicing water conservation in the accommodation sector in Zimbabwe. The study concludes that without proper planning, communication, and enforcement of regulations large amounts of fresh water will continue to be wasted to the deprivation of communities.

LIST OF ACRONYMS

^{0}C	Degrees Celsius
CAMPFIRE	Communal Area Management Programme for Indigenous Resources
CSR	Corporate Social Responsibility
DMO	Destination Management Organisation
EMA	Environmental Management Agency
EMS	Environmental Management Systems
ESAP	Economic Structural Adjustment Programme
GDP	Gross Domestic Product
GoZ	Government of Zimbabwe
GPA	Global Political Agreement
HVAC	Heating Ventilation and Air Conditioning
KZN	KwaZulu-Natal
SPSS	Statistical Package for Social Sciences
TCA	Thematic Content Analysis
UAE	United Arab Emirates
UK	United Kingdom
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme.
UNFCCC	United Nations Framework Convention on Climate Change (UNFCCC,
UNWTO	United Nations World Tourism Organization
USA	United States of America
WRI	Water Research Institute
WSSD	World Summit on Sustainable Development
WTTC	World Travel and Tourism Council
ZINWA	Zimbabwe National Water Authority
ZNCCRS	Zimbabwe National Climate Change Response Strategy
ZNWP	Zimbabwe National Water Policy
ZTA	Zimbabwe Tourism Authority

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CHAPTER ONE: INTRODUCTION

1.1 Introduction

Globally, the tourism sector has been identified as one of the industries that consume vast amounts of water resources (Ranade, 2012:7; Gössling, Peeters, Hall, Ceron, Dubois and Scott, 2012:3). In the Southern African region, water resources and the reliant biodiversity are under threat from climate change (Dube and Nhamo, 2018:114). Warming trends, unstable rainfall patterns and lower than average winter temperatures have been recorded over the past 50 years with linkages to regional economic activities (Kusangaya, Warburton, Van Garderen and Jewitt, 2014:51; Dube and Nhamo, 2018:114). Indeed, impacts of climate change are being felt over the region's economy which relies heavily on water resources for growth in industries such as agriculture, mining, tourism, and wildlife management (Rurinda, Van Wijk, Mapfumo, Descheemaeker, Supit and Giller 2015:4588). In Zimbabwe, sectors that contribute to the economy, such as tourism, mining and agriculture rely heavily on water resources (Davis and Harji, 2014:1). With impacts of climate change tipped to intensify, sectors of the economy, such as agriculture and tourism, will be heavily affected by water supply, infectious diseases, heatwaves, floods, droughts, insects, and water-borne diseases. According to the United Nations World Tourism Organization [UNWTO] (UNWTO, 2018:10) these problems will influence tourist decision about where and when to travel.

Having understood the underlying threats climate change pose on the economy, in 1992, the Government of Zimbabwe (GoZ) joined the United Nations Framework Convention on Climate Change (UNFCCC, 2016: ii). This was done to enable international consultations, and to open ways for lines of credit for the common good. To further strengthen its commitment towards the global climate change agenda, during the late 1990s, the GoZ identified the need for water conservation and gazetted the Water Act [Chapter 20:22] (Zimbabwe, 1996). This was further developed and a new Water Act [Chapter 20:24] was ratified in 2000 (Zimbabwe, 1998). A water management agency was thereafter introduced, known as the Zimbabwe National Water Authority (ZINWA). ZINWA oversees the management, development, protection, conservation, and pricing of Zimbabwean waters (ZINWA, 2018). Since the

commencement of ZINWA, several policy documents have been drawn up to support water management, including the Zimbabwe National Water Policy [ZNWP] and the Zimbabwe National Climate Change Response Strategy [ZNCCRS] (Government of Zimbabwe, ZNWP 2012; Government of Zimbabwe, ZNCCRS 2014). The ZNCCRS is intended to promote sustainable economic development through mitigating and adapting to climate change, eradicating harmful means of production, and encouraging sustainable opportunities in all economic sectors (Government of Zimbabwe, 2014:9). In support of these commitments, regional researchers and international institutions provided recommendations for managing climate change and water resources at catchment, institutional and community level in Zimbabwe (Kusangaya *et al.,* 2014:52). These recommendations benefit farmers, miners, and ecologists whose livelihoods depend on water resources in food production, mineral extraction, wildlife and tourism management (Rurinda *et al.,* 2015:4588).

However, despite these developments and recommendations, Zimbabwe, a highly competitive tourist destination, is currently facing serious water supply problems especially in cities and towns which are hotspots for tourism (Davis and Harji 2014:22; Makurira and Tumbare, 2014:2). According to Dube and Nhamo (2018:114), the tourism sector depends on nature, hence any threats to the environment, poses serious threats to the industry. Moreover, given that the accommodation sector in Zimbabwe consumes large amounts of water and energy, continual water shortages will most likely affect growth and development of the tourism industry (Zengeni, Zengeni and Muzambi, 2013:65). Dinarès and Saurí (2015:625) claim that destinations without adequate water supply may suffer low tourist flows. Additionally, there is a possibility that certain areas will likely face water resource conflicts between hosts and guests as demand for water intensifies (Mowforth and Munt, 2009:251). There is, therefore, an urgent need for the tourism industry, and more especially the accommodation sector in Zimbabwe, to engage itself in sustainable water conservation practices and apply adaptation measures (Kaján and Saarinen, 2013:168). According to Hernandez and Ryan (2011:82) in the face of dire climate change consequences, tourism developers need to promote responsible tourism, energy and water supply management, linking these to climate variables such as precipitation and temperature.

This chapter introduces the study which examines the nature and extent of water management practices in the accommodation sector in Zimbabwe. More specifically, the chapter focuses on the problem statement, the aim and objectives of the study, the significance of the study, limitations and delimitations of the study, and a summary of the various chapters.

1.2 Problem Statement

The tourism industry in Zimbabwe utilizes and relies on ground and surface water as major sources of supply (Davis and Harji, 2014:1). The same water sources are shared between tourists and local communities. With a huge demand on water resources and evident threats of climate change, it is worrying to learn that there has been little effort put on the management, planning and development of water resources in Zimbabwe since the mid-1980s (Davis and Harji, 2014:2). As a consequence, the majority of Zimbabwean citizens are currently facing serious water supply problems, especially in cities and towns which are also tourist destinations (Makurira and Tumbare, 2014:2). Zimbabwe stands as a competitive tourist destination in Africa, receiving a large number of tourists every year (Tichaawa and Mhlanga, 2015:4). According to statistics released by the Zimbabwe Tourism Authority [ZTA], the country saw a 9% increase in tourist arrivals in 2015 from 1 880 028 in 2014 to 2 056 588 (ZTA, 2015:9). Statistical records for the past 7 years further indicate that tourist arrivals have been increasing since 2012, and if water supply problems continue at the destination, there is likely to be water resource concerns between the locals and the tourists (Mowforth and Munt, 2009:251).

Styles, Schoenberger and Galvez-Martos (2015:188) believe that many tourism destinations face water stress problems during dry seasons when demand for water by farmers is high and tourism is at its peak. Sloan, Legrand, and Chen (2013:95) concur by mentioning that popular tourist destinations are mostly found in areas that are warmer and dry, hence the demand for water by domestic users, farmers, and tourists usually leads to supply mismatches. As a result, it is important that water conservation measures be practiced by all sectors and institutions (Government of Zimbabwe, 2012:27-28). Eriksen, Nightingale and Eakin (2015:531) recommend that

social-political institutions should work together to bring about successful adaptation processes and measures for the benefit of the community.

1.3 Aim and objectives of the study.

1.3.1 Aim

This study aims to examine the nature and extent of water management practices in the accommodation sector in Zimbabwe.

1.3.2 Research objectives

In order to achieve the aim of this research, the following objectives are tendered:

- To ascertain the level of water consumption and sources of water for the accommodation sector in Zimbabwe;
- To examine the type of water management practices currently being undertaken by the accommodation sector in Zimbabwe;
- To examine the challenges facing water conservation and the benefits of water conservation in the accommodation sector in Zimbabwe.
- To make suggestions and recommendation for water conservation by the accommodation sector

1.3.3 Research questions

- What is the current extent of water usage in the accommodation sector in Zimbabwe?
- What are the sources of water supply for the accommodation sector in Zimbabwe?
- To what extent is the accommodation sector in Zimbabwe engaging in water conservation practices?
- What are the challenges facing water conservation in the accommodation sector in Zimbabwe?
- What are the benefits of water conservation practices in the accommodation sector in Zimbabwe?

1.4 Significance of the study

Several countries are facing freshwater problems and these problems are expected to escalate over the coming years (Sloan, Legrand, and Chen 2013:91; Ding and Ghosh 2017:2). Zimbabwe is no exceptional to these problems, as water stress issues are increasing and are expected to be elevated by warm temperatures, serious evaporation, and other climate change conditions (Davis and Harji, 2014:33). Zimbabwe is a land locked country with an economy that is heavily dependent on agriculture, mining, and tourism as fiscal contributors (Government of Zimbabwe, 2013:20). These economic drivers rely heavily on water resources; hence water is an integral part of the economy just as it is to all economies (Tom and Munemo 2015:63; Tichaawa and Mhlanga 2015:4).

The growth of the accommodation sector and water demand in recent years has been linked to the growth of tourism in popular tourist destinations, including Zimbabwe (Gössling *et al.* 2012:4). Indeed, the growth of the tourism sector has led to a rise in water demand which has forced businesses and locals to extract water from wells, a move that is leading to a conflict on water resources (LaVanchy, 2017:45). In many destinations, an increase in tourist arrivals puts pressure on water resources which both tourists and host communities need for drinking, cooking, cleaning, and washing. Today, there is overwhelming evidence showing several countries facing freshwater problems (Sloan, Legrand, and Chen, 2013:91). However, while many factors are contributing to water scarcity, the proliferation of accommodation facilities in popular tourist destinations has been exerting extensive pressure on local water resources (Gössling *et al.* 2012:1; LaVanchy, 2017:43).

In circles of research, the argument so far has been that the accommodation and lodging sector consumes large amounts of water through its various activities. This puts pressure on water resources which are vital to the protection and development of various communities. Kirk (1995 cited in Rahman, Reynolds and Svaren 2012:726) narrates that guests at accommodation facilities expect to find high pressure showers, the best swimming pools as well as fresh and clean towels and linen which all require substantial amounts of water. Indeed, changes in the availability and quality of water resources can have a detrimental effect on the accommodation sector and the tourism industry at large. To minimize the amount of fresh water used in the accommodation

sector, water management practices need to focus on controlling the amount of water used in the following areas: bathrooms, laundry, swimming pool area, grounds, kitchen and laundry (Kasim, Gursoy, Okumus and Wong 2014:1092). Against this backdrop, it is, therefore, important to conserve water in this sector for the benefit of both the accommodation sector and communities (Barberán, Egea, Gracia-de-Renteria and Salvador, 2013:188).

Extensive research on climate change, and water conservation in the accommodation sector has been done in Europe and some parts of Asia (Fang, Yin and Wu 2018:122). According to Hoogendoorn and Rogerson (2016:356), when it comes to climate change and tourism research output, Southern African countries are lagging behind, especially Botswana, Namibia, Mozambique and Zimbabwe; hence the need to produce research outputs which can benefit the region (Hoogendoorn and Fitchett, 2018:753). Against this backdrop and considering the gap in the literature on water management in the accommodation sector in Zimbabwe and the region, the aim of this research is to attempt to provide tangible evidence that will highlight the nature and extent of water conservation in the accommodation sector in Zimbabwe. The study will be of value to students, accommodation managers, environmentalists, developmental consultants, and economists interested in the subject of environmental management and water conservation practices in the accommodation sector. Furthermore, the research will propose ideas that the National Tourism, Water and Environmental Management Authorities can identify and use as performance benchmarks for the accommodation sector. In addition, the regional tourism organisations can also use the research to improve inter and intra destination collaborations for water management in the accommodation sector in Southern Africa.

1.5 Limitations and delimitations

1.5.1 Limitations

The study was confined to a particular group of individuals and a certain sector of the tourism industry which is the accommodation and lodging sector. Key respondents were individual managers from various types of accommodation establishments and five industry stakeholders who were willing to participate in the study. Moreover, as would be expected, views of accommodation managers differed according to type and

size of the accommodation establishment, number of rooms, service offered including facilities available, personality of regular customers, seasonality, occupancy rate, sources of water and location among other elements affecting the hospitality industry. These elements led to various responses which subsequently generated mixed results.

In addition, other limitations of this study concerned with the coordination of respondents, unit of analysis and the season when the surveys were undertaken. Firstly, this study focused on a contentious issue of water management and as a result some accommodation managers were reluctant to respond for fear of exposing themselves. Secondly, since studies like these are unusual in Zimbabwe, some difficulties in obtaining information were not anticipated including internet problems in some locations. This led to the printing of hard copy questionnaires for physical administration in areas where online administration had been anticipated. Thirdly, and as mentioned previously, the study's unit of analysis was just but one sector of the tourism industry – the accommodation and lodging sector amongst many others including attraction, transport, and amenity providers in the tourism industry.

Lastly, the season when the surveys were undertaken was the shoulder season to the peak season. This transition in seasons has its challenges, however, in this study, the transition was managed well through a guided data collection instrument which asked for average monthly water consumption instead of litres per guest per night which could have been misleading in our calculations.

1.5.2 Delimitations

In terms of delimitations, the study focused on the environmental management subject of water management amongst other environmental issues such as waste, energy, air quality, green procurement, and community awareness. This is because of interests in the subject of water stress in Zimbabwe and the critical need to address climate change induced problems and water management practices in Sub-Saharan Africa. Moreover, the study concentrated on water consumption and water conservation in the accommodation sector in Zimbabwe focusing on the accommodation managers as the main respondents.

Lastly, in this study, the researcher did not delve deeply into studying the engineering science of water management strategies in Zimbabwe because of the generality, scope, and purpose of this study.

1.6 Summary of chapters

Chapter One of the study outlines the problem statement, background of the study, aim and objectives, significance of the study, and the limitations and delimitations of the study. Chapter Two will provide an overview of the relevant literature pertaining to this study. The chapter will focus on debates, recommendations, and contradictions by authors on water management in the accommodation sector. Chapter Three will provide an overview of the research design which includes the study type, the study area, the purpose of the study, sample techniques utilized, and the population and sample selection criteria used. The chapter will also discuss the questionnaire design and administration, data analysis techniques used, and the reliability and validity of the study. Chapter Four will present the primary data collected from respondents. Presentation of data will be supported by interpretation and discussion of the results, with a critical analysis of the findings. Chapter Five will summarize the findings of the study and draw conclusions from the findings. The chapter will also offer recommendations for resolving the situation affecting water management in the accommodation sector in Zimbabwe.

1.7 Conclusion

Water stress is a challenge in most tourism destinations (Gössling *et al.* 2012:3; Cazcarro, Hoekstra and Choliz 2014:96; Styles *et al*. 2015:196). According to Sloan, Legrand, and Chen (2013:91), a significant number of African nations are facing fresh-water problems and millions of people throughout the continent are dying from preventable water-borne diseases. Gössling *et al.* (2012:3) reports that tourism is responsible for the use of millions of litres of fresh water every year and Charara, Cashman, Bonnell and Gehr (2011:232) stress that regulation of water use is lacking across the accommodation sector in many destinations. This study seeks to investigate the level of water use in the accommodation sector in Zimbabwe, and the extent to which water conservation practices are currently being undertaken by this sector. The study will further examine challenges facing water conservation in the

accommodation sector in Zimbabwe. The next chapter undertakes a review of national and international literature on water management generally and more specifically the accommodation sector in the tourism industry.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

International tourism has grown to become one of the largest economic sectors in the world (Scott and Gössling, 2015:270). The growth of tourism is not merely taking place in the so-called developed economies, but also in developing economies. Warren and Becken (2017:290) assert that emerging economies with their unique climate, seasonality and building systems are increasingly contributing to the growth of the tourism industry. Tourism growth requires support infrastructure and facilities such as roads, airports, hotels with swimming pools, golf courses, gardens, and other landscape features (LaVanchy, 2017:39). Numerous facilities and services of the tourism industry, especially the accommodation sector, need portable water to meet the growing tourism market. Ding and Ghosh (2017:1) postulate that given water scarcity is becoming a global issue, with the demand for water expected to exceed supply by 40 percent in 2030, proper management of water resources is now a necessity. This chapter examines arguments, discussions, comments, and recommendations made by various researchers on the subject of water management in the accommodation sector of the tourism industry. The chapter begins by discussing topics and subjects relating to the growth of the tourism sector globally and in Africa and the impacts thereof on water resources.

2.2 The growth of tourism

Since World War II, the tourism industry has grown at a rapid pace, and has become a vital sector in many countries and regions globally (UNWTO, 2018:2-3). Evidence indicates that, despite the challenges facing global economic growth, tourism numbers are surging every year, thereby demonstrating the sector's ability to withstand political, environmental and economic challenges. Figure 2.1 shows a sustained growth in tourist numbers between 2009 and 2017.

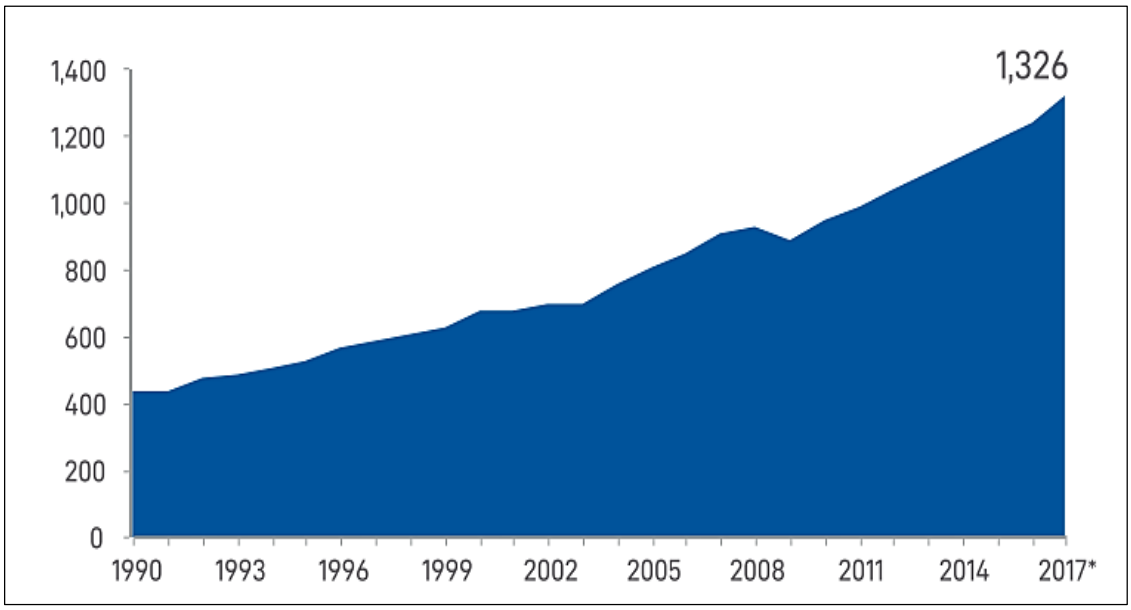


Figure 2.1: International tourist arrivals (million)
Source: (UNWTO, Tourism Highlights 2018:4)

According to the UNWTO (2018:4), international tourism grew to a record level for the 8th consecutive time in 2017, with international arrivals having risen from 1 240 million in 2016 to a significant 1 326 million tourists, indicating a 7% marginal change, the highest growth in 10 years. International tourism growth was due to a sustained global economy and an improved concern over security issues in various destinations (UNWTO 2018:4). According to Haxton (2015:15), to maintain this sustained tourism growth globally, there is need for policy makers in every region to keep track of economic and environmental dynamics that affect tourism organisations and community outcomes.

On the regional front, tourism has grown beyond average estimates in areas where peace and security have recovered (UNWTO, 2018:4). Evidence confirms that over the last decade, all continents benefited immensely from an influx of international tourists. Figure 2.2 indicates that regional tourism growth has been on an upswing since the end of World War II from 1950.

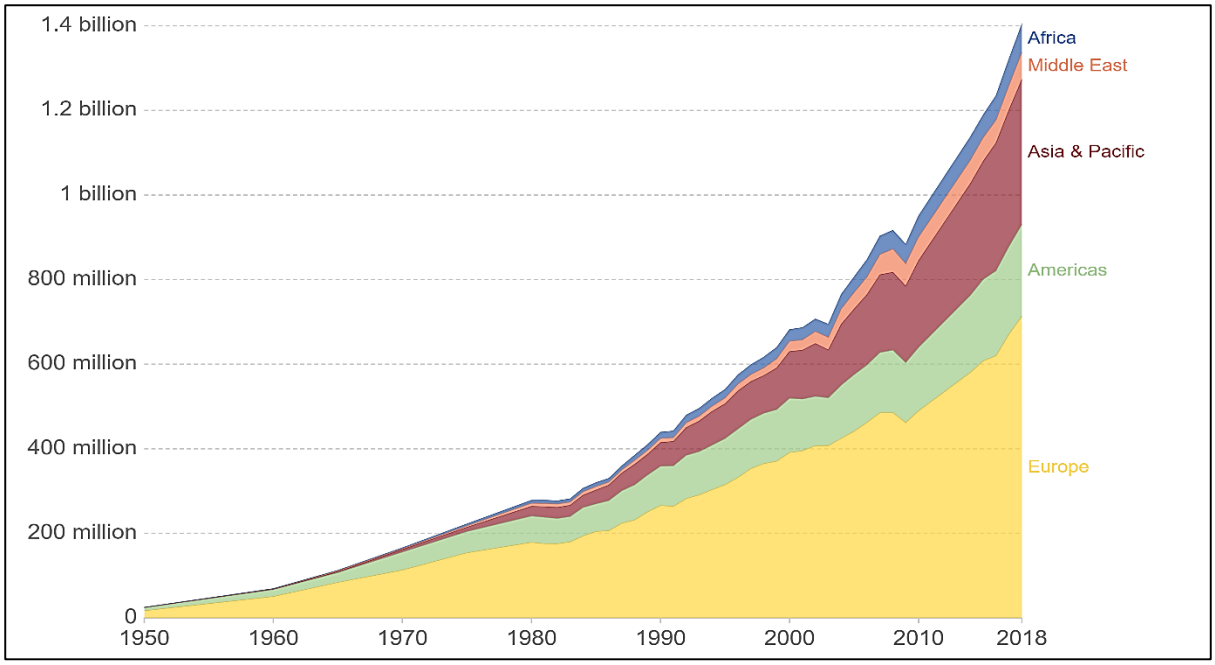


Figure 2.2: International tourist arrivals by region

Source: United Nations World Tourism Organisation – World Tourism Barometer and Statistical Annex (UNWTO, 2019)

Over the recent years, tourism in emerging economies has grown significantly faster than that of advanced economies. Scott and Gössling (2015:270) note that the remarkable shift in tourism markets towards emerging economies is part of the evolution of the tourism system which is expected to continue over the next 40 years. Table 2.1 shows tourist arrivals in millions by world regions, and reveals that in 2017, Europe and the Americas received double the number of tourists they were receiving in 1995. According to Scott and Gössling (2015:270), the market share of these two regions has however declined significantly over the past 40 years considering that they used to enjoy 94% of the global tourism market share in the 1970s. Instead, according to Table 2.1, Africa, Asia, and the Pacific received three times more tourists than they used to receive in 1995 and the Middle East quadrupled its receipts.

Table 2.1: International Tourist Arrivals by (Sub) region

International Tourist Arrivals (million)							
	1995	**2000**	**2005**	**2010**	**2015**	**2016**	**2017***
WORLD:	531	680	809	952	1,195	1,240	1,326
Advanced Economies	*342*	*430*	*469*	*515*	*655*	*686*	*730*
Emerging Economies	*189*	*250*	*339*	*437*	*540*	*554*	*597*
Europe	308.5	392.9	452.7	487.7	605.1	619.5	671.7
Asia and the Pacific	82.0	110.4	154.1	208.2	284.1	306.0	323.1
Americas	108.9	128.2	133.3	150.4	194.1	201.3	210.9
Africa	18.7	26.2	34.8	50.4	53.6	57.7	62.7
Middle East	12.7	22.4	33.7	55.4	58.1	55.6	58.1

Source: United Nations World Tourism Organisation (UNWTO, 2018:5)

By any measure, tourism is contributing immensely to global economic growth in most developing countries (Ranade, 2012:6). According to the United Nations Conference on Trade and Development (UNCTAD) (2010 cited in Scott and Gössling 2015:272), tourism is one of the five top export earners in over 150 countries, and the number one export earner in 60 countries. According to the World Travel and Tourism Council (WTTC) (2018:1), in 2017 tourism directly contributed 3.2% to the Gross Domestic Product (GDP) of the world economy. In addition, over 118 million tourism jobs were directly supported by the sector (WTTC, 2018:2; UNWTO, 2018:6). All these economic benefits were realised in all regions and include tourism investments of US$882.4 billion in 2017 (WTTC, 2018:1). According to the WTTC (2018:5), tourism investments are expected to rise by 4.3% per annum over the next ten years to a significant US$1, 408.3bn in 2028.

While emerging markets have contributed immensely to global tourism, the impact of these markets in driving economic growth in low-income regions is painstakingly low due to lack of infrastructural and technological support in these regions (Lin, Yang and Li 2019:762). However, one of the most interesting patterns noted in Figure 2.3 is the uptrend line of tourism growth in Africa. The growth of tourism in Africa has remained on an upward swing, even within the dark periods of the global economic recession of 2008 when all regions suffered from a slow international tourism growth; the African trend maintained its course.

Tourism in Africa has of late been driven by the realisation of political stability on the continent as well as technological integration and infrastructural support (Viljoen,

Saayman and Saayman, 2019:870). According to the UNWTO (2018:5), in 2017 the African continent experienced an 8% growth in tourist arrivals. Figure 2.4 shows that North African countries Morocco and Tunisia received a significant number of tourists on the continent, followed by South Africa and Zimbabwe which led in Sub-Saharan Africa.

2.2.1 The growth of tourism in Africa

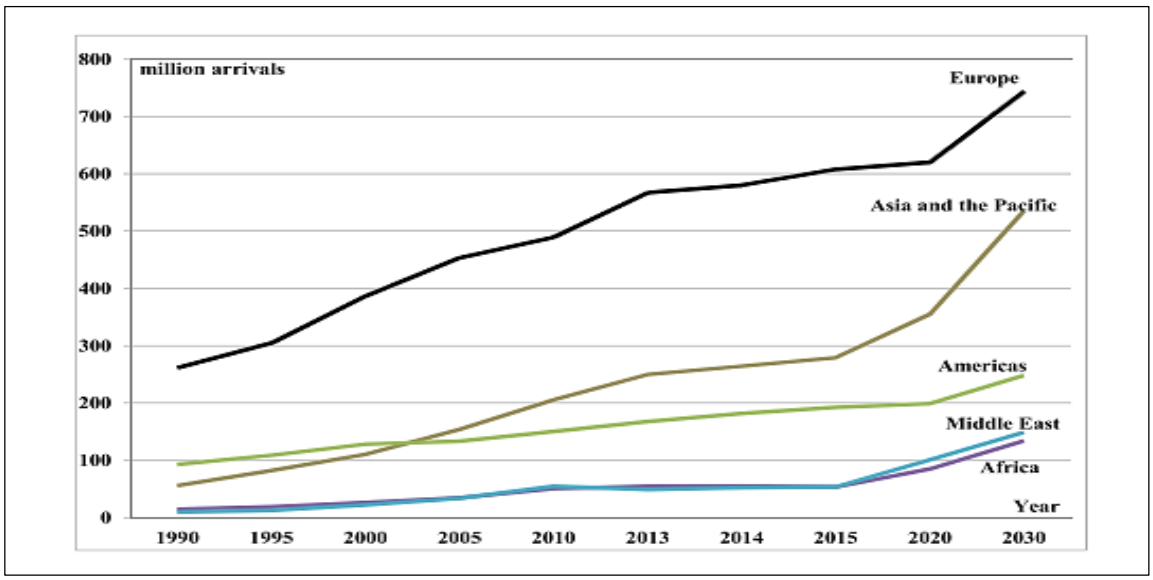


Figure 2.3: International tourist arrivals by destination region
Source: Lozano and Gutiérrez (2018:589)

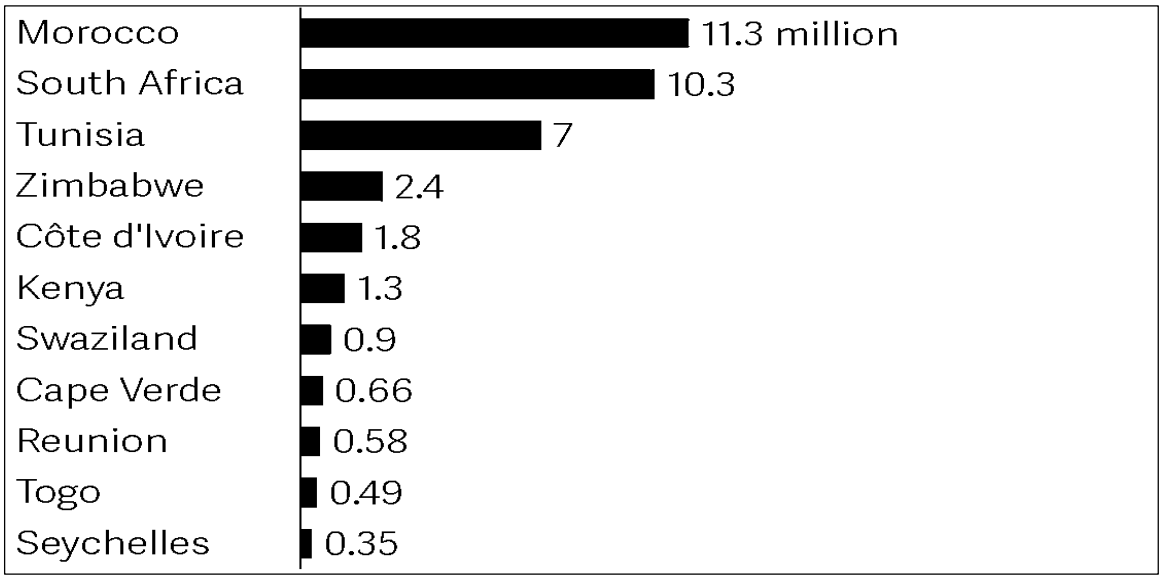


Figure 2.4 International tourist arrivals in Africa
Source: United Nations World Tourism Organisation (UNWTO, 2018:18)

According to the World Travel and Tourism Council (WTTC, 2018:1), tourism in Africa directly contributed about US$72.8 billion to the continent's GDP and has supported over 9.2 million jobs in 2017. The growth of tourism in Africa has been facilitated by the advent of a 'borderless' world, the increase in the number of baby boomers, globalisation, continual realisation of the continent as a value for money destination and infrastructure development (Inkson and Minnaert, 2018:12; Viljoen, Saayman and Saayman, 2019:870).

Due to colonial past, Africa prides itself in colonial architecture and historical narrations that continue to attract people from across the world including African diasporians who in the past fled wars and colonial brutality (Novelli, 2015:123). This, however, has not been the whole narration of the continent's tourism fortunes. Africa also prides itself in natural features such as the fauna and flora and a rich cultural heritage, which again attracts many from around the globe. The latter explains why ecotourism remains a key economic contributor to tourism in Africa (Snyman, 2017:248). In addition, due to its disadvantaged background and the subsequent colonial problems, Africa remains a potential business destination for investors from across the globe (Novelli, 2015:18). All of this, and more, is leading to the growth and development of tourism in Africa and globally. While celebrating the positive impacts that tourism is making on the global economy, there is even more to think about in terms of the growth of tourism and the growth of the accommodation sector under new preferences in a new global tourism system led by emerging economies (Scott and Gössling, 2018:272).

2.3 The growth of the accommodation sector

The growth in international tourism has led to the proliferation of many forms of accommodation and lodging facilities (George, 2015:123). The increase in foreign and domestic trips since World War II subsequently led to this growth (Wyllie, 2014:216). Evidence across the globe shows that in many cases, and in various destinations, a growth in tourist arrivals has led to a subsequent growth in accommodation and lodging facilities (Sellers-Rubio and Casado-Díaz, 2018:78; PricewaterhouseCoopers, 2018:2). Table 2.2 indicates that in the 15 years from 1995 to 2010, the accommodation sector grew significantly in different regions (Scott and Gössling, 2018:272). Even though data shows Europe with the highest number of hotel rooms, the Middle East had exceptional investments in the accommodation sector since the

mid-1990s realizing a 194% growth in the 15 years to 2010 (Warren and Becken, 2016:290). Indeed, compared with the past, the accommodation sector of the tourism industry is now an integration of many forms of lodging facilities and amenities that support the tourism industry (Inkson and Minnaert, 2018:102).

Table 2.2: Hotel room distribution and growth 1995–2009/2010

Hotel room regional market share						
	Europe	**Asia and the Pacific**	**Americas**	**Africa**	**Middle East**	**South Asia**
1995	4 882 159	2,961,120	4,820,452	343,974	188,901	143,562
2009/2010	6,824,401	4,558,345	7,663,057	385,713	554,574	171,850
15-year growth	40%	54%	59%	12%	194%	20%

Source: UNWTO (2012 cited in Scott and Gössling 2018:272)

As a result of international tourism growth and the shifting of regional markets towards other economies, several accommodation chains are investing in emerging markets (Scott and Gössling, 2018:272; Woo, Assaf, Josiassen and Kock, 2019:48). Competition is on the rise in major cities of the world as accommodation chains fight for market control and dominance (Assaf, Josiassen, Woo, Agbola and Tsionas, 2017:270). Cities such as London, Beijing, Mumbai, New York, and Dubai amongst others, have become expansion ports for accommodation chains as they are seen to connect the world and are competitive (Woo *et al.* 2019:51). However, competition is not only seen amongst established accommodation players but also from new entrant providers such as Airbnb, small hotels and other independent categories that are negatively and positively affecting the performance of established accommodation brands (Assaf *et al.* 2017:278; Knight Frank 2018:4; Blal, Singal and Templin, 2018:85).

Overall, evidence confirms that globalization and international tourism have not only ushered in competition, but diverse customers with several different preferences and perspectives (Liu, Guillet, Xiao and Law, 2014:150). The accommodation sector has become a complex subsector containing many alternative accommodation categories which include “hotels, resorts, serviced apartments, lodges, guest houses, holiday homes, cottages, and shared accommodation” (Warren and Becken, 2016:290).

Hence, the accommodation sector has developed many alternative accommodation categories which have completely altered the hospitality landscape. Mergers and acquisitions continue to multiply in all parts of the world as investors jostle to seize opportunities coming from tourists globally (Santos, Brochado and Esperança, 2016:5236). Hotel chains and hotel chain affiliations are now recognized as significant players for achieving economic growth (Knight Frank 2018:1; Chen, 2019:4). Today, categories of accommodation products range from large chain international accommodation brands like Holiday Inn, Intercontinental, Accor, Radisson, Hilton and Marriot, to major national and regional brands like Tsogo Sun (Knight Frank, 2018:7). However, in most destinations these hotel chains have not been the answer to accommodation demands hence they have been complimented by small accommodation groups, independent accommodation providers and consortiums of all sorts (Knight Frank 2018:4).

2.3.1 The growth of the accommodation sector in Africa

According to Figure 2.5, as of December 2017, the following accommodation development projects were taking place in five regions of Africa.

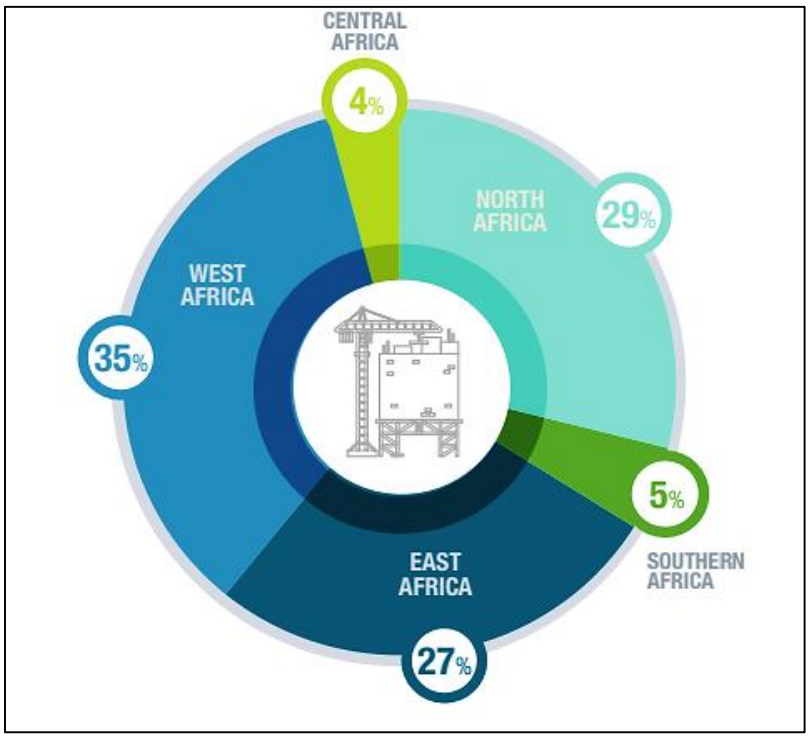


Figure 2.5: Distribution of hotel development projects in Africa
Source: Knight Frank: Hotels Africa (2018:4)

Regions such as West, North, and East African regions had the most hotel development projects taking place compared to the South and Central African regions. Figure 2.6 shows South Africa leading in terms of countries with the highest number of hotel chains and branded accommodation facilities followed by Egypt and Morocco.

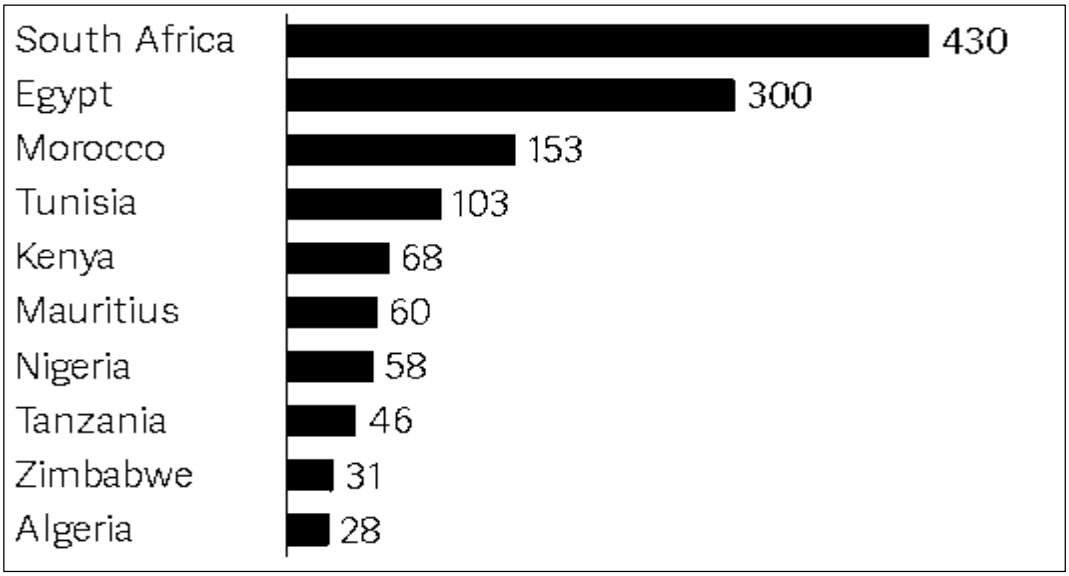


Figure 2.6: Top African countries with chain and branded hotels
Source: Knight Frank: Hotels Africa (2018:3)

Against this backdrop, the evidence shows that the accommodation sector in Africa is thriving, realising steady demand, improved performance, attracting investor interest, and becoming a vital subsector of the economy (PricewaterhouseCoopers, 2018:15). The independence and peaceful transition in most African states in the 1980s and 1990s has encouraged growth in tourist receipts and subsequent growth in accommodation facilities across the continent (Rogerson, 2018:11; George, 2015:122). Major accommodation brands have invested and are investing in the continent's accommodation sector as can been seen by the number of accommodation brands that had their presence in the continent as of December 2017, as depicted in Figure 2.7.

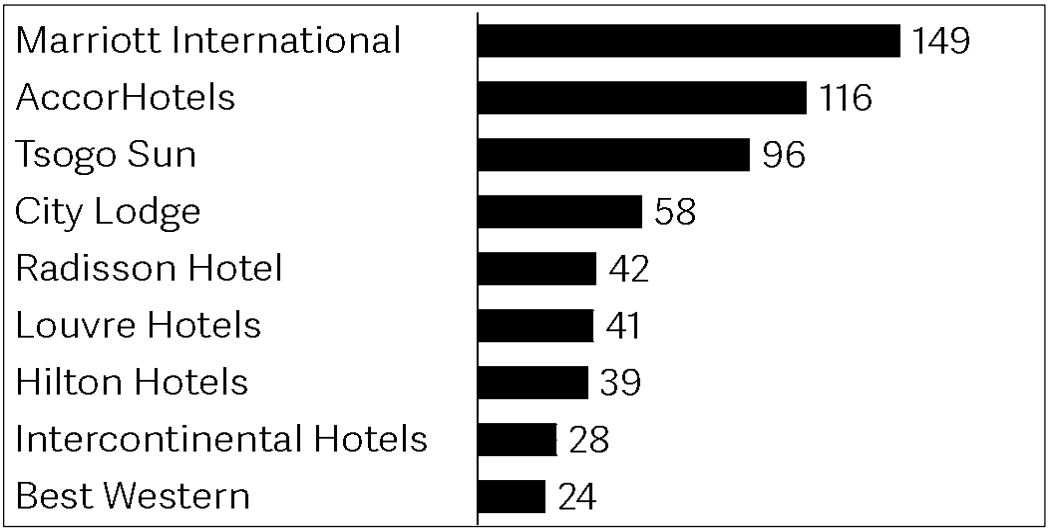


Figure 2.7: Major Accommodation Brands on the African Continent – Dec 2017
Source: Knight Frank: Hotels Africa (2018:6-7)

2.3.2 Categories of accommodation

There are various categories of accommodation which provide serviced and non-serviced accommodation products (Nutsugbodo, 2016:74). According to Inkson and Minnaert (2018:103), serviced accommodation facilities are ones that have to do with the provision of accommodation, food, and beverages while non-serviced accommodation facilities are ones that simply offer accommodation. Page and Connell (2020:233) notes that non-serviced accommodation facilities became common and dominant after the Second World War. These brought competition to the accommodation sector and included the use of caravan homes as well as the self-catering apartments which became a notable feature of holiday homes for the rich. The types of accommodation facilities available today are depicted in Table in 2.3.

Table 2.3: Categories of serviced and non-serviced accommodation facilities

Serviced accommodation facilities	Non-serviced accommodation facilities
• Hotels/Motels/Hostels • Guesthouses • Farmhouses • Educational Establishments • Local homes, sharing homes of friends • City Private Country Clubs	• Apartment/Condominium • Cottages/Villas, Campgrounds/Cabins, Air BnB/ Home Away • Timeshare properties • Holiday Centres/Camps • Second homes for personal and commercial use registered as accommodation. • Educational establishment residences, local homes via sharing economy brands or peer to peer

Source: Middleton, Fyall and Morgan (2009:365)

Over the last decade, Airbnb alone has grown from obscurity to become a multi-billion-dollar accommodation category spreading across 191 countries and boasting 3 million users (Blal, Singal and Templin, 2018:85). In Africa, new entrant accommodation and lodging facilities like Airbnb and other small hotels are playing a pivotal role in offering personified affordable services, positively contributing to economies and the environment (Knight Frank, 2018:4; Musavengane, 2019:790).

To a greater extent, due to the development and spread of various categories of accommodation, room availability in many parts of the globe has improved (Santos, Brochado, Esperança, 2016:5237). Type and size of accommodation categories are expanding in every region of the world, thereby demanding various resources. Moreover, developments in technological systems for accommodation consumers and businesses have also improved ways of doing things (Lam and Law, 2019:60).

However, while it is significant to celebrate the growth of the accommodation sector, it is also essential to mention that for the accommodation industry to reach its optimal contribution levels, it demands scarce environmental resources such as land, water and energy (Gössling *et al.* 2012:5). According to Warren and Becken (2016:290), different types of accommodation categories use and rely on different types of resources, both natural and artificial. Voluminous use of energy and water resources have been attributed in many cases to the accommodation sector of the tourism industry (Gössling *et al.* 2012:3). Understanding the extent of resource consumption and environmental impacts by the accommodation sector is therefore critical in achieving sustainable growth.

2.4 Environmental impacts of the accommodation sector

Research conducted since the dawn of the industrial revolution has warned that unmonitored and uncontrolled economic development, growth and dominance over nature will affect the world's environment (Ranade 2012:4; Hannigan 2014:120; Urry 2015:46; Panayotou 2016:140; Harper, Harper and Snowden 2017:50;). Consequently, the past three decades have seen increasing concerns over the environment by scientific researchers (Ranade 2012:3). One of the major concerns that have emerged is that damage to the environment will soon reach a point of irreversibility (Urry 2015:46). Today, there is overwhelming evidence of global warming, ozone depletion, viral and bacterial infections, deforestation, land degradation, soil erosion, mass tourism as well as pollution in the world. Researchers who have been collecting information on environmental changes in the 20th century have pointed to human activities as major contributors to global environmental change (Ding and Ghosh, 2017:1; Weir, 2017:108).

However, while every industry has been accused of contributing to environmental damage, in the tourism industry, the accommodation sector is held responsible for its huge consumption of energy and water (Gössling *et al.* 2012:3). The accommodation sector has also been condemned for its tendency to reap profits out of the environment through unsustainable means of doing business (LaVanchy, 2017:45; Inkson and Minnaert, 2018:217). Construction activities on beaches make sand vulnerable to erosion and lead to loss of biodiversity (Zhong, Deng, Song and Ding, 2011:2975; Inkson and Minnaert, 2018:227). Irresponsible groundwater extraction by hotels and restaurants has led to contamination of water bodies (Gössling *et al.* 2012:3; LaVanchy, 2017:45). Moreover, lack of proper land use and building regulations has resulted in sprawling developments especially along coastlines or valleys of strategic importance (Kumar, 2017:497). The various environmental impacts brought about by accommodation businesses include depletion of natural resources, soil erosion, land degradation, land grabbing, global warming, viral and bacterial infections, mass tourism and pollution (Rogerson and Sims 2012:393; Mikayilov, Mukhtarov, Mammadov and Azizov 2019:19390; Khatter, 2020:225). These impacts can be discussed separately according to the challenges they bring about, however pollution, water stress, deforestation and unpredictable weather conditions have been at the

centre of most 21st century discussions (Trumbore, Brando and Hartmann, 2015:818; Wilkins, de Urioste-Stone, Weiskittel and Gabe 2018:1043).

2.5 Water consumption in the accommodation sector

Today, there is overwhelming evidence showing several countries facing fresh-water problems (Sloan, Legrand, and Chen, 2013:91). However, while many factors are contributing to water scarcity, the proliferation of accommodation facilities in popular tourist destinations has been exerting extensive pressure on local water resources (Gössling *et al.* 2012:1; LaVanchy, 2017:43). The growth of the accommodation sector and water demand in recent years has been linked to the growth of tourism in popular tourist destinations (Gössling *et al.* 2012:4). In Spain for example, Spanish regions with the most tourism activity, are the ones which face severe water stress issues (Barberán *et al.* 2013:181). In destinations such as Gigante, Nicaragua, the growth of the tourism sector has led to a rise in water demand which has forced businesses and locals to extract water from wells, a move that is leading to a serious conflict over water resources (LaVanchy, 2017:45). Indeed, an increase in tourist arrivals puts pressure on water resources which both tourists and host communities need for drinking, cooking, cleaning and washing.

In the accommodation and lodging sector, water is consumed directly and indirectly in various ways. Direct consumption is identified in the provision of guest services including cleaning of guest rooms, maintenance of swimming pools, washing of guest linen and towels as well as watering of gardens (Thomas Cook-Futouris, 2015:8). Figure 2.8 depicts globally, the average direct and indirect water consumption statistics at accommodation establishments per guest per night. According to Gössling *et al.* (2012:8), Gössling (2015:234); Sustainable Hospitality Alliance (2020) direct water use per tourist a day in the accommodation sector ranges between 84 to 2 425 litres and, if indirect water use is included, each tourist uses an estimated range of between 2 000 to 7 500 litres a day. A study by the University of Twente, Netherlands (2012 cited in Sloan, Legrand, and Chen 2013: 92) reveals that domestic water use per person/day in the global arena stands at 127 litres per day. In the United Kingdom (UK), according to Statista (2020), a single person uses about 149 litres of water per day.

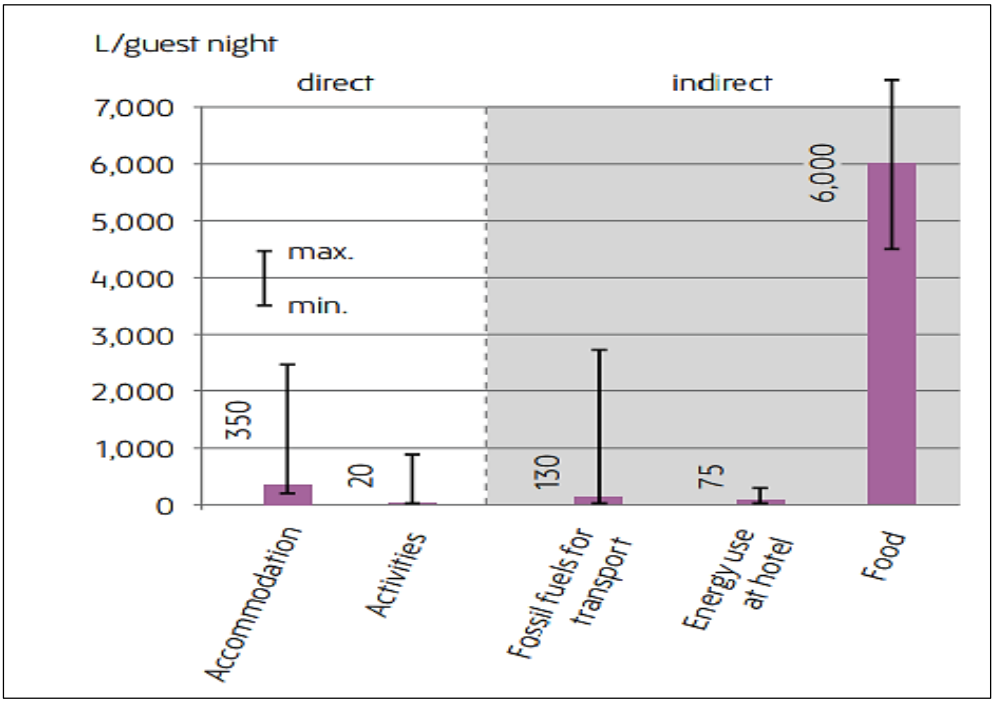


Figure 2.8: Globally averaged water footprint, L per guest night
Sources: Gössling (2015:236)

Indirect water usage at accommodation establishments is identified in food, energy and fossil fuels for transport (Gössling 2015:236; Rico, Olcina, Baños, Garcia and Sauri, 2020:780). Food consumes much water as can be seen in Figure 2.8 with a global average of 6 000 litres per guest per night. This takes into consideration the amount of water that farmers use on a seasonal basis to produce the crops and livestock which are then used at accommodation establishments. Thomas Cook-Futouris (2015:9) points out, for example, that a kilogram of tomatoes is produced with at least 214 litres of water.

Clearly, the amount of water consumed by each tourist per day is over and above that which is consumed by a single household per day. In Europe, average water use per resident a day is usually half the average water use per day by a tourist (Styles *et al.* 2015:188). Gössling *et al.* (2012:4) report that international tourism generally accounts for 1% of national water use. Much water is used in ensuring quality tourism which most tourists prefer and is offered in most developed countries (LaVanchy, 2017:40). According to Sloan, Legrand, and Chen (2013:92), the average daily water consumption per tourist in the accommodation sector varies from country to country.

Table 2.4 below shows estimated water use by each tourist per night in various countries of the world.

Table 2.4: Estimated water use of tourism and share of municipal use by country

Country	Tourism use per person per night (litres)	Estimated tourism water use (m^3 per annum)	Tourism share of municipal water withdrawals
Australia	332	43 332 088	1.2
China	956	362 448 794	0.5
Egypt	717	35 456 764	0.7
Fiji	716	1 789 210	7.2
France	169	96 197 487	1.7
Germany	198	34 479 004	0.7
India	830	101 335 527	0.2
Indonesia	860	52 917 638	0.4
Italy	264	68 720 204	0.8
Jamaica	849	929 735	0.3
Japan	437	23 537 235	0.1
Malaysia	914	87 148 207	2.2
Mexico	568	123 144 660	1.1
New Zealand	295	12 132 330	1.2
Philippines	981	22 649 695	0.4
Singapore	530	4 369 799	0.4
Spain	188	135 706 158	2.4
Sri Lanka	901	4 283 431	0.5
Thailand	716	53 461 049	2.0
UAE	679	21 487 710	3.5
United Kingdom	178	43 252 885	0.6

Source: Modified from Becken (2014:16)

As reflected in Table 2.4, the average water consumption per tourist varies from country to country (Sloan, Legrand, and Chen, 2013:92). Indications are that more water is consumed in developed countries compared to less developed countries. This, however, can be the result of judgement as many factors come to play including location, climatic conditions, and levels of water stress. In sum, evidence from Table 2.4 confirms that average water consumption per tourist is higher than average water consumption per single household. Sucheran (2013:154); Styles *et al.* (2015:189) assert that people use more water directly and indirectly when they travel as tourists than they use at home. In their study, Han, and Hyun (2018:94) found however, that certain water conservation norms like towel reuse behaviour can help to conserve

water at accommodation establishments if they are carried from homes to hotels. However, the onus for this argument does not only rest with tourists but on accommodation and lodging establishments who in their service delivery activities use water excessively in order to portray an image of quality tourism services especially in instances that seek to meet the needs and support the experiences and comfort of guests (LaVanchy, 2017:41). With this submission in mind, it is therefore important to look at the extent of water usage in the accommodation sector specifically in relation to provision of guest services.

2.5.1 Extent of water usage in the accommodation

Various quantities of water are used in the accommodation sector for different activities to provide for customer needs (LaVanchy, 2017:43). Accommodation activities which require water include swimming pools, ice-making, irrigation of gardens and golf courses, toilet flushing and washing hands, bathing, laundry of bed linen and towels, cooking, and dishwashing as well as floor and wall cleaning (Gössling, *et al.* 2012:4). Various researchers have come up with different estimates as to how much water is consumed by each activity in the accommodation sector. Table 2.5 shows average water usage per activity as given by various researchers.

Table 2.5: Water usage per activity

Activity	Average water usage per activity (liters)	Source
Watering of swimming pools	1 064 000 litres per annum (Temperate region) 17 840 000 litres (Tropical region)	Green hotelier (2014:7)
	6 892 litres per day	Perez, Chinarro, Mouhaffel, Martin and Otin (2016:8)
Ice-making	4 litres per guest per day 1.8 litres per meal	Cooley, Hutchins-Cabibi, Cohen, Gleick, Heberger (2007:8)
Irrigation of gardens	2.67 litres per m^2 daily consumption = 975.55 litres per m^2 per annum	Perez, Chinarro, Mouhaffel, Martin and Otin (2016:6)
	2 154 000 litres per annum (Mediterranean region) 3 568 000 (Tropical region)	Green hotelier (2014:7)
Irrigation of golf courses	3 500 000 litres a day (18 hole)	Medstat (2009:17); Water Wise Rand Water (2020:1)
Toilet flushing	12 litres per flush	Gössling (2015:239)
	10 liters per flush (1 580 liters per day)	Alexander (2002 cited in Sucheran 2013:71)
Heating Ventilation and Air Conditioning (HVAC)	532 000 litres per annum (Temperate region) 1 231 000 litres per annum (Mediterranean region) 57 088 000 per annum (Tropical region)	Green hotelier (2014:7)
Laundry	9 044 000 litres per annum (Temperate region) 2 410 000 litres per annum (Mediterranean region) 39 248 000 litres per annum (Tropical region)	Green hotelier (2014:7)
Cooking (Kitchen)	11 704 000 litres per annum (Temperate region) 8 614 000 litres per annum (Mediterranean region) 48 168 000 litres per annum (Tropical region)	Green hotelier (2014:7)

Source: Compiled by the Researcher (2019)

In terms of water usage by activity, it is clear, that more water is used in activities directly linked to guest services including cooking, laundry of guest linen and towels, watering of swimming pools, flushing of toilets and heating. Indirect usage which is also linked to gratifying guests, includes irrigation of golf courses and gardens. Evidently, information being conveyed in Table 2.5 clearly indicates that water usage at accommodation establishments depends on the type of activities that guests, or the establishment engage in. Moreover, water usage depends on the type of climate or temperature in the area where the accommodation establishment is located.

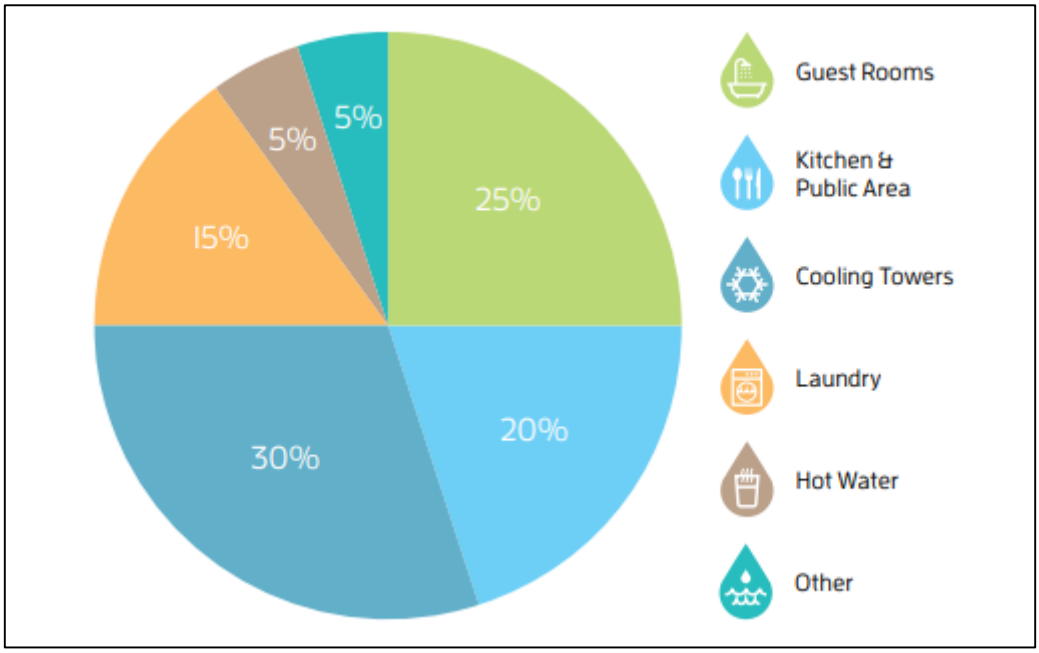


Figure 2.9: Average use per area – Upper Scale Resort

Source: Ecolab (2012 cited in Becken, Garofano, McLennan, Moore, Rajan and Watt 2014:13)

Figure 2.9 depicts water usage in various areas of the accommodation establishment. In terms of usage, the highest consumption of water at accommodation establishments takes place in cooling towers (30%). Cooling towers are generally used for heating, ventilation and air conditioning (HVAC) (Sloan, Legrand and Chen, 2013:98). This is followed by guest rooms which consume about 25% of water. After guest rooms comes kitchen and public areas which consume about 20%, laundry services 15% and lastly, hot water and other uses which share 5% each. From the above it can be deduced that cooling towers use more water than other areas of the accommodation establishment. This is irrefutable especially given that cooling towers are associated with high water and high energy use (Becken and Scott 2018:159). Guestrooms on the other hand are key drivers of hospitality businesses; as such they also consume large amounts of water (Dinarès and Saurí 2015:631; Toyosada, Otani and Shimizu 2016:2). Evidence, however, shows that guestrooms are complimented by areas of guest servicing such as bathrooms, kitchen, restaurants, and other public areas which also draw large amounts of water (Green Hotelier 2014:7; Hernaiz 2017:26). These areas contribute significantly to a guest's consumption of the accommodation product. That said, while the above data can be confirmed, understanding statistical information on water usage by guests at accommodation establishments demands a thorough

examination of factors affecting water usage. The next section examines factors which influence water consumption at accommodation establishments.

2.5.2 Factors affecting water usage in the accommodation sector

Gabarda-Mallorquí, Garcia and Ribas (2017:84) maintain that water consumption in the accommodation sector is affected by three factors namely capacity, size and category. However, other factors such as facilities, cuisine, seasonality, geographical location, climate zone, rural or urban, also have an impact of water usage in the accommodation sector (Gössling *et al.* 2012:7; Becken, 2014:16).

2.5.2.1 Capacity

Capacity of the accommodation relates to the number and size of rooms, beds, occupancy rate and the carrying capacity of the facilities found at the accommodation establishment (Orfila-Sintes and Mattsson, 2009:383; Gabarda-Mallorquí, Garcia and Ribas, 2017:84). Styles *et al.* (2015:189) note that occupancy rate, food cover sold, laundry operations and availability of swimming pool influences water consumption in the accommodation and lodging sector. In their study, Gabarda-Mallorquí, Garcia and Ribas (2017:89) found that although upmarket 5-star hotels in Lloret de Mar, Spain had fewer beds (273 against 437 for 4-star hotels and 504 for 3-star hotels), they covered large tracts of land - approximately 27334.5 m^2. As a result of their size these hotels had more high-end facilities that required more water. The 5-star hotels in question also had a higher water consumption per guest night than 4-star (8,956.18 m^2) and 3-star (8,566.73 m^2). The argument, therefore, is that size of land and the subsequent carrying capacity of the accommodation establishment determines water usage. According to Gabarda-Mallorquí, Garcia and Ribas (2017:84), large accommodation facilities have larger size facilities such as golf courses, swimming pools, gardens, kitchens, restaurants, and water fountains. Size of the accommodation establishment relates to the length and breadth of the ground covered by the accommodation establishments. The size of the hotel structure, which can be high rise or resort style, has an impact on water usage in the accommodation sector (Gössling *et al.* 2012:7).

While the size of land covered by the accommodation establishment can significantly affect water usage, guest services and innovation decisions, the number of rooms and occupancy rate at the accommodation establishment may have no similar effects (Orfila-Sintes and Mattsson, 2009:383). Rahman, Reynolds and Svaren (2012:726) for example found no significant differences in terms of efficient use of environmental resources between hotels with more than 100 rooms and those with less than 100 rooms. This view, however, is opposed by Tortella and Tirado (2011:2576) who found that a 1% increase in the number of rooms increases water consumption by 6%. In their study on water consumption per guest per night in hotels, in Jamaica, Meade and Gonzalez-Morel (1999 cited in Charara *et al.* 2011:234), found that hotels with less than 50 rooms consumed 440 litres of water; hotels with between 50 and 150 rooms consumed 580 litres of water and hotels with more than 150 rooms, consumed 666 litres of water per guest per night.

While these arguments can be backed by various environmental, socio-economic reasons, evidence backed reasons can also be drawn from hotel occupancy rates. In terms of occupancy Gabarda-Mallorquí, Garcia and Ribas (2017:90) found that water consumption by guests decreased when hotel capacity increased. The authors argue that when there are more guests at the accommodation establishment, facilities such as swimming pools tend to be used by a lot of people at the same time. Moreover, the more the occupancy rate the more guests tend to engage in other activities which may be less water consuming (Gabarda-Mallorquí, Garcia and Ribas (2017:90).

Rico *et al.* (2020:775) investigated a 4-star hotel in Benidorm, Spain with 3 500 m^2 of garden and more than 1 000 rooms. At this hotel, 70% of water was used to clean guest rooms, 10% in the kitchen and the remaining 20% on outdoor facilities including garden and swimming pool. According to Ecolab (2012 cited in Becken *et al.* 2014:13), 25% of water consumed at accommodation establishments goes to guest rooms (Figure 2.9). According to Green Hotelier (2014:7) guest rooms of hotels in temperate regions consume about 18 088 m^3 (34%) of water per annum; guest rooms of hotels in the Mediterranean region require about 17 075 m^3 (33.3%) of water per annum and guest rooms of hotels from tropical region require about 121 312 m^3 (34%) of water per annum.

Figure 2.10 depicts water usage at a 5-star hotel with conventional toilets. It is evident more water is consumed through direct guest activities in guest rooms such as showering, flushing of toilets, bathing, and general hygiene. Toilets consume the largest amount of water (25 000 litres per season), followed by showers (11 000 litres per season), whilst sinks (6 000 litres per season) and bathtubs (5 000 litres per season). In any case, according to Figure 2.10, both warm and cold water are consumed in large amounts. Barberán *et al.* (2013:185) notes that there are generally significant reductions in hot water consumption and significant increases in cold water consumption in summer.

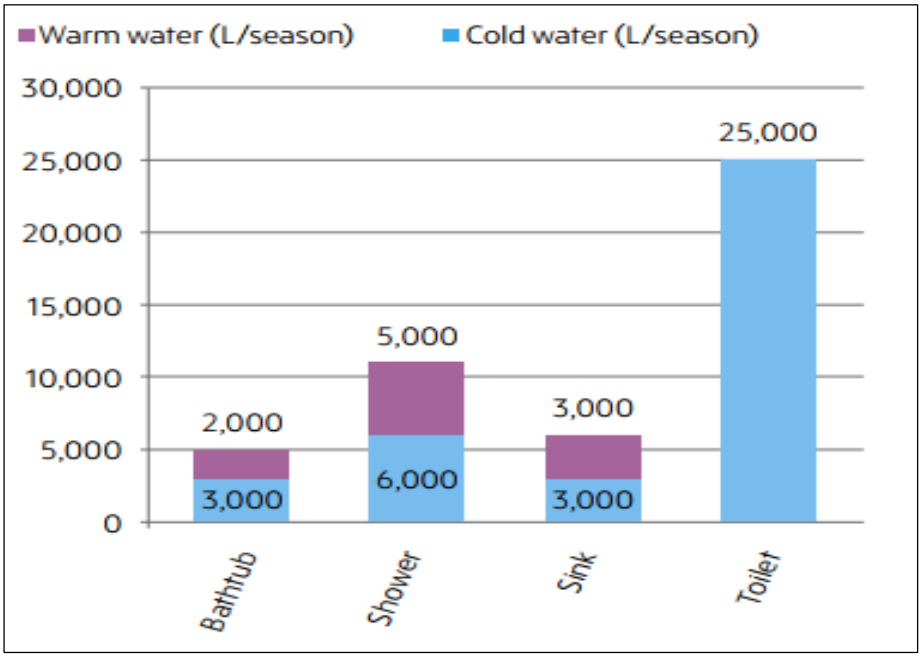


Figure 2.10: Water use in rooms, 5-star hotel, Greece
Source: Thomas Cook-Futouris (2015:10)

In sum, without looking at the variations in percentage usage provided by researchers it is clear, that capacity affects water usage. The next section discusses how facilities found at accommodation establishments such as swimming pools, laundry, golf courses, toilets and urinals affect water usage.

2.5.2.2 Accommodation facilities

Evidence confirms that the amount of water consumed within an accommodation and lodging entity depends on the number and size of facilities available (Gabarda-Mallorquí, Garcia and Ribas, 2017:84; Barberán *et al.* 2013:182). Facilities available

at accommodation establishments vary according to shape, size and purpose. Gardens, golf courses, kitchens, restaurants, laundries, spas, toilets, wellness centres and swimming pools are all available at different accommodation types. Table 2.6 depicts the key areas where water is consumed at accommodation establishments in different climatic regions.

Table 2.6: Extent of water usage in the accommodation sector per facility in three climatic zones

Area	Temperate		Mediterranean		Tropical	
	m^3	%	m^3	%	m^3	%
Guest Rooms	18,088	34	17,075	33.3	121,312	34
F&B incl. Kitchens	11,704	22	8,614	16.8	48,168	13.5
Lockers/public toilets	10,640	20	8,255	16.1	17,840	5
Laundry	9,044	17	2,410	4.7	39,248	11
HVAC	532	1	1,231	2.4	57,088	16
Steam generation	2,128	4	205	0.4		
Pool	1,064	2			17,840	5
Gardens			2,154	4.2	3,568	1
Snack Bar			1,743	3.4		
Water supply treatment					24,976	7
Public areas					14,272	4
Boilers					3,568	1
Cold rooms					1,784	0.5
Others/not metered			9,589	18.7	7,136	2

Source: Green Hotelier (2014:7)

Table 2.6 confirms what was previously mentioned vis-à-vis areas and facilities where water is mostly consumed. Water is consumed in various areas including guest rooms, kitchens, toilets, laundry, HVAC, swimming pools, gardens, bars, public areas, boilers, and cold rooms. The next discussion focuses on these areas and facilities – how they contribute to water usage. References will be made to Table 2.6 in the discussion.

a) Swimming pools

According to Gabarda-Mallorquí *et al*. (2017:90), water consumption by guests at swimming pools varies according to size and capacity of the pool. Tortella and Tirado (2011:2576) reveal that at accommodation establishments where there are swimming

pools, more water is used. Gössling *et al.* (2012:7) concur that swimming pools require substantial amounts of water and chemicals to maintain.

In terms of watering and maintaining swimming pools the following variables are known to contribute to the need for constant maintenance: usage, evaporation, leakage and washing of filters (Perez *et al.* 2016:7). According to Table 2.6, swimming pools in temperate regions such as Germany, consume an average of 1 064 m^3 (2%) of water per annum, while swimming pools from tropical regions (Jakarta, Indonesia) use 17 840 m^3 (5%) of water per annum. Tortilla and Tirado (2011:2576) reveal that the marginal propensity to save water at an accommodation facility without a swimming pool is much higher compared to that of an accommodation establishment with a swimming pool.

b) Toilets and urinals

According to Scarfiello (2016:31) conventional toilets before 1980 used to consume between 17 and 27 litres of water per flush. In the mid-90s the author reveals that toilets could use an average 13 litres of water per flush. Sloan, Legrand, and Chen (2013:100) noted that, toilets and urinals account for 40% of domestic water consumption at accommodation establishments.

Table 2.6 shows that public toilets for hotels in temperate regions use about 10 640 m^3 of water per annum, Mediterranean regions - 8 255 m^3 and Tropical regions - 17 840 m^3 of water per annum. Most water in toilets and urinals is used during flushing and cleaning. In terms of toilet flushing, Alexander (2002 cited in Sucheran 2013:71), mentions that the average toilet uses about 10 litres of water per flush which in most cases depends on use, and can amount to an average of 1 580 litres per day at an accommodation establishment. According to Gössling (2015:239) guestrooms with old model toilets releasing 12 litres of water per flush, consume 100 litres per guest night. Scarfiello (2016:32) illustrates that if an old toilet is to be flushed an average six times a day in a guestroom (two times during cleaning and four times by the guest) 78 litres of water would be consumed per guest per night. By and large, this is the quantity of water usage in toilets and urinals.

c) Landscape

In terms of landscape maintenance, it is believed that the landscaping of gardens demand millions of litres of water per year (Tortilla and Tirado, 2011:2576; LaVanchy 2017:42). Much of this consumption is said to happen during hot and dry seasons. However, air temperatures are not the sole cause for water demand; soil type, irrigation systems, rainfall patterns and type of vegetation also contribute to demand for water for irrigation of landscape areas (Gabarda-Mallorquí, Garcia and Ribas, 2017:84; Perez, Chinarro, Mouhaffel, Martin and Otin 2016:7). According to Gössling *et al.* (2012:11) where there are indigenous, drought resistant plants, less water is used as opposed to where there are exotic plants. According to Green Hotelier (2014:7), gardens for hotels located in the Mediterranean region require an average of about 2 154 m^3 of water per annum, while gardens for hotels located in tropical regions require about 3 568 m^3 of water per annum (Table 2.6). In the Canary Islands annual average water consumption for irrigation activities is 100 l/m^2 a year (Perez *et al.* 2016:7).

Scholarly evidence confirms that irrigation in accommodation establishments consumes large quantities of water because landscaping and gardening at most hotels is attractive to guests. Moreover, marketing and advertisements of popular tourist destinations often show green lawns, vegetation, and an abundance of water at hotels (LaVanchy, 2017:41). These images attract tourists who then come with expectations to enjoy lush gardens and an abundance of water.

d) Golf course

Gössling (2015:234) stresses that golf is the most water-intensive activity in the tourism sector, and irrigation of gardens and golf courses consume millions of litres of water per year (Tortilla and Tirado, 2011:2576; Gössling *et al.* 2012:8). According to Medstat (2009:17; Water Wise Rand Water 2020:1), an 18-hole golf course requires about 3 500 000 litres of water per annum. Golf courses also require the extensive use of chemicals and fertilizers, which further contribute to environmental damage (Zhong *et al.* 2011:2977). Evidence provided so far shows that most high rated accommodation establishments have golf courses, which they use to extend traditional tourist seasons in their respective locations (Oliveira, Pedro and Marques, 2013:643).

e) Laundry

A significant amount of water in the accommodation sector is used in laundry services (Gössling *et al.* 2012:7). Deng and Burnett (2002 cited in Tirado, Nilsson, Deyà-Tortella, and García 2019:10) reveal that on-site laundry services consume 47% of the total hotel water consumption. In their study on water consumption at accommodation establishments in Zanzibar, Tanzania, Gössling *et al.* (2012:7) found that each tourist indirectly consumes about 47 litres of water in laundry services per night if they are staying at a hotel, and 25 litres if they are staying at a guesthouse. Styles *et al.* (2015:189) report that laundry services at accommodation establishments in Europe consume between 30 and 100 litres of water per occupied room per night.

According to Green Hotelier (2014:7), accommodation establishments located in temperate regions consume about 9 044 m^3 of water per annum in laundry services; accommodation establishments from the Mediterranean region consume about 2 410 m^3 of water per annum in laundry services while accommodation located in tropical regions use approximately 39 248 m^3 of water per annum in laundry services (Table 2.6). Gössling (2015:242) asserts that the best indicator to help calculate water usage in laundry services is knowing the number of kilograms' guests generate in laundry per day. The author reveals that that 2-3 kilograms of laundry require about 30 litres of water per day.

f) Food and beverage (kitchen, restaurant and bar areas)

Kitchen, restaurants and bars play crucial roles in income generation at accommodation establishments. In large accommodation establishments these areas are part of the revenue earning sections which include guest rooms. According to Ecolab (2012 cited in Becken *et al.* 2014:13), 20% of water consumed at accommodation establishments is used in these areas (Figure 2.9). Rico *et al.* (2020:775) states that 10% of water consumed at a 4-star hotel, for example, is used in the kitchen, and Becken *et al.* (2014:18) maintain that the kitchen is the second largest water consuming area in an accommodation establishment. According to research undertaken by Green Hotelier (2014:7), kitchen, restaurants, and bars at accommodation establishments in temperate regions consume 11 704 m^3 of water per annum which is 22% of total water consumption. In the Mediterranean regions, 8 614 m^3 (16.8%) of water is used in food and beverage services per annum, whilst in tropical

regions food and beverage consume about 48 168 m^3 of water per annum which is 13.5% of total water consumption (Table 2.6).

Having revealed this, Styles *et al.* (2015:189) point out that evidence for water consumption in kitchens, restaurants and bars is scarce; however, what is generally known is that most of the water used in kitchens, is during food preparation, cleaning and dish washing activities. Coordinating statistics for water use in kitchens is a problem because there is direct and indirect water usage (Thomas Cook-Futouris, 2015:9). Direct water usage is through washing of fruits and vegetables, cooking, and cleaning. Indirect water usage is through farming activities. Earth-Check Research Institute (2013 cited in Scarfiello 2016:6) estimates that daily water requirements to support human diet range from 2 000 to 5 000 litres of water per person per day with an estimate of 1 litre of water for 1 kcal of food.

In bars and restaurants, water is consumed in ice making as well as rinsing of glass and cutlery. In ice-making for example, according to Cooley *et al.* (2007:8), each guest consumes about 1.8 litres of water per meal. This translates to 4 litres per guest a day if the guest is having all meals at the establishment. According to evidence provided by Green Hotelier (2014:7), snack bars for accommodation establishments located in the Mediterranean region consume about 1 743 m^3 of water per annum. In restaurants, Bohdanowicz and Martinac (2007 cited in Styles *et al.* 2015:189) report that water usage per dining guest per day is between 35-45 litres. Research, therefore, confirms that, although the food and beverage division forms part of the revenue earning section of accommodation establishments, a significant amount of water is used in these areas.

g) Recreational (Spa, gym and water sports)

Recreational activities such as water sports, snow sports, gymnastics, nutritional programmes, spa and hot spring treatments have from time immemorial been marketed at various destinations and accommodation establishments as part of wellness tourism (Chen, Liu, and Chang, 2013:122; Silva 2018:59). Researchers in this niche market admit that it relies heavily on water in its activities which include water sports, snow sports, spa therapy and hot spring treatments. Over the past decade, the world has been seen carrying a more aging population and delivering a health-conscious generation. These developments have led to the resuscitation of

health and wellness tourism at various destinations globally (Heung, and Kucukusta, 2013:347; Zacarias, 2015:173). According to Silva (2018:14) and Damijanić (2019:980) health and wellness tourism has to do with the connection and recuperation of the body, mind and spirit.

According to research undertaken by Green Hotelier (2014:7), public areas including water sporting areas, gyms and spas at accommodation establishments consume about 14 272 m^3 of water per annum in the tropical region. In their study on water consumption in the island of Mallorca, Tortella and Tirado (2011:2576) however, found that spa facilities do not have a significant impact on water consumption.

In sum, the discussion so far regarding factors that influence water usage at accommodation establishments has focused on the capacity of the accommodation and facilities available at accommodation establishments. The next section looks at categories of accommodation and their contribution to water usage.

2.5.2.3 Categories of accommodation establishment

Accommodation establishments vary and are classified into numerous categories such as star grading and comfort, affiliation to chains and type of accommodation establishment.

a) Star grading

Accommodation establishments in the hospitality industry are essentially categorized as comfort, standard or luxury, which in some cases entails a star grading of one to five stars (Gössling *et al.* 2012:7). According to Styles *et al.* (2015:189), services provided, and the associated rating or star-grading of an accommodation enterprise determines water usage. The authors provide information from Accor (2010), which reveals that a 1-star hotel uses about 187 litres of water per occupied room per night while a 5-star hotel uses about 1 568 litres of water per occupied room per night. Gabarda-Mallorquí, Garcia and Ribas (2017:89) reveal that hotels with 4 to 5 stars consume more water than hotels with less stars. Oliveira, Pedro and Marques (2013:642) confirm that when a hotel has more stars it means luxury, better services, prime area location, better views and availability of health and wellness facilities, which results in higher water usage.

Thomas Cook-Futouris (2015) undertook a study to determine how much water is consumed per guest per night by various categories of hotels located in the Mediterranean region and those located in Tropical regions. Table 2.7 displays the data for this study, and confirms that overall, luxury hotels consume far more water compared to small/budget hotels. Water consumption in these establishments also reflect a higher water usage in Tropical areas compared to Mediterranean areas.

Table 2.7: Water consumption benchmarks in hotels

Litres of water/ guest night	Luxury Hotel			Midrange Hotel			Small/Budget Hotel		
	Low	Medium	High-excessive	Low	Medium	High-excessive	Low	Medium	High-excessive
Mediterranean Climate	<450	450–650	>650	<300	300–500	>500	<150	150–250	>250
Tropical Climate	<600	600–900	>900	<500	500–700	>700	<300	300–400	>400

Source: Thomas Cook-Futouris (2015:15)

Dinarès and Saurí (2015:631) researched water usage in star-graded hotels in Barcelona, Spain. The study revealed that 5-star hotels in Barcelona consumed 17 times more water annually than 1-star hotels. Water usage was confirmed as 1 866 m^3 in 1-star hotels, 5 127 m^3 in 2-star hotels, 5 655 m^3 in 3-star hotels, 10 734.5 m^3 in 4-star hotels and 32 212 m^3 in 5-star hotels. Evidence put forward by Gössling *et al.* (2012:6) shows that the average water consumption for 3-star hotels, regardless of region, is between 250 and 300 litres of water per guest per day, and between 350 and 1 300 litres per guest per day for a 5-star hotel per guest per day. In sum, the general submission is that the higher the grade of an accommodation establishments the greater the quantity of water consumed.

b) Hotel affiliation

According to Ivanova and Ivanov (2015:149) hotel affiliation plays a critical role in the hospitality industry's growth, expansion, and bargaining power. In terms of resource consumption, Tortilla and Tirado (2011:2578) notes that hotel affiliation plays a significant role in water consumption. The authors note that hotels affiliated to large international chains have higher levels of water consumption than individual or

privately-owned hotels. One of the reasons they use to argue is that chain affiliated accommodation and lodging facilities tend to adhere to a group of set standards for providing services to guests (Tortilla and Tirado, 2011:2577). Some of these set standards include room cleaning, gardening, cooking, and washing which could have been strategically imported to several destinations globally. This claim is supported by Gabarda-Mallorquí, Garcia and Ribas (2017:89) whose model revealed that independently owned hotels consume less water than chain affiliated hotels. However, opposing views by Sucheran (2013:233) and Chen (2019:4) contend that affiliated accommodation establishments use environmental resources more efficiently than non-chain affiliated establishments. Moreover, evidence shows that, chain affiliated accommodation establishments are managed efficiently and are willing to engage in CSR activities or environmental programmes which boost their brand value and competitive edge (Oliveira, Pedro, and Marques 2013:642). Brand value and environmental performance leads to attraction of investors who come through franchises and management contracts (Ivanova and Ivanov, 2015:150). In addition, brand value allows hotels to charge higher prices for hotel rooms (Chen 2019:2).

c) Type of accommodation establishment

Styles *et al.* (2015:189) and Sloan, Legrand, and Chen (2013:194) reveal that water consumption varies in different types of accommodation establishments namely, campsites, bed and breakfast, hostels, inns, and hotels. Econtrans (2006 cited in Styles *et al.* 2015:189) reveal that water consumption statistics from various European accommodation categories show that the average water use per tourist per night ranges between 95 and 150 litres in campsites,115 litres in hostels, 226 litres in Bed and Breakfasts, 180 to 310 litres in urban hotels and between 1180 to over 1500 litres in luxury and 5-star hotels, respectively. Gössling *et al.* (2012:7) further reports the following variations in water use between hotels and guesthouses in Zanzibar, Tanzania (Table 2.8).

Table 2.8: Summary of comparison of water use between hotels and guesthouses in Zanzibar, Tanzania.

Area	Hotels (litres per tourist a day)	Guesthouse (litres per tourist a day)
Swimming pools	140	-
Laundry	47	25
Cleaning	47	12
Restaurant	37	47
Shower/toilets/taps	136	186

Source: Modified from Gössling *et al.* (2012:7)

Table 2.8 depicts variations in water usage between hotels and guesthouses in Zanzibar. Clearly, hotels were consuming more water than guesthouses in various facilities except when it came to the use of showers, flushing toilets and in restaurants. One of the reasons for this variation could be that hotels can afford some facilities such as low flow showerheads, censor taps and dual flush toilets which guesthouses cannot afford.

According to the review of the literature undertaken by Warren and Becken (2017), it is evident (Table 2.9) that water consumptions levels vary according to the type of accommodation establishments. Resorts are found to consume the largest amount of water of between 6 300-19 600 litres per guest per night (Trung and Kumar 2005). Water consumption in hotels vary considerably, largely depending on the location, size and grading of the establishment. The data presented in Table 2.9 indicates that water consumption varies from 313 litres per guest per night (McLennan *et al.* 2014) to 38 900 litres per guest per night (Trung and Kumar 2005). Hostels reveal a water usage of 100 litres per guest per night (Styles *et al.* 2015), whilst eco-resorts consume between 390 to 1 090 litres of water per guest per night. Warnken *et al.* (2005) confirmed that caravan parks consume an average of 558 litres of water per guest per night. Campsites consume the least amount of water per day which amounts to 58-94 litres per guest per night (Styles *et al.* 2015).

Table 2.9: Water use per guest night according to type of accommodation establishments, as reported in literature.

Accommodation type (sample size)	Country (region)	Litres/guest night (range)	Source
Hotel (115)	Australia/New Zealand	313	McLennan *et al.* (2014)
Hotel (95)	South East Asia	677	McLennan *et al.* (2014)
Hotel/resort (5)	Jamaica	(536–1,031)	Meade and Pringle (2001)
Hotel (14)	Jamaica	527–1,596	Meade and Monaco (2001)
Hotel (1)	Tunisia (Tunis)	293	Khemiri and Hassairi (2005)
Hotel 4 star (9) **Hotel 3 star (25)** **Hotel 2 star (12)**	Vietnam	4,400–38,900 2,200–11,000 600–10,800	Trung and Kumar (2005)
Hotel (10)	Australia (Qld)	621 (390–1,410)	Warnken *et al.* (2005)
Hotel (184)	Europe	Hilton: 516 (133–1,880) Scandic: 216 (86–506)	Bohdanowicz and Martinac (2007)
Hotel (21)	Barbados	770 (323–1,220)	Charara *et al.* (2011)
Hotel (20)	Jamaica	440 (<50 rooms) 583 (50–150 rooms) 666 (>150 rooms)	Meade and Gonzalez-Morel (2011)
Hostel	Europe	100	Styles *et al.* (2015)
Resort (4)	Vietnam	6,300–19,600	Trung and Kumar (2005)
Ecoresort (4)	Australia (Qld)	653 (390–1,090)	Warnken *et al.* (2005)
Caravan park (6)	Australia (Qld)	558 (307–996)	Warnken *et al.* (2005)
Campsites 4–5 star	Europe	94	Styles *et al.* (2015)
Campsites <4 star	Europe	58	Styles *et al.* (2015)

Source: Extracted from Warren and Becken (2017:296)

2.5.2.4 Location

The location of accommodation establishments has an impact on its efficiency, occupancy rate, performance, and revenue (Oliveira, Pedro and Marques, 2013:643). Styles *et al.* (2015:189) acknowledge that water consumption in the accommodation sector differs between different locations due to factors such as the region, climatic conditions, urban or rural areas.

2.5.2.4.1 Region

According to Barberán *et al.* (2013:182) water consumption varies between regions. Wang and Huang (2013:183) comments that hotels located in attractive areas and/or developed areas to entice guests from developed countries generally have high operational expenses. Becken, Rajan, Moore, Watt, and McLennan (2013:22)

examined the water consumption of hotel guests per night by various regions around the world.

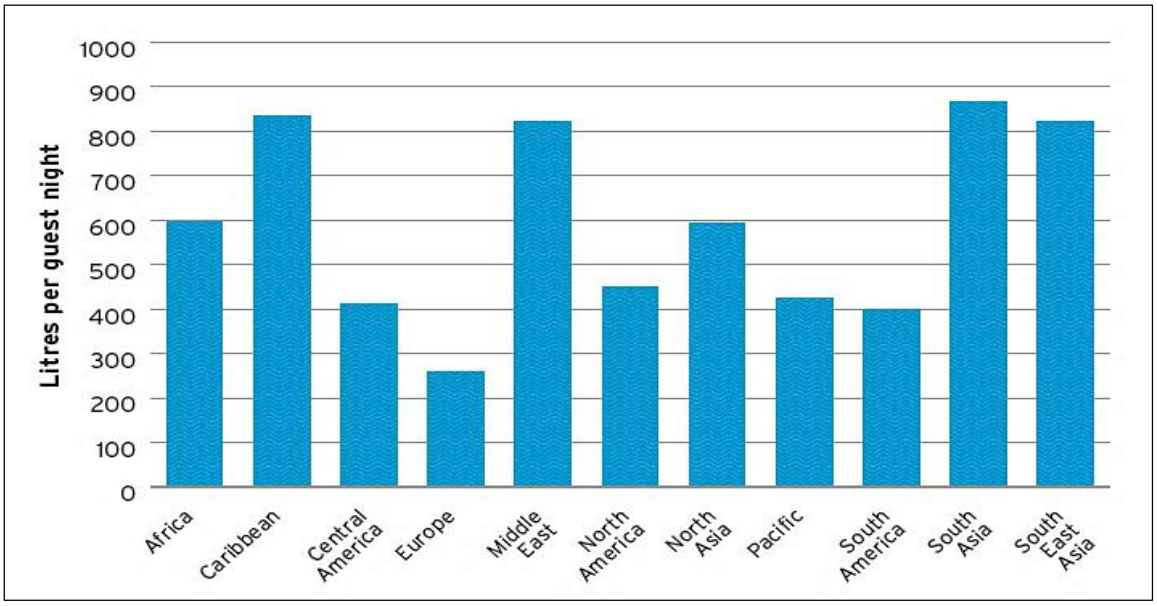


Figure 2.11: Average water usage per guest per night in hotels in world regions

Source: Becken, Rajan, Moore, Watt, and McLennan (2013:22)

The study confirms that that hotels in South Asia, Caribbean, South East Asia and the Middle East have the highest water usage rate, of over 800 litres of water per guest per night. This is followed by Africa and North Asia where usage rate per guest per night is around 600 litres of water. Guests at hotels in Central America, Pacific, North and South America are found to consume at least 400 litres of water per night. The least water consuming region according to Figure 2.11 is Europe where water consumption per guest per night is below 300 litres. Europe has been successful in introducing regulations on sustainable water use through various initiatives as is recorded by various scholars and environmental protection organisations (Sucheran 2013:198; Styles *et al.* 2015:189). With the high consumption of water by the accommodation sector globally, a grave concern exists, as a number of countries, most of which in the Middle East and South Asia, are facing extreme high-water stress levels (Hofste, Reig and Schleifer, 2019). Table 2.10 shows water stress rankings by country.

Table 2.10: National Water Stress Rankings

Source: Water Resources Institute Aqueduct (2019)

2.5.2.4.2 Climatic conditions

Climatic conditions are closely related to regions of the world. Gössling *et al.* (2012:7) notes that areas slightly above or below the equator have a climate which require continuous irrigation of gardens because they have long dry seasons. Table 1.10 clearly shows that regions with long dry seasons and have high temperatures, use more water, and face high water stress levels. According to Tortella and Tirado (2011:2577), high temperatures usually force guests into using showers and swimming pools more frequently in an effort to try and cool off. A report by Sydney Water (2019:6) for example found that the hot-dry weather conditions of 2017-2018 resulted in an increase in water demand of 17.8 litres per day to 323.9 litres per day. This was more than what was demanded over the same period, under the same weather conditions in the previous years.

Furthermore, guests also tend to engage more in activities like skiing, water polo, volleyball, basketball and using spas and wellness areas when they are faced with

warm weather conditions (Warren and Becken, 2016:290). Becken *et al.* (2014:11) comments that water usage by tourists increases in areas with uncomfortable temperatures.

High temperatures are, however, not only a problem to tourists but to accommodation establishments as well in that they come with high maintenance costs. Gabarda-Mallorquí, Garcia and Ribas (2017:84) reveal that higher temperature areas effect outdoor swimming pools and gardens where evaporation drains water pools to critical levels on a daily basis. This raises the demand for water at the destination level and puts pressure on water sources. In addition, the inability of the soil to keep adequate water means more water has to be extracted to water plants and provide guest services (Gössling *et al.* 2012:4; LaVanchy, 2017:45). Dry soil also expands and exerts pressure in pipes leading to leakages (Sydney Water, 2019:3).

2.5.2.4.3 Urban and rural areas

Guests accommodated in urban areas tend to have different patterns of water use, and they tend to use different quantities of water than people accommodated in locations which are in rural areas or areas far away from city centres and towns. According to Eusébio, Carneiro, Kastenholz, Figueiredo and da Silva (2017:199), the rural tourist market is associated with middle to high class tourists with high levels of education who travel with children to rough-hewn traditional areas in search of their wellbeing. Basically, this group loves culture, nature and gastronomy as may be seen in visits to cultural villages, agricultural areas, wine lands, tea or coffee estates and other plantations. In contrast to urban visitors, rural tourists are known for low spending and visiting friends and family (Bel, Lacroix, Lyser, Rambonilaza and Turpin, 2015:562). Urban areas on the other hand are known to have plenty of products and services which are expensive and most urban tourists consume large amounts of water.

NH Hotels (2010 cited in Styles *et al.* 2015:189) report that urban hotels in Germany use about 184 litres of water per guest per night while resort hotels in the same country are reported to use about 698 litres of water per guest per night. On the other hand, Torres-Bagur, Ribas and Vila-Subirós (2019:7) found that hotels located along the coast and those located close to the city had the highest number of beds, high

occupancy rates, high water consumption levels than those located in inland areas and rural settings. Torres-Bagur, Ribas and Vila-Subirós (2019:7) also found that hotels and campsites in rural settings were smaller compared to those located along the coast and close to the city. Torres-Bagur, Palom, and Vila-Subirós (2019:565) found that accommodation establishments located in coastal areas were more concerned about the impacts of climate change on availability of water consumption compared to those operating in inland areas. It is evident that there is little consensus as to the nature of water consumption between rural and urban tourists. However, what is widely known and spoken of is that consumption differs according to where tourists come from, developed or less developed countries. LaVanchy (2017:48) for example confirmed that tourists from developed countries had a tendency of using larger quantities of water than locals and tourists from less developed countries. The next section offers a discussion on what an environmentally sustainable accommodation establishment ought to be.

2.6 An environmentally sustainable accommodation sector

Sustainable development is a progressive concept that advocates a balanced approach towards the management of resources for the benefit of both current and future generations (United Nations Conference on Sustainable Development, 2012:7). By and large the concept promotes optimal and efficient use of economic, social and environmental resources by current generations for the benefit of future generations (Sucheran, 2013:24; Moghaddam, Changani, Mohammadi, Hadei, Ashabi, Majd and Mahvi, 2017:463). The concept was orchestrated and well documented in the Brundtland Report published in 1987, Agenda 21 1992, and in the report that followed the 2002 World Summit on Sustainable Development (WSSD) (Barkemeyer, Holt, Preuss and Tsang, 2014:16; Le Blanc, 2015:186). These reports discuss the need for institutions and governments to ensure efficient and effective use of environmental resources with an emphasis on maximizing positive developments (Laasch, 2018:174). Furthermore, recommendations from the reports concentrate on three predominant spheres of the political - economy known as the triple bottom line dimensions to sustainability which comprise economic, social, and environmental resources (Brandi, 2017:26).

The use of the triple bottom line approach seeks to ensure firstly that there is sustainable economic development. This entails equal sharing of economic resources, uplifting of people from poverty and empowering communities whose resources are being exploited (Barkemeyer *et al.* 2014:17). The second dimension has to do with ensuring that the moral and social fabric is kept intact and developed for the benefit of communities and the world (Okech, 2010:350). According to Inkson and Minnaert (2018:212), this dimension demands protection of social and cultural values of every society for the benefit of its progenitors. The last dimension of the triple bottom line approach deals with the commitment to environmental protection and maintenance of biodiversity for the benefit of future generations (Ranade, 2012:3). The concept of sustainable development moves from defining the overall scope of the triple bottom line approach to the development of a plan to deliver tangible and intangible products.

As an extension of sustainable development, sustainable tourism is a concept that stresses the need for tourism to meet the needs of present generations without compromising the needs of future generations (UNWTO and UNDP, 2017:15). The concept of sustainable tourism concentrates on ensuring firstly that tourism makes optimal use of environmental resources; secondly, tourism respects, promotes and preserve culture (Okech 2010:350); and thirdly, tourism ensures there is economic viability within communities and businesses. In their study on whether sustainable development affects tourism's economic benefits, Pulido-Fernández, Andrades-Caldito and Sánchez-Rivero (2015:59) argue that sustainable tourism does not hinder businesses from creating wealth, neither does it stop communities from enjoying economic benefits of tourism. Through implementing environmentally friendly policies and practices, businesses go green. Rahman, Reynold and Svaren (2012:723) comment that tourism businesses go green by improving their environmental practices thus reducing their consumption of resources. Styles *et al.* (2015:196) provide examples of hotels and campsites in Europe, that can save 376 million m^3 to 46 million m^3 of water per annum if they adhere to efficient water consumption practices. In the hospitality sector, accommodation establishments that engage in environmentally friendly practices are defined as green hotels or eco-friendly hotels (Sucheran 2013:58).

According to the Green Hotels Association (2020), green hotels or environmental-friendly hotels "whose managers are eager to implement environmentally - friendly

programmes which save water, energy, reduce waste and at the time saving money". Han, Hsu and Sheu (2010:325) define a green hotel as an environmentally - friendly lodging property that follows ecologically sound programmes such as recycling, water conservation and energy saving. Manaktola and Jauhari (2007:365 cited in Kim Lee and Fairhurst 2017:227) define a green hotel as a "less environmentally damaging property which has made commitments" to engage in environmental practices such as "saving water, energy and reducing waste." Rahman and Reynolds (2016:108) points out that practices expected of green hotels include, towel reuse programmes, low flow fittings, use of natural ventilation, light sensors, and waterless urinals. Table 2.11 depicts environmentally friendly practices which are undertaken by accommodation establishments that want to become sustainable or go green.

Table 2.11: Environmental best practices undertaken in the hospitality industry to become more sustainable.

Item	Environmental Best Practice Undertaken by Green Hotels
Water	• Low flow fixtures • Greywater • Reduce waste • Rain-water • Reuse programmes
Energy	• Compact efflorescent lights • Energy star efficient HVAC • Renewable energy • Occupancy sensors • Reduce waste
Solid Waste Management	• Recycling • Compositing • Refillable amenities
Air Quality	• Low volatile organic compounds • Air filtration • Cut vehicle pollution
Environmental purchasing	• Paper bleached without chlorine • Paper made from recycled product • Purchase from environmentally responsible purveyors • Purchase of organic food • Purchase locally grown food
Community awareness	• Green teams • Conservation training • Make an effort visible to guests

Source: Mbasera, du Plessis, Saayman and Kruger (2018:3)

Table 2.11 contains elements of environmentally - friendly or green practices which accommodation establishments implement when going green or when they want to be constituted as green hotels (Mbasera *et al.* 2018:3). Karimi (2014:97) defines green practices as commitments by firms to engage in environmentally - friendly activities which produce green products. Kim, Lee and Fairhurst (2017:227) define it as environmentally - friendly ways of doing business which are aimed at reducing waste. Ecolabels and Environmental Management Systems (EMS) have been widely recommended as the most effective systems for encouraging environmentally - friendly practices and for showing guests' commitments to green practices (Millar and Baloglu 2011:307; Merli*,* Preziosi, Acampora and Ali 2019:170). Environmentally - friendly measures undertaken by the accommodation sector, generally focuses on water, energy, waste, air quality, green procurement, and community awareness (Table 2.11) (Mbasera *et al*.2018:3; Rahman and Reynolds, 2016:109). Green hotels are also known for implementing technological changes in guestrooms and common areas, thus retrofitting and renovating buildings to enable adoption of water and energy saving technologies (Rico *et al.* 2020:775). Rahman, Reynold and Svaren (2012:724) argue emphatically, that being green is more than managing waste and consumption, but also managing the supply chain. Al-Aomar and Hussain (2017:77) believe that it is in the management of the supply chain that green practices are reflected before they are seen in the products and services of the accommodation establishment. Of significance to the accommodation sector, is the sustainable management of water consumption, given that the sector consumes large volumes of water.

2.7 Water conservation in the accommodation sector

Kirk (1995 cited in Rahman *et al*. 2012:726) narrates that guests at accommodation facilities expect to find high pressure showers, the best swimming pools as well as fresh and clean towels and linen which all require substantial amounts of water. Against this backdrop, it is therefore important to conserve water in this sector for the benefit of both the accommodation sector and communities (Barberán *et al.* 2013:188). Indeed, changes in the availability and quality of water resources can have a detrimental effect on the accommodation sector and the tourism industry at large. Sloan, Legrand and Chen (2013:97) explain that as much as water conservation is critically important, striking a balance between conserving water and satisfying guests

is always a challenge for accommodation managers. In order to minimize the amount of fresh water used in the accommodation sector, water management practices need to focus on controlling the amount of water used in the following areas: bathrooms, swimming pool area, grounds, kitchen and laundry (Kasim *et al.* 2014:1092). Currently, most managers within the accommodation sector are seeking to reduce operational costs by decreasing energy and water consumption. The process of responsible water management focuses on identifying vulnerabilities and adaptation measures (Ding and Ghosh 2017:4). Fraj, Matute and Melero (2015:39) postulate that accommodation facilities that embrace innovation are more likely to implement and accept environmental changes.

Barberán *et al.* (2013:183) provides a scenario of the Siken Reino de Aragón Hotel in Zaragoza, Spain:

> *The hotel which opened in 1996 has 117 rooms and 191 beds, a restaurant, banqueting rooms with a carrying capacity for 250 people, various rooms for events holding up to 350 people and major water consuming facilities which include gymnasium, swimming pools and other guest services. Average daily water consumption at the hotel in 2008, before renovations and retrofitting were done, stood at 50 975 litres of water, each guest was consuming an average 396.5 litres of water per guest per day with a cost of €115.6 per day. After renovations and retrofitting were done to introduce low flow shower heads, sensor taps and controlling of any water which flows for dishwashers and so forth, average daily consumption fell to 39 118 litres a day, equivalent to 378.6 litres per guest per day.*

Such evidence confirms the importance of water conservation in the accommodation sector. Azam, Alam and Hafeez (2018:336) note that the development of balanced tourism models can help preserve natural resources, the environment, and ecosystems. Styles *et al.* (2015:191) propose the following model (Figure 2.12) which they suggest represents relevant performance indicators for benchmarking water consumption within an accommodation enterprise. The main reasons for introducing such water consumption benchmarks and water saving measures are more strategic in nature; for example, for a hotel to differentiate itself and increase customer loyalty it has to improve its management of processes (Tortella and Tirado, 2011:2578).

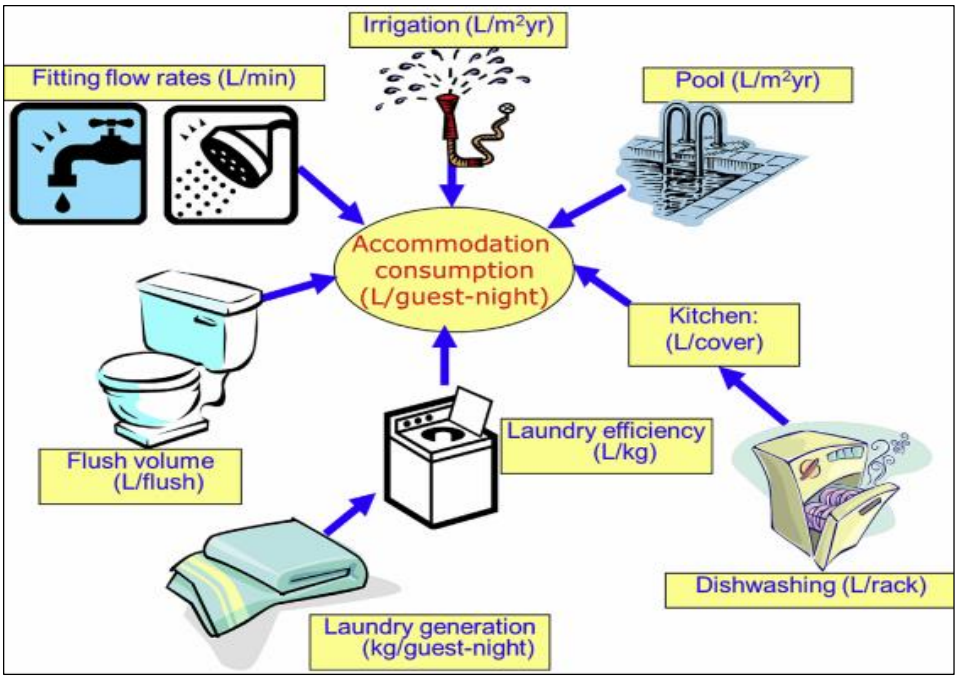


Figure 2.12: Relevant performance indicators for benchmarking water consumption within an accommodation
Source: Styles *et al.* (2015:191)

Styles *et al.* (2015:194) suggest water consuming areas or facilities at accommodation establishments, as well as unit of measurements that must be used to help come up with performance benchmarks (Figure 2.12). The authors state that sub-metering and benchmarking all zones where water consumption is high can yield valuable information on water usage and allow management to solve the problem intelligently. Basically, using units of measurements to know how much water each facility at an accommodation establishment uses, in relation to guest usage, can help improve water consumption (Thomas Cook-Futouris, 2015:10). Toilets for instance should be measured in terms of litres per flush; irrigation of gardens and golf courses should be measured by how many litres of water are used per m^2; dishwashers in terms of litres per rack; laundry by litres per kilogram per guest per night; swimming pools in terms of litres per m^2 per year; kitchens by how many litres per cover and lastly showers and taps should be measured by how many litres are used per flow per minute. Through these measurements, accommodation establishments will be able to know how much water is consumed by each guest per night, which will help them make informed decisions, with known probabilities in the water management processes (Styles, Schönberger and Galvez Martos, 2013:30).

Table 2.12: Water reductions in the accommodation sector as reported in the literature

Practice and behaviour	Saving	Baseline	Context	Reference
Retrofit water fixtures and reduce leakage	Daily saving: 3,402 L of cold and 2,767 L of hot water	€140,000 over 12-year life of equipment	Zaragoza, Spain (hotel)	Barberán *et al.* (2013)
Application of Environmental Management Systems	50% water saving over 2 years	Before 2,087 L/gn, after 1,032 L/gn	Jamaica (resort, 134 guest rooms)	Meade and Pringle (2001)
Towel reuse program	Annual saving: 2,500 loads of laundry (2.6 million L)	Increase guest participation by 15%	California, USA (hotel)	Baca-Motes *et al.* (2013)

Source: Warren and Becken (2017:296)

Numerous studies (Table 2.12) confirmed the efficient use of water conservation measures in the reduction of water usage in the accommodation sector. In Spain, Barberán *et al.* (2013:183) undertook a study of an older hotel and found that the retrofitting of water plumbing fixtures and fixing of water leaks resulted in a daily saving of 3 402 litres of cold water and 2 767 litres of hot water per guest per night. In Jamaica, Meade and Pringle (2001) found that through application of EMS, 50% of water was saved over a period of 2 years. In California, USA, Baca-Motes, Brown, Gneezy, Keenan and Nelson (2013) found that a towel reuse programme helped save 2.6 million litres of water which could have been used in 2 500 loads of laundry. As has just been revealed, there is a wide range of measures that accommodation establishments can use to minimize water usage. The next section discusses these measures in greater detail.

2.7.1 Water conservation measures in the accommodation sector

According to Sloan, Legrand, and Chen (2013:9) poor water management affects health, the economy, human livelihoods and other activities. As a consequence, water conservation measures that help to reduce health hazards are, therefore, good for society (Gössling *et al.* 2012:12). Sustainable water management helps to ensure rationality and responsibility in various areas where water is used (Ding and Ghosh 2017:4). Styles *et al.* (2015:188) notes that responsible water management practices in the accommodation sector can help prevent water resources conflicts, that is, tension between guests and hosts. Against this backdrop, it is imperative for managers

of accommodation establishments to establish water management plans, develop strategies for each area, control and reduce water consumption, maintain proper functioning facilities, train, and develop the employees and raise awareness among customers (Kasim *et al.* 2014:1090). Managerial measures can be applied in manners elaborated below.

2.7.1.1 Managerial measures

Managerial measures of water conservation at accommodation establishments are those practices which hotel management endorses as green policies and ensures that they are implemented to conserve water conservation. Some of these measures are general, and they do not require large investments and are not too technical in nature (Tirado *et al.* 2019:4). One such measure is having an environmental policy which focuses on the education of guests and employees on water conservation, monitoring water usage across departments, controlling of washing and irrigation times, maintenance of plumbing systems, towel and linen reuse programmes, and general environmental management systems. According to Mbasera *et al.* (2018:2) green policies may be considered as benchmarks for environmental control at accommodation establishments. With environmental benchmarks, managers can reduce water consumption by 10-50% without compromising guest experiences (Thomas Cook-Futouris, 2015:14).

Indeed, the accommodation sector has a responsibility not to use more water than necessary since it is one of the service industries where water plays a crucial role in everyday operations. To prepare as well as to achieve realistic goals for cost-effective management of water resources in the accommodation service sector, it will be necessary to invest not only time but also financial resources to careful planning, training, and monitoring of water conservation objectives that would have been set (Nilsson and Hammer, 2013:53; Sustainable Hospitality Alliance, 2020). Sloan, Legrand and Chen (2013:98) suggest water metering as well as setting of clear goals and benchmarks which help to achieve proper water management practices. In addition, a collaborative and coordinated effort is needed among all stakeholders involved to address issues and challenges of water resource management at accommodation establishments. This includes employees, suppliers and guests who

management of accommodation establishments can closely work with in order to augment water management practices.

2.7.1.1.1 Employee management

According to Mbasera *et al.* (2018:10) training and development of hotel staff towards environmental issues will help hotels improve their environmental performance. Yusoff, Nejati, Kee and Amran (2020:664) notes that when hospitality employees receive training on environmental issues, they will start using environmental resources efficiently, leading to reduction in carbon footprints and operational costs. Cop, Alola and Alola (2020:3498) notes that green training induces employee behavioural control and organisational commitment. This is confirmed in a hospitality study conducted in Vietnam by Pham, Tučková, and Jabbour (2019:396) in which they found that a positive relationship exists between green training, employee behavioural change and environmental performance. Indeed, where management plans and implements training and development programmes aimed at up-skilling workers, performance on maintenance of equipment improves and water is used sparingly (Sloan, Legrand, and Chen 2013:98; Warren and Becken 2016:290).

Although changes in water usage after training and development cannot be easily quantified, researchers concur that employee training is basically a step in the right direction (Pham, Thanh, Tučková and Thuy, 2020:7; Cop, Alola and Alola 2020:3504). Kim, Kim, Choi and Phetvaroon (2019:89) conclude, for example, that employee training on environmental issues enhances their commitment to the organization, transforms their knowledge, abilities and skills into eco-friendly behaviours and improves the environmental performance of their buildings. In Slovenia, Cvelbar, Grün and Dolnicar, (2017:928) found that hotel employees were able to use their training and organisational commitment to explain to guests about the importance and purpose of the towel-reuse programme.

According to Frag, Matute and Melero (2015:39) organisations need to be innovative and proactive in ways that motivate employees to exercise their knowledge, skills and abilities towards water conservation. Formal and informal environmental training programmes can be used to conscientize employees to conserve water (Charara, *et al.* 2011:242). Employees, especially housekeeping staff, can be trained on various

ways they can use to reduce water consumption at hotels (Karimi 2014:102). A case in particular is in accommodation establishments where linen cleaning or washing is done within the accommodation premises; employees can be encouraged to use machines when they are fully loaded so as to minimize the rinse cycle as much as possible (Tuppen, 2013). In guestrooms, housekeeping staff can be encouraged to flush toilets once as opposed to twice during cleaning (Styles *et al.* 2015:194). In addition, managers can direct employees to carry out water audits by instituting water audit teams which check areas with major water costs (Kirk 1996:42). Management can also set department targets for water conservation practices, monitoring results and give feedback on what will be taking place. According to Pham, Tučková and Jabbour (2019:387) in order to give regular feedback to employees and other stakeholders, management should establish a monitoring and targeting system with rewards attached to it. Management can also present letters of appreciation to staff for good ideas, and/or introduce profit-sharing schemes linked to savings achieved through better solid waste, water, and wastewater management processes (Warren and Becken 2016:290).

In sum, what this points to is that there should be consistent engagement between management and subordinates over commitment to environmental issues and the final objectives of such an action. Management should be able to communicate to all employees and to clarify goals and targets that need to be met with data on consumption, costs and trends (Pham, Tučková and Jabbour 2019:388). Management should also be able to differentiate between domestic water consumption and water consumption by guests. On top of that, workers should be given a platform to air their suggestions on water saving processes or water management practices. With such interventions in place, management could improve efficiency on water conservation measures (Kirk 1996:42).

2.7.1.1.2 Guest management

According to Dimara, Manganari and Skuras (2017:425), hotel guests support for environmentally - friendly initiatives is critical in ensuring the success of green practices at accommodation establishments especially in policies such as water saving, reuse and recycling. Han and Hyun (2018:94) posit that guest rooms can be used by hoteliers to induce a water saving behaviour amongst their guests. Merli, Preziosi, Acampora and Ali (2019:176) however, advise that hotels should not only

engage in environmentally - friendly consumption of resources but should also have the ability to communicate about their eco-friendly practices to guests. Accommodation establishments should be able to communicate its initiatives to guests, because for it to be green it needs the participation of hotel guests (Chen, Bernard and Rahman, 2019:327). Han, Hsu and Shen (2010:332) assert that guests should be educated on why it is important and beneficial to participate in green initiatives. Education of guests in general involves use of information leaflets encouraging water conservation at accommodation establishments (Sucheran, 2013:71; Gössling, Araňa and Aguiar-Quintana, 2019:280).

According to Yusof and Jamaludin (2014:507) and Dimara, Manganari and Skuras (2017:431), when information is clearly passed on to guests, they tend be supportive of green operations at hotels, leading to improved practices. Customer participation may reward the accommodation with a competitive advantage over competitors. Guests can be encouraged to watch or monitor the time they spend in showers and on sinks and reduce their water consumption accordingly (Sloan, Legrand, and Chen, 2013:100). However, serious considerations or tests have to be taken into account to assess if the measures taken will not compromise quality, experience, and the health and safety of the employees and the guests. For instance, controlling water volume and flushing times may not be favourable to accommodation guests. Rahman and Reynolds (2016:108) suggest that managers need to understand the dynamics of consumer behaviour before they communicate environmental programmes for implementation.

2.7.1.2 Maintenance and retrofitting of plumbing systems

A major activity undertaken in all aspects of the accommodation sector is regular maintenance. According to Tuppen (2013), the maintenance of bathrooms can help save up to 750 litres of water per day. Styles *et al.* (2015:194) recommend that an inspection of water equipment and fittings be done regularly and, where replacements are needed, management should consider installing low flow fittings such as low flow showerheads, sensor taps and aerators in faucets. Sloan, Legrand, and Chen (2013:100) suggest that instead of repairing toilets, organizations can install new displacement devices and tank restrictors in toilets. This is supported by Barberán *et al.* (2013:184) who, in their study of the Siken Reino de Aragón Hotel in Spain, found

that retrofits had a positive impact on both cold and hot water consumption. The authors note that, after retrofits, cold water consumption was reduced by 3 402 litres per day whereas hot water consumption was reduced by 2 767 litres per day. In the kitchen alone retrofits reduced water consumption by 1 345 litres a day which was almost 85% of daily consumption (Barberán *et al.* 2013:184). A practical study by Barnard, Darkins, Earl and Adeyeye (2014:37) found that retrofitting can be used as a cost cutting measure – saving bills from portable water consumption and wastewater disposal.

On the other hand, research confirms that detecting leaks and fixing them can have a huge impact on the total water usage in the accommodation sector (Bragiel, 2018). Sydney Water (2019:13) reveals important information about causes of water leaks and breaks. Information offered by the report identifies several factors which include but are not limited to deteriorating connections and fittings, cracking pipes, and changes in water pressure and temperature. According to Barberán *et al.* (2013:183), leakages can lead to loss of large amounts of water. According to Thomas Cook-Futouris (2015:18) a moderate toilet leak wastes approximately 0.5 L/min or 20 m^3/month. In their study on water usage and water saving measures in hotels, the authors estimated that leakages increased cold water usage by 13 986 litres a day. Styles *et al.* (2015:189) note that leaking taps can increase hotel water use by 5%. Therefore, the detection and maintenance of plumbing systems is an integral measure that accommodation establishments should undertake in an effort to reduce water consumption. Moreover, employees and guests should both check and ensure that no taps, toilets or water pipes are left running or leaking. According to Thomas Cook-Futouris (2015:18) detecting and fixing water leaks on time can help save about 20 m^3 per month. That said, according to Sydney Water (2019:13), effective water conservation strategy requires that all pipe networks are free from leaks and breaks. It is with this submission in mind that this study argues that conservation efforts may not yield positive results if maintenance and retrofitting of plumbing systems is not well taken care of.

2.7.1.3 Towel and linen-reuse programs

Towel and linen reuse programmes are programmes in which fabrics at hotels are only washed on a call basis (Rahman and Reynolds, 2016:109). Such programmes at

accommodation establishments can help save a lot of water and money (Han and Hyun 2018:95). Green Lodging Calculator (2016 cited in Dimara, Manganari and Skuras 2017:426) reveals that a 150-room hotel can save up to 794 936.48 litres of water and 541 litres of detergent per year if it engages in towel and linen reuse programmes. In California, USA, Baca-Motes *et al.* (2013:1080) found that a towel reuse programme accompanied by guest commitment helped save 2.6 million litres of water, which could have been used to wash 147 000 towels in 2 500 loads of laundry. Goldstein (2009, cited in Han and Hyun 2018:89) revealed that it costs about USD1.50 per hotel room per day to provide fresh towels. Thomas Cook-Futouris (2015:19) makes the following suggestions: firstly, bed linen can be changed after three days, or on a call basis only; secondly, in room towels may be changed after they have been placed in a specific basket in the bathroom, and the changing of pool towels can be charged a fee or should be done within a specific allotted time.

2.7.1.4 Low flow showerheads and sensor taps

Use of faucet aerators to regulate and restrict water flow on taps and showerheads is highly commended by several researchers and local government councils throughout the world (Nthiga 2018:110; Sydney Water 2019:11). This is because of the role aerators play in reducing water usage in both commercial and household constituencies. According to Scarfiello (2016:34) faucet aerators are used to regulate and restrict water flow in kitchens, restaurants, public areas and guestrooms. Studies show that retrofitting faucets with aerators can help reduce water usage by over 50% (Rico *et al.* 2020:775). Faucets aerators are defined by Scarfiello (2016:34) as accessories that are used to restrict water flow. Aerators come in different forms including electric-eye sensors which can stop and release water from taps when one's hand or object is detected. Flow restrictors on showerheads are also part of the accessories used to reduce water flow in bathrooms.

According to Bragiel (2018), low flow bathroom features can reduce water usage by as much as 30 percent. These features can come in the form of showers with buttons, aerated shower heads and taps with sensors. Kasim *et al.* (2014:1092) advise that for proper and sustainable water management practices in accommodation establishments, shower flow should be minimized to less than 10 litres per minute. Gössling *et al.* (2012:11) notes that low flow showerheads can use less than 7 litres

of water per minute compared to conventional high - pressure showers which consume between 16 and 20 litres per minute. With a flowrate of between 6 and 9 litres per minute, low-flow showerheads can help save up to 1 200 litres per year in one room. In Kenya, Nthiga (2018:110), found that faucet aerators (spray taps and low flow showerheads) were attractive water conservation measures.

Sloan, Legrand, and Chen (2013:99) point out that faucet aerators (low-flow showerheads/spray taps) are critical in water conservation as they have the potential to reduce at least 5 litres of water per minute should they be used. Conventional basin taps pour between 10 and 15 litres of water per minute. In addition, Sloan, Legrand, and Chen (2013:99) further argue that if aerated taps are used for general hygiene purposes, they can help save up to 600 litres of water per day provided they have an average flow rate of between 4 to 6 litres per minute. If these interventions compliment water used in flushing toilets and urinals a whole lot of water is saved in bathrooms.

2.7.1.5 Toilets and urinals

Previously it was revealed that toilets from the 1980s to the 1990s could use between 13 and 27 litres of water per flush. Today a modern dual flush toilet is believed to use between 3 litres and 7 litres of water (Scarfiello 2016:34). According to Sloan, Legrand, and Chen (2013:100) installation of dual flush toilet systems and gravity and pressure assisted toilets can help save large volumes of water in the long run. Gravity and pressure assisted toilets are toilets whose efficiency depends on gravity and air. Kasim *et al.* (2014:1092) support this view by revealing that dual flush toilets can use an average of 6 litres of water per flush unlike conventional ones which use at least 10 litres of water per flush. Scarfiello (2016:32) states that by installing modern (dual flush) toilets, guests can use about 6 litres of water to flush solid waste and about 3 litres to flush liquid waste. Replacing conventional toilets with dual flush toilets can help save up to 15 000 litres of water per year in one guest room (Kasim *et al.* 2014:1092). According to Ogbeide (2012:1) the payback period for investing in ultra-low flush toilets is 2.1 years.

The argument so far points to the fact that a lot of water is consumed in toilet and urinal systems. Indeed, these are critical instruments of hygiene which cannot function without the precious resource. However, the point is economic and responsible use of

water in toilets and urinals can be beneficial to all who require the precious liquid for hygienic purposes. In addition, to using modern technologies in toilets installing modern urinals can also save water. According to Scarfiello (2016:33) modern urinals are better preferred for water conservation than traditional urinals. Modern urinals are self-regulating when it comes to releasing water while traditional urinals continuously discharge water. Modern urinals such as gravity tank-type urinals, siphonic jet urinals and electric-eye sensor urinals can, therefore, be used to save large amounts of water at accommodation establishments. In terms of figures traditional urinals are believed to use between 7 and 11 litres of water per flush while modern urinals use about 2 litres of water per flush (Scarfiello 2016:34).

2.7.1.6 Sub-metering

Metering of water pipes in different departments can help conserve water and be very rewarding in the long run. Though expensive in the short run, in the long run this measure will prove to be worthwhile as it encourages monitoring and efficient use of water in the hotel (Thomas Cook-Futouris, 2015:13; Styles *et al*., 2015:194). According to Tirado *et al.* (2019:5), water consuming areas such as kitchens, guest rooms, laundry areas, gardens and public toilets can be installed with sub meters to help monitor and control water usage. Moreover, installation of water meters should also be done at all sources of water supply including boreholes, municipal water, harvested rainwater and grey water from laundry, toilets and bathrooms (Thomas Cook-Futouris, 2015:12). Monitoring meters manually against industry benchmarks and measuring flow rates per room can help minimize costs and help detect areas of unnecessary water consumption (Thomas Cook-Futouris, 2015:12). According to Styles, Schönberger and Galvez Martos (2013:219) sub-metering and recording data from areas of priority like kitchen, laundries, guestrooms, swimming pools and public toilets can help to identify irregular water use patterns. Moreover, it can also help organizations to compare results against industry benchmarks. Styles *et al.* (2015:194) note for example that by using best practice benchmarks, guests at fully serviced hotels are expected to consume about 140 litres of water per night while guests at shared accommodation establishments like hostels are expected to consume about 100 litres of water per night.

2.7.2 Water conservation measures in various departments

The argument so far has been that the accommodation sector consumes water through its various activities. In the previous section it was discussed how water usage can be minimized through employee management, guest management as well as plumbing systems intervention. This, however, is not the whole answer as researchers believe more water can be saved through interventions in priority areas like laundry, food and beverage, grounds and swimming pool. These departments and facilities are considered part of the support system which accommodation establishments use to stimulate guests' experiences.

2.7.2.1 Laundry

Often, the laundering of accommodation linen, towels and guests' clothing items is usually undertaken using fresh water, which in many places is scarce and is provided in rations (Gössling, Araňa and Aguiar-Quintana, 2019:275). According to Bragiel (2018), laundry accounts for a huge proportion of water usage in the accommodation sector. In the previous section on water use it was revealed that laundry services consume between 30 and 100 litres of water per guest per night (Gössling *et al.* 2012:7; Styles *et al*., 2015:189). This is because guests generate a considerable amount of laundry from clothes, bed linen and guest towels. Dimara, Manganari and Skuras (2017:426) reiterates that even though laundry of such items may account for some reasonable amount of water, it also requires the use of energy and detergents. However, to focus on water usage, Becken *et al.* (2014:19) reveals that an accommodation establishment with no laundry services uses 15% less water compared to that with on-site laundry services. Existence of on-site laundry services is, however, not a problem where laundry equipment is operated efficiently through minimizing rinse cycles and using the correct amount of soap which does not require extra rinsing. According to Tuppen (2013), water from previous rinse cycles can be re-used for the first wash of the next cycle. This can be made possible by installing temporary water holding tanks to keep grey water. Recycled grey water from laundry can also be used for irrigation (Tirado *et al.* 2019:4). Becken *et al.* (2014:19) and Styles *et al*. (2015:195) suggest that the use of effective equipment and certified clean detergents can reduce water usage in small and large-scale laundry services.

According to Tirado *et al.* (2019:10), although the existence of on-site laundry facilities at accommodation establishments is costly on paper, in reality, it compels organizations to find innovative ways to conserve water as they seek to cut costs, through measures such as the installation of ozone systems in the laundry and replacement and retrofitting of laundry water valves (Tuppen 2013). In addition, strict monitoring of laundry volumes per room and installation of sub-meters at laundry zones can also be done to help track water usage and manage guests (Thomas Cook-Futouris, 2015:12; Tirado *et al.* 2019:5). Furthermore, when procuring laundry machines, management should purchase the ones with an economical water consumption rating. Styles *et al*. (2015:195) encourages use of new domestic washing machines with an average annual laundry water consumption of 7 litres per kg laundry.

2.7.2.2 Food and Beverage (kitchen, restaurant, and bar areas)

The food and beverage department is one of the most important income generating departments at accommodation establishments. The department is responsible for organisation and administration of the kitchens, restaurants, and bars. Earlier in this study it was indicated that kitchens, restaurants, and bars consume considerable amounts of water through various ways including food preparation, ice-making, thawing, cleaning and hand washing. Over the years, researchers have come up with ways in which water usage can be minimized within the food and beverage department. Some of the ways include installing water efficient appliances like faucet-aerators, dishwashers, and pre-rinse sprays.

When considering water consumption from kitchens, restaurants, and bars, one should always look beyond the walls of these areas. This is because of the indirect linkages which go beyond the kitchen, the restaurant, and the bar such as indirect water used in farms and industries to produce crops, drinks and meat used in these areas. Thomas Cook-Futouris (2015:9) reveals for example that to produce one kg of tomatoes farmers need about 214 litres of water, while to produce a kg of beef 15 500 litres of water are used. However, when looking at water consumption in kitchens, restaurants and bars researchers usually focus on direct water usage, meaning water used during food preparation, cleaning and washing dishes. This anecdote was looked at in section 2.5.2. In this section the focus is on various ways in which water consumed in kitchens, restaurants and bars can be minimized.

According to Styles *et al.,* (2015:196) water used in kitchens, restaurants and bars should be monitored and recorded in order to better manage its usage. As previously mentioned, monitoring water usage can help detect irregular patterns and areas of unnecessary consumption. Looking at kitchens, Bragiel (2018) comments that use of new industrial kitchen technologies at accommodation establishments can help cut water loss to minimum levels. Scarfiello (2016:39), recommends use of faucet aerators and pre-rinse sprays to save water in kitchens. Indeed, use of aerated taps can help minimize water loss during washing of hands, cleaning, washing of fruit and vegetable and cooking. According to Styles *et al.,* (2015:194) using sink taps with sensors or pedals can also restrict unnecessary water flows. Reznickova and Kysela (2016:4) assert that taps used in kitchens should have a maximum flow of 10 litres per minute.

In addition to using low-flow taps, according to Bragiel (2018), kitchen staff should minimize the use of ice machines and desist from thawing food under running water. Furthermore, installing steam cookers in kitchens can also help to save large volumes of water and reduce costs for water. Moreover, controlling water heating in kitchens and bathrooms to the standard 45^0C to 60^0C can also help to reduce water consumption substantially (Styles *et al*. 2015:194).

In restaurants and bars, dishwashing is a major water-consuming and wastewater generating activity. To minimize water-use during dishwashing, organisations can use modern pre-rinse sprays. Modern pre-rinse sprays according to Scarfiello (2016:39) release 6 – 10 litres of water per minute. This is better than conventional sprays which use between 9 and 15 litres per minute. Water use and discharge can also be reduced by educating staff to hand-scrape plates before loading, filling each rack to maximum capacity, recycling final rinse water and keeping flow rates as low as possible (Bragiel, 2018). Pre-rinsing of plates with spray valves that have small nozzles in the kitchen can also help save substantial amounts of water. Gössling *et al.* (2012:11) and Styles *et al*. (2015:196), propose using efficient dishwashers in the kitchen especially those with hot water supply connections. Dishwashers should be used on full load, and the kitchen staff should be advised to pre-soak utensils and dishes. Moreover, use of bottled water can be minimized by using glass bottles and food made from locally produced crops can be served to reduce water footprints (Thomas Cook-Futouris, 2015:25).

2.7.2.3 Landscape and outdoor areas

Previously, in this study, it was revealed how much water is consumed maintaining landscape areas. In this section the study looks at how much water can be saved in this area of accommodation. According to Kasim *et al.* (2014:1091) when maintaining outdoor areas, accommodation providers should use wastewater instead of freshwater sources. Gössling *et al.* (2012:11) propose installation of water meters with grey water irrigation. Furthermore, in an attempt to implement good water management practices, watering of the garden or grounds in the accommodation sector should be done in the evening when evaporation seems to be low due to low temperatures. Automated irrigation systems should be avoided unless the system's water flow has been reduced to a level that will not result in moisture stress to the plants. Kasim *et al.* (2014:1101) and Gössling *et al.* (2012:11) recommend drip type irrigation, while Sloan, Legrand and Chen (2013:101) recommend the use of artificial plants and tuff and indigenous plants which are favourable to climatic conditions of the area. According to Thomas Cook-Futouris (2015:21) installation of smart wastewater treatment systems and smart water control systems for sprinklers for landscape irrigation can help save 25 litres of water per day in irrigation water.

To avoid over-wetting, management can install moisture sensors in gardens or grounds (Gössling *et al.* 2012:11). There is also a need to harvest rainwater from gutters, driveways and pavements and store it in large tanks for use in watering the grounds and laundry services (Sloan, Legrand and Chen, 2013:102; Kasim *et al.* 2014:1093). Grey water from baths and sinks can also be treated and be used for irrigation purposes. In their study on water efficiency in the hotel industry, Gabarda-Mallorquí, Garcia and Ribas (2017:90) studied Hotel Samba in Lloret de Mar, Spain and found that by installing an efficient system to reuse grey water, the hotel managed to recycle over 160000 m3 of water from guest rooms between 1997 and 2013. Al-Aomar and Hussain (2017:77) recommends green practices such as these including water recycling, separation of water for plants and grass with sludge from the hotel. According to Sydney Water (2019:14), recycling water is a practice that can be used in watering the gardens, golf courses, parks, and agriculture as well as flushing toilets, car washing and reserve water for firefighting.

2.7.2.4 Swimming pools

To conserve water from swimming pools, Styles *et al*. (2015:196) propose use of natural filtration for outdoor pools as well as controlling water usage and chemical use. Use of plant filtration systems and supplementary disinfection methods like ozonation to clean pools are natural ways hotels can use to minimize use of chlorine. According to Sucheran (2013:194) eco-labelled chemicals which are less polluting can also be used to save water where filter backwashing is not used. According to Thomas Cook-Futouris (2015:22) backwashing of the pool mounts to wastage hence it cannot be done daily, but at intervals of two or three days. At times only filters may be cleaned manually to avoid backwashing (Tuppen, 2013). In addition to these measures Gössling *et al.* (2012:11) propose reducing the size of swimming pools to reduce water consumption. Styles *et al*., (2015:196) recommend benchmarking water levels to minimize unnecessary water intake. Thomas Cook-Futouris (2015:12) adds that sub-metering of the pool can also be done to allow monitoring of water usage and water evaporation at pools. Monitoring of water usage/evaporation can be done regularly by reading water meters every evening and every morning before the start of any new-day's work.

Where water evaporation is a problem, it can be minimized by covering the swimming pool as shown in Figure 2.13 (Gössling et al. 2012:11; Styles *et al*. 2015:197). Sloan, Legrand, and Chen (2013:100) note that pool covers can reduce evaporation by 80 – 90 percent and have the advantage of reducing heat loss. This according to Daisy (2020:12) can help save 10 000 litres of water per month. In addition, it is believed that using pool covers also reduces chemical consumption by 35 to 60 percent (United States Department of Energy – DOE 2020).

An alternate proposal by Thomas Cook-Futouris (2015:23) is replacing the entire freshwater pool with saltwater at the beginning of the summer season then subsequently topping up evaporated water with freshwater.

Figure 2.13: Covered swimming pool
Source: www.solarsafepoolcovers.com

In summary, what has been said so far is that the accommodation sector of the tourism industry consumes large amounts of water through various activities and facilities. Contemporary discussions globally emphasise the need for the t the accommodation sector to conserve water to help communities fight water stress. The scourge of water stress justifies why accommodation managers, employees and customers need to value water conservation. To assist in this regard, the last section of this study examined various ways water can be conserved in the accommodation sector. What was conveyed in the discussions was that implementing various water conservation measures saves money, reduces utility costs from pumping and maintenance and protects the environment. This is because conserving water reduces strain on local water resources and infrastructure and improves the comfort of guests by reducing the likelihood of water shortages and equipment failure (King 2013:2). However, while the above solutions can be effective, evidence shows that there are challenges facing the adoption of water management practices at various accommodation establishments in the world. These include lack of robust action from industry players as well as lack of incentive support from governments.

2.8 Challenges facing water conservation in the accommodation sector

Given the proliferation of accommodation facilities globally, and the subsequent issues involving water scarcity, managing water responsibly in the tourism industry is now critical to save society and help it to grow (Sloan, Legrand, and Chen 2013:93). However, many tourism sectors, including the accommodation sector, are faced with

numerous challenges in the sustainable management of water resources. According to Yusof and Jamaludin (2014:508) barriers or challenges facing water management in accommodation establishments can be grouped into significant, less- significant and non-significant. According to the authors, significant barriers include, lack of green experts, lack of environmental resources and lack of green equipment. Less-significant barriers include high implementation costs, high maintenance costs and lack of government support. Lastly, non-significant measures include lack of green knowledge and uncertainty of green outcomes. Below we look at these challenges in detail.

2.8.1 Lack of government support

One of the challenges facing water conservation is lack of government support. Government support comes in two forms, namely, incentive support and regulatory support (LaVanchy, 2017:45). A lack of both lead to problems including health risks, unsustainable groundwater abstractions, water contamination, water stress and excessive water usage (Mbereko, Moses, Manyangadze and Mukaratirwa, 2020:6). In most countries national water laws/policies are well crafted and passed into law, but evidence on the ground shows lack of monitoring and enforcement (Charara *et al.* 2011:242; Davis and Harji 2014:46; Howes, Wortley, Potts, Dedekorkut-Howes, Serrao-Neumann, Davidson, Smith and Nunn 2017:11). In Malaysia, Yusof and Jamaludin (2014:508) found, for example, that there was lack of government support on water conservation initiatives at local level. This has impeded water conservation efforts by hotels in the country.

Nepal, Irsyad and Nepal (2019:151) charge that governments that want to see water conservation within their boundaries should monitor organisations that comply with bylaws and incentivise them. This may encourage lackadaisical organisations to participate in environmentally friendly initiatives (UNWTO, 2018:14). Barberán *et al.* (2013:188) argue, however, that public subsidies are not necessary to encourage installations of water saving devices; what authorities can actually do is to regulate construction and building designs as well as plumbing systems. Indeed, regulatory policies if developed and implemented quickly, may be used to address environmental misdemeanours (UNWTO, 2018:14).

Offering alternative water conservation instruments, Azam, Alam and Hafeez (2018:337) propose that governments can introduce water consumption taxes to hotels, regulate commercial services and revoke permits of organisations that do not comply. This proposal, however, can only be viable in countries where domestic water management at national level is solely in the hands of the government. According to LaVanchy (2017:44) water management all over the world takes two approaches, namely, free market and government or command approach. The former approach is more favourable to the business than the later. However, the later approach is more effective than the former. LaVanchy (2017:48) further reveals, for example, that in the Balearic Islands, the government managed to control water usage through command efforts which included imposing eco-taxes, guiding water management based on regional supply sources, educating residents, and introducing water rights and water permits. Saenz-de-Miera and Rossello (2014:280) argue, however, that consumers may not approve the use of environmental regulations and taxes because they will pay more for tourism goods. Economic measures such as increasing tax and water prices though cited as effective tools for reducing water consumption are usually not welcomed by businesses and consumers (Rico *et al.* 2020:775). In cases where such measures are not welcome, Howes *et al.* (2017:11) comments that government will need to effectively communicate and be able to convince stakeholders to accept environmental sustainability as a new way of doing things. By and large, according to Gössling *et al.* (2012:13) water pricing through tariffs can definitely be used to encourage or enforce water conservation. Razumova, Rey-Maquieira, and Lozano (2016:84) concur that high-water tariffs will more likely force accommodation facilities to comply with environmental laws than low water tariffs. The challenge with this measure is that smaller, less economical establishments, such as independent hotels and small to medium sized hotels, will end up at the mercy of the most powerful internationally connected hotels that have financial resources (LaVanchy, 2017:46).

2.8.2 Lack of implementation funds to invest in water conservation

What has been agreed on so far is that there are high costs associated with water conservation in the hospitality industry, and, therefore, independent, and smaller hotels often find it difficult to invest in, due to lack of funds (Barberán *et al.* 2013:181). Kim, Hlee and Joun (2016:1345) reveal that green practices are more common in large

hotels with higher ratings than in small hotels. LaVanchy (2017:45) confirms that most problems associated with water management within the accommodation sector are associated with high implementation costs. In their study on barriers facing green accommodation establishments in Malaysia, Yusof and Jamaludin (2014:507) found that chain affiliated hotels had strong financial support coming from their parent companies, hence, the implementation of green practices was not a hurdle. At the same time, independent accommodation establishments felt that engaging in green operations called for high initial costs. Evidence shows that lack of funds usually leads to delays in the implementation of water conservation measures and green practices (Al-Aomar and Hussain, 2017:78).

2.8.3 Lack of manpower, skills and expertise

Yusof and Jamaludin (2014:507) found there was consensus amongst hotel managers in Malaysia over the lack of green experts, skilled manpower and green equipment. According to UNWTO (2018:14), green teams or green experts are an integral part of organisations which can psychologically influence guests and staff members to engage in environmental programmes. In many cases, training and development of employees is always suggested when it comes to filling the knowledge and skills gap at organisations (Karimi 2014:111; Frag, Mature and Melero 2015:39). However, transforming the organisation's culture may make or break employee morale if it is not handled by experts (Al-Aomar and Hussain, 2017:78). In their study on Malaysian hotels and resorts, Yusof and Jamaludin (2014:507) found that after receiving training, some employees were not interested in committing to green practices, hence, they chose to resign on the basis of extra work. Contrary to this, in Slovenia, Cvelbar, Grün and Dolnicar, (2017:928) found that after receiving training on water management, hotel employees committed themselves to ensuring guests understood the concept behind the towel-reuse programme.

In sum, the argument is that lack of skilled manpower in the form of green experts may lead establishments to focus on basic water conservation practices and not advanced ones. In their study on green operations and organisational performance in Kenya, Karimi (2014:108) found the effects of this when they discovered that water conservation was the least implemented green practice amongst other key practices such as energy consumption, waste management and employee training. In most

places it is believed that water availability and usage are tied to guest experience (Han, Hsu and Sheu 2010:331; Kim, Hlee and Joun 2016:1347).

2.8.4 Guests management

Striking a balance between water conservation practices and guest satisfaction is usually a challenge for accommodation managers (Sloan, Legrand, and Chen 2013:97; Yusof and Jamaludin 2014:507). In many cases, efforts to address water usage at accommodation establishments have been ridden with issues such as guests complaining about comfort, inconvenience, unhygienic practices, and higher accommodation prices (Saenz-de-Miera and Rossello 2014:280; Nthiga, 2018:115). According to Kim *et al*. (2016:1347) when designing green practices or any environmental initiative, accommodation facilities should come up with policies that motivate guests to participate and ensure satisfaction. This will help minimise complaints which are still inevitable in water conservation efforts.

Chen, Bernard, and Rahman (2019:333) note, for example, that issues such as towel reuse programmes are easily received by guests who are aware of what is happening and who understand how green hotels work. In a study by Thomas Cook-Futouris (2015:18) indications were that the majority of guests (30% against 7%) had no problem with having their linen changed after three days. However, in some cases these programmes do not usually sit well with guests, especially those who think towel and linen reuse programmes are backed with financial gain or are unhygienic (Rahman and Reynolds 2016:109). In their study, Dimara, Manganari and Skuras (2017:431) found that guests who indicated they were not interested in towel and linen reuse programmes were concerned about hygiene and cleanliness. The same was found in Nakuru County, Kenya, where hotel guests indicated that they were not comfortable reusing their towels because they believed it was unhygienic (Nthiga, 2018:111).

Sloan, Legrand and Chen (2013:101) note that reusing sheets and towels and other water conservation practices may not sit well with guests from luxury accommodation establishments as they may think the accommodation is greenwashing. Greenwashing is the most challenging aspect of environmental management as it may prompt guests to spread negative word of mouth advertisements (Chen, Bernard, and

Rahman 2019:333). Kenton (2019) defines greenwashing as the passing of false information by an organisation that its products and services are environmentally friendly. The problem with the greenwashing narrative is that guests have different expectations and interpretations about what constitute a green hotel product. (Chen, Bernard and Rahman (2019:332) suggest that greenwashing can only be done away with by offering green practices. Thus, the evidence on the ground shows that sustainability programmes do not directly affect consumer satisfaction; consumers are affected by the perception they have on the quality of service at the accommodation (Kim, Hlee and Joun (2016:1346). One of the perceptions is that green hotels charge premium prices and some programmes like water conservation are inconvenient and unhygienic (Rahman and Reynolds 2016:109).

This is reflected in a study by Rahman, Reynold and Svaren (2012:726) who note that by becoming eco-friendly, some accommodation managers are afraid to lose guests especially those who desire to see quality tourism services. It is guests who demand high pressure showers, brim filled swimming pools as well as clean and fresh linen who make water conservation a challenging route for accommodation managers.

The other challenging aspect of consumer behaviour that frustrates water conservation practices within the hospitality sector is that eco-friendly behaviours such as recycling and buying of eco-friendly products are not associated with the decision to purchase a green hotel product (Han, Hsu and Sheu 2010:331). Millar and Baloglu (2011:308), for example, point out that some guests may prefer paying less for green hotels because they may have a perception that green practices are a cost saving measure by hotels. Based on this fact it is difficult for managers to know exactly what consumers want.

In conclusion, in order to deal decisively with guests, it is very important for accommodation managers to listen attentively to guests' needs and to inform them about water conservation policies otherwise guests may equate environmental practices to poor guest service, warns Kim Hlee and Joun (2016:1347). Such guests need to be informed about the benefits of environmental programmes before they spread their negative views by word of mouth.

2.9 Benefits of water conservation in the accommodation sector

According to Tortella and Tirado (2011:2578) and Mbasera *et al.* (2018:10) the need to gain a competitive advantage over competitors is one of the main reasons why hotels introduce water saving measures. Indeed, water conservation measures are more of a differentiation strategy for tourism practitioners in the hospitality industry. According to Chan (2013:443), organizations are differentiating themselves from their competitors through efforts in green practices and green marketing. Applying the differentiating strategy is a logical portray, given that environmentally conscious tourists are an easy prey to value elements such as water conservation, recycling, convenience, quality, energy saving and wastewater management (LaVanchy, 2017:41). In addition, there is overwhelming evidence which confirms that green management policies and practices affect accommodation establishments positively in various spheres of business including market expansion, customer satisfaction, cost reduction, competitive sustainability, and customer loyalty (Mbasera *et al.* 2018:8).

2.9.1 Image, customer loyalty and market expansion

Good organisational image begets positive word of mouth advertisements which transcends to market expansion (Dinarès and Saurí, 2015:9). According to Han *et al*. (2018:64) environmentally conscious guests feel good when they are staying at accommodation facilities that practice proper water conservation and waste management. Merli *et al.* (2019:176) reveals that hotel environmental commitments are positively recognized by guests. According to Rahman and Reynolds (2016:109) willingness to sacrifice for the environment positively influences consumers to pay for green products. It encourages guests to participate in environmental programmes. Indeed, according to Han *et al*. (2018:64) guests are more likely to engage in water conservation practices or may develop value for water conservation when they assess accommodation efforts in such areas. With this in mind Karimi (2014:99) concludes that, to establish a good environmental image, organisations need to reduce their environmental footprint. An environmentally conscious image can be used to create a brand strategy (Kim, McGinley, Choi, and Agmapisarn 2020:1).

In addition, according to Lavens (2012:43), target markets for environmentally friendly and socially responsible products are readily available. Merli *et al.* (2019:170) asserts

that going green is now a new way of acquiring customers and a strategy for increasing market share. The authors reiterate that guests are more likely to return to green hotels after they have visited one which engages in eco-friendly practices (Merli *et al*, 2019:176). Mbasera *et al.* (2018:9) concur that satisfied guests bring repeat business.

This basically suggests that environmentally friendly practices can aide market expansion. Marketing of the accommodation can allow hoteliers to do segmentation and choose the most attractive segments to serve with customised attention. Taking for instance, current research which indicates that Europeans are more informed and willing to visit greener destinations (Hernandez and Ryan, 2011:84). According to Dief and Font (2010:166), European tourists are willing to pay for ethical tourism offerings, hence, most tourism organisations tend to market green products to Europeans than to other markets. In such regions, the evidence confirms that social pressures, competition, and marketing objectives, tend to force hotels to adopt water conservation practices (Dinarès and Sauri, 2015:645). Green marketing can also appeal to investors by making the concept attractive to socially active investors. The Radisson Blu Edwardian Hotel in London, for example, has been rolling out programmes which distinguishes them as a green hotel.

According to Green Hotelier (2013), the hotel shows a clear understanding and commitment to green management ethics. The hotel provides outstanding customer experiences, whilst providing a sympathetic approach to the environment. Moreover, the hotel has a green management structure. The green management structure or green human resources management structure is an organisational structure in which value chain elements of the hotel meet to support their green marketing claim, reduce environmental impacts as well as implement business strategies (Chen, Chen, Zhang and Xu, 2018:1393; Sobaih, 2019:128). The evidence so far confirms that large accommodation establishments are strong adopters of green practices than smaller accommodation establishments (Rahman, Reynold and Svaren, 2012:726). Kim, Hlee and Joun (2016:1345) also found that green practices are intense in higher rated hotels than those with lower rating.

Furthermore, evidence shows that chain affiliated accommodation establishments are able to adopt to green practices and run them more efficiently than independent hotels

(Rahman, Reynold and Svaren, 2012:724). The main reason for this is that they encourage guests to save water and to engage in recycling. Han, Hsu, and Shen (2010:331), however, found that clients had many reasons to purchase green hotel products than regular hotels. Some of the reasons included the influence of their referents about services offered at green hotels.

2.9.2 Environmental sustainability

Sustainability is a very important topic in business today. There are three pillars of sustainability which researchers believe can make or break a business if it does not engage in them. These include economic sustainability, social sustainability, and environmental sustainability (Azam, Alam and Hafeez, 2018:337). According to Gabdrakhmanov, Rubtzov, Baybakov, Somaeh and Nugaev (2016:21) economic sustainability is about securing and sharing the wealth and prosperity in the community in which the business operates. Social sustainability on the other hand is about looking after the community and its interests – cultural, material, and spiritual. Lastly, environmental sustainability is about looking after the community ecosystem. Any business initiative is, therefore, expected to circle around these key pillars in what is known as the triple bottom line approach on sustainable development (Sucheran, 2013:24). With industry's involvement in pushing the triple bottom line approach, the three pillars are, therefore, looked upon as allies with business for community development, evolvement and sustenance. In this study the focus is however on environmental sustainability which captures the issue of pollution and depletion of natural resources.

Environmental sustainability seeks to regulate, reduce and mitigate wastage through implementation of policies that advance community progress and protect resources for future use. Environmental sustainability is, therefore, considered a panacea for all ills. Global environmental ills are believed to be caused by natural changes and human developmental activities (Ding and Ghosh 2017:1). Researchers who have been collecting information on environmental changes in the 20th century have pointed to human activities as major contributors to global environmental change (Weir 2017:108). Global environmental impacts include the following: depletion of natural resources, soil erosion, land degradation, land grabbing, global warming, viral and

bacterial infections, mass tourism and pollution (Dube and Nhamo 2018:119; Wilkins *et al.,* 2018:1043).

Over the years and most significantly during the start of the 21st century tourism organisations have been at the forefront claiming their engagements in environmental sustainability programmes (Hernandez and Ryan 2011:80; Jenkins, and Karanikola 2014:364). Popular environmental policies by companies include water conservation, energy management, employee training and wastewater management (Mbasera *et al.* 2018:10). These are encapsulated under environmental management systems – EMS which organisations submit as processes and procedures for environmental performance targets (Jenkins, and Karanikola 2014:363; Warren and Becken, 2017:296*;* Merli *et al.* 2019:170). Achievements in environmental sustainability are reported in annual reports and include performance accomplishments in water conservation through low flow plumbing fixtures, rainwater harvesting, use of greywater, wastewater management and towel and bed-linen reuse programmes (Nthiga, 2018:109; Gössling, Araňa and Aguiar-Quintana, 2019:280). In terms of energy management, performance reports include adoption of renewable energy, use of efficient HVAC systems, mounting of efflorescent lights and occupancy sensors (Green Hotelier, 2014; Mbasera *et al.* 2018:3; Rico *et al.* 2020:775). Waste management measurements include waste reduction measures, recycling, compositing, use of bio-degradable products and low volatile organic compounds (Takashima, 2017:49). Other environmental performance targets include cut on vehicle pollution, use of recycled paper products, air filtration, purchase of organic food, purchase of locally grown food and availability of green management structures (Rahman, Reynold and Svaren, 2012:724; Mbasera *et al.* 2018:3).

The discussion so far is that tourism businesses have a role to play to ensure that there is environmental sustainability. Environmental sustainability initiatives can be reflected through efficient management of air, water, energy and waste. In Southern Africa, Tsogo Sun Group is one of the few tourism establishments engaging in noticeable environmental sustainability practices (South African Tourism, 2019). In KwaZulu Natal, South Africa, Sucheran (2013:234) found that hotels and lodges affiliated to chains and those owned by large corporations were engaging in Corporate Social Responsibility (CSR) activities.

Styles *et al*. (2015:193) reveal that through engagement in environmental management systems, a 100-room hotel has the potential to save 15 543 m^3/year if grey water is used to flush toilets and to irrigate. This figure can amount to 16 573 m^3/year if rainwater is harvested. Overall annual water savings of 15 543 m^3 can help save 209 541 kWh of energy (Styles *et al.* 2015:192). Environment and communities can also benefit from water resource which are saved as well as aquatic life which is protected by responsible water management practices (Kirk 1996:44).

2.9.3 Economic benefits

Any accommodation establishment, before it goes green, incurs large initial costs (Yusof and Jamaludin, 2014:507). Hotel operational costs usually come from consumption of water and energy in departments such as housekeeping, kitchen, and laundry (Karimi 2014:99). Wasting water reduces a scarce resource and costs the accommodation facility money vis-à-vis engaging in water saving measures can be economical in the long run (Gössling *et al.* 2012:12). Styles *et al*. (2015:190) notes that responsible water use can become a cost curtailment measure if the accommodation facility manages to save energy and water. Yusof and Jamaludin (2014:507) found there was consensus amongst hotel managers that green operations do not have high maintenance costs. Mbasera *et al.* (2018:10) admits that reduction in cost was the main reason why hotels were engaging in green management practices such as water conservation, energy management, employee training and wastewater management. In their study on water consumption and water management practices in Barcelona, Spain Dinarès and Sauri (2015:645) found that the need to cut costs was the main reason why most hotels adopted water conservation measures.
Styles *et al*. (2015:194) argue that there are significant economic paybacks found when low flow fittings are installed and when new equipment are bought for the hotel. Payback periods span from one month to six and half years. For example, the payback period for low flush toilets is pegged at 33 months. Styles *et al*. (2015:198) reveal that payback time for low flow basin taps and low flow shower heads is usually 4 and 5 months, respectively. In their study of the Siken Reino de Aragón Hotel, Zaragoza Spain Barberán *et al.* (2013:187) found that financial benefits derived from retrofitting water consumption facilities amounted to €88 369 after 12 years. According to Thomas Cook-Futouris (2015:21) detecting and repairing toilet leaks can help save at least

€308 per year, which can purchase two best practice toilets. In terms of indirect water consumption, installing 300 solar panels can save 1,000 kWh of electricity and reduce indirect water consumption by 1,000 litres (Thomas Cook-Futouris, 2015:27).

In terms of general management, Barberán *et al.* (2013:188) recommends installation of basic plumbing systems such as low flow shower heads, dual flush toilets and aerators saying they do not inconvenience guests and they help save a lot of money. According to Thomas Cook-Futouris (2015:18) reducing laundry volumes for guests through towel and linen reuse programmes can save a significant amount of money per season. Moreover, savings on foodstuffs of €0.1 – 0.3 per guest night can bring total savings of €10 000 annually at 50000 guest nights (Thomas Cook-Futouris, 2015:21).

2.9.4 Stakeholder edification

Cost containment can release funds that can be used elsewhere. In addition, guests can benefit from efficiency and this can result in repeat visits (Merli *et al.* 2019:176). Not only do guests benefit, but staff can also benefit from empowerment through training which in turn leads to satisfaction, good and better employee management relationships, lower levels of absenteeism, lower rate of employee turnover and employee retention (Frag, Mature and Melero, 2015:39). Mbasera *et al.* (2018:10) found that employee edification was one of the main reasons why accommodation establishments implement green management policies. Moreover, water conservation practices can help to improve transparency during Corporate Social Responsibility (CSR) reporting which are of interest to investors and other stakeholders such as government (Styles *et al*. 2015:200).

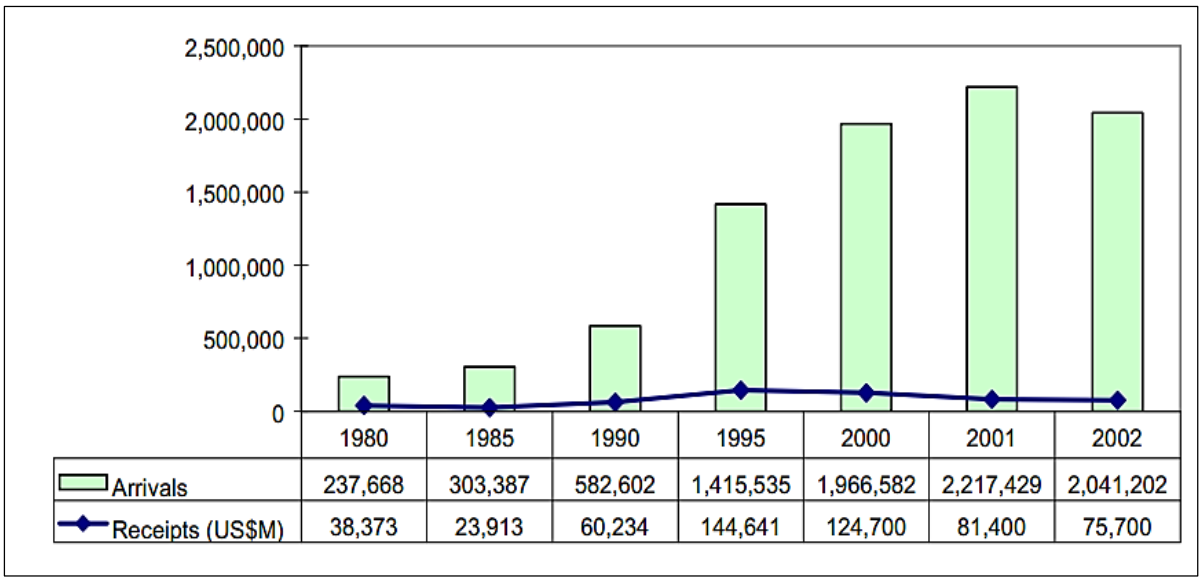
2.10 The situation in Zimbabwe

The growth of tourism in Zimbabwe has been an up and down oscillatory swing which has been affected in many ways by the country's quest to attain full political and economic freedom (Hanlon, Manjengwa and Smart 2012:5). Ancient Zimbabwe was a hub for business tourism through trade by Arab traders (Chirongoma 2016:3). The arrival of missionaries, archaeologists, explorers, and imperialists boosted the industry as discoveries of monasteries, manmade structures, natural and cultural features such

as the Great Zimbabwe, Khami Ruins and the Victoria Falls were made. Around the 1930s, leisure tourists were coming through South Africa from as far as the United States of America, Europe, and Australia to view the Victoria Falls, a natural wonder (Rogerson 2018:5).

2.10.1 The growth of the tourism industry in Zimbabwe

Two decades after attaining independence in 1980, the Zimbabwe tourism sector boosted from a mere 237 668 tourists a year to 2 041 202 tourists. Figure 2.14 depicts the growth in tourist arrivals in Zimbabwe from the period 1980 to 2002.



	1980	1985	1990	1995	2000	2001	2002
Arrivals	237,668	303,387	582,602	1,415,535	1,966,582	2,217,429	2,041,202
Receipts (US$M)	38,373	23,913	60,234	144,641	124,700	81,400	75,700

Figure 2.14: Tourist Arrivals in Zimbabwe 1980-2002
Source: Zimbabwe Tourism Authority (2002:1)

Gains in tourism during the period spanning 1990 to 1999 are credited to successful economic policy instruments such as the Communal Area Management Programme for Indigenous Resources (CAMPFIRE), which was introduced to reduce poverty in communal areas which are located close to natural resources like wildlife (Scoones, Marongwe, Mavedzenge, Mahenehene, Murimbarimba, and Sukume 2010:19). Over more than a decade from 2002, the Zimbabwean tourism sector has grown steadily. In the year 2018, Zimbabwe received a total 2 579 974 tourist arrivals, 6% up from 2 422 930 received in 2017 (Zimbabwe Tourism Authority 2018:7). The positive growth was driven by the noteworthy upsurges in arrivals from all regions except Europe and

Oceania. The growth in arrivals into Zimbabwe was generally backed by growth in the country's traditional markets such as the United Kingdom (UK) and United States of America (USA) and compounded with the positive performance of African source markets (ZTA 2017:6).

Counting on its steady growth, the tourism sector in Zimbabwe benefit locals through employment creation directly and indirectly. Secondly, tourism is the fourth foreign currency earner and one of the key contributors to the country's Gross Domestic Product (GDP) (ZNCCRS 2014:9). According to the (WTTC 2018:1) in 2017 tourism directly contributed about US$512.3 million to the Zimbabwean economy and supported about 69 000 jobs.

2.10.2 Growth of the accommodation sector in Zimbabwe

The growth of the accommodation sector in Zimbabwe cannot be divorced from the history of the country itself. Cecil John Rhodes's Cape-to-Cairo vision marked the watershed of the accommodation sector in the country. Indeed, in the later years what gave, and continued to give, shelter to the tourists started as a means to accommodate those who partook in the fulfilment of Rhodes's dream. The Victoria Falls hotel is one such good example of early developments in the accommodation sector (Victoria Falls Hotel 2019). With dramatic views of the gorges of Zimbabwe's spectacular Victoria Falls, The Victoria Falls Hotel, built by the British in 1904, was originally conceived as accommodation for workers on the Cape-to-Cairo railway (Victoria Falls Hotel 2019).

The continued lucrative survival and growth of the hotel and other accommodation facilities built in that area can be attributed to its proximity to the Mosi-oa-Tunya or Victoria Falls as compared to some hotels which are found a great distance away from the resort area. Since the 1930s, the Victoria Falls resort town attracted many tourists from across the globe who came to enjoy both the scenic views and enjoyed the benefits of cutting transport costs while touring through the land (Rogerson 2018:5). Years following the Universal Declaration of Independence (UDI) by the Smith regime (1965), independence of the black majority (1980) and the Economic Structural Adjustment Programme (ESAP, 1991-1995) saw an extension of accommodation facilities and the building of new lodging houses in the country.

Every accommodation investment has followed its interests among the ten Zimbabwean provinces. Every province has its own attractions and unique features which attract tourists from across the globe (Figure 2.15). These include national parks, sanctuaries, reserves, botanical gardens and recreational parks which cover about 12.7% of the country's land (Masvingo, Mashonaland Central, East and West, Matabeleland North and South) (Mutanga, Vengesayi, Chikuta, Muboko and Gandiwa 2017:7; Zimbabwe Parks and Wildlife Management Authority, 2019). Other attractions include gorges and granite peaks in the Eastern Highlands (Manicaland), national monuments and business pullers in major cities and mining towns (Harare, Bulawayo, Midlands, and others). Given this rich tourism heritage, one can find a variety of accommodation facilities in each province, catering for leisure tourists, business tourists and other types of travellers to the country (ZTA 2018:53).

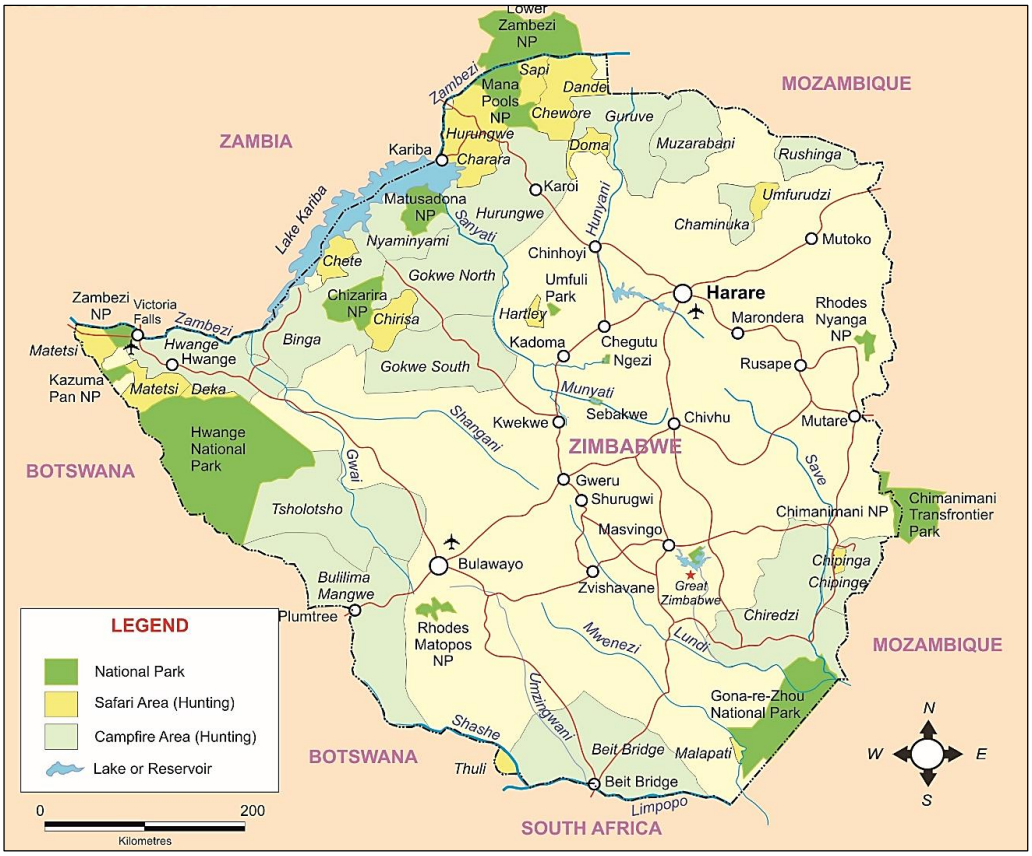


Figure 2.15: Tourism hotspots of Zimbabwe
Source: Victoria Falls 24.com (2013)

Today, the accommodation sector in Zimbabwe comprises of various lodging facilities, owned, and managed by various entities including international corporate brands, major national brands, small accommodation groups, individually owned

accommodation facilities and consortiums among other niche categories (Zimbabwe Tourism Authority Database 2019). According to the Zimbabwe Tourism Authority (ZTA) as of May 2017, there were generally 516 registered accommodation providers in Zimbabwe. These include bed and breakfast establishments, inns, campsites, lodges, hotels, motels, guest houses, hostels, and self-catering facilities. Table 2.13 shows statistics of registered accommodation establishments in Zimbabwe.

Table 2.13: Types of accommodation and lodging facilities in Zimbabwe (registered)

Accommodation type	Population size
Bed and breakfast	18
Campsites	3
Guest Houses	137
Hostels	37
Farmhouses	2
Hotels	96
Lodges	175
Inns	2
Motels	8
Self-Catering	38
TOTAL	**516**

Source: Zimbabwe Tourism Authority (2017)

Secondary data from the Zimbabwe Tourism Authority (ZTA) shows a rise in small-medium sized accommodation establishments such as lodges, guesthouses and bed and breakfast. Recent data released by the ZTA shows, for example, that registered lodges rose by about 13% from 175 in 2017 to 199 in 2019, guesthouse by over 50% from 118 in 2014 to 183 in 2019 and bed and breakfasts from 14 in 2014 to 40 in 2019 (ZTA Database, 2014, 2017, 2019). This alone reveals the growth of the accommodation sector in Zimbabwe. However, such growth has to be looked at in relation to the water situation in the country.

2.10.3 Water situation in Zimbabwe

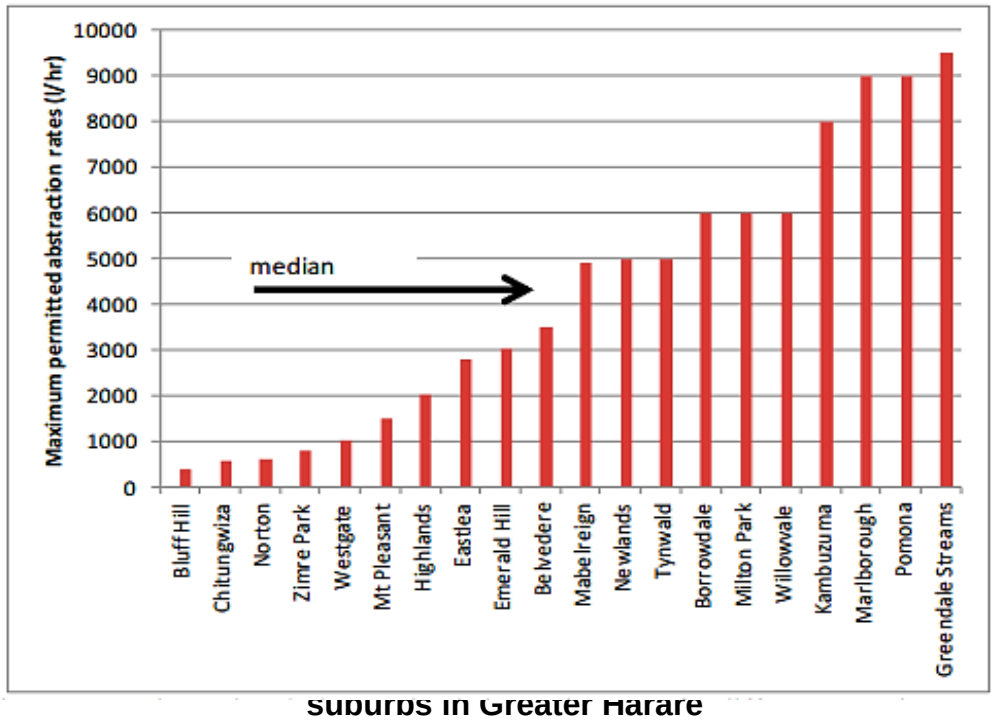
In Zimbabwe, the urban water consumption ranges from 93 litres to 500 litres per person/day (Davis and Harji 2014:22). These consumption levels are influenced by the population and the geographical area covered. Information supplied by the municipality of Harare pointed out that water demand in Harare stands at around 12

million m^3/day, of which production per day is estimated to be standing at around 600 000m^3/day (Davis and Harji 2014:22). Similar demand-supply defects are found in various towns and cities in Africa where water demand is far higher than water supply (Davis and Harji 2014:17). Water resources is probably the most important limiting factor for economic and natural resource development needs and must be given the prominence it deserves in national planning processes (Nilsson and Hammer 2013:53).

According to the United Nations Educational, Scientific and Cultural Organization (UNESCO 2016 cited in Ding and Ghosh 2017:2), water scarcity is three dimensional namely, institutional, physical, and economical. Physical scarcity is when there is inadequate rainfall in some regions of the world and an abundance in other parts of the world. Economic scarcity is when there are infrastructural gaps that hinder the supply of water. Institutional scarcity is when responsible organisations and institutions fail to secure and supply water to users (UNESCO 2016 cited in Ding and Ghosh 2017:2). Zimbabwean cities and towns, which are also popular tourist regions, are currently facing all these types of water scarcity (Makurira and Tumbare 2014:2). Physical induced water scarcity has been caused by inadequate rainfall in Zimbabwe and the region over the past few years. The Southern African region has experienced concurrent droughts and floods over the past decade or so (Kolusu, Shamsudduha, Todd, Taylor, Seddon, Kashaigili, Ebrahim, Cuthbert, Sorensen, Villholth and MacDonald, 2019:1752). Economic induced water scarcity in Zimbabwe has been caused by corruption and infrastructural gaps that hinder the supply of water while institutional induced water scarcity has been caused by a failure by responsible authorities to secure water resources and supply water to users (Banhire, Muziri and Matamanda, 2019:288).

Whilst the water policy in Zimbabwe provides a strategy for recovery of the water system, the economic difficulties that began in the late 1990s has currently reached crisis proportions resulting in a collapse of water revenues and a serious deterioration of water infrastructure (Government of Zimbabwe 2012:1; Chitsiko, Murungweni and Dione, 2013:1). Although, most urban water supplies are said to come from dams, businesses and communities are now relying on ground water supply due to water supply shortages (Makurira and Tumbare 2014:2). In Harare, the capital city, for

example, water stress has been very severe, to the extent that boreholes and wells have been drilled by accommodation establishments and communities. However, they are limits to water abstractions in each area as depicted in Figure 2.16.



suburbs in Greater Harare

Source: Makurira and Tumbare (2014:5)

Figure 2.16 shows the maximum permitted water abstractions per litre per hour amongst suburbs in Zimbabwe's capital city, Harare. As alluded to earlier, municipal water supply in Zimbabwe at present is not meeting current demand (Davis and Harji 2014:22). Communities and organisations, therefore, rely on borehole water, rainwater harvesting and other unsafe water sources (Makurira and Tumbare 2014:5). With urban populations relying on water from informal sources such as rainwater harvesting, boreholes and unsafe surface water, waterborne diseases are always rife in the country. Although Figure 2.16 shows how much water each location in Harare can pull off the ground, this is not closely monitored, and organisations and households are digging boreholes at any time. Hence, groundwater levels in Harare are reported to have declined by around 15m over the last 5 to 10 years (Davis and Harji 2014:22).

According to Nilsson and Hammer (2013:53), the economic and financial constraints are probably the most important limitations for a full development of the available water resources in Zimbabwe. The hyperinflation which started in the late 2000s led to a collapse in revenues for maintenance, rehabilitation and even purchase of water treatment chemicals, which resulted in inadequate and erratic water supply and sanitation, poor quality of water provided to residents, and badly decaying infrastructure (Murungweni, Chitsiko, and Dione 2013:3; Hanlon, Manjengwa and Smart 2012:93). The water policy in Zimbabwe reveals that government grants and donor support will be needed to undertake essential rehabilitation and maintenance work (Manzungu and Machiridza 2009:99). However, the rate of cost increases for operation and maintenance of existing water supply schemes is far above the present inflation rate (Nilsson and Hammer 2013:53). In addition, economics of future schemes will be negatively influenced by longer conveyance distances and topographically less optimal dam sites. As a result, partly due to higher costs, it will be increasingly difficult to arrange funding for construction, operation, and maintenance of new water supply schemes (Murungweni, Chitsiko, and Dione, 2013:1).

Such national water challenges have not spared the accommodation sector, despite the fact that the number of tourists visiting the country is now on the increase (Davis and Harji (2014:50). The current shortage of cash in Zimbabwe has also negatively affected the accommodation sector and hampers all efforts to carry out maintenance programmes in order to conserve water.

2.10.4 Water usage in the accommodation sector in Zimbabwe

The accommodation sector in Zimbabwe depends on unsustainable means of water supply (Davis and Harji 2014:1). Zengeni, Zengeni and Muzambi (2013:65) point out that the accommodation sector in Zimbabwe consumes large amounts of water and energy. However, according to Cazcarro, Hoekstra and Choliz (2014:99), there are few studies on water consumption and footprint in arid and semi-arid regions; knowledge of water consumption and water management in these regions is very important given the demand for water and threats of climate change in the region. A significant number of studies on water management in Zimbabwe focus on water quality, importance of water in communal development, surface water sources,

treatment and regulations (Davis and Harji 2014:2; Tom and Munemo 2015:63). Fewer studies concentrate on water footprints in the hospitality and tourism sector in Zimbabwe (Marunda, Sai and Muchenje 2013:481; Mandimika, Taderera, Nyikahadzoi, and Matamande, 2013:7). Nonetheless, given the challenges of water in Zimbabwe, Marunda, Sai and Muchenje (2013:482) recommend that the accommodation sector in Zimbabwe needs to install modern plumbing technology, use grey water, engage in water harvesting activities and train employees on water conservation. Mandimika *et al.* (2013:7) stress that more can be done by tourism companies in Zimbabwe, large and small, to engage in social environmental sustainability. Presently, CSR gestures by organisations in Zimbabwe including the tourism sector are only being done to survive and create a favourable image and not to solve impending problems like water shortages (Ding and Ghosh 2017:3).

In the light of the above and given that the concept of the green economy is still in its infancy in Zimbabwe, there is need for new ideas and abrupt methods for managing and conserving water in the country (Dube 2018:38; Ding and Ghosh 2017:1). Indeed, changes in weather patterns, continuation of droughts, increasing urban population, combined with erratic rainfall and high- water abstractions in Zimbabwe may require realignment of business models especially in the accommodation sector (Dube and Nhamo 2018:122).

2.11 Conclusion

The growth of the tourism sector has contributed immensely to the growth of the global economy. In Africa tourism has been growing at a faster rate than ever before, contributing to job creation and poverty alleviation. This growth has followed efforts by African governments to end wars and ensure political stability on the continent, including the integration of technology and infrastructure in service delivery as well as changing ways of doing business. Supported by this growth in tourist arrivals, the accommodation sector has also been on the spiral. Globally, there has been competition between serviced and non-serviced, chain and non-chain, international and regional accommodation establishments to set foot on various destinations across the world. The impacts of this growth have been felt in destinations where water stress has become a problem as a result of an influx of tourists. Evidence presented in this

chapter showed that tourists at accommodation establishments consume more water per day than urban households. This chapter looked at arguments and discussions by various researchers on the subject of water consumption at accommodation establishments, including factors that influence water consumption such as type of accommodation establishment, facilities, capacity, location, and chain affiliation. The chapter went on to examine comments and recommendations made by various researchers on the subject of water management in the accommodation sector including management of guests, employees, facilities, and departments. Throughout this chapter, it was indicated that there are various benefits as well as challenges that accommodation establishments face in their quest to conserve water. These challenges and benefits were looked at in greater detail as well as the current nature of water management practices in the accommodation sector in Zimbabwe. The next chapter focuses on the research design of this study.

CHAPTER THREE: RESEARCH METHODOLOGY AND STUDY AREA

3.1 Introduction

This chapter focuses on the research design utilized in this study. Information in this chapter includes aspects relating to the study's population, the sampling method used, the sample size, data collection tools as well as data collection methods. The last section of the chapter discusses the analysis of the data, reliability and validity of the study and confidence levels expected from this study.

3.2 Research Design

According to Brunt, Horner and Semley (2017:22), there are three opposing parts of research design which are available for use. These three parts depend on beliefs and principles surrounding the research and are: inductive and deductive approach; qualitative and quantitative methods; and primary and secondary data.

3.2.1 The research approach: inductive and deductive approach

This study used the deductive method approach as the study was not seeking to generate new theory (inductive) on the subject of water management practices in the accommodation sector in Zimbabwe. The aim of the study was rather, to examine the nature and extent of water management practices in accommodation establishments in Zimbabwe. According to Creswell and Creswell (2018:181), inductive and deductive methods are used to ensure research themes are comprehensive, thus, by looking back at themes from other studies, deductive data analysis, for instance, seeks for more evidence to support each theme or concept of the study. Warren and Becken (2017:299) believe that building research on theory is very critical, especially when dealing with areas where there is a complex interplay between behaviour and technical issues. According to Zikmund, Babin, Carr and Griffin (2013:43), deductive reasoning "is the process of deriving a conclusion about a specific instance based on a known general premise or something known to be true". Sekaran and Bougie (2016:26) state that the deductive reasoning approach can be used to test a theory using hypotheses and observations that lean on a set of organised assumptions.

This study was an exploratory study intended to reveal the nature and extent of water management practices in the accommodation sector in Zimbabwe. Sekaran and Bougie (2013:5) define exploratory research as research that has not been done before or has little information on it. This study, therefore, sought to ascertain and understand characteristics, practices, performance, challenges, and benefits of water conservation in accommodation establishments in Zimbabwe.

3.2.2 Method of research: qualitative and quantitative methods

The second aspect of the research design is that which relates to qualitative and quantitative data. In this study, the mixed methods research approach was used, which is essentially a combination of qualitative and quantitative data (Sekaran and Bougie 2013:7). Creswell and Creswell (2018:222) describe the mixed method approach as that in which researchers firstly collect quantitative data, analyse the results, and then build findings to collect qualitative data. However, this may not be the case always as many strategies are possible such as collection of both qualitative and quantitative data simultaneously. According to Creswell (2003:37) and Brunt, Horner and Semley (2017:30), the mixed methods research approach has the advantage that it uses multiple ways to explore a research problem. Warren and Becken (2017:299) commend mixed research method as an approach that completely affirms social theory studies. The qualitative data for this study was obtained from five interviews held with relevant stakeholders in hospitality and tourism sectors in Zimbabwe, whilst quantitative data was attained through survey questionnaires that were administered to managers of accommodation establishments throughout Zimbabwe. Interviewees who participated in the study were from the Environmental Management Agency, Zimbabwe Tourism Authority, Zimbabwe National Water Authority and Masvingo City Council.

Sanders, Lewis, and Thornhill (2007:472) explain qualitative research as research that relies on the collection of qualitative data, such as facts, opinions and other observatory information that cannot be easily quantified. Sekaran and Bougie (2016:2) and Creswell and Creswell (2018:3) define qualitative data as “data in the form of words, which is generated from broad conversations such as interviews or responses

to open ended questions in a questionnaire." Additionally, Schindler (2019:124) defines qualitative data as data which seeks to describe, decode, and translate meanings and is ideal when extracting feelings, emotions, motivation, perceptions, personal behaviour and language. On the other hand, quantitative data is defined as data in the form of numbers, gathered through structured questions (Sekaran and Bougie 2016:2; Creswell and Creswell 2018:3). Schindler (2019:203) defines quantitative research as research that relies primarily on the collection of quantitative data such as figures and numbers. Overall, in terms of usefulness, Schindler (2019:128) notes that quantitative data has the advantage that it clearly distinguishes facts and judgments - something which qualitative data is unable to do. Having said this, however, the use of both methods was deemed good for two reasons: firstly, reinforcing the reliability and validity of this research and secondly assisting in addressing the study objectives**.**

3.2.3 Primary and secondary data collection

According to Brunt, Horner and Semley (2017:26), primary data collection refers to the gathering of information that has not been collected before. Schindler (2019:33) defines primary data as raw data which has not been processed. Advantages of using primary data is that it is specifically tailored to one's research needs; the researcher has control over data collection and sampling methods; it is reliable; and it is not outdated (Saunders, Lewis and Horahill 2007:356). Disadvantages of primary data are that it is expensive to obtain thus it requires a lot of time and investment (Sekaran and Bougie 2013:75). In this study primary data was collected from accommodation managers and expert stakeholders from tourism, water, and the environment departments in Zimbabwe. The instruments for primary data collection were online survey questionnaires and in-depth interviews.

Secondary data was used to support the research and test its validity and reliability. According to Brunt, Horner and Semley (2017:26), secondary data collection is the gathering of data that has already been collected by others and is readily available for use. In this study, secondary data was sourced from academic journals, books, internet sites, web pages, media articles, intergovernmental and government publications, periodicals, and other dissertations on the topic under study. Such data

is cheaper and quicker to obtain than primary data and may also be available when primary data cannot be obtained at all (Cameron and Price 2009:210).

3.3 Study area and target population

The study area was Zimbabwe. Zimbabwe is a land locked country with an economy that is heavily dependent on agriculture, mining, and tourism as fiscal contributors (Government of Zimbabwe, 2013:20). In this study the researcher assessed all categories of the accommodation sector found in the country. The accommodation sector in Zimbabwe comprises of various lodging facilities, owned, and managed by various entities including international corporate brands, major national brands, small accommodation groups, individually owned accommodation facilities and consortiums among other niche categories.

Figure 3.1 reveals the spatial distribution of registered accommodation facilities across the ten Zimbabwean provinces (ZTA Database, 2017). The provinces are characterized into six regions according to their relief, temperature, and drainage patterns. Each province has its own attractions and unique features which attract tourists from across the globe. These attractions include national parks, sanctuaries, reserves, botanical gardens, and recreational parks which cover about 12.7% of the country land (Mutanga *et al.* 2017:7; Zimbabwe Parks and Wildlife Management Authority, 2019). Other attractions include gorges and granite peaks in the Eastern Highlands, national monuments and business pullers in major cities and mining towns. Given this tourism heritage one can find a variety of accommodation facilities in each province catering for adventure tourists, business tourists and other types of travellers to the country (ZTA 2008:25; ZTA 2018:53).

According to Figure 3.1, in 2017 Zimbabwe had a total of 516 registered accommodation establishments. The province with the highest number of establishments was Harare (139), followed by Bulawayo (100), Matabeleland North (64), Manicaland (58), Midlands (45), Masvingo (36), Mashonaland West (30), Mashonaland East (24), Matabeleland South (12) and Mashonaland Central (8).

Figure 3.1: Number of registered accommodation facilities in Zimbabwe by province as of May 2017

Source: MAP: Maps of World. Accommodation Facilities by Provinces compiled by researcher from Zimbabwe Tourism Authority 2017 database

3.4 Population and sample

According to Sekaran and Bougie (2013:240), the population refers to the entire group of people, elements, units, or events that the researcher wishes to investigate. In this study, the population refers to all accommodation facilities in Zimbabwe. The researcher used the entire population of registered accommodation facilities in Zimbabwe. This is also known as the census sampling method or saturation sampling method, which includes all elements of the population in the study. According to Schindler (2019:93), a census sample has to do with the counting of every member of the population. Census was appropriate for this study because the types of accommodation establishments varied from each other in terms of size, location, target market, water usage and type of facilities available at each accommodation establishment. Charmaz (2006), cited in Creswell and Creswell (2018:186) mention

that census works more or less the same with saturation which is described as the collection of data until categories or themes are saturated meaning collection of data is done until there is nothing new coming but a repetition of concepts. According to Veal (2006:160) census sampling is an appropriate method as it helps to evaluate and generalise performance within a specified geographical area.

According to the database obtained from the Zimbabwe Tourism Authority (ZTA), as of May 2017 there were 516 registered accommodation establishments in Zimbabwe in the categories of bed and breakfast establishments, inns, campsites, lodges, hotels, motels, guest houses, hostels, and self-catering facilities. Table 3.1 shows the population of registered accommodation facilities in Zimbabwe, of which all were targeted in this study. Indications are that there is a great number of lodges, hotels and guesthouses compared to other types of accommodation. According to Maphosa (2014:1) lodges in Zimbabwe enjoy some kind of monopoly as they are no barriers to entry in this type of accommodation. The reasons for this are explained in more detail in Chapter 4, Table 4.2.

Table 3.1 Registered accommodation providers in Zimbabwe 2017

Accommodation type	Population size	Number responded	Response Rate
Bed and breakfast	18	15	83.3%
Campsites	3	2	66.6%
Guest Houses	137	34	24.8%
Hostels	37	3	8.1%
Farmhouses	2	2	100%
Hotels	96	54	56.3%
Lodges	175	81	46.3%
Inns	2	1	50%
Motels	8	2	25%
Self-Catering	38	9	23.6%
TOTAL	**516**	**203 (n)**	**39.3%**

Source: Compiled by researcher (2018)

According to Sekaran and Bougie (2013:241), a sample is a section of the population that is selected by the researcher to represent the entire population. Brunt, Horner and Semley (2017:85) state that there are two basic types of sampling techniques: probability and non-probability sampling. Schindler (2019:127) highlights that while probability sampling aligns with quantitative research, and non-probability sampling

aligns with qualitative research. In this study, the type of non-probability sampling used was purposive sampling. Purposive sampling has to do with purposefully selecting participants that will best help the researcher to understand the problem and research questions (Schindler 2019:185). Employees from the ZTA and others from tourism and water management organisations in Zimbabwe were interviewed to help achieve the aim and objectives of this study.

A significant amount of data for this study was also collected from 203 general managers or representatives of accommodation facilities from across the country. Each region was represented with a fairly good number of respondents which helped to eliminate bias and enhance the confidence interval (CI) (Bryan and Cramer 2009:122). With a response rate of 39% which is slightly above the average 33% which is considered reliable to represent an entire population the study's results are generalizable to the entire population (Lindemann, 2019). Besides that, the study's response rate of 39% is slightly above what similar studies examined on water management practices used. In Lloret de Mar, Spain, Gabarda-Mallorquí, Garcia and Ribas (2017:86) used a sample size of 30.97%. In Barbados, Charara *et al*. (2011:236) used a sample size of 28.37%. These are similar and important studies for this subject area which in years past have provided reliable and valid results. According to Ornstein (2013:67), when studying businesses or organisations it is wise to use a sampling technique which guarantees reliability and validity of results. In this study, the census sampling method was effective because data was collected from elements of the population that needed representation and information was enquired from suitable individuals, for instance managers who are conveniently available and are best placed to know information about water use in the accommodation establishments (Sekaran and Bougie 2013:252-254). The selected sampling method also enriched chances of success and reliability of findings which helped achieve the study's aim and objectives.

3.5 Data collection

Primary data for this study was obtained by using questionnaires and in-depth interviews. The survey questionnaire included open and closed-ended questions as well as questions based on rank scales. Questions focused on specific research themes which included water consumption at the accommodation facility, source(s) of water for the accommodation, water management practices currently being undertaken at the accommodation facility, the benefits of water conservation measures, and challenges facing water conservation at the accommodation facilities.

Online survey questionnaires were emailed to managers of registered accommodation facilities in the country. The majority of the questionnaires were self-administered by the researcher whilst some were handed in directly to accommodation facilities through ZTA area managers who could assist. Online questionnaires have the advantage that they can reach a wide geographical area, are easy to administer and are not expensive (Sekaran and Bougie 2013:147-148). Apart from that, online questionnaires are a growing interest in the hospitality and tourism industry, managers favour them for their convenience (Brunt, Horner and Semley 2017:85). On self-administered questionnaires, according to Sekaran and Bougie (2013:147) self-administered questionnaires help researchers to manage time. In addition, self-administered questionnaires have the advantage that any questions that respondents may need clarification on will be clarified on the spot (Sekaran and Bougie 2013:147). In this study, self-administration was adopted when it was identified that some places where accommodation establishments are located had network problems hence targeted respondents could not take online questionnaires.

Data was also collected through in-depth interviews undertaken with key tourism stakeholders in Zimbabwe, including representatives from the Zimbabwe Tourism Authority, representatives from the Environmental Management Agency (EMA) and the Zimbabwe National Water Authority (ZINWA). These stakeholders have been selected because they possess valuable insight on the issue of water conservation in accommodation establishments in Zimbabwe. According to Sekaran and Bougie (2013:127), interviews have the advantage that they give an in-depth view about various themes of interest. For interviews, the convenience sampling technique was used to collect data from individuals who are best placed to know institutional policies

and information about water use in accommodation establishments (Sekaran and Bougie 2013:252-254). Expert stakeholders are crucial when studying specialised subjects such as water management (Styles *et al*. 2015:190-191).

In-depth interviews constitute qualitative data for this study (Schindler 2019:128). Questions asked were adapted and modified from similar studies by previous researchers such as Sucheran (2013), Gabarda-Mallorquí, Garcia and Ribas (2017). Key themes from interview questions included: stakeholders' view on water consumption and water management practices in the accommodation sector; effects of current water management practices on Zimbabwean communities; finding out about studies and policies available to help encourage water conservation in the accommodation sector; lastly, availability of conservation awareness programmes and preservation of sources of water used in the accommodation sector. According to Creswell and Creswell (2018:188), interviews allow researchers to control their line of questioning. Secondly participants can help indicate historical information which may be useful to the researcher. However, disadvantages are that information given is filtered through the views of the interviewees. In addition, not all people are articulate and perceptive (Creswell and Creswell 2018:188).

The questionnaire and interview schedule were tested for content validity and other forms of validity and reliability. This was done by using expert judges which included the supervisor and other lecturers who looked at questions in the research instruments and ascertained whether the content was relevant and answerable to the study (Tredoux and Durrheim 2002:217). According to Dhingra and Dhingra (2012:48), validity is the ability of the research instrument to fulfil the study's primary intention. In other words, validity is deemed good if the research instrument measures the exact objects of the study.

At the outset, e-mails were sent, and phone calls were made to seek permission to complete the questionnaire. Follow-up e-mails were sent to ensure a higher online response rate. Distribution of hard copies was also done where e-mails had a low response rate. In such cases the first and most important step was to establish rapport by introducing the researcher and the research study. A covering letter was addressed to the respondent outlining the importance of the study, the aim of the questionnaire and the value of participation. The covering letter serves the purpose of transparency.

According to Cooper and Schindler (2014:236) transparency in obtaining primary data is also an element that is highly emphasized when evaluating the reliability of the study.

To support primary data, secondary data was used to extract information for literature review and comparing results from the study to what other researchers have found and concluded on various subjects and themes (Schindler 2019:33). Secondary data is the data that has been already collected and readily available from other sources (Saunders, Lewis and Horahill 2007:248). Cameron and Price (2009:209) state that secondary data refers to the information invested for and collected by individuals or organisations other than the researcher. Secondary data for this study was sourced from academic journals, textbooks, reports, internet sites and web pages, media articles, government and non-governmental publications, periodicals, and other dissertations on the topic.

According to Saunders, Lewis and Horahill (2007:248) advantages of secondary data are that it is economical, it saves time, effort and expenses; it helps to make primary data collection more specific since with the help of secondary data; it is easier to make out what the gaps and deficiencies are and what additional information needs to be collected; it helps to improve the understanding of the problem; and it provides a basis for comparison for the data that is collected by the researcher. Published data was obtained and used from various sources like books, magazines, newspapers, journals, and periodicals etc. Published data is the most reliable secondary source of information. The validity of published data is greater than unpublished data. Government Records are available in the form of government surveys, tax records, census data and other statistical reports.

3.5.1 Questionnaire design

The online survey questionnaire was created through Google Forms which is user-friendly. The first section of the questionnaire focused on the characteristics of the accommodation facility and included attributes such as type of accommodation establishment, location, grade of the accommodation facility, years in operation, chain affiliation, guest profile and general questions about the facility including number of rooms, facilities available, average monthly water usage and occupancy rate. In this

section of the questionnaire, the nominal scale was used and there were more closed-ended questions. The second section of the questionnaire sought to examine water conservation practices at the accommodation facility. Questions were arranged with great order such that they could bring a logical experience to the respondents. Questions about water consumption at the accommodation facility, source(s) of water for the accommodation, water management practices currently being undertaken at the accommodation facility. The last section of the questionnaire focused on the benefits achieved from water conservation measures and challenges facing water conservation at the accommodation facility.

Overall, the researcher used nominal scales, interval scales, dichotomous scales and comparative scales. The purpose of using various scales was to ensure that there is validity and goodness of measure (Sekaran and Bougie 2013:225). Salkind (2014:211) mentions that scales help to measure attitudes that individuals have towards a particular subject or event. The questionnaire which was used in this study is more or less similar to that used by Gabarda-Mallorquí, Garcia and Ribas (2017:84) in their study of the hotel sector in Spain and includes sections such as general information, water consumption, facilitation, and services as well as water conservation. In addition, literature from studies by Gössling *et al.* (2012), (Sucheran 2013), Nthiga (2018), Thomas-Cook Futouris (2015) and many other studies acknowledged in Chapter 2 were also useful in formulating the questionnaire for this research.

3.5.2 Pretesting

According to Sekaran and Bougie (2016:155), pretesting questionnaires is a necessary procedure that helps researchers to ensure that questions are understood by the respondents. This further helps to remove bias and misconceptions (Creswell and Creswell 2018:154). To ensure that the questions in the questionnaire were apt, clear and time constant, a pre-test was done with the help of colleagues from the hospitality and tourism department. The questionnaire was also thoroughly reviewed by the supervisor and other lecturers from the Hospitality and Tourism department. This exercise was also used as an assessment for the measuring instrument's test-retest ability which has to ensure the measuring instrument is usable again in future

and can bring about the same results (Salkind 2014:169). Through pretesting the researcher learnt that the questionnaire would take 10-15 minutes of the respondent's time and about 20 minutes of the interviewee's time. Minor changes were made to the questionnaire after the pre-testing process was complete.

3.6 Data analysis

Once data was downloaded the researcher edited, coded, and sent it to the statistician to examine the results logically. According to Zikmund *et al.* (2013:460) editing is the "process of checking and adjusting data for omissions, consistency and legibility. Proper editing of collected data makes the coding of the work easier. Codes were distributed according to dimensions and elements that were being tested by the measuring instruments. Rossman and Rallis (2012) cited in Creswell and Creswell (2018:193) define coding as narrating words representing categories.

De Vos *et al.* (2015:333) maintain that data analysis is a procedure of bringing order, structure and meaning to the data gathered in research. Sarantokas (2015:60) postulates that data analysis is the statistical analysis of data collected in research to establish whether the generated hypotheses have been supported. The responses to the questionnaire were captured by the researcher and analysed by a statistician using the Statistical Package for Social Sciences (IBM SPSS) version 26.0 for Windows. This constituted the quantitative data for the study. The initial data was analysed into descriptive statistics for the demographic variables. The descriptive statistics were used to analyse the composition and characteristics of the population. This data was summarised and presented in tables and charts. According to Salkind (2014:229) descriptive statistics are used to describe the basic features of the data in a study and to describe characteristics of distribution scores. In cases where there were independent and dependent variables, the Pearson correlation matrix was used to indicate strength and significance of relationships between these variables (Sekaran and Bougie 2016:286). Cross-tabulations, correlations and Chi-square analyses was further undertaken to test the relationships between variables and ascertain their level of significance and association.

The qualitative data for this study was analysed using Thematic Content Analysis (TCA). According to Sekaran and Bougie (2016:350), content analysis is a method of

gathering and analysing qualitative data which anchors systematically on analysing words, concepts, characters, themes, or sentences. Both conceptual and relational analysis were used especially in analysing words which interviewees or respondents used together which fall under one theme of the study, for example environmental sustainability or water consumption. Sekaran and Bougie (2016:347) mentions that drawing conclusions from qualitative data encapsulates identifying themes comparing and contrasting thinking patterns and relationships which may be similar or different. In this study both category and inter-judge reliability methods were taken into account. Inter-judge reliability is defined as the “degree of consistency between coders” while category reliability has to do with classification of definitions or other items of responses.

3.7 Reliability and validity

Reliability refers to stability and consistency of the research instrument as well as its findings and validity refers to how well the instrument used by the researcher measures the concept under study (Sekaran and Bougie 2013:228). In simpler terms and according to Gray (2009:155), validity means the research instrument has to measure what it intends to measure. Two measurements are used to assess the validity of a study – internal and external validity. Internal validity refers to the authenticity of the study while external validity refers to the generalizability of the results to the external environment (Sekaran and Bougie 2016:349).

While the definitions have given a clear picture of these research concepts, analysis of reliability and validity in qualitative and quantitative data is different. According to Creswell and Creswell (2018:223) validity needs to be done for both qualitative and quantitative studies. Sekaran and Bougie (2016:348) and Creswell and Creswell (2018:199) note that when analysing qualitative data, validity and reliability are looked at from different spectacles, separate from those used when analysing quantitative data. For instance, in qualitative data, validity is looked at from the lenses through which the results accurately represent what was collected (internal validity). Secondly, validity in qualitative data is important to check whether results of the study can be generalised or transferred to other settings or contexts – external validity (Sekaran and Bougie 2016:348). On the other hand, in quantitative research reliability tests

consistency and stability of the research instrument, focusing mainly on how well the "concept hang together as a set" (Sekaran and Bougie 2016:289).

It is clear that reliability and validity complement each other in most cases, thereby ensuring the research is free from bias. To guarantee this research is reliable and valid, the researcher ensured that adequate and representative sets of items were used. Managers from all registered accommodation units had an equal chance to participate in the study. Industry players who are well versed with policies and legislation of water management and hospitality operations were interviewed. Greater attention was given to the research instruments to ensure the set of questions asked were tapping each and every concept pointed in the objectives of the study.

3.8 Ethical considerations/ anonymity and confidentiality

Participation in this study was voluntary. Respondents were allowed to give their consent to participate. The researcher used the covering letter to assure respondents of confidentiality, privacy and absence of risk(s). Contact details of the researcher and supervisor were provided on the cover letter should the respondent desire to confirm the authenticity of the study. The questionnaires were accompanied by letters from the Zimbabwe Tourism Authority (ZTA) and the university which confirmed that the researcher was a registered student at the Durban University of Technology and had been given permission to administer the study. Cover letters and permissions of this nature help boost respondents' confidence in the study. In addition, according to Sekaran and Bougie (2016:159), confidentiality and protection of any information provided by respondents should be viewed as the primary aim of the researcher.

3.9 Conclusion

The purpose of this chapter was to reveal elements of the research design that were used to come up with a sound methodology in an attempt to solve the research problem and address the aim and objectives of this study. Empirical questions raised in this study were answered using the mixed methods research design. Tools such as the questionnaire and structured interviews were designed in a methodical, rational, and systematic way and were used to enquire into stakeholder beliefs on the subject of water management practices at accommodation establishments in Zimbabwe. The

chapter also analysed and clarified elements of the research design including sampling technique, questionnaire design, data analysis, reliability, validity as well as ethical issues so that they can all be seen in a more scientific and clinical light.

CHAPTER FOUR: DATA ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter presents the analysis of data and the discussion of the findings. The objectives of the study were: to ascertain the extent of water consumption in the accommodation sector in Zimbabwe; determine the source of water used in the accommodation sector in Zimbabwe; examine water management practices currently being undertaken by the accommodation sector in Zimbabwe and examine challenges facing water conservation in the accommodation sector in Zimbabwe. The data is analysed and is presented in graphs and tables. The chapter begins by presenting findings and discussions on characteristics of accommodation establishments in Zimbabwe including accommodation type, location, number of rooms, facilities available and years of operation. The chapter then presents findings on water usage and water conservation practices currently being undertaken by various accommodation establishments in Zimbabwe. Lastly, the chapter presents challenges and benefits of water conservation in the accommodation sector in Zimbabwe.

4.2 Characteristics of accommodation establishments

The following section presents the data on the characteristics of accommodation establishments that formed part of the study. Information on the accommodation establishment's location, type, grading/rating, chain affiliation, size, years in operation, key market segment, and visitor type will be discussed in this section.

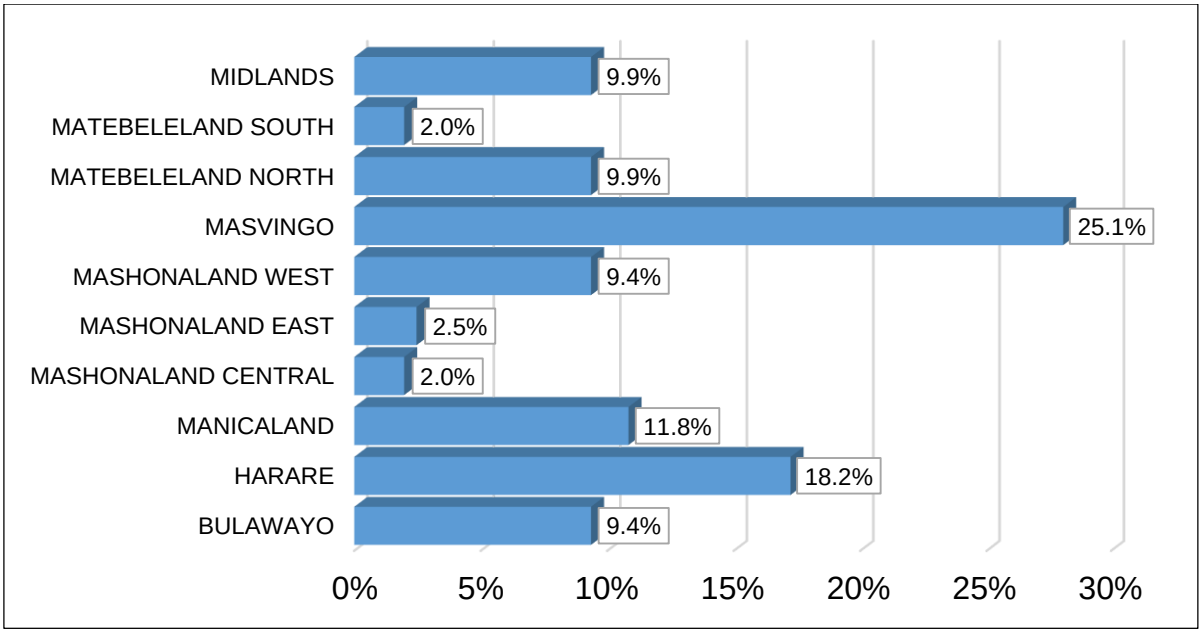


Figure 4.1: Location of accommodation establishments (n=203)

Figure 4.1 presents the geographical spread of accommodation facilities that were included in the study by province. In terms of the geographical distribution of accommodation facilities, Masvingo had the highest number of respondents (25.1%), followed by Harare (18.2%), Manicaland (11.8%), Matabeleland North and Midlands (9.9%) and Bulawayo (9.4%). Mashonaland East had a response rate of 2.5% while Matabeleland North and Mashonaland Central had 2.0% each. These numbers are an indication of the provinces in terms of tourism businesses and other activities which attract guests. According to Aksoy and Ozbuk (2017:79) and Masiero, Yang and Qiu (2019:90), the geographical location of accommodation facilities helps to enhance information about the characteristics of accommodation facilities and resources that are found in the region of location, which act as pull factors to tourists. Masvingo province, for example, is a land of vast expanse which prides itself in a plethora of tourist attractions that include wildlife conservancies, mines, sugarcane plantations and sugar processing plants, Tugwi-Mukosi dam and the famous Great Zimbabwe Ruins which attract tourists from all over the country and the world. Likewise, Harare, Bulawayo, Matabeleland North and Manicaland are amongst the provinces with the highest number of hotel rooms and room occupancy rate in the country (Muchenje 2011:64; Zimbabwe Tourism Authority 2017:7).

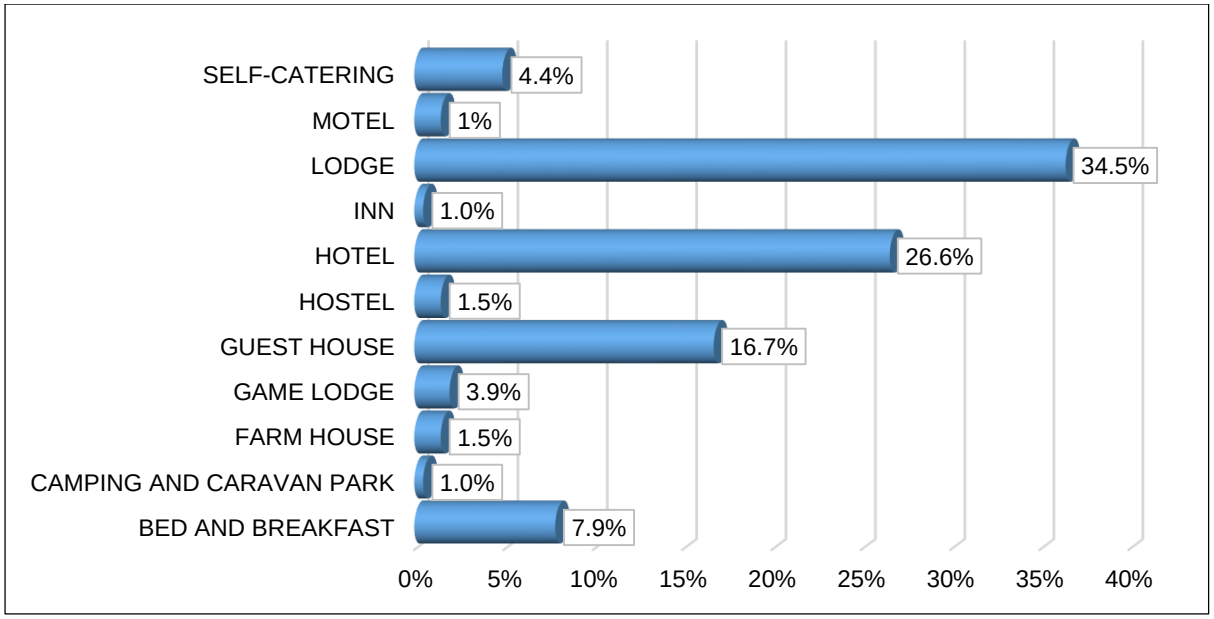


Figure 4.2: Type of accommodation establishment (n=203)

Figure 4.2 depicts the type of accommodation establishments that were part of the study. As indicated, the most represented type of accommodation establishment was lodges (34.5%), followed by hotels (26.6%), guesthouses (16.7%), bed and breakfast (7.9%) and self-catering (4.4%). The least represented accommodation establishments were game lodges (3.9%), inns (1.0%), farmhouses (1.5%), motels (1%) and camping and caravan parks (1%).

Ministry of Environment and Tourism Statutory Instrument 128 of 2005 defines a hotel as a “commercial accommodation establishment which rents out furnished rooms to transitory clientele and is permanently in use throughout the year”. The Statutory Instrument 128 of 2005 further defines a lodge as an inn located in natural surroundings where travellers stay at least overnight and is built in a traditional style. Given that most attractions are found in natural areas, it is credible that lodges dominate the number of accommodation establishments. According to Maphosa (2014:1), lodges in Zimbabwe also dominate the accommodation market somehow because there are no barriers to entry in this type of accommodation, in terms of licencing. This is permitted as the ZTA is still encouraging growth of the hospitality industry, and ownership is easy as individuals can easily convert their buildings into lodges and can use their residential land to construct lodges.

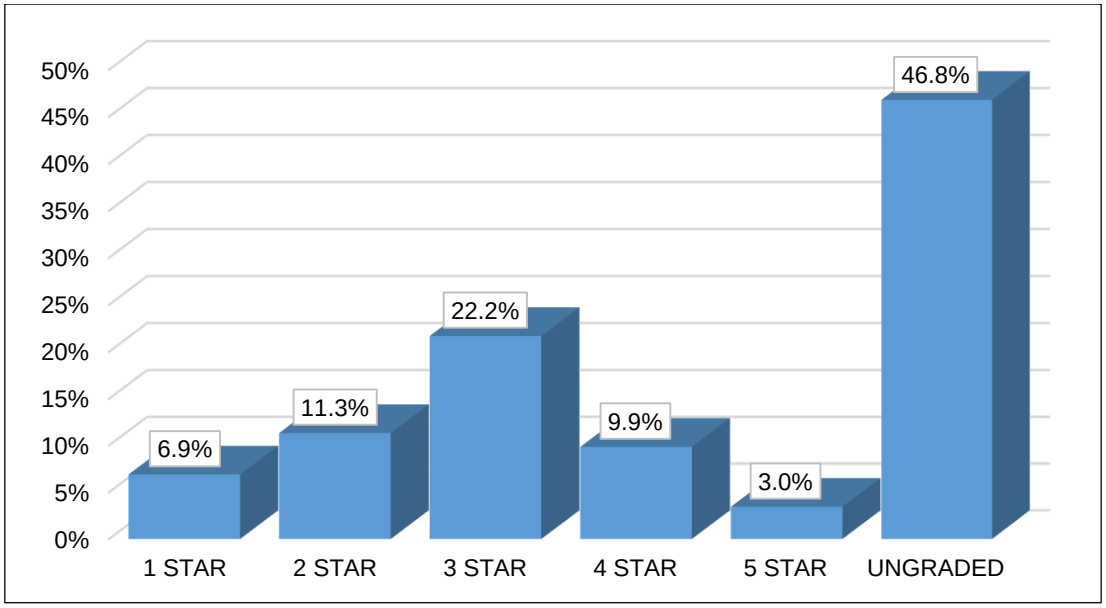


Figure 4.3: Star grading of accommodation establishment (n=203)

Figure 4.3 depicts the current star-grading of the accommodation establishments that were part of the study. Evidently, the largest proportion of graded accommodation establishments (22.2%) were 3-star, followed by 2-star (11.3%), 4-star (9.9%), 1-star (6.9%) and 5-star (3%). Moreover, 46.8% of the accommodation establishments were not star graded. The grading of accommodation establishments in Zimbabwe in terms of stars, standard, comfort or luxury is an ongoing exercise which began in 2006 to standardise accommodation establishments in the country and make them uniform in the region (Marawanyika 2006; Muchenje 2011:65; Maphosa 2014:1). The grading exercise which began in major tourist hotspots such as Victoria Falls and Harare has spread to other regions over the years.

According to Zimbabwe Statutory Instrument 128 of 2005, hotels in Zimbabwe are graded against a five-star index while lodges are graded standard, comfortable and luxury. The legislation defines a one-star or standard level hotel as a small-scale unit with basic structures, simple but adequate quality furniture and serviceable equipment. Two-star accommodation establishments are defined as those which offer good quality services including, good customer service; three-star accommodation establishments offer very good quality services including high class decorations as well as spacious rooms which are well and wisely furnished. Four-star accommodation establishments offer superior to excellent services including comfortable and quality furniture, and high standard guest services. Five-star accommodation establishments offer luxurious

premises which match international standards, attention to detail, have the best furnishings, a wide range of top-quality guest services including swimming pools, sports and exercise (Muchenje 2011:59).

According to the literature the associated rating or star-grading of an accommodation enterprise determines water usage (Styles *et al.* 2015:189; Gabarda-Mallorquí, Garcia and Ribas 2017:89). Indeed, this has been found to be true in places near and far as various researchers discovered that higher rated accommodation establishments were consuming more water than lower rated accommodation establishments (Sucheran 2013:154; Gabarda-Mallorquí, Garcia and Ribas 2017:89).

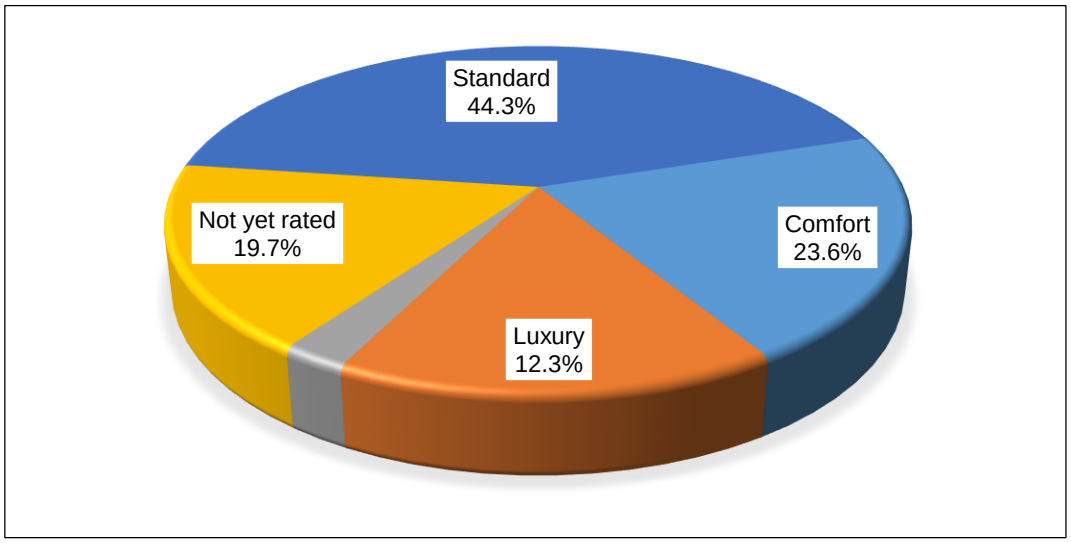


Figure 4.4: Rating of accommodation establishments (n=203)

Figure 4.4 displays the data on the rating of accommodation facilities in terms of standard, comfort, and luxury. Evidently, 44.3% of the accommodation facilities were rated as 'standard', 23.6% as 'comfort', and 12.3% as 'luxury'. Overall, 19.7% of accommodation establishments have not been rated. The term luxury is associated with accommodation establishments with 4 or more stars offering international high - quality services, located in prime areas, have better views, and offer health and wellness services among other things (Oliveira, Pedro, and Marques 2013:642). In general, classifications are necessary indicators of the accommodation establishment's standard of service which guests can use to choose products they want. In Zimbabwe, the rating of accommodation establishments as Standard, Comfortable and Luxury has mainly been associated with lodges guided by Statutory Instrument 128 of 2005 (Maphosa, 2014:50). Categories are represented by drum

symbols with one drum representing Standard, three drum – Comfort, and 5 drum – Luxury.

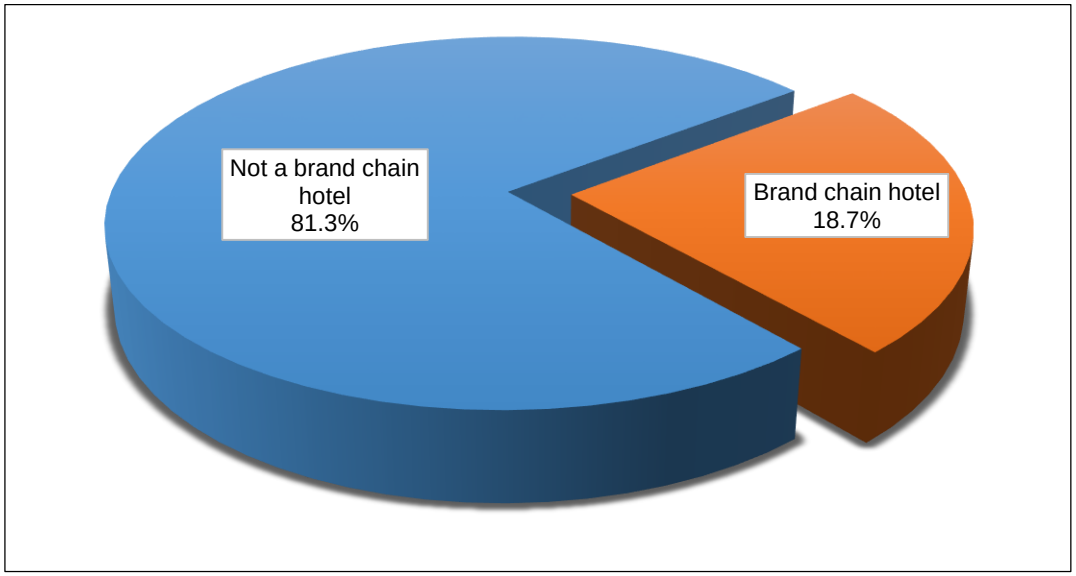


Figure 4.5: Accommodation establishment brand chain (n=203)

Figure 4.5 depicts the brand chain of accommodation establishments in the study. As illustrated, 18.7% of the accommodation establishments indicated that they were part of a brand chain, while 81.3% indicated they are independent accommodation facilities, and not part of any brand chain. Major national and international accommodation brands in Zimbabwe own a small proportion of accommodation establishments. One of the reasons for this is that major international players in the accommodation sector are reluctant to invest in tourism sector due to the harsh economic environment and policy inconsistency that prevails in the country (Mutana, Chipfuva and Muchenje 2013:154). This has led to local ownership dominating the country's hospitality sector.

While this is the reality on the ground in Zimbabwe, world over, there is widespread consensus that chain-affiliation affects water usage in one way or the other. Indeed, there some researchers who contends that chain-affiliated hotels have higher levels of water consumption than independent or privately-owned hotels (Tortilla and Tirado 2011:2578). While this is the case, another school of thought affirms that chain affiliated accommodation establishments use environmental resources more efficiently than independent or privately-owned hotels (Chen 2019:4).

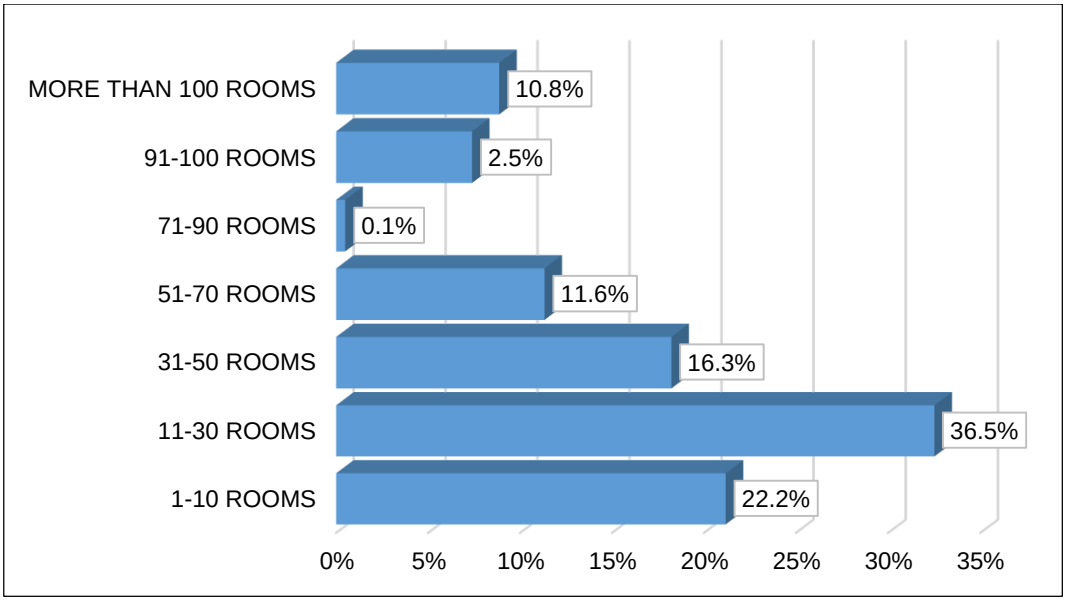


Figure 4.6: Size of accommodation establishment (in number of rooms) (n=203)

Accommodation establishments in this study varied according to capacity and size, as presented in Figure 4.6. The largest proportion of accommodation establishments in this study (36.5%) had the capacity of between 11 to 30 rooms; 22.2% had between 1 and 10 rooms; 16.3% had between 31 and 50 rooms, 11.6% had between 51 and 70 rooms, 10.8% of the accommodation establishments had more than 100 rooms, 2.5% had between 91 and 100 rooms and the least number of accommodation establishments had between 71 and 90 rooms (0.1%). Capacities of these accommodation establishments are related to historical facts and the economic situation that has prevailed in the country since the early 2000s (Mutanga, Gandiwa, and Muboko 2017:7). The proliferation of small accommodation establishments in Zimbabwe, such as lodges, as indicated by Maphosa (2014:1) justifies why over 75% of the respondents had fewer rooms of between 1 and 50. Small accommodation establishments have come in hand to fill the gap that has been left void following the demise of large tourism traffic in the 2000s (Mutana, Chipfuva and Muchenje, 2013:154). In addition, small accommodation establishments are also growing to satisfy the low-income economy which the country has become, following the 2008 financial crisis and the subsequent bad governance (Zimbabwe Tourism Authority, 2008:3; Mutanga, Gandiwa, and Muboko 2017:7). Evidence provided by the Zimbabwe Tourism Authority (ZTA) (2019:42) shows that with the support of small accommodation establishments and a hefty local clientele the national bed capacity

stood at 12 772 in 2018. Driven by domestic tourism, the ZTA also revealed that hotel bed occupancy rose by an average of 4% between 2017 and 2018.

Researchers are of the opinion that the size of the accommodation establishment affects water usage (Kasim, Dzakiria and Ahmad, 2017:370). Hotel sizes can be distinguished by number of rooms, number of beds, occupancy rate, food covers sold, carrying capacity of the facilities available, size of the land that needs to be maintained and architecture which can be high rise or resort style (Gössling *et al.* 2012:7; Styles *et al.* 2015:189; Gabarda-Mallorquí, Garcia and Ribas 2017:90; Rico *et al*. 2020:775).

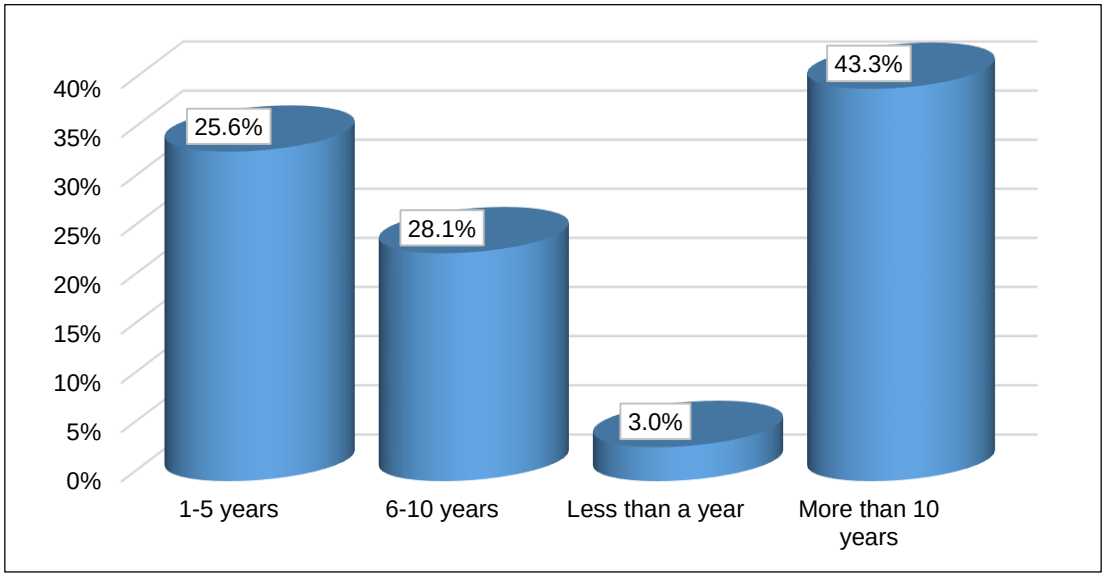


Figure 4.7: Accommodation establishments' years in operation (n=203)

Figure 4.7 presents the data on the years of operation of accommodation establishments that formed part of the study. Evidently, 43.3% of the establishments have been in operation for more than 10 years; 28.1% for between 6 and 10 years and 25.6% for between 1 and 5 years. A relatively small proportion of accommodation establishments (3%) indicated that they have been in operation for less than a year. Noticeably there has been a growth in the number of accommodation establishments over the past decade in Zimbabwe. This growth has been linked to the time of political and economic stability ushered in by the 2008 Global Political Agreement (GPA) (Mutana, Chipfuva and Muchenje, 2013:154). This period saw tourism numbers beginning to grow, and new accommodation investors in the tourism and hospitality industry of the country. Since then, and recently, tourism numbers in Zimbabwe have

been rising with receipts hovering between 2 400 000 and 2 500 000 tourists' year on year since 2017 (Ministry of Finance and Economic Development 2019:111).

In recent years, researchers have concluded that water usage may be affected by number of years in operation. For instance, newer hotels are known for using less water because they are by design equipped with advanced water saving technologies, whereas older hotels have older types of facilities and plumbing fixtures which are not geared towards water conservation (Barberán *et al.,* 2013:183).

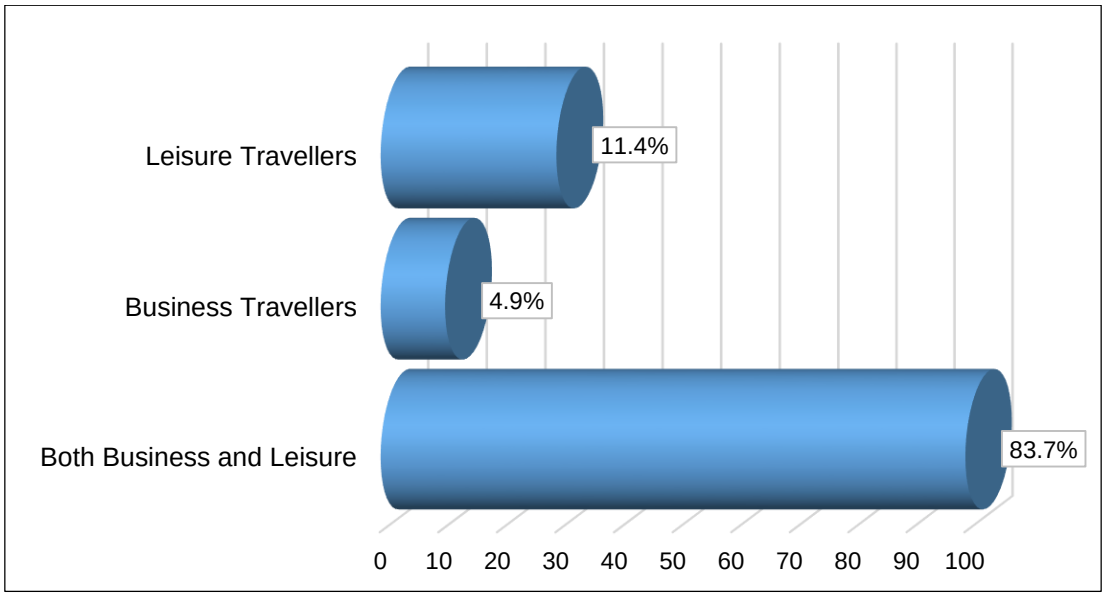


Figure 4.8: Key market segment of accommodation establishment (n=203)

Figure 4.8 reflects the key markets for accommodation establishments which were part of the study. As depicted, the key market for accommodation establishments in Zimbabwe are both business and leisure travellers (83.7%), whilst 11.4% of accommodation businesses indicated that their key market is leisure travellers and 5% stated that their key market is business travellers. Suspicions are always that leisure travellers consume more resources than business travellers, however, according to Millar, Karl, Mayer and Baloglu (2012:407), there is no difference in attitude and behaviour between leisure and business travellers when it comes to green products and environmental issues. However, what is substantively known and has been recorded so far regarding guests' attitude rests on where they come from and their prior experience (Dimara, Manganari and Skuras 2017:434). European tourists

(leisure or business) for example are thought to be more informed about environmental issues than tourists from other markets (Hernandez and Ryan, 2011:84).

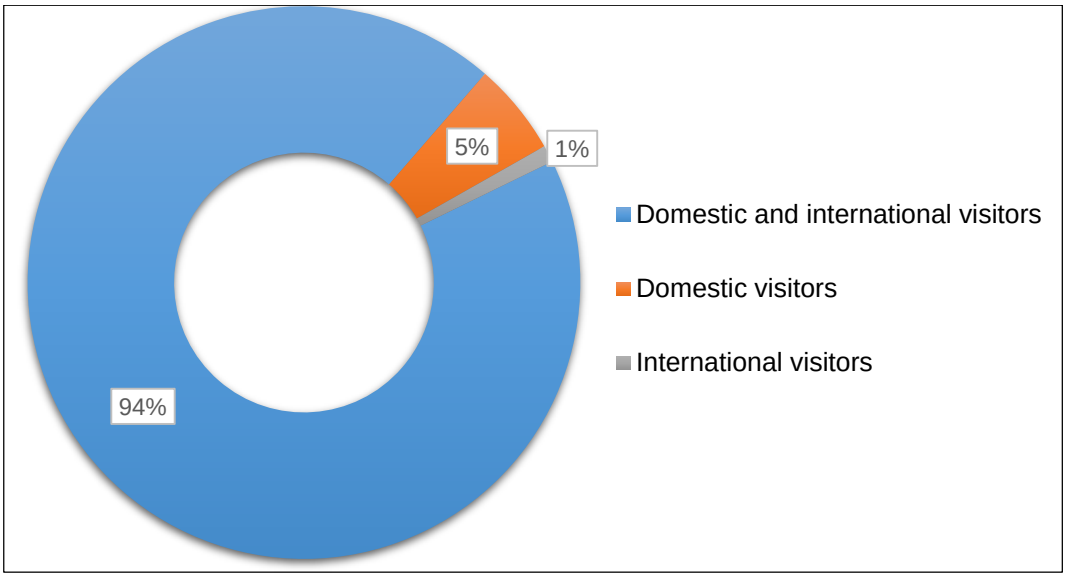


Figure 4.9: Type of visitors to accommodation establishments (n=203)

Figure 4.9 indicates the types of visitors attracted to accommodation establishments in this study. Majority of the accommodation establishments (94%) indicated that their key guests are from both domestic and international markets, while 5% indicated that their visitors are form the domestic market. A mere 1% of accommodation establishments indicated that their niche is the international market.

Given Zimbabwe's competitive advantage as a tourist destination, it is understandable that accommodation establishments in the country target and prepare for both domestic and international tourists. Essentially, in Zimbabwe, regional and domestic tourism markets have been crucial in sustaining the country's tourism industry. According to the ZTA (2019:44), 76% of tourism revenue in 2018 was generated from foreign receipts ($1.051 billion), while 24% was generated from domestic receipts ($335 million). Muchenje (2011:64) found that hotels in Harare were frequently booked by local business tourists than foreign tourists because there were no adventure activities in the capital city, compared to resort towns of Victoria Falls and Nyanga.

Various sections of the literature agree that the type of visitors who frequently visit an accommodation establishment affects water usage (cite a few refs. Here). Firstly, there is wide consensus that the more informed a market is about environmental issues the

more careful it is and vice-versa. The second issue has to do with the class of the visitors. Accommodation establishments located in rural areas usually attract high to middle class visitors who have high levels of education and will be searching for their wellbeing more than environmental destruction (Bel *et al*. 2015:562). On the other hand, accommodation establishments located in urban areas attract all kinds of visitors (low to high income). With such a profile of visitors, use of environmental resources is uncontrollable and more especially because of the belief that urban areas have plenty of resources, products as well as services. Last but not least is the issue of economic domination. For instance, LaVanchy (2017:48) found that visitors from developed countries tend to use large quantities of water compared to locals and tourists from less developed countries.

Table 4.1: Facilities available at accommodation establishments (n=203)

Accommodation Facilities	Percentage
Landscaped areas	99.0
Swimming pool	75.4
On-site laundry	73.9
On-site kitchens	65.0
Restaurant	54.7
Conference facilities	47.3
Bar	45.3
Camping facilities	29.1
Private Lounge	25.1
Curio Shop	21.7
Gym	17.2
Water Sports	12.8
Spa	9.9
Golf Course	7.4
Business Centre	3.9

Table 4.1 presents the data on the various facilities available at accommodation establishments which were part of this study. Landscape areas were largely available at almost all the accommodation establishments as indicated by 99% of the respondents. This is followed by swimming pools (75.4%), onsite laundry (73.9%), onsite kitchens (65%), restaurants (54.7%), conference facilities (47.3%), bars (45.3%), camping facilities (29.1%), private lounges (25.1%), curio shops (21.7%) and gyms (17.2%). The least type of facilities found at accommodation establishments were business centres (3.9%), golf courses (7.4%), and spas (9.9%).

The literature has linked the growth of the accommodation sector to water demand in various destinations (Gössling *et al.* 2012:4). Water demand has then been linked to size and type of facilities found at accommodation establishments (Sucheran 2013:197; Gabarda-Mallorquí, Garcia and Ribas 2017:90). In their studies Gössling *et al.* (2012:7) and Sucheran (2013:69) found that facilities which use more water at accommodation facilities were the laundry, kitchen, swimming pools and landscapes and golf courses. Tortella and Tirado (2011:2576) reveal that where there are more swimming pools, more water is used. On an average water consumption from swimming pools is between 80 and 140 litres of water per guest per night (Gössling *et al.* 2012:7; Thomas Cook-Futouris, 2015:10).

As highlighted, 99% of the respondents indicated that they have some form of landscape areas. Studies reveal again that more water is used in landscape irrigation (LaVanchy (2017:42). According to Perez *et al*. (2016:7) average daily water consumption per m^2 of a hotel garden is 2.67 litres of water which is 975.55 litres per m^2 per annum. This, however, depends on size of garden and region. According to Green Hotelier (2014:7), gardens for hotels located in the Mediterranean regions require an average of about 2 154 m^3 of water per annum, while gardens for hotels located in tropical regions require about 3 568 m^3 of water per annum.

Table 4.1 shows that 65% of accommodation establishments indicated they have on-site kitchens. According to Thomas Cook-Futouris (2015:11), through the kitchen, each guest consumes about 25 litres of water per night. If restaurants are included, water usage per dining guest per day amounts to between 35 and 45 litres (Styles *et al*. 2015:189). Moreover, a large proportion (73%) of respondents indicated that they have on-site laundry facilities, and it is estimated that each guest consumes about 30 litres of water in laundry per night (Thomas Cook-Futouris, 2015:10).

4.3 Water usage and water conservation measures in accommodation establishments in Zimbabwe

The following section discusses data on water usage and water conservation measures being applied at accommodation establishments in Zimbabwe, that formed part of the study. In particular, this section will focus on the number of years' accommodation established have engaged in water conservation, types of water conservation measures being applied at accommodation establishments, impact of water conservation measures on water usage, benefits of water conservation measures in Zimbabwe and challenges being faced in implementing water conservation measures in the country.

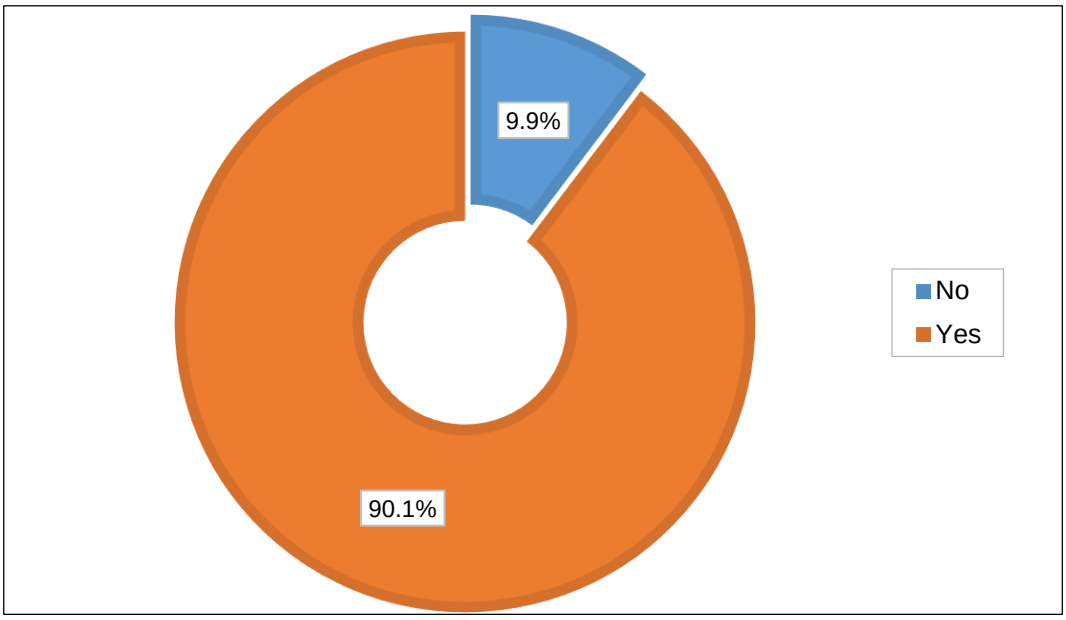


Figure 4.10: Accommodation establishment engages in water conservation practices (n=203)

Figure 4.10 presents the data on whether accommodation establishments engage in water conservation measures. Evidently, the majority of accommodation establishments (90.1%) indicated that they engage in water conservation measures, as opposed to 9.9% who indicated they do not. The results in Figure 4.10 confirm that because Zimbabwe is facing water scarcity issues, over the past decade and perhaps beyond, water has been a problem in the country to the extent that organisations have generally been practicing various water conservation practices including use of storage tanks, harvesting rainwater and other basic water conservation practices

(Davis and Harji 2014:10; Makurira and Tumbare 2014:5). It is, therefore, encouraging to observe that accommodation establishments are engaging in water management practices in Zimbabwe.

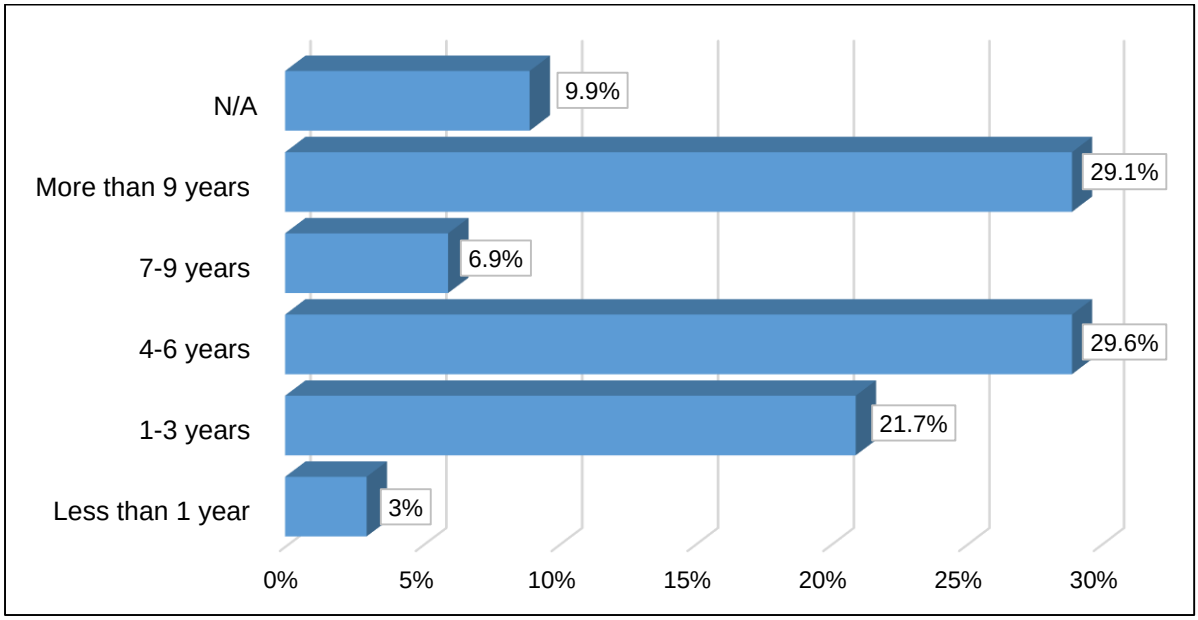


Figure 4.11: Number of years engaged in water conservation measures (n=203)

According to Figure 4.11, 29.6% of accommodation establishments indicated that they have been engaging in water conservation measures for the past 4 to 6 years, whilst a further 29.1% of accommodations establishments indicated that they have been engaging in water conservation for more than 9 years; 21.7% for 1 to 3 years, 6.9% for 7 to 9 years and 3% for less than a year. Overall, a significant number of accommodation establishments began engaging in water conservation measures for less than a decade. Results in Figure 4.11 can be attributed to water stress and scarcity, which over the past decade, has forced organisations in Zimbabwe to slowly adopt new technology and new ways of managing their water consumption. Renovations, extensions and retrofitting of buildings and water systems have been taking place at accommodation establishments as organisations seek to compete, adapt and mitigate to climate change (Karimi 2014:98; Rico *et al.* 2020:775). Moreover, as indicated previously, there has been a proliferation in the number of new accommodation establishments over the past decade (Figure 4.7). With increased awareness of water conservation practices globally, it is, therefore, not surprising that accommodation establishments built over the past decade have conservation in mind,

in particular water saving technologies (Yusof and Jamaludin 2014:507; Rico et al. 2020:775).

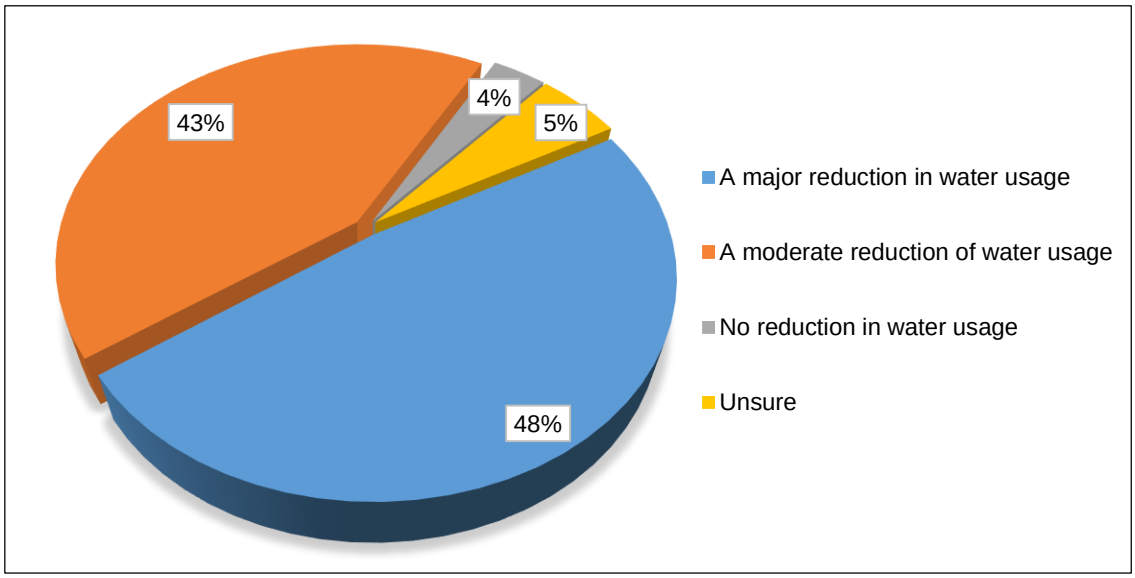


Figure 4.12: Impact of water conservation measures on water usage (n=203)

Figure 4.12 presents the data on the impact of water conservation measures on water usage in accommodation establishments. In terms of water consumption, 48% of the accommodation establishments indicated that they have witnessed a major reduction in water usage at the accommodation establishments; 43% indicated there has been a moderate reduction in water usage; and 5% were unsure of the impact of their water conservation measures on water usage.

Based on the results indicated in Figure 4.12, it is evident that the impact of water conservation measures is subject to implementation, monitoring and evaluation. For water conservation measures to be effective, various factors come into play, including timing, organisations' policies and effective management of the accommodation establishment among other things. Major reductions have been identified where water saving technologies have been adopted especially in major water consuming areas such as kitchens, guestrooms, restaurants and swimming pools (Rico *et al.* 2020:775). Moderate reductions have been realised in accommodation establishments which have adopted basic water conservation measures like education of guests and employees on water conservation, monitoring of water usage across departments, controlling of washing and irrigation times, maintenance of plumbing systems, towel

and linen reuse programmes, and other general environmental management systems (Tirado *et al.* 2019:4). In their study on green practices in Kenya, Karimi (2014:106) found that green practices were being practiced at a moderate scale leading to moderate results.

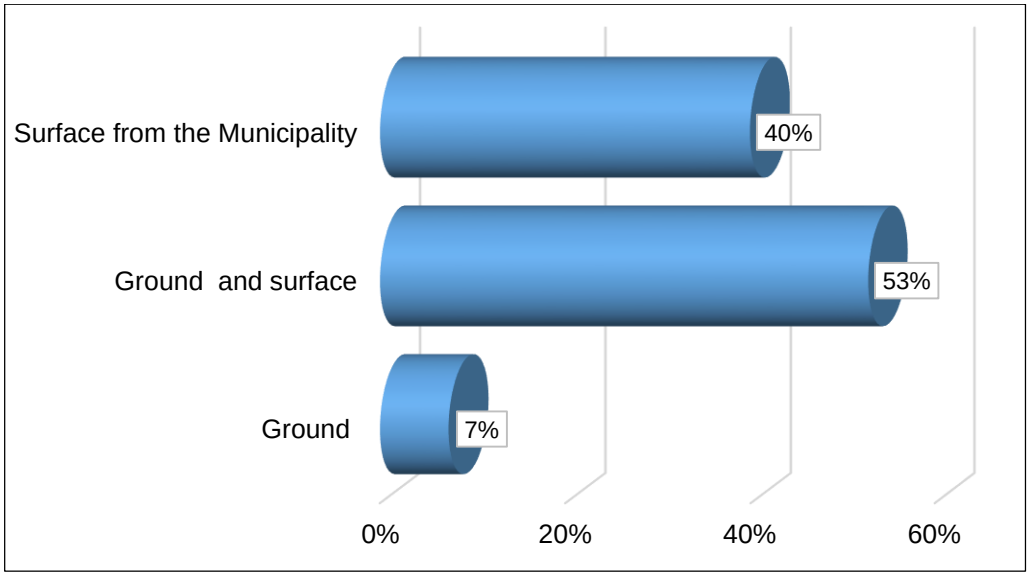


Figure 4.13: Source of potable water supply (n=203)

Figure 4.13 depicts source of water supply for accommodation establishments which were part of the study. As indicated, a little over half (53%) of accommodation establishments pointed out that their main source of water supply was both surface water and ground water, and 40% of accommodation establishments indicated that they rely on the municipal water supply. Only 7% of accommodation establishments stated that ground water was their main source.

According to Brazier (2015:12), Zimbabwe's surface water is from streams, rivers, and dams, while its ground water is from wetlands and aquifers. Major water supply in Zimbabwean towns is from its 8 000 dams (Braziel 2017:37). Due to poor service delivery over the past decade, in most urban areas, communities and organisations have taken to using groundwater instead (Davis and Harji, 2014:37; Tom and Munemo 2015:63). However, depending on the intensity of ground water abstractions, infiltration of saltwater and sewers into communal wells due to over pumping is highly likely. Moreover, given that a significant number of accommodation establishments use ground water, there is a possibility that in the long run the water table will be affected as is happening in countries like China (Gössling *et al.* 2012:10). This

observation is supported by Becken (2014:14) who argues that water withdrawals differ from place to place. LaVanchy (2017:48) found that excessive ground water abstractions by tourism businesses in Nicaragua were affecting the water table and was causing water contamination. During the interviews conducted with key tourism stakeholders, all interviewees mentioned that they are encouraging accommodation establishments to have alternative sources of water especially given that there is poor supply of water in the country. In terms of responses from interviewees, 80% of them indicated that they encourage and support drilling of boreholes but with the condition that water is tested to see if it is uncontaminated and 20% of interviewees mentioned that they encourage accommodation establishments to have alternative sources of water that conforms to sustainable tourism practices.

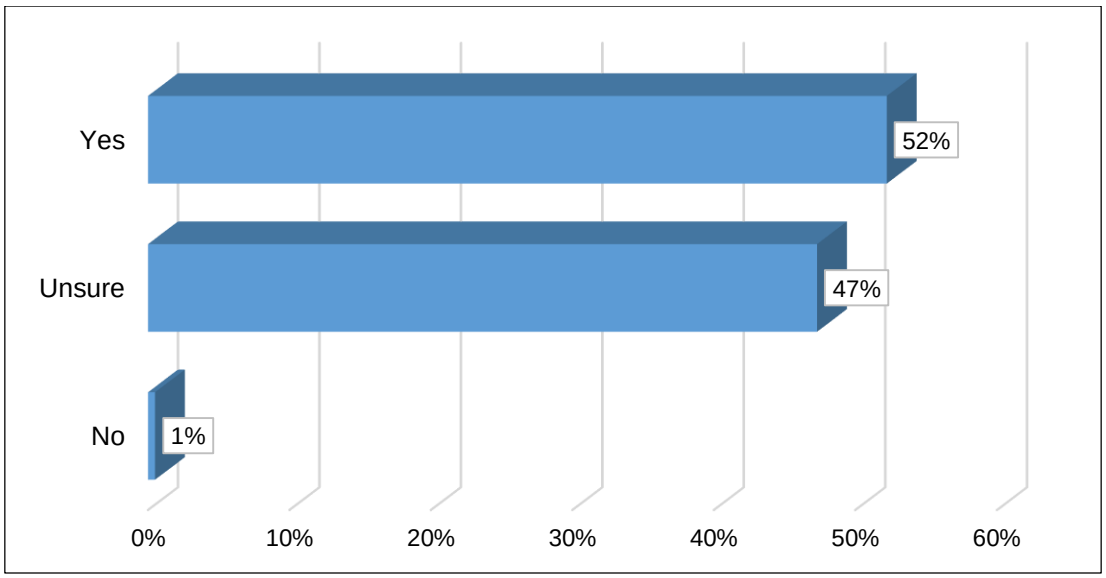


Figure 4.14: Willingness to engage in water conservation in the future (n=203)

Figure 4.14 indicates data on the willingness of accommodation establishments to engage in water conservation. Evidently, 52% of the accommodation establishments pointed out that they were willing to engage in water conservation practices, whilst 47% indicated that they were not sure, and just 1% stated that they were not willing to engage in such practices. Willingness to engage in water management practices is attributed to education and awareness programmes. Sucheran (2013:151) reveals that there is a growing number of accommodation managers willing to support environmental issues in South Africa because of awareness programmes which have been run successfully. Moreover, there is also growing pressure on hotels to engage

in green practices so that they can become competitive (Karimi, 2014:98), and cut costs and prevent possible government penalties (Rico et al. 2020:779).

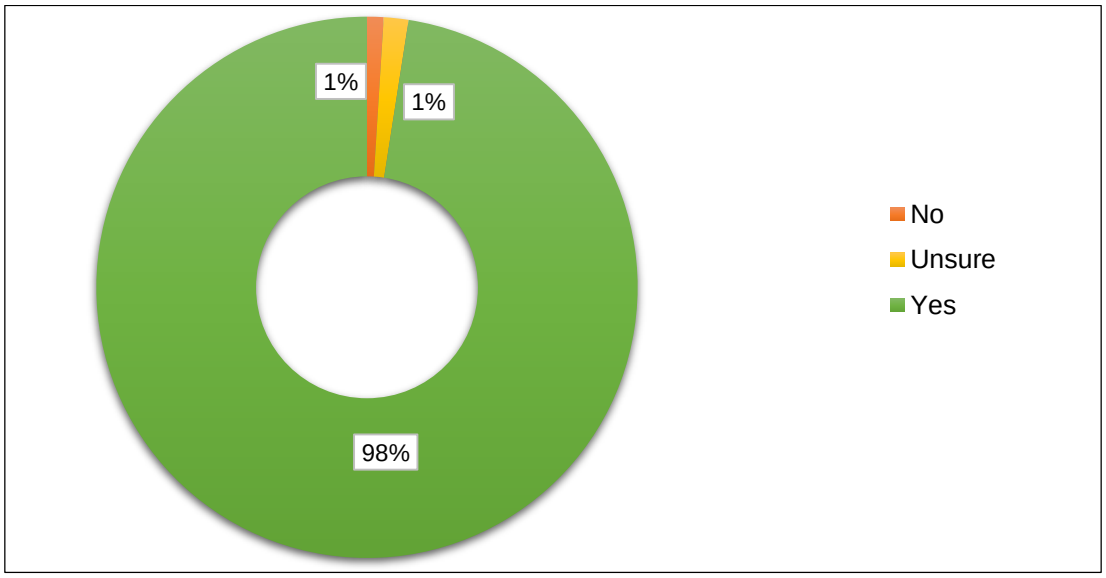


Figure 4.15: Benefits associated with water conservation (n=203)

Figure 4.15 identifies perceptions of benefits associated with water conservation at accommodation establishments. As depicted, 98% of the accommodation establishments indicated that there are benefits associated with water conservation; 1% saw no benefits associated with water conservation, and 1% of respondents were unsure. Benefits associated with water conservation range from economic benefits to socio-environmental benefits (Gössling *et al.* 2012:12; Wang and Huang 2013:183). This subject is discussed in greater detail in the following section.

Table 4.2: Water usage in accommodation establishments (per month) (n=203)

Water usage (litres)	Percentage
Up to 15 000 litres	46.8
15 001-30 000 litres	20.7
30 001-60 000 litres	11.3
60 001-120 000 litres	11.8
More than 120 000 litres	9.4

Table 4.2 depicts water usage per month by accommodation establishments in Zimbabwe. Evidently, in terms of the litres of water used by the accommodation sector per month, 46.8% of accommodation establishments use up to 15 000 litres, 20.7%

use between 15 001 and 30 000 litres, 11.3% use between 30 001 and 60 000 litres, 7.9% use between 60 001 and 90 000 litres, 3.9% use between 90 001 and 120 000 litres and 4.4% use between 12 001 and 150 000 litres. Only 5% of establishments use more than 150 000 litres of water per month. Essentially, a vast majority of accommodation establishments (67.5%) use up to 30 000 litres of water per month.

Literature confirms that water consumption at accommodation establishments is influenced by size, category and type of accommodation, services offered and number of facilities available (Barberán *et al*. 2013:182; Sucheran 2013:197; Oliveira, Pedro and Marques 2013:642; Styles *et al*. 2015:189). In this study, results indicate that small to medium accommodation establishments are more in number than large accommodation establishments in Zimbabwe. This may help to explain the distribution in water usage statistics in Table 4.2.

Table 4.3: Cross-tabulation: water usage by type of accommodation establishment per month (n=203)

Water usage (litres)	Up to 15 000 litres	15 001-30 000 litres	30 001-60 000 Litres	60 001-90 000 litres	90 001-120 000 litres	> 120 000 litres	Chi Square
Hotel	7.4%	14.3%	56.5%	56.3%	55.6%	77.8%	
Lodge	53.7%	19.0%	13.0%	12.5%	33.3%	16.7%	
Guesthouse	20.0%	16.7%	21.7%	18.8%	-	-	
Bed & Breakfast	2.1%	31.0%	4.5%	-	-	-	
Camp & Caravan	1.1%	2.4%	0.0%	-	-	-	
Farmhouse	2.0%	0.0%	4.3%	-	-	-	.000*
Hostel	2.1%	2.4%	-	-	-	-	
Inn	1.1%	4.6%	-	6.3%	-	-	
Game Lodge	4.2%	4.8%	-	6.1%	-	5.5%	
Self-catering	6.3%	4.8%	-	-	11.1%	-	
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	

***** *Significant values (p<0.05) Chi-square analysis*

Table 4.3 displays the data on the cross-tabulation between water usage and accommodation type. Of the accommodation establishments that consume less than 15 000 litres of water per month, the largest proportion was from lodges (53.7%) and guesthouses (20.0%). In terms of water usage of 15 000 litres up to 30 000 litres per month, bed and breakfasts showed the largest usage (31%), followed by lodges (19%), guesthouses (16.7%) and hotels (14.3%). Of the accommodation

establishments that consume between 30 000 and 60 000 litres of water, the largest proportion is from hotels (56.5%), followed by guesthouses (21.7%) and lodges (13.0%). In terms of water usage of 60 000 to 90 000 litres per month, the largest usage is from hotels (56.3%), followed by guesthouses (18.8%) and lodges (12.5%). In terms of water usage of between 90 000 and 120 000 litres per month, the largest usage is from hotels (55.6%), followed by lodges (33.3%). Lastly, in terms of water usage of more than 120 000 litres per month, the highest usage is from hotels (77.8%) and lodges (16.7%).

Reflecting on Table 4.3, the overall evidence shows that large scale accommodation establishments such as hotels and lodges use more water than small scale accommodation establishments like inns, bed and breakfast, hostels, camp and caravans and self-catering establishments. Take for instance, hostels; data from Table 4.3 clearly reveals that hostels do not use more than 30 000 litres of water per month. Data also shows that establishments such as bed and breakfast, farmhouses as well as camp and caravan parks do not use an excess of 60 000 litres of water per month.

To support this data, what we have so far is that small accommodation establishments tend to be smaller in scale in terms of room numbers, room sizes, room occupancy and land sizes (Sucheran, 2013:233). In addition, it is documented that small accommodation establishments have fewer number of employees and facilities that consume a lot of water such as swimming pools, golf courses, landscape areas and gymnasiums (Radwan, Jones and Minoli, 2012:534; Kasim, Gursoy, Okumus, and Wong, 2014:1094). However, the problem with small accommodation establishments is that they tend to exist in large numbers in an area than medium and large sized accommodation establishments (Kasim *et al.* 2014:1100).

In addition, what is also being conveyed in Table 4.3 is that a strong relationship exists between water usage and type of accommodation establishment ($p \leq 0.05$). These findings confirm what was discussed in the literature that the types of facilities, size, type and category of accommodation establishments affect water usage (Barberán *et al.* (2013:182; Gabarda-Mallorquí, Garcia and Ribas, 2017:84). Indeed, facilities and numerous other factors may cause variations in water usage at different accommodation establishments including and not limited to type of accommodation establishment, number of rooms, type of clients, occupancy rates and landscape

areas. (Charara *et al.,* 2011:237). According to Styles *et al*. (2015:189) facilities alone can contribute to water usage depending on their shape, frequency of usage and carrying capacity. Various studies have pointed to facilities such as gardens, golf courses, kitchens, restaurants, laundry areas, spas, toilets, wellness centres and swimming pools (Kasim et al. 2014:1094; Thomas Cook-Futouris 2015:10; Rico *et al.,* 2020:780). Many of these are found at various accommodation establishments in various shapes and sizes.

Table 4.4: Cross-tabulation: water usage per month by star grading of accommodation establishment (n=203)

Water usage (litres)	Up to 15 000 litres	15 001-30 000 litres	30 001-60 000 litres	60 001-90 000 litres	90 001-120 000 litres	> 120 000 litres	Chi Square
One Star	4.3%	11.9%	13.1%	6.3%	0.0%	5.6%	0.000*
Two Star	6.3%	12.0%	13.0%	31.3%	22.2%	11.1%	
Three Star	10.5%	21.4%	43.5%	31.1%	66.7%	27.8%	
Four Star	4.1%	7.2%	8.7%	31.3%	0.0%	33.3%	
Five Star	2.2%	2.4%	0.0%	0.0%	11.1%	11.1%	
Not graded	72.6%	45.1%	21.7%	0.0%	0.0%	11.1%	
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	

**Significant values (p<0.05) Chi-square analysis*

Table 4.4 displays the data on the cross-tabulation between water usage and star grading of accommodation establishments. In terms of accommodation establishments that consume less than 15 000 litres of water per month, the largest proportion was from ungraded establishments (72.6%), followed by three star graded establishments (10.5%), two-star (6.3%), and one star (4.3%). In terms of water usage of 15 000 litres up to 30 000 litres per month, ungraded establishments showed the largest usage (45.1%), followed by three-star (21.4%), two star (12.0%) and one star (11.9%). Of the accommodation establishments that consume between 30 000 and 60 000 litres of water per month, the largest proportion was from three-star accommodation establishments (43.5%), followed by ungraded establishments (21.7%), one-star accommodation establishments (13.1%) and those with two-stars (13.0%). In terms of water usage of 60 000 to 90 000 litres per month, the highest consumption was from two and four-star accommodation establishments which showed 31.3% concurrently. This is followed by three-star establishments (31.1%) and lastly one-star establishments (6.3%). In terms of water usage of between 90 000 and

120 000 litres per month, the largest usage is from three-star accommodation establishments (66.7%), followed by two-star (22.2%) and five-star (11.1%). Lastly, in terms of water usage of more than 120 000 litres per month, the highest usage is from four star (33.3%), followed by three-star (27.8%), five- star, two -star and ungraded (11.1%).

Overall, the findings in this study suggest a strong relationship exists between water usage and accommodation rating. This in part is explained by the Chi-square analysis $p \leq 0.05$. The findings in Table 4.4 generally confirms what was discussed in literature that services provided, and the associated star rating of accommodation establishments determine water usage (Styles *et al*., 2015:189). It is clear that high category (3-5 star) accommodation establishments consume more water than low category accommodation establishments (1-2 star). Normally, accommodation establishments are graded according to the number of facilities they have, meaning those with more facilities or bigger rooms tend to have higher grades than those without (Maphosa, 2014:7). According to Oliveira, Pedro and Marques (2013:642) high category accommodation establishments are known for better services, prime area location, better views and high-water consuming facilities.

Table 4.4 also revealed that ungraded accommodation establishments are consuming a significant amount of water in Zimbabwe. Most ungraded accommodation establishments in Zimbabwe are new entrant hotels that sprung up following the 2008 Global Political Agreement, a period that ushered political and economic stability (Mutana, Chipfuva and Muchenje, 2013:154). Some of the ungraded establishments are representing Airbnb a new niche in the hospitality industry that has come to fill the gap in accommodation supply (Blal, Singal and Templin, 2018:85). Having said this, it is also important to note that not all accommodation establishments that have not been graded are new. Some of the accommodation establishments are old but have not been graded according to the new grading system which the Ministry of Environment and Tourism launched in 2006 to standardise accommodation establishments in the country, and make them uniform in the region (Marawanyika, 2006).

Table 4.5: Cross-tabulation: water usage by chain affiliation (n=203)

Water usage (litres)	Chain	Non-Chain	Chi Square
Up to 15 000 litres	11.6%	88.4%	.000*
15 001 – 30 000 litres	11.9%	88.1%	
30 001 – 60 000 litres	13.0%	87.0%	
60 001 – 90 000 litres	31.2%	68.8%	
90 001 – 120 000 litres	44.4%	55.6%	
More than 120 000 litres	55.6%	44.4%	

**Significant values (p<0.05) Chi-square analysis*

Table 4.5 depicts water usage by chain affiliation. In terms of water usage by chain affiliation, data shows that accommodation establishments that use the least amount of water (up to 15 000 litres) were: non-chain (88.4%) and chain (11.6%). In terms of water usage of 15 000 litres up to 30 000 litres, the largest usage was from non-chain accommodation establishments (88.1%), followed by chain affiliated establishments (11.9%). Of the accommodation establishments that consume between 30 000 and 60 000 litres of water, the largest proportion was from non-chain accommodation establishments (87.0%), followed by chain affiliated establishments (13.0%). In terms of water usage of 60 000 to 90 000 litres per month, the highest consumption was from non-chain accommodation establishments (68.8%), followed by chain accommodation establishments (31.2%). In terms of water usage of between 90 000 to 120 000 litres, the largest usage was from non-chain accommodation establishments (55.6%), followed by chain affiliated establishments (44.4%). Lastly, in terms of water usage of more than 120 000 litres, the highest usage was from chain affiliated accommodation establishments (55.6%), followed by non-chain establishments (44.4%).

Overall evidence from the study shows that non-chain accommodation establishments consume more water than chain accommodation establishments. According to evidence in Table 4.5 non-chain accommodation establishments are visibly dominant with water usage from 1 000 litres up to 120 000 litres. All this serves to confirm what was discussed in the literature that non-chain affiliated accommodation establishments consume more water than chain accommodation establishments (Sucheran 2013:233). The view is that chain affiliated accommodation establishments follow a set of international standards which they use to provide uniform guest services. These sets of standards somehow help chain affiliated accommodation establishments manage water efficiently compared to independent or non-chain accommodation establishments (Rahman, Reynold and Svaren, 2012:724).

As per the Chi-Square test, results from Table 4.5 show there is a strong relationship between water usage and chain affiliation. P is less than or equal to 0.05 ($p \leq 0.05$).

Table 4.6: Cross-tabulation: water usage by number of rooms in accommodation establishment (n=203)

Water usage (litres)	Less than 10 rooms	10-30 rooms	31-50 rooms	51-70 rooms	71-100 rooms	> 100 rooms	Chi Square
1000-5000	57.8%	32.4%	6.1%	8.3%	0.0%	4.5%	
5 001-10 000	17.8%	17.6%	3.0%	4.2%	0.0%	13.6%	
10 001-15 000	6.7%	10.8%	6.1%	4.2%	0.0%	0.0%	
15 001-20 000	11.1%	16.2%	12.1%	8.3%	0.0%	0.0%	
25 001-30 000	4.4%	8.1%	18.2%	16.7%	20.0%	0.0%	
30 001-60 000	2.2%	10.8%	24.2%	16.7%	0.0%	9.1%	.000*
60 001-90 000	0.0%	1.4%	21.2%	20.8%	0.0%	13.6%	
90 001-120 000	0.0%	0.0%	3.0%	4.2%	60.0%	13.6%	
120 001-150 000	0.0%	1.4%	6.1%	4.2%	0.0%	22.7%	
150 001-180 000	0.0%	0.0%	0.0%	12.5%	0.0%	13.6%	
> 180 000	0.0%	1.4%	0.0%	0.0%	20.0%	9.1%	

**Significant values (p<0.05) Chi-square analysis*

Table 4.6 indicates a cross tabulation showing relationship between water usage and number of rooms. According to Table 4.6 establishments that use the least amount of water (up to 10 000 litres) were: accommodation with less than 10 rooms (75.6%), accommodation with 10-30 rooms (50%), accommodation with more than 100 rooms (18.1%), accommodation with 51-70 rooms (12.5%) and accommodation with 31-50 rooms (9.1%). Accommodation establishments that used between 10 001 to 30 000 litres of water were: accommodation with 31-50 rooms (36.4%), accommodation with 10-30 rooms (35.1%), accommodation with 51-70 rooms (29.7%), accommodation with less than 10 rooms (22.2%), accommodation with 71-100 rooms (20%) and accommodation with more than 100 rooms (0%). A consumption of between 30 001 to 90 000 litres of water was done by accommodation with 31-50 rooms (45.4%), accommodation with 51-70 rooms (37.5%), accommodation with more than 100 rooms (22.7%), accommodation with 10-30 rooms (12.2%) and accommodation with less than 10 rooms (2.2%). Accommodation establishments that used the most amount of water (more than 90 000 litres were: accommodation with 71-100 rooms (80%), accommodation with more than 100 rooms (59%), accommodation with 51-70 rooms

(20.9%), accommodation with 31-50 rooms (9.1%), accommodation with 10-30 rooms (2.8%) and accommodation with less than 10 rooms (0%).

Overall, according to the Chi-square test a significant relationship exists between water usage and number of rooms $p \leq 0.05$. While findings by Tortella and Tirado (2011:2576) were that a 1% increase in the number of rooms increases water consumption by 6%; results by Gabarda-Mallorquí, Garcia and Ribas (2017:89) showed that hotels with over 500 beds (plus or minus 200 rooms) were more efficient when it comes to using water than those with less rooms and fewer beds. The thought however is that there are no significant differences in efficient use of environmental resources between hotels with more than 100 rooms and those with less than 100 rooms (Rahman, Reynolds and Svaren, 2012:726). Having said this, the answer certainly continues to revolve around the fact that water consumption at accommodation establishments is influenced by size, category, type of accommodation, services offered and number of facilities available (Barberán et al. 2013:182; Sucheran 2013:197; Oliveira, Pedro and Marques 2013:642; Styles *et al*. 2015:189).

Table 4.7: Cross-tabulation: Water conservation measures by accommodation type (n=203)

	Guest-House	Hotel	Lodge	B n B'	Camp & Caravan Park	Farm-House	Hostel	Inn	Self-catering apartment	Game Lodge	Chi-square
Promptly fix water leaks	82.4%	87.0%	88.6%	68.8%	50.0%	100%	100%	75.0%	100%	100%	.005*
Organic composting in landscaping	85.3%	87.0%	82.9%	93.8%	50.0%	100%	66.7%	75.0%	100%	50.0%	.012*
Staff regularly informed water conservation measures	76.5%	87.0%	85.7%	87.5%	50.0%	100%	100%	50.0%	100%	50.0%	.134
Drought resistant plants in landscaping	82.4%	81.5%	84.3%	87.5%	50.0%	100%	66.7%	75.0%	100%	75.0%	.941
Compare water consumption over time	82.4%	88.9%	80.0%	87.5%	50.0%	66.7%	66.7%	75.0%	77.8%	50.0%	.579
Rainwater harvesting	67.6%	83.3%	68.6%	93.8%	50.0%	100%	66.7%	75.0%	100%	75.0%	.008*
Low-flow taps	70.6%	81.5%	71.4%	81.3%	100%	66.7%	66.7%	50.0%	88.9%	62.5%	.856
Low-flow showers	70.6%	81.5%	70.0%	75.0%	100%	66.7%	66.7%	50.0%	88.9%	62.5%	.950
Water conservation policy	64.7%	90.7%	58.6%	81.3%	100%	66.7%	33.3%	25.0%	77.8%	75.0%	.030*
Regular maintenance of swimming pools	67.6%	87.0%	54.3%	87.5%	0%	66.7%	66.7%	75.0%	100%	50.0%	.000*
Linen re-use program	50.0%	68.5%	74.3%	50.0%	50.0%	66.7%	33.3%	25.0%	55.6%	87.5%	.276
Restricted water flow taps	52.9%	72.2%	60.0%	87.5%	50.0%	33.3%	0%	75.0%	66.7%	62.5%	.102
System to promptly report water leaks	67.6%	81.5%	37.1%	81.3%	50.0%	66.7%	100%	75.0%	100%	50.0%	.000*
Drinking stations instead of water bottles	64.7%	53.7%	70.0%	75.0%	50.0%	100%	66.7%	25.0%	55.6%	50.0%	.600
Dual-flush toilets	50.0%	81.5%	44.3%	81.3%	100%	66.7%	66.7%	50.0%	33.3%	62.5%	.005*
Staff training on water conservation	67.6%	83.3%	37.1%	93.8%	0%	66.7%	33.3%	25.0%	66.7%	25.0%	.000*
Recycled grey water for irrigation	67.6%	83.3%	30.0%	75.0%	0%	66.7%	66.7%	100%	100%	25.0%	.000*
Water landscape in evenings	58.8%	66.7%	50.0%	62.5%	0%	66.7%	0%	25.0%	22.2%	62.5%	.001*
System for monitoring water usage	52.9%	74.1%	40.0%	50.0%	0%	66.7%	66.7%	75.0%	44.4%	50.0%	.220
Aerated taps	55.9%	63.0%	38.6%	43.8%	0%	33.3%	66.7%	25.0%	77.8%	50.0%	.175
Towel re-use program	41.2%	42.6%	60.0%	37.5%	50.0%	66.7%	33.3%	0%	33.3%	75.0%	.037*
Wastewater treatment	55.9%	77.8%	22.9%	31.3%	0%	33.3%	66.7%	50.0%	44.4%	37.5%	.000*
Encourage guests to shower instead of bath	41.2%	61.1%	47.1%	31.3%	0%	66.7%	33.3%	0%	22.2%	50.0%	.037*
Flow controllers in plumbing fixtures	47.1%	66.7%	15.7%	68.8%	0%	66.7%	66.7%	50.0%	44.4%	12.5%	.000*
Waterless urinals	41.2%	70.4%	18.6%	43.8%	50.0%	33.3%	33.3%	75.0%	22.2%	25.0%	.000^

Sensor taps	44.1%	68.5%	12.9%	43.8%	0%	66.7%	33.3%	25.0%	44.4%	12.5%	.000*
Water conservation information leaflets	41.2%	50.0%	21.4%	62.5%	0%	0%	33.3%	50.0%	22.2%	62.5%	.115
Sensor-flush toilets	38.2%	63.0%	12.9%	37.5%	50.0%	33.3%	66.7%	25.0%	55.6%	12.5%	.000*
Water efficient appliances	50.0%	61.1%	14.3%	31.3%	0%	0%	100%	0%	44.4%	12.5%	.000*
Taps with flow timers	44.1%	51.9%	12.9%	75%	0%	66.7%	33.3%	25.0%	22.2%	25.0%	.001*
Staff incentives offered for water conservation	47.1%	42.6%	12.9%	81.3%	0%	66.7%	33.3%	0%	22.2%	12.5%	.000*
Sensors for landscape irrigation	32.4%	64.8%	10.0%	56.3%	0%	0%	33.3%	0%	33.3%	12.5%	.000*
Sprinklers with timers for landscape irrigation	29.4%	35.2%	7.1%	31.3%	0%	0%	66.7%	25.0%	22.2%	12.5%	.068
Certification encouraging water conservation	20.6%	37.0%	7.1%	18.8%	0%	33.3%	0%	25.0%	11.1%	37.5%	.084

**Significant values ($p<0.05$) Chi-square analysis*

Table 4.7 indicates a cross-tabulation showing relationship between water conservation measures and accommodation types. In this crosstab the study sort to find out which accommodation type applied the most water conservation measures. According to results in Table 4.7, in terms of applying water conservation measures, most accommodation establishments indicated that they were engaging in fixing water leaks except for camp and caravan parks and bed and breakfasts which showed slightly lesser percentages in implementation. Use of organic waste in landscaping was indicated to be largely undertaken by most accommodation establishments, but to a lesser extent by camp and caravan parks, hostels, and game lodges. Most accommodation types indicated that they regularly inform their staff about water conservation measures except camp and caravan parks, inns, and game lodges. In retrospect, results show that only half of these establishments are practicing water conservation measure. Use of drought resistant plants in landscaping was indicated to be practiced by all accommodation establishments except for camp and caravan parks and hostels which showed slightly lesser percentages in implementation.

In terms of comparing water consumption over time, most accommodation types indicated they were practicing this measure except for camp and caravan parks, farm-houses, hostels and lodges which indicated slightly lesser percentages in implementation. Rainwater harvesting was indicated to be practiced by all accommodation establishments though to a lesser extent by guesthouses, lodges, camp and caravan parks and hostels. Use of low-flow taps was indicated to be applied by all establishments except inns, farmhouses, hostels, and game lodges which showed slightly lower percentages. Use of low-flow showerheads was indicated to be applied at all accommodation establishments except farmhouses, hostels, inns, and game lodges which showed slightly lesser percentages in applying this water conservation measure.

In terms of applying their water conservation policy, the following accommodation types indicated they were applying this measure more than the rest: camp and caravan parks (100%), hotels (90.7%), bed and breakfast (81.3%), self-catering apartments (77.8%) and game lodges (75%). Regular maintenance of swimming pools was indicated by all accommodation types except guesthouses, lodges, camp and caravan parks, farmhouses, hostels and game lodges which indicated lesser percentages in implementing. Linen re-use programmes were indicated to be largely practiced by

game lodges and lodges more than other accommodation types. Restricted water flow taps were largely indicated to be used by bed and breakfast establishments, inns, and hotels. System to promptly report water leaks was indicated to be practiced by all accommodation establishments except game lodges, camp and caravan parks, farmhouses and lodges which showed slightly lesser percentages. Drinking stations instead of water bottles was being practiced largely by farm- houses, bed and breakfast establishments and lodges. Use of dual-flush toilets was largely indicated by camp and caravan parks (100%), hotels (81.5%) and bed and breakfast (81.3%). Staff training on water conservation was largely indicated to be practiced at bed and breakfast establishments (93.8%) and hotels (83.3%). Use of grey water for irrigation was largely indicated by inns (100%), self-catering apartments (100%), hotels (83.3%) and bed and breakfast (75%).

In retrospect, while the majority of the data in Table 4.7 is commendable, there is however more to be seen from a different angle. The most outstanding evidences from Table 4.7 is that of the following water conservation measures which were not fully practiced across all accommodation types: watering of landscape in the evening; use of systems for monitoring water usage use of aerated taps; towel re-use programmes; use of wastewater treatment plants; encouraging guests to shower instead of bathing; use of flow controllers in plumbing fixtures; use of waterless urinals; sensor taps, use of water conservation information leaflets; availability of sensor-flush toilets; taps with flow timers; use of staff incentives to encourage water conservation; use of sensors in landscape irrigation; use of sprinklers with timers for use in landscape irrigation as well as affiliation to certification programmes that encourage water conservation. In summary, what this suggests is that most accommodation establishments in Zimbabwe are currently practicing soft water conservation measures. However, this cannot be certainly confirmed without zooming into each accommodation type to see what water conservation measures they have been practicing the most.

Looking closely at each accommodation type, data shows that in terms of application of water conservation measures, guesthouses were largely involved in the use of organic composting in landscapes (85.3%), prompt fixing of water leaks (82.4%), use of drought resistant plants in landscaping (82.4%), comparing water consumption over time (82.4%) and regular training of staff about importance of water conservation (76.5%).

Hotels on the other hand, indicated that they were largely involved in the following water conservation measures: using water conservation policy (90.7%); comparing water consumption overtime (88.9%); prompt fixing of water leaks (87%); use of organic composting in landscaping (87%); regular training of staff about water conservation measures (87%); use of drought resistant plants in landscaping (81.5%); regular maintenance of swimming pools (87%); rainwater harvesting (83.3%); staff training on importance of water conservation (83.3%); use of recycled grey water for irrigation (83.3%); installation and use of low-flow taps (81.5%); use of low-flow showers (81.5%); system to promptly report water leaks (81.5%); use of dual-flush toilets (81.5%); use of wastewater treatment plant (77.8%) and availability of waterless urinals (70.4%). Lodges were largely involved in the following water conservation measures: prompt fixing of water leaks (88.6%); use of organic composting in landscaping (82.9%) regularly informing staff about water conservation measures (85.7%); use of drought resistant plants in landscaping (84.3%) comparing water consumption overtime (80%) and linen-reuse programmes (74.3%).

Bed and breakfast establishments indicated that they were largely involved in the following water conservation measures: staff training on importance of water conservation (93.8%); use of organic composting in landscaping (93.8%); rainwater harvesting (93.8%); regularly informing staff about water conservation measures (87.5%); use of drought resistant plants in landscaping (87.5%); restricted water flow taps (87.5%); comparing water consumption overtime (87.5%); regular maintenance of swimming pool(s) (87.5%); use of low-flow taps (81.3%); availability and use of water conservation policy (81.3%); system to promptly report water leaks (81.3%); use of dual flush toilets (81.3%); use of low-flow showers (75%); use of drinking stations instead of water bottles (75%) and use of recycled grey water for irrigation (75%).

Camp and caravan parks indicated that they were applying the following water conservation measures: low flow taps (100%); low flow showerheads (100%); water conservation policy (100%) and dual flush toilets (100%). Farmhouses indicated that they were largely involved in the following water conservation measures: prompt fixing of water leaks (100%); use of organic composting in landscaping (100%); regularly informing staff about water conservation (100%); use of drought resistant plants in landscaping (100%); rainwater harvesting (100%) and use of drinking stations instead of bottled water (100%).

Hostels on the other hand indicated that they were largely involved in the following water conservation measures: prompt fixing of water leaks (100%); staff regularly informed about water conservation (100%) and system for promptly reporting on water leaks (100%). Inns indicated that they were largely involved in the following water conservation measures: prompt fixing of water leaks (75%); use of organic composting in landscaping (75%); use of drought resistant plants in landscaping (75%); comparing water consumption overtime (75%); rain water harvesting (75%); regular maintenance of swimming pool(s) (75%); restricted water flow taps (75%); system to promptly fix water leaks (75%); use of recycled grey water for irrigation (100%); system for monitoring water usage (75%) and use of waterless urinals (75%).

Self-catering apartments indicated that they were largely involved in the following water conservation measures: prompt fixing of water leaks (100%); use of organic composting in landscaping (100%); regularly informing staff about water conservation (100%); use of drought resistant plants in landscaping (100%); rainwater harvesting (100%); use of drinking stations instead of bottled water (100%); regular maintenance of swimming pools (100%); system to promptly report water leaks (100%); low flow taps (88.9%), low flow showers (88.9%); aerated taps (78.8%); availability and use of water conservation policy (77.8%) and comparing water consumption overtime (77.8%). Lastly, game lodges indicated that they were involved in the following water conservation measures: prompt fixing of water leaks (100%); linen reuse programmes (87.5%); use of organic composting in landscaping (75%); rainwater harvesting (75%); use of water conservation policy (75%) and towel reuse programmes (75%).

Having revealed this; in summary, key results from Table 4.7 are that: inns, self-catering apartments, lodges, and hotels inform their staff more about the benefits of water conservation than other accommodation types. The least responses in informing staff about the benefits of water conservation were camps and caravan parks (50%). In KwaZulu-Natal, South Africa, Sucheran (2013:175) found that 80% of the hotels and lodges were encouraging employees to participate in environmental programs. Results also showed that educating employees and guests to conserve water was being adopted by 78% of hotels and lodges in KZN (Sucheran 2013:198). In Nakuru County, Kenya, 73.7% of four-star hotels indicated that they were using water-saving awareness programs to engage employees on environmental issues (Nthiga, 2018:112). In Barcelona, 70.4% of the hotels indicated that they had notes at key water

consumption points which they were using to educate guests and staff about water conservation (Dinarès and Saurí 2015:638). Not only did they rely on notes but also 59.3% indicated they were training their employees on water conservation and employees where involved water conservation practices through giving advice and action.

In terms of prompt fixing of water leaks farmhouses, hostels, self-catering apartments, and game lodges indicated they were applying this measure more (100%), followed by lodges (88.6%) and hotels (87%). The least in applying this measure was indicated by camps and caravan parks (50%). In Nakuru County, Kenya, prompt repair of water leaks was indicated by 87.4% of four-star hotels. Literature proved that finding water leaks and fixing them can have a huge impact on total water usage in the accommodation sector (Bragiel, 2018).

In terms of the use of organic composting in landscaping the most usage of this measure was by farmhouses, self-catering apartments, and game lodges (100%). This is followed by bed and breakfast (93.8%), hotels (87%), guest houses (85.3%) and lodges (82.9%). The least in applying this measure was indicated by camps and caravan parks (50%). Organic compositing can help to reduce water loss in landscape areas (Gössling *et al.* 2012:4).

In terms of regularly staff updates on water conservation measures, the most usage was by farmhouses, hostels, and self-catering apartments (100%), followed by BnBs (87.5%), hotels (87%) and lodges (85.7%). The least in applying this measure was indicated by camps and caravan parks, inns, and game lodges (50%). In Kenya 81.1% of hotels from Nakuru County indicated that they regularly engage their employees on environmental issues through various awareness campaigns and education programmes. In terms of use of drought resistant plants in landscaping, the most usage was by farmhouses and self-catering apartments (100%). This is followed by BnBs (87.5%), lodges (84.3%), guesthouses (82.4%) and hotels (81.5%). The least usage of this measure was indicated by camps and caravans (50%).

In terms of comparing water consumption over time the most usage of this measure was by hotels (88.9%), BnBs (87.5%), guesthouse (82.4%), lodges (80%) and self-catering apartments (77.8%). The least usage of this measure was indicated by camps and caravans (50%) and game lodges (50%). In terms of harvesting rainwater,

farmhouses and self-catering apartments indicated they were applying this measure more (100%). This is followed by BnBs (93.8%) and hotels (83.3%). Rainwater harvesting is being least used in camps and caravan parks (50%). In terms of low-flow taps, camps and caravans indicated they were using low flow taps (100%). This was followed by self-catering apartments (88.9%), hotels (81.5%) and BnBs (81.3%). The least usage of this measure was indicated by inns (50%).

In terms of monitoring and comparing water consumption across departments, farmhouses and inns indicated they were using this measure more (100%). This is followed by BnBs (93.8%) and hotels (92.6%). The least usage of this measure was indicated by camps and caravan parks and game lodges (50%). Measuring flow rate across departments and reading water meters manually against industry benchmarks is another way of managing water which can help minimize costs and prevent unnecessary water consumption (Styles *et al*.2015:194; Thomas Cook-Futouris, 2015:12).

In terms of use of low-flow showers, camps and caravan parks indicated that they had these installed (100%), followed by self-catering apartments (88.9%), hotels (81.5%) and BnBs (75%). The least usage of this measure was indicated by inns (50%). In Nakuru County, Kenya, Nthiga (2018:111) found that, only 68% of four-star hotels had low-flow showerheads. Low flow showers can reduce water usage by a significant 1 200 litres per room per season (Thomas Cook-Futouris (2015:16). In terms of having a water conservation policy, camps and caravan parks indicated that they had one (100%), followed by hotels (90.7%), BnBs (81.3%) and self-catering apartments (77.8%). The least usage of this measure was indicated by hostels (33.3%). Regular maintenance of swimming pools was undertaken mostly by self-catering apartments (100%), followed by BnBs (87.5%) and hotels (87.5%). The least usage of this measure was indicated by lodges (50%) and camps (0%).

Following the results in Table 4.7, a crosstab was thereafter undertaken to establish water conservation measures by type of accommodation establishment. The crosstab found that there is a positive relationship between accommodation types and water conservation measures ($p \leq 0.05$) in particular with accommodation establishments engaging in basic or soft measures such as prompt fixing of water leaks ($p = 0.005$), rain water harvesting ($p = 0.008$), water conservation policy ($p = .030$), regular

maintenance of swimming pools (p =0.000), water landscape areas in the evening (p =0.001), have towel re-use programmes (p = 0.037), systems to promptly report water leaks (p = .000), use of recycled grey water for irrigation (p =0.000), use organic composting in landscaping (p =0.012) training staff on water conservation (p =0.000), offering staff incentives for water conservation (p = .000), encouraging guests to shower instead of bathing (p =0.037)

The Chi-square analysis ($p \leq 0.05$) also shows strong levels of association between water conservation measures and accommodation types which engage in advanced water conservation measures such as, wastewater treatment (p =0.000), use of flow controllers in plumbing fixtures (p =0.000), having waterless urinals (p = 0.000), installed sensor taps (p =0 .000), sensor-flush toilets (p =0 .000), dual flush toilets (p = 0.005), water efficient appliances (p =0.000), taps with flow timers (p =0.001) and sensors for landscape irrigation (p = 0.000). Similar to the current study, 81.5% of the most applied conservation measures by Barcelona hotels had to do with low flow taps, showers and irrigation management (Dinarès and Saurí 2015:638). The results from Barcelona hotels indicate that 63% of the hotels had low-flow shower heads and flushing toilet systems while 51.9% indicated they had a towel reuse programme. A study conducted in KwaZulu-Natal highlighted that 40% of hotels and lodges indicated that they had installed low-flow taps, 63.3% low-flow showers, 46.7% dual-flush toilets and 88.3% have implemented linen and towel reuse programmes (Sucheran 2013:198). In the current study, use of low-flow taps amongst all types of accommodation totalled 74.9%; low-flow showers totalled 73.9%; reporting of water leaks, 63.1%; dual flush toilets totalled 59.6% and linen reuse programmes 64.5%. When it comes to installation of low flow taps and showerheads, several reasons have been put forward, for example, Dinarès and Saurí (2015:638) note that in Barcelona hotels were pushed by the drought and water stress which were in the region. Similarly, in Zimbabwe there are serious issues when it comes to water stress and droughts, hence, the above water conservation measures were significantly applied, though, in this case, by few accommodation establishments.

Table 4.8: Cross tabulation: Water conservation measures by chain association (n=203)

	Chain	Non-Chain	Chi Square
Water conservation policy	84.2%	67.9%	.110
System for monitoring water usage	76.3%	48.5%	.006*
Compare water consumption over time	81.6%	81.2%	.891
Monitor water consumption across departments	84.2%	72.1%	.186
Low-flow taps	84.2%	72.7%	.338
Waterless urinals	60.5%	35.8%	.019*
Dual-flush toilets	73.7%	56.4%	.146
Low-flow showers	76.3%	73.3%	.490
Sensor-flush toilets	68.4%	28.5%	.000*
Sensor taps	73.7%	29.7%	.000*
Aerated taps	68.4%	46.1%	.044*
Restricted water flow taps	68.4%	62.4%	.786
Taps with low water flow timers	52.6%	31.5%	.045*
Flow controllers in plumbing fixtures	60.5%	37.6%	.026*
Water conservation information leaflets	60.5%	32.1%	.000*
Towel re-use program	44.7%	49.1%	.613
Linen re-use program	65.8%	64.2%	.571
Encourage guests to shower instead of bath	47.4%	46.1%	.554
Rainwater harvesting	76.3%	76.4%	.889
Certification encouraging water conservation	26.3%	18.8%	.350
Promptly report water leaks	81.6%	58.8%	.026*
Promptly fix water leaks	81.6%	87.3%	.656
Regular maintenance of swimming pools	81.6%	67.3%	.222
Water efficient appliances	63.2%	29.7%	.000*
Drinking stations instead of water bottles	65.8%	62.4%	.260
Staff training on water conservation	81.6%	54.5%	.007*

Staff regularly informed water conservation measures	94.7%	80.6%	.101
Staff encouraged to provide solutions on water conservation	92.1%	79.4%	.156
Staff incentives offered for water conservation	44.7%	30.3%	.233
Staff informed about benefits of water conservation	84.2%	87.3%	.872
Sensors for landscape irrigation	55.3%	27.9%	.005*
Water landscape in evenings	57.9%	53.9%	.372
Drought resistant plants in landscaping	86.8%	82.4%	.235
Sprinklers with timers for landscape irrigation	34.2%	19.4%	.075
Recycled grey water for irrigation	76.3%	55.2%	.045*
Organic composting in landscaping	94.7%	81.8%	.131

**Significant values (p<0.05) Chi-square analysis*

Table 4.8 depicts a cross-tabulation showing relationship between water conservation measures and hotel chain affiliation. In this crosstab the study sort to determine which hotel affiliation applied the most water conservation measures. According to results in Table 4.8, chain hotels showed a higher level of implementation on all water conservation measures compared to non-chain hotels except in measures such as, towel reuse programmes, prompt fixing of water leaks and informing staff about benefits of water conservation. These measures were implemented more in non-chain hotel establishments. Chain affiliated hotels are usually ahead when it comes to innovative ways of doing business. This is because they have strong financial and innovative support (Yusof and Jamaludin, 2014:507).

In addition, chain hotels are usually guided by the standards and directives of the chain which they follow in order to meet the demands of their customers and achieve a competitive edge in the industry (Tortilla and Tirado, 2011:2577). Some of the standards prohibit programmes such as towel and linen reuse which may be seen as unhygienic or compromising comfort and luxury which guests seek. Gabarda-Mallorquí, Garcia and Ribas (2017:90) observed that often it is because of these standards that more water is consumed at chain affiliated hotels. However, results in Table 4.8 also show that other water conservation measures were being equally implemented in both chain and non-chain accommodation establishments. These include, comparing water consumption over time, encouraging guests to shower instead of bathing, rainwater harvesting and use of drinking stations instead of water bottles.

In sum, the crosstabulation in Figure 4.8 indicates that water conservation measures were being implemented at a much higher level by chain affiliated hotels than non-chain hotels except for towel reuse programmes which has a slightly higher level of participation from non-chain hotels. More specifically the Chi-square analysis reflects strong associations between chain hotels and water conservation with regards to a number of water conservation measures ($p \leq 0.05$).

The Chi-square analysis was undertaken to establish the association between water conservation and chain affiliation. Statistical significances were found in water conservation measures where the Chi-square test is equal to or less than 0.05 ($p \leq 0.05$). Strong statistical relations were evident between chain and non-chain

accommodation establishments in terms of: a system for monitoring water usage (p=0.006), waterless urinals (p=0.019), sensor flush toilets (p=0.000), sensor taps (p=0.000), aerated taps (p=0.044), taps with low flow timers (p=0.045), flow controllers in plumbing fixtures (p=0.026), water conservation information leaflets (p=0.000), promptly report water leaks (p=0.026), water efficient appliances (p=0.000), staff training on water conservation (p=o.007), sensors for landscape irrigation (p=0.005), and recycled grey water for irrigation (p=0.045). Clearly, most chain hotels implemented advanced and technical water conservation measures including technological changes. Advanced and technical water conservation measures are those which require large sums of money, technical advice and expertise (Tirado *et al.* 2019:4).

Overall results in this study correspond with findings by Sucheran (2013:202) who found that among KZN hotels, affiliated establishments were more involved in water conservation measures, for example, installation of dual flush toilets was done more by chain hotels than independent hotels. In addition, Chen (2019:4) posits that chain hotels are more responsible and efficient when it comes to water conservation than independent hotels. However, Gabarda-Mallorquí, Garcia and Ribas (2017:90) found that hotels affiliated to regional chains and not large international chain hotels were consuming more water than independent hotels. According to Tortilla and Tirado (2011:2577) chain affiliated hotels tend to adhere to a group of set standards for providing services to guests which sometimes contribute to vast water consumption. In the light of this, it has to be acknowledged that most chain hotels in Zimbabwe are affiliated to regional chain organisations not international large chain hotels, hence the possibility of consuming more or less the same amount of water as independent hotels.

Table 4.9: Cross-tabulation: water conservation measures by star grading (n=203)

	1 Star	2 Star	3 Star	4 Star	5 Star	Not graded	Chi square
Water conservation policy	85.7%	82.6%	82.2%	95.0%	100%	53.7%	.000*
System for monitoring water usage	57.1%	73.9%	66.7%	70.0%	100%	35.8%	.001*
Compare water consumption over time	85.7%	82.6%	86.7%	70.0%	100%	78.9%	.556
Monitor water consumption across departments	85.7%	82.6%	82.2%	85.0%	83.3%	64.2%	.385
Low-flow taps	100%	65.2%	75.6%	75.0%	83.3%	72.6%	.326
Waterless urinals	42.9%	39.1%	60.0%	70.0%	66.7%	23.2%	.000*
Dual-flush toilets	71.4%	60.9%	71.1%	85.0%	83.3%	45.3%	.003*
Low-flow showers	78.6%	78.3%	64.4%	85.0%	83.3%	73.7%	.618
Sensor-flush toilets	42.9%	47.8%	62.2%	65.0%	66.7%	11.6%	.000*
Sensor taps	57.1%	47.8%	55.6%	70.0%	83.3%	14.7%	.000*
Aerated taps	71.4%	56.5%	48.9%	65.0%	83.3%	41.1%	.005*
Restricted water flow taps	57.1%	73.9%	64.4%	65.0%	83.3%	60.0%	.234
Taps with low water flow timers	50.0%	56.5%	48.9%	60.0%	83.3%	13.7%	.000*
Flow controllers in plumbing fixtures	71.4%	39.1%	62.2%	60.0%	100%	21.1%	.000*
Wastewater treatment	50.0%	65.2%	75.6%	75.0%	100%	17.9%	.000*
Water conservation information leaflets	50.0%	43.5%	48.9%	50.0%	50.0%	25.3%	.032*
Towel re-use program	50.0%	39.1%	31.1%	30.0%	83.3%	60.0%	.012*
Linen re-use program	28.6%	56.5%	66.7%	50.0%	83.3%	72.6%	.038*
Encourage guests to shower instead of bath	42.9%	43.5%	51.1%	40.0%	66.7%	45.3%	.221
Rainwater harvesting	78.6%	82.6%	82.2%	75.0%	100%	70.5%	.510
Certification encouraging water conservation	14.3%	26.1%	28.9%	50.0%	50.0%	7.4%	.000*
Promptly report water leaks	78.6%	78.3%	84.4%	80.0%	100%	41.1%	.000*
Promptly fix water leaks	78.6%	87.0%	86.7%	80.0%	100%	87.4%	.289
Regular maintenance of swimming pools	85.7%	87.0%	80.0%	75.0%	100%	55.8%	.002*
Water efficient appliances	42.9%	43.5%	51.1%	60.0%	100%	16.8%	.000*
Drinking stations instead of water bottles	71.4%	47.8%	51.1%	50.0%	83.3%	72.6%	.052
Staff training on water conservation	85.7%	65.2%	71.1%	70.0%	100%	44.2%	.000*
Staff regularly informed water conservation measures	85.7%	73.9%	80.0%	85.0%	100%	85.3%	.925
Staff encouraged to provide solutions on water conservation	92.9%	78.3%	82.2%	80.0%	100%	80.0%	.045*
Staff incentives offered for water conservation	50.0%	34.8%	48.9%	55.0%	50.0%	16.8%	.004*
Staff informed about benefits of water conservation	78.6%	87.0%	84.4%	75.0%	100%	90.5%	.539
Sensors for landscape irrigation	35.7%	30.4%	57.8%	70.0%	66.7%	11.6%	.000*
Water landscape in evenings	57.1%	60.9%	44.4%	70.0%	83.3%	52.6%	.278
Drought resistant plants in landscaping	78.6%	78.3%	84.4%	85.0%	83.3%	84.2%	.962
Harvested rainwater for landscape irrigation	71.4%	73.9%	73.3%	75.0%	83.3%	61.1%	.555
Sprinklers with timers for landscape irrigation	14.3%	30.4%	40.0%	40.0%	16.7%	9.5%	.006*
Recycled grey water for irrigation	64.3%	87.0%	88.9%	70.0%	83.3%	33.7%	.000*
Organic composting in landscaping	92.9%	78.3%	86.7%	80.0%	100%	83.2%	.049*

**Significant values (p<0.05) Chi-square analysis*

Table 4.9 depicts the relationship between water conservation measures and hotel star grading. In terms of having a water conservation policy, all graded accommodation establishments (1 to 5 star), indicated that they had a water conservation policy. Only half of ungraded establishments indicated that they had a water conservation policy.

System for monitoring water usage was indicated to be largely undertaken by five-star, four-star and two-star accommodation establishments but to a lesser extent by one-star, three-star, and ungraded accommodation establishments. Comparing water consumption overtime was indicated to be largely undertaken by all accommodation establishments – graded and ungraded. Use of low flow taps was indicated to be largely undertaken by one-star, three-star, four-star and five-star accommodation establishments but to a lesser extent by two-star and ungraded accommodation establishments.

Waterless urinals were indicated to be largely used by 4-star accommodation establishments, while dual flush toilets were largely indicated to be used by four and five-star accommodation establishments. Most accommodation types indicated that they had low flow showers except for three-star and ungraded accommodation establishments which showed slightly lesser percentages in terms of implementation.

Use of sensor taps, aerated taps, restricted water flow taps, taps with low water flow timers, having flow controllers in plumbing fixtures, encouraging guests to shower instead of bath, towel and linen reuse programmes were indicated to be largely used by 5-star accommodation establishments. Use of a wastewater treatment plant was indicated to be practiced by 3-star, 4-star and 5-star accommodation establishments. Moreover, 1-star, 2-star and ungraded accommodation establishments showed slight lesser percentages in implementation.

Rainwater harvesting was indicated to be practiced by all accommodation establishments (one to five-star including ungraded). In terms of prompt reporting of water leaks all graded accommodation establishments indicated that they were using this measure. Only 41.1% of ungraded accommodation establishments indicated that they were using this measure.

Prompt fixing of water leaks was indicated by all accommodation types (graded and ungraded). Regular maintenance of swimming pools was indicated by all graded accommodation establishments (one to five-star).

Use of water efficient appliances and drinking stations instead of water bottles were indicated to be largely used by 5-star accommodation establishments. Staff training on water conservation was largely indicated to be practiced by 5-star accommodation establishments. In terms of encouraging staff to provide solutions on water conservation and regularly informing staff about the importance of water conservation, both graded and ungraded accommodation establishments indicated that they were using these measures. In terms of informing staff about benefits of water conservation, use of drought resistant plants in landscaping and organic composting in landscaping, both graded and ungraded accommodation establishments indicated that they were using these measures to help save water.

Watering landscape in the evening was largely indicated by 5-star accommodation establishments. Harvesting rainwater for landscape irrigation was largely indicated to be used by 4 and 5-star accommodation establishments. Use of grey water for irrigation purposes was largely indicated by 2, 3 and 5-star accommodation establishments. However, there are other water conservation measures which were not fully practiced by both graded and ungraded accommodation establishments. These include the use of water conservation leaflets, use of sensor flush toilets, certification encouraging water conservation, staff incentives encouraging water conservation, use of sprinklers with timers and sensors for landscape irrigation.

Looking closely at each accommodation establishment, data shows that 1-star accommodation establishments were largely involved in the following water conservation measures: installation of low-flow taps (100%); encouraging staff to provide solutions on water conservation (92.9%); use of organic composting in landscaping (92.6%; training staff on water conservation (85.9%); use of water conservation policy (85.7%); comparing water consumption over time (85.7%); monitor water consumption across departments (85.7%); informing staff about benefits of water conservation (78.6%); use of drought resistant plants in landscaping (78.6%); prompt reporting and fixing of water leaks (78.6%) and use of low-flow showers (78.6%).

In addition, 2-star accommodation establishments were not dominant in most water conservation measures but their participation is unquestionable in applying basic water conservation measures like using recycled grey water to irrigate plants (88.9%),

use of organic composting in landscaping (86.7%), informing staff about benefits of water conservation (87%), prompt fixing of water leaks (87%), regular maintenance of swimming pools (87%), use of water conservation policy (82.6%), comparing water consumption over time (82.6%), monitoring water consumption across departments (82.6%), rainwater harvesting (82.6%), use of low flow showers (78.3%), promptly reporting of water leaks (78.3%), encouraging staff to provide solutions on water conservation (78.3%) and using drought resistant plants in landscaping (78.3%).

Regarding ,participation in various activities , 3-star accommodation establishments showed the highest proportion in the following: use of recycled grey water for irrigation (88.9%); use of organic composting in landscaping (86.7%); prompt fixing of water leaks (86.7%); comparing water consumption over time (86.7%); informing staff about benefits of water conservation (84.4%); prompt reporting of water leaks (84.4%); use of drought resistant plants in landscaping (84.4%); having a water conservation policy (82.2%); rainwater harvesting (82.2%); monitoring water consumption across departments (82.2%); encouraging staff to provide solutions on water conservation (82.2%); regular maintenance of swimming pools (80%) regularly informing staff about importance of water conservation measures (80%); use of low-flow taps (75.6%) and use of wastewater treatment (75.6%).

Four star accommodation establishments showed the highest participation in the following measures: water conservation policy (95%); monitoring water consumption across departments (85%); dual-flush toilets (85%); low-flow showers (85%); regularly informing staff about water conservation measures (85%); use of drought resistant plants in landscaping (85%); prompt reporting of water leaks (80%); prompt fixing of water leaks (80%); encouraging staff to provide solutions on water conservation (80%); use of organic composting in landscaping (80%),; low-flow taps (75%); use of wastewater treatment (75%); rainwater harvesting (75%); use of harvested rainwater for landscape irrigation (75%); regular maintenance of swimming pools (75%) and informing staff about benefits of water conservation (75%).

Leading the accommodation types, 5-star accommodation establishments showed the highest levels of participation in the following water conservation measures: water conservation policy (100%); system for monitoring water usage (100%); comparing water consumption over time (100%); flow controllers in plumbing fixtures (100%);

wastewater treatment (100%); rainwater harvesting (100%); prompt reporting of water leaks (100%); prompt fixing water leaks (100%); regular maintenance of swimming pools (100%); water efficient appliances (100%); staff training on water conservation (100%); regularly informing staff about water conservation measures (100%); encouraging staff to provide solutions on water conservation (100%); informing staff about benefits of water conservation (100%); use of organic composting in landscaping (100%); monitoring water consumption across departments (83.3%); use of low-flow taps (83.3%); dual-flush toilets (83.3%) low-flow showers (83.3%); sensor taps (83.3%); aerated taps (83.3%); restricted water flow taps (83.3%); taps with low water flow timers (83.3%); towel re-use programme (83.3%); linen re-use programme (83.3%), drinking stations instead of water bottles (83.3%); watering landscape in the evenings (83.3%); use of drought resistant plants in landscaping (83.3%); use of harvested rainwater for landscape irrigation (83.3%) and use of recycled grey water for irrigation (83.3%).

Overall, results show that four and five-star accommodation establishments participated in most water conservation measures compared to one, two- and three-star hotels. However, it has to be acknowledged that basic water conservation measures such as education and training of guests were applied by all accommodation establishments regardless of category of grading (1 to 5 star) (Sucheran 2013:201).

In addition, results also indicate a lower level of engagement in water conservation measures between graded and ungraded accommodation establishments. Clearly, ungraded accommodation establishments did not participate in most water conservation measures compared to graded accommodation establishments. This could be because graded accommodation establishments having standards to maintain especially when it comes to courtesy and hospitality of guests. Unlike ungraded establishments, graded accommodation establishments need to ensure that their facilities and services are appropriate to meet the category of the establishment.

Having revealed this, the Chi-square analysis undertaken on the data in Table 4.9 to establish the association between water conservation practices and accommodation ratings shows a strong statistical relationship between water conservation measures and accommodation grades in measures such as water conservation policy (p=0.000),

system for monitoring water usage (p=0.001), waterless urinals (p=0.000), dual-flush toilets (p=0.003), sensor-flush toilets (p=0.000), sensor taps (p=0.000), aerated taps (p=0.005), taps with low water flow timers (p=0.000), flow controllers in plumbing fixtures (p=0.000), wastewater treatment (p=0.000), water conservation information leaflets (p=0.032), towel re-use programme (p=0.012), linen re-use programme (p=0.038), certification encouraging water conservation (p=0.000), promptly report water leaks (p=0.000), regular maintenance of swimming pools (p=0.002), water efficient appliances (p=0.000), staff training on water conservation (p=0.000), staff encouraged to provide solutions on water conservation (p=0.045), staff incentives offered for water conservation (p=0.004), sensors for landscape irrigation (p=0.000), sprinklers with timers for landscape irrigation (p=0.006), recycled grey water for irrigation (p=0.000) and organic composting in landscaping (p=.049).

However, evidence from the Chi-square analysis also suggest no relationship exist between the following water conservation practices and accommodation rating): comparing water consumption over time (p=0.556); monitoring of water consumption across departments (p=0.385); availability of low-flow taps (p=0.326); low-*flow* showers (p=0.618); restricted water flow taps (p=0.234); encouraging guests to shower instead of bath (p=0.221); rainwater harvesting (p=0.510); prompt fixing of water leaks (p=0.289); use of drinking stations instead of water bottles (p=0.052); staff regularly informed about water conservation measures (p=0.925); staff informed about benefits of water conservation (p=0.539); watering of landscape areas in the evening (p=0.278); use of drought resistant plants in landscaping (p=0.962) and using harvested rainwater for landscape irrigation (p=0.555).

Evidence from the literature suggests that star rating of an accommodation enterprise determines water usage (Styles *et al*. 2015:189). Gabarda-Mallorquí, Garcia and Ribas (2017:89) observe that hotels with stars were consuming more water than hotels without stars. Oliveira, Pedro, and Marques (2013:642) comment that hotels with more stars usually own high-water intensive facilities. Indeed, Dinarès and Saurí (2015:635) found in Barcelona that 4 and 5- star hotels had water intensive facilities. Similarly, Sucheran (2013:179) noted that in KwaZulu-Natal, hotels and lodges with higher star grading had facilities which consume more water. In the light of this, Dinarès and Saurí (2015:635) conclude that the higher the star rating, the more the facilities, the more the water required to run those facilities. This, however, is not the whole answer as

indications from studies have shown otherwise, including this study. In terms of investment and efficiency in water conservation practices it has been widely acknowledged that higher category accommodation establishments invest more in both basic and advanced water conservation practices. In Spain, Dinarès and Saurí (2015:644) found that higher category accommodation establishments were investing more in environmental practices. Sucheran (2013:201) for example found that in KwaZulu-Natal, South Africa installation of dual flush toilets had been applied more by hotels with 4 and 5-star ratings than those graded 1, 2 and 3-star.

Not only were applications limited to dual flush toilets, Sucheran (2013:201) also found that measures such as low flow taps were not applied in 1-star accommodation establishments. The conclusion attributed to this was the lack of human and financial resources to install and maintain these systems. The latter result is supported by Gabarda-Mallorquí, Garcia and Ribas (2017:89) who found that large hotels had technical staff who were working in departments such as maintenance to help address water related issues like leaks. Lack of experts was indicated as a drawback to water conservation by accommodation managers in Malaysia (Yusof and Jamaludin, 2014:507).

Table 4.10: Cross-tabulation: water conservation measures by period of operation (n=203)

	Less than 1 year	1-5 years	6-10 years	> 10 years	Chi square
Water conservation policy	100%	59.6%	68.4%	77.3%	.020*
System for monitoring water usage	66.7%	32.7%	52.6%	65.9%	.000*
Compare water consumption over time	83.3%	80.8%	75.4%	85.2%	.089
Monitor water consumption across departments	83.3%	57.7%	71.9%	85.2%	.183
Low-flow taps	66.7%	78.8%	75.4%	72.7%	.392
Waterless urinals	50.0%	38.5%	26.3%	50.0%	.000*
Dual-flush toilets	50.0%	53.8%	50.9%	69.3%	.000*
Low-flow showers	83.3%	76.9%	68.4%	75.0%	.056
Sensor-flush toilets	33.3%	23.1%	31.6%	46.6%	.000*
Sensor taps	50.0%	21.2%	33.3%	50.0%	.000*
Aerated taps	100%	34.6%	43.9%	60.2%	.007*
Restricted water flow taps	83.3%	57.7%	63.2%	65.9%	.141
Taps with low water flow timers	33.3%	17.3%	31.6%	48.9%	.000*
Flow controllers in plumbing fixtures	66.7%	23.1%	42.1%	51.1%	.000*
Wastewater treatment	66.7%	26.9%	40.4%	60.2%	.000*
Water conservation information leaflets	83.3%	36.5%	35.1%	36.4%	.013*
Towel re-use program	66.7%	63.5%	52.6%	35.2%	.414
Linen re-use program	66.7%	69.2%	66.7%	60.2%	.584
Encourage guests to shower instead of bath	33.3%	48.1%	50.9%	43.2%	.537
Rainwater harvesting	100%	69.2%	82.5%	75.0%	.211
Certification encouraging water conservation	66.7%	17.3%	21.1%	18.2%	.002*
Promptly report water leaks	83.3%	46.2%	57.9%	75.0%	.000*
Promptly fix water leaks	83.3%	90.4%	87.7%	83.0%	.064
Regular maintenance of swimming pools	50.0%	59.6%	66.7%	79.5%	.011*
Water efficient appliances	50.0%	26.9%	31.6%	43.2%	.000*
Drinking stations instead of water bottles	33.3%	71.2%	73.7%	53.4%	.586
Staff training on water conservation	83.3%	50.0%	52.6%	68.2%	.039*
Staff regularly informed water conservation measures	83.3%	76.9%	89.5%	83.0%	.609
Staff encouraged to provide solutions on water conservation	83.3%	78.8%	80.7%	84.1%	.229
Staff incentives offered for water conservation	50.0%	26.9%	33.3%	35.2%	.044*
Staff informed about benefits of water conservation	83.3%	86.5%	86.0%	87.5%	.045*
Sensors for landscape irrigation	66.7%	21.2%	31.6%	38.6%	.001*
Water landscape in evenings	33.3%	48.1%	57.9%	58.0%	.931
Drought resistant plants in landscaping	50.0%	82.7%	84.2%	85.2%	.784
Harvested rainwater for landscape irrigation	66.7%	61.5%	64.9%	73.9%	.550
Sprinklers with timers for landscape irrigation	50.0%	17.3%	28.1%	19.3%	.019*
Recycled grey water for irrigation	83.3%	38.5%	57.9%	70.5%	.000*
Organic composting in landscaping	83.3%	80.8%	84.2%	86.4%	.418

**Significant values (p<0.05) Chi-square analysis*

Table 4.10 reflects the data on the cross-tabulation between water conservation measures by number of years in operation. The reason for this cross tabulation is to assess whether older or newer hotels are more involved in applying water conservation measures. According to Table 4.10 accommodation establishments that have been in operation for less than one year observed the following water conservation measures better than the rest: water conservation policy (100%); system for monitoring water usage (66.7%); waterless urinals (50%); use of low-flow showers (83.3%); sensor taps (50.0%); aerated taps (100%); restricted water flow taps (83.3%); flow controllers in plumbing fixtures (66.7%); wastewater treatment (66.7%); use of water conservation information leaflets (83.3%); towel re-use program (66.7%); rainwater harvesting (100%); prompt reporting of water leaks (83.3%); staff training on water conservation (83.3%); use of sensors in landscape irrigation (66.7%;, sprinklers with timers for landscape irrigation (50.0%) and use of recycled grey water for irrigation (83.3%).

Compared to others, accommodation establishments that have been in operation between 1 and 5 years revealed the highest levels of water conservation in measures such as prompt fixing of water leaks (90.4%), use of low-flow taps (78.8%) and linen re-use program (69.2%). In addition, accommodation establishments that have been in operation between 6 and 10 years showed prominence in applying the following water conservation measures: regularly informing staff about water conservation measures (89.5%) and encouraging guests to shower instead of bath (50.9%).

Lastly, accommodation establishments that were in operation for more than ten years, showed high levels of water conservation in a number of measures such as comparing water consumption over time (85.2%), monitoring water consumption across departments (85.2%), waterless urinals (50.0%), dual-flush toilets (69.3%), sensor-flush toilets (46.6%), sensor taps (50.0%), taps with low water flow timers (48.9%), regular maintenance of swimming pools (79.5%), encouraging staff to provide solutions on water conservation (84.1%), informing staff about benefits of water conservation (87.5%), water landscape in evenings (58.0%), drought resistant plants in landscaping (85.2%), harvested rainwater for landscape irrigation (73.9%) and organic composting in landscaping (86.4%).

Overall, evidence from Table 4.10 reveal that newer accommodation establishments that are less than a year old or less than 5 years old have higher levels of engagement in water conservation practices than older accommodation establishments. This confirms what was mentioned in the literature that due to climate change, droughts and water stress in Zimbabwe, organisations are slowly applying water conservation measures which are cost effective and sustainable (Davis and Harji 2014:10; Dinarès and Saurí 2015:638). Indeed, just by looking at the results, data shows that older accommodation establishments are slowly adopting to new technology and new ways of managing water. In their studies Karimi (2014:98) and Rico *et al*. (2020:775) also found similar patterns where retrofitting of water systems was taking place at older hotels which were seeking to cut costs, adapt and mitigate climate change. In Kenya only 40% of the hotels that have been in operation for between 20 and 29 years were applying water conservation measures (Karimi, 2014:104).

While older hotels are retrofitting and renovating, new accommodation establishments, are by design considering water saving technologies in their architecture. This is confirmed by the number of water conservation measures which accommodation establishments which have been in business for less than a year indicated. However, technology and retrofitting are not the only cause for water conservation at accommodation establishments. A study by Arulappan (2017:59) found that well established tourism organisations whose operations spanned beyond 6 years had, for example, ecolabels or were signatories to some certification programme which was encouraging them to engage in environmentally friendly practices. In this current study, certification encouraging water conservation was seen as dominant with new organisations which have been in operation for less than a year having a positive relationship with the number of years in operation according to the Chi-square test ($p=0.002$). Gabarda-Mallorquí, Garcia and Ribas (2017:89) found that accommodation establishments without environmental certification were using more water than those certified. Along with authors such as Styles *et al*. (2015:194) this study found that the number of years in operation can push accommodation establishments to reduce costs from water consumption.

The Chi-square analysis results indicated in Table 4.10 indicates a significant association between years of operation of accommodation establishments on a number of water conservation measures including water conservation policy

(p=0.020), system for monitoring water usage (p=0.000), waterless urinals (p=0.000), dual-flush toilets (p=0.000), sensor-flush toilets (p=0.000), sensor taps (p=0.000), aerated taps (p=0.007), taps with low water flow timers (p=0.000), flow controllers in plumbing fixtures (p=0.000), wastewater treatment (p=0.000), water conservation information leaflets (p=0.013), certification encouraging water conservation (p=0.002), prompt reporting of water leaks (p=0.000), regular maintenance of swimming pools (p=0.011), water efficient appliances (p=0.000), staff training on water conservation (p=0.039), staff incentives offered for water conservation (p=0.044), informing staff about benefits of water conservation (p=0.045), sensors for landscape irrigation (p=0.001), sprinklers with timers for landscape irrigation (p=0.019) and use of recycled grey water for irrigation (p=0.000). This helps to confirm what was said in the literature that newer hotels have higher levels of water conservation than older hotels because of technology.

Table 4.11: Perceived benefits of water conservation at accommodation establishments (n=203)

Benefits	Yes	Unsure
Improves the image	54.2%	45.8%
Increases customer loyalty	49.8%	50.2%
Increases profitability	77.8%	22.2%
Helps gain a competitive advantage	73.4%	26.6%
Improves public relations	36.9%	63.1%
Reduces operational costs	77.8%	22.2%
Improves environmental sustainability	67.5%	32.5%
Improves investor relations	28.1%	71.9%

Table 4.11 depicts the data on the perceived benefits of water conservation at accommodation establishments. The majority of accommodation establishments (77.8%) indicated that they believe that water conservation reduces their operational costs, whilst 22.2% were unsure. In Barcelona, 85.2% of hotels indicated that their main reason for applying water conservation measures was to reduce operational costs (Dinarès and Saurí 2015:633). Rico *et al.* (2020:779) found that reduction of costs was the major reason why accommodation establishments in Benidorm, Spain engaged in water conservation practices. Similar results by Sucheran (2013:204) indicates that 73.4% of hotels and lodges in KwaZulu-Natal, South Africa mentioned

they engage in environmental practices to reduce operational cost. Almost sixty-two percent (61.7%) of them believe by engaging in environmentally friendly practices chances are that they may increase their profitability. According to Mbasera *et al.* (2018:8) reducing water usage helps to cut costs in hotels.

A large proportion of establishments (73.4%) stated that it helps them gain a competitive advantage, and 26.6% were unsure. The need to gain a competitive advantage was cited as one of the reasons why accommodation establishments introduce water saving measures (Tortella and Tirado, 2011:2578; Mbasera *et al*. 2018:10). Seventy percent (70%) of hotels and lodges in KwaZulu Natal, South Africa indicated that they engage in environmental practices to gain a competitive advantage (Sucheran 2013:204). This is supported by literature reviewed in this study in which the argument was that accommodation establishments engage in water saving measures to strategically outcompete their competitors (Tortella and Tirado 2011:2578).

Accommodation establishments confirmed that water conservation helps improve environmental sustainability (67.5%) and 32.5% were unsure. Environmental sustainability has been widely recommended as the most effective way accommodation establishments can show guests and communities their commitment to green practices (Millar and Baloglu 2011:307; Merli *et al*. 2019:170). Ding and Ghosh (2017:4) comment that sustainable water management helps to ensure rationality and responsibility in areas where water is used. In the interviews undertaken with industry stakeholders there was consensus that lack of water conservation in the accommodation sector in Zimbabwe affects communities (100%).

Slightly over fifty-four percent (54.2%) of accommodation establishments indicated that they believe water conservation improves their corporate image while 45.8% where unsure. Over ninety percent (91.6%) of hotels and lodges in KwaZulu- Natal, South Africa indicated that their engagement in environmental practices was motivated by their need to improve their corporate image (Sucheran, 2013:204). Studies show that guests are most likely going to return to accommodation establishments that engage in eco-friendly practices (Merli *et al*. 2019:176). According to Dinarès and Saurí (2015:9) good organisational image produces word of mouth advertisement.

Accommodation establishments indicated that water conservation at accommodation establishments increases customer loyalty (49.8%); 50.2% were unsure. 53.3% of hotels and lodges in KwaZulu-Natal, South Africa indicated that their engagement in environmental practices was motivated by their need to improve customer loyalty (Sucheran, 2013:204). Merli *et al*. (2019:170) comment that going forward, green practices will be a new way of acquiring customers and a strategy for increasing market shares. According to Tortella and Tirado (2011:2578) accommodation establishments that seek to improve customer loyalty should improve their management of processes especially water and energy management.

Almost forty percent (36.9%) indicated they believe water conservation measures improves public relations and 63.1% were unsure. In KwaZulu- Natal, South Africa 58.3% of hotels and lodges indicated that their engagement in environmental practices was motivated by the need to improve relations with the local community (Sucheran 2013:204). Accommodation establishments that indicated they believed water conservation practices improves investor relations comprised 28.1% and 71.9% were unsure. Environmental practices can appeal to investors by making the concept attractive to socially active investors (Styles *et al*. 2015:200).

In the interviews, key tourism industry stakeholders mentioned the following benefits of water conservation: first, it encourages preservation of the scarce resource for the benefit of biodiversity especially aquatic animals which will not be robbed of their habitat. Secondly, it also encourages growth of the accommodation sector in a more scenic and sustainable way. Thirdly, it lessens pressure on local authorities which will then supply more water to residential areas. Fourth, water conservation encourages equal distribution of water between tourism and other important sectors of the economy such as agriculture. Lastly, it encourages development of the industry and reduces long term expenses which may come as a result of water contamination.

Table 4.12: Challenges facing water conservation at accommodation establishments (n=203)

Challenges	Yes	No
High costs associated with water conservation measures	72.9%	27.1%
Lack of funding	69.5%	30.5%
Lack of regulations for water conservation	61.1%	38.9%
Lack of awareness	50.2%	49.8%
Lack of specialised staff	49.3%	50.7%
See no economic benefits from water conservation	9.4%	90.6%
Water conservation not important	4.4%	95.6%

Table 4.12 depicts challenges affecting water conservation at accommodation establishments in Zimbabwe. While the majority (72.9%) of accommodation establishments highlighted high costs as the greatest challenge affecting their engagement in water conservation, 27.1% indicated that costs associated with water conservation were not a problem. Results in this study correspond with the literature reviewed in Chapter 2 in which it was established that most problems associated with water management within the accommodation and lodging industry were associated with high initial costs (LaVanchy, 2017:45). Initial costs are always the problem; maintenance costs for green practices are considered to be low (Yusof and Jamaludin, 2014:507).

Accommodation establishments indicated that lack of funding was a challenge (69.5%), however, 30.5% indicated it was not a problem to them. When it comes to funding of green initiatives it is mostly independent accommodation establishments that feel the pinch because they do not have backup funds (Yusof and Jamaludin, 2014:507). In Malaysia, Yusof and Jamaludin (2014:507) found that chain affiliated hotels had strong financial support, hence, implementation of green practices was not problem. During interviews undertaken with key tourism industry stakeholders, participants indicated that they have been putting the following measures in place to encourage water conservation: pushing for green practices through tourism policy (20%) and encouraging water conservation through education to all necessary stakeholders and society included (40%). However, the remaining 40% indicated that they have not been able to do much with specific reference to the accommodation sector because of lack of resources to implement what is on paper.

While 61.1% of accommodation establishments indicated that lack of regulations on water conservation was their challenge, 38.9% indicated that it was not. Interestingly, these results correspond with findings by Sucheran (2013:208) where 66.7% of hotels and lodges in KwaZulu- Natal cited lack of legislation as one of their obstacles to engaging in environmentally friendly practices. LaVanchy (2017:45) also found that lack of regulations was also a problem in Nicaragua. Enforced regulations are very important because they help to guide industries and address environmental challenges (UNWTO, 2018:14). In Zimbabwe regulations are there but some of them require changes and enforcement (Davis and Harji, 2014:40). Eighty percent of industry experts interviewed for this study mentioned that they believe little was being done to ensure there is proper water conservation in the accommodation sector in Zimbabwe. Twenty percent of the interviewees, however, said that there was no lagging behind of any sort in the accommodation sector in Zimbabwe; water conservation was happening through use of boreholes which most accommodation establishments were using to mitigate climate change. Earlier in this study it was mentioned that too much reliance on borehole water reduces groundwater and may lead to contamination of wells.

Lack of awareness was indicated by 50.2% against 49.8%. This is not far from what was found in other countries and regions. In KZN, South Africa, for example,68.4% of hotels and lodges pointed lack of adequate knowledge as a barrier to implementation of environmental programmes (Sucheran 2013:208). In the United Arab Emirates (UAE), Al-Aomar and Hussain (2017:77) found that about 63% of accommodation managers indicated that they were aware of green practices. In Malaysia, accommodation managers indicated that they were learning about green operations through the internet (Yusof and Jamaludin, 2014:507). In general, and in this particular case, awareness should, however, be looked at as a broad term especially considering that one has to be knowledgeable about costs, consumer behaviour and green practices. Gössling *et al.* (2012:13) identified for instance that inadequate knowledge on costs involved and inadequate knowledge on compliance outcomes were challenges facing most tourism organisations. In addition, Sucheran (2013:235) identified lack of awareness about consumer behaviour as a problem for not implementing environmentally friendly practices.

The other challenge identified was lack of specialised staff 49.3% against 50.7% who disagreed. Lack of green experts was also mentioned as a challenge by a majority of managers in Malaysia (Yusof and Jamaludin, 2014:507). In KZN, South Africa, 38.3% indicated lack of specialised staff as a barrier to implementation of environmental programs (Sucheran, 2013:208). In the UAE Al-Aomar and Hussain (2017:78) also identified lack of specialists as a challenge for not implementing green practices. According to Fraj, Matute and Melero (2015:38) organisations need to develop structures that encourage new ideas, learning and innovation especially ensuring employees have access to relevant environmental information.

Accommodation that see no economic benefits from water conservation were only 9.4% against 90.6%. According to Kirk (1996:44) and Styles *et al*. (2015:200) it is only through application of water conservation measures that economic benefits can be realised. Overall, challenges affecting Zimbabwean accommodation establishments are emanating from almost similar sources as were found among KZN hotels and lodges by Sucheran (2013:208) including lack of government assistance, poor economic climate, and insufficient resources.

Table 4.13: Cross-tabulation: extent to which water conservation measures have reduced water usage (n=203)

Water conservation measures	Major reduction in water consumption	Moderate reduction in water consumption	No reduction in water consumption	Not applicable	Chi Square
Sensor-flush toilets	75.3%	16.4%	2.7%	5.5%	.000*
Flow controllers in plumbing fixtures	75.3%	12.9%	2.4%	9.4%	.000*
Water efficient appliances	75.3%	15.1%	2.7%	6.8%	.000*
Taps with low water flow timers	75.0%	13.9%	4.2%	6.9%	.000*
Sensors for landscape irrigation	74.6%	13.4%	1.5%	10.4%	.000*
Sensor taps	74.0%	14.3%	5.2%	6.5%	.000*
Wastewater treatment	72.3%	19.1%	3.2%	5.3%	.000*
Staff training on water conservation	71.1%	21.5%	1.7%	5.8%	.000*
Promptly report water leaks	70.3%	20.3%	2.3%	7.0%	.000*
Sprinklers with timers for landscape irrigation	68.9%	17.8%	2.2%	11.1%	.015*
Waterless urinals	68.3%	20.7%	4.9%	6.1%	.002*
System for monitoring water usage	67.0%	22.0%	3.7%	7.3%	.000*
Recycled grey water for irrigation	66.7%	21.7%	3.3%	8.3%	.000*
Water conservation information leaflets	65.8%	23.7%	2.6%	7.9%	.003*
Regular maintenance of swimming pools	65.5%	26.8%	1.4%	6.3%	.000*
Harvested rainwater for landscape irrigation	65.2%	26.1%	1.4%	7.2%	.000*
Dual-flush toilets	63.6%	26.4%	3.3%	6.6%	.004*
Certification encouraging water conservation	63.4%	26.8%	2.4%	7.3%	.735
Water conservation policy	61.8%	27.1%	2.8%	8.3%	.001*
Aerated taps	61.8%	29.4%	2.9%	5.9%	.056
Rainwater harvesting	60.0%	31.0%	1.9%	7.1%	.009*
Restricted water flow taps	59.7%	33.3%	3.1%	3.9%	.001*
Staff incentives offered for water conservation	59.7%	23.9%	3.0%	13.4%	.169
Low-flow taps	59.2%	34.9%	1.3%	4.6%	.000*
Staff regularly informed water conservation measures	58.6%	34.9%	1.2%	5.3%	.000*
Low-flow showers	57.3%	35.3%	2.7%	4.7%	.010*
Monitor water consumption across departments	57.0%	33.1%	2.6%	7.3%	.260
Water landscape in evenings	56.8%	36.0%	1.8%	5.4%	.050

Promptly fix water leaks	56.6%	35.4%	1.7%	6.3%	.001*
Staff encouraged to provide solutions on water conservation	56.0%	35.5%	2.4%	6.0%	.011*
Drought resistant plants in landscaping	55.6%	36.1%	1.8%	6.5%	.005*
Compare water consumption over time	55.2%	35.2%	1.8%	7.9%	.000*
Organic composting in landscaping	55.0%	35.1%	2.3%	7.6%	.129
Staff informed about benefits of water conservation	54.0%	37.5%	1.7%	6.8%	.001*
Drinking stations instead of water bottles	53.9%	39.8%	1.6%	4.7%	.000*
Encourage guests to shower instead of bath	51.1%	41.5%	1.1%	6.4%	.000*
Linen re-use program	45.0%	46.6%	1.5%	6.9%	.000*
Towel re-use program	44.9%	50.0%	1.0%	4.1%	.000*

**Significant values ($p<0.05$) Chi-square analysis*

Table 4.13 depicts a cross tabulation showing extent to which water conservation measures have successfully reduced water usage. The reason for this crosstab is to identify, which measures are proving to be effective in reducing water usage at accommodation establishments in Zimbabwe. Overall results from Table 4.13, show that all water conservation measures resulted in major reductions in water usage, except for the linen and towel reuse programmes which generated moderate reductions in water usage. However, to be more specific, major reductions in water usage were largely visible at accommodation establishments which apply the following water conservation measures: water efficient appliances (75.3%); flow controllers in plumbing fixtures (75.3%); sensor flush toilets (75.3%); sensors for irrigation (74.6%); wastewater treatment (72.3%); staff training on water conservation (71.1%) and prompt reporting of water leaks (70.3%).

In addition, and though to a lesser extent, major reductions were also identified at accommodation establishments which engage in the following measures: sprinklers with timers for landscape irrigation (68.9%); waterless urinals (68.3%); water conservation information leaflets (65.8%); regular maintenance of swimming pools (65.5%); use of harvested rainwater for landscape irrigation (65.2%); dual-flush toilets (63.6%); certification encouraging water conservation (63.4%); water conservation policy (61.8%); aerated taps (61.8%) and rainwater harvesting (60.0%).

Other measures indicated by accommodation establishments to be useful were: use of restricted water flow taps (59.7%); use of staff incentives to encourage water conservation (59.7%); low-flow taps (59.2%); regularly informing staff about water conservation measures (58.6%); low-flow showers (57.3%); monitoring water consumption across departments (57.0%); watering landscape in evenings (56.8%); prompt fixing water leaks (56.6%); encouraging staff to provide solutions on water conservation (56.0%); use of drought resistant plants in landscaping (55.6%); comparing water consumption over time (55.2%); use of organic composting in landscaping (55.0%); informing staff about benefits of water conservation (54.0%); use of drinking stations instead of water bottles (53.9%) and encourage guests to shower instead of bathing (51.1%).

Generally, most measures proved to be effective in reducing water usage at accommodation establishments. Indeed, hotels throughout the world are reporting

how application of basic and technical water conservation measures are bringing about major to moderate reductions in water usage. Water conservation measures such as towel and linen reuse programmes have for instance been identified by most accommodation establishments as effective tools for reducing water consumption. In this study, evidence proved that most accommodation establishments are indeed seeing major to moderate reductions in water usage from towel and linen reuse programmes.

Moreover, the Chi-square analysis shows a strong relationship that exists between all water conservation measures and reduction in water usage at accommodation establishments. An exception is only on a few water conservation measures in which the Chi-square is greater than 0.05 ($p>0.05$). These exceptional measures include certification encouraging water conservation ($p=.735$), use of aerated taps ($p=.056$), staff incentives offered for water conservation ($p=.169$), monitoring water consumption across departments ($p=.260$) and use of organic composting in landscape areas ($p=.129$). Reasons for these results can range from that fewer organisations have joined certification programmes; some organisations may be financially stable to engage in staff incentives and monitoring programmes.

Overall, findings in this study are supported in the results of several scholars who have advocated the importance of use of all the identified water conservation measures. Sloan, Legrand, and Chen (2013:99) for example suggests that use of aerated taps can reduce water usage by a potential 5 litres per minute. Baker, Davis and Weaver (2014:97); Rahman and Reynold (2016:108) and Rico *et al*. (2020:775) advocated for technological changes in guestrooms and common areas including use of low flow showers, dual flush toilets, drip irrigation systems, towel and linen reuse programmes as effective in reducing water usage. In KZN, South Africa, Sucheran (2013:198) found that proper maintenance of landscape areas reduces water usage. In Kenya, Karimi (2014:106) found that conventional or basic measures were being used to conserve water in coastal Kenya including maintenance of water leaks, harvesting of rainwater and use of indigenous plants which minimise water consumption. These measures were however bringing about moderate reductions in water usage (Karimi 2014:108). Additional results from Table 4.13 correspond again with findings by Frag, Mature and Melero (2015:38) who advocate for measures such as engagement and involvement of employees in environmental management practices as a way to help reduce water.

In addition, measures such as use of grey water support findings by Styles, Schönberger and Galvez-Martos (2015:193) who indicate that there is a potential saving of 15 543 m^3/year if and when grey water is used to flush toilets and other things at a 100-room hotel. Other researchers including Gössling *et al.* (2012:11) also allude to the potential of using grey water to save fresh water.

Table 4.14 Cross-tabulation: The extent of reduction in water usage by type of accommodation establishment (n=203)

	Major reduction	Moderate reduction	No reduction	Not applicable	Chi Square
Guesthouse	58.8%	17.6%	5.9%	17.6%	.000*
Hotel	66.7%	22.2%	3.7%	7.4%	
Lodge	28.6%	64.3%	0.0%	7.1%	
Bed & Breakfast	75.0%	12.5%	0.0%	12.5%	
Camp & Caravan Park	0.0%	100.0%	0.0%	0.0%	
Farmhouse	66.7%	33.3%	0.0%	0.0%	
Hostel	100.0%	0.0%	0.0%	0.0%	
Inn	50.0%	25.0%	25.0%	0.0%	
Self-catering	88.9%	0.0%	0.0%	11.1%	
Game lodge	37.5%	62.5%	0.0%	0.0%	

**Significant values (p<0.05) Chi-square analysis*

Table 4.14 depicts a cross-tabulation showing the extent of reduction in water usage by type of accommodation establishment. The reason for this crosstab is to identify which accommodation types are seeing major reductions in water usage.

According to Table 4.14, in terms of major reductions in water usage by accommodation type, hostels, self-catering apartments, bed and breakfast and hotels indicated that they were seeing major reductions in water usage than other types of establishments.

Moderate reductions in water usage were identified by camp and caravan parks, lodges and game lodges. No reductions in water usage were mentioned largely by inns and to a very minor extend by guesthouses and hotels.

Overall, the Chi-Square analysis ($p \leq 0.05$) shows a strong relationship exists between reduction in water usage and type of accommodation establishment.

Table 4.15 Cross-tabulation: The extent of reduction in water usage by accommodation grading (n=203)

	Major reduction	Moderate reduction	No reduction	Not applicable	Chi square
One-star	78.6%	21.4%	0.0%	0.0%	.000*
Two-star	52.2%	21.7%	4.3%	21.7%	
Three-star	64.4%	20.0%	2.2%	13.3%	
Four-star	60.0%	20.0%	15.0%	5.0%	
Five-star	83.3%	16.7%	0.0%	0.0%	
Not graded	38.9%	54.7%	0.0%	6.3%	

**Significant values (p<0.05) Chi-square analysis*

Table 4.15 depicts a cross-tabulation showing the extent of reduction in water usage by accommodation grading. The reason for this crosstab is to identify which category of accommodation establishment is seeing major reductions in water usage. In terms of major reductions in water usage by accommodation establishment, five-star accommodation establishment indicated that they were seeing major reductions in water usage. That was followed by one-star, three-star four stand and two-star accommodation establishments.

Moderate reductions in water usage were identified largely by ungraded accommodation establishments. No reductions in water usage were identified largely by four-star accommodation establishments. Overall, the Chi-Square analysis shows a strong relationship exists between reductions in water usage and accommodation grading ($p \leq 0.05$).

Table 4.16 Cross-tabulation: The extent of reduction in water usage by accommodation chain (n=203)

	Major reduction	Moderate reduction	No reduction	Not applicable	Chi Square
Chain	57.9%	26.3%	5.3%	10.5%	.356
Non-chain	50.9%	38.8%	1.8%	8.5%	

Table 4.16 depicts a cross-tabulation showing the extent of reduction in water usage by accommodation chain. The reason for this crosstab is to identify which category of accommodation establishment is seeing major reductions in water usage. In terms of major reductions in water usage by chain affiliation, five-star accommodation establishment indicated that they were seeing major reductions in water usage. Both chain and non-chain accommodation establishments indicated that they were seeing major reduction in water usage. Moderate reductions in water usage were identified to a lesser extent by non-chain accommodation establishments. No reductions in water usage were identified to a minor extent by both chain and non-chain accommodation establishments. Overall, the Chi-Square analysis shows no relationship between the reduction of water usage between chain and non-chain accommodation establishments ($p > 0.05$).

Table 4.17 Cross-tabulation: The extent of reduction in water usage by duration of implementation of water conservation measures (n=203)

Duration	Major reduction	Moderate reduction	No reduction	Not applicable	Chi square
Less than 1 year	66.7%	33.3%	0.0%	0.0%	.000*
1-3 years	40.9%	54.5%	0.0%	4.5%	
4-6 years	48.3%	46.7%	0.0%	5.0%	
7-9 years	50.0%	35.7%	7.1%	7.1%	
More than 9 years	64.4%	23.7%	5.1%	6.8%	
N/A	50.0%	5.0%	5.0%	40.0%	

**Significant values (p<0.05) Chi-square analysis*

Table 4.17 depicts a cross-tabulation showing the extent of reduction in water usage by duration of application of water conservation measures. The reason for this crosstab is to identify progress in water reductions by duration of implementing water conservation measures. In terms of major reductions in water usage, accommodation establishments which applied water conservation measures about a year ago indicated they were seeing much progress than the rest. These were followed by those who started implementing water conservation measures for more than 9 years, 7-9 years, 4-6 years and lastly 1-3 years. Moderate reductions in water usage were identified to a greater extent by accommodation establishments which began implementing water conservation measures 1-3 years ago. These are followed by those which started to implement water conservation measures 4-6 years, 7-9 years, less than a year and lastly more than 9 years ago. No reduction in water usage was reported to a lesser extent by establishments which began to implement water conservation measures at least 7 years ago.

Having revealed this, by and large, evidence from Table 4.17 distinguishes between older and newer hotels – between experience and renaissance of modern architecture through the adoption of modern technologies. Overall, the Chi-Square analysis shows a strong relationship exists between reduction in water usage and duration of application of water conservation measures ($p \leq 0.05$).

4.4 Conclusion

This chapter presented results of data collected from interviews undertaken with key tourism stakeholders as well as the formal study conducted at accommodation

establishments in Zimbabwe. The aim of the study which was to examine the nature and extent of water management practices in the accommodation sector in Zimbabwe was answered through presentation, interpretation, and discussion of results in diverse manners. The chapter focused on establishing linkages between primary data, secondary data from literature, as well as objectives and variables of the study. Arguments and conclusions from literature supported research findings in this study through interpretation and discussion of results. The next chapter, Chapter 5, provides recommendations and conclusions based on the study's findings. Furthermore, managerial implications and suggestions for future researchers will also be discussed together with other international ideas.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This study on the nature and extent of water management practices in the accommodation sector in Zimbabwe argued that effective management of water at accommodation establishments in Zimbabwe is critical for the growth of tourism the industry and realisation of the green economy. Despite the impacts of the tourism sector in Sub-Saharan Africa, it was established that there is limited understanding of water management practices currently taking place in the accommodation sector. This chapter is dedicated to providing a conclusion of the study with brief analysis and discussion of results which answered the objectives of the study. The chapter also offers recommendations for resolving issues raised in the problem statement and recommendations for future studies on the subject of water management in the accommodation sector. The chapter is, therefore, presented according to the objectives of the study. First, the chapter discusses key findings on the level of water consumption and sources of water for the accommodation sector in Zimbabwe. Secondly, the chapter focuses on the type of water management practices currently being undertaken by the accommodation sector. Thirdly, the chapter reports on the challenges facing water conservation in the accommodation sector as well as the benefits of water conservation in the accommodation sector in Zimbabwe.

5.2 Summary of key findings

This section of the chapter provides a summary of the key findings of the study according to the objectives and research questions that were raised in Chapter 1.

5.2.1 Objective one: Level of water consumption and sources of water for the accommodation sector in Zimbabwe.

The purpose of this objective was to ascertain the amount of water accommodation establishments in Zimbabwe use and the sources of water they use to draw their water from. This objective sort to understand how certain characteristics of the

accommodation sector such as the number of rooms, number of facilities, type of guests, number of years in operation, and chain affiliation affects water usage.

5.2.1.1 Characteristics of the accommodation establishments in Zimbabwe

Characteristics of accommodation establishments include issues such as information on the accommodation type, accommodation grading/rating, chain affiliation, carrying capacity, facilities available, years in operation, key market segment, and visitor type.

The study found that the majority of accommodation establishments were lodges, hotels, guesthouses and bed and breakfast. These establishments constituted over eighty percent of the types of accommodation and lodging providers registered in the country. In terms of water usage, the study established that hotels and lodges consumed more water than the other types of accommodation establishments. Size, number of rooms and number of facilities available were noticeable factors contributing to water usage between lodges, hotels, guesthouses and bed and breakfast establishments. Uncontrolled water usage by guesthouses, hotels, lodges and bed and breakfast accommodation exacerbates water stress at destination level.

In terms of numbers, it was established that there were more small-medium sized accommodation establishments in Zimbabwe compared to large size accommodation establishments. To this effect, the study found that small and medium-sized accommodation establishments consumed more water because they were the majority and, proportionately they had more rooms than large hotels. However, on the other hand, large accommodation establishments also consumed more water because they had a significant number of rooms plus water-consuming facilities such as golf courses, kitchens, laundries, restaurants, swimming pools, and gardens. Following this exposé, the study established that large scale hotel operations lead to consumption of more water.

Water demand is linked to the size and type of water using facilities found at accommodation establishments. The availability of large-scale water-using facilities is, therefore, considered a threat to water conservation. Results from this study indicate that the majority of accommodation establishments in Zimbabwe have large water-consuming facilities such as landscaped areas, swimming pools, on-site laundries, on-site kitchens, restaurants, and conference facilities.

Further revelations from the study indicate that slightly over fifty percent of the accommodation establishments had only operated for less than 10 years. These accommodation establishments were keen adopters of modern water saving technologies that are environmentally friendly.

Results from this study indicated that the majority of accommodation establishments were graded two to four- star. However, in terms of water consumption the most usage was identified with three to five-star accommodation establishments. Further findings from the study were that over eighty percent of accommodation establishments are not affiliated to chain hotels or large corporations. Independent or non-chain accommodation establishments are associated with massive water consumption. This is because they lack funding and technical advice to set water efficient benchmarks. Against this backdrop, this study finds Zimbabwe under serious and pending water challenges presently and in the near future unless serious interventions encouraging water conservation take place.

Unregulated groundwater abstractions threaten water availability. The results indicate that due to water stress most accommodation establishments in Zimbabwe were now relying on the use of both ground (borehole) and surface (municipal) water. On ground water there were however concerns about contamination and the falling levels of the precious liquid from the water table. Regardless of the latter, drilling of boreholes was cited as one of the ways industry is encouraging water conservation. On the ground, however, accommodation establishments were applying basic but sustainable water conservation measures including rainwater harvesting, use of greywater, prompt fixing of water leaks, use of low flow taps and showers and training staff on water conservation among other measures.

5.2.2 Objective two: Water management practices currently being undertaken by the accommodation sector in Zimbabwe

The purpose of this objective was to expose water management practices currently being undertaken to minimize water usage in the accommodation sector in Zimbabwe. The study established that accommodation establishments were engaging in water conservation practices. However, it was also revealed that the application of water management measures was divided between basic and advanced measures. The research findings indicated that the introduction of technology over the turn of the new

millennium has significantly helped improve water management practices amongst most accommodation establishments as evidenced by the utilisation of modern conservation practices like sensor tapes that control the amount of water being used. The findings also revealed simple and advanced water conservation measures as the two main categories of practices used in Zimbabwe.

(a) Simple water conservation measures

The results established that most accommodation establishments in Zimbabwe were adopting basic water conservation practices such as installing low flow plumbing fixtures, training employees, using organic composting in landscaping, planting drought resistant species in landscape areas and having water conservation policies. Indeed, water conservation policies were identified to be widely accepted as they were found at most accommodation establishments. It was established that accommodation establishments have water management policies which are blueprints that demonstrate organisations' commitment to water conservation. This is encouraging in relation to the future of water management in Zimbabwe as it shows most organisations have good intentions.

Most accommodation establishments indicated that they regularly inform their staff about benefits of water conservation. Managers indicated that they inform their employees through training programmes and empowerment activities including encouraging staff to provide suggestions on water conservation and this aids in changing consumer behaviour towards water usage. Further revelations from the study indicated that a majority of accommodation establishments compare water consumption overtime. Chief among them are those hotels which have been in operation for more than ten years. Monitoring water usage is a critical water management tool which helps track water patterns and minimises unnecessary water usage at accommodation establishments. Monitoring water usage in high priority areas such as guestrooms, swimming pools, laundry areas and kitchens can help reduce significant amounts of water.

The results indicate that low-flush toilets were popular with 4 and 5-star accommodation establishments. Installation of timers and other intelligent irrigation systems were found to be common only with highly graded (5-star) accommodation establishments, the rest of the accommodation establishments indicated that they did

not have these in place. In terms of vegetation management in landscape areas, the use of organic composting in landscaping is a common practice amongst accommodation establishments in Zimbabwe. Moreover, planting of drought resistant plants was also common amongst most accommodation establishments. Planting indigenous plants which are suited to the climate helps reduce water usage since native species absorb water quickly and do not require constant irrigation.

Encouraging guests to shower instead of bathing was not popular amongst the majority of accommodation establishments. The study found that this measure was popular with 5-star accommodation establishments, however, the degree of implementation is still not satisfactory. The same was found in relation to linen and towel reuse programmes. These were found to be popular with chain accommodation establishments and 5-star accommodation establishments. Towel and linen reuse programmes are not popular as they evoke issues of hygiene among guests, however, studies show that where they are accepted and enforced towel and line reuse programmes have proved to be useful in conserving water in laundry spaces.

In terms of low-flow fittings (showerheads and taps), this study found that newer accommodation establishments that are less than five years old had these in place and were doing better in terms of adopting new technologies than older accommodation establishments. However, in terms of adopting advanced technologies such as sensor taps, aerated taps, restricted water flow taps, taps with low water flow timers, having flow controllers in plumbing fixtures, these were indicated to be largely practiced by 5-star accommodation establishments. Ordinary plumbing fixtures such as low- flow taps and showers are cheaper but advanced technologies need organisations with a better financial muscle.

(b) Advanced water conservation measures

Clearly, the study found that basic water conservation measures were popular with independent/non-chain accommodation establishments, low graded accommodation establishments and small-medium sized hotels. Overall, findings from the study indicate that accommodation establishments affiliated to chain hotels and major corporations showed the highest commitment to water conservation practices when it comes to using efficient water appliances. These applied basic and advanced water conservation measures including use of advanced water efficient appliances, sub-

metering, use of flow controllers and sprinklers with timers in irrigation. In addition, r higher graded accommodation establishments (4 and 5- star) regardless of affiliation, participated in both simple and advanced water conservation measures compared to lower graded accommodation establishments.

It was evident that treatment of wastewater was not being fully practiced across all accommodation establishments. Limited use of wastewater treatment plants (average 42%) at most accommodation establishments in Zimbabwe indicate that this measure is not anywhere near full adoption unless there are serious interventions (Table 4.7). Wastewater can be used to flush toilets, wash cars or irrigate plants thus helping to conserve freshwater.

Though not fully utilised rainwater harvesting was found to be common amongst many accommodation establishments. Zimbabwe receives significant amounts of rainfall between October and March, which if accommodation establishments prepare through harvesting in large storage tanks could help reduce water demand during the dry season – April to October. Rainwater harvesting has been commended world over as one of the most effective water conservation measure.

Control and repair of water leakages was found to be popular with most accommodation establishments. However, monitoring of water usage across departments was only popular with highly graded (3-5 star) and chain affiliated accommodation establishments. Controlling water is effectively done through sub-metering critical water usage areas such as the laundry, swimming pools, landscape areas, guestrooms, and kitchens. Identifying and promptly fixing water leaks is an integral water conservation measure which accommodation establishment should constantly undertake to reduce unnecessary water usage.

The findings indicate that there is little participation in environmental certification programmes that encourage accommodation establishments to engage in water conservation. Ecolabels have been widely recommended as the most effective systems for encouraging environmentally friendly practices and for showing guests commitment to green practices.

In sum, the study findings show that advanced water saving measures have not been fully adopted by most accommodation establishments in Zimbabwe including sub-metering of critical water consumption zones, use of wastewater to irrigate landscape

areas, taking full advantage of rainwater to collect and utilise it in irrigation, laundry and other non-portable uses and reducing water pressure using modern water appliances and devices. Overall indications show that the impact of water management practices being currently applied in Zimbabwe is pleasing because there is so much potential and commitment from hospitality players.

5.2.2.1 Impact of water management practices on water usage

The study findings indicated that major reductions have been identified at accommodation establishments where water saving technologies have been adopted. According to the results, the biggest adopters of advanced technologies are accommodation establishments affiliated to chain hotels and major corporations. Highly graded accommodation establishments (3-5 star) also indicated that they were seeing major reductions in water usage. Independent and non-chain affiliated accommodation establishments on the other hand indicated they were seeing moderate reductions in water usage. Such interventions proved to have a great impact on financial resource management and improvement in brand image.

5.2.3 Objective three: Challenges facing water conservation and benefits of water conservation in the accommodation sector in Zimbabwe.

The reason for this objective was to gain an understanding of the challenges facing accommodation establishments in Zimbabwe and to lay bare various benefits managers indicated they were aiming at when engaging in water conservation practices.

The primary data identified that there are challenges related the implementation of water conservation methods in the accommodation sector in Zimbabwe. These include high costs in utilisation of conservation measures which is associated with lack of funding with regards to such measures. Non-enforcement of regulations found in government policies and lack of proper awareness as to the monetary benefits of practicing water conservation in the accommodation sector in Zimbabwe were identified as some of the main challenges.

Having identified these challenges, the study however, established that there are several benefits attached to the utilisation of water conservation practices. Chief

among them is the increase in profits that the accommodation establishment enjoys through the utilisation of such practices. This major benefit produced the same results as the reduction in operational costs. In fact, the two major benefits work hand in glove. There is a direct link between the reduction in operational cost and the increase in profitability. These fundamental benefits were both identified to be important as they aid in gaining a competitive edge over rivals within the same industry as well as building the organisational image.

Accommodation establishments indicated that building an organisational image is one of the benefits they aim at when engaging in water conservation practices. Over sixty-seven of the accommodation establishments confirmed that they believe water conservation helps improve environmental sustainability. Water conservation is part of environmental management systems (EMS) which effectively helps organisations fulfil their environmental sustainability mandates. With these benefits in mind, the implementation of water conservation at accommodation establishments is beneficial, hence should be upheld at all costs.

5.3 Recommendations

There are efforts being made by accommodation establishments in water conservation as this proved to yield positive results in terms of cost management among other benefits. These findings concur with claims by numerous researchers who undertook studies on water usage and water management in the hospitality industry as well as those that focused on other environmental management systems (EMS) including the nexus between energy and water. Given this background, the findings helped to affirm that water conservation in the hospitality and tourism industry is critical and thus must be upheld.

5.3.1 Extent of water consumption in the accommodation sector in Zimbabwe

Facilities available at accommodation establishments were consuming large amounts of water. To summarize the matter, it is the inefficient management of water in guest rooms, swimming pools, landscape areas, kitchens, bars, restaurants, business centres and golf courses that leads to vast usage of water at the accommodation establishment in Zimbabwe. This study, therefore, concurs with findings by Fraj,

Matute and Melero (2015:30) that accommodation and lodging businesses contribute to environmental problems through uncontrolled use of resources. The following section highlights conclusion and recommendations for managers, the government and industry stakeholders and what they can do to minimise water consumption at accommodation establishments in Zimbabwe.

5.3.1.1 Management's role in water conservation

Similar to previous studies on water management, this study concluded that management of water consumption at accommodation and lodging facilities in Zimbabwe is very important. Proper management of water at accommodation establishments insinuate serious monitoring of water usage across departments and facilities at the hotel. Failure by management to prove they have a grip on water consumption and conservation practices in the accommodation sector may lead to continuous wastage of the precious resource.

Leaking water pipes and taps contribute immensely to water wastage, hence, it is the responsibility of accommodation managers to ensure that these are reported and repaired promptly. Furthermore, this study shares the thought that to reduce water usage, managers should invest in meeting the dynamic expectations of hotel guests with regular and sustainable water management practices. Regarding this, managers can make use of water inventories to keep track of water consumption patterns. While that can be implemented rapidly through various departmental managers, there are some key management practices that need constant care and monitoring. For example, in their study Tortella and Tirado (2011:2577) found that the existence of an environmental department, recognition of high- water bills and availability of water regulations have little to no impact on water consumption at hotels. Amidst similar cases, managers should, therefore, intensify policies that educate guests and employees on the importance of water conservation. It is also the study's belief that guests are more likely to engage in water conservation practices and may develop values for water conservation when they see accommodation efforts and engagements in such practices. Employees on the other hand are more likely to follow policies if they are trained. In this study, it was established that where guest and employee education was being applied, water usage was better than where there was

no education and training. Indeed, education is key where managers are aware of the technical capacity, skills, and knowledge of their employees in implementation of water conservation measures.

Further to what has been mentioned above, the following revelations emanated from the broad accommodation management spectrum; tourism operators normally operate on their own without consulting or engaging each other on best practices for saving water. This study shares the belief that water usage at accommodation establishments should be measured against similar types of accommodation establishments doing better elsewhere. However, where implementation funds and strategies are a challenge or differ, government and authorized industry boards can intervene to offer incentives, technical advice as well as regulations that suit the hospitality sector in Zimbabwe.

5.3.1.2 Government's role in water conservation

Environmental regulations on tourism services in Africa seem to be slacking. This study found that there was a lack of enforcement on regulations that discourage over consumption of water resources at accommodation establishments. Regulations dealing with water consumption in the accommodation sector are there but weak and complex when one considers the number of stakeholders involved. Zimbabwe has a sound water governance system which only needs proper implementation to avert water stress issues. To come up with robust water management policies and strategies, this study suggests there be a panel of stakeholders which include the government, the accommodation sector, national water management bodies and national tourism authorities. However, as a matter of warning, while policies for water conservation may be introduced, it is this study's argument that they may not work if there is no strict government control and monitoring measures. In Zimbabwe, according to the 1998 Water Act, water is owned by the President and is managed from catchment and sub-catchment areas by municipalities or those with permits (Davis and Harji, 2014:40). Against this backdrop, this study asserts that strict water management policies are most likely going to be easier to enforce in the accommodation sector in Zimbabwe when compared to countries where the free-market concept is used to manage water and water sources. LaVanchy (2017:43) for

example reveals weaknesses of water conservation policies in Nicaragua by mentioning how the water policy there is not supported by tight water regulations, property rights and law enforcement. Indeed, tourism businesses, policy makers and law enforcement agencies both share the responsibility to manage the environment responsibly.

The argument everywhere else is that tourism plays a pivotal role in the improvement of economies and society. To sustain this industry for generations to come, governments should guide water management practices based on supply, educate residents and tourists on water availability and water management in communities and destinations concerned. Local governments can also introduce appropriate water prices for water which encourage water conservation.

5.3.1.3 Industry's role in water conservation

Effective management of water usage at accommodation establishments demands a firm understanding of the tourism industry and its contribution to the economy. By and large, the tourism industry is volatile, hence, it needs strong institutional support to assess and approve necessary levels of water consumption that is not detrimental to the tourist experience. During interviews undertaken with key tourism stakeholders, 80% of the interviewees mentioned that they have never done a study on water conservation in the accommodation sector in Zimbabwe. Twenty percent indicated that they have done quite a number and recommendations have always been that industries in Zimbabwe must prioritise water conservation. Dinarès and Saurí (2015:645) argue that industry should be proactive when it comes to environmental issues, thus the idea of waiting for droughts in order to act is not sustainable. This study advises that the tourism industry to be proactive to avoid consequences which come with non-compliance. Proactivity is indeed crucial in these times of climate change and environmental burdens. Against this backdrop, this study suggests that Destination Management Organisations (DMOs) should no longer focus on demand side planning only but should also factor supply side issues such as water and waste management.

Moreover, to ensure efficient and sustainable usage of water at accommodation establishments this study suggests the tourism industry in Zimbabwe set benchmarks for water usage for different facilities and departments at accommodation

establishments. Benchmarks for water usage statistics can be set against those of meaningful accommodation establishments in Africa. There is also need for the industry to encourage and enforce regulations for wastewater use. During interviews with key tourism stakeholders, 80% of the interviewees indicated for example that wastewater treatment was only on paper, no organisation ensured that there were wastewater treatment facilities at accommodation establishments. Twenty percent indicated that their organisations were advocating for green tourism practices at accommodation establishments through a sustainable tourism policy document.

5.3.2 Source of water resources used in the accommodation sector in Zimbabwe

This study found that most accommodation establishments in Zimbabwe rely on both ground and surface water to provide guest services. The study suggests, therefore, that efforts must be put into assessing sources of water for accommodation establishments in Zimbabwe to see how they can be efficiently and significantly used to develop models for sustainable water conservation. Understanding the tourism industry's interaction with water sources is crucial for the development of sustainable tourism. Indeed, this is very important especially given that at tourist destinations like Nicaragua where ground water sources are drying up, there is no information available to guide businesses on the amount of water they should extract from the ground (LaVanchy, 2017:47).

In Zimbabwe, there is still room to control water sources and encourage green practices at accommodation establishments. This can only be possible if water rights and water permits are given to those accommodation establishments which rely on ground water sources. In addition, to help address excessive consumption of water at destination level during low and shoulder seasons, the volume of tourists can be reduced or spread within the region through industry coordination. Where coordination is not feasible water budgets can be proposed to businesses that rely on ground water so that they may know how much water they could use over a specific period of the month. In this regard local governments can then introduce environmental taxes to punish those who break their water budget quotas. By and large this will encourage water conservation. In conclusion it is this study's submission that public authorities

should promote quality environmental certification and water conservation which means that local governments should constantly intervene to ensure efficient usage of water.

5.3.3 Type of water management practices currently being undertaken by the accommodation sector in Zimbabwe

It is evident that advanced water conservation practices were not being practiced by all accommodation establishments in Zimbabwe. In the study it was discovered that basic water conservation measures dominated the sector. All this is understandable given that implementation of advanced water conservation practices requires large investment funds, technical expertise and have longer payback periods. However, since basic water conservation measures were proving effective this study identified that there is need to create models which can be used by every accommodation establishment at each department or facility. Models can be created for landscaping of gardens where use of indigenous plants can be promoted as a way to educate tourists about various plants found in the country. At farmhouses there can be models for construction of biogas tanks to help teach guests about the environmental benefits and use of biogas systems. Bars, kitchens and laundry can be contracted out as a way to support the local economy. Against this, Dinarès and Saurí (2015:644), argue, however, that contracting services such as laundry and bars may seem to be a noble idea but may not necessarily translate into improved resource efficiency.

Furthermore, large accommodation establishments can implement water accounting and reporting schemes, which enable guests to track water usage as well as report irregularities like water leaks. This can be done through providing guests with an internal water leak reporting number which they could use. This can reduce call time and improve reporting of leaking water or burst pipes.

Computer software systems that monitor all water pipes at the accommodation establishments can also be used to monitor water flow. Visuals can be connected to the engineering department responsible for fixing water leaks and controlling flow rates. The thought in general is the accommodation sector should be encouraged to improve monitoring of water conservation through comprehensive and consistent reporting of water usage in high water consuming areas like kitchens, landscapes, guestrooms, golf courses, laundries, and all public areas.

In terms of education, the study realised that more can be done by accommodation establishments to educate guests, employees and communities that surround them. Magazines and pamphlets can be used beyond the role of marketing tools to teach communities about the importance of water conservation. They can be printed for all categories of people in English and vernacular languages. The idea is that hoteliers cannot only engage in green management policies for the sake of competition but for edification of communities and employees.

5.3.4 Challenges facing water conservation in the accommodation sector in Zimbabwe

Despite the importance of tourism to the economy of Zimbabwe, the drive towards a sustainable tourism industry seems to be moving at a painstakingly slow pace. This study found that in the accommodation sector they were still experiencing many challenges with regards to water conservation including high implementation costs and lack of funding. Although funding was a genuine concern, this study does not support funding without commitment. The study proposes that government should offer tax relief or rebates to smaller accommodation establishments that may be importing advanced water conservation equipment and plumbing systems. In this way, the study predicts that the less powerful and independent accommodation establishments will be able to keep pace with more powerful chain affiliated accommodation establishments.

The study also found that lack of regulations was also a problem. This challenge was addressed in the previous section, under government's role in controlling water usage. The conclusion of the matter was, to effectively manage water at accommodation establishments, regulations must be narrowed to be industry specific and enforced. Enforcing regulations entails ensuring that water conservation policies are not only on paper but are practically implemented.

The study found that there is a relationship between availability of specialised staff and water conservation. These findings support claims by several researchers about the need for environmental experts. Lack of specialised staff was identified by managers as one of the challenges stalling implementation of water conservation practices. For an organisation to be effective, it needs skilled manpower. This study supports formal and informal training of employees on environmental management

systems. Training and development of employees should impart knowledge, skills and promote attitude development leading to a boost in employee morale, job satisfaction, retention and improved performance in water conservation.

5.4 Limitations and recommendations for future research

There is limited literature on the subject of water management practices in the accommodation sector in Zimbabwe. Research on the subject of water is more inclined to mining and agricultural sectors. As a result, in order to provide this study with a sound theoretical background, the researcher had to rely on studies from South Africa, Kenya, the continents of Europe, Asia and America. Through various studies from across the globe concepts were extrapolated and lessons were learnt on how water can be managed effectively at various accommodation establishments in Zimbabwe.

This study focused on water management practices at accommodation establishments from a managerial point of view. Future, researchers interested in the subject of water management at accommodation establishments should also look at energy, wastewater management, employee, and consumer attitudes towards water conservation at accommodation establishments in Zimbabwe. Indeed, there is increased demand for energy in pumping water and treating wastewater at accommodation establishments, hence the energy-water nexus cannot be ignored. Moreover, given that competition and resources vary between small-medium and large accommodation establishments it will be good in future to compare performance of small accommodation establishments in Zimbabwe against small accommodation establishments in other southern African countries in particular South Africa which is doing better in terms of environmental management. Similar comparative studies should be undertaken with large accommodation establishments to determine whether they meet international standards.

There is also a need to promote green certification in Zimbabwe especially to new accommodation establishments. Moreover, this study realised that there is a knowledge gap which is straining implementation of sustainable tourism in Zimbabwe. The knowledge base in the area of water conservation in Zimbabwe could be increased through integrating social and technical research, reporting the scope of

what exactly is happening on the ground, exposing biases, and issuing practical solutions for sustainable tourism in Zimbabwe in the context of international standards.

5.5 Conclusion

The aim of this study was to examine the nature and extent of water management practices in the accommodation sector in Zimbabwe. This research found that accommodation establishments in Zimbabwe have been reactive to climate change induced water stress and have been applying several water-conservation practices. However, more is still to be done with regards to monitoring water usage and managing water conservation. It was also evident that there is immense demand for water by accommodation establishments in Zimbabwe hence without proper planning, communication, and enforcement of regulations large amounts of fresh water will continue to be wasted. Suggestions for dealing with challenges, managerial implications and what future researchers can do was discussed together with ideas obtained from the literature review.

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APPENDICES

Appendix 1: Research Instrument: Questionnaire for accommodation managers

GOOGLE FORMS LINK:

https://docs.google.com/forms/d/138ZtucBDwEy6dmN3M9mIocCe4Gf1xHUVIZoaiAYdQ1c/edit

Please Mark/Fill in the Appropriate Section

GENERAL INFORMATION

1. **Please indicate the type of accommodation**

GUEST HOUSE	☐	**HOTEL**	☐	**LODGE**	☐
BED AND BREAKFAST	☐	**CAMPING AND CARAVAN PARK**	☐	**HOUSE BOAT**	☐
FARM HOUSE	☐	**HOSTEL**	☐	**INN**	☐
MOTEL	☐	**SELF-CATERING APARTMENT, HOUSE**	☐	**GAME LODGE**	☐
Other, please specify					

2. **Please indicate location of the accommodation establishment.**

BULAWAYO	☐	**MASHONALAND WEST**	☐	**MASVINGO**	☐
HARARE	☐	**MATEBELELAND SOUTH**	☐	**MASHONALAND EAST**	☐
MASHONALAND WEST	☐	**MATEBELELAND NORTH**	☐	**MASHONALAND CENTRAL**	☐
MIDLANDS	☐	**MANICALAND**	☐		

3. **Please indicate the current star rating of the property.**

1 STAR ☐	**2 STAR ☐**	**3 STAR ☐**	**4 STAR ☐**	**5 STAR ☐**	**UNRATED ☐**

OR

STANDARD **☐** **COMFORT ☐** **LUXURY ☐** **NOT YET GRADED ☐** **OTHER_____**

4. **Is the accommodation facility part of a Brand Chain?**

Yes ☐	**No ☐**

5. **If YES indicate the brand chain name to which this establishment belongs**

African sun	☐	**Rainbow**	☐	**Legacy**	☐
Cresta	☐	N/a	☐		☐
Other, please specify :					

6. **How many rooms does this accommodation establishment have?**

1-10 ROOMS	☐	**11-30 ROOMS**	☐	**31-50 ROOMS**	☐
51-70 ROOMS	☐	91-100 ROOMS	☐	MORE THAN 100 ROOMS	☐

7. **Indicate the number of guests that can be accommodated at this establishment?**

Less than 10 guests	**:**
10-20 guests	**:**
21-40 guests	**:**
41-60 guests	**:**
61-80 guests	**:**
81-100 guests	**:**
101-120 guests	**:**
121-140 guests	**:**
More than 140 guests	**:**

8. **How many years has the accommodation facility been in operation?**

Less than a year ☐ 1-5 years ☐ 6-10 years ☐ More than 10 years ☐

9. **Which is the key market sector for this establishment?**

Business Travellers ☐ Leisure Travellers ☐ Both Business and Leisure ☐

10. **Who are your key visitors at this establishment?**

Domestic visitors ☐ International visitors ☐ Both domestic and international visitors ☐

11. **What is the average occupancy rate of the establishment in percentage (%)?**

High-Season	**:**
Shoulder/Mid-Season	**:**
Low Season	**:**
AVERAGE	**:**

12. **Which of the following facilities are available at this accommodation establishment?**

Swimming pool	☐	**Bar**	☐	**Water Sports**	☐
Golf Course	☐	**Spa**	☐	**Conference facilities**	☐
Restaurant	☐	**Private Lounge**	☐	**Curio Shop**	☐
Gym	☐	**Camping facilities**	☐	**Business Centre**	☐
On-site laundry	☐	**On-site kitchens**	☐	**Landscaped areas**	☐
Other (specify)					

13. **According to your water bills, what is the average monthly water usage at this accommodation in monetary value (USD$)?**

14. **Approximately, how many litres of water are used at this accommodation facility (on average) per month?**

WATER CONSERVATION

15. **Does this accommodation establishment engage in water conservation?**

Yes ☐ **No ☐**

16. **If yes, how long has this establishment engaged in water conservation measures?**

Less than one year	☐	1-3 years	☐	3-5 years	☐	5-7 years	☐
7-9 years	☐	More than 9 years	☐	N/A	☐		

17. **If yes, specify which of the following water conservation measures are implemented by this accommodation establishment.**

	YES	NO	N/A
Water conservation policy			
System for monitoring water usage			
Compare water consumption over time to identify areas that can be improved and to enhance water use efficiency.			
Monitor and compare water consumption across departments			
Low-flow taps			
Waterless urinals			
Dual-flush toilets			
Low-flow showers			
Sensor toilets			
Sensor taps			
Aerated taps			
Restricted water flow taps			
Taps with water flow timers			
Flow controllers in plumbing fixtures			
Wastewater treatment			
Water conservation information leaflets for guests			

Towel-reuse program			
Linen re-use program			
Encourage guests to shower instead of take a bath			
Rainwater harvesting			
Ecolabel certification encouraging water conservation			
System to promptly report water leaks			
Process to fix water leaks immediately			
Regular maintenance of swimming pools			
Retrofit old appliances with efficient water use models (ENERGY STAR)			
Drinking water stations instead of bottled water			
Staff training programme in place regarding water conservation			
Staff are regularly informed about water conservation behaviour			
Staff are encouraged to provide suggestions on how to conserve water.			
Staff incentives offered for water conservation.			
Staff informed on the benefits of water conservation.			
Moisture sensors for landscaping irrigation			
Water landscaping in evenings			
Drought resistant plants in landscaping			
Harvested rainwater for landscape watering			
Sprinklers with timers for landscape irrigation			
Use recycled grey water for irrigation			
Use organic composting in landscape			
Other, please specify			

18. Were there any changes in water consumption levels noted after the implementation of water saving devices at this establishment?

Yes		No		N/A	

19. **If yes, indicate how the implementation of water saving devices has affected water usage at this establishment?**

A major reduction in water usage	
A moderate reduction of water usage	
No reduction in water usage	
N/A	

20. **What is this establishment's major source of potable water?**

GROUND	
SURFACE from the MUNICIPALITY	
BOTH GROUND AND SURFACE	

21. **If there are currently no water conservation measures in place at this establishment, would you be willing to implement water conservation measures at this establishment in the future?**

Yes		No		Unsure	

22. **If there are currently no water conservation measures in place at this establishment, would you be willing to increase water conservation measures at this establishment in the near future?**

Yes		No		Unsure	

23. **What do you perceive to be the barriers facing water conservation in this establishment?**

Lack of awareness	
Lack of funding	
Lack of specialised staff	
Lack of regulations for water conservation	
See no economic benefits from water conservation	
High costs associated with water conservation measures	
Water conservation not important	
Other, specify.	

24. **Do you believe that there any benefits to water conservation measures in accommodation establishments?**

Yes		No		Unsure	

25. **Which of the following benefits do you believe water conservation can have for this establishment?**

Improves the image	
Increases customer loyalty	
Increases profitability	
Helps gain a competitive advantage	
Improves public relations	
Reduces operational costs	
Improves environmental sustainability	
Improves investor relations	
Other, please specify	

26. **Any general comments on water conservation in accommodation establishments?**

Appendix 2: Interview questionnaire for industry experts

Interview Questionnaire for Industry Experts

1. What are your thoughts on the use of water in the accommodation sector of the tourism industry in Zimbabwe? In other words, do you think the accommodation sector consumes a lot of water than other sectors in the industry?

2. What is your view on water management practices in the accommodation sector in Zimbabwe in terms of conservation and wastage?

3. Do you think lack of water conservation practices in the accommodation sector in Zimbabwe affects society in any way? If yes, then explain in what way does it affect Zimbabwean communities

4. What would you point as benefits of water conservation in the accommodation sector in Zimbabwe?

5. Has your organisation ever done a study on water conservation in the accommodation sector in Zimbabwe?

6. If yes, what were the findings and can you provide me with a document on the study. If no study has been done what could be the assumption or issue?

7. To what extent is your organisation acting on ensuring that water is conserved in the accommodation sector in Zimbabwe?

8. Are there any water conservation awareness programmes that are in place that are for the accommodation sector of the tourism industry or are in general?

9. Do you by any chance encourage accommodation providers to have alternative sources of water supply such as boreholes?

10. If yes, to what extent do you ensure that these alternative sources of water are environmentally friendly?

11. Where does your organisation stand when it comes to waste water disposal and recycling methods in the accommodation sector in Zimbabwe?

12. What policies are available or how are you planning to ensure the accommodation sector in Zimbabwe conserves water in future?

Appendix 3: Letter of Information

LETTER OF INFORMATION

Title of the Research Study: The nature and extent of sustainable water management practices in the accommodation sector in Zimbabwe

Principal Investigator/s/researcher: Mr. Kudzai Norman Ushamba

Co-Investigator/s/supervisor/s: Dr Reshma Sucheran (PhD Geography and Environment Studies, University of KwaZulu Natal)

DEAR PARTICIPANT

You are being invited to voluntarily participate in a research study on water management in the accommodation sector in Zimbabwe.

BRIEF INTRODUCTION AND PURPOSE OF THE STUDY:

Water is crucial to the economy of Zimbabwe, and tourism which is one of the economic drivers relies and uses water. Global research evidence so far reveals that the tourism industry consumes millions of freshwater every year. This study seeks to analyse water conservation practices currently being undertaken by the accommodation sector in Zimbabwe and the extent to which they are monitored and evaluated. The study will also examine challenges facing water conservation in the accommodation sector in Zimbabwe and establish key benefits that can be accrued if water conservation measures are taken. More so, the study will point out the importance of water conservation in the accommodation sector in Zimbabwe and will be of good use to accommodation managers, students, environmentalists, policy makers and tourism authorities.

BENEFITS:

The study will suggest how efficient water management can help Zimbabwe become a sustainable tourist destination and be competitive. In the course of participating in the research you shall find this study enjoyable. Also, by participating in this research, you may learn various questions you need to answer when making strategic decisions.

RISK AND COMFORTS:

As far as the researcher and promoter are concerned there are no risks or anything that may in the end bring utmost uneasiness on your part. From your participation, the researcher will be able to summarise and submit his results on the topic to the promoter/supervisor. Your contribution is vital to the successful completion of this study as a result we are asking you to help the researcher by filling out the questionnaire. The results of the survey will help the researcher to complete his work towards a Master of Management Science degree. The findings on this research will add to the existing knowledge of water management in the accommodation sector. It will also answer how organisations can help conserve water in destination Zimbabwe.

The survey (attached) is anonymous and the data collected will only be reported in a summary fashion. Individual responses will be held in strict confidence by the researcher. The researcher will investigate, summarise and analyse results for his study.

If you are willing to take part in the study the estimated time for the questions is 10 minutes. You will not be forced to supply any personal or sensitive information i.e. trade secrets that you might find in the questionnaire survey. The questionnaire will remain anonymous and results will be in summary form. In the event that you decide to withdraw from participating in the research you may do so freely. You will not be inclined to give any reason.

If you would like additional information regarding the topic or in the event that you encounter problems or have queries feel free to contact Kudzai on +27 64 463 0904, +263 779 457 839 or ushambank@gmail.com or the researcher's supervisor, on (+27) 31 373 5509.

Thank you for your time and serious consideration.

Yours Sincerely

Kudzai Norman Ushamba

Appendix 4: Letter seeking to conduct research

Durban University of Technology
Hospitality and Tourism Department
(Ritson Campus)
Durban, South Africa
4000

Zimbabwe Tourism Authority

REF: PERMISSION TO CONDUCT RESEARCH

I do hereby apply for permission to conduct an academic research in your area as well as assistance in distributing online questionnaires to managers of various accommodation facilities in the country. I am a Master of Management Science student from the Durban University of Technology. My research focuses on water management in the accommodation sector in Zimbabwe.

Global statistics reveal that the hospitality and tourism industry consume over 1.5 million litres of freshwater every year and water stress is becoming a challenge in most tourist destinations hence by causing host-guests' apathy.

Zimbabwe, a competitive tourist destination in Africa is not exceptional to this challenge as water stress issues are increasing in its urban areas. According to a 2014 Issues Paper on Water Management in Zimbabwe, water stress cases are expected to increase over the coming years owing to the severity of the weather - warm temperatures, serious evaporation and other climate change conditions.

The study seeks to investigate the level of water use in the accommodation sector and the extent to which water conservation practices are currently being undertaken by this sector. The study will further examine challenges facing water conservation in the accommodation sector in Zimbabwe and will help ascertain the extent to which efficient water management in the accommodation sector in Zimbabwe can help the country become a sustainable tourist destination. Results from this study will be useful to environmentalists, educators, policy makers, tourism authorities and the accommodation sector.

Online Questionnaires: Online questionnaire to be send will be anonymous and the data collected will only be reported in a summary fashion. Individual responses will be held in strict confidence by the researcher. The researcher will investigate, summarise and analyse results for his study.

Respondents: Respondents will not be forced to supply any personal or sensitive information i.e. trade secrets that they might find in the questionnaire/survey. The questionnaire will remain anonymous and results will be in summary form. In the event that respondents decide to withdraw from participating in the research they may do so freely and will not be inclined to give reason(s).

For additional information regarding the research or if you have any queries feel free to contact Kudzai on (+27) 64 463 0904; (+263) 77 945 7839 ushambank@gmail.com; 21143526@dut4life.ac.za or the researcher's supervisor on (+27) 31 373 5509.

Thank you for your time and serious consideration.

Yours Sincerely

Kudzai Norman Ushamba (Researcher)

_____

21143526@dut4life.ac.za

Reshma Sucheran (PhD)

_____

Supervisor / Promoter

Appendix 5: Gatekeeper's letter

ZIMBABWE TOURISM AUTHORITY

HEAD OFFICE
Tourism House
55 Samora Machel Ave
P.O. Box CY 286 Causeway
Harare
Tel: 263-4-790514/
774708, 774768, 790365
Fax: 263-4-758826/28
E-mail: marketing@ztazim.co.zw
info@ztazim.co.zw
Website: http://www.zimbabwetourism.co.zw

Bulawayo
Coal House
95 R. G. Mugabe Way
P. O. Box FM 150
Bulawayo
Tel: 263-9-72354/8
Email: zta@byo.ztazim.co.zw

Mutare
109 H. Chilepo St
Cnr Fifth Ave
3rd Floor
Zimre Centre
Tel: 020-66611/15/17
Email: mutare@ztazim.co.zw

Gweru
Civic Centre
8th St
Box 1933
Gweru
Tel: 054-231671-2
Fax: 054-231670
Email: midlands@ztazim.co.zw

Victoria Falls
Shop 13-14 Galleria Building
P. O. Box 103
Victoria Falls
Tel: 263-13-44376
Fax: 263-13-44380
Email: ztavicfalls@ztazim.co.zw

Beitbridge
NSSA Building
1st Floor Left Wing
Great North Road
Beitbridge
Tel: 263-286-23642/3
Email: bb@africaonline.co.zw

Masvingo
2nd Floor, Zimre Centre
Cnr Hughes Street
Simon Mazorodze Rd
Tel: 263-39286240-3
P.O. Box 1740
Masvingo
E-mail: masvingo@ztazim.co.zw

Kariba
Stand No. 487
Observation Point
Mahombekombe
Kariba
Tel: 263-261-2146276
Email: ztakariba@africaonline.co.zw

Chiredzi Office
Old Mutual House, 1st Floor
Chirongo Drive
Chiredzi
Tel: 263-231-2653
263-231-2686
Fax: 263-231-2702
E-mail: marvelous@ztazim.co.zw

DTSR/RE/03/19

25 March 2019

Durban University of Technology
Hospitality and Tourism Department
Riston Campus
Durban, South Africa

ATTENTION: RESHMA SUCHERAN

AUTHORISATION TO CONDUCT RESEARCH - KUDZAI NORMAN USHAMBA

Reference is made to your letter dated 13 March 2019, in which you sought authorization to conduct research in the tourism Sector. The Zimbabwe Tourism Authority (ZTA) hereby grants you permission to approach all relevant tourism players to conduct your study on **"Water Management in the accommodation sector in Zimbabwe"**

ZTA fully supports this study as the results will contribute positively to the development of tourism. It is our sincere hope that you will be able to share findings from your study with us.

G. Chidzidzi
CHIEF OPERATING OFFICER

Zimbabwe
A World of Wonders