Effects of Communities' Knowledge and Perceptions on Conservation within Turfloop Nature Reserve, Limpopo Province, South Africa.

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Effects of Communities' Knowledge and Perceptions on Conservation within Turfloop Nature Reserve, Limpopo Province, South Africa

by

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DISSERTATION

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DEDICATION

This study is dedicated to my family, especially my late grandfather, Johannes Matsobane Nkoana. My achievements are through his inspirations. May his soul rest in peace. I also dedicate this work to all the study participants, without whom the quest for a sustainable society would not be attainable.

DECLARATION

I declare that The effects of Communities' Knowledge and Perceptions on Conservation within Turfloop Nature Reserve, Limpopo Province, South Africa hereby submitted to the University of Limpopo, for the degree of Master of Science in Geography has not previously been submitted by me for a degree at this or any other university; that it is my work in design and in execution, and that all material contained herein has been duly acknowledged.

_____ _____

Mothapo, MV (Ms) **Date**

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ABSTRACT

Nature reserves generate substantial local income through tourism, provide opportunities for recreation and employment and aid in the protection of wildlife, biodiversity, and natural resources. In South Africa, the protection and management of nature reserves are generally done through a protectionist approach whose rigid enforcement of laws excludes access and involvement of local communities, who are a crucial stakeholder for successful wildlife management and conservation. How then do the local communities perceive nature reserves, and how does this affect nature conservation? To answer this question, this study examines the effects of communities' knowledge and perception of nature conservation in Turfloop Nature Reserve (TNR), in Limpopo Province of South Africa. Mixed method of qualitative and quantitative techniques was used in the study to collect the data from 196 respondents in 9 local communities living within a radius of 4km from TNR. Key informant's in-depth interviews were conducted with TNR management and community leaders. Several demographic, socio-economic and spatial variables of the local people that included education level, distance, and period of residence in the area (amongst others) were found to significantly influence knowledge and perceptions of the local people towards the TNR conservation activities. Study findings suggest that although local people appreciate the nature reserve and its role in conserving nature and wildlife, there is evidence of dislike and unfavorable perceptions towards some management activities of TNR. The unfavorable perceptions that some community members had were attributed to the absence of participation of the local people in the management of the nature reserve, access to and use of resources from the nature reserve and lack of tangible benefits from the reserve. Positive perceptions were attributed to the benefits received from TNR, such as support for educational programmes, sustainable harvest, and recreation opportunities. Therefore, this study recommends that local people should be involved in the management activities and decision making within TNR and benefits should be increased so that local people may support conservation.

Keywords: Conservation, Local communities, protected areas, Perceptions, Benefits,

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

C	: Celsius
CAMPFIRE	: Communal Areas Management Programme for Indigenous Resources
CBD	: Convention on Biological diversity
CLF	: Community Levy Fund
DEAF	: Department of Environmental affair
DEAT	: Department of Environmental Affairs and Tourism
DF	: Degree of freedom
ECA	: Environmental Conservation Act
GIS	: Geographical Information Systems
Ha	: Hectares
IIED	: International Institute for Environment and Development
IUCN	: International Union for Conservation of Nature,
Km	: Kilometres
LC	: Local Committee
LEDET	: Limpopo Economic, Development, Environment and Tourism
LEMA	: Limpopo Environmental Management Act
LTPB	: Limpopo Tourism and Parks Board
M	: Meters
MEA	: Millennium Ecosystem Assessment
MM	: Millimetres
MMB	: Mamabolo Mountain Bushveld
NEMA	: National Environment Management Act
NEMBA	: National Environmental Management: Biodiversity Act
NEMPAA	: National Environment Management: Protected Areas Act
NPAES	: National Protected Area Expansion Strategy
NRF	: National Research Foundation
ODA	: Oversea Development Agency
PAs	: Protected Areas
PPB	: Polokwane Plateau Bushveld
SANParks	: South African National Parks
SAWS	: South African Weather services
SPSS	: Statistical Package for the Social Sciences

STATSSA	: Statistical South Africa
TNR	: Turfloop Nature Reserve
TRA	: Theory of Reasoned Action
UN	: United Nations

CHAPTER ONE

BACKGROUND TO THE STUDY

1. 0 Introduction

This introductory chapter outlines the background of the nature conservation and local communities' perception and knowledge on protected areas, define the problem statement, study aims and objectives and the significance of the study as well as the organisation of the dissertation.

1. 1 Background of the study

Humans and wildlife have always shared their habitats since time immemorial (DEAT, 1997; Adams, 2004). In that shared existence, strategies and ways of co-existence have evolved (Chape et al., 2005; Boonzaaier, 2010; Andrade & Rhodes, 2012). However, human activities such as pollution, habitat destruction and, overexploitation of plant and animal species have resulted in the increased loss of biological wealth (IUCN, 1991; Safalsky, 2000; Lopoukhine et al., 2012). Consequently, this has attracted the attention of conservationists and subsequently led to the call of establishing protected areas (Hulme & Murphree, 2001; Pratt et al., 2004). Such areas are meant to protect biodiversity and natural resources against human activities. On the other hand, protected areas provide society with many benefits in terms of ecosystem preservation, provision of environmental services and opportunities for recreation and tourism (Safalsky, 2000; Coad et al., 2008; Dudley et al., 2012; Watson et al., 2014).The first recorded protected area to be established was Yellowstone Park in the United States of America in 1872 and it was based on protectionist approach, which generally excludes local communities from utilizing resources within protected areas, (Spence,1996b; Mulder & Copollilo, 2005; Andrade & Rhodes, 2012). The establishment of the Yellowstone Park resulted in the forced removal of indigenous people. Since then, the same protectionist approach has been used in many countries to establish protected areas. Most of these protected areas are found to be in lands owned and claimed by indigenous people (Kellert et al., 2000). According to the International Union for Conservation of Nature (IUCN) (1991), more than four-fifths (85%) of the world protected areas are inhabited by indigenous people, whereas, protected areas cover more than 10% of the earth's terrestrial surface (Sobreville, 2008; Lele et al., 2010). Despite reported earlier successes involving this protectionist conservation model in several places worldwide, the

approach has been reported to be causing conflicts between the practitioners and local communities and is associated with high costs especially in developing countries where two-thirds of the world's biodiversity is located (Lele et al., 2010). In these countries, biodiversity provides an important resource for economic development (DEAF, 1994; Stolton et al., 2010). However, there were indications that economic and social problems were jeopardising the existence and effectiveness of protected areas. These problems included high population growth and poverty, which was increasing the demand for natural resources in protected areas, hence creating conflicts in resource In Africa, the practice of mass exclusion of indigenous people to make way for protectionist conservation dates back to the 1960s (Brockington, 2002). The setting of Serengeti National Park in Tanzania, for example, was based on the idea that the park should remain a primordial wilderness to be effective, and that no humans should be allowed to live inside the park, irrespective of whether these people were native or not (Brockington, 2002; Chape et al., 2005). In the 1980s, the exclusionary nature of protectionist conservation began to be challenged in favour of the community conservation approach (Brechin et al., 2002). Underpinning this challenge was the criticism that the protectionist approach failed to consider social, cultural, and political issues regarding local communities, hence jeopardising the success of conservation policy enforcement (Andrade & Rhodes, 2012). An alternative to the protectionist approach is the approach of community conservation. The approach promotes that local people should be involved in the protection of biodiversity in protected areas. To stress this point, the World Conservation Union in 1980 published the world conservation strategy, arguing that successful environmental conservation depends upon the involvement and participation of local communities (IUCN, 1991; DEAT, 1997). Through the adoption of the community concept, several projects incorporating local communities in wildlife conservation have been carried out successfully in parts of Africa: the Amboseli and Maasai-Mara National Park in Kenya, the Queen Elizabeth National Park in Uganda, the Sangha Rain Forest Reserve in the Democratic Republic of the Congo and the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) in Zimbabwe (Boonzaaier, 2010). All these projects incorporated local communities' knowledge and attitudes towards wildlife conservation. Globally, the role of the local communities' knowledge on wildlife conservation is receiving increasing attention as it is argued to play an important part in enhancing the success of protected areas (Trakolis, 2001; Huntington, 2011). Knowledge about wildlife conservation helps local communities to have a good understanding of natural resources conservation and heightens their conservation awareness (Gandiwa et al., 2014). It is also increasingly being recognised that natural resources are lost or conserved at

the local level, thus local people's knowledge and perceptions of conservation are important in the conservation of projects (Sundaresan, 2012).

1. 2 Problem Statement

Protected areas play a significant role in meeting national and international biodiversity conservation priorities (King, 2007; Dudley et al., 2012). They also provide opportunities for recreation, tourism, and employment (Safalsky, 2000; Stoloton & Dudley, 2003). Globally, many communities around protected areas substantially depend on natural resources within protected areas for their livelihoods (Infield, 1988; Mamo, 2015). In South Africa, however, this is not the case as most protected areas in the country were established using a protectionist model of conservation, which generally excludes local communities from utilising resources within protected areas (Infield &Namara, 2001; Anthony, 2007; Boonzaaier, 2010; Huntington, 2011; Andrade & Rhodes, 2012). This exclusion has been creating conflicts between communities and protected areas (Vodouhê et al., 2010) with several such cases having been reported in the country (Infield, 1988; King, 2007; Boonzaaier, 2010; Snyman, 2014). Furthermore, some communities pointed out that protected areas disrupt their cultural way of living and negatively affect their livelihoods (Snyman, 2014; Mamo, 2015). Hence, in areas where community benefits have either been absent or minimal, communities have even resorted to killing wildlife, degrading wildlife habitats and generally refraining from complying with wildlife protection regulations (Infield, 1988). Local people's perceptions of protected areas depend on their perceived cost and benefit from protected areas, their dependence on local resources, and their knowledge about protected area management (Bennet, 2016). Their perceptions and knowledge of protected areas influence the interaction that they have with protected areas and thus impact on conservation effectiveness (Ormsby & Kaplin, 2005; Ramakrishnan, 2007; Allendorf et al., 2012). Perceptions also play an important role in communities' attitudes toward protected areas (Adams & Hulme, 2001; Infield & Namara, 2001; McClanahan et al., 2005; Ormsby & Kaplin, 2005; Anthony, 2007; Allendorf et al., 2012). Therefore, understanding local people's' perceptions and knowledge about conservation is the key to improving the relationship between people and protected areas and reducing conflicts between humans and wildlife (Weladji et al., 2003). Turfloop Nature Reserve is a protected area that borders several rural villages (Mashatole, 2009). There is no empirical information about their knowledge and perception of nature conservation within the reserve and anecdotal evidence suggests that negative attitudes may exist regarding the nature reserve.

This, therefore, heightens the need to pursue a study that seeks to examine the communities' perception and knowledge and their impact on conservation within the Turfloop Nature Reserve. Understanding these relationships will enable better planning for sustainability and the possible accrual of benefits to the communities surrounding the nature reserve.

1. 3 Rationale

The involvement of adjacent local communities to protected areas is very important for the conservation of biodiversity and natural resources as well as minimising the possible conflicts between local communities, protected areas authorities, and wildlife within protected areas (Wells et al.,1992). This involvement also improves the success of the management regulations of the protected areas (Andrade & Rhodes, 2012).

In part of developing countries, more effort has been made to give local communities control on the management of the protected areas (i.e. South Africa, Kenya, Tanzania, and Zimbabwe). However, very little is known about the knowledge, perceptions, attitudes, and beliefs of local communities on wildlife conservation and protected areas in South Africa (Vodouhê et al., 2010; Thondhlana, & Cundill, 2017). Knowledge and perceptions of local people on conservation are crucial in evaluating the success of conservation and building positive relationships between local people and protected areas' management (Allendorf et al., 2012).

1. 3. 1 Study Aim

The study aims to examine the effects of local communities' knowledge and perception on nature conservation in Turfloop Nature Reserve and to identify challenges related to such conservation in local communities.

1. 3. 2 Specific Objectives

The specific objectives of the study are to:

i. Assess local communities' knowledge of natural resource conservation practices.

ii. Ascertain the perceptions of the local communities around TNR about nature conservation.

iii. Assess the effect of communities' knowledge and perceptions on their interaction with the nature reserve.

iv. Identify the benefits derived by local communities from nature conservation within the nature reserve;

v. Identify the management practices applied and challenges related to nature conservation in Turfloop Nature Reserve;

1. 4 Scientific Contribution

Numerous cases of conflicts between local communities and conservation areas have been reported in South Africa (Anthony, 2007; King, 2007; Boonzaaier, 2010; Snyman, 2014; Thondhlana & Cundill, 2017). This study will help examine, in detail, the underlying causes of the lack of support for conservation areas in South Africa. The study will also be able to identify interventions that are relevant to ensure long- term support and success of the conservation area as well as the maintenance of good relations between local people and protected area management authority. The recommendations from this study can also be integrated into decision-making and therefore, help policymakers and enable managers of the nature reserve to devise strategies that are necessary for the sustainability of the nature reserve.

1. 5 Organisation of Chapters

Chapter one is an introduction. The chapter provides the background to the study, defined the problem and the scientific contribution of the study, as well as the rationale which includes the study aims and objectives.

Chapter _two gives an in-depth review of the literature on the evolution of conservation, explores the concept of protected areas and approaches to conservation. The chapter further, outline the challenges that persist in order to achieve sustainable conservation strategies. Theoretical framework for the study is proposed, formulated and discussed. The review of this literature indicates the gaps that need further research which reinforces the importance of the objectives of this study.

Chapter_ three provides a description of the study area, methodology, procedures, and techniques employed in the study. This chapter further outline the research objectives guiding the research. The research instruments employed, analysis method employed, ethics and limitations for the study are also provided.

Chapter four_ provides an analysis and discussion of the data collected from all nine villages sampled by the local people and the nature reserve management.

Chapter _five presents a summary of the key findings. The chapter highlights the implications and contribution of the study results to the conservation perceptions and protected areas management, outlining the management challenges, making overall observations and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2. 0 Introduction

This chapter reviews the evolution of conservation, the emerging shift in the concept of protected areas, the protectionist approach, and the new model of community conservation as well as their challenges and successes on conservation. This chapter further reviews the local people's perceptions and knowledge of conservation and protected areas, to understand human interactions with their environment and their involvement in conservation. The focus is global and then narrowed down to South Africa, and Limpopo Province. Aspects included in this chapter are the definition of operational concepts, theoretical framework underpinning the study, the evolution of conservation concept, the emergence of protected areas, benefits of protected areas, the approaches of protected areas management and the threats to protected areas. The discussions follow below.

2. 1 Operational concepts

This section provides some of the key operational definitions used in the study. These include community, household, conservation, community participation, protected areas, and perceptions.

2. 1. 1 Community

There is an ongoing debate as to what constitutes a community (Green & Haines, 2008). According to human ecology theory, community is a structure of relationships through which a localised population meets its daily requirements (Luloff & Krannich, 2002). Drawing to this definition, International Institute for Environment and Development (IIED) (1994), defined community as a group of people, physically living in the same area, arising from a common history and cultural heritage, and sharing resources. Borrini-Feyerabend (2004:9) on the other hand, defined community as “human groups sharing territory and involved in different, but related aspects of livelihood, such as managing natural resources, producing knowledge and culture, and developing technology and practices” guided by these definitions, community is being defined in the study as a locality consisting of people living in a geographical area; the resources such people require to survive and progress; and the processes in which such individuals engage to distribute and exchange such resources to achieve local needs and wants.

For the purpose of this study, the villages selected to participate in the study are considered as communities, and the people, resources and households are considered its elements.

2. 1. 2 Household

According to Sesabo et al. (2006), households are different in terms of their needs, their socio-economic, demographic characteristics, and their knowledge. Hence, different households within their framework, view natural resources differently (Kideghesho et al., 2009; Vodouhê et al., 2010; Allendorf et al., 2012). Household is, therefore, defined as a group of one or more people living together under the same roof or several roofs within the same dwellings, which share foods or make common provision for food or other living arrangements (Kideghesho et al., 2009). Therefore, this study refers to houses found within communities selected as a household.

2. 1. 3 Conservation

The IUCN in collaboration with UNEP and WWF (1991) defined conservation as the management of human use of organisms and ecosystems to ensure such use is sustainable. Moreover, IUCN/UNEP/WWF, (1991:234) states, "Besides sustainable use, conservation includes protection, maintenance, rehabilitation, restoration and enhancement of populations and ecosystems" Conservation of biodiversity can, therefore, be interpreted as the protection, maintenance, sustainable use, restoration and enhancement of the components of biological diversity (DEAT, 2004). This study focuses on nature conservation in TNR. Nature conservation is referred to as protecting nature so that it is not overexploited (SANParks, 2008).

2. 1. 4 Community participation

There is a growing realisation that for conservation to be successful, local communities should be involved in the management of protected areas (Ntiamoa-Baidu et al., 2000). According to Wells et al. (1992) and McNeely, (1993), for a community to participate in any conservation programme, the following factors should be taken into consideration, their characteristics, cultural background, social-economic setting, and the management processes. Therefore, community participation can be defined as an active process that involves local communities to take part in the management and decision making on conservation within protected areas. This process further enables the local communities to enhance their well-being and to gain

greater control over their lives and resources which their livelihood depends upon (Beaumont, 1997; Ntiamoa-Baidu et al., 2000; Adams & Hulme, 2001; Barrow & Murree, 2001).

2. 1. 5 Protected areas (PAs)

Globally, protected areas were established as a means for preserving the world's untouched natural areas and to protect the natural resources from ever-increasing human threats. Protected areas are, therefore, defined as "clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values" (Dudley et al., 2012). In general, protected areas can be defined as parts of terrestrial or ocean that are preserved formally for the management of biodiversity through laws (NPAES, 2008). Protected areas include special nature reserves, national parks, nature reserves, and protected environments. A protected area can be declared on private or communal land, with the landowner recognised as the management authority (DEAT, 2004).

The study focuses on Nature reserve as a formal system of the protected area, in South Africa. Nature reserve is referred to as a geographical area, which is declared, managed, and protected for the sake of its biodiversity using legal, or other effective mechanisms, to achieve the long-term conservation of the environment (IUCN, 2008). In the South African context, nature reserves refer to an area declared, or regarded as having been declared, in terms of section 23 as a nature reserve or designated in terms of provincial legislation for a purpose for which that area could in terms of section 23(2) be declared as a nature reserve (DEAT,1997).

The objectives of the nature reserve are to supplement the system of national parks in South Africa to protect an area if the area; has significant natural feature or biodiversity; is of scientific, cultural, historical or archaeological interest; or requires long-term protection for the maintenance of its biodiversity or the provision of environmental goods and services; to provide for a sustainable flow of natural products and services to meet the needs of a local community (DEAT, 1997).

2. 1. 6 Knowledge on Conservation

According to Warburton & Martin, (1999), different terms have been used in literature to refer to the collective knowledge of local people: indigenous knowledge, indigenous technical knowledge, 'traditional' knowledge, and rural people's knowledge. The term community's

knowledge is used here to include local knowledge of people in rural and peri-urban communities who rely on natural resources in some way.

In an African context, local people's knowledge has been ignored and marginalised by outsiders. However, with time, the application of local people's knowledge to conservation issues attracted a growing attention, providing the foundation for participatory approach to development that are both cost effective and sustainable (Myers,1972; Warburton & Martin, 1999). Local people's knowledge on conservation plays an important role in enhancing the success of protected areas. It further guides efforts for protecting habitats of endangered or culturally important species (Johannes & Yeeting, 2001). This knowledge is the resultant of the long-standing relationship between local people and their immediate environment resulting in local people having a good understating of natural resources through resource use, education, and conservation awareness (Gandiwa et al., 2014; Mutanga et al., 2015).

Even though, the knowledge of local people was found to be important in managing and conserving natural resources, knowledge and access to knowledge are not spread evenly through community or between communities even between individuals. Several studies have indicated that people have varying objectives, interests, perceptions, beliefs and access to information and resources (Gandiwa et al., 2014). The strength of people's knowledge lies in local people's ability to observe events over a sustained period and focus on what directly affects their lives (Warbutron & Martin, 1999; Trakolis, 2001; Huntinton, 2011).

2. 1. 7 Perceptions

According to Belkayali et al. (2015), the concept of perception is very significant in analysing the environment. It is defined as the subjective process of making sense out of the surrounding environment and applying knowledge to a situation. Perceptions shows how an individual observes, understand, interprets, and assess a referent object, action, experience, individual, policy, or outcome (Bennet, 2016).

Several studies on conservation and environmental management have used this concept to assess the positive and negative attributes of some aspects of conservation (Vodouhê et al., 2010; Bennet & Dearden, 2014; Belkayali et al., 2015; Bennet, 2016; Tilahun et al., 2017). Therefore, local people's perceptions of protected areas and conservation can be defined in this study as the process whereby local people obtain environmental information to meet their needs.

Several authors (e.g. Mehta & Heinen, 2001; Kideghesho et al., 2007; Tessema et al., 2010; Vodouhê et al., 2010; Bennet & Dearden, 2014; Tilahun et al., 2017) observed that, perceptions on the environment is influenced by several factors, including cultural background (e.g. cultural code, believes, religion and values, individual factors (emotions, personal experiences, theoretical knowledge about protected area, management), social change (ethnic, sex, gender, education, and income), resource scarcity (absolute and relative) and economic factors (social-benefits and costs). Moreover, Bennet & Dearden, 2014 observed that factors such as past experiences, present experiences, personality, and motivation, are very important to how people perceive events or the environment. Understanding all these factors is very crucial to improve the relationships between local people and protected areas (Vodouhê et al., 2010; Bragagnolo et al., 2016).

The perceptions of local people on conservation or protected areas can later form their attitudes towards those protected areas (Bennet & Dearden, 2014). In addition, perceptions of local people towards management processes in protected areas can influence their attitudes to behave in a certain manner (Ramakrishnan, 2007; Vodouhê et al., 2010; St John et al., 2010). For example, when local people believe they are not being involved in the management and not benefitting from protected, they often tend to hold negative attitudes. Attitudes of local people on the protected area can later transform into behaviour (St John et al., 2010). For instance, when local people, hold a negative attitude towards protected area or conservation they tend to not support conservation, giving rise to conflicts between them and those protected areas.

2. 2 Theory of Reasoned Action and Conservation

The approach underpinning this geographic study of the protected area is that of human-environment interrelationships. Underlying this approach is the philosophy that the study of people cannot be undertaken without reference to their environments (Downs, 1970). Alternatively, a study of the environment cannot be done in isolation from the people who have the power to influence and alter the same environment (Downs, 1970). Thus, this study is about humans and the environment as well as their interactions hence the human-environment geographical approach.

There are several theories explaining the attitudes of local people towards conservation, and the theory or reasoned action and the theory of planned behaviour are among those theories. In this study, nature conservation is examined in the context of the theory of reasoned action

(TRA) (Ajzen, 1991). This theory has been used previously in studies of human dimensions of natural resource management and conservation science to understand human thoughts and behaviours and to investigate multiple predictors of behaviour (Fishbein, 1979). Understanding this theory will help protected areas managers as they work with different stakeholders such individuals and communities by allowing them to predict behaviours and attitudes towards future management strategies (St John, et al., 2010).

This theory explains two things Firstly, "that people consider the consequences of their actions before deciding to engage, or not engage in given behaviour it and secondly, people make quite rational decisions based on a systematic evaluation of information available to them (be it correct or not)" (Fishbein, 2008). It suggests that an increase in actual behaviour of an individual, which is an additive function of attitudes and subjective norms leads to a stronger intention to perform the behaviour (Ajzen, 1991; Fishbein 2008).

Conservation represents the overall intention of managing human use of organism and ecosystems (IUCN/UNEP/WWF, 1991). Because conservation represent voluntary and conscious decision to engage in management of ecosystems, it is reasonable to examine how such decisions are made through the use of theory of reasoned action (TRA) as explained below (Figure 1).

Attitudes measures an individual perception of the positive or negative feelings about performing a specific behaviour (Ajzen, 2001; St John et al., 2010; Bennet, 2016). It is determined by the individual's behavioural belief weighted by his/her evaluation of these consequences (outcome evaluations) (Fishbein &Ajzen, 1975; Mishra et al., 2014). Therefore, attitudes influence behaviour, on the other hand, it affects the motivation which determines the behaviour (Ajzen & Fishbein, 1980; St John et al., 2010). Within conservation, there has been a general perception that positive conservation attitude, or a negative attitude towards protected area, are likely to be linked to pro conservation behaviours (St John et al., 2010). For example, individuals or groups who observe or believe they are not receiving an equitable share of the benefits, and they are experiencing some losses of conservation may actively oppose conservation and therefore not adhere to the rules and regulation put in place for conservation. On the other hand, individuals or groups who perceive some benefits from conservation or believe their rights have not been undermined for conservation, may support conservation (Infield & Namara, 2001; Bennet & Dearden, 2014). However, there is an argument that attitudes alone is not an adequate predictor of a behaviour. An individual may have a positive

attitude or negative attitude to conservation and yet still perform behaviour that contradict that behaviour (St John et al., 2010; Bragagnolo et al., 2016).

Subjective norms on the other hand, refer to the perceived influences that others may have. Subjective norms are assumed to be a function of beliefs that individuals approve or disapprove of the behaviour and they are underlined by normative beliefs (St John et al., 2010). In this study, subjective norms are important in predicting pro conservation, behaviours, such as on nature conservation, and the intention to abide by proposed nature reserve rules. Normative social influence towards conservation measures the influence of other people which leads others to conform to be liked and accepted by them (Fishbein & Ajzen, 2010). Although an action may not be accepted or approved by an individual, normative social influence places pressure on an individual to comply with the group's social norms. Normative social influence has been shown to impose a high persuasive influence on individuals. An individual will intend a behaviour when he/she perceives that important others (i.e. partner, friends etc) think he/she should do so (Ajzen & Fishbein, 1980).

For behaviours that are completely under an individual's control, this theory has been proven to predict behavioural intention, which has in turn been demonstrated to predict the actual behaviour (Fishbein & Ajzen, 2010; St John et al., 2010). It is, therefore, argued in this study that local people's perception towards conservation is shaped by attitudes, subjective and social norms. It is hypothesized in this study that the local communities closer to protected areas, might hold a positive attitude towards conservation if they receive more benefit from it and if the costs, they experience from protected areas are lower than the benefits. Hence, an individual, households will intend to perform a certain behaviour when he or she evaluates conservation positively. The outcome of local communities' positive attitude may be that they support conservation, through following management rules of the protected areas.

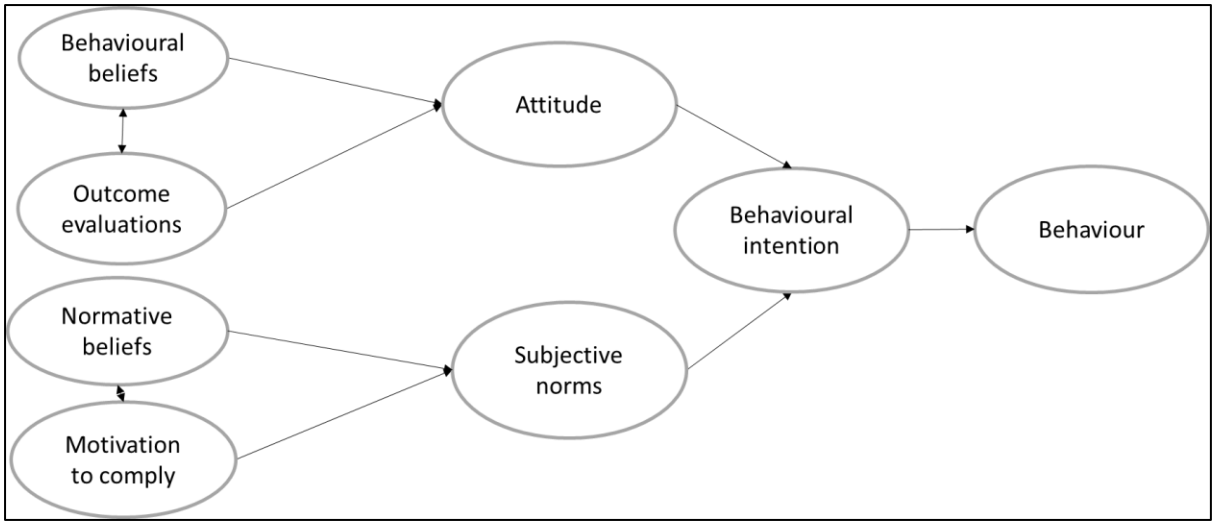

Figure 1: Theory of reasoned action (TRA) (adapted from Vallerand et al., 1992).

2. 3 The evolution of conservation

Globally, humans had a complex relationship with terrestrial areas since time immemorial. Terrestrial areas have long been the centre for human settlement due to their production environment and provided ecosystem services as well as cultural resources to communities around the world (Colchester, 2004; Coad et al., 2008). Today billions of communities around the world depend on natural resources from these areas for their livelihood and survival.

It is estimated that about 4%-5% of the world population are indigenous people living in 70 countries (Cohen, 1999). This population of indigenous people is heavily depending on forest resources and live inside or adjacent to protected lands (Cohen, 1999). Moreover, Mbaya et al. (2001), argued that more than 80% of the people in Eastern and Southern Africa depend on the immediate forest resources for livelihood and survival. South Africa is no different, most of the human population directly depend on natural resources from terrestrial areas for their livelihood, wellbeing, and health care (Arendse & Wilkinson, 2002).

It was documented that the very high dependency of communities on terrestrial areas and increased human population have resulted in a rapid exploitation of the world's natural resources. Over the last century, there was an overwhelming -decrease in the world's biological diversity (IUCN, 1991). People have changed the ecosystems in an intensive way including land cover and land-use changes, the spread of invasive alien species, climate change and pollution, causing a loss in biodiversity and ecosystem services (United Nations (UN), 2015). According to the Millennium Ecosystem Assessment (MEA) (2005), about 60% of the world

ecosystems were already degraded over 50 years ago, due to increased human activities and populations. Moreover, this high dependency led to the loss of the very same terrestrial areas, while undermining rural livelihood (Colchester, 2004; Lopoukhine, 2012).

According to IUCN (1991) and Lopouckhine, (2012) in the late 19th century, there was a global realisation that the world's terrestrial area would soon run out of significant natural resources, therefore, such areas need to be preserved from human activities and threats (Colchester, 2004). This, therefore, led to the conservation of biodiversity and natural ecosystems getting more and more attention (Pratt et al., 2004). Thus, the introduction of protected areas.

2. 4 The emergence of protected areas (PAs)

Protected areas (PAs) are used as a fundamental approach to control the human activities that threaten the ecosystems and wildlife (Stolton et al., 2010). They have long been the cornerstone of international and national conservation strategies (Stolon &Dudley, 2003; Watson et al., 2014). PAs act as a refuge for species and ecological processes and provide space for natural evolution and future ecological restoration (Brockington, 2002; Stolton et al., 2010; Dudley et al., 2012). In Africa, PAs are the cornerstone of biological conservation (Dudley, 2008). South Africa is no different and PAs have been used for decades in the country as a valuable tool for conserving the nation's natural and cultural heritage (DEAT, 2004; Mashatole, 2009).

In the 19th century, the first modern protected areas emerged (Hulme & Murphree, 2001; Mulder & Coppolillo, 2005). The first protected area i.e. Yellowstone National park as such was established in the United States of America, Yosemite in California in 1872. The park was established under the ideology that certain areas of land valued for their natural species should be set aside for recreation and protected from other uses (Chape et al., 2005). According to Adams & McShane (1996) PAs were set up in North America to protect exciting and sublime scenery, while in Africa PAs, were set up to protect wildlife and their habitats to maintain elite hunting traditions, and in Europe PAs were established to protect the landscape and seascape.

Following the Yellowstone National Park was the development of numerous parks globally. For example, many other countries amongst others started protecting natural areas such as Royal National Park in Australia in 1879 and, Tongariro, Virunga National Park in Zaire in 1925. The South African government also adopted the concept of protected areas in the early 1920s, with the Kruger National Park in 1926 (Stevens, 1997; Mulongoy & Chape et al., 2004). Ever since the establishment of the Yellowstone National park, several protected areas around

the world increased exponentially. In the year 1949 less than six hundred protected areas were established worldwide (Chape et al., 2005). Between 1950 and 1990, however, this figure grew to nearly three thousand, of which thirteen hundred were established just in the 1970s (Chape et al., 2005).

According to Chape et al. (2008), in 2005, the world reached a total of 144, 296 protected sites, covering an area of 19,381,000 km², (12.9%) of the earth's land area. Most of these protected areas are in developing countries, where the focus for further expansion is placed due to their elevated level of biodiversity (Chape et al., 2005; Naughton-Treves et al., 2005; Ghimire & Pimbert, 1997). By the end of the 20th century, more than twenty-five thousand protected areas existed world widely to protect nature and prevent threats to biodiversity (Chape et al., 2008).

Currently, there are about 209,000 protected areas in the world, covering 15.4% of the world's terrestrial areas (CBD, 2014). That falls just short of the 17% target set for 2020 by the Convention on Biological Diversity under the Aichi Biodiversity Targets (CBD, 2014). Rands et al, (2010) argued that although 15.4% of the land surface on earth is protected, only 0.5% of territorial seas have been so designated. More than two-thirds of critical sites for biodiversity have incomplete protection or none.

In South Africa today, there are about 422 formally protected areas, which constitute some 6% of the total land surface area. The system of protected areas in South Africa consists of special nature reserves, national parks, nature reserves (including wilderness areas) and protected environments (DEAT, 2004). These protected areas are managed by the national (South African National Parks) and provincial conservation agencies, respectively (Wynberg, 2002; DEAT, 2004). The main mandate of the conservation agencies is to implement programmes to meet conservation targets such as expanding areas under protection consistent with the convention of biodiversity targets, which South Africa is a signatory to (Thondhlana & Cundill, 2017).

There are about 62 (i.e. State-owned and/or declared in terms of NEMBA) and informal (i.e. Private nature reserves not declared in terms of NEMBA) (DEAT, 2004). Formally protected areas in Limpopo province of South Africa, covering over 1,357,156ha (11%) of the area. These areas are managed by the Limpopo Economic Development Environment and Tourism Department and Limpopo Parks and are regulated under the Limpopo Environment Management (LEMA, Act No 7 of 2003) (Rampedi & Moshibudi, 2004).

2. 5 The local benefits of protected areas

Protected areas provide a wide range of benefits to local communities around the world (Safalsky, 2000; Coad et al., 2008; MEA, 2005; Dudley, 2008). According to Stolton et al. (2010), PAs provide more ecosystem services, supporting and regulating services, provisioning services, cultural services, and economic services. Although the benefits of protected areas are clear on a global scale, on local livelihood they depend upon the management strategies i.e. the inclusion or exclusion of those local communities and their livelihood activities, or the sharing of protected area benefits with surrounding communities (Coad et al., 2008; Watson et al., 2014). Moreover, Myers, (1996) and Balmford et al. (2002), pointed out that local communities normally might not recognise these benefits when the cost they experience from the protected areas are higher than the benefits. These benefits normally shape the perceptions and attitudes of local people towards conservation (Gillingham et al., 1999). Some of the benefits of protected areas on local livelihood are discussed below looking at different case studies from around the world (Bennet, 2016).

2.5.1 Supporting and regulating services

Supporting and regulating services are the type of benefits local communities obtain from the ecosystem. The supporting and regulating services include generating and maintaining soils, primary production, sustaining hydrological cycles, runoff control, and soil erosion control and storing and cycling essential nutrients (MEA, 2005). Globally, local communities benefit from protected areas through drinking water. About a third of the world's largest cities receive a significant proportion of drinking water from the watershed inside protected areas (Dudley & Stolton, 2003). In other parts of the world, protected areas are used curb floods and sustain agriculture, for example in Cameroon, the Korup National park provide floods control for agricultural land and help to sustain downstream mangrove fisheries (Myers, 1996).

2.5.2 Provisioning services

This are ecosystem services that local people obtain from the ecosystems. Provisioning services include food, water, timber, and fiber. Resource extraction is one of the greatest benefits of protected areas recognised by many local communities around protected areas (Allendorf, 2010). Some studies have indicated that an increase in forest production through protection has

benefited local communities. For example, in Nepal, the Annapurna conservation area, about 72% of locals gave the sustainable use of resources as their main reason for becoming involved in conservation projects set up by the protected area and reported an increase in fodder, fuel wood trees, forest cover, water resources and wildlife populations (Bajracharya et al., 2006).

2.5.3 Cultural benefits

For many people around the world, the connection of protected areas to their past and all it represents is reason enough to have protected areas. Local communities have had protected areas for cultural benefits through decades. The cultural benefits are those less visible intangible benefits that are highly valued by local traditional communities around the world. These benefits include among others, recreational, aesthetic, and spiritual benefits. Protected areas play a crucial role in maintaining cultural and heritage identity, preserving traditional landscapes and empowering local knowledge. For example, a study by Xu et al. (2006) in Wolong biosphere reserve, in south western China indicated that the principal social development benefit of the reserve is that of increased social stability and cultural identity.

2.7.4 Economic benefits

Tourism is one of the major economic benefits to local communities around the world. Tourism attracts tourist and through tourism local communities can benefit through the sale of goods and services to tourists. Protected areas provide income through jobs and in some cases, they also provide direct income to communities through direct revenues such as park fees. Adams & Infield (2003) argue that tourism projects in protected areas need to embrace the market values of biodiversity attractions, including the tourist's willingness-to-pay in their pricing. This could substantially increase the revenue acquired and would be a significant source of funds for local communities involved in the projects. These funds may be shared directly or invested in community activities. For instance, at the Kwa-Zulu Natal National Park in South Africa, a Community Levy Fund (CLF) has been established, levying charges to visitors for developmental and economic activities both within and outside the tourism areas (Luckett et al., 2003). Many tourism projects also yield significant non-financial benefits through the development of skills and increased access to information, credit, and markets .These benefits can diversify options for financial assets and income, including migration opportunities provided by new roads, as well as employment opportunities within the protected area. A clear

picture of economic benefits available at a local level can assist people understand the role of protected areas in their livelihood (Gillingham et al., 1999).

2. 5 The approaches of conservation

Several approaches to conservation were followed when protecting conservation in the world. These approaches include amongst others, the protectionist approach and community conservation approaches. The approaches are discussed below as follows.

2. 5. 1 The protectionist approach

A protectionist approach aims at protecting nature together with biodiversity and ecosystems from human activities and threats through complete exclusion of human presence to protected areas (Chape et al., 2008). Growing research demonstrated that most of the protected areas in the world were established using the protectionist approach (King, 2007; Mulder & Coppolillo, 2005; Andrade & Rhodes, 2012; Watson et al., 2014). Moreover, Morehouse (1996), pointed out that many, if not all, national parks in the United States are established through a protectionist approach. This protectionist approach for conservation has been the preferred way of conservation for most of the twentieth century especially in game reserves in Africa, such as the Mkomazi game reserve in Tanzania and the Kruger National Park in South Africa (Brockington, 2002; Muhumuza & Balkwill, 2013).

While many protected areas in some parts of world overlap with lands owned and claimed by native and indigenous people, this approach had adverse impacts on their communities (Chape et al., 2008). Some of those impacts include forced removal of local communities, restriction from the utilisation of resources and access to protected areas. For example, In the USA, Yellowstone national park, refused to acknowledge the central rights of local and indigenous people (Spence, 1996b; Gandhi-besbes, 2018). The indigenous people were excluded from the management of Yellowstone, Glacier and Grand Canyon national parks, with some local people being denied the right to access natural resources preserved with those areas (Spence, 1996b). In most cases, this deprivation seems to have detached local communities from the protected areas (Colchester, 2004). Moreover, it has been observed that other local people were being relocated from their homeland to create paths for the extensions of protected areas. Therefore, many protected areas in Southern Asia, North America, Africa, and South Africa particularly failed to fully integrate other crucial factors such as social, cultural, and political issues of local communities (Andrade & Rhodes, 2012). In general, the first model of national

park creation in the U.S.A stimulated local opposition, due to its shifts of resource control from the local or regional level to the national level. For example, Sequoia and General Grant national parks had been largely created in response to regional demand for resource protection, but the creation of the National Park Service made the management of the reserves less responsive to local needs (Dilsaver & Tweed, 1990). The expansion of national parks from the United States set a standard of how protected areas and conservation organisations function worldwide. In Africa, the movement of conservation began with an active protection of species and habitats from over-exploitation and to encourage ecotourism in some areas (Boonzaaier, 2010; Muhumuza & Balkwill, 2013; Mutanga et al., 2015). The protectionist approach was replicated in Africa and was based on policies that discouraged every form of resource use while ignoring the dependence of local communities on the environment (Adams et al., 2004). Also, the people who have been using available resources from the protected areas lost their traditional rights (Baird et al., 2009; Torri, 2011).

The protectionist approach, however, was successful in conserving endangered species of wildlife at a high cost in Africa where two-thirds of the world's biodiversity is located (Lele et al., 2010). The approach was easier to conceptualize in Africa and had measurable success (Mehta & Heinen, 2001), but some costs such as displacement of local people from their traditional lands, limited access from utilisation of resources, park-people conflicts, inequitable distribution of benefits emerged with time (Coad et al., 2008; Wilkie & Brockington, 2015).

According to Brockington, Igoe &Schimdt-Soltau (2006), this approach in Africa discontinued some communities from newly established protected territories and involuntarily resettled some, with sometimes unforgivable socio-cultural and economic consequences. For instance, Neumann, (1998); Kideghesho et al. (2007); Muhumuza & Balkwill (2013), pointed out that communities neighbouring the Serengeti National Park in Tanzania were removed when the park was created. Most reserves were set aside for the elite British communities as hunting grounds and land to be used at the expense of others. As a result, many poor communities in Africa became both the victims and the agents of environmental degradation for they were too often forced to meet short term survival needs at the cost of long-term sustainability. The displacement of people from their traditional lands often led to unsuccessful conservation practices, hence local people who were displaced from their areas of origin held unfavourable attitudes towards the protected areas. The negative attitudes further led to

unacceptable behaviours on protected areas (Boonzaaier, 2010; Vodouhê et al., 2010; Kideghesho, 2016; Duncker & Goncalves, 2017).

According to Okello et al. (2003)**,**in Africa this approach led to some traditionally traveling communities being forced against their wishes to abandon their nomadic existence and adopt a settled lifestyle. Some of the local communities were forced to abandon the use of resources upon which their livelihoods depend, with some of these actions often being without compensation (Borrini-Feyerabend et al., 2004). Due to these circumstances, local communities had no alternative but to use what minimal resources remain, including areas 'protected' for biodiversity conservation (Gillingham et al., 2003).

Restraining local communities from utilising the natural resources led to the failure of conservation in many local communities across Africa (Kideghesho et al., 2007; Vodouhê et al., 2010). Shackleton et al. (2000), for example, attribute the failure of conserving biodiversity in three National Parks in Uganda to restricted access to park resources. This restriction on natural resource access caused negative attitudes amongst local communities (Vodouhê et al., 2010; Duncker & Goncalves, 2017). Failure to adequately compensate these local communities further forced local people to go against park rules and to harvest resources in the park (Kideghesho et al., 2007; Vodouhê et al., 2010).

In 1994, the protectionist approach of conservation similarly plagued the country's protected areas management, as in other parts of southern Africa (Khan, 1994). The protectionist approach was successful in conserving biodiversity in South Africa, however, in the process much human misery and hostile attitudes towards PAs (SANParks, 2000). Local South Africans were forcefully removed from their rural areas and replaced elsewhere without adequate compensation (Callimanopulos, 1984; Volkman 1986; Campbell & Shackleton, 2001). The local communities were then regularly limited or prohibited of access to PAs. Some communities were not allowed any participate or input in protected area's management, or any share of their benefits (Khan, 1994; Ramutsindela, 2003; Kepe et al., 2005; Snyman, 2012). For example, the Makuleke community bordering the north of Kruger National Park was relocated to expand the park for conservation of wildlife (Ramutsindela, 2003; Snyman, 2012). This resulted in elderly people having unfavourable attitudes towards the park due to exposure to historical injustices (Anthony, 2007).

Considering the challenges caused by the protectionist approach of conservation around the world, many African countries began to look at the approach that engages with the local communities, hence the establishment of the community conservation approach.

2. 5. 2 The community conservation approach

After the 1980s, the protectionist approach was challenged by the community conservation approach, after reports on the negative impacts on local communities (Songorwa, 1999; Brechin et al., 2002). According to Brockington et al. (2008), the community conservation approach stresses the need to secure the involvement and participation of local people in conservation in areas adjacent to protected areas. Several authors, (Kiss, 1990; Wells & Brandon, 1992, Kidheghesho et al., 2007) further argue that the inclusion of local communities in conservation, and particularly in nature conservation, is a crucial element for successful conservation. Moreover, Myers (1972:19) wrote that "the future of the parks would depend on the extent to which ecological needs are balanced with socio-economic needs" the purpose of this, is to establish a symbiotic relationship between man and nature reserve. He further proposed that man's role as a component in most ecosystems of Africa be recognised and suggested that multiple forms of land use would allow the gap between conservation and the needs of rural people to be overcome. The local people, especially those living in and around protected areas, have important and long-standing relationships with these areas. Therefore, their needs, aspirations, and attitudes must be considered in protected area management. Otherwise, the long-term survival of protected areas will be jeopardised (Songorwa, 1999).

In Africa, several conservation projects, promoting community conservation were established to encourage the participation of local people in conservation (Kideghesho et al., 2007; Boonzaaire, 2010; Mamo, 2015). Some of those projects include The Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) in Zimbabwe, Selous Conservation Programme in Tanzania, Purrous project in Namibia and Maloti-Drakensberg Transfrontier Conservation in South Africa (Boonzaaire, 2010; Wittmayer & Büscher, 2010). All these projects have the same fundamental set of objectives, which is the protection of the integrity of the protected areas, and benefit to the local people (Fiallo & Jacobsohn, 1995; Boonzaaire, 2010). Also, these conservation projects are aimed at giving local people access to resources such as firewood, thatching grass, traditional medicine, water, and bushmeat.

Moreover, the South African, National Parks adopted a proactive strategy of conservation-based human development and natural resource management (SANParks, 1995). This was achieved through the establishment of several community development projects in the national parks and the consideration of the possibility of allowing communities around the parks to harvest resources (e.g. fuelwood collection) (SANParks, 1995; SANParks, 1997). Several parks management committees and community forums were formed in order to increase dialogue around the management of natural resources and the participation of communities in the management of the parks in general (SANParks, 1998).

According to Chellan & Khan (2008), the South African government has attempted to ensure that those communities that were exposed to vicious social injustices and prohibition from land ownership and rights have these restored and their participation in decision-making is encouraged (Department of Land Affairs, 1994 cited in Chellan & Khan, 2008). Moreover, the principle that biodiversity and protected areas must benefit people is contained in a 'White paper on the conservation and sustainable use of South Africa's biological diversity' (Department of Environmental Affairs and Tourism, 1997) and in the National Environmental Management: Protected Areas Act, 2003 (Act No.57 of 2003) (Republic of South Africa, 2003), which states that protected areas must be able to deliver some needed benefit to neighbours and that mechanisms to ensure this must be outlined in that protected area's management plan (Boonzaaier, 2010).

Although the community conservation approach promotes local participation and benefits for local people, the challenge is for the smaller protected areas in South Africa (i.e. municipal and provincial reserves). These protected areas have fewer financial and skills resources, to engage with this complexity (Taylor & Atikson, 2012). According to Boonzaaier (2010:6), "experience has proved that it is not easy to involve local people in the planning and implementation of conservation programmes, one of the main reasons for this is the struggle to find the correct balance between the economic development of people and the conservation" the focus has been on conservation rather than the socio-economic development of people (Coad et al., 2008).

Despite the theoretical emphasis on the involvement of local communities on conservation most literature sources fail to describe the people concerned. They also fail to describe people's relationship with the local natural environment (Boonzaaire, 2010; Thondhlana & Cunhill, 2017). Thus, little is known about the knowledge and perceptions of local communities on

conservation within protected areas in South Africa (Vodouhê et al, 2010; Boonzaaire, 2010; Thondhlana & Cundill, 2017). Thus, this study aimed to reach a better understanding of the local communities' perception of conservation using evidence from Turfloop Nature Reserve in Limpopo province of South Africa.

2. 6 Local communities' threats to protected areas

Numerous protected areas (PAs) have been created globally to safeguard wildlife and other natural resources. However, significant threats from anthropogenic activities and the decline of wildlife populations persist, while conservation efforts in most PAs are still minimal. The threats are discussed in the African context and they include population growth and poverty and inequality.

2. 6. 1 Population growth

Human population growth refers to an increase in number of people living in an area during a specific period. The human population in Africa was approximately 13.3 million by 1900s when the first national park was created (Muhumuza & Balkwil, 2013). Today, there are about 92.3 million people in Africa, which make Africa the second most populated continent after Asia with a population of approximately 4.5 billion. The population of Africa is expected to double from 0.8 billion to 1.8 billion in the next 40 years. By 2050 Africa, is expected to have around 2billion inhabitants (ILRI, 2009; Muhumuza & Balkwill, 2013). It is therefore, of importance to acknowledge the factor of human population in the current process of managing protected areas.

While human population growth is caused by an increase in human numbers, in other areas human population growth results from a general expansion from nearby population centers. For instance, Joppa et al. (2009), in his study on the Kafue National Park in Zambia, found out that with time, distant rural population centers grew outwards in all directions, threatening Kafue National Park. This is a common trend for most protected areas in Africa (Joppa et al., 2009). Similarly, in the Gauteng Province of South Africa, urban development is beginning to surround small-protected areas such as the Abe Bailey Nature Reserve. Wittemyer et al. (2008), in other developed countries, also found that human density tended to increase outside protected areas through urban development and increased residential market values of land near 'nature'.

Human population growth has resulted with an increase on demand for natural resources, which led to the establishment of protected areas. When the human population's needs are constantly growing, the fragmentation of the environment is likely to accelerate, resulting in very few "natural" areas. In this context, the pressure on protected areas (PAs) is rising rapidly and their ability to conserve nature in the long term is increasingly uncertain (Stolton et al., 2010; DEAT, 1997).

PAs were established throughout the world to minimise the risk of wildlife extinction from over-use. However, in Africa, there was a recognition that protected areas themselves may cause an increase in human population size, due to protected areas because of the opportunities and benefits protected areas offer in a world of decreasing resource availability (Carew-Reid, 2003; Wittemyer et al., 2008).

Human population growth involves settlement expansion, which has resulted in the encroachment into protected areas, constriction of species into marginal habitat patches, and increased direct competition for coexistence (Stolton et al., 2010; Mamo , 2015). In Africa the encroachment of human settlement into protected areas has been documented mostly in Nigeria, Uganda, Ghana, Congo, Kenya, Tanzania, Zambia, and South Africa to name a few countries (Muhumuza & Balkwill, 2013).

Growth in the human population further affected nature conservation in various ways and to conflict between humans and wildlife in communities within and at the margin of the protected areas. Firstly, the high human population limits the enactment of by-laws (Nkonya et al., 2005) secondly, people may increase pressure, demanding access to the protected areas and illegally accessing the protected areas resources (Muhumuza & Balkwill, 2013).

2. 6. 2 Poverty

Many African protected areas i.e. nature reserves have been established in rural areas, where most of the population is living under poverty (Adams et al., 2004; Wilkie & Brockington, 2015). Lele et al. (2010) similarly stated that some of the world's poorest countries have a significant proportion of their territories designated as protected areas in the most remote parts where the rural poor often live.

These areas are expected to support this impoverished and marginalised segments of human population found in rural areas (Swanson, 1991). One way of supporting them is to intensify

the exploitation or use of the environment. According to Lele et al., (2010) and Stolton & Dudley (2003), the rural poor people largely depend directly on natural resources to sustain their livelihoods but are forced for survival to use them unsustainably. As noted earlier in this study, in many circumstances' conservation cannot and will not happen without the support of the relevant communities. Several studies have concluded that conventional conservation initiatives have harmed the world's poorest and most marginalised societies living adjacent frontiers to protected areas where they come into conflict with biodiversity objectives (Infield, 1988; Borrini-Feyerabend et al., 2004; Mamo, 2015; Wilkie & Brockington, 2015). However, at the same time, it has been demonstrated that poverty and often has a deleterious effect on protected areas (Stolton & Dudley, 2003; Lele et al., 2010).

In Sub-Saharan Africa, for example, Makhanya & Ngidi, (1999) present the top threats to protected areas as poverty-related that include unsustainable resource extraction (e.g., illegal hunting or fishing and fuelwood collection) and encroachment for agriculture. For example, growing poverty in Zimbabwe has led to the over-exploitation of natural resources and the increase of illegal activities including poaching (Gandiwa et al., 2014). Moreover, poverty contributes greatly to biodiversity loss in Zimbabwe's ecosystems, about 76% of rural households in Zimbabwe are poor (Mutanga et al., 2015). Poverty in rural areas has led to unsustainable exploitation of natural resources as people there increasingly engage in unsustainable livelihood strategies such as the cultivation of marginal areas, alluvial mining and commercialization of forest and non-forest products (Carew-Reid, 2003, Makindi, 2010).

About nearly half of the population in South Africa was considered chronically poor at the upper-bound national poverty line of ZAR 992 per person per month (2015 prices) (StatsSA, 2015). This segment of the population is characterized by high poverty persistence. Most of these poor population is found in rural communities of South Africa such as Limpopo Province. In Limpopo Province, 88% of the province's population of more than 6 million live on 33% of the Province's surface area of 4 million hectares (Boonzaier, 2010). Unemployment is estimated at about 60% of the population, with the result that most of the population relies directly on environmental resources, such as the topsoil, plants, trees, animals, grazing and water, for their livelihood (De Beer, 1999).

2. 7 Conclusion

This chapter has provided a detailed review of the theoretical framework of the study by contextualising conservation and protected areas trends across the world and South Africa, the management approaches and the threats to conservation. Protected areas involves one-way task of transforming conservation institutions to meet defined goals that integrate biodiversity conservation with social and economic aspects of the community.

Globally, Conservation have proven to have played an important role in the effective management and sustainabilty of natural resources. Several studies in the African context have shown that through protectionist management of protected areas, many local people's perceptions and knowledge were not integrated in the management of nature conservation, with more communities being denied opportunity to utilise resource from the protected areas . This has influenced local people to behave in a certain manner such as poaching and illegal harvesting of natural resources and these behaviours have a direct effects on the management and regulations of conservation leading to unsustainable conservation. Due to these resultant behaviours local people were later involved in the management of conservation through community conservation approaches. Local people's needs were then taken into consideration, however, these conservation area continue to encounter challenges as local people's knowledge and perceptions were not fully studied. It has been shown in the studies that local people's knowledge and perceptions on conservation depends on various factors such as access to information, costs and benefits, and experiences if fully studied and understood, can improve the management of protected areas. The chapter further focused on local people's perception of protected areas and gave the theoretical framework within which the concept of perception, attitude, and behaviour are discussed in link to community support for conservation. The following chapter presents a detailed discussion of the research methodology employed in this study.

CHAPTER THREE

RESEARCH METHODOLOGY

3. 0 Introduction

Leedy & Ormrod (2001:12) define research methodology as "the general approach a researcher takes in carrying out the research project; to some extent, this approach dictates the particular tools the researcher selects". This chapter, therefore, outlines the rationale for the research design and methodology used in the study to collect data. It provides the sampling method and data collection techniques used and presents procedures for analysing the collected data. The chapter also provides a description of the study area and sampling methods.

3. 1 Description of the study area

The Turfloop Nature Reserve (TNR) is located 23˚53'9.6''S and 29˚46'14.16'' E, about 27 km east of Polokwane city, along the R71 road in the Limpopo Province of South Africa (Figure 2). The TNR is bordered by the University of Limpopo on the west, the R71 road (linking Polokwane and Tzaneen town) and Badimong village on the south, Ga-Kama village on its north and communal land on the east. It covers an area of 503 ha in size, which includes an estimated 50 ha of immense granite hills and outcrops, agricultural facilities, and a dam (Turfloop dam) which is fed by the Pou River; a seasonal Spruit (Mashatole, 2009). The network of water bodies (Pou River) within the TNR is associated with the population of water birds such as Southern bald ibis, number of Antelopes, Blue Wildebeest, Impala, and Kudu. Many Giraffes and Ostriches are also housed in the reserve (Mashatole, 2006).

TNR falls within the Savanna biome. According to Brendenkamp &Van-Vuuren, (1977) the vegetation of TNR falls broadly within the sour mixed bushveld, situated on the margin of the Polokwane Plateau Bushveld and the (PPB) Mamabolo Mountain Bushveld (MMB). The reserve is situated 1312 m above sea level and has a mean summer temperature of 27ºC and experiences a mean winter temperature of 18ºC (SAWS, 2006). According to Mucina & Rutherford (2006), the daily maximum temperatures for the area are 33.2°C or higher during the summer months and can be as high as 24°C during June and July (winter months). The

mean annual rainfall varies between 400 mm and 600 mm with a mean of 500 mm (SAWS, 2006). Turfloop nature reserve is located at the heart of Mamabolo tribal authority.

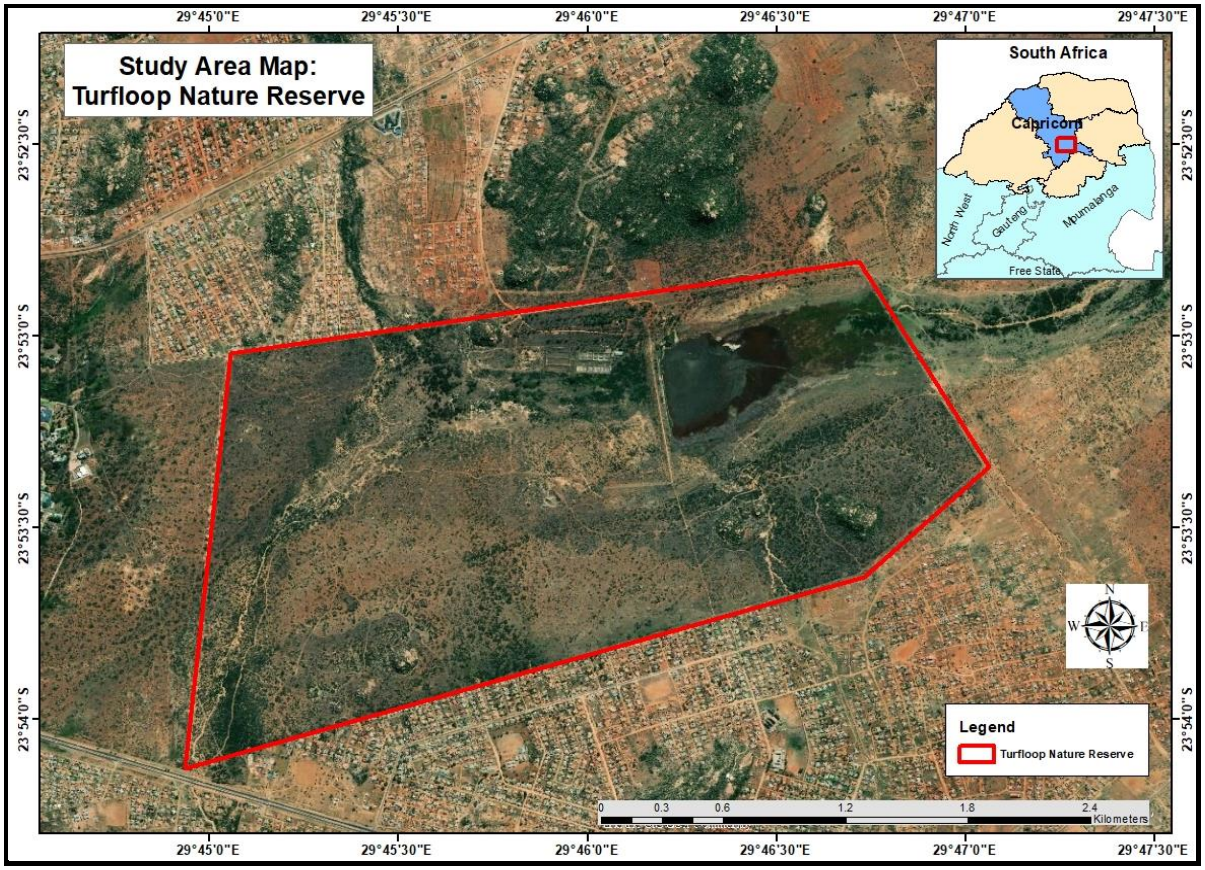

Figure 2: Map of Turfloop nature reserve

3. 2 Research Design

A research design is a plan of how a researcher proceed in determining the nature of the relationship between variables (Leedy & Ormord, 2001). This study followed a mixed-methods approach by conducting a quantitative questionnaire survey and qualitative in-depth interviews using semi-structured interview guides. This approach was adopted because it captures the best of both quantitative and qualitative approaches thus increasing methodological rigor (Allendorf et al., 2007).

The quantitative approach was adopted in this study to capture trends and the relationship between variables observed. The qualitative approach, on the other hand, enabled the researcher to explain the trends and aspects that are not quantifiable, but important to achieving

the objectives of the research. Hence, observation, opinions, and feelings expressed by the participants could only be captured through open-ended questions and interviews. According to Raval (1994) in Allendorf et al. (2007), qualitative approach is best suitable for studies which examine the nature of protected areas and perceptions of local communities.

3. 3 Sampling Procedures

Sampling is defined as a process of identifying and selecting a relatively small sample (n) from a larger delineated population (N) so that the information collected from the sample allows the researcher to understand and make judgments about the larger population (Creswell, 2003). In this study, sampling entailed the selection of communities and households into the study sample. The selection criterion for the communities was that they should be within a four-kilometer radius from the Turfloop nature reserve. It was predicted that communities located further than this distance would have little interaction with the TNR and thus there would be little useful information that could be collected from them.

3. 3. 1 Sampling frame: Selection of communities

A sampling frame refers to the entire group of communities the researcher is interested in and wants to study (Bless & Higson-Smith, 2000). For this study, the sampling frame consisted of all communities that are within a 4km radius to the Turfloop Nature Reserve boundary. The choice of a 4km radius approach was adopted from the existing literature (Infield & Namara, 2001; Jim & Xu, 2002; Allendorf et al., 2007; Boonzaier, 2010; Vodouhê, 2010). These communities were also selected based on the rationale that communities that are closer to the protected areas are the ones that mostly bear the difficulties induced by the protected areas (Infield & Namara, 2001; Allendorf et al., 2007; Vodouhê, 2010). Moreover, Allendorf et al. (2007), in his study of resident's perceptions of Royal Bardia National Park in Nepal, established a study area 0-4km wide around conservation area, with the idea that attitudes resulting from either positive or negative perceptions coming from the conservation will generally be most noticeable in those communities living in the close proximity. The Geographical Information System (GIS) software using the Arc Map 10.8 tool, was used to select the sample frame of the study and create a map of the sample to determine the proximity of communities to the nature reserve boundary using a buffer distance of 4km. After establishing a buffer of 4km radius to TNR, nine communities were found to fall within the distance specified. These nine communities, with a total population of 6480 households,

therefore, formed the sampling frame of the study. The list of the number of households within each community sampled was taken from StatsSA, 2011 census data 2011 (Figure 3).

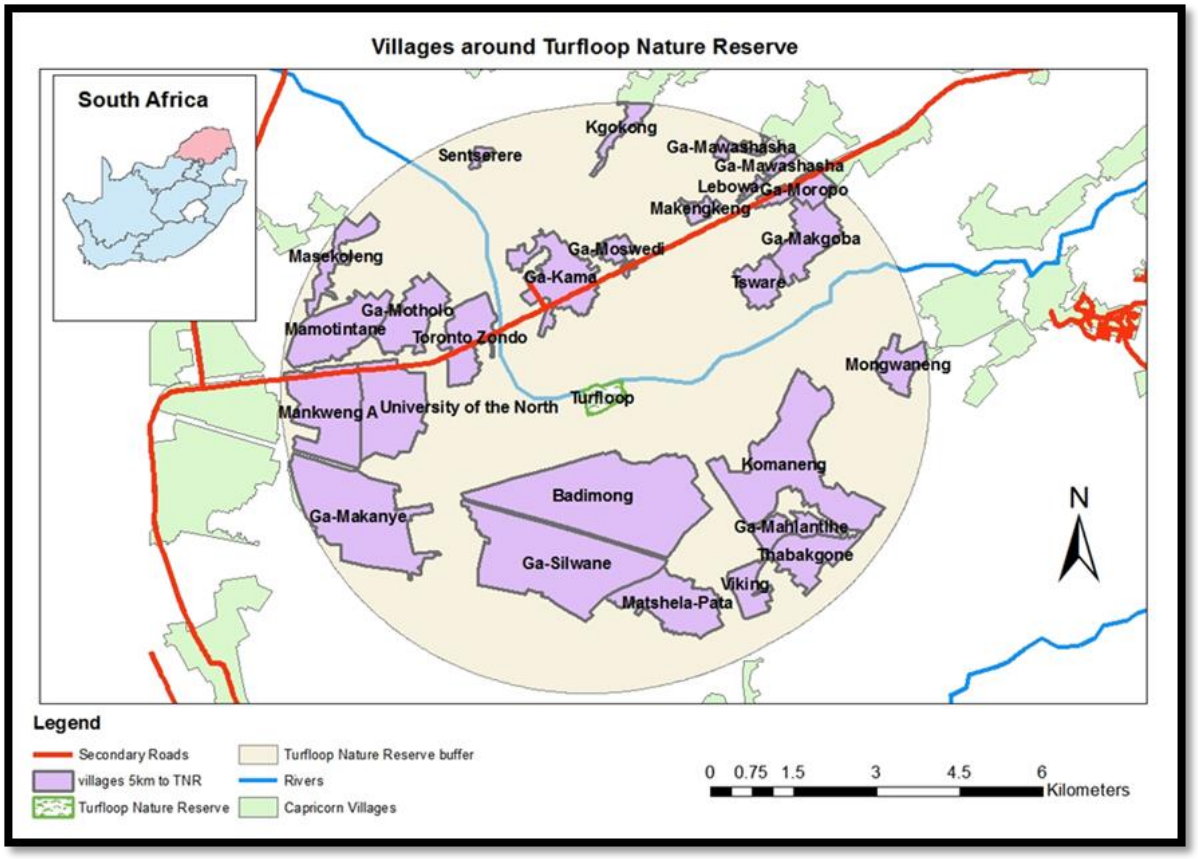

Figure 3: The sampled communities (4km radius to TNR)

3. 3. 2 Sample size

The sample size refers to the number of households taking part in the survey within the study area. Sample size must be the representation of the entire population. The researcher could not study all the households from the communities selected due to time and cost considerations. However, with a larger research budget, more households might have been sampled. Hence, the need for sampling. Various sample sizes formulars have been developed to produce acceptable sample sizes. The total sample size for this study was determined using the Cochran formula (1977).

$$n = \frac{\left(\frac{z\alpha}{z}\right)^2 * p * q}{(W)^2} \quad (1)$$

Where:

n = required sample size

$(z\alpha/z)^2$ At α = 1.96 for 95% confidence level)

$P*q$ = Degree of accuracy (5%), expressed as a proportion (0.05); It is the margin of error

W ` = Researcher's willingness to accept the margin of error in which is 7% (0.07%) Therefore, the sample size for this study was a total of 196 households from all the nine communities.

3. 4 Sampling methods

Following the mixed-methods approach, the study was conducted by applying both probability and non-probability sampling. This was done using purposive sampling, stratified random sampling (proportional stratified sampling) and simple random sampling in selecting households and respondents within selected communities.

3. 4. 1 Stratified sampling: Selection of households

Stratified sampling was used in the study, to select households within the communities that are 4km radius to the nature reserve to those over 5km from the nature reserve boundary. Therefore, the area was divided into nine stratified sampling units represented by pre-determined categories of the distance from the nature reserve. This method was adopted to ensure that the households selected meet the specific characteristic outlined in the study, so that the sample reflects a true proportion of households required without the chances of excluding households that form part of the study population (Creswell, 2003).

This was achieved by using the formular below, dividing the total number of households in all communities (4km radius) to the nature reserve and multiplying them with the calculated sample size to give the representative total number of households to be studied in each community. This sampling method was employed in studies by Jim & Xu (2002) and Xu et al. (2006) to ensure the proportional representation of households in the region identified.

$$ni = \left(\frac{hi}{N}\right) \times n \quad (2)$$

Where:

Ni = Allocation in the *i*th stratum

hi = strata (e.g. Ga- kama= 620)

N = Population of households (6480)

n = Sample Size (196)

Table 1: Number of households sampled in each community and its distance to TNR

Stratum (Villages (communities) sampled (4km radius to TNR)	(Population elements (*hi*)) Household size	Proportional Sample size $ni = ((\frac{hi}{N}) \times n)$	Distance to TNR (km)
1. Ga-kama	620	18	0-1
2. Iraq	348	10	1-2
3. Makeketela	781	24	3-4
4. Matsea	422	13	3-4
5.Makwalaneng	420	13	3-4
6. Komaneng	428	13	3-4
7.Monywaneng	517	16	1-2
8. Badimong	2756	83	3-4
9. Tshware	188	6	3-4
Total	*N*=6480	*ni*=196	

3. 4. 2 Simple random sampling: Selection of households' respondents

Simple random sampling was adopted within the categorised distance (4km) to ensure that the households sampled had an equal chance of being selected. All the households in the given

community (strata) were identified using a list from the municipality which was arranged using stand numbers. Therefore, using computer Microsoft excel, 196 random numbers were generated, to randomly select all households from the communities to form part of the study. Therefore, households in this study were used as units of analysis because it is in the household that major decisions relating to resource use are made (Mutanga et al, 2015). The participating population was restricted to an adult member of the household, (18 years and above) which were selected by walking through the communities.

3. 4. 3 Purposive sampling: Selection of key informants

Patton (1990) and Creswell & Plano Clark, (2011), observed that purposive sampling is employed in many different qualitative studies to identify and select individuals nor groups of individuals that are especially knowledgeable about or experienced with a phenomenon of interest. Purposive sampling was selected for the second phase of the study to select a few participants according to a list of specific criteria. Initially Turfloop nature reserve director, Government officials from LEDET and the community leaders were consulted and asked to nominate groups or individuals involved in conservation initiatives at different levels of participation. Following this, the TNR director and government officials (LEDET), as well as the Chief leader, were interviewed based on the knowledge they possess about conservation, nature reserve and the community interaction with the nature reserve.

3. 5 Data collection instruments

According to Bickman & Rog (1998), several techniques cutting across qualitative and quantitative research, are required for reliable results in a study. Also, De Vos et al. (2002), pointed out that qualitative and quantitative techniques can be blended to provide insight into the same events through triangulation. Therefore, this section discusses both secondary and primary data collection instruments that were adopted in the study.

3. 5. 1 Secondary data

Secondary data collection instruments used in the study include an in-depth study of relevant literature on the research topic. Information was gathered through the review of library books, maps, journal articles, general media, census data (StatsSA, 2011), conferences and seminar proceedings, project proposals, and evaluations of past and ongoing conservation-oriented projects in the area and websites. The information derived from the initial literature review and

the preliminary study undertaken in the study communities was used to shape the research objectives and generate guides for interviews.

3. 5. 2 Primary data

To complete data collection, two primary data collection instruments were used this includes key informants interviews for the qualitative part of the research with open end ended questions (Appendix D attached) and semi-structured questionnaire for households respondents with both open and closed ended questions for the quantitative component of the study (Appendix C).

3. 5. 2. 1 Questionnaire survey

Semi-structured questionnaires with both open ended and closed ended questions (Appendix C) were administered to 196 randomly selected household heads in nine communities. The questionnaires were designed to collect information on household demographics, socio-economic and spatial characteristics of the respondents, the benefits, and costs of the nature reserve on local communities, local people's perceptions of an array of the reserve management aspects. The questionnaire was pre-tested in one of the communities that was not part of the selected sample.

Communities knowledge related to nature conservation was assessed using an item questions which includes knowledge on the presence of TNR, knowledge on the natural resource use, and access within TNR, knowledge of conservation and, the importance of TNR in conserving natural resources (Appendix C). Knowledge questions were utilized to explore participant's general knowledge of the nature reserve and awareness regarding the importance of the nature reserve. Conversely, local people's perceptions towards conservation were assessed using a five-point Likert scale questions, which included perceptions towards the presence of TNR, towards resource use and access, towards benefits of conservation, towards consultations and toward relationships and support for conservation. Also, the respondents were asked about their overall satisfaction levels with the existence of the TNR.

To identify the benefits derived by the local communities from the nature reserve, socio-economic indicators describing: employment status and monthly household incomes and direct benefits of conservation were used as variables to measure the benefits communities obtained

from the TNR. The questions on benefits served as a guide to identify the willingness of local communities to support conservation within TNR.

All interviews were conducted in Sepedi, which is the local language and translated into English. Both tape recordings and notes taking were used during interviews to capture information comprehensively.

3. 5. 2. 2 Key informants' interviews (KII)

Face to face semi-structured interviews with both open ended questions were conducted with the Turfloop nature reserve director, government representative (i.e. LEDET) and community leaders (Ntona from Mamabolo village). This was done to elaborate more on the study and to generate detailed views, experiences, and opinions regarding knowledge on TNR, management practices employed in the nature reserve, relationships between local communities and Turfloop Nature Reserve authorities. All the interview sessions were tape-recorded, and handwritten notes were used to support the recordings. This assisted the researcher with the transcription of the interviews for analysis purposes.

3. 6 Data analysis

Mouton & Marais (1996) refer to data analysis as a consistent process where, order, structure, and meaning is brought to the mass of data collected. Quantitative data captured through households' questionnaires from closed ended questions was analysed using the Statistical Package for the Social Sciences (SPSS) version (2.3) software. This form of data was given individual codes for the fixed responses. Qualitative data from open-ended questions was used to support trends identified in the quantitative components of the study. The tape-recorded data collected through interviews was transcribed and typed to give a general sense of the information. Direct quotes from the interviews were used to illustrate points and emergent themes. Several steps discussed below were followed in analysing collected data.

3. 6. 1 Descriptive statistic

Descriptive statistics were used in analysing the demographic characteristics (i.e. age, sex, gender), socio-economic status (employment status, education level), and spatial variables (Period of residence) of the households sampled. The descriptive statistics performed include frequencies(n) distribution and/or percentages (%) to measure the independent and the

dependent variables in the study. Frequencies were presented in a tabular and graphical form. Cross tabulation were used to analyze the effects of communities knowledge and perceptions on nature conservation, the benefits received from conservation, the management practices and challenges related conservation and the overall attitudes of local communities on conservation by checking their relationship with the demographic, socio-economic and spatial variables of the respondents.

3. 6. 2 Chi- square

Inferential statistics of Pearson's Chi-square (x^2) was adopted in this study to measure and test the association between dependent (i.e. Perception, benefits, knowledge, attitude) and independent (i.e. age, education level, gender) The Pearson's Chi-square (x^2) was used in several studies investigating the perception of local people on protected areas, to determine if two variables were independent of each other, with a significance level of 0.05 (P<l0.05).The following formula for the Chi-square (x^2) model was used.

$$x^2 = \sum \frac{(O - E)2}{E} \quad (3)$$

Where:

O= observed value(s)

E= expected value(s)

3. 6. 3 Multivariate linear regression model

Multivariate linear regression model was also employed in the study to establish the effect of socio-economic, demographic, and spatial variables that influence community the overall attitudes of conservation within TNR. Belkayali et al. (2015) in his study, used the multivariate linear regression model to detect the perceptions of the residents in Kure Mountains National Park in Turkey. The following formula of the multivariate regression model was used:

$$Y = A + b1x1 + b2x2 + b3x3 \quad (4)$$

Where:

Y= expresses the dependent variable (local people's attitudes toward TNR).

A= shows the invariance coefficient;

bn= independent variable coefficient and;

xn = independent variable (gender, age, education, level of satisfaction).)

3. 7 Ethical consideration

The researcher obtained permission from the University of Limpopo ethical committee before conducting this study (Appendix B). Permission to conduct the study in the sampled villages was obtained from the department of local government, (i.e. Limpopo Department of Economic Development, Environment and Tourism) and the respective local authorities, as well as the relevant traditional Chiefs before the start of the survey. The researcher revealed the aim and objectives of the study as well as the procedures to be followed upfront to study participants, stressing that their participation was voluntary and that they could withdraw their participation whenever they felt like doing so. The researcher ensured that all participants completed an informed consent form. During the study, the researcher strived to be honest, respectful, and sympathetic towards all participants. All participant's information and responses shared during the study have been kept private and the results were presented anonymously to protect the identities of the participants.

3. 8 Limitations of the study

The study respondents comprised the local people living 4-km radius to the nature reserve and the management staff working in the protected areas under study as well as government and local leaders in the areas. Due to time and financial constraints, the researcher could not make comparisons with communities further away from the nature reserve and the entire network of protected areas in the Limpopo province.

3. 9 Conclusion

The chapter has provided a detailed description of the study area, discussion on the sampling procedures and justification of the methods employed, outlining the data collection instruments utilized. The following chapter presents and discusses the results of the study.

CHAPTER FOUR

LOCAL COMMUNITIES' KNOWLEDGE, PERCEPTIONS AND EFFECTS ON NATURE CONSERVATION IN TNR

4. 0 Introduction

This chapter presents and discusses the study findings of household respondents. This include the demographic, socio-economic and spatial variables of the respondents,' knowledge, perceptions, benefits, and attitudes of local people on conservation within Turfloop nature reserve. An analysis and discussion of the key trends and differences between communities and among households and respondents were also provided as well as the reasons for the differences observed. To complement data collected from household respondents, key informant interviews were held with the Nature reserve manager, the government representative from LEDET and the Chief leader to understand further the management and conservation as well as the challenges of such conservation management in the reserve. The analysis was further organized into themes.

4. 1 Demographics, socio-economic and spatial characteristics of the respondents

This section describes demographic, socio-economic, and spatial variables of the sample (gender, age, education level, marital status, monthly household income, employment status, period of residence in the area and distance to the nature reserve). These variables are important since households of different demographic and socioeconomic status may also have varying perceptions of local conservation.

4. 1. 1 Gender

The study comprised of more (55.6%) female household respondents than males 44.4%. This gender disparity was a result of the fact that more women were at home in the communities during the survey times in comparison to men, most of whom were at work away from home. Although gender is built upon sexual characteristics, it refers to how roles rights and responsibilities for men and women are defined in each society (Bragagnolo et al., 2018). It is

envisaged in the study that gender may influence community's perception of conservation since men and women perform different tasks and may enjoy different benefits from conservation.

4. 1. 2 Age and marital status

The total sample was divided into five age groups (Figure 4). The age distribution shows that most (23.0 %) of the respondents were between the ages of 31-40, about 21.9% were between 18-30 years while 19.4% were 61 years and above. A further 18. 9% of the respondents were between the ages 41-50, while the remaining 16.8% were aged between 51-60 years. Study results further show that the most (40.3%) of the household respondents were married, while 39.3% were single and 16.8% were widowed. The remainder were either separated 1.5%, cohabiting 1.5%.

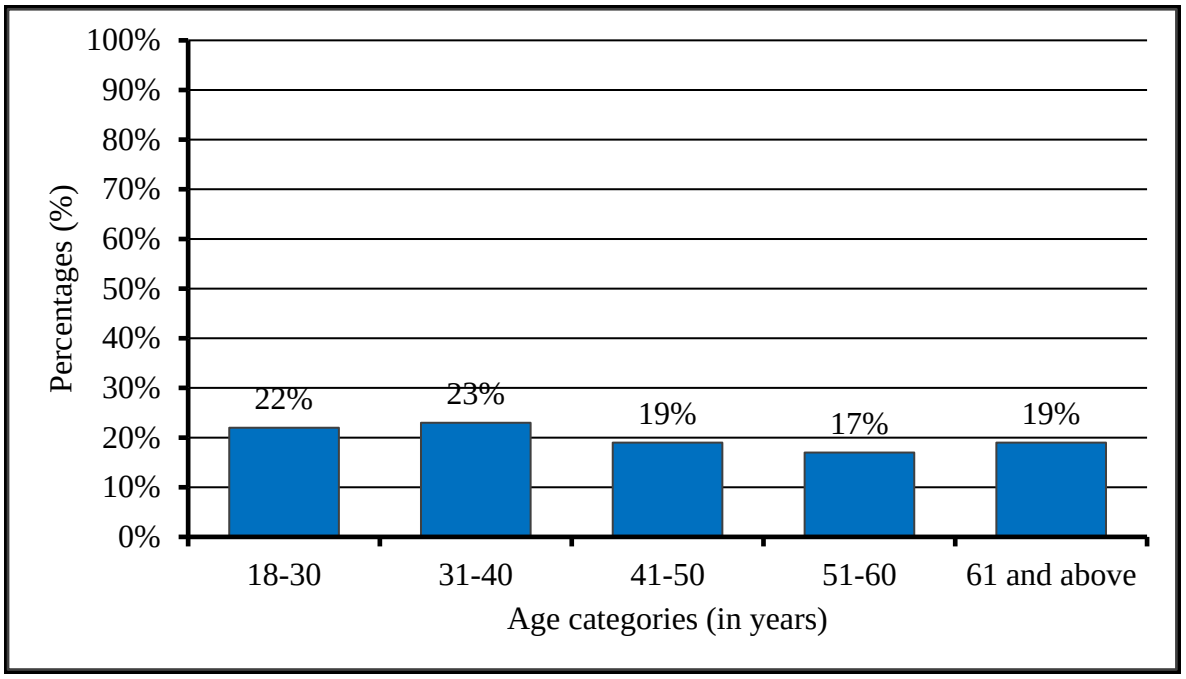

Figure 4: Age of household respondents (Source: Survey data, 2018).

4. 1. 3 Education level

The study shows that more than half (53.1 %) of the household respondents had obtained secondary education, about 21.1% obtained tertiary education and 13.8% of the respondents had obtained primary schooling education, only 11.7% of the respondents had no formal schooling (Figure 5). The education levels in all the sampled communities increase with level, from no formal schooling to secondary education and then decrease with tertiary education. This can be attributed to the fact that there is a lack of funding for tertiary education, while

education is free for most primary and secondary schools in rural South Africa. According to Makindi (2010), education is a very important factor contributing to successful community conservation. Through education, local people are likely to understand information on natural resources issues and livelihood economic options. This point was further elaborated by Kideghesho et al. (2007) and Okello et al. (2003) who highlighted that conservation education programmes are likely to be unsuccessful when local communities have low levels of education. Moreover, Ntiamoa-Baidu (2001) and Vodouhê et al. 2010 observed that when local communities are literate, they can usually take advantage of the benefits and opportunities from conservation and this can further take communities out of poverty while reducing threats on conservation. However, when they are illiterate, they might not take advantage of the opportunities available.

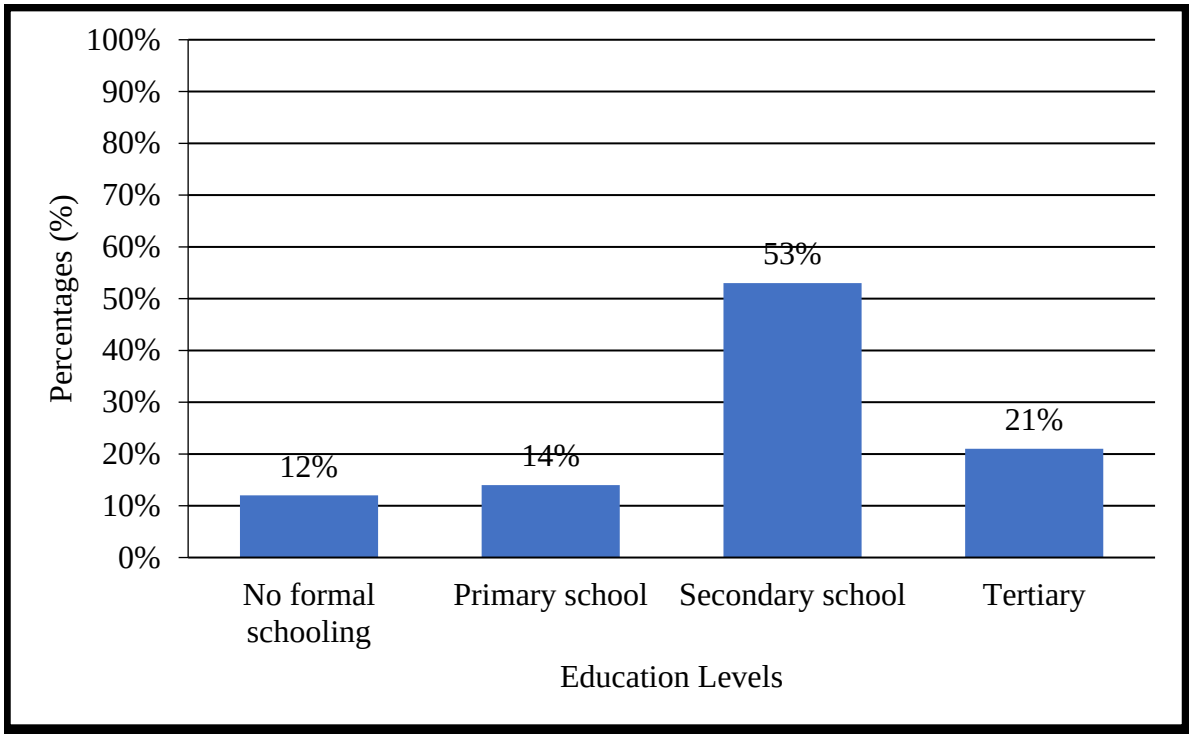

Figure 5: Highest education level (Source: Survey data, 2018).

4.1. 4 Period of residence

More than two-thirds (66.8 %) of the household respondents had stayed in their communities around the TNR for more than 21 years, this signifies that they may have an adequate knowledge of developments and prevailing issues in their neighborhood. Those that had stayed

in the study area for between 16-20 years constituted 12.8 % of the sample, while another 12.2 % of the respondents had been staying in the study area for less than 5 years, about 4.6 % reported that they had resided in the areas for 6-10 years and very few 3.6 % of the respondents had been staying in the area for about 11 -15 years (Figure 6). According to Shrestha & Avalapati (2006) the period of residence period of residence in an area, lead to an attachment of local people to a place to a larger degree. Place attachment involves care and concern for the place and normally influences both the perceptions of and response to changes in the environment. This place attachment could affect the perceptions and attitude of local people towards conservation.

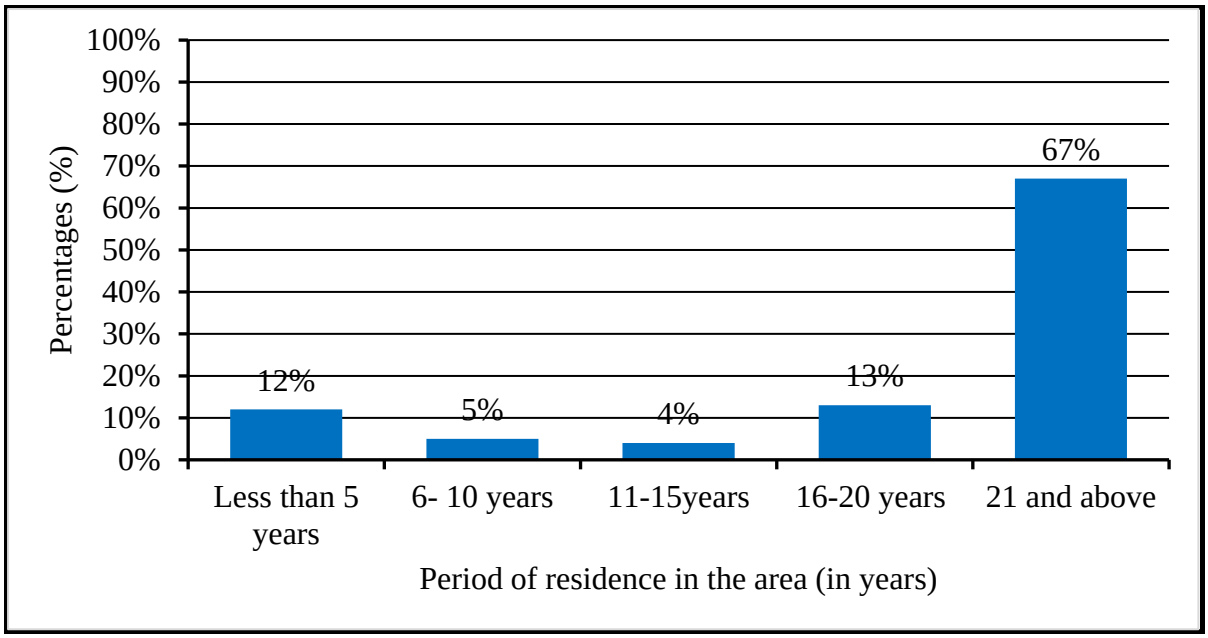

Figure 6: Period of residence in the area (Source: Survey data, 2018).

4. 1. 5 Employment status

The results show that about 38.3 % of the respondents were employed, and about 17.3 % were unemployed. The remaining 19.9 % of the respondents were pensioners, relying on government money, about 10.2% of the respondents were self-employed, while 3.6 % of the respondents were retired (Table 2).

Table 2: Employment status (Source: Survey data, 2018).

Employment status	Frequency (n)	Percentage (%)
Unemployed	34	17.3

Employed	75	38.3
Scholar	21	10.7
Retired	7	3.6
Pensioner	39	19.9
Self -employed	20	10.2
Total	196	100.0

4. 1. 6 Household income

Due to the wide distribution of income categories, the total sample was divided into five categories (Table 3). Over half (56.1%) of the respondents were receiving a monthly household income between R1001-R5000, while 17.3 % received a monthly household income of less than R1000. This may be attributed to the fact that most individuals were unemployed and depended on social grants. About 13.8 % of the respondents received monthly household income between R5001 - R10000, while 7.7 % of the respondents received a monthly household income between R10001-R15000 the remaining 4.9% of the respondents received a household monthly income of R15000 and more.

The results have indicated that most of the people surrounding the TNR were living below the South African poverty line of R992 per person per month (StatsSA, 2015). This was because most households' members received a monthly household income between Rl001 and R5000 meaning an individual from the household contributed less than R992 per month. With observed low household incomes from the study, it is worth noting that poverty will lead communities to engage in unsustainable resource extraction and protected area encroachment to sustain their livelihood (Emerton, 2001; Carew-Reed, 2003).

Table 3: Monthly household income (Source: Survey data, 2018).

Monthly household income (Rands)	Frequency (n)	Percentage (%)
<R1000	34	17.3
R1001-R5000	110	56.1
R5001-R10000	27	13.8
R10001-R15000	15	7.7
R15000 and more	10	5.1

Total	196	100.0

4. 1. 7 Household headships

Over half (52.6 %) of the respondents were household heads while, 47.4% consisted of children of the heads of the household above 18 years of age, about 23.5% respondents, were spouses of households heads, 12.8%, siblings of household heads 5.6%, relatives 4.6% and parents of household heads 0.5%. Most (51.5 %) of the household heads were males than females 49.5%. Makindi (2010), pointed out that, men and women in different societies, have different responsibilities, legal status, user rights, legal status, division of labor, and decision-making. Although women's involvement in nature conservation is recognized as crucial, literature has shown that traditionally men are the most influential members in African rural families, and they are regarded as the heads of households. Women or children only head households if the husband/ father is absent (Makindi, 2010). This point is further highlighted by Baral & Heinen (2007) who pointed out that women had secondary roles and less power in decision-making, while men hold primary roles, with high power and are usually household heads.

4. 1. 8 Household size

The study show that majority (43.4 %) of households comprised between 4 - 6 members, while 27.0% consisted of 7 - 9 members, about 26.5 % are small-sized household with less than 3 members, whereas the remaining percentage of 3.1% is considered large family with 10 and more members (Figure 7). According to Makhanya & Ngidi (1999) and Makindi (2010), in developing countries, in the rural context, a larger household is recognised as a blessing due to its contribution towards labour for household economic activities. However, this can lead to an increase in population and consequently high demand for resources meaning greater pressure on the natural resource base (Carew-Reid, 2003). Moreover, Tessema (2007) pointed out that larger families' values protected areas than smaller families and require more resources from protected areas.

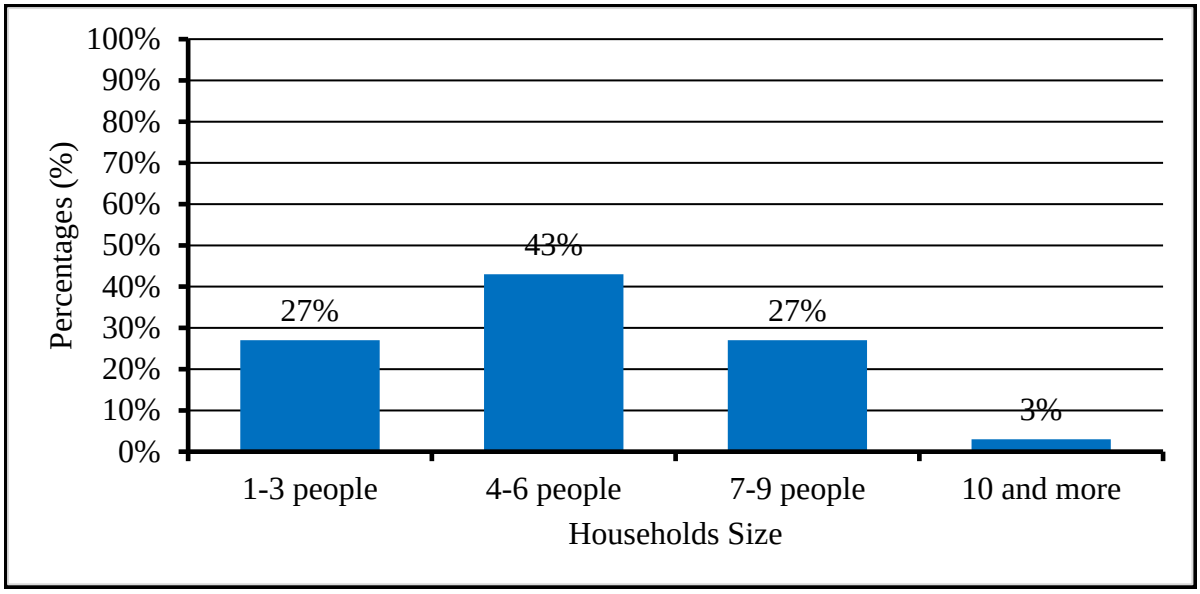

Figure 7: Household Size (Source: Survey data, 2018).

4. 1. 9 Distances of respondents' location to TNR

The results indicated that most (44.2 %) of the respondents were residing within 1-2 kilometers radius to TNR, while over one-third (37.2 %) of the respondents reside within the 3-4km radius to TNR. Approximately one-fifth (18.4 %) reside within 0-1km radius to TNR (Table 4). The distance of the local communities' residence in relation to the protected area boundary is very crucial in determining the interactions of the local people with the nature reserve. It was observed that community dependency and awareness conservation programmes on protected areas are influenced by spatial variable such as the distance of local communities' residences to protected areas (Bragagnolo et al., 2016). On the other hand, communities that are closer to the protected area might be the ones that mostly bearing the difficulties induced by protected areas. However, communities far away from the protected areas, may have less awareness and lesser benefits from protected areas.

Table 4: Distances of respondents' location toTNR (Source: Survey data 2018).

Distance to TNR (km)	Frequency (n)	Percentage (%)
0-1km	36	18.4
1-2km	87	44.4
3-4km	73	37.2
Total	196	100.0

4. 2 Knowledge of local communities on Nature conservation practices in Turfloop nature reserve.

This section analyses and presents findings on the knowledge and awareness of local communities regarding the establishment of TNR, its importance and practices of conservation employed within the Turfloop nature reserve. The discussion follows below.

4. 2. 1 knowledge related to the existence of TNR

Study respondents were asked whether they knew of the existence of TNR. This was done to assess their knowledge about the nature reserve and understanding of its principal functions and practices. Most of the respondents (94.9 %) indicated that they knew about the existence of the TNR, while the remaining 5.1 % did not. Most of the respondents knew about TNR under different names such as Pou River, Turfloop dam, Turfloop game reserve, Letamo la ga -Israel, and Letamo la ga -Sephotho.

The study reveals that local people in the communities around TNR had a very strong sense of belonging. Hence, an overwhelming majority of respondents knew about the existence of the Turfloop nature reserve. However, it is no surprise some of the respondents knew it under different names stated above, the main reason for the protection of the area initially was for water protection purposes. Therefore, the local people developed various names for the nature reserve in association with the dam within the nature reserve.

4. 2. 2 Factors influencing local people's knowledge of TNR

According to Warburton & Martin (1999), local people's access to knowledge, and the importance and credibility attached to what someone knows, can be affected by various socio-economic characteristics. Therefore, this section examines the influence of the respondent's demographic, socio-economic and spatial variables on the knowledge regarding the existence of TNR. Chi-square cross-tabulation tests were conducted with an acceptable significance level of less than 0.05%. The variables are discussed below:

The findings show that more than half (53.4%) of female respondents knew about the existence of TNR, while 45.7% of male respondents knew about it. (Table 5). These results were expected since the study consisted of more females than male respondents. Most (23.1%) of respondents aged 31-40, knew about the existence of TNR knowledge, and about 37.7% of

respondents employed knew about the existence of TNR. The findings show that most (45.2%) respondents residing 1-2km knew about the existence of TNR. This finding indicated that there may be higher chances of those living closer to the boundary to know about the existence of TNR than living a further from the boundary, higher proportion (69.9%) of respondents who stayed in their villages for over 21 years knew about the existence of TNR. The Chi-square test results show (Table 5) that there was a significant association between this knowledge and period of residence in the area (P=0.000). According to Shumker & Taylor (1993), the long period of residence in a place, often signifies that local people may have adequate knowledge about prevailing conservation issues and their neighbourhood. This result concurs with Mehta & Heinen (2001) and Arjunan et al. (2006), results that period of residence in a place has an influence on knowledge because the longer people stay in a place, the more accustomed they become to the place and to the surrounding environment. The study further found out that other variables such as gender (p=0.111), age (p=0.480), education level (p=0.086), employment status (p=0.217*)* and distance to the protected area (p=0.525) (Table 5) did not contribute to significant variation in knowledge about the existence of TNR.

Table 5: Factors influencing local people ‘s knowledge of TNR (Source: Survey data, 2018).

Did you know about the existence of TNR?					
Categories	**Group**	**Yes**	**No**	***df***	***P (level of significance)***
Gender	Male	85(45.7%)	2(20.0%)	1	0.111
	Female	101(54.3%)	8(80.0%)		
Age	18-30	40(21.5%)	3(30.0%)	*4*	0.480
	31-40	43(23.1%)	2(20.0%)		
	41-50	35(18.8%)	2(20.0%)		
	51-60	30(16.1%)	3(30.0%0		
	60 and above	38(20.4%)	0(0.0%)		
Education	No formal education	23(12.4%)	0(0.0%)	3	0.086
	Primary school	25(13.4 %)	2(20.0%)		
	Secondary school	101(54.3 %)	3(30.0%)		

	Tertiary education	37(19.9 %)	5(50.0%)		
Period of residence	Less than 5years	20(10.8%)	4(40.0%)	4	0.000*
	6-10	8(4.3%)	1(10.0 %)		
	11-15	5(2.7%)	2(20.0 %)		
	16-20	23(12.4%)	2(20.0%)		
	21 and above	130(69.9%)	1(10.0 %)		
Distance to TNR	0-1km	33(17.7%)	3(30.0%)	2	0.525
	1-2km	84(45.2%)	3(30.0%)		
	3-4km	69(37.1%)	4(40.0%)		
Employment Status	Unemployed	30(16.1%)	4(40.0%)	5	0.217
	Employed	70(37.6%)	5(50.0%)		
	Scholar	20(10.8%)	1(10.0%)		
	Retired	7(3.8%)	0(0.00%)		
	Pensioner	39(21.0%)	0(0.00%)		

[1] P denotes level of *significance at 95% level of confidence (P<0.05).

4. 2. 3 Sources of knowledge about the existence TNR

More than half (54.3 %) of respondents who reported that they had learnt about TNR because they live very close to the boundary. Results on the information dissemination about TNR showed that the greatest contributing factor that led to the spread of knowledge about TNR was friends, relatives, and colleagues, 28.5 %, while 11.3 % learnt about it from community meetings held outside the TNR. About 3.8 % learnt from TNR management authorities through government initiatives and education programmes and door to door campaigns while a very small proportion (2.2 %) of the respondents knew about TNR from direct employment inside TNR (Figure 8).

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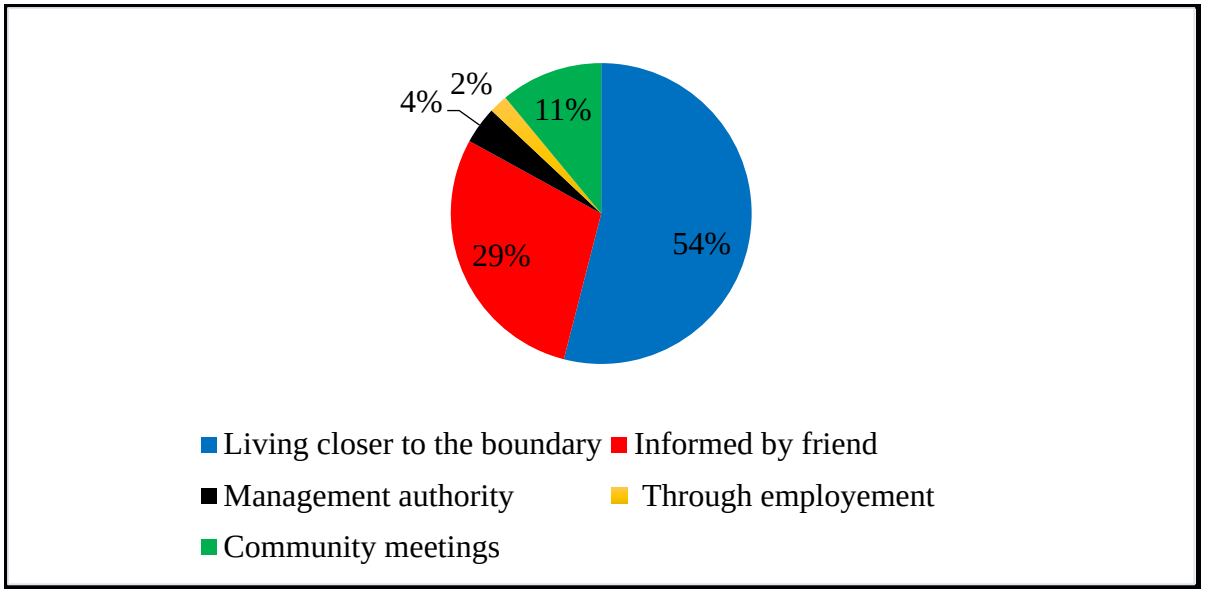


Figure 8: Sources of knowledge about TNR existence (Source: Survey data, 2018).

4. 2. 4 Local people's knowledge on the importance of TNR

More than half (51.6 %) of the respondents perceived TNR as a conservation and ecological symbol, where most water bodies (Pou river and Turfloop dam), animals and trees were protected. Even though most respondents were not familiar with the concept of conservation and ecology, most stated that the importance of the Turfloop nature reserve was to keep the dam (preserve water within the dam) away from human use, protect the wild animals so that people cannot access them. Slightly more than a quarter (29.0%) of the respondents indicated that TNR had no importance, these respondents stated that they did not see the importance of the nature reserve. About 15.6% believed the importance of TNR was to preserves the heritage and culture of the surrounding area. These were the respondents who believed that the area has beautiful mountains and rock history that must be preserved. Much of this heritage is preserved on the historical rock paintings and granite outcrop hills within the nature reserve. A small proportion (3.2 %) of respondents reported that the importance of TNR was for research purposes. This group of respondents believed that TNR was being used for educational value and has good research material for surrounding schools and universities around (Figure 9).

The study revealed that Turfloop nature reserve was never officially declared a nature reserve. However, it was officially protected in 1988 by Lebowa government because of its rich water bodies (Turfloop dam) and its source Pou river, its historical significance (graves inside the reserve and granite outcrops within and surrounding the area), and later on, wild animals were

translocated in the area, for further wildlife conservation. The nature reserve plays a critical role in ensuring the effective management of endangered species by mandatory governance systems.

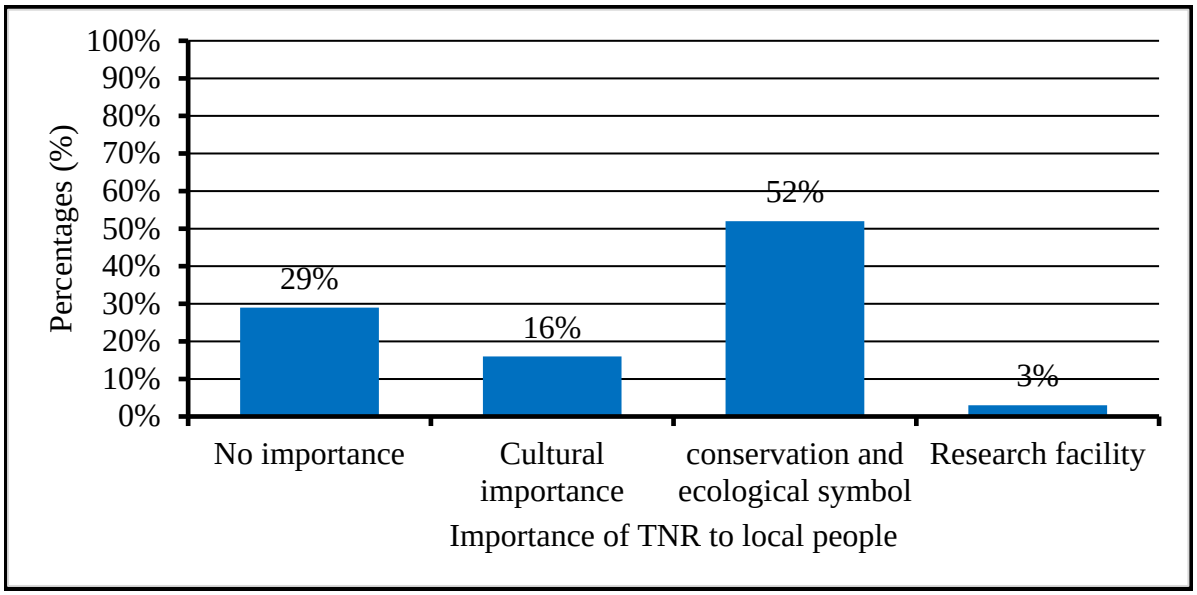


Figure 9: Importance of TNR (Source: Survey data, 2018).

4. 2. 5 Local people's visits and reasons for their visit in TNR

Respondents were asked if whether they made visits to the reserve. The results show that more than two-thirds (71.5%) of the respondents visited the nature reserve, while 28.5% never made any visits to TNR.

Of the respondents that had visited TNR, most (32%) reported having been in TNR by passing through to the next villages across the reserve (e.g. a local resident passing from Ga-Kama to Badimong) or to access nearby market and church. About 17 % of the respondents indicated that they had been to TNR during the culling season to buy bushmeat. About 10% of the respondents have been in TNR for other reasons such as attending educational programmes, collecting medicinal plants, and livestock to drink water. A further 9% of the respondents visited TNR to attend functions and ceremonies held by local communities' residents within the reserve, while 8% have been in TNR for fishing and about 4% have been in TNR through

direct employment. Only a few respondents 1%, had been in the reserve to visit a friend or relative who normally works inside TNR (Figure 10).

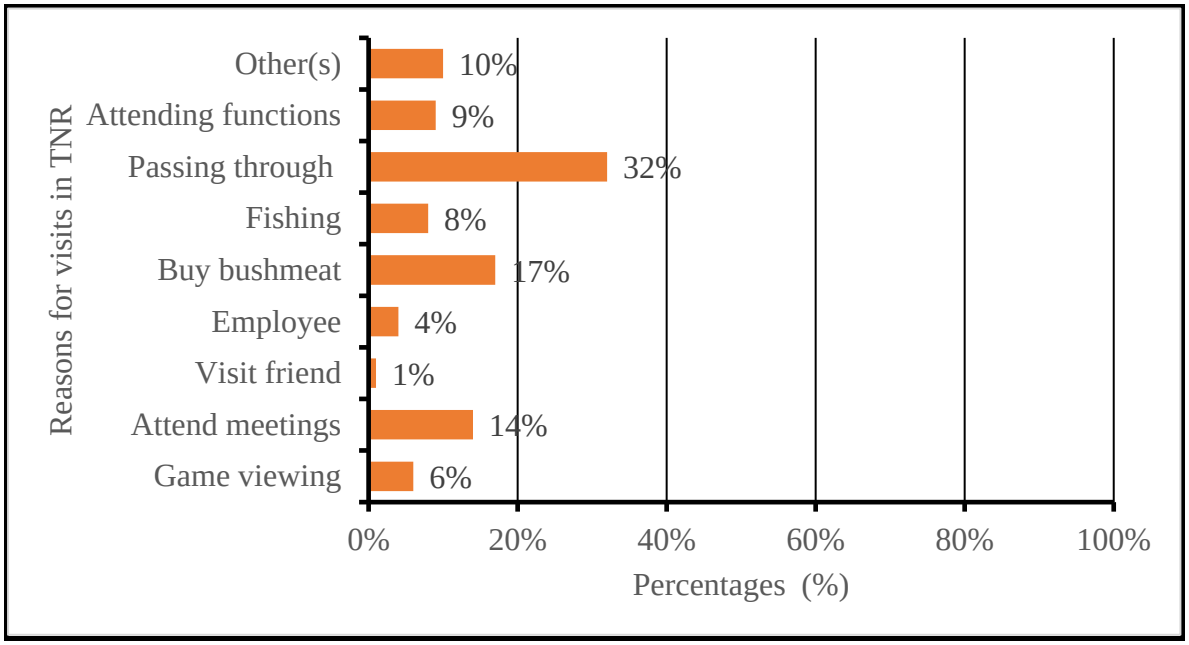


Figure 10: Local people's reasons for visiting TNR (Source: Survey data, 2018)

4. 2. 6 Factors influencing local people's visits to TNR

The findings indicated that more local people residing closer to the TNR (1-2km radius) made more visits as compared to residents living further from the reserve (3-4km). The Chi-square results (Table 6) also showed that a significant difference was found between respondents' visits and distance of residence to TNR (P=0.007). Significance difference was also found between respondents' visits to TNR and the highest level of education (p=0.000). Other variables such as gender, age, and period of residence in the area did not contribute to significant variation in factors affecting the visits to TNR.

Table 6 : Factors affecting visits to TNR (Source: Survey data, 2018).

Have you ever been in TNR?					
Category	**Group**	**Yes**	**No**	***df***	***P (level of significance***
Distance	0-1km	27(20.3%)	6(11.3%)	2	0.007*
	1-2km	66(49.7%)	18(34.0%)		

	3-4km	40(30.1%)	29(54.7%)		
Education	No formal education	21(15.8%)	2(3.8)	3	0.000*
	Primary school	15(11.3%)	10(18.9%)		
	Secondary school	79(59.4%)	22(41.5%)		
	Tertiary education	18(13.5%)	19(35.8%)		

4. 2. 7 Knowledge of TNR ownership

Respondents were asked whether they knew about who owned TNR (Figure 11). Most (52.2%) of the respondents indicated that TNR was owned by the government, while 24.7% indicated that TNR was a privately owned, and 19.4% of the respondents did not know the owner of the TNR, while 3.2% indicated that TNR was owned by the community, very few (0.5%) of the respondents indicated that TNR was owned by both government and the community.

The study found out that the Turfloop nature reserve is a government and community-owned nature reserve. This is because the Turfloop nature reserve is located on Mamabolo tribal communal land which is under the chief Mamabolo and managed through the Limpopo

protected area system by the government. These results were similar to the views expressed by some of the local people that TNR was owned by both the government and community.

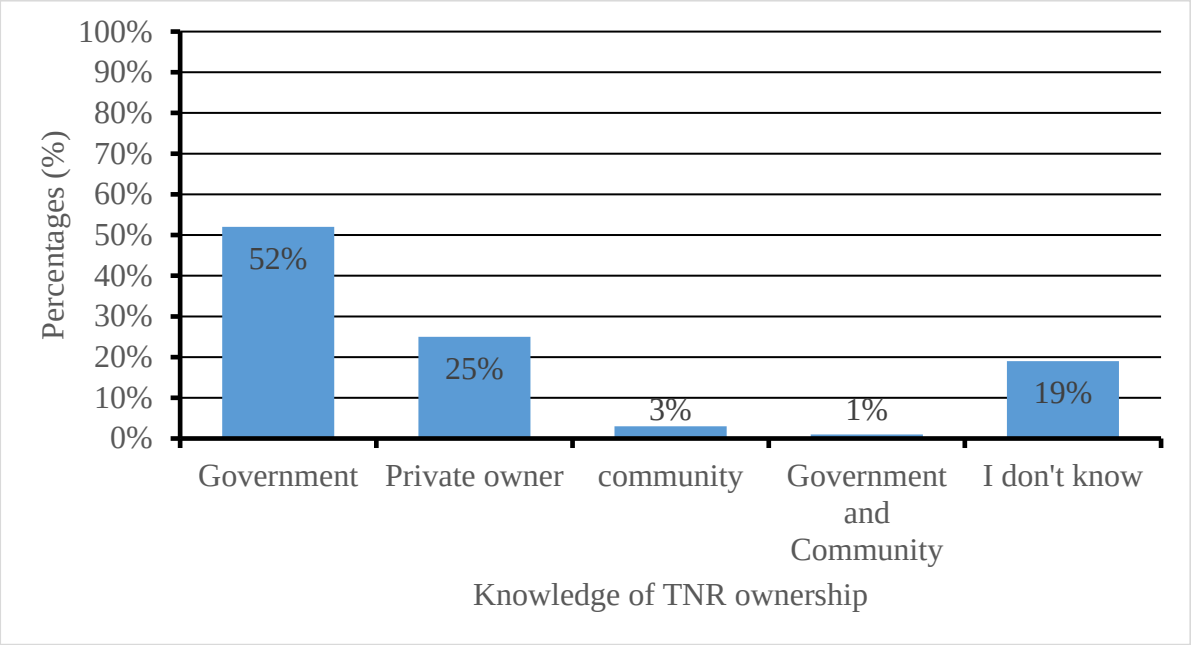


Figure 11: Knowledge about TNR owner (Source: Survey data, 2018).

4. 2. 8 Information access from TNR

Respondents identified several ways in which information about the management of TNR reaches the local communities (Table 7). Most (58.6 %) respondents indicated that they did not receive any information at all from the TNR. About 16.7% indicated that they received information through extension work by TNR workers, while 16.1% of the respondents reported receiving information through community leaders during community meetings held outside the premises of the TNR. About 4.8% received information through local schools' meetings. While, 2.2% of the respondents receive information through community distributed notice letters, only a small (0.5%) proportion of the respondents respectively receive information through media, (0.5%) door to door campaign or (0.5%) workshops.

Concerning information sharing with the local communities, the study found out that the information from the reserve is shared with the local communities' leaders, whom were expected to represent local communities on issues around conservation and to disseminate information received with their respective communities, however, the challenge was that the community forums which were meant to disseminate the information were found not to be active in all nine villages sampled. This study suggests that, when local communities are poorly

represented by their local leadership, around issues on conservation and protected areas, they might feel left out this challenge might further affect the relationship between the nature reserve staff with the local communities while jeopardizing the success of the conservation in the nature reserve.

Table 7: Information sources (Source: Survey data, 2018).

Information sources from TNR	Frequency (n)	Percentage (%)
Extension work by TNR workers	31	16.7
Community meetings	30	16.1
Local schools	9	4.8
Notice letters	4	2.2
Media	1	0.5
Door to door campaigns	1	0.5
workshops	1	0.5
Total	186	100.0

4. 2. 9 Respondent's perceptions on visits by TNR officials

The study suggests that interactions between the nature reserve staff and local people might significantly have played a significant influence on their perceptions towards protected areas and later their relationships may transform into positive attitudes. When asked whether anyone from TNR has made visits to the villages, the majority (77.4%) of the respondents indicated that no one from TNR has ever visited their villages. While few 23.6% indicated that they had seen reserve officials in their villages. On enquiring about the reason for TNR staff visits, most (31.0%) of the respondents indicated that the TNR staff visited the local schools to educate them about conservation and wildlife. While 26.2% indicated that visits were specifically to report problems related to wildlife crimes. About 19.0% indicated that they came to the village to gather information and to patrol, while 9.5 % indicated that to be informed bush meat sale, very few 11.9% indicated that the visits were mainly for other reasons such as wildlife crimes, veld fires, and pollution around the reserve. Only 2.4 % of the respondents indicated that the TNR visited to inform them about the water problem from the dam (Pou) protected within the nature reserve. This results in contrast with the results by Weladji et al. (2003) who reported

that in North Cameroon, the park made visits to local communities, only during patrols or to arrest suspected poachers and hardly to educate local people. According to Weladji et al. (2003) and Baral & Heinen, (2007) when the purpose of visits is focused on providing support to the local communities, they foster a positive attitude. However, when visits are orientated toward enforcing prohibition management activities that are based upon the need for access to the protected area for resources by local people, more frequent negative interaction results.

The study found out that TNR staff have previously visited the communities and surrounding local schools. The purpose of the visits as revealed by the study was to provide environmental education and awareness, to teach local people about the importance of environment, wildlife, and the need for conservation. Unofficial visits were also made to local communities to conduct patrols and to assess damages on the nature reserve caused by local people such as cutting off the reserve fence and setting wildfires. These findings indicated that TNR staff were committed to interact and engage with local communities. According to Weladji et al. (2003) the frequent visits to the local communities by protected areas staff foster relationships between the protected areas and the local people that related to the purpose of visits.

"We normally visit local schools, to teach them about conservation and the importance of protected areas, we also held meetings with the local leaders whom we trusted to disseminate the information with the local communities"

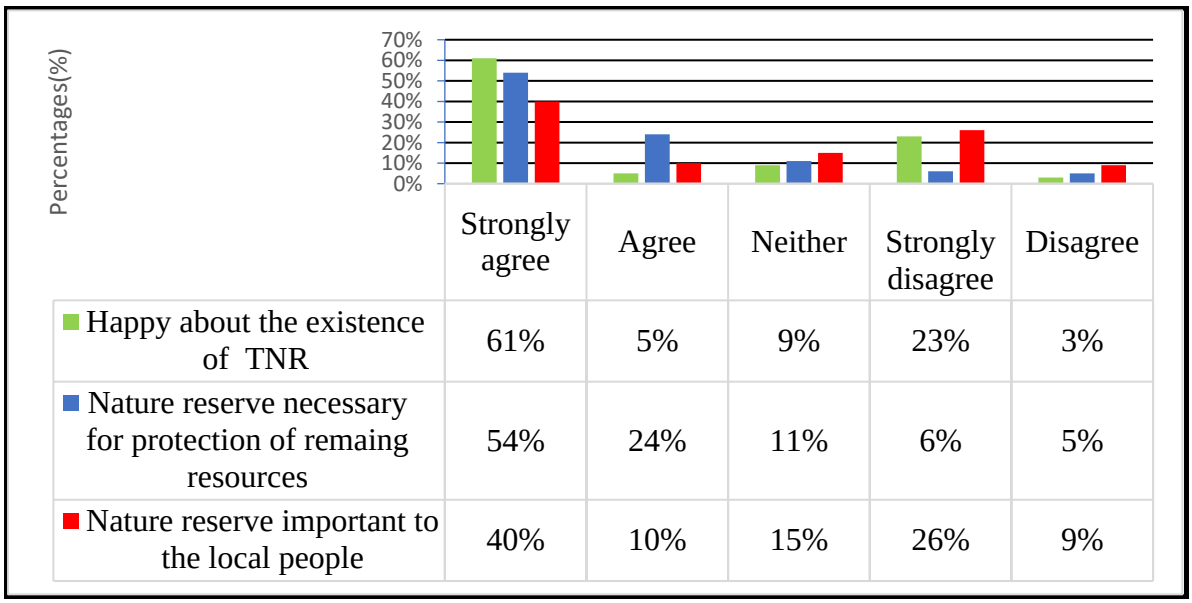
(TNR staff member, Turfloop nature reserve, July 2018).

4. 3 The Perceptions of local communities about nature conservation in TNR

This section examines the perceptions of local people on the nature reserve establishment. The perceptions of the respondents were evaluated to gain a general view of local communities' reactions towards conservation in Turfloop nature reserve. The conservation perceptions of the local people were sought by providing the respondents with statements regarding the presence of the nature reserve, resource use, their participation, relationships, management, and benefits as well as their willingness to support conservation within Turfloop Nature reserve. Their responses were ranked through a five-point Likert scale (1=Strongly Agree, 2=Agree, 3=neither, 4=Strongly Disagree, 5=Disagree). In this section data were analysed using descriptive statistics of percentages, bar graphs were also used to present data. Direct quotes from respondents was used as evidence to support claims and express, meanings.

4. 3. 1 Perceptions on the existence of TNR

Three statements were used to analyse the perception of communities respondents on the presence of the nature reserve and conservation within this include: I am happy with the presence of a nature reserve in my village, the nature reserve is necessary for the protection of the remaining natural resources, the nature reserve is important for the local people (Figure 12).



	Strongly agree	Agree	Neither	Strongly disagree	Disagree
Happy about the existence of TNR	61%	5%	9%	23%	3%
Nature reserve necessary for protection of remaing resources	54%	24%	11%	6%	5%
Nature reserve important to the local people	40%	10%	15%	26%	9%

Figure 2: Respondent's perceptions on the existence of TNR (Source: Survey data, 2018).

A higher proportion of respondents (66%) in all nine villages agreed that they were happy about the existence of TNR in their villages, however, 26% of respondents disagreed with the statement. Very few (9%) of the respondents were neutral. This statement had a significant association with period of residence in the area (df =16, p=0.008*), age (df =16, p=0.040*) and employment status (df =20, p =0.024). However, this statement had no significant association with the distance to the nature reserve (df =8, p=0.913).

A significantly greater proportion (78%) of respondents agreed that the nature reserve was necessary for the protection of remaining resources, while 11% of respondents disagreed with the statement, about 11% of the respondents were neutral about the statements (Figure 12). This statement had no significant association with the distance to TNR (df =8, P=0.103).

About half (50%) of the respondents agreed that the nature reserve is important for the local people, while 35% agreed with the statement, about 15% were neutral about the statement (Figure 12). This statement also had no significant association with distance to the reserve (df =8, p=0.860). By agreeing to these statements, the household' respondents showed an appreciation of conservation and TNR as a conservation area.

"I am very happy that there is a nature reserve in my village, which allows me and my grandchildren to see wild animals, without having to pay a lot of money to see them in far places"

(**Respondents No. 15 Iraq village, 14 July 2018).**

4. 3. 2 Perceptions on the resource use from TNR

The utilisation and access to resources play a very important role in influencing the local communities' perception of conservation. It is, therefore, argued in this study that people who depend largely on the reserve resources for their livelihood are likely to hold negative attitudes towards conservation if a prohibition is imposed on the exploitation of the nature reserve. This section analyses the perceptions of local people on resource use in TNR.

Respondents were asked a set of four questions to indicate whether they agree or disagree with this statement regarding their access and resource use to the TNR. The results show that about 16% of the respondents agreed with the statement that there was no restriction to access TNR, while over half (55%) of the respondents disagreed with the statements, about 29% of respondents were neutral about the statement. This statement had a significant association with education level (df =12, p=0.046*). The findings are supported by Vodouhê et al., (2010) results that the education level of participants was highly correlated with positive perceptions towards protected areas. No significant association was found for distance from the reserve and this statement (df =8, p=0.526).

The study indicated that very few (7%) of the respondents agreed that there was accessed to utilise natural resources within TNR, while a higher proportion (77%) of the respondents disagreed with the statement, about 16% were neutral about the statement. No significant association was found for distance from the reserve and this statement (df =16, p=0.967).

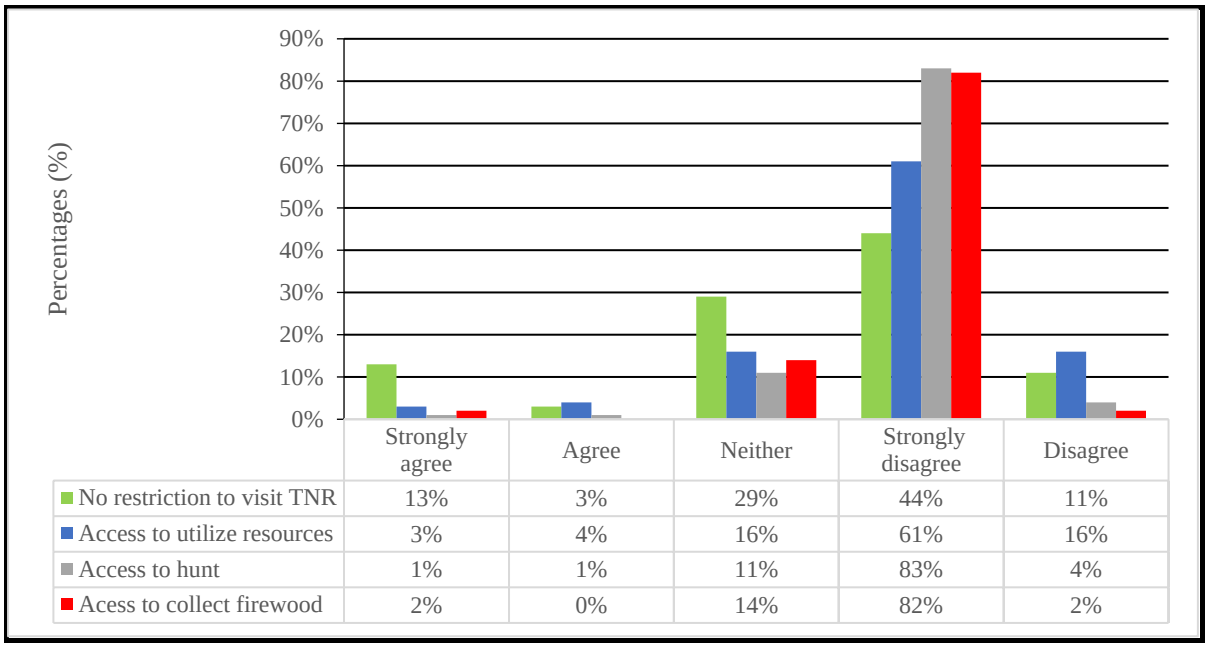
A very small proportion (2%) of the respondents agreed with the statement that local people can hunt within TNR, close to nine-tenths (87%) of the respondents disagreed with the statement, while 11% were neutral about the statement. This statement, however, had no significant association with the distance to the reserve (df =6, p=0.786).

Similarly, a very small proportion (2%) of the respondents agreed with the statement that they could collect firewood within the reserve, while a significantly higher proportion (84%) of respondents disagreed with the statement, about 14% were neutral about the statement. This statement also had no significant association with the distance to the reserve (df =8, p=0.828) (Figure 13).

> "Access to the reserve for fuelwood collection, fishing and hunting is restricted, we are only allowed to use the road within the reserve to pass through to the villages or market across the reserve"

(Respondents No. 34 Badimong village, 26 July 2018).

The findings show a great concern with the management of the nature reserve in terms of resource use and access. These results further indicated that lack of access and resource use within the nature reserve may generate negative attitudes towards and bring forth conflicts between local people and nature reserve managements.



	Strongly agree	Agree	Neither	Strongly disagree	Disagree
No restriction to visit TNR	13%	3%	29%	44%	11%
Access to utilize resources	3%	4%	16%	61%	16%
Access to hunt	1%	1%	11%	83%	4%
Acess to collect firewood	2%	0%	14%	82%	2%

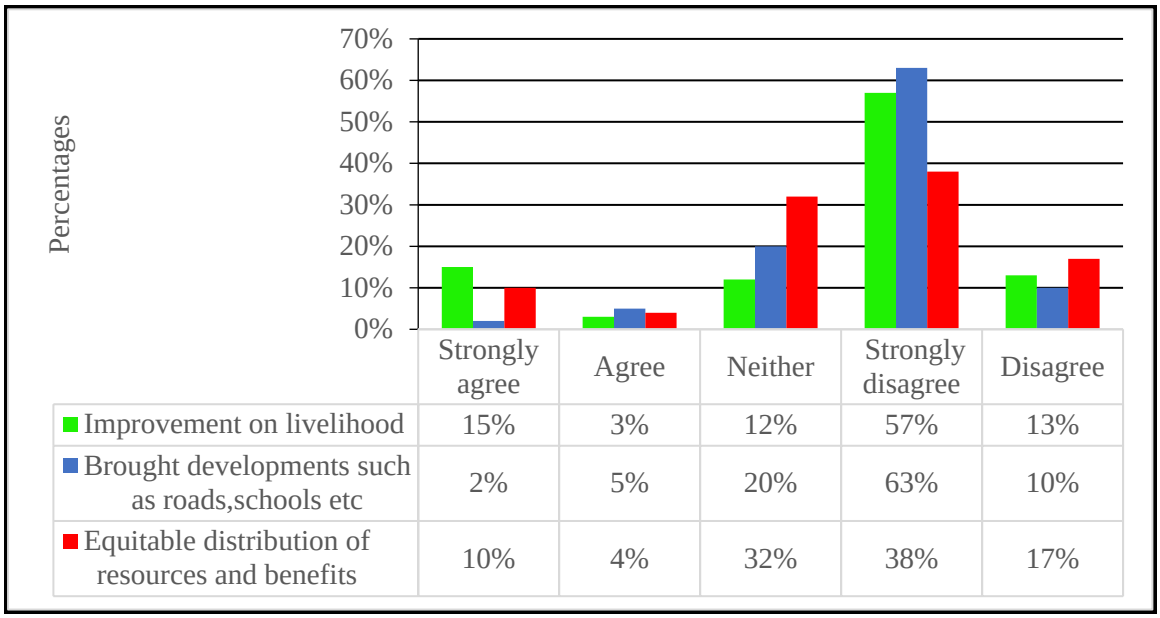
Figure 13: Perceptions on access and resource use (Source: Survey data, 2018).

4. 3. 3 Perceptions on benefits received from TNR

To analyse the respondent's perceptions of benefits from TNR, a set of three questions were used (Figure 14). The study shows that very few (7%) of respondents agreed with the statement that the presence of TNR, has improved their living conditions and livelihood, while a higher proportion of the respondents (73 %) disagreed with the statement, about 20% were neutral about the statement. This statement had a significant association with employment status (df =20, p=0.013*) and household size (df=12, p=0.002*). However, the statement had no significant association with distance of village to the reserve (df =8, p=0.156)

The results further show that very few (18%) of the respondents agreed with the statement that the presence of TNR has brought development to their villages, a higher proportion (70%) of respondents disagreed with the statement, while 12% were neutral about the statement. This statement had a significant association with monthly household income (df =16, p=0.052*), household size (df=12, p=0.000*), period of residence in the area (p=16, df=0.37). However, the statement had no significant association with distance of village to the reserve (df =8, p=0.512). Since most of the respondents disagreed with this statement, these results indicated that local people had many expectations from TNR in terms of community developments. While 14% of the respondents agreed that there was an equitable share of common-pool natural resources and benefits from TNR, over half (55%) of respondents disagreed with the statement and about 32% were neutral (Figure 14). This statement had a significant association with employment status (df =20, p=0.047*) and period of residence in the area (df =16, p=0.052*), however, the statement has no significant association with distance of village to the reserve (df =8, p=0.170). By disagreeing with most of these statements on perceived benefits, the study shows a great concern also for the management and benefits sharing, and this further indicates that community members may have a negative attitude towards the nature reserve since it is not beneficial to them.

> "Sometimes the Nature reserve sell bush meat at very low prices, but most of it is taken by the workers since they have inside information on when the Nature reserve will be selling the meat", and "very few local people are lucky enough to have a job in the Nature reserve**"**
>
> **(Respondents No. 196 Badimong Village, 26 July 2018)**



	Strongly agree	Agree	Neither	Strongly disagree	Disagree
Improvement on livelihood	15%	3%	12%	57%	13%
Brought developments such as roads,schools etc	2%	5%	20%	63%	10%
Equitable distribution of resources and benefits	10%	4%	32%	38%	17%

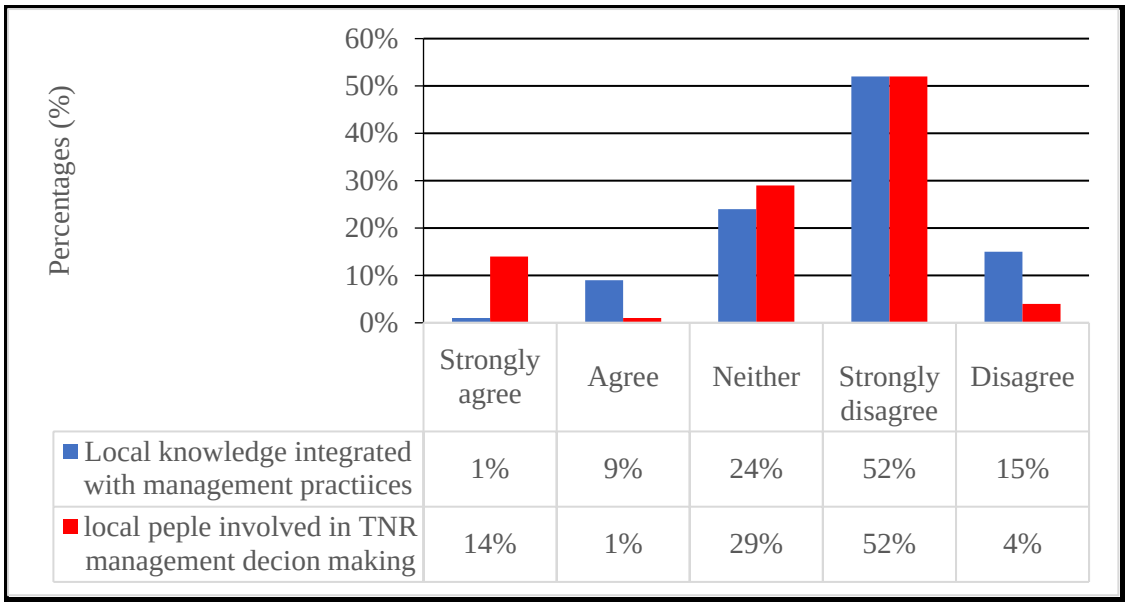
Figure 14: Perceptions on benefits from TNR (Source: Survey data: 2018).

4. 3. 4 Perceptions on consultations between local people and TNR officials

To analyse perceptions of local people on consultation processes within TNR, two sets of questions were used. The findings indicated that 10% of the respondents agreed with the statement that local knowledge was integrated with the management practices within TNR. While over half (52%) of the respondents disagreed with the statement, very few (24%) were neutral about it (Figure 15). This statement had a significant association with monthly household income (df =16, p=0.038*) and period of residence in the area (df=16, p=0.004*) however, no significant association was found for distance to the reserve (df =8, p=0.458). The findings show that very few (15%) of the respondents agreed that local people were involved in the management and decision making in TNR, while over half (56%) of respondents disagreed with the statement, about 29% were neutral. This statement had a significant association with distance to the nature reserve (df =8, p=0.011).

> "This reserve does not consult with the community when making decisions or implementing their plans, for example, when employment opportunities arise, the TNR management employ people that are not from our communities, they also employ people without consulting with local leadership"
>
> (**Community leader**, **Moshate, 24 June 2018**).

The findings show that many local community respondents felt that there was no good communication between them and the nature reserve. Therefore, the nature reserve in question have not fully involved the communities in its management as explained by the different perceptions' communities had on benefits and consultations. According to Hulme & Murree (2001), the involvement of the local people in the management activities of PAs is fundamental to sustainable development and the conservation of biodiversity. This reinforces the findings of this study highlighted above on the importance of community involvement, for as Adams & Hulme (2001) note, if the local communities are alienated, they will not support conservation efforts and conflicts are likely to increase.



	Strongly agree	Agree	Neither	Strongly disagree	Disagree
Local knowledge integrated with management practiices	1%	9%	24%	52%	15%
local peple involved in TNR management decion making	14%	1%	29%	52%	4%

Figure 15: Perceptions on consultations (Source: Survey data, 2018).

4. 3. 5 Perceptions on relationship between local communities and TNR officials.

This section analyses the perceptions of the local people on the relationship between the TNR management authorities and the local communities (Figure 16). This information is aimed at interpreting the effects of these perceptions on the local people's attitudes toward conservation. The discussion follows below:

The study found out that most (42%) of the respondents disagreed that their community's relationship with the nature reserve is good, while, 36% of the respondent were neutral about this statement, about 23% agreed that their communities' relationship with the reserve is good (Figure 20). This statement had a significant association with distance to the nature reserve (df=8, p=0.018).

The study further found out that the TNR staff believed their relationship with the local communities was satisfactory. This finding contrasts with the views expressed by the community respondents below that indicated that their relationship with the nature reserve staff was the most severed. The satisfactory relationship identified was because of the nature reserve provided benefits to the local people.

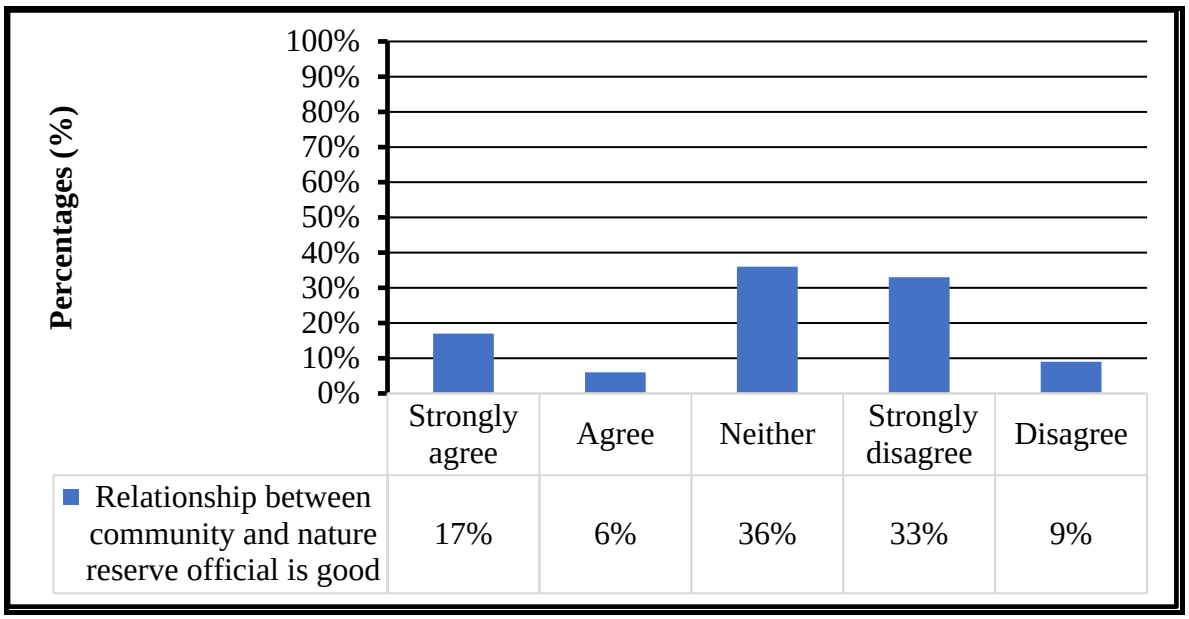


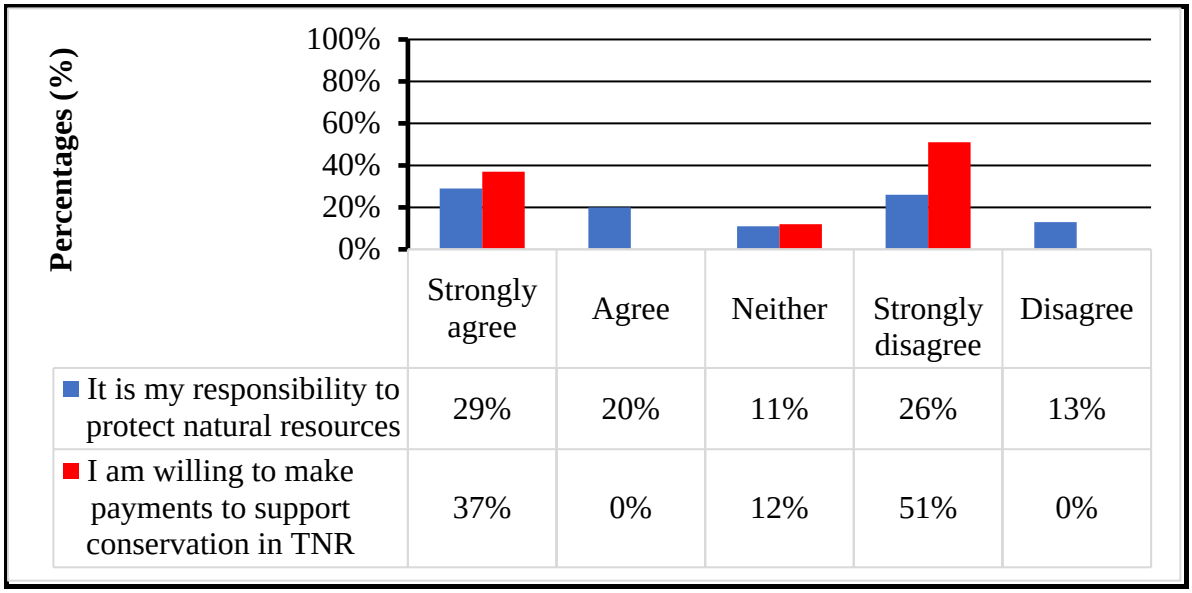
Figure 16: Perceptions on relationships (Source: Survey data, 2018).

4. 3. 6 Perceptions on support for conservation within TNR

To analyse the perceptions of local people on support for conservation effort s in TNR, two sets of questions were used. The study found out that 49% of respondents agreed with the statement that it was their responsibility to protect natural resources within TNR (Figure 17), while 39% of the respondents disagreed with the statement, a very small proportion of 11% of respondents were neutral. The study found out that 37% of respondents agreed with the statement, that local people were willing to make payments to support conservation in TNR, over half (51%) of the respondents disagreed with the statement and 12% were neutral about this statement. This result could be influenced by little benefits received from TNR by local people, therefore, respondents do not see a need to support a system they not benefitting from.

"I cannot use my money to pay for entrance fee in the nature reserve, or even if they ask me to contribute money to make development in the reserve, I will not contribute, because I am not gaining anything from this reserve"

(Respondents No. 47, Makeketela, 27 July)



	Strongly agree	Agree	Neither	Strongly disagree	Disagree
It is my responsibility to protect natural resources	29%	20%	11%	26%	13%
I am willing to make payments to support conservation in TNR	37%	0%	12%	51%	0%

Figure 17: Respondents 'perceptions on support for conservation within TNR (Source: Survey data, 2018).

4. 4 Attitudes of local people towards conservation in TNR

This section examines, the attitudes of local communities on conservation within TNR using multivariate regression analysis. According to Xu et al. (2006), attitudes are shaped in part by communities' and individual's perceptions and experiences of the protected areas.

When asked about their overall attitude towards TNR, given the experienced disadvantages and advantages of staying next to TNR, most (34%) of the respondents were neutral, while 28% were not satisfied, about 14% of respondents were very satisfied, and very few 12% of

the respondents were somewhat dissatisfied. Another 12% of the respondents indicated that they were somewhat satisfied (Figure 18).

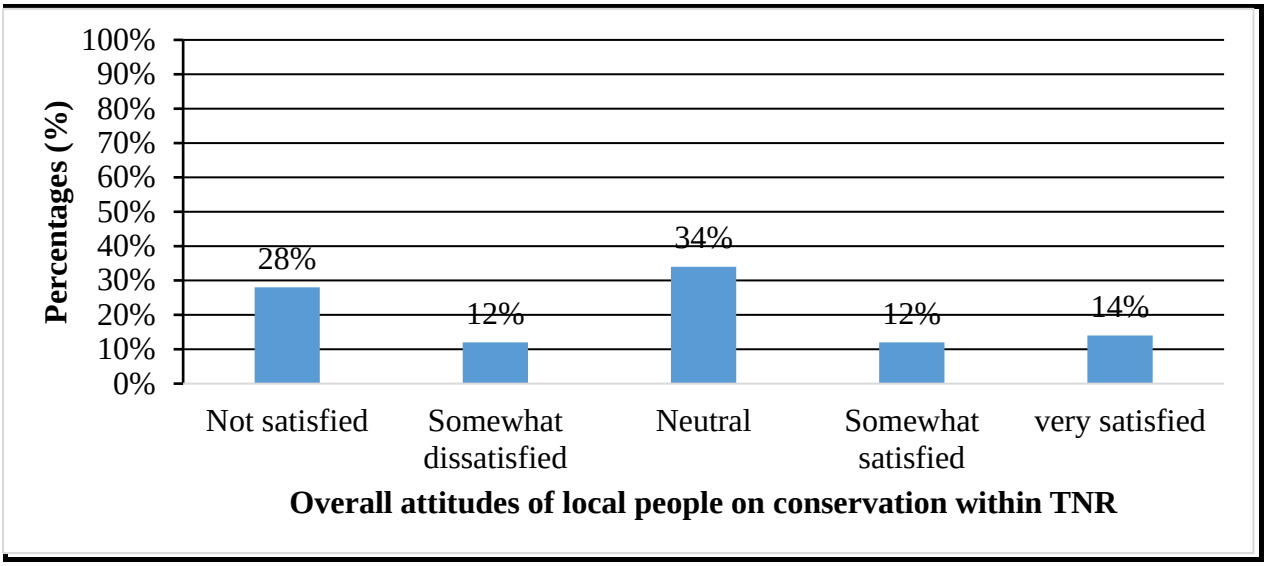


Figure 18: Overall attitudes of local people towards conservation in TNR (Source: Survey data, 2018).

A multivariate linear regression model was used to examine the effects of demographic, socioeconomic and spatial variables on attitudes of local people towards conservation in Turfloop nature reserve. One question about attitude towards conservation in TNR was used as the dependent variables, while the demographic, socio-economic and spatial variables (gender, age, highest education level, employment status, monthly household income, household size, period of residence in the area and distance to TNR), benefits received, losses perceived and visits to TNR were acknowledged as independent variables. For each independent variable, coefficient, standard error, t, and level of significance are presented in Table 7. The coding of each independent variable is indicated in parenthesis, with the sign of the coefficients showing whether associations were positive or The demographic, socioeconomic and spatial variables included in the regression model explained about 23% (R^2) of the variation in conservation attitudes of local communities, with a significance level of $p < 0.00$. Multivariate linear regression results indicated that respondents who held more favourable attitudes were likely to be those who benefitted from the nature reserve hence, there were significant associations ($p = 0.000$), between local people's attitudes and benefits. These results were supported by Karanth & Nepal's (2012) results that attitudes to protected areas are mainly shaped by protected area related benefits. Moreover, theoretical studies also predicted

that local people who benefit from conservation often hold a positive attitude (Marks & Davis, 2011; Bennet, 2016). Therefore, this study suggests that, received benefits, is one of the motivations for local communities to hold positive attitudes towards established protected areas. The study findings were like Infield & Namara's (2001) results who reported that at Lake Mburo National Park, 44% of respondents held positive attitudes towards conservation programmes because they were provided with benefits such as access to utilization of resources within the park, grazing, and water access. The multivariate linear regression model results further indicated that respondents who stayed in their villages for a longer period were likely to hold favourable attitudes towards conservation in TNR. Hence, there was a significant association ($p = 0.017$) between the period of residence of local people in their communities and attitudes towards conservation. This result was supported by Karanth & Nepal's (2012) results that attitudes to protected areas are mainly shaped by the period of residence in the area by local people. Moreover, Lele et al. (2010) and Vodouhê et al. (2010), observed that local people who stayed in their residence for a longer period generally held favourable attitudes towards the protected area and conservation.

The results show that other variables such as education level (0.554), did not contribute to significant variation in conservation attitudes, this finding is similar to Gadd (2005) and Groom & Harris's (2008) results that education did not play an important role in predicting attitudes of local people towards protected areas and conservation. Moreover, Bennet & Dearden, 2014 argued that attitudes toward the environment might be developed based on life experiences rather than education.

Table 8: Multivariate linear regression model (Source: Survey data, 2018).

Independent variables	**Coefficients**	**Standard error**	**t**	**P (level of significance)**
Gender (e.g. male=1)	0.244	0.191	1.277	0.203
Age category (in years)	-0.25	0.094	-0.262	0.790
Highest education level	-0.92	0156	-0.593	0.554
Employment status	-014	0.070	-0.193	0.847

Monthly income (Rands)	0.152	0.102	1.484	0.140
Household size	-0.177	0.116	-1.521	0.130
Period of residence in the area (in years)	-0.176	0.073	-2.413	0.017*
Distance to TNR (in km)	0.044	0.131	0.334	0.739
Received benefits from TNR (e.g. Yes=1)	-1.132	0.210	-5.403	0.000*
Received losses from TNR (Yes=1)	0.197	0.280	0.703	0.483
Visited TNR (Yes=1)	-0.007	0.231	-0.30	0.976

[2] Dependent variable: What is your overall attitude towards Turf loop nature reserve? P=0.000, R- squared (R^2) =0.228 (23%), * Significant = $p<0.05$

4. 5. The benefits of Turfloop nature reserve on local communities

Several studies on conservation and management of protected areas observed that the type of management and the benefits received from protected areas influence local people's perception either positively or negatively (Vodouhêa et al., 2010; Gandiwa et al., 2014; Mamo, 2015). Moreover, Bennet & Dearden, (2014), pointed that individuals or groups believing that they are not receiving a reasonable share of the benefits of conservation, might vigorously unfavored and not support conservation this section presents an analysis of benefits derived by local communities from TNR and their influence on conservation within TNR.

When asked if whether they received any benefits from the establishment of TNR, about 60% of respondents received no benefits, whereas 40% perceived some benefits (Figure 19). When asked about revenue sharing in TNR, most (94.4%) of the respondents indicated that they never heard about it, while 0.5% of the respondents indicated that they have heard about it. However, none of the respondents that heard about revenue sharing claim to benefit from it.

[2]

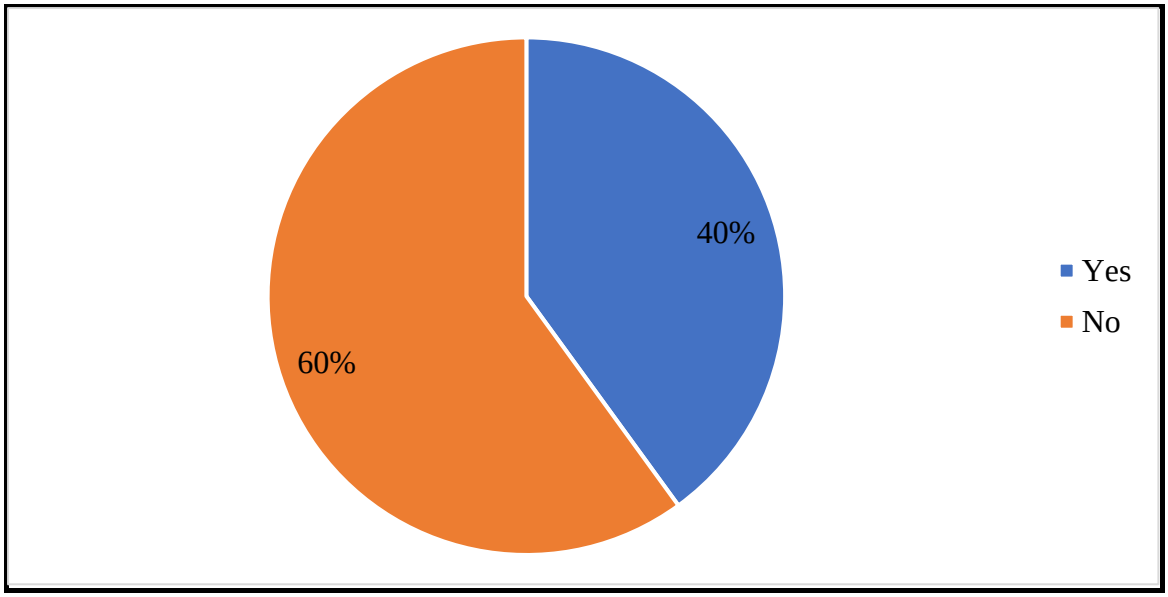


Figure 19: Whether respondents received benefits from TNR (Source: Survey data, 2018).

4. 5. 1 Factors influencing respondent's perceptions on benefits from TNR

Although, the results show that most (50.7%) people residing1-2km closer to TNR received some benefits, however, no significant difference (p =0.102) was found between the distance of residence and received benefits (Table 8). This result was like Jim & Xu's (2002) results that no significant difference was found in perceptions of benefits from the Shimentai Nature Reserve, China, between respondents inside and that 4 km radius to the protected area.

The study found out that most (44.6 %) female respondents received some benefits as compared to male respondents 35.3 %. However, no significant difference (p=0.200*)* was found between the gender of respondents and benefits received, this might be contributed by the fact that male and female enjoy different benefits from the reserve.

Regarding education, the study found out that most (44.6 %) of respondents with secondary education level, received some benefits from TNR. However, no significant difference (p=0.602) was found between the education level and the benefits received.

The study found out that about 50.0% of households with 10 and more family members have received some benefits from TNR. However, no significant difference was found between benefits and household size (p=0.492). About household income level, most (53.8%) people who earned between R10001-R15000 received some benefits, however, the results further

show that there was no significant difference found between household monthly income (p=0.537) and benefits received.

The study found out that there was a significant difference between the period of residence in the area and benefits (p=0.033) and between employment status and benefits (p=0.027). This result was supported by Htun et al, (2012) results that period of residence in the area was the most important factors associated with perceptions and beliefs of benefits related to conservation and protected areas. These results suggest that local communities will support conservation efforts if they benefit from protected areas.

Table 9: Factors influencing respondent's perceived benefits from TNR (Source: Survey data, 2018).

Categories	**Group**	**Yes**	**No**	**df**	***P (level of significance)***
Gender	Male	30(35.3%)	55(64.7%)	1	0.200
	Female	45(44.6%)	56(55.4%)		
Education	No formal education	8 (34.6%)	15(65.2%)	3	0.602
	Primary school	8(32.0%)	17(68.0%)		
	Secondary school	45(44.6%)	56(55.4%)		
	Tertiary education	14(37.8%)	23(62.2%)		
Household Monthly income	<R1000	12(38.7%)	19(61.3%)	4	0.537
	R1001-R5000	42(39.6%)	64(60.4%)		
	R5001-R10000	12(46.2%)	14(53.8%)		
	R10001-R15000	7(53.8%)	6(46.2%)		
	R15000 and more	2(20.0%)	8(80.0%)		
Period of residence in the area	Less than 5years	3(15.0%)	17(85.0%)	4	0.033*
	6-10	6(75.0%)	2(25.0%)		
	11-15	1(20.0%)	4(80.0%)		
	16-20	10(43.5%)	13(56.5%)		
	21 and above	55(42.3%)	75(57.7)		
Employment Status	Unemployed	12(40.0%)	18(60.0%)	5	0.027*
	Employed	25(35.7%)	45(64.3%)		
	Scholar	9(45.0%)	11(55.0)		
	Retired	2(28.6%)	5(71.4%)		
	Pensioner	12(30.8%)	27(69.2%)		
	Self-employed	15(75.0%)	5(25.0%)		
Household Size	1-3	22(45.8%)	26(54.2%)	3	0.492

	4-6	33(41.8%)	46(58.2%)		
	7-9	17(32.1%)	36(67.9%)		
	10 and more	3(50.0%)	3(50.0%)		
Distance to TNR	0-1km	16(21.3%)	17(15.3%)	2	0.102
	1-2km	38(50.7%)	46(41.4%)		
	3-4km	21(28.0%)	48(43.3%)		

4. 5. 2 Benefits received from TNR

Looking further into the personal benefits received from the Turfloop nature reserve (Figure 20), About 17.2% of respondents benefitted through sustainable harvests such as bush meat, fishing, and collection of firewood, including medicinal plants and herbs collection, while 9.1% benefitted through recreational activities which include game viewing, having picnic and holding ceremonies within TNR, about 6.5% benefitted through educational programmes, and 5.4%, benefitted through national ecosystem services such as provision of water from Pou river and fresh air from the surrounding. Only a very few 2% benefitted through direct employment. The study indicated that a higher proportion (60%) of respondents received no benefits from TNR. This reinforces some of the results in figure 8 that show that there is a lack of benefits local people received from Turfloop nature reserve, with a lack of consultation with local people.

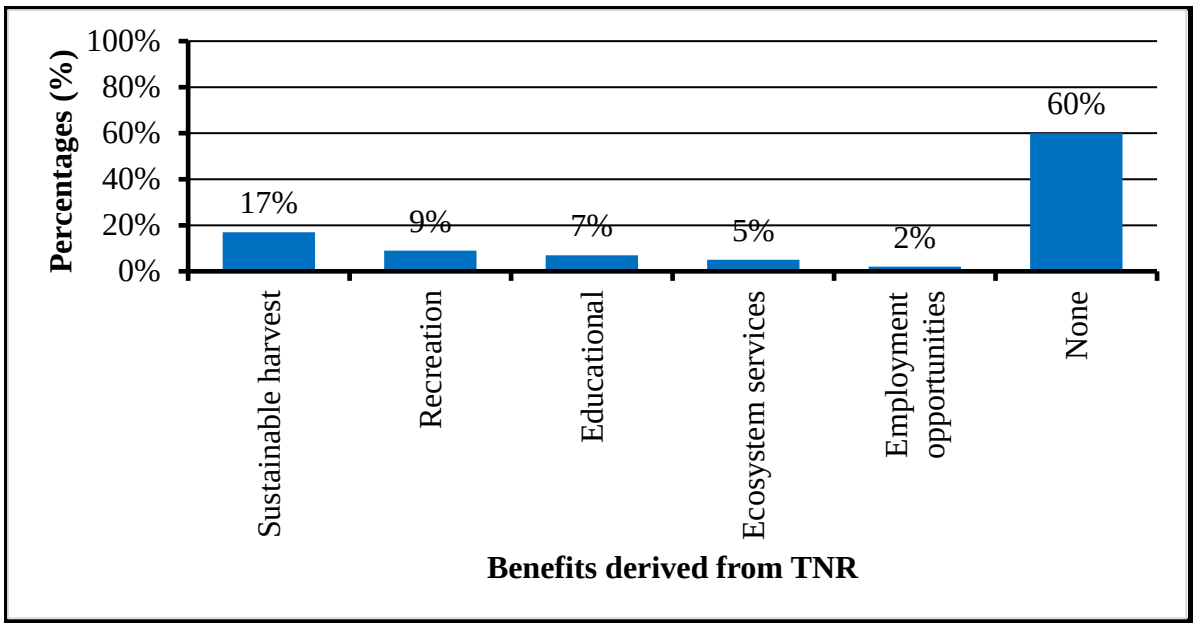


Figure 20: Perceived benefits from TNR (Source: Survey data, 2018).

4. 5. 3 Who specifically benefits from TNR

When asked about who they think specifically benefits from the natural resources within TNR, the majority (36.6%) of respondents identified Turfloop nature reserve workers and management as the people who specifically benefits. About 24.2% identified government institutions, while 7% identified members of the local communities (e.g. Chief). Few 3.8 % of

the respondents identified private owners, whereas a small proportion (1.6 %) identified another group of individuals such as universities, schools, and NGOs (Figure 21).

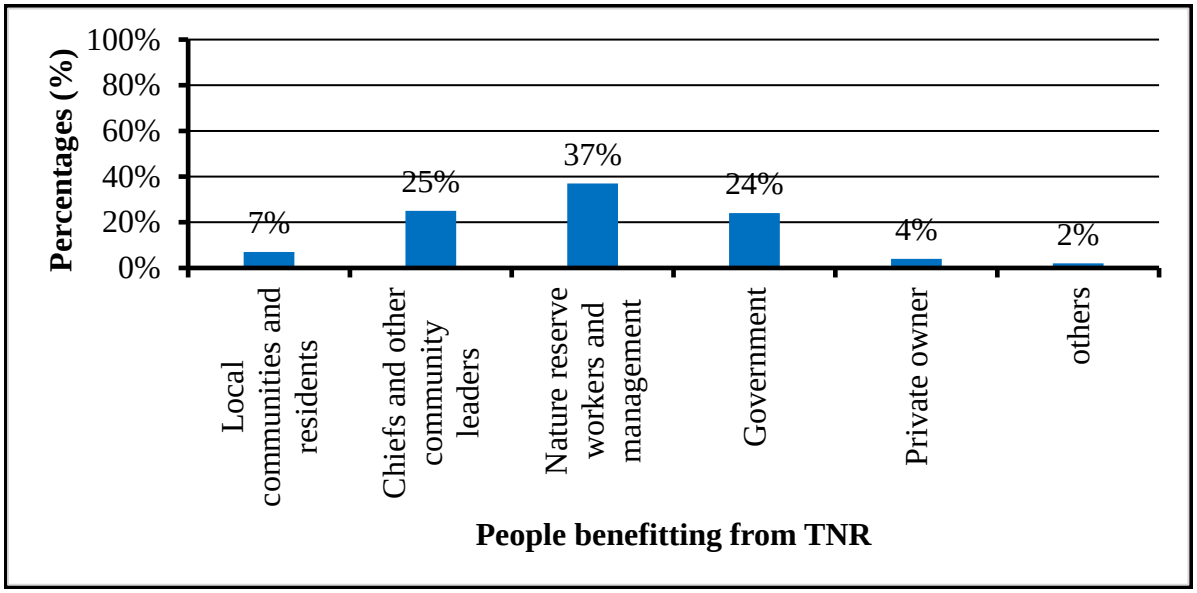


Figure 21: Who specifically benefits from TNR? (Source: Survey data, 2018).

4. 5. 4 Experienced losses from TNR

Respondents were asked if whether they experienced some losses from the establishment of TNR. About 12.9% of respondents indicated that they have received some losses while 87.1% received no losses. Some of the losses identified by the local people include loss of land for farming and settlement 33%, loss of grazing land 29%, loss of livelihood 21%, and damage of property and crops by wildlife particularly small animals such as porcupines 17% (Figure 22). Although very few (12.9%) of the respondents from all nine villages indicated that they observed losses from the establishment of TNR, none of them, however, have been compensated for the losses. The study suggests that in the absence of compensation

mechanism, these losses identified could lead to an increase in negative attitudes to the nature reserve and its management (e.g. lack support), illegal behaviours (e.g. poaching) and social.

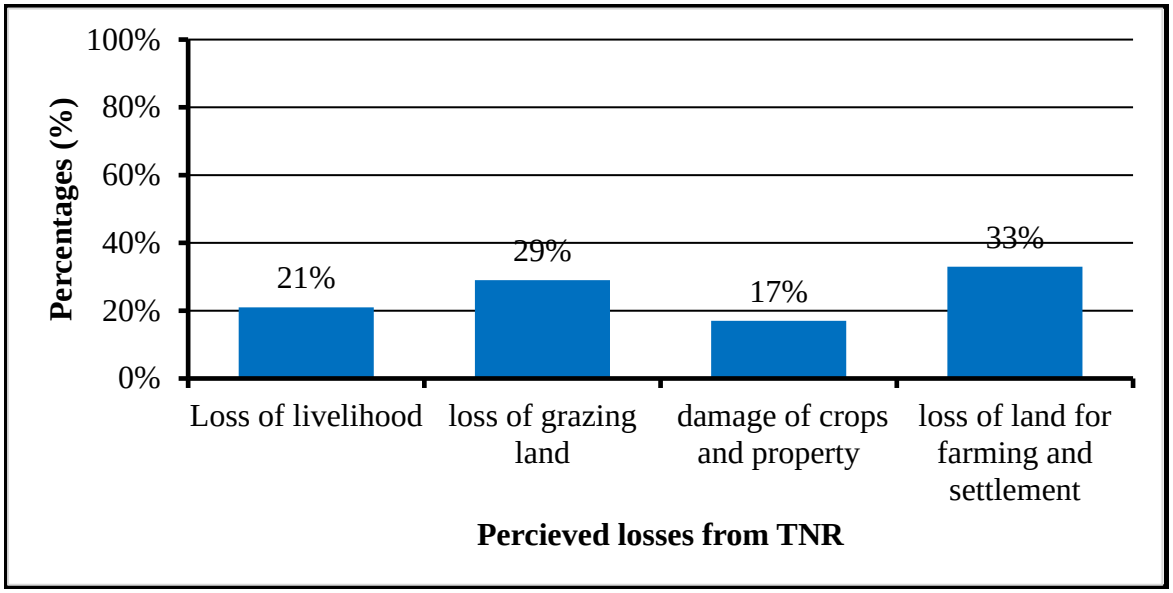


Figure 22: Experienced losses from TNR (Source: Survey data, 2018).

The study shows that local communities' losses from the establishment of TNR significantly differed between distance (P=0.019). The majority of (70.8%) respondents living within 1-2km radius to TNR boundary perceived some losses, whereas most of the respondents living within 3-4km perceived (38.9%) no losses (Table 9). This result was supported by Sarker & Roskaft, (2011) and Karanth & Nepal's, (2012) results that the most important factors associated with beliefs of costs related to conservation and protected areas are spatial variables related to distance to the boundary of the protected area. The households closer to the nature reserve might suffer huge losses owing to raids of wild animals, loss of livelihoods, farming and settlement lands, while households further away from the nature reserve boundary were less likely to encounter problems from the nature reserve establishment. This study, therefore, suggests that local people residing closer to the nature reserve boundary were most likely to hold negative attitudes towards conservation in nature receive owed to the experienced losses.

Table 10: Perceived losses in relation to distance to TNR (Source: Survey data, 2018).

Have you perceived losses from TNR?					
Group	0-1km	1-2km	3-4km	Total	P (level of significance
Yes	1(4.2%)	17(70.8%)	6(25.0%)	24(100.0)	0.019*

No	32(19.8%)	67(41.4%)	63(38.9%)	162(100.0)	

4. 5. 5 Expectations of local people towards TNR

When asked about their expectations from TNR (Figure 23) , about 48% of the respondents expected provision of job, while 23% expected water provision, 11% expected other things such as consultation with the local community, about 8% of the respondents expected development in the community such as schools 4% and creation of tar roads 4%, while 5% of the respondents expected to be allowed to utilise of natural resources, about 3% indicated they expected to be allowed to graze their livestock inside the nature reserve, very few (2%) respondent expected the nature reserve to improve the tourism facilities within the nature reserve, only a small proportion (1%) of the respondent expected the management to control wild animal damages. This study suggests that the potential consequences of these expectations not being met are an increase in social frustration and, as results decreased support for the nature reserve.

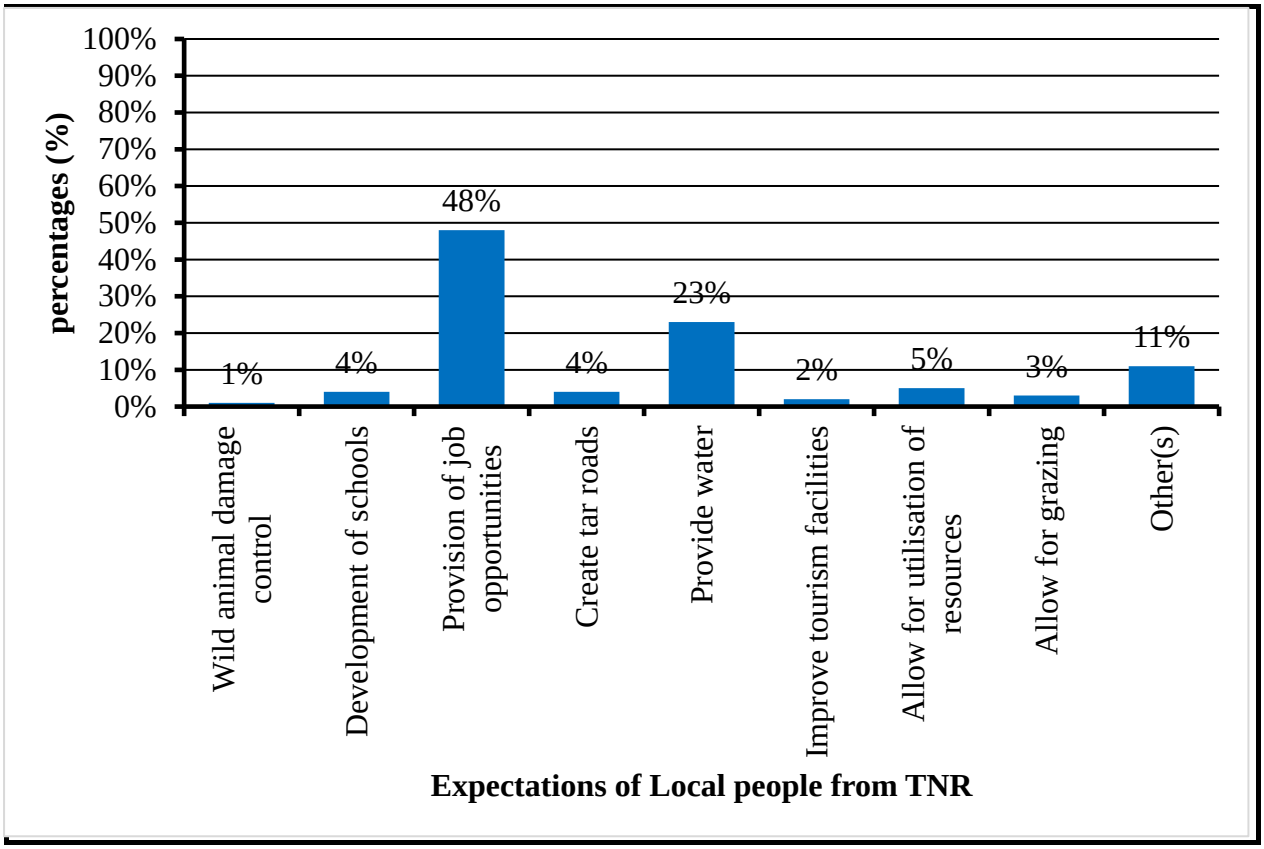


Figure 23: Expectations of local people from TNR (Source: Survey data, 2018).

The above results revealed that TNR offers various benefits to the local communities and local people around the reserve. The direct benefits identified by the TNR official include passing through the reserve to other areas. It was found in the study that almost every day of the week, about 70 people from local communities pass through the reserve to their respective areas across the border of the reserve. Another benefit identified was that the local community gets the supply of water from the borehole within the nature reserve.

"Passing through the reserve to the villages or areas across the reserve is something that should not be happening, however, there is nothing we can do since it is beneficial to local communities"

(Reserve manager, Turfloop nature reserve, July 2018).

The study also found out that local communities are benefitting culturally from the reserve by performing rituals on the graves and hills within the reserve. Medicinal plants collection is another benefit identified by the protected area management to the local communities. Culling seasons or the sales of bush meat had also been identified as another benefit to local communities. Although, culling is not a process that happens yearly, however, during the season local communities get reduced tariffs to buy the bush meat. Other benefits include community development such as roads developed, crèches, education programmes for the surrounding local schools and as well as educational games such as treasure hunts. Even though local people received some benefits from the nature reserve, the problems lie with the equal distributions of those benefits among communities and individuals.

The study found out that the reserve had no costs to the local communities, and if they were any, they were never officially reported. However, this finding contrasts with the views expressed by the household respondents that the establishment of TNR has brought losses for local people, which were never compensated. The study, therefore, suggests that when local communities are not fully compensated for the losses caused by the establishment of the nature reserve, they might hold unfavourable attitudes towards nature reserve, and this could further lead to unfavourable behaviours such as the killing of wild animals.

4. 6 The management practices and challenges related to nature conservation in TNR

This section analyses and presents the management practices applied in Turfloop nature reserve as well as their associations on conservation, to determine behaviours of local people related to conservation. Some of the variables discussed below include the participation of local people in the establishment and management of TNR, activities that should be allowed or prohibited in TNR as well as the management challenges identified by TNR management authorities.

4. 6. 1 Opinions on whether local people believe their communities were involved during the establishment of TNR

When asked if whether they believe, they were involved during the establishment of TNR, most (67%) of the respondents believed their communities were involved, while 26% believe they were not involved, a small proportion 7% of the respondents did not know if whether their communities were involved during the establishment of TNR (Figure 24). This study suggests that the entire communities around the reserve might believe their involvement is insufficient if they were not consulted during the establishment of the nature reserve.

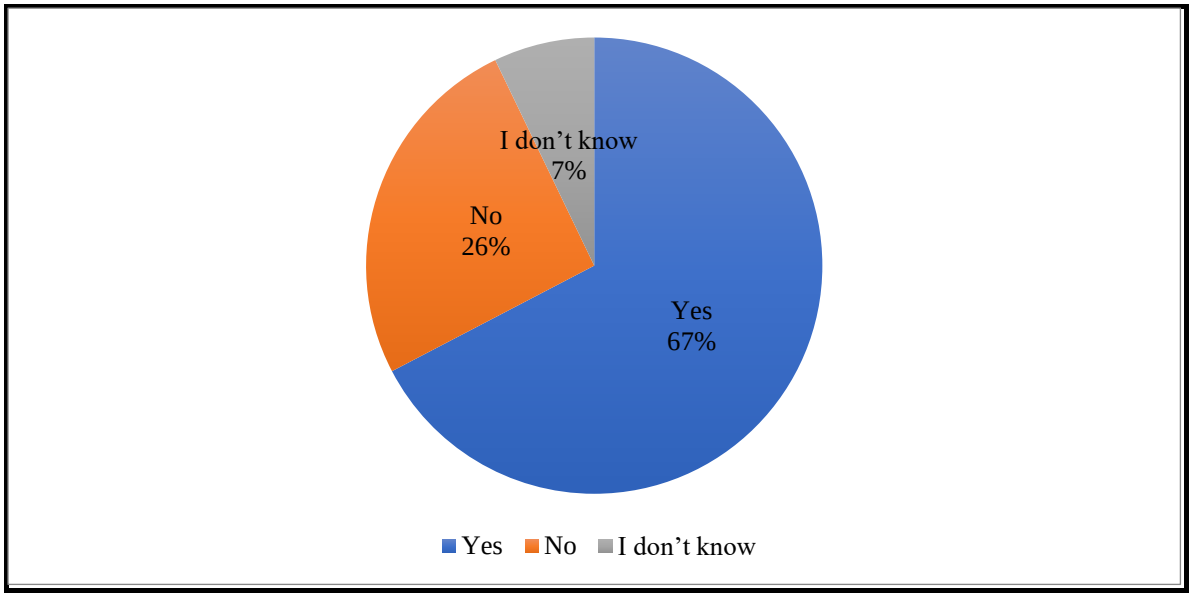


Figure 24: Beliefs on whether local people were involved during the establishment of TNR (Source: Survey data, 2018).

4. 6. 2 Who should be responsible for the management of TNR

When asked about who should be responsible for the management of TNR (Figure 25), over half (52%) of the respondents indicated that there should be partnership between local

communities and government, while 38% indicated that government should be responsible for the management, about 5% indicated that community members should be responsible for the management of the nature reserve. Another 5% indicated that the employees and management officials should be responsible for the management of TNR. Taken together, these responses indicated a desire by the communities for greater participation in nature conservation. In addition, the need for community involvement in management of natural resources has been widely proposed as an important element in sustainable management (e.g. Adams & Hulme, 2001).

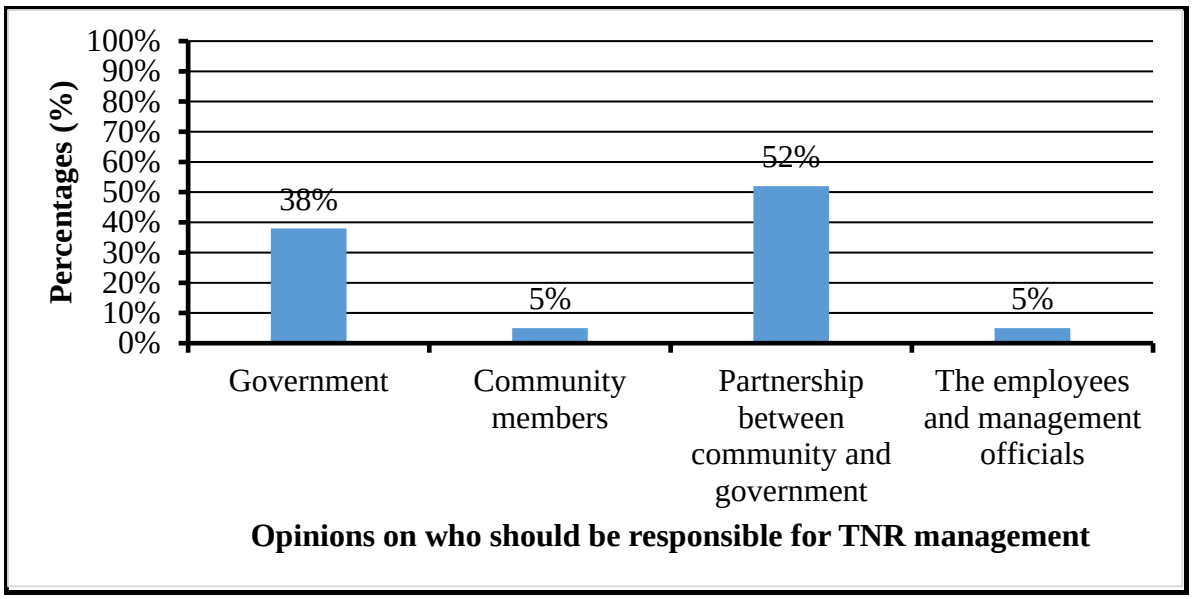


Figure 25: Opinions on who should be responsible for TNR management (Source: Survey data, 2018).

4. 6. 3 Reasons for local communities' involvement in the management of TNR

Among respondents who believed that local communities should be engaged in the management of TNR, about 48% of them stated that involvement in the nature reserve will encourage them to comply with the laws, rules, and regulations of the reserve without jeopardizing any. While 26% of the respondents indicated that their involvement in the management will provide them a sense of ownership of the nature reserve. About 14% indicated that they should be involved in the management of the nature reserve because they depended on the natural resources within the nature reserve for their livelihoods (Figure 26).

While a small proportion (11%) indicated that they should be involved so that they can support the conservation within the reserve. According to Kiss (1990), involving local communities in the management of protected areas is very crucial, because local communities are at the center of the protected area agenda at the expense of wild biodiversity conservation objectives. Similarly, Adams & Hulme, (2001) pointed out that that any involvement should not only be in the form of handouts but should be holistic to extend to economic survival, environmental conservation, and socio-cultural integrity. Therefore, this study suggests that when local communities are involved in the management of the protected area, they tend to support conservation efforts, and this further improves the relationship between local people and nature reserve officials.

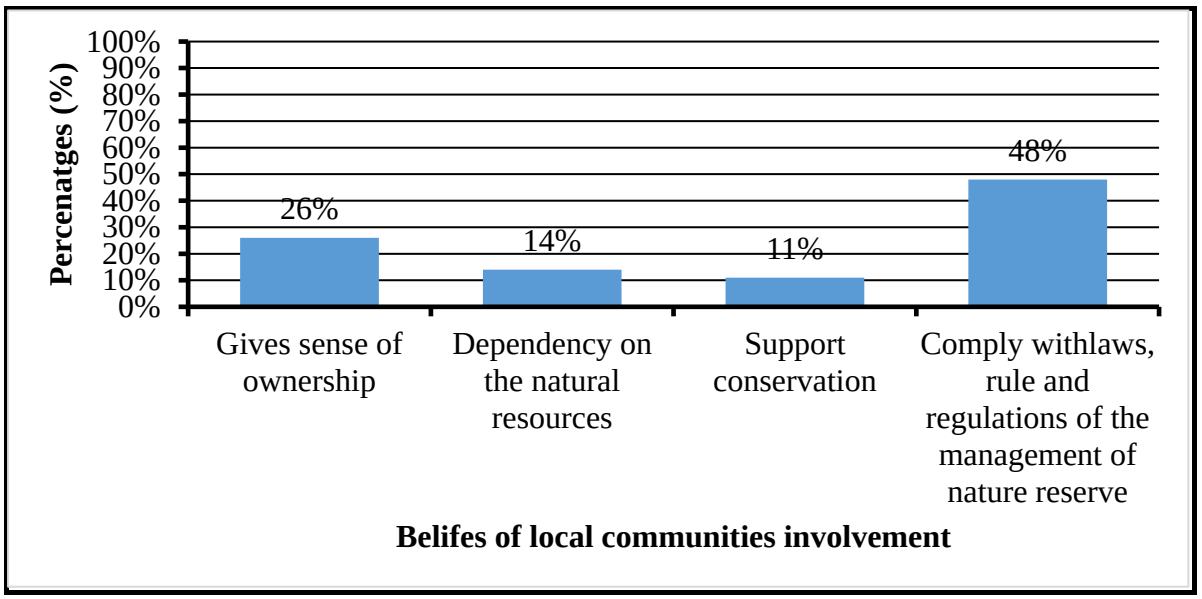


Figure 26: Beliefs on why local communities should be involved (Source: Survey data, 2018).

4. 6. 4 Opinions of local people on the activities that should be allowed or prohibited within TNR

The respondent's perceptions of allowed and prohibited activities in protected areas is difficult (Figure 27). Indicated activities that should be prohibited in protected areas are the ones that involve, firewood collection 84%, hunting other species 15%, Grazing 62% and Tourism 15%, free entrance 12% and Passing through the reserve to the next areas 44%. These activities are perceived as a negative influence on nature. Among the permitted activities, the first place is represented by free entrance 88%, followed by tourism 85%, subsistence fishing 62%, passing

through the reserve 55%, firewood collection 52%, grazing 39% and hunting other species 16%. This study suggests that local people might perceive conservation as a bad thing, especially when they are prohibited from utilizing the natural resources, which they largely depend upon for their livelihood.

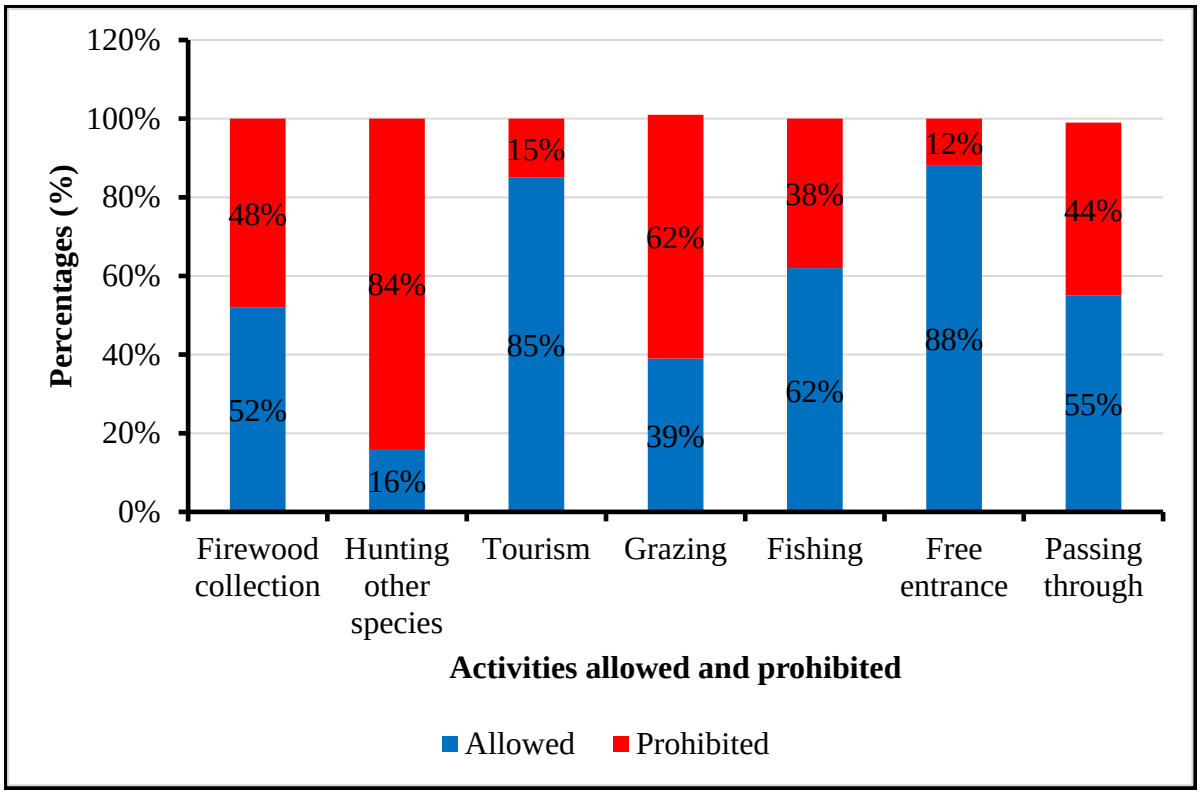


Figure 27: Opinions on activities which should be allowed or prohibited (Source: Survey data, 2018).

The study revealed that TNR is being managed under the Limpopo Environment Management (LEMA, Act No 7 of 2003), which focuses mainly on the regulation and management of the nature reserve. The rules and the laws for the management of TNR are centered on prohibition and limitation from the utilization of natural resources within the reserve such as hunting, fishing, collection of firewood, plants, and passing through the reserve, and grazing. However, certain activities within the nature reserve such as viewing wildlife, passing through the nature reserve, holding ceremonies, firewood collection and fishing reserve were allowed under certain conditions, such as people should obtain permission, entrance fees were also paid to access the nature reserve. According to Brockington, Igoe &Schimdt-Soltau (2006), the laws and rules prohibiting or limiting the local people living closer to the boundary of a protected area from utilizing the resources within the mature reserve, economically displace them from

their livelihoods. As a result, these prohibitions and limitations undermine the success of conservation objectives within protected areas and aggravate conflicts with the local communities (Newmark et al., 1993).

> "Traditional healers from the surrounding local communities are given permits to perform rituals or access medicinal plants within the reserve. Certain activities such as fishing, firewood collection, and hunting are mainly restricted"

(TNR staff member, Turfloop Nature reserve, July 2018).

4. 8 Conclusion

This chapter presented the analysis and discussion of the data collected from the local people in all nine communities sampled, the community leaders and the Turfloop nature reserve officials. The discussions made specific reference to the reviewed literature and study suggestions were made. The results on community respondents indicated that local people were knowledgeable about the existence and had an idea of the importance as well as the conservation processes within the nature reserve. The general overall impression was that there was very much concern about the involvement of local communities in the management of the nature reserve. The results further indicated that local people expect more benefits from the nature reserve to improve their livelihood. The study further identified the management challenges within the reserve, which were very much associated with the prohibition of resources use and lack of community involvement, therefore this study advocated for partnership between local communities and the government for conservation success in the nature reserve.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5. 0 Introduction

This chapter provides a summary of the key findings in this study. As local people constitute an important element within nature conservation, it is, therefore, of importance for one to understand their knowledge and perceptions towards conservation. In this regard, this study was aimed at examining the effects of local communities' knowledge and perceptions on conservation within the Turfloop nature reserve. This chapter provides a summary of key findings, conclusions, and recommendations for this study.

5. 1 Summary of key findings

This section presents and discusses the key findings of the study objectives. The attribute included in this section are, socio-economic, demographic and spatial characteristics of the respondents, Knowledge of local people on the conservation practices within TNR, Perceptions, and views of local people on conservation, benefits, and losses perceived from the reserve as well as the management practices applied, and challenges related to conservation in Turfloop Nature Reserve.

5. 1. 1 Socio-demographics and spatial characteristics of the local people

Overall, the study revealed a high proportion (55.6%) of females' respondents than males 44.4%, with a majority (23.0%) of respondents aged between 31 - 40 years. The results show that more than half (53.1%) of the respondents obtained education until the secondary level and have stayed in their respective villages for more than 21 years and above 66.8%. It was also found in the study that 38.3% of the respondents were employed and earning a household income 56.1% between R1001-R5000. More than half (52.6%) of the respondents were households' heads. The study found out more (43%) of the respondents were living in a household with a total household size of (4-6) family members. About 44.4% of the respondents were residing 1-2km radius to the boundary of the reserve.

5. 1. 2 Knowledge of communities on the natural resource conservation practices within TNR.

This section discusses the key findings on local people's knowledge of nature conservation and practices within TNR. The results show that most of the respondents from all nine villages sampled knew about the existence of TNR, even though, many knew it by different names. The reserve names provided by residents were linked to the dam found within the reserve. The study findings show that most respondents knew about TNR because they reside close to it. However, information about the reserve normally is disseminated through friends, relatives, and colleagues. Although local communities did not know about conservation or ecology, most respondents identified the importance of TNR as strictly for the protection of the dam and wildlife from local communities.

The Chi-square cross-tabulation tests indicated a significant difference between communities' knowledge of the existence of TNR and period of residence in the area ($p<0.05$). This finding was supported by Arjunan et al. (2006) results that long period of residence in a place origin shows that communities are mostly established in the areas. Therefore, the more people stayed in a place, the more familiar they are about the place and to the environment around them. The findings further show that knowledge of local people on the existence of TNR had no significant association ($p > 0.05$) with gender, age, household size, and highest education level, employment status, and monthly household income and distance to TNR (Table 5).

The results indicated that local people interacted with the nature reserve through visits, and very few (Figure 14) of those visits were for game viewing and to visit a friend. However, passing through the reserve to the other areas across was identified as the number one reason local people visit TNR. A significant association was found between local communities' visits to TNR and the highest level of education ($P<0.05$) as well as the distance of residence to TNR (Table 6). Therefore, this study expected educated people to visit TNR, the reason being that they had better environmental awareness since they live closer to the reserve again local people who reside closer to the boundary were also expected to make more visits for educational purposes.

The results indicated that a small proportion of local people acknowledge that TNR authorities and staff, had made some visits to their respective communities, the study found out that those visits were made mainly at surrounding schools rather the local communities. The main purpose of the visits was to educate schools about the environment and wildlife as well as the

importance of the nature reserve. Local communities acknowledge that visits that were made were precisely for educational and environmental awareness purposes.

Overall, these results on knowledge on the existence of Turfloop nature reserve, indicated that the local people were aware of the presence of the nature reserve in their communities. However, local people did not see the importance of it, mainly because of ignorance or little been done by the management/authorities in the reserve to share information on the importance and relevance of the reserve and its management with the local communities.

5. 1. 3 Perceptions and views of local people on conservation within TNR

Consistent with the theory of reasoned action and empirical literature provided in the study, the study assumed that local people's perceptions were linked to their attitudes and behaviour. Therefore, it was expected that the same factors that influence perceptions of local people on conservation within TNR, could also influence their attitudes, whether directly or indirectly through the influence of perceptions on attitude. This section discusses the key findings on local people's perception and views towards and their effects on conservation.

The study results disclosed that the perceptions of local people were uncertain, conservation was considered as good and bad. Conservation was generally considered good because local people were able to see wildlife without paying a lot of money, and the animals were protected for future generations. Most respondents were in favour of conservation and the presence of TNR in their communities. These findings were supported by Infield (1988) results that regardless of a belief that the protected areas caused several complications for local people, and that the natural resources, opportunities, and benefits promised were not fulfilled, two-thirds of the respondents were in favour of conservation, many people within the local communities recognised the desirability of conservation. Moreover, Duncker & Goncalves's (2017) results show that conservation was perceived good by the local people because of, job opportunities and the resulting money from tourism flowing into the areas; as well as for protecting animals for future generations.

The findings show that conservation in TNR was also perceived not to be good, mainly because local people were limited or prohibited access to resources within the reserve such firewood, hunting, fishing, and livestock grazing, with many local people indicating that they were not allowed to access and utilise some of the resources on which their lives depend upon, hence most of the local people indicated that their livelihood was lost due to the presence of the

reserve. These results were supported by Duncker & Goncalves (2017), which results that conservation was perceived bad when local people are not being employed by the park, and their access to resources limited, restricted, or prohibited. Moreover, the conservation was perceived bad in TNR because most respondents were claiming not to be benefitting from it, with many local people expecting employment from the reserve. Most people indicated that benefit from the reserve were not equally shared among communities and local people, with nature reserve staff and management benefiting from the reserve, since they are the one holding the inside information. These results are supported by Bennet et al. (2016) results that when communities around the protected area observed or believed they were not receiving an equitable share of the benefits of conservation might actively oppose conservation within that park. The study findings show that most people were not in favour with the management of the TNR, most people believed that their knowledge was not integrated in the management, and they were also not allowed to decide conservation in TNR. These results indicated that local people disagree with specific conservation management processes, i.e. such as the prohibition of other resources. As a result, conflicts might arise, local people might kill wild animals in a belief that if the reserve is not allowing them to utilise the resources they might as well steal from the reserve. This will further result in severed relationships between local people and nature reserve officials.

The study findings make it firm that local communities' perceptions towards conservation within TNR, can be influenced by several socio-economic, demographic and spatial factors such as period of residence in the area, age, education level, employment status, household size, monthly household income and distance to TNR. These findings were supported by Kideghesho et al. (2007); Tessema et al. (2010) and Mutanga et al. (2015) results that perception towards conservation was shaped differently by a various range of socio-economic, demographic, and spatial factors. On the other hand, this study findings did not support Arjunan et al. (2006) and Mehta & Kellert's (1998) results that gender is a significant predictor of positive perceptions towards protected areas. The study found out that gender had no effect on community perception of conservation in TNR as did Kideghesho et al. (2007), who reported that in Western Serengeti, gender had no effect on community perception of conservation, this is because as Kalternborn et al. (2007) stated, men and women, enjoy the same benefits from conservation and suffer the same costs from conservation.

Overall, the study found out that the local communities were not satisfied with conservation within TNR, mainly because they were not benefitting from it. Local people were rather not satisfied with the process of conservation than the concept of conservation. Period of residence in the area and benefits received from the nature reserve were found to have a significant difference ($p < 0.05$) on the attitudes of local people.

5. 1. 4 Benefits, and losses perceived from the nature reserve

This section discusses the key findings on local people 's benefits and losses received from TNR. The results show that most of the respondents perceived no benefits from the reserve, however, 40% of the respondents received benefits in the form of sustainable harvest such as bush meat, fishing and collection of firewood and medicinal plants and herbs with very few respondents employed received direct employment opportunities.

The Chi-square results show that distance of respondent's communities' location to the nature reserve had no influence on the benefits. Hence, no significant difference was found between distance and the benefits received. The study found out that there was a significant difference ($P<0.05$) between benefits and period of residence in the area as well as employment status. The results show that very few (21.9%) of the respondents perceived some losses from TNR, a very small proportion of 17% of those respondents identified those losses linked to wildlife damage. Even though none of the respondents has been compensated for their losses. The study found out that locals expected the nature reserve to employ the locals or provide job opportunities to the local members. This study suggests that managing local communities' expectations through understanding their perceptions and attitude under varying socio-economic conditions, will lead to more efficient and sustainable community conservation in the nature reserve.

5. 1. 5 The management practices applied, and challenges related to conservation in Turfloop Nature Reserve.

This section discusses the management practices applied and challenges related to conservation in TNR. This was done to understand the influence of the management process on the perceptions and attitudes of local people on conservation. The study found out that the local people in all nine villages sampled believed that the current "management strategies" employed within the nature reserve, hindered the local people from accessing the nature reserve to utilise natural resources such as firewood collection. They reckoned that due to the prevailing high

levels of poverty in the villages they should be allowed access to the natural resources of the reserve. The local people were also found to be affected by the rules that they can no longer graze their cattle or fish on the reserve and if they want to pass through the reserve to visit their relatives on the opposite side, they must pay an entrance fee or ask permission. The study found out that poor community structures or forums further hinder the success of conservation in TNR. Hence, local people believed they were not involved in the management of TNR.

5. 2 Conclusion

The results suggested that examining the effects of local people's knowledge and perceptions on conservation can produce useful information that could be integrated into the decision-making process and management of TNR, thus reducing conflicts. The findings indicated that local people were knowledgeable about the presence of TNR. However, they had no extensive knowledge of the importance of TNR. As seen in other studies reviewed, local people in the study promotes partnership between local communities and government in the management of TNR rather than having the TNR staff and management authority to manage their resources. Period of residence in the community played a critical role in influencing local people's knowledge about conservation; people who stayed in their origin communities for over 21 years knew the surrounding area and issues prevailing to conservation. This study was significant because local people’s perceptions shape their attitudes in the very short-run and behaviours in the long-run. Local people’s perceptions were negatively affected by both the perception of benefits from the reserve. Simultaneously, the nature reserve management appears to negatively affect people’s perceptions of conservation. While local people’s expectation negatively affects the conservation in TNR, perceptions of benefits positively affect how people perceive the rules governing the reserve and nature conservation. These results suggest that if people perceive the rules of the reserve negatively, then they are less likely to conserve nature and at the same time this will increase the likelihood of conflicts.

5. 3 Recommendations

The recommendations are pertinent to the key findings and suggestions for the management of the Turfloop nature reserve. Some of the recommendations are discussed below:

The key findings of this study were that socio-economic, demographic, and spatial variables in terms of, age, income and education levels amongst others had a significant association with local people’s knowledge, perceptions, and attitudes. This study, therefore, suggests that if

improved socio-economic conditions can resolve resource use conflicts and foster conservation attitudes of the local people they should be strengthened. This can be achieved through the addition of effective strategies and programmes that empower the local people and designed concerning the state and condition of the nature in each area and take into consideration the socio-economic circumstances of the local people.

The key findings of this study were that local people knew about the existence of TNR. However, they did not understand the process of conservation and the importance of TNR as a protected area. This result was because of a lack of information sources mentioned in the study. This represents a real challenge for the nature reserve authorities' institutions involved in reserve management. In order to minimise the challenge and achieve sustainable management, reserve authorities should align its objectives to better communication and collaboration with the local communities. This can be achieved using awareness conservation programmes in local communities. The other key findings of this study were that there was a need to increase local people's access to benefits from the nature reserve (Figure 23).

Another key finding in this study was the argumentative access to the extraction of resources from the nature reserve. Whereas most of the respondents indicated a need for access to the nature reserve and for utilization of various resources such as fishing, grazing, and firewood collection, the nature reserve staff respondents reported that such access and extractive use is not and should not be allowed unless under certain conditions. while exclusions are important for the protection of nature and its associated components, it is recommended in this study that the management activities reflect on ways in which the nature reserve authorities can improve the livelihoods of the local people such as compensation for losses caused by the establishment of the nature reserve areas and provision of alternatives for resources to which access has been prohibited.

The study found out that there was a need to involve local communities in resource management to improve conservation support and to achieve sustainable management of the nature reserve. This point is echoed by Weladji et al. (2003), who stated that appropriate and efficient conservation management should encourage the involvement of local communities and improve the interaction of park staff and local people through decentralizing real power and authority to local people and existing and appropriate local institutions. This reinforces a recommendation forwarded by a significantly high proportion of the respondents in this study that local communities should be significantly involved in the management activities of the

protected areas to improve relations with the nature reserve management staff and enhance the conservation attitudes as it gives them a sense of ownership. Such involvement, as Wells et al. (1992) suggested, should not only be in the form of contributions like being hired as temporary employees but should be in real decision-making. This will serve to eliminate the general hostility towards the conservation systems.

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APPENDIX A: PROPOSAL APPROVAL LETTER

24/11/2017

NAME OF STUDENT:	Mothapo MV
STUDENT NUMBER:	201206143
DEPARTMENT:	Geography and Environmental Studies
SCHOOL:	Agricultural and Environmental Science
QUALIFICATION:	MSCA01

Dear Ms Mothapo

FACULTY APPROVAL OF PROPOSAL (PROPOSAL NO.119 OF 2017)

I have pleasure in informing you that your masters proposal served at the Faculty Higher Degrees Committee meeting on **24 August 2017** and your title was approved as follows:

"An examination of communities' knowledge and perceptions on conservation within Turfloop nature reserve, Limpopo Province, South Africa."

Note the following: The study

Ethical Clearance	Tick One
Requires no ethical clearance	
Proceed with the study	
Requires ethical clearance (Human) (TREC) (apply online)	√
Proceed with the study only after receipt of ethical clearance certificate	
Requires ethical clearance (Animal) (AREC)	
Proceed with the study only after receipt of ethical clearance certificate	

Yours faithfully

Prof P Masoko
Secretariat: Faculty Higher Degrees Committee

CC: Dr MR Ramudzuli
Dr MR Ramudzuli
Prof TP Mafeo

APPENDIX B: ETHICAL CLEARANCE CERTIFICATES

University of Limpopo
Department of Research Administration and Development
Private Bag X1106, Sovenga, 0727, South Africa
Tel: (015) 268 3935, Fax: (015) 268 2306, Email: Anastasia.Ngobe@ul.ac.za

TURFLOOP RESEARCH ETHICS COMMITTEE CLEARANCE CERTIFICATE

MEETING:	05 June 2018
PROJECT NUMBER:	TREC/118/2018: PG
PROJECT:	
Title:	An examination of communities' knowledge and perceptions on conservation within Turfloop nature reserve, Limpopo province, South Africa.
Researcher:	MV Mothapo
Supervisor:	Dr MR Ramudzuli
Co-Supervisors:	Dr G Tawodzera
School:	Agricultural and Environmental Sciences
Degree:	Master of Science in Geography and Environmental Studies

PROF TAB MASHEGO
CHAIRPERSON: TURFLOOP RESEARCH ETHICS COMMITTEE
The Turfloop Research Ethics Committee (TREC) is registered with the National Health Research Ethics Council, Registration Number: **REC-0310111-031**

Note:
i) **Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee.**
ii) **The budget for the research will be considered separately from the protocol.**
PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.

APPENDIX C: COMMUNITY SURVEY QUESTIONNAIRE (2018)

INTRODUCTION: My name is **Mabatho Valencia Mothapo** (201206143). I am a Master student in the Department of Geography and Environmental Studies at the University of Limpopo. I am carrying out a study on "Communities' Knowledge and Perceptions on Conservation within Turfloop Nature Reserve (TNR), Limpopo Province of South Africa". This is an academic study and the information provided in this study will be used for academic purpose only. The answers that you will provide will be treated with strict confidentiality and will not in any way be linked to you individually. I hope that you will cooperate with me in this exercise so that I am able to meet my academic requirements at the University.

CONSENT TO PARTICIPATE IN THE STUDY

Please indicate to me, whether you "Agree" or "Disagree" with the following statements as I read for you:

I. I understand that my participation in the study is entirely voluntary and that I am free to stop at any time. **Agree [ ] Disagree [ ]**

II. I understand that I cannot be identified by my answers and that my answers cannot be linked to me. **Agree [ ] Disagree [ ]**

III. I understand that I do not have to answer any question that I do not wish to answer for any reason. **Agree [ ] Disagree [ ]**

IV. I agree that the information I give may be used in research reports and that these reports will not reveal my identity. **Agree [ ] Disagree [ ]**

V. I have understood the information regarding my participation in the study and I agree to participate in the study. **Agree [ ] Disagree [ ]**

SECTION TO BE COMPLETED BY THE INTERVIEWER

Name of the Interviewer:	
Date of data Collection	
Name of the Village:	

SECTION A: SOCIO-ECONOMIC CHARACTERISTICS OF THE PARTICIPANTS

Select the appropriate answer that describes you in terms of the information below (Please Circle number next to your answer)

1. Gender					
1	Male	2	Female		
2. Are you the household head?					
1	Yes	2	No		
3. Relationship to the household head (If not head)		1	Parent(Mother/father)		
2	Spouse	3	Child		
4	Sibling	5	Other(s) **(Please specify)**		
4. Age category					
1	18 -30	2	31-40	3	41-50
4	51-60	5	61 and above		
5. Marital Status		1	Single	2	Married
3	Cohabiting	4	Widow/Widower	5	Separated
6	Divorced				
6. Highest Educational Level		1	No formal schooling	2	
3	Primary School	4	Secondary School	5	

6	Tertiary	7	Other(s) **(Please specify)**		
7. Employment Status		1	Unemployed	2	Employed
3	Scholar	4	Retired	5	Pensioner
6	Self-employed	7	Other(s)(**Please specify)**		
8. What is your Occupation?					
9. What is your monthly household income?					
10. Household size(People per household)		1	1-3	2	4-6
3	7-9 people	4	10 and more		
11. Residency period (Years)		1	Less than 5	2	6-10
3	11-15	4	16-20	5	21 and above
12. Origin of Residence		1	Born in this village	2	Not born in this village
13. Distance to the Nature Reserve (km)		1	0-1 km	2	1-2 km
3	3-4 km	4	5km and above		

SECTION B: KNOWLEDGE ON CONSERVATION WITHIN TNR

14. Before this Study, did you know about Turfloop Nature Reserve?			
1	Yes	**2**	No
15. If yes, how did you come to know about the Turfloop Nature Reserve?			

1	Community meetings	2	Management authority meeting	3	Other(s)**(Please specify)**
16. Have you ever been in Turfloop Nature Reserve?		1	Yes	2	No

17. If yes, what was the reason for the visit?

1	Game viewing	2	To attend meetings	3	Visit a friend or relative
4	Employee	5	Other(s)**(Please specify)**		

18. What were the conditions for your visit?

17. Whom of the following do you think is/are the owner(s) (Multiple responses)

1	Government	2	Private owned(NGO's)	3	Community
4	Others**(Please specify)**				

18. What is the importance of TNR to you?

1	It is my cultural village	2	It is a conservation symbol	3	It is an ecological symbol
4	Other(s)**(Please specify)**				

19. What are the ways in which information from the Turfloop Nature Reserve (TNR) reaches you?

1	Extension work by TNR	2	Media (i.e. Radio and television)	3	Community leaders
4	Other(s)**(Please specify)**				

21. Has anyone from TNR ever visited your village?

1	Yes	2	No		
22. If yes, when did they last visit?					
1	This year	2	Past year (Specify the years)	3	Other(s)**Please specify)**
23. What was the reason for the visit?					
1	Educate on wildlife	2	Information gathering	3	Other(s)(**Please specify)**
24. If yes, who visited?					
1	Community representatives	2	TNR officials	3	Other(s**)(Please specify)**

SECTION C: PERCEPTION ON CONSERVATION WITHIN TNR. (Please, indicate the extent to which you agree or disagree with the following statements 1=**strongly agree, 2=Agree, 3=Neither, 4=Disagree, 5=strongly disagree**

25. Statements (Can you say….)	1.	2.	3.	4.	5.
a. I am happy about the presence of a Nature reserve in my village?					
b. The Nature reserve is necessary for the protection of remaining natural resources?					
c. The nature reserve is important to the local people					
d. Local people knowledge is integrated with modern management practices in the nature reserve					
e. The presence of the Nature reserve has improved my living conditions?					

f. The presence of the Nature reserve has brought development such schools to the village					
g. The size of the Nature Reserve has increased overtime					
h. There are no restrictions to visit Turfloop nature reserve					
i. I am allowed to utilise natural resources from nature reserve					
j. Local people are allowed to hunt in the Nature reserve?					
k. Local people are allowed to collect firewood in the nature reserve					
l. Relationship between community and Nature reserve officials is good?					
m. The local people are involved in decision-making and the management of the Nature reserve?					
n. It is responsibility of the local people to protect natural resources?					
o. There is an equitable distribution of common pool resources and benefits from the nature reserve?					
p. there is no problems of living next to the nature reserve					
q. Local people are compensated for their losses caused by wildlife in the nature reserve					
r. My relationship with the Nature reserve is good?					
s. I am willing to make payments such as entrance fee to support conservation in TNR					

25. What is your overall attitude towards Turfloop Nature Reserve?

1.Not satisfied	2. Somewhat dissatisfied	3. Neutral/Do not know	4. Somewhat satisfied	5.Very satisfied

26. What are the advantages of living next to a Nature reserve? (write your answer below)
27. What are the disadvantages of living next to a Nature reserve? (write your answer below)
28. If Turfloop Nature Reserve could do one thing to make your life in your village better, what should it be? (Multiple responses)

1. Animal problems control	2. Construction of schools	3. Allow grazing
4. Compensate for losses	5. Provide job opportunities	6.Other(s) (Please specify)

SECTION D: BENEFITS DERIVED WITHIN AND AROUND TNR

29. Does the establishment of TNR benefit you?			
1	Yes	**2**	No
30. If yes, what are those benefits?			
1	Sustainable harvest	2	Recreation
3	Education	4	Scientific Research
5	National ecosystem services	6	Other(s) (**Please specify)**
31. Have you heard about revenue sharing around TNR?			

1	Yes	**2**	No
32. Have you benefitted from revenue sharing?			
1	Yes	2	No
33. If Yes how?			
1	Construction of schools	2	Provision of water
3	Construction of roads	4	Other(s) **(Please specify)**
34. In your opinion, who do you think specifically benefits from the Nature reserve? (Please circle number next to your answer)			
1	Local communities	2	Chief and Community leaders
2	Nature reserve workers/Staff	3	government
4	Other(s **)(Please specify)**		
35. How can your community achieve these benefits in the absence of a Nature reserve, or will it even be possible? (write your answer below**)**			
36. Can you foresee any replacements to achieve these benefits? (Write your answer below)			
37. Have you perceived losses from the establishment of TNR?			
1	Yes	2	No
38. If yes, what are those losses? (Write your answer below)			

39. Please indicate whether they are low, Medium or high
40. In what ways are you being compensated for those losses?(Write your answer below)

SECTION E: MANAGEMENT CHALLENGES AND MANAGEMENT DYNAMICS WITHIN TNR

41. In your opinion, who should be responsible for the management of the park?			
1	Government	2	Community members
3	Partnership between Community and Government)	4	Other(s)**(Please specify)**
42. Does your village use any rules/regulations (Tradition or Modern) concerning wildlife use or protection?			
1	Yes	2	No
43. If yes what are they?(Multiple responses)			
1	Taboos	2	Beliefs
3	Sacred landscape	4	Spiritual values
5	Royal traditions rules	6	Harvesting methods
7	Other(s) **(Please specify)**		

44. Do you think your community was involved during the establishment of the nature reserve?			
1	Yes	2	No

45. In your opinion, why do think the local communities should be involved in the management of the nature reserves? (Multiple responses)			
1	Gives a sense of ownership	2	Dependency on the natural resources
3	Support conservation	4	Comply with laws, rules and regulations of the management of nature reserve
5	Other(s) **(Please specify)**		

46. In your opinion, Which activities do you think should be prohibited or allowed in management of the TNR? (Tick your choice answer in the right column)		
Activities	**1**. Allowed	**2**. Prohibited
a. Firewood collection		
b. Hunting other species		
c. Tourism		
d. Grazing		
e. Other(s) (**Please specify)**		
f. Other(s) (**Please specify)**		

SECTION E: SUGGESTION TO IMPROVE TURFLOOP NATURE RESERVE.

47. What will encourage you to fully support conservation and management of the Nature reserve?

48. What is your expectation about the management of the nature reserve?
Thank you for your time and co-operation.do you have any question or comment to add?

APPENDIX D: KEY INFORMANTS INTERVIEW GUIDE

The question below will be used as a guide in probing information in interviews regarding the Knowledge on the establishment of Turfloop nature reserve, resource use management and conservation issues and the relationships between TNR staff and local communities

1. When was TNR established?
2. Who own the nature reserve?
3. What were the objectives for the establishment of the nature reserve?
4. Who owns natural resources in the nature reserve?
5. Do the local communities have access to, and use of the resources?
6. Under which condition is access to use of the resources, if any permitted
7. What management practices do you undertake to enforce the conservation of nature within TNR
8. Does anyone from the nature reserve visits the local communities? And what was the purpose for the visits?
9. What are the cost and benefits of protected areas to the local people?
10. How is the relationship between TNR managers with local communities?

Thank you very much for your time and cooperation