UNIVERSITY OF ZULULAND

Investigating Indigenous Knowledge Systems in the conservation of Protected Areas in KwaZulu-Natal, South Africa and Portland, Jamaica: Policy, Practice and Management

By

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ORIGINALITY DECLARATION

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DEDICATION

This research project is dedicated to my late maternal grandmother Jabulile Barbara Cele (1959-2012), for her valuable contribution to my life as a young woman. I will forever cherish the love and support she gave to me, against all odds. May her soul rest in immutable peace.

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LIST OF ABBREVIATIONS

BJMNP	Blue John Crow Mountains National Park
CBD	Convention on Biological Diversity
CBNRM	Community Based Natural Resources Management
CF	Conceptual Framework
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
EKZN	Ezemvelo KwaZulu-Natal
IDP	Integrated Development Programme
IK	Indigenous Knowledge
IKS	Indigenous Knowledge Systems
IMP	Integrated Management Plan
IUCN	International Union for Conservation of Nature
JCDT	Jamaica Conservation Development Trust
KZN	Kwa-Zulu Natal
NEPA	National Environment and Planning Agency
NRCA	National Resources Conservation Authority
ODMNP	Okhahlamba-Drakensberg Mountains National Park
PAs	Protected Areas
SANBI	South African National Biodiversity Institute
TF	Theoretical Framework
UNESCO	United Nations Educational, Scientific and Cultural Organization

ABSTRACT

The main aim of this study was to comparatively investigate Indigenous Knowledge Systems (IKS) in the conservation of Protected Areas in KwaZulu-Natal, South Africa and Portland, Jamaica. The aim of this study was achieved through the following objectives: (a) to identify and classify the IKS that exist in the study areas, (b) to establish the status of Indigenous Knowledge Systems in the current practices of conservation of protected areas, (c) to assess the effectiveness of co-management plans that exist in the study areas and (d) to propose strategies for enhancing the integration of IKS in the management of protected areas. Based on the deployment of a mixed method approach in the form a convergent parallel paradigm, qualitative data was gathered through interviews of purposely sampled participants. Quantitative data was collected through the use of questionnaires from randomly selected participants from the study areas. In line with the convergent parallel design, qualitative and quantitative data analysis was done concurrently. Quantitative data was coded using different group of numbers for each theme investigated, these numbers were inserted into Microsoft Excel 2013, where different worksheets were created for the different study areas and then uploaded into Microsoft Excel 2013 so as to produce graphs and tables. Content analysis was utilised to analyse qualitative data. This involved the interview responses, text was shortened to the most significant, coded or named to the most relevant, codes were categorized according to similarities or differences and then themes were interpreted. The results of the study indicate that efforts for the continuous identification and classification of Indigenous Knowledge Systems has been obstructed by the displacement and disregard of Indigenous Knowledge Systems by Protected Areas. Consequently, the status of IKS in the current practices of Protected Areas for conservation management in the study areas is limited at best and non-existent at worst. In an attempt to provide transformation, co-management plans were introduced, however, these plans have inefficiently integrated indigenous communities and their Indigenous Knowledge Systems. Consequently, this research advances strategies which could be adopted so as to enhance the use and successful integration of indigenous communities and their Indigenous Knowledge Systems in the co-management and governance of Protected Areas in the study areas.

Keywords: Protected Areas, Indigenous Knowledge Systems, Co-management, Conservation, Environment

CHAPTER 1: ORIENTATION TO THE STUDY

1.1 Introduction

This chapter provides a background to this study. It formulates the problem statement and in addition also outlines the aim and objectives of the study. The significance of the study is also discussed as well as the description of the structure or format of the whole study.

1.2 Background to the study

The idea for forming Protected Areas was developed in the United States in the nineteenth century (Machado et al., 2017) and globally, Protected Areas are considered to be the key tools for biodiversity conservation (Stolton et al., 2015). Protected Areas were formed in an attempt to curb the ominous rates of biodiversity loss worldwide and globally, the practice of dislocating persons from their traditional lands was implemented in order to construct Protected Areas (Stolton et al., 2015). As a result, in Africa, in countries such as Kenya and Zimbabwe, amongst others, indigenous people were displaced from their areas of origin to delineate large hectares of land as Protected Areas, after conservationists and colonists became wary of endangering the environment and its natural resources (Drewniak et al., 2012). In South Africa, this exercise coincided with the inhumane apartheid system (Noyoo, 2007). He further noted that during this era, homeland policies were executed and these allowed for forceful removals of people from their indigenous lands to particularly compact zones that were short of and had scarce natural resources leading to adversely altered livelihoods and dreadful environmental conditions. The removal of people from their land was to create Protected Areas (Department of Environmental Affairs and Tourism (DEAT), 2009). The latter ministered the limited use of IK for environmental conservation (Tang and Gavin, 2016) resulting in a negative effect on South Africa's biodiversity, communities and ecosystems (Department of Environmental Affairs and Tourism (DEAT), 2009).

A significant number of people were removed from various parts of the KwaZulu-Natal province to form Protected Areas (Skelcher, 2003) and conservation policies were created to restrict access to these areas. Consequently, conservation was regarded elitist and the indigenous groups had no inputs to and no benefits from it (DEAT, 2009). On the other hand, in Jamaica, indigenous people that used to occupy the Blue and John Crow Mountains National Park, utilized the mountains as a source of shelter and food as they hid in the mountains (Smit, 2016) and moved out to the surroundings of the park after they conquered the British

government (Otuokon et al. 2012). Smit (2016) noted that indigenous communities migrated to other places and left the mountains in search of better socio-economic prospects. In Jamaica, people have always been utilizing their IK for conservation of the environment and farming practices (Beckford & Barker, 2007). However, as a result of the abovementioned incidences, Indigenous Knowledge (IK) for environmental conservation was ignored and maligned (Eyond, 2007). IKS refers to the intentionally or unintentionally managing natural resources through the practice of the local people's belief system, taboos and confined guidelines that have been developed by the local people (Fabricius et al., 2004).

Recent studies (Wilson 2016; Meyer 2015; Davies et al, 2013, Jardine 2012) have investigated Indigenous Knowledge Systems (IKS) in relation to the conservation and management of Protected Areas. These studies focused on the interpersonal relationships, governance, leadership, financial arrangements and economic benefits in the Protected Areas and disregarded the integration of IKS in the conservation of the environment. A relatively old study that can be referred to in the context of this research is that of Sharland (1989) which advocates for the integration of IKS into scientific knowledge for the conservation of Protected Areas. This is reiterated by recent research, such as that of Jardine (2012). This study is therefore situated in this context and thus investigates the integration of IKS in the conservation of selected Protected Areas in KZN, South Africa and Portland, Jamaica, with focus on the policy, practices and management.

1.3 Problem Statement

After indigenous communities were displaced from their biodiverse land in most colonised countries such as those in Africa, Western epistemologies for the conservation of Protected Areas were embedded. Such that, during and post the colonial period, IKS was disregarded in the conservation and management of natural resources in Protected Areas (Dabo, 2017; Maluleke, 2018; Thondhlana, 2018). The values of biodiversity and the various roles indigenous knowledge systems play in biodiversity conservation are at a risk of becoming inexistent seeing they are constantly overlooked (Gandile et al. 2017). Literature suggests that efforts to identify and classify IKS in the conservation of Protected Areas has been ineffective (Berkes et al., 2000 and Agrawal, 2002). Likewise, the current practices of the conservation and management of Protected Areas disregard IKS (Fraser, 2006). Moreover, co-management suggests that IKS is not effectively involved in the management and governance of Protected Areas (Mawere, 2013). However, efforts to achieve biodiversity conservation have been

unsuccessful and in some cases policies were poorly implemented (Van Wilgen & McGoech, 2014). Against this background, this study sought to investigate IKS in the conservation of Protected Areas with much of its focus on policy, practices and management. On the basis of this, the study proposed possible strategies for integrating IKS in the conservation of Protected Areas.

1.4. Research aim and objectives and research questions

1.4.1 Aim of the study

The overall aim of this study was to comparatively investigate IKS in the conservation of Protected Areas in KwaZulu-Natal, South Africa and Portland, Jamaica. Specific objectives of this study were as follows:

1.4.2 Objectives of the study

a) To identify and classify the IKS that exist in the study areas.
b) To establish the status of IKS in the current practices of conservation of Protected Areas in Jamaica and South Africa.
c) To assess the effectiveness of co-management plans that exist in Jamaica and South Africa.
d) To propose strategies for enhancing the integration of IKS in the management of Protected Areas in Jamaica and South Africa.

1.4.3 Research Questions

a) What IKS can be found in Jamaica and South Africa?
b) What is the status of IKS in the current practices of conservation of Protected Areas?
c) Are the co-management plans that exist Jamaica and South Africa effective?
d) What strategies for enhancing the integration of IKS in the management of Protected Areas can be proposed for Jamaica and South Africa?

1.5 Significance of the study

Firstly, this study is significant in that it will allow for the acknowledgement of indigenous and/or local communities that were marginalized and excluded from the conservation of Protected Areas given the partial use of IKS after the enactment of colonial and apartheid policies that forced indigenous communities to move unproductive environments. Secondly, once the IKS from the two communities have been identified and classified, the study will show how these are or have been utilized over the years in the study areas. This will allow for proposals of the integration of IKS in the conservation of Protected Areas. And lastly, the study

will allow for the exchange and dissemination of IKS for the conservation of Protected Areas in an attempt to fill the knowledge gaps by comparing the two Protected Areas.

1.6 Outline of the study

The study consists of seven chapters. Chapter one comprises of the orientation of the study, the research problem statement, the aim of the study, research objectives and research questions. Chapter two discussed the theoretical framework by focusing on two theories, which are Political Ecology and Common Property Theory, in terms of how they provide insights for this research. Chapter three is the literature review. It includes an overview of authentic sources of information on themes such as the identification and classification of IKS in the study areas, the status of IKS in the current practices of biodiversity conservation in Protected Areas and lastly, the effectiveness of the co-management plans of the study areas. Chapter four describes the physical setting of the study areas and Chapter five focuses on the research methodology of the study. This chapter explains the research design of the study, the methods adopted to achieve the objectives of the study as well as the instruments that will be utilized to collect and analyse data in the study. Chapter six analyses and interprets the results of the study and lastly, Chapter seven concludes the study, by focusing on the evaluation of the research objectives, the conclusion as well as recommendations of the study.

1.7 Conclusion

This chapter has presented the setting of the study in terms of discussing the background to the research, the problem statement as well as a description of the aims and objectives of the study. The same chapter has also elaborated on the significance and the outline of the study. The next chapter is a discussion of the theoretical framework of this research.

CHAPTER TWO: THE CONCEPTUAL AND THEORETICAL FRAMEWORKS

2.1 Introduction

This chapter discusses the conceptual, theoretical framework of the study as well as provides the definition of terms of most relevancy to the study. The conceptual framework (CF) refers to the main part of the design of the study, either in a narrative form or graphically were the main themes of focus including a system of concepts are discussed and in order to inform the study at hand (Robson, 2011). Andthe theoretical framework (TF) is the analysis and validity of an existing theory aligned with the study (Lederman and Lederman, 2015). Further, Grant and Osanloo (2014) suggest that a TF should also provide basis for the study as well as support the research questions, problem statement, literature review and the methods of the study. As a result, the first part of the chapter discusses the CF and the second part focuses on the TF.

2.2 The Conceptual Framework and Definition of Terms

Figure 2.1 below, is a graphical representation of the conceptual framework adopted in this study. These include protected areas, the environment, conservation and natural resources, Indigenous Knowledge Systems, marginalization and indigenous people as well as policies and practices. These give rise to research questions and the methods utilized in the study which are discussed in Chapter 1 section 1.4.3 and Chapter 5 respectively.

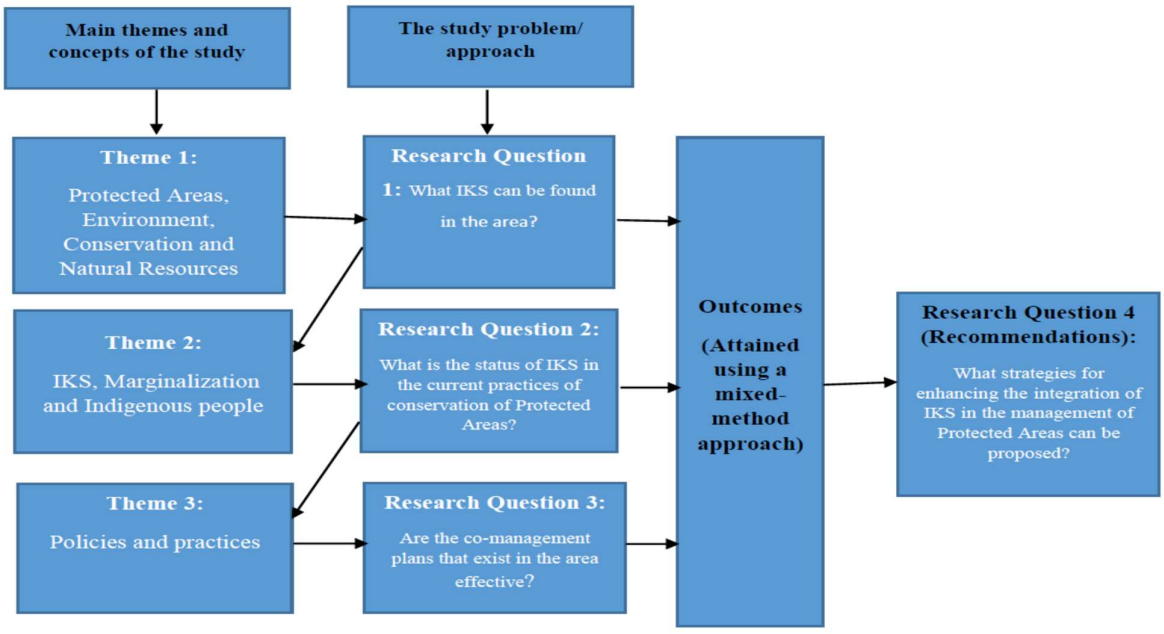


Figure 2.1: The Conceptual Framework for the study

Source: Author (2020)

There are various terms around which this study revolves and these are;

2.2.1 Conservation

It is the provision of protection, management and/or monitoring of natural resources in order to constrain the destruction of these resources through overconsumption and overexploitation. This is done through upholding a mutual relationship with the environment and its surroundings (Sandbrook, 2015). This term was applied in this study to understand the context in which it will be utilized throughout the interactions with the various stakeholders involved with the study as well as how these stakeholders conserve their environment using IKS.

2.2.2 Environment

A great portion of the study was situated around environmental conservation and therefore this term was used throughout to shed light onto the particular elements of the environment that are cited in the study. Having said that, the term environment refers to a system that is made up of biotic, abiotic and cultural elements (Prasad, 2015), mainly natural constituents such as air, land, water, fauna and flora that are indispensable to as well as impacted by anthropogenic activities (Sauvé et al., 2016).

2.2.3 Indigenous Knowledge Systems (IKS) And Indigenous Knowledge (IK)

On one hand, IKS is defined by Mwangi (1998:2) as the "body of knowledge built through generations living in close contact with nature and it includes a system of classification, a set of empirical observations about the local environment, and a system of self-management that governs resource use". IKS is the understanding and technologies existing in various forms that are indigenously found in particular geographical areas (Rozani, 2009). On the other hand, IK refers to, "a set of ideas, beliefs, and practices of a specific locale that has been used by its people to interact with their environment and other people over a long period of time" (Mawere, 2015). In this respect, these concepts and/or acronyms are utilized interchangeably in this study. These definitions of the terms were applied to the study to provide a distinct understanding of the term and how participants were required to understand the term as they were required to identify and classify IKS in the different study areas and overall, their perceptions regarding their IKS for biodiversity conservation.

2.2.4 Indigenous people

According to McMillan & Rigney (2015), the concept of indigenous people lacks an official definition. In this study, the definition put forward by Cassel & Maureira (2017) was be adopted. They define indigenous people as a distinct group of people with unique experiences,

culture, history, and a way of living and interacting with their surrounding natural environment. This concept was mentioned throughout the study along with IKS and/or IK. Also, indigenous people have an enormous part in this study as participants. Therefore, it is imperative that the concept adopted for this study was clearly distinguished.

2.2.5 Marginalization

It is the forceful exclusions and displacements of indigenous and local communities from their land of origin Maldonado et al. (2014), comprising of exclusionary rights for indigenous persons in forms of jurisdictions and/or well-defined frontiers (Vaccaro et al., 2013b). The utility of this term in the study was to convey the depth and intensity of living conditions following the removal of indigenous peoples from their areas of origin and the introduction of the prohibiting laws that restricted them from utilizing the natural resources in their surroundings.

2.2.6 Natural resources

Natural resources include renewable (for example, freshwater and land) and non-renewable (for example, oil, gas and coal) resources (Unruh and Williams, 2013) that are consumed and extracted for economic productions and are impacted by various anthropogenic activities and subject to different unorthodox views (Ushie, 2013). In the study, the term was used to clarify what these commodities are and how they are significant to indigenous communities as well as how they consume, conserve and manage them.

2.2.7 Protected Area

Refers to a specific portion of land that is secured for its aesthetic value, flora and fauna, created after ungoverned and uncontrolled natural resource depletion (Andrade & Rhodes, 2012) with the key objective being the preservation of natural resources (Machado et al., 2017) but able to accomplish a myriad of societal and commercial objectives (Watson et al., 2014).Therefore in this study, the application of this term was to fully understand the concept, given the complexity and forces that led to the creation of these areas.

2.3 The Theoretical Frameworks

Figure 2.2 below provides the theoretical frameworks of the study, accompanied by in-depth explanations of the theories. In investigating IKS in the conservation of Protected Areas, the theory of political ecology, assisted by the common property theory were deemed relevant. Therefore, these theories were consulted in the study for the reason that PAs were established with exclusionary ideologies. Pragmatic examples include the environmental control by the use

of borders and jurisdictions that controlled the access to and the consumption of natural resources. This was done by the utilization of influence and control of the colonial system over powerless social groups, in this case, indigenous communities.

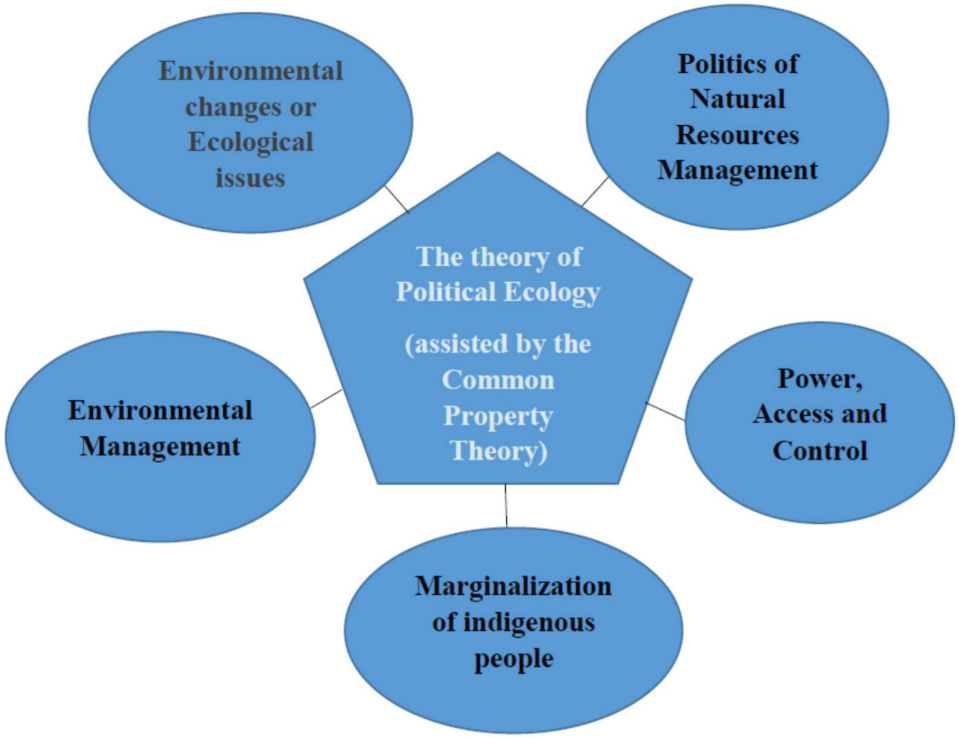


Figure 2.2: The theoretical frameworks of the study

Source: Author (2020)

2.3.1 The Political Ecology and Common Property Theories

As a theory, political ecology states that environmental issues and/or problems cannot be understood outside of politics (Walker, 2005). In other words, political ecology advances that, a balanced and nuanced analysis and ultimately understanding of environmental issues or contests and problems is only possible if the political issues are equally illuminated (Walker, 2005). This implies that there is need for the inclusion of politics in environmental issues, hence the term political ecology that is, politics in ecological issues, analysis and debates. In this respect, political ecology as a paradigm, comprises of ecological, social, cultural and historical issues that are utilized to understand pertinent environmental issues and the relationship between lands, resources and people, especially those that were marginalized (Mccreary & Lamb, 2014; McCarthy & Thatcher, 2017).

As the main theory of the study, political ecology was utilized and assisted by the common property theory to understand these issues as mentioned above. According to Nkhata (et al. 2012) and Agrawal & Benson (2011), the common property theory is the understanding of the relationships that exist in communities for the equal distribution of pooled resources as well as the capability to accomplish the appropriate preservation of these resources. In this study it was used to thoroughly take in for questioning the processes of sharing resources, as well as the access, consumption of these resources and the underlying policies of this theory. Therefore, in this study, political ecology and the common property theories were used to uncover historical issues of conservation, displacement and/or marginalization of people from their land, natural resources consumption and control and environmental change and management.

a) Historical issues

Historical issues from the theory of political ecology allow for the interpretation of relevant past issues (Balée and Balée, 2013) and enhance the understanding of environmental issues that have led to environmental change today and also provide assistance in determining the future of the environment (Vellend et al., 2013). Generally, the common property theory traces historical issues such as environmental and/or land degradation and the overexploitation of natural resources as the main influences of the underlying policies of the political ecology theory (Vellend et al., 2013). These examples have been referred to as "Tragedy of the Commons" by Hardin, who suggests that indigenous people are responsible for and therefore suggests that the state be responsible for managing natural resources (German and Keeler, 2010). Hardin argues that local communities on there are not capable of governing natural resources on their own (Acheson, 2019). This is because, state management of natural resources holds the potential for curbing the deteriorating rate of natural resources (Vaccaro and Beltran, 2019).

Globally, common property regimes including the equal distribution to the access and consumption as well as management of natural resources had always existed within indigenous communities (Vaccaro and Beltran, 2019). Vaccaro and Beltran (2019) posit that these were later exhausted by colonial laws in the name of environmental conservation. The history of conservation and control suggests that in the pre-colonial era, indigenous people had always been conserving their natural resources (Fabricius et al., 2013). This was governed by traditional leaders who controlled access to natural resources (Department of Environmental Affairs (DEA), 2018).

These were achieved through prohibiting the consumption and hunting of sacred animals and restricting access to sacred areas as well as the demarcation of areas to prevent exploitation (Fabricius et al. (2014); DEA, 2018). Yet, during the colonial era, colonist gave instructions to regulate activities such as hunting, and tree cutting (resulting in deforestation) to conserve forests and in this manner, Protected Areas were created and indigenous knowledge was marginalized (DEA, 2018). Further, DEA (2018) wrote that the post-apartheid era gave birth to policies, (discussed further in the study), that reduced the application of and disabled indigenous knowledge in the conservation of Protected Areas. The understanding these issues mentioned above assisted the study in identifying and classifying the IKS that exist in the study areas to date, as well as establishing the status of IKS in the current practices of conservation of Protected Areas.

b) Displacement and/or marginalization of people

These issues are perpetuated by environmental dispossession, also known as the displacement of people from their aboriginal land for the creation of Protected Areas (O'Brien et al., 2007). Through hegemonic subjugation Debelo et al. (2012) and Kashwan (2017) states that indigenous communities were displaced and marginalized to hinterlands and restricted from accessing and utilizing resources within the Protected Areas (Andersson et al., 2017). Whilst the common property theory suggests for the balanced power relations, equal access to and the consumption of natural resources (Turner, 2017). Colonists usurped land from indigenous communities leaving them without any land entitlements and infertile soils (Chomba et al., 2016). Another catalyst for displacement and marginalization of indigenous groups was the discovery and mining of natural resources (Winters, 2015).

According to Adger et al. (2001), the ecological issues continued, for example the occurrence of deforestation as a global ecological dispute in the 1980s that prompted climate change which led to natural disasters such as floods, then the loss of biodiversity, fertile land for agriculture and/or soil degradation and water availability. This led to social issues of class, gender and ethnical variances and disparities in the distribution of ecosystem services and the marginalized populations were denied access to natural resources that negatively affected their livelihoods (Kull et al., 2015) as well as their physical well-being (Tobias and Richmond, 2014). This study sought to identify and classify IKS in the study areas, as well as establish the status of IKS in the current practices in Protected Areas, however according to Nkhata et al. (2012) the former and latter influenced the abridged ability to apply IKS in these areas.

c) Natural resource management, conservation and control

According to Kashwan (2013) and Bixler et al. (2015), these exclusionary policies fabricated by colonists' subjugation permitted for control over natural resources access and consumption and other activities on land. The policies were created based on the assumption that the communities occupying the fringes of the Protected Areas are unable to sustain and manage natural resources (Fabricius et al., 2013) and therefore exert certain pressures resulting in (Bixler et al., 2015) the over-consumption and depletion of natural resources (Rees, 2017).

The deteriorating state and depletion of natural resources has been blamed upon indigenous and local communities situated on the peripheries of protected areas (Hübschle, 2017). The reasons for this have been thought to be the continued social exclusion of people and increasing human populations (Guerbois et al., 2013). Due to progressing social disparities and reduction in the access to natural resources (Fletcher, 2012) people have developed animosity towards parks (Mombeshora and Le Bel, 2009). The common property theory as has been introduced, assumes that people have the right to access and consume resources of their land of origin (Turner, 2017). This is supported by Ostrom, who stated that indigenous communities on their have the potential of achieving communal governance of resources (German and Keeler, 2010). The natural resource governance and control by the state has accelerated resource conflicts amongst Protected Area authorities and the indigenous communities (Heatherington, 2012) and has negatively affected the perceptions of the surrounding communities regarding conservation relationships (Snyman, 2012).

This is important as the study seeks to understand the relationship between Protected Area authorities and the indigenous communities and the forms of management for natural resources that can include IKS, given that indigenous communities were forcibly removed from their own land and were required to adhere to conservation objectives that were foreign to theirs (Nelson, 2003; Makwabe, 2004). Thus, this study aimed to investigate the restricted use of IKS in the conservation policies being practiced and IKS that exists in the study areas today. Given that the principles of Political Ecology that suggest that indigenous communities were forcibly removed from their own land and were required to adhere to conservation objectives that were foreign to theirs (Nelson, 2003; Makwabe, 2004). The study found it imperative to seek an understanding of relationship between Protected Area authorities and the indigenous communities and the forms of management for natural resources that include IKS,

d) Environmental Change and Management

Given the over exploitation of natural resources that is linked to environmental change, the field of environmental management was introduced (Mtolo, 2010). This process of environmental management, according to Mostert (2015) and Carelse (2016) is the process of determining how actions should be taken before and after the occurrence of an impact on the environment. As most of the impoverished communities depend on their surrounding environment for their livelihoods, they are susceptible to environmental changes and impacts (Uitto, 2014). Environmental management is said to be the governing of the interrelationship between man and the environment in an attempt to managing and conserving natural resources (Lannelongue et al., 2014). However, these environmental mandates and policies have extensively failed to include IKS and indigenous peoples' skills have been marginalized over Western epistemologies for the management of natural resources (Nhamo and Inyang, 2011). Vaccaro and Beltram (2019) argue that common property involves the governance of resources as well as the measures adopted. Therefore, the common property theory advances that natural resources governance be an action assumed collectively to solve ecological issues (Acheson, 2015). As these resources have been known to have assisted and continue to assist society in attaining sustainable development (Saha and Goswami, 2019). And due to the marginalization of indigenous people from their land, these people were also excluded from policy-making procedures worldwide (Wesselink et al., 2013). Consequently, this study sought to propose strategies for enhancing the integration of IKS in the conservation of Protected Areas, keeping in mind that it is imperative that the cultural ecology of indigenous communities be taken into consideration as it provides ways that these individuals use to monitor, adapt and/or overcome ecological issues (Sutton and Anderson, 2013). This assisted in the process of proposing the necessary strategies as mentioned above.

2.4 Conclusion

The chapter has provided the conceptual framework of the study, discussed the concepts which provided a foundation for this study. These concepts are conservation, environment, indigenous knowledge systems, marginalization, natural resources and protected areas. The chapter has also provided and discussed the theoretical value of political ecology By advancing the theory, it assisted this research to understanding the issues of the environment and link them to the problem statement and research questions of the study.

CHAPTER THREE: LITERATURE REVIEW

3.1 Introduction

This chapter reviews literature around IKS, but within the limits of the objectives of the study. As such, the chapter is structured as follows, first, there is an overview of IKS and environmental conservation in terms of a discussion of the history of the establishment of PAs and consequences arising out of this. The second part presents the identification and classification of IKS. The third section is a discussion of the current status of IKS in environmental conservation while the fourth section discusses the notion of co-management of PA. The fifth and final section of the chapter is the conclusion.

3.2 A brief overview of IKS and environmental conservation.

There is a long history around the establishment of PAs. For instance, the United States of America was the first country to set up a PA, the Yellowstone National Park (Robin, 2013, Shafer, 2015; Machado et al., 2017). According to Stolton et al., (2015), initially PAs were established as an indispensable instrument for biodiversity conservation. However, Shafer (2015) posits that the designation of PAs introduced exclusionary policies that displaced and marginalized indigenous people from their lands. Then, the setting up of PAs, spread to other regions of the world, such as Asia (Heinen, 2012, Rocha et al., 2017) Europe (Mose, 2016), Latin America (Larson and Dahal, 2012) and Africa (Andersson et al., 2017).

According to Kiran (2015) in general, Protected Areas are commonly constructed on aboriginal lands/indigenous peoples` land, in which such communities have always been managing natural resources within their vicinity in order to sustain their livelihoods (Pius, 2017). As discussed in the previous chapter of the study, natural resources governance was initially managed by traditional leaders, kings and/or chiefs in indigenous communities as evident in African countries such as South Africa, Swaziland and Botswana (Fabricius et al., 2013). However, throughout the 20th century natural resource governance was controlled by the colonial government who introduced exclusionary policies such as the fortress conservation approach (Andersson et al., 2017, Fletcher, 2012). The implementation of the fortress conservation policy, is said to be evident in Africa and the United States (Mfune, 2012, Vaccaro et al., 2013a). These exclusionary policies disregarded indigenous communities and their IKS (Antipa, 2015; Kitamura, 2010; Cele and Moyo, 2020a, Cele and Moyo, 2020b). According to Muchimba (2018), IKS has been dissolved by western methods of natural resources management. Further to this, Romero et al. (2012) uphold that these policies are as a matter of

course grounded on western epistemologies for biodiversity conservation, in spite of their incompetency that is revealed across the world.

After the end of colonial rule in Africa, natural resources governance has been controlled by independent states (Dabo, 2017). Despite this, there was a longstanding adversity until recently when there has been a far-reaching range of IKS that subsists for managing natural resources (Berkes et al., 2000). In addition, there has been an incremental value for the acknowledgement of IKS for solving environmental issues (Inter-Agency Support Group on Indigenous Issues, 2014). This is because IK possesses principal characteristics for biodiversity conservation (Jasmine et al., 2016; Kiran, 2015). Likewise, the efficacious utilization of IK for environmental conservation by indigenous communities has been advocated (Tanyanyiwa and Chikwama, 2011).

Halim et al. (2012) noted that indigenous knowledge is a valuable tool that assists in decision-making at local community levels, conserving the natural environment and making certain that indigenous knowledge can be transferred from one generation to another. As such constructive relations between the indigenous communities and PAs may conceivably enhance conservation of the latter (Inter-Agency Support Group on Indigenous Issues, 2014). Indigenous communities and their IK are influential when it comes to natural resources management (Chowdhury et al., 2014). Success stories of using IKS for nature conservation can be retrieved from indigenous communities themselves (Antipa, 2015). For example, Kiran (2015) underlines that in India, indigenous communities have successfully managed to transform their farming practices with the procedure of mixing of crushed vegetation grasses to create fertilizer. For these reasons, amongst others, protected area management requires the involvement of a number of contributors (Sutherland et al., 2013). In other words, indigenous people ought to be recognized in the management of protected areas (Maass, 2008). But, a substantial amount of studies that encompass resourceful IKS practices in environmental conservation lack acknowledgement (Berkes et al., 2000; Agrawal, 2014). Added to this is that, these practices are not deservingly presented and corroborated in the field of biodiversity conservation (Karki & Adhikari, 2015). The inclusion of IKS and indigenous communities in achieving conservation objectives has been a contested issue (Agrawal, 2002). This is because there have been both negative and positive outcomes (Ervin, 2010). Nonetheless, the inclusion of indigenous people in participatory approaches to environmental conservation and to a certain management is mandatory (Berkes, 2004). Given the overview above, the overall aim of this

study was to investigate IKS in the conservation of Protected Areas in KwaZulu-Natal, South Africa and Portland, Jamaica.

3.3 Identification and classification of IKS

Indigenous knowledge has the ability to explicate how indigenous people have over centuries, become accustomed to on-going ecological modifications (Sutherland et al., 2013; Parrotta et al., 2016). It must be noted that indigenous knowledge poses as esteemed knowledge that has been prevailing for centuries enabling indigenous communities to prosper in their environment from generation unto another (Iloka, 2015; Diawuo & Issifu, 2015). Iloka (2015) found that one explanation to this would be that indigenous knowledge presents indigenous communities with plausible tactics for thriving in their natural environment. Equally important, IK embodies the principle perception of an indigenous environment prevalent and stored within the customs, the way of life and experiences of indigenous communities (Berkes, 2012; Muchimba, 2018). Indigenous knowledge and methods can be maintained by linking it to existing approaches to biodiversity conservation and utilizing community based approaches for the transferral of knowledge from one place to another and from one generation to another (McCarter et al., 2014).

Gope et al. (2017:887) posit that IKS is "community specific and/or community centric." In addition to this, IK is also capable of adapting to dynamic environmental issues (Tang and Gavin, 2016) and is said to be "unique" (Iloka, 2015:1). As a result of this, IK should be visibly distinguished (Risiro et al., 2013). For instance, IKS can be identified and utilized for preservation, conventional resource management, protection and monitoring of natural resources, as well as in measures for adaptation, cultivation, harvesting and agriculture (Berkes et al., 2000; Jasmine et al., 2016; Tang and Gavin, 2016). These can be classified and or categorized for sustenance, hunting and grazing, medicinal and health purposes, fuelwood, timber and building materials (Abdullahi et al., 2013 & Chikwa, 2011). Furthermore, the classification of IKS can include royal tradition, livelihood tradition and harvesting methods (Abdullahi et al., 2013). In addition, a study conducted by Risiro et al. (2013), diverse indigenous systems were identified as tools that could be used for environmental conservation and these included taboos, totems, and sacred areas that have been effectively implemented.

Various types of indigenous methods have been widely utilized for centuries in countries as far as Ghana in Africa and on an island situated in Southern Europe called Malta, for harvesting rainwater (Wandera, 2017). More examples of water conservation and/or rainwater harvesting using IK include that of Lake Fundudzi a sacred place for the Vha-Venda people located in

Limpopo, South Africa (Anuymba & Nkuna, 2017). In rural Zimbabwe, indigenous communities successfully utilize water taboos, *usawetera mumvura (do not urinate in rivers and dams)* going against these would lead to the deteriorated health and well-being of the violator as well as the rest of the community (Reniko et al., 2018). To retain rainwater, an IK system known as *godha and thagalok*, is utilized by the Jumma indigenous community of Bangladesh, south of Asia, were a dam is constructed using bamboo and wood to store water for domestic use and irrigation purposes for the community (Magni, 2017). Evident wells in Sudan (Iloka, 2015) and rock hewn cisterns in the Maltese Islands have shown that this area has been successfully utilizing indigenous knowledge to catch and store water, (Bezzina & Laiviera). Also, sacred wells in the Zaka District of Masvingo, Zimbabwe, have over the years remained unpolluted given the indigenous practices enacted in this area (Risiro et al., 2013).

For weather predictions, Vilakazi (2017) wrote that in KwaZulu-Natal, South Africa, indigenous people utilize the phenology of plants, such as the leaves as well as the presence of Cape Sparrow (*Passer melanurus)* to predict precipitation. Similarly, Kenalemang and Kaya (2012) observed that the Batswana people of Southern Africa encompass a number of indigenous knowledge strategies that are utilized to predict and adapt to natural disasters, including their observations of the behaviour of game, insects and other animals in their natural surroundings as early warning indicators. Likewise, in Jamaica, the interpretation of meteorological forecasts utilizing the observation of the behaviour of animals in their area is identified (Picking et al., 2019). In the case of wildlife and natural resources management, research has revealed that sacred spaces are natural habitats for indigenous vegetation and wildlife that are subsequently shielded from misuse (Iloka, 2015:2). In the Teso District of Kenya, wildlife totemism has been practiced, were the different animals are viewed as protectors of indigenous people and therefore are kept safe and preserved (Ayaa and Waswa, 2016). This is also evident in Jamaica (Picking et al., 2019). Literature on land and soil management using IK shows that the use of organic materials, manure and/or compost are utilized so as to enhance quality of the soil (Altieri et al., 2015). According to Iloka (2016) in the Niger Delta region of Nigeria, soil erosion and landslides are prevented through the use of bamboo plants and palms. IK has always permitted and/or led to the reciprocal link between man and the environment (Thi & Chi, 2011). Indigenous communities are generally dependent on resources provided by their surrounding natural environment, however, this indigenous knowledge if undocumented and disregarded, is at risk of not being transferred from one generation to another (Kenalemang and Kaya 2012). It is on this basis that this study identifies

and classifies the IKS that exist in the study areas and therefore the literature review in this section provides a context for addressing the first objective of this research.

3.4 The current status of IKS in the conservation of PAs

3.4.1 Exclusion of IKS in biodiversity conservation

This section of the study deals with the following aspects of the question, how and why IKS is/was excluded from biodiversity conservation. As noted above and in the previous chapter of the study, the creation of PAs included the displacement and/or the marginalization of indigenous communities and their IK (Shafer, 2015). Traditionally, it has been argued by Oldekop et al. (2016), Brockington and Igoe (2006) that in order to achieve conservation management, indigenous people have to be exempted from PAs. This was supported by the theory of the *"Tragedy of the commons"* by Hardin in 1968, who further endorsed the construction of PAs on the basis that indigenous communities were incompetent and/or unskilled enough to manage natural resources on their own (Reniko et al., 2018). Moreover, indigenous communities in developing states were said to have failed to conserve the environment (Death, 2016). Therefore, African states amongst other developing states, adopted western epistemologies for the conservation of the environment (Ndlovu and Manjeru, 2016). This, led to the marginalization and disregard of indigenous societies in the practices of natural resources management (Reniko et al., 2018; Cele and Moyo, 2020a, Cele and Moyo, 2020b). To add to the point above, the marginalization and disregard of indigenous communities to hinterlands excessively, threatened, reduced and disabled IKS (Kiran, 2015; Diawuo and Issifu 2015; Rocha et al., 2017; Reniko et al., 2018)

Indigenous people that sustained their practices of IKS for ecological processes were considered as substandard and this led to the negligence of the practices, thus hindering the transmission of this knowledge from one generation to another (Reniko et al., 2018). Likewise, through hegemonic subjugation, IKS was marginalized and then disregarded (Duarte and Belarde-Lewis, 2015). A study conducted by Ayaa and Waswa (2016) reported that in communities where IKS was prevalent for conservation, over the years, the practices were abandoned. Essentially, the application and transmission of IKS was condemned by colonization (Johnson et al., 2016). According to Magni (2017), it has then been found that IK have been subjected to unceasing subjugation and the field of environmental management has been dominated by western paradigms. These western paradigms, for example the exclusionary policies enacted by PAs have deteriorated IKS and have adversely affected indigenous

communities (Parrotta et al., 2016), more specifically, indigenous communities who rely on their surrounding environment in order to maintain their livelihoods (Baldwin and Beazley, 2019). And yet, no alternative livelihood measures are provided for indigenous communities, leaving them in poverty (McShane, 2003) as cited in (Cobbinah et al., 2015). What is more, Baldwin and Beazley (2019) assert that the overall welfare and the livelihoods of these communities should be recognized along and in the processes of managing the environment. However, IKS has not been included within the current biodiversity management practices (Kiran, 2015). IKS has been disregarded in informing policy makers, in decision-making processes and indigenous communities have been repudiated the right to use their natural resources (Holmberg 2011 & Antipa, 2015). Also, Protected Area management does not involve the most significant stakeholders in natural resources management, that is, the community, in decision-making processes and in the development of policies (Dube, 2018; Cele and Moyo, 2020a, Cele and Moyo, 2020b).

The key aspect of this argument is that IKS is considered as gone in time (Risiro et al., 2013), its authenticity is interrogated (Reniko et al., 2018) and it is generally thought that IK is obsolete and miniature in contrast to western epistemologies for biodiversity conservation (Desta & Smithson, 2016). It is within this context, that in this study the current status of IKS was investigated, in an attempt to understand its exclusion from the biodiversity conservation of PAs, and in addition to this, explore the perceptions of indigenous communities regarding their displacement during the construction of PAs.

3.4.2 Shifting focus to IKS

The natural environment we occupy today would not have survived if it were not for IKS (Sillitoe, 2015). Indigenous knowledge has been a subject of fierce debate and to date, there has been a developing concern to reinstitute IK (Mapira & Mazambara, 2013). Thus, given the statement above, advocates for IK have called for the integration of indigenous practices for achieving the goals of conservation given that western policies have been unsuccessful (Reniko et al., 2018). With the imbalances of authority amongst colonizers and the colonized indigenous communities, the shift in focus to and integration and application of IKS along western paradigms is vital for including previously marginalized IK holders (Ludwig, 2016). Also there must be a wide-reaching consideration for indigenous communities' perception of the conservation and management of these Protected Areas (Thing et al, 2017; Wilder et al., 2016 and Davies et al., 2013; Holmberg, 2011). Indigenous communities hold valuable indigenous practices that could enrich western knowledge for environmental conservation when included

in western policies (Risiro et al., 2013). Most notably, “indigenous communities have been observing the natural environment for centuries” (Johnson et al., 2015:28). Hence, Sahai (2003:10) asserts that, “the importance of indigenous knowledge can be understood when one realizes that there are no rice or wheat plants nor cotton or mustard, found in the forest are wild plants out of which communities of men and women over generations have bred races of several food and cash crops”.

Indigenous communities possess an in-depth connection with their environments (Ross et al., 2016). To draw our attention, Bohensky, Butler & Davies (2013) declare that the reliability of IK in incorporating it with western scientific knowledge has been driven by efforts to include indigenous people and their IK in research. Researchers have acquired a number of techniques to triumph over global phenomena such as climate change by initiating contact with indigenous communities (Sahai, 2003). Thus, IKS should be contained within the approaches of resources management in order to permit coping with a myriad of environmental issues on a global scale (Thakaran, 2015). In addition, biodiversity would be achieved on a wide scale if given proper attention by conservationist and/or policy-makers (Risiro et al., 2013).

There is a substantial role that is played by indigenous knowledge when it comes to biodiversity conservation (Pius, 2017). The significance of integrating IK and IK holders to western paradigms for biodiversity conservation is reflected in international strategies namely; the Ramsar Convention (1971/75), the Convention on Biological Diversity (1992/3), the Millennium Ecosystem Assessment (2005) and the Strategic Plan for Biodiversity (2011-2020) (Ens et al., 2012). In his paper, Whyte (2013:2) proposes that “IK is assumed as a two-way concept as it has the capability to permit the exchanging of information between diverse indigenous communities”. Pius (2017) has advised that conservation evolvement is now fluctuating in the direction of incorporating IK in policy frameworks. For that reason, Chowdhury et al. (2014) call for the need to involve indigenous people and their IK for environmental management and perceptions regarding Protected Areas when developing policies for biodiversity conservation. Additionally, there has been enriched acknowledgement for IK in the current practices for biodiversity conservation (Robinson & Wallington, 2012).

In certain occurrences, IKS is utilized in conjunction with scientific data in order to produce ideal effects, since it has constantly played a fundamental part in preserving the natural environment in areas that encompass rich biodiversity and where IKS has been prevailing for an extended period of time (Chowdhury et al., 2014; Antipa, 2015; Kiran, 2015). Most

significantly, the recognition of IKS is most prominent in the fields of ecological management and medicine (Nkomo, 2013). For that reason and the fact that there has been a wide-spread failure of top-down approaches, indigenous communities and their IK have been integrated in achieving natural resources management (Ens et al., 2012).

As far as the opponents of IKS are concerned, they assert that, it was not meant for biodiversity conservation. However, there have been plentiful instances that prove that IKS have and are indeed contributing to biodiversity conservation (Khamis and Ruheza, 2012). According to the Caribbean Protected Areas Management (2009), indigenous communities and their indigenous knowledge are acknowledged. In Latin America and Africa, participatory ways and means of biodiversity management have been successful (Romero et al., 2012). According to Jasmine et al. (2016), in India, indigenous societies and their IKS have been integrated to existing policies for biodiversity conservation, and a digital library was created as a collaborative project. Ens et al. (2012) notes that in Australia, IKS are recognized for playing a role in natural resources management and therefore, indigenous knowledge practices have been integrated and in most cases, utilized alongside western practices in the Northern and Central parts of the country. Their role is shown in the Environmental Protection and Biodiversity Act 1999 (Ens et al., 2012). Equally important, Pert et al. (2015) highlight the creation of an online database for Australian IK for environmental conservation, as well as the conservation of culture of the indigenous people.

In addition, there has been a call for an approach that will holistically recognize and include indigenous people and their IKS in resources management and practices of sustainable development (Altman & Jackson, 2014; Diawuo & Issifu 2015). This is because lands occupied by indigenous people have shown prosperous conservation of natural resources and this is apparent in countries such as Australia, Brazil and Canada (Johnson et al., 2016; Schuster et al., 2019). Other relevant points to note are that firstly, for the successful implementation of conservation objectives, collaborating with indigenous communities is crucial (Schuster et al., 2019) and/or establishing noble affiliations with them (Ruheza et al., 2013). Secondly, a study conducted by Garnett et al. (2018) revealed that recognizing indigenous peoples rights to access natural resources and the equal sharing of benefits, the purpose of conservation is accomplished. Lastly, the integration of IKS would lead to the reduction of conflicts that exist amongst indigenous communities and PAs (Ruheza et al., 2013). As a result, this background is significant in a study of this nature, in terms of enhancing the understanding of where IKS lies in the conservation of protected areas in the study areas and how changes can be made to

ensure the consideration of IK in achieving the goals of conservation. This will assist in addressing the second objective of this research.

3.5. A paradigm shift: introducing Collaborative Management (Co-Management)

Collaborative management is an approach that is aimed at involving indigenous peoples in the decision-making process of environmental management and governance (Hill et al. 2012). In other words, co-management is the partitioning of authority, because, it proposes mutual responsibility and authority between the community and the state (Berkes 2004). According to Smith (2015), on a broad scale, co-management has been a mechanism for decision making in the field of environmental management since the 1990s and it is adopted when an establishment displays incompetency in interpreting ecological issues on its own. Collaborative management also known as co-management, in the environmental management field has been valuable and prominent in solving complex environmental issues (Muller, 2010; Seid-Green, 2014). Co-management is also a tool for managing and/or resolving conflicts (Dandy et al, 2014). The development of the concept of co-management was chiefly influenced by scholarship within common-pool resources (Diver, 2016), given the status of natural resources and global environmental changes (Desta and Smithson, 2016). According to Berkes (2004:630), "conservation has become participatory for two reasons. First, there has been a rise of stakeholders and civil society in general throughout the world. Second, participatory approaches have come to dominate management because the very nature of complex environmental problems requires a different, participatory approach." This approach encompasses three key phases (Figure 1 below) (Borrini-Feyerabend et al., 2007) and according De Koning (2010), there subsists, eight types of co-management; ad hoc benefit sharing, consultation benefit sharing, lease, part lease / part co-manage, cooperative co-management, part co-manage / part delegated management, delegated management, and privately managed.

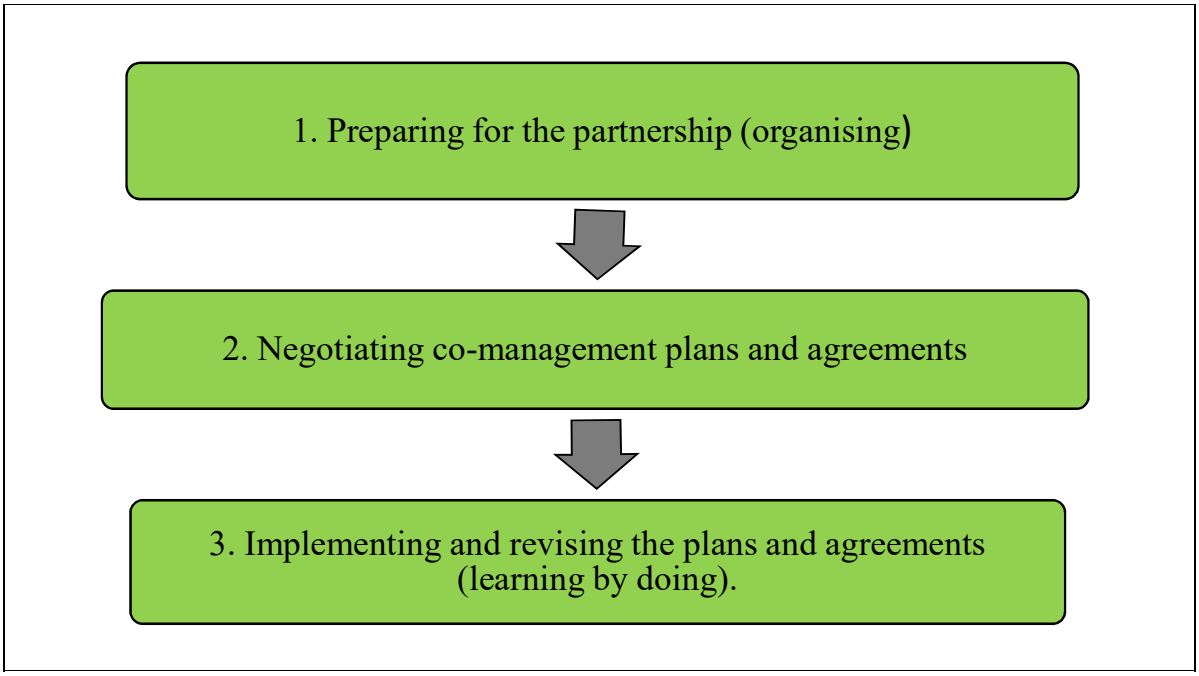


Figure 3.1: The three main phases of collaborative management

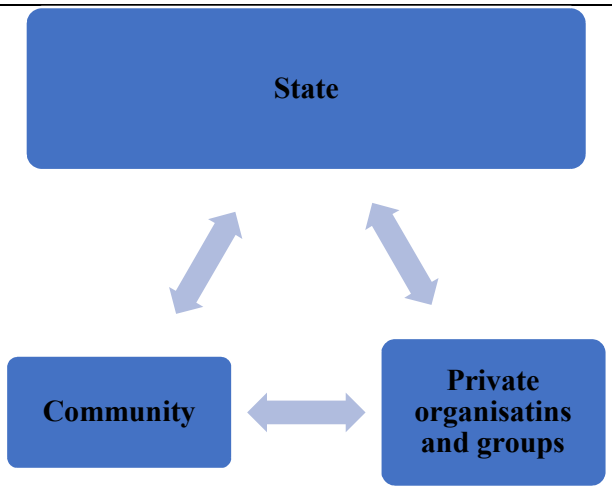
Source: (Borrini et al., 2007:64)

Further, collaborative management takes account of other interested parties such as non-governmental organizations (NGOS) that are given a fraction of conservation management onuses (Protected Area Management System Master Plan: Jamaica 2013-2017), see Table 3.1 below. In the South African context, co-management is seen as an approach that perceives the distribution of power and enhanced natural resources management as the key fulfilment of post-apartheid policies and/or programmes (Dabo, 2017). On one hand, there are various forms that co-management can take (Finkbeiner and Basurto, 2015) on the other hand, Gustavo (2012:1) speaks of the levels of co-management, including; "a consultative level, whereby communities are consulted before any decisions are made; the collaborative level where there subsists a partnership between stakeholders involved and lastly, the delegation level that includes communities' control in the decision-making process". Table 3.1 below, represents the participatory natural resource governance where there is dispersed control amongst the stakeholders involved.

Frameworks within the co-management approach are envisioned as facilitators of equitable distribution of power between the state and indigenous communities whilst sustaining natural resources (Diver, 2016). Notably, co-management permits indigenous communities to working

collaboratively with other stakeholders involved in order to reap significantly from resources management (Whyte, 2013).

Table 3.1: Model of co-management governance structure and key features

Model for Collaboration	
	
Stakeholder positions	Self-governing entities determine the involvement of all stakeholders
Power base	Self-sufficient (autonomy) leadership and social networks
Model of representation	Partnership (participatory) stakeholder governing arrangements)
Mechanisms of social interaction	Bottom up: social learnings, deliberations and negotiations
Delivery	Shared between stakeholders

Source: Adapted from Pearson & Dare (2013)

The success of co-management lies upon the relationship established between the state, resource users and other stakeholders involved (Dube 2018). Co-management, to its full ability, can yield enhanced outcomes for all participants involved assuming, their full participation in

adopting this approach (Dube, 2018). For example, the Wayuu Native American community living adjacent to the Makuira National Park have a reciprocal affiliation with the park management where both interested parties are completely involved in collaboratively attaining the goals of biodiversity conservation (Premauer & Berkes, 2015). Protected Area management needs to include IK and the indigenous communities and utilize the most pertinent information available (Chowdry et al, 2014). To return to an earlier point, Protected Area management must be certain that their policies realize the needs of indigenous communities whilst sustaining natural resources management (De Koning, 2010).

Community based programmes developed as an annex of co-management, established with the intention of commonly including local communities in nature conservation, such as the Community Based Natural Resources Management (CBNRM) that emerged in the 1990's. It is influenced by indigenous people that have always been utilizing their IK for resources management with the intention to utilize more of the IK (Berkes, 2004; (Schnegg, Bollig & Linke, 2016; Dabo, 2017). Further, Gruber (2011) describes CBNRM as an international model for natural resource management and an approach utilized to achieve the promised social justice and environmental protection. Emeagwali and Dei (2014) emphasize that there exists IKS that are associated with the land that continuously guides everyday survival. Therefore, community participation approaches strongly prefer that the role of local people in conservation policy processes and participation be recognized and advocates for natural resource management to move away from top-down conservation initiatives (Nkhoma, 2004; Seekamp & Whiles, 2014).

The main aim of CBNRM programmes is the successful application of IKS and indigenous communities in the conservation of natural resources (Meyer, 2015). CBNRM has drawn a lot of attention considering that most programmes are co-managed involving various stakeholders whose engagement promotes their own external agendas (Musavengane and Simatele, 2017). It is generally agreed that CBNRM provides community members, as stakeholders involved, with socio-economic benefits (Silva and Mosimane, 2014). It also speaks to equitable distribution of resources, power relations, access and use of previously relegated communities (Odendo et al., 2009) (see Figure 3.2 below).

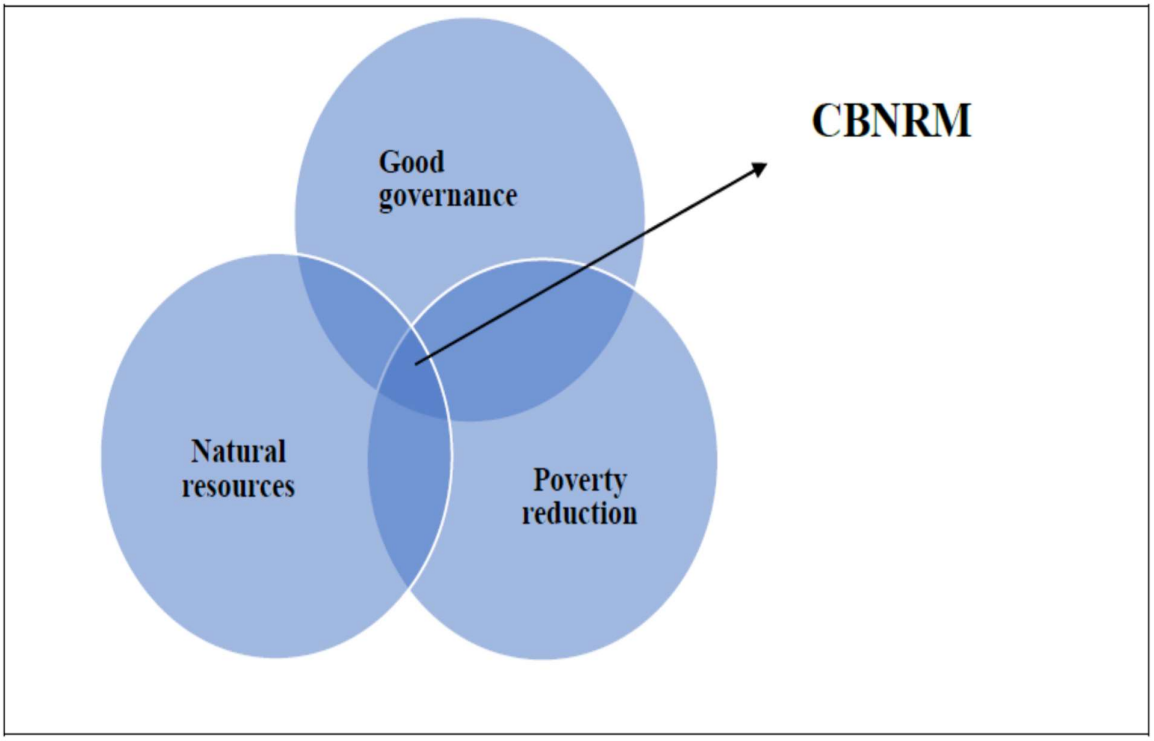


Figure 3.2: CBNRM and its relations with the goals of development
Source: Adapted from Odendo et al. (2009)

On one hand, there has been unsatisfactory distribution of benefits retrieved by local communities due to the insufficiency of methods and/or arrangements established for such a process (Silva and Mosimane, 2014). But then, American political economist Elinor Ostrom has argued for state or external mediations to make available support in disentangling such complications experienced by local communities (Mansbridge, 2010). This can be done by ensuring the equitable access to natural resources (Silva and Mosimane, 2014). According to Dabo (2017:3), "CBNRM is condemned for further disadvantaging communities and benefitting stakeholders outside of the communities and their conservation objectives". As stated by Seekamp, Davenport & Whiles (2014), to accomplish CBNRM, the approach requires, in no particular order; authority, enthusiasm, mutual ideologies, awareness and/or education, marketing, communication, planning, funding and equipment.

In addition, "there are three identified arrangements of benefit distribution; first, collaborative, second, market oriented and third egalitarian" (Silva and Mosimane, 2014: 100). They further elaborate on the above terms. Collaborative distribution of benefits include systems aimed at regulating the relationship between local communities and the state. Market oriented includes bargaining between stakeholders involved, where both parties mutually benefit (Silva and

Mosimane, 2014). And lastly, Silva and Mosimane (2014) wrote that egalitarianism, is grounded on the certainty that all stakeholders are one and the same and therefore ought to be allowed alike privileges in the agreements of benefit-sharing where CBNRM initiatives are concerned. CBNRM encompasses direct and indirect benefits. Where direct benefits include but are not limited to employment and monetary compensation and where indirect benefits include for example, progress in natural resources management (Odendo et al., 2009).

This study is concerned with the benefit sharing between state and the local communities in conservation initiatives and therefore it is vital that the points mentioned above be investigated further. This will assist the study in realizing the effectiveness of the co-management plans of the respective Protected Areas as well as contribute to achieving objective three of this study.

3.5.1 Co-management and indigenous communities adjacent to protected areas

Co-management is said to be a pluralist tactic utilized in the process of natural resources management, seeking to achieve conservation objectives such as the sustainable use of natural resources, equivalent distribution of benefits as well as responsibilities (Borrini-Feyerabend et al., 2007). Within co-management is the involvement of stakeholders in order to collectively achieve goals and responsibilities as well as resources (Davies and White, 2012). This approach comprises of a benefits package that differ according to the type of co-management structure adopted by an institution (Dube, 2018). In co-management, the resource users and the state share equal governance (Finkbeiner & Basurto, 2015; Carlsson & Berkes, 2005). The co-management described by Bollig (2016) as the devolution of rights from state to resource users in the management of natural resources is evident in Sub-Saharan African countries.

Basically, the process of benefit-sharing has to include resource users in managing common resources, gaining access to and utilizing these resources (Wynberg & Hauck, 2014), as well as the sharing of responsibilities (Thondhlana, Cundill & Kepe, 2015). Another is the provision of net benefits from co-management (Gundy et al., 2000). According to Wynberg & Hauck (2014), this process was influenced by the Convention on Biological Diversity 1992, and the issues in natural resources management in Sub-Saharan Africa (Gundy et al., 2000). In countries such as South Africa, such governance has already been instigated (Thondhlana, Shackleton & Blinaut, 2015). However, findings from a study conducted at the Kgalakgadi Transfonteir Park in South Africa, reveal lack of participation, power relations and the unequal distribution of benefits as well as the lack of access and use of natural resources (Thondhlana, Shackleton & Blinaut, 2015).

Management effectiveness includes the benefits of improving the collaboration between stakeholders (Worboys et al., 2015). Nevertheless, in this section of the study, the research will focus much on the equivalent distribution of benefits as well as access to natural resources, specifically the involvement of indigenous communities in the management of natural resources. These indigenous communities have the ability to sustainably preserve and protect natural resources whilst satisfying their livelihoods (Dabo, 2017).

Co-management allows for the inclusion of indigenous communities in environmental governance (Ross et al., 2011 & Gilmour, 2013). It is an ideal model for integrating IK into environmental management, (Austin et al., 2019). This view is supported by Austin et al. (2019) who state that it is the indigenous communities that influence co-management as they request that their IK in natural resources management is acknowledged and integrated as much as existing practices. Besides, excluding indigenous people may propagate conflicts between the stakeholders (Ross et al., 2016). The key aspect of this argument is that, when conflicts amongst stakeholders are unresolved, biodiversity loss may persist (Hausman et al., 2016). As a result, Iloka (2015) argues for the necessity to realize how indigenous people coexist with the environment. The prohibition of indigenous communities from common-pool resources is a backbreaking process (Seid-Green, 2014).

Therefore, it is within the co-management model that the equal distribution of benefits and responsibilities of indigenous communities and their IK is maintained (Austin et al., 2019). Conservation initiatives are required to satisfy the needs of humans as much as the goals for conservation as well as make certain that community participation is implemented at all levels of management (Adetoro, Lawal & Jenyo-Oni, 2011). However, at some instances, instead of a community member being a manager, conservation authority still persists in co-management (Maluleke, 2018). Furthermore, Dube (2018) avows that communities are not commonly involved in the management of Protected Areas.

The significance of creating Protected Areas is well noted, however, it is the very establishment that creates conflicts between the Protected Area managers and surrounding communities (Dube, 2018). By and large, communities adjacent to Protected Areas have not seen any direct benefits (Dube, 2018). In South Africa, there has been a lack of tangible benefits from co-management (Maluleke, 2018). To date, the only benefits retrieved from co-management include employment opportunities and the access to natural resources (Maluleke, 2018).

Communities that are not benefitting from co-management remain resentful (Stolton et al., 2015).

Managing natural resources is not easy, it can involve conflicts (Gilmour, 2013). Thus, involving indigenous communities in achieving the goals of natural resources management may assist in reducing the unsuccessful implementation of co-management and conflicts that may persevere between the stakeholders involved (Poe et al., 2014). According to Bennett & Dearden, 2014), community support is required for the success of any conservation initiatives. Failure to succeed, has led to unequal partnerships given the incomplete involvement of indigenous people (Ross et al., 2016). Ciocănea et al. (2016) identify the main reasons for conflicts between the government and local and/or indigenous communities as the limited available information regarding the goals for conservation, poor communication between the stakeholders and the lack of participation of local community members. Additionally, the distribution of benefits must include, benefitting from resources management based on an individual's level of participation (Schegg, Bollig & Linke, 2016). In countries such as Nepal in South Asia, the effective participation of all stakeholders involved in natural resources management, significant influential incentives have been identified, the first being access to resources, second the assurance to complete benefits and third, enforcing legal property rights of IK (Adhikari, Kingi & Ganesh, 2014).

3.5.2 The effectiveness of Co-Management

According to the National Environmental Management: Protected Areas Act 57 of 2003 section (11), the principles for the management of Protected Areas in South Africa states that, one of the commitments is to ensure efficiency and effectiveness within a Protected Area (Nkomo, 2013). Further, it is necessary to emphasises that since the establishments of Protected Areas in the 19th century, the effectiveness of Protected Areas has not been spoken of until in the recent Fifth World Parks Congress held in Durban, South Africa 2003 (Worboys et al., 2015), although there had already been an increased concern regarding global environmental issues since the 1992 Earth Summit in Rio De Janeiro (Desta & Smithson, 2016). One of the outcomes of the summit included the signing of international agreements by various states to ensure sustainable development whilst protecting and conserving the natural environment (Steimikiene, 2013).

General human well-being is measured by the availability of natural resources (Giri et al., 2001). Nonetheless, globally 85 percent of endangered species are still unsuccessfully

protected (Di Minin & Toivonen, 2015). In South Africa, the South African National Biodiversity Institute (SANBI) (2013) reported that the country had been increasingly subjected to natural habitat loss. Natural habitat loss has threatened the KZN biodiversity too (Jewitt et al., 2015). This has also been evident in Jamaica (Blue John Crow Mountains National Park: Management Plan). Pardo-de-Santayana & Macia (2015) indicated that IK of certain plant species assisted local communities in adapting and coping through famine and achieving the conservation of these species.

Consequently, present day conservation argues for the inclusion of indigenous communities and their IK and likewise the provision of a number of benefits from natural resources management (Nkambule, Buthelezi & Munien, 2016). In order to avoid further biodiversity losses in Protected Areas, natural resources management needs to be properly implemented (Qasim, Tareen & Shah, 2016). Globally, the loss of biodiversity is challenging and thus, requires a number of stakeholders, including the state and local communities in collaboratively working to find probable resolutions (Secretariat of the Convention on Biological Diversity, 2014). Local communities should be involved in all stages of conservation control (Adetoro, Lawal & Jenyo-Oni, 2011). Essentially, there is a need for continued effectiveness management in order to assist in responding to accelerating global issues, for example, decline in biodiversity resources (Worboys et al., 2015). Biodiversity conservation is most significant for the general well-being of human life (Giri et al., 2001). Alcorn & Toledo (2000); Berkes et al. (2000) and Maffi & Woodley (2010) as cited in Tang & Gavin (2016) highlight that IK is capable of playing a significant role in natural resources management and thus, disregarding this type of knowledge may lead to further biodiversity loss.

Equally important, there has been some increased efforts for integrating IK in the restoration of lost habitats (Wilder at al., 2016:499). Hence, in order for effective participation of stakeholders, a coherent policy for the natural resources management must be established (Alberts, 2000). As far as effectiveness of Protected Areas is concerned, the key aspect of this section of the study is to review the co-management plans of Jamaica and South Africa with the intention to find out about the relationships between the park managers and indigenous communities, the benefits retrieved from co-management as well as the equitable access and use of natural resources, some of which have been discussed above.

As per requirements of the National Environmental Management: Protected Areas Act 57 of 2003 (Sections 39 (3) and 41 (2) (e) of South Africa (Integrated Management Plan, 2012) and

similarly the National Resources Conservation Act 1991 (Section 5) of Jamaica (The Blue and John Crow Mountains Management Plan 2012/12), the development of the management plan must consist of a collaborative procedure that takes into account the key stakeholders (Davis-Mattis, 2002). Yet, the extent to which communities are involved in management plans is indistinct (Alberts, 2010 and Sillitoe, 2015). Important for this study is the effectiveness of the co-management plans in dealing with the integration of indigenous communities in the management of the parks, issues of access and resource consumption as well as the distribution of equitable benefits of natural resources management.

3.6 Collaborative Management of PAs in KwaZulu-Natal, South Africa and Portland, Jamaica

3.6.1 Co-Management in the Blue and John Crow Mountains National Park (BJCMNP) in Portland, Jamaica

In Jamaica, the Blue and John Crow Mountains National Park (BJCMNP) was initially protected after 1885 (Otuokon and Beale, 2013). The BJCMNP is managed by the Jamaica Conservation Development Trust (JCDT) and the JCDT was delegated by the Natural Resources Conservation Authority (NRCA) through the National Environment and Planning Agency (NEPA) (The Blue and John Crow Mountains Management Plan 2012/12). In the management plan, it is highlighted that their co-management for conservation includes the NRCA, JCDT, the Forestry Department and inputs from communities adjacent to the park. Signed in the year 2000, the collaborative management agreement has been said to have been successful in natural resources management (CBD - Fourth National Report for Jamaica, edited version (2013:63).

According to the BJCMNP management plan (2011-2016) there is still the desire for community participation for conservation initiatives of the park and surrounds. In accordance with the investigation of the study, access, consumption and benefits, the following have been identified from the BJCMNP management plan (2011-2016: xvi-xx);

a. The co-management committee includes the local communities in participatory planning and programmes available for managing the park.
b. Communities are involved in park management activities.
c. Education and/or awareness regarding the goals of conservation and environmental management is provided to local communities. Public involvement is encouraged.
d. Park management works alongside community leadership in facilitating the conservation of their natural and cultural heritage.

e. Access to and consumption of natural resources is granted, for example, the harvesting of plants for healing and the hunting of wild hog for food.
f. Local community members enjoy direct and indirect benefits such as employment and communities adjacent to the park benefit through cash income.

Given the above, there is still lack of information regarding the extent to which communities are involved in managing the park, their roles and responsibilities in natural resources management and most importantly, the integration of IKS in the conservation of the park. Data collected will assist in closing the gaps mentioned above and provide a better understanding of the co-management plan and its processes. Thus, further addressing the third objective of this study.

3.6.2 Co-Management in the Okhahlamba-Drakensberg National Park, KwaZulu-Natal, South Africa

The Okhahlamba-Drakensberg National Park has since been through 12 proclamations and amendments of government notices following its establishment in 1903 by the Natal Colonial Government as a Protected Area, (Ezemvelo KwaZulu-Natal (EKZN) - Wildlife, 2012). The park is managed by EKZN-Wildlife, a state organisation and statutory board which was established by the KwaZulu-Natal Environment, Biodiversity and Protected Areas Management Bill, 2014. Protected Area managers and adjacent community members collaborate to try and ensure that the land use adjacent to the park and its integrity is maintained and remains compatible with that of the park (EKZN- Wildlife, 2012). Also, stakeholder engagements are encouraged through the creation of relationships with adjacent communities, guided by the local board, community levy trust funds as well as outsourcing of funds for community projects (EKZN- Wildlife, 2019). A few functions of EKZN include managing, protecting and controlling Protected Areas and the compilation of the Protected Areas management plan in accordance with the Constitution of South Africa 1996, National Environmental Management: Protected Area (Act 57 of 2003), National Environmental Management: Biodiversity (Act 10 of 2004), the KwaZulu-Natal Conservation Management Act 9 of 1997 and the World Heritage Convention Act 49 of 1999.

According to the Okhahlamba-Drakensberg Park World Heritage Site Draft Integrated Management Plan (2012:101-102), the sustainable development of, access to and consumption of natural resources by local surrounding communities is permitted, given that the resource users adhere to the Ezemvelo KZN Wildlife Extractive Use Policy inclusive of the following guiding principles:

a. The context of the Park's zonation plan, in particular the ecological sensitivity of particular areas, must be considered.
b. The benefits that such resource use will provide to the neighbouring communities around the Park must be taken into account.
c. Opportunities for access to resources by neighbouring communities must be fair and equitable.
d. All collection of biological materials for purposes falling under the definition of bioprospecting requires authorisation and a bioprospecting permit from DEA; this process aims to ensure that only the holders of indigenous knowledge benefit from any commercialisation of medicinal products derived from indigenous plants.
e. Any extractive use may only take place if the Park is able to effectively control and monitor such resource use.
f. In general, extraction of vegetative portions of plants (thatch, reeds) may be considered, whereas removal of entire plants (bulbs, corms) is not considered appropriate for a Protected Area.
g. Harvesting of animals and animal parts from the protected area for traditional use will not be considered; however, animal parts from management activities such as culling or from natural mortalities may be made available under certain conditions.
h. Notwithstanding the above, the Park will make two elands per year available for traditional ceremonies for San descendants.
i. Whether activities such as the collection of biological materials/samples are for legitimate scientific purposes, or are from bone fide South African research institutions and are undertaken in accordance with relevant Ezemvelo policies.
j. The ability of the Park's management team to effectively control and monitor such resource use.

Concerning, the Okhahlamba-Drakensberg Park: Integrated Management Plan (2012), and in relation to that this study, data collected focussed on whether the local communities are aware of natural, cultural and wilderness values of the Park and if they understand their roles in

collaborative management of Okhahlamba-Drakensberg National Park, given that they are included as beneficiaries. This will be elaborated on in chapter 6 of the study's analysis and interpretation. In addition, their involvement in biodiversity conservation programmes, the state of collaboration management as well as the benefits which they received form the Park will be investigated.

4. Conclusion

This chapter has reviewed literature on the history of PAs in relation to IKS and the current status of IKS in the conservation of PAs. Also discussed in this chapter are the concepts of co-management in light of the objectives of the study which is to analyse the state and level of collaboration between indigenous communities and PAs. The literature suggests that, management plans of the PAs in both Jamaica and South Africa outline the involvement of indigenous communities and whether or not this is the case in reality, were revealed during data collection. Hence, the next chapter explains the settings of the study areas from which the data was collected.

CHAPTER FOUR: THE PHYSICAL SETTINGS OF THE STUDY

4.1 Introduction

The study was conducted in two different areas being, the Okhahlamba Drakensberg in KwaZulu-Natal, South Africa and Portland Parish in Jamaica. Thus, this chapter provides a description of the study areas as well as an outline of the climatic, geomorphological and hydrological and biodiversity characteristics of the respective study areas.

4.2 Description of the study areas

The study areas were chosen specifically due to the fact that, they are Protected Areas, listed in the world heritage sites as inscribed by the United Nations Educational, Scientific and Cultural Organization (UNESCO). According to Cameron and Rössler (2016), a world heritage site is defined as a global instrument for conserving and preserving that encompasses both cultural and natural heritage considered to have exceptional significance to society. The development of world heritage site is influenced by authority or the state, given historical events in that area, the species the area encompasses as well as ecologies identified as significant (Liburd and Becken, 2017). According to UNESCO, a place is deemed a world heritage site when it meets certain criteria. These criteria are inclusive of both cultural and natural heritage that is considered to be of great significance and/or value to that society. As a result, there are two categories of world heritage sites, namely; cultural heritage and natural heritage (Laue, Challis & Mullen, 2017).

The Blue John Crow Mountains National Park (BJCMNP) was designated as a mixed world heritage site (has both natural and cultural heritage) on the 3rd of July 2015 (Smit, 2016). It is an International Union for the Conservation of Nature (IUCN) category II Protected Area with a buffer zone of 28 494ha (BJCMNP Management Plan, 2011-2016). It is one of the utmost remarkable regions of genetic diversity in the Caribbean (Jamaica Protected Areas Systems Master Plan, 2013-2017). Added to this, is the heritage and history of the Taino, an Amerindian group who were the first inhabitants of the mountains and later, the Windward Maroons, a group of people who were enslaved Africans that were initially under the Spanish colonists and later the European colonists (Baldwin-Jones, 2011). The Windward Maroons now occupy the foothills of the Protected Area in Charles Town and Moore Town (Otuokon et al., 2012).

The Okhahlamba Drakensberg Mountain National Park (ODMNP) was inscribed by UNESCO on the 29th of November 2000 (Ndlovu, 2016). This park is an IUCN category I and II protected area with a buffer zone of 46 630ha (Okhahlamba-Drakensberg National Park Integrated

Management Plan (ODNP), 2019). Initially, the area was previously occupied by the isiZulu speaking group of people called AmaZizi in 1600AD, who are now on the northern foothills of the mountain and later AmaNgwane moved in from other traditional areas in the late 18th century (ODNP Management Plan, 2019). Okhahlamba is liable for protecting a great number of global endemic and threatened species, most particularly bird life and flora (Ezemvelo KwaZulu-Natal Wildlife 2011; Okhahlamba Integrated Development Plan (IDP), 2018/2019). The ODMNP, includes the largest and most concentrated caves, rock shelters and rock art in Africa, created by the San people who have lived in the area for over four millennia (Ndlovu, 2016). Due to the above reason, this protected areas has been inscribed as a mixed site (ODNP Integrated Management Plan, 2019).

Granted that, the above areas are PAs and also World Heritage Sites, they are significant to the study, which seeks to investigate indigenous knowledge systems in the conservation of the environment.

4.2.1 Okhahlamba-Drakensberg National Park in KwaZulu-Natal, South Africa

The Drakensberg Mountains, UKhahlamba in isiZulu, from which Okhahlamba has been derived, means barrier of spears (Okhahlamba IDP, 2018/2019, 2017:3). The Okhahlamba local area (Figure 4.1) has a total population of 132 068 people that encompass 3543.63km^2 of the area, lying 29º 23′ S 29º 32′ 26″ E, in three main traditional authority areas, namely; AmaNgwane, AmaZizi and AmaSwazi that lie on the foothills of the Okhahlamba-Drakensberg National Park (Okhahlamba IDP, 2018/2019, 2017). It also includes, three towns namely; Bergville, Cathkin Park, Geluksburg and Winterton (Okhahlamba IDP, 2018/2019, 2017). The number of households is 27 576 and the majority of the population age groups range between 0 and 35 years (Statistics South Africa, 2012).

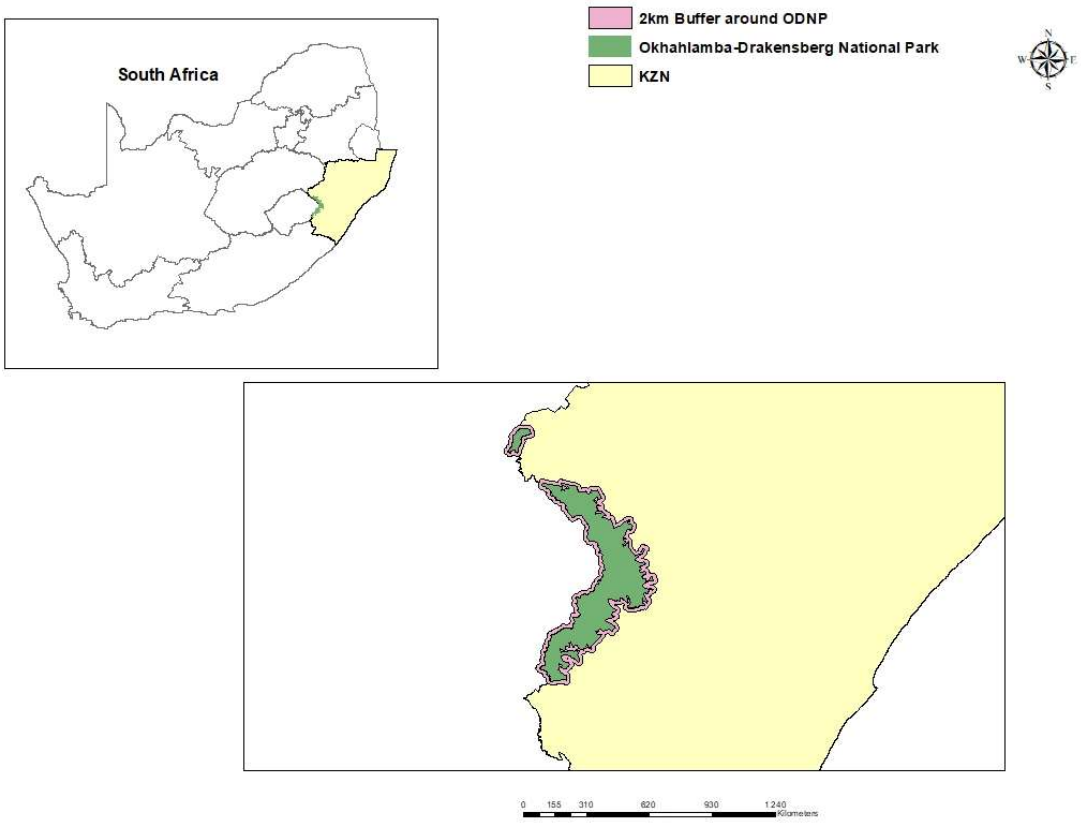


Figure 4.1: Location of the Okhahlamba-Drakensberg in KwaZulu-Natal, South Africa

Source: Author, 2019

4.2.2 Port Antonio in Portland, Jamaica

The area of Portland lies approximately 40km from Kingston, the capital of Jamaica (Statistical Institute of Jamaica, 2013). Portland (Figure 4.2), is referred to as a parish (a province in South African terms) in Jamaica is located on the northeast coast of the island on a total land area of 813,9km^2 and covers almost 89.86km of the coastal area, northeast of the Caribbean Sea (Statistical Institute of Jamaica, 2013). According to the Statistical Institute of Jamaica (2013), the area receives northeast trade winds that bring rain to the area, and is characterized by a hilly terrain mostly suitable for the growth of coffee. It has over half the flowering plants in the park are endemic to Jamaica. The population of Portland is 82 717 and has a population age group that ranges from 30 to 64 years living in approximately 26 891 dwelling units (Statistical Institute of Jamaica, 2013). These populations constitute of a vast majority of the Windward Maroon indigenous communities that occupy the small towns in the areas namely; Moore Town and Charles Town (Baldwin-Jones, 2011). The BJCMNP extends over a total area of 486.5

km^2, representing about 35.6% of the Portland at 17°57′00″N 76°49′00″W (Blue John Crow Mountains National Park Management Plan, 2011-2016).

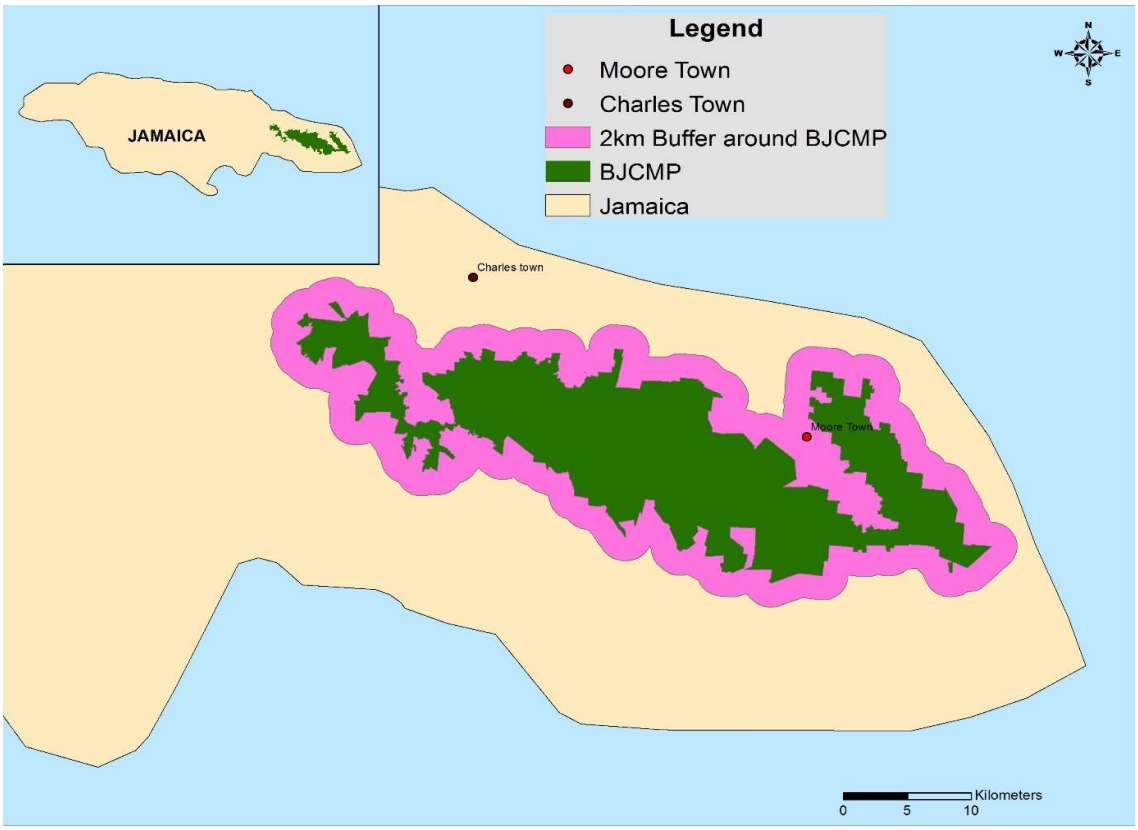


Figure 4.2: The location of the Charles and Moore Town in Portland, Jamaica

Source: Author, 2019

4.3 Climate

4.3.1 Okhahlamba Drakensberg Mountains National Park

An interesting fact about the Drakensberg area is that it is the least drought-prone area in Southern Africa (IDP, 2016/17). The Drakensberg area receives about 1000mm of rainfall on the foothills and almost 1800mm on the escarpments (Nel, 2007), with a mean annual temperature that lies between 16° Celsius and up to 35° Celsius during its summer months, the area also receives 8 days of snowfall per annum during the dry winter months (EKZN-Wildlife, 2012).

4.3.2 Blue John Crow Mountains National Park

The BJCMNP region receives the utmost quantities of precipitation and the highest amount of rainy days in the island. Rainy seasons are highest in May and October (BJCMNP Management Plan, 2011-2016). In the management plan of2011-2016, it is stated that, the frequency of rainfall and thunderstorms in the island influence natural disasters such as flooding and landslides on the mountains. Levy & Koening (2008), states that the mean monthly temperature in the park lies between 18.5^{o} Celsius and 20.5^{o} Celsius. Mist usually covers the highest points of the mountains, increases humidity and limits incident light, this decelerates the process of photosynthesis and thereby affecting plant development and disrupting the forest ecologies (BJCMNP Management Plan, 2011-2016).

4.4 Geomorphology and Hydrology

4.4.1 Okhahlamba Drakensberg Mountains National Park

The Okhahlamba Local Municipality is characterised by the Drakensberg mountains spatial feature with the topography of the steep mountain slopes that limit agricultural potential (EKZN-Wildlife, 2012). However, they are mostly suitable for grazing, forestry and wildlife. The largest protected area is the Drakensberg National Park, which is divided into physiographic areas namely; the escarpments, foothills, steep sided spurs that are elevated to 3400m and valleys that are 2000m above sea-level and reaches the highest peak at 3482m (EKZN-Wildlife, 2012). The PA also encompasses vast basalt, sandstone cliffs, deep valleys, intervening spurs and extensive plateau area as well as rivers and wetlands (Okhahlamba IDP, 2018/2019, 2017, Ezemvelo KZN Wildlife, 2012). Almost 15.6% of the land in the Okhahlamba area is occupied by environmental areas, such as Protected Areas, a number of dams as well as predominant commercial agriculture (Okhahlamba Mountains National Park, 2019). The Drakensberg mountains lies in a watershed that feeds into the Orange, Mooi, Mkomazi rivers as well as the Tugela river which is the largest water source in KwaZulu-Natal (Okhahlamba IDP 2016/17, 2015).

4.4.2 Blue John Crow Mountains National Park

The BJCMNP consists of three mountain ranges (Smit, 2016). First, the Blue Mountains, second, the John Crow Mountains and third, the Port Royal Mountains of Jamaica (BJCMNP Management Plan, 2011-2016). The preservation zone of the Park extends one kilometre from the boundary covering an area of 276km^2 incorporating surrounding indigenous communities (BJCMNP Management Plan, 2011-2016). The type of rocks found on the mountains reveal a 100-million-year history of the development of the Caribbean tectonic plate which scholarship has confirmed to be the eldest geological establishments in Jamaica. It consists of a wide-

ranging history of sedimentation, volcanism, plutonic and metamorphic activities (BJCMNP Management Plan, 2011-2016). Noteworthy is the highest mountain point in Jamaica of 2.256m in altitude which is also the second highest peak in the Caribbean (BJCMNP Management Plan, 2011-2016). In addition, the mountains are an important source of water in Jamaica (Jamaica Protected Areas System Master Plan, 2013-2017).

4.5 Biodiversity

4.5.1 Okhahlamba Drakensberg Mountains National Park

The PA constitute almost 215 978 hectares of the area encompassing a large proportion of fauna and flora that are endemic to the area and known as the hotspot plant diversity in Southern Africa (Okhahlamba-Drakensberg Local Municipality's IDP 2016/17, 2015). The PAs hosts a total number of 2153 plant life where 25% are endemic and 109 are listed as threatened species (Okhahlamba-Drakensberg Local Municipality's IDP 2016/17, 2015). According to the (Okhahlamba-Drakensberg Local Municipality's IDP 2016/17 (2015), Basalt Grassland and Lesotho Highland Basalt Grassland within the upper montane region and Drakensberg Afro Alpine Heathland within the lower alpine region have been identified in the area. Other identified vegetation consists of wetland grass, sheet rock grass, high altitude alpine grassland, and high altitude alpine fynbos grassland, including Drakensberg Foothill Moist Grassland, semi-dry savannah and moist forest as well as typical inselberg vegetation of low, cushion-forming fynbos shrubs and wetland vegetation (Okhahlamba-Drakensberg Local Municipality's IDP 2016/17, 2015). The Okhahlamba Drakensberg area has wildlife species including the eland, the oribi, wildebeest, blesbok, reedbuck, the duiker and small animals such as the hyrax and genets. And birds such as the Cape Vulture and the black eagle (EKZN-Wildlife, 2012).

4.5.2 Blue John Crow Mountains National Park

The BJCMNP is a major habitat for vulnerable and threatened natural vegetation and forestry on volcanic soils (BJCMNP Management Plan, 2011-2016). There are about 500 flowering plants that have been identified at the park, many of which are indigenous to Jamaica (Otuokon et al., 2012). The Park also provides habitat to numerous Jamaican birds as well as migratory birds of the island that are mostly threatened by habitat destruction (BJCMNP Management Plan, 2011-2016). The Blue John Crow Mountains park is basically known as the main place in Jamaica with plant diversity and it is also an endemic bird area. This area also consists of frog said to be globally threatened and endangered u. The BJCMNP Management Plan (2011-2016) highlights the montane forest and the wet limestone forest as the main types of forests

that are found in the area with ferns, mosses and small orchids. Also found in the area, are unique Mor Ridge Forest and other endangered tree species.

4.6 Conclusion

This chapter has described in detail the study areas including climates, biodiversity, geomorphology and hydrology. It also motivated why these, were specifically chosen as the study areas. The next chapter discusses how data was collected in these study areas.

CHAPTER FIVE: RESEARCH METHODOLOGY

5.1 Introduction

This chapter discusses the research methodology of the study. It explains the research design, the sample as well as the instrumentation used in the study for data collection. The chapter also explains how data was analysed. The final part of the chapter outlines ethical considerations.

5.2 Research Methodology

5.2.1 Research Design

This study adopted the mixed-method approach, also known as the multi-method (Glogowska, 2011). It is defined as "two methodological paradigms in research" (Hamersley, 2017: 39). The mixed method approach is the combination of the quantitative and qualitative methods of research. It allows for a complementary and integrated approach to the study and assists in embracing the strengths of both the quantitative and qualitative approaches (Creswell & Creswell, 2017). According to Molina-Azorin (2016), this approach allows for an objective development of instruments for data collection in a study. Thus, the researcher is able to gain an in-depth understanding of the study (Maree 2007) as well as an improved validation of outcomes and deduction (McKim, 2017).

Proponents of this view state that, the mixed method approach provides an in-depth understanding of the theory or theories being tested in the study (McKim, 2017; Creswell & Plano-Clark, 2011). The mixed method approach is well associated with pragmatism and the construction of data collection instruments that include open-and closed ended questions (Creswell & Creswell, 2017). Consequently, "pragmatism permits the investigation of experiences, the lifestyle of relegated societies and analysis of asymmetric power relationships" (De Lisle, 2011:92). This is important for a study of this nature, which focuses on areas that were previously marginalized during the creation of Protected Areas as discussed in chapters one, two and three.

The mixed method approach encompasses three different research designs, namely the explanatory sequential, exploratory sequential as well as the convergent (Creswell, 2014). In the explanatory design, quantitative data collection and analysis methods are prioritized over qualitative data, qualitative data follows and is utilized as complementary to quantitative data (Alavi and Habek, 2016). However, in the exploratory design, qualitative methods of data collection and analysis are conducted first and thereafter, quantitative methods, to complement the former (Romm and Ngulube, 2015).

The convergent parallel design (see Figure 5.1 below) was followed in this study (Demir and Pismek, 2018). This design involves the collection and analysis of qualitative and quantitative data concurrently, however separately (Van Wyk & Taole, 2015). There is then the integration of the overall findings (Creswell & Creswell, 2017). In this case, the researcher concurrently but then separately collects and analyses both the qualitative and quantitative data. Findings are then compared, related and interpreted collectively (Creswell and Clark (2017).

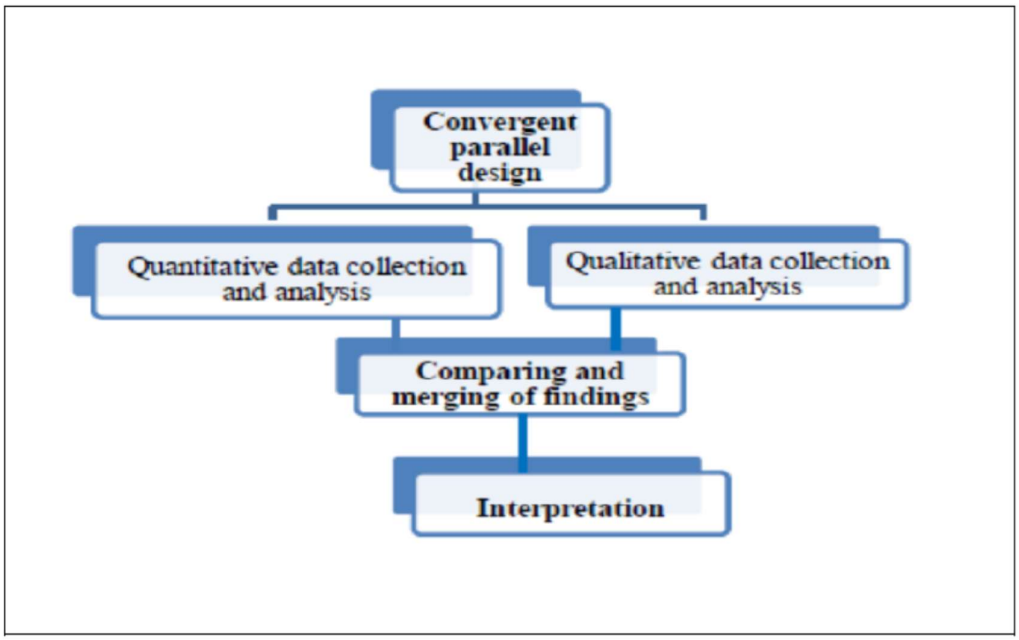


Figure 5.1: The convergent parallel design process

Source: Adapted from Demir & Pismek (2018)

As seen above (Figure 5.1), the convergent research design entails three steps and/or phases (Demir & Pismek, 2018). In this study, step one involved the collection of both qualitative and quantitative data. In South Africa this was done towards the end of 2018 and the middle of 2019. This happened after permission to engage with the park managers, traditional leaders and communities as a whole was obtained in November 2018 for AmaNgwane traditional area and in March 2019 for AmaSwazi and AmaZizi traditional areas in South Africa. In Jamaica, data was collected in March 2019 and this was after permission was granted in June 2018 to engage with the park managers of the Blue John Crow Mountains National Park, the leaders of and community of Charles Town and Moore Town. In the qualitative part of the study, interviews were conducted and in the quantitative part questionnaires were completed by participants, as explained in Chapter 5. Both the qualitative and quantitative data collection processes were

done in one single phase without compromising one approach over another. After data was collected and as part of step one, the analysis of both data sets was conducted independently.

As part of step two of this design, which involves comparing and merging of results, the researcher identified similarities and differences within the findings of both data sets and presented these in summaries and/or discussions. Examples of such data sets included comparing information on community engagement with Protected Areas. Another example is that of the information on the knowledge and perceptions of participants towards the co-management policies in the study areas. In step three, Tables and Figures were constructed to better present and create an understanding of both data sets that were already been compared or merged according to the relevance of the content identified in the findings by the researcher.

5.2.2 Research Population and Sample

In line with the research design explained above, the research population for the study is discussed. According to Gentles et al. (2015), a research target population consists of individuals with similar characteristics suitable to attain the study objectives. In this study, this includes the entire population of the AmaNgwane, AmaSwazi and AmaZizi in KwaZulu-Natal as well as in Charles Town and Moore town in Jamaica. The following sections explain in detail the quantitative and qualitative parts of the research design, in terms of sampling, instrumentation and data collection and analysis.

5.2.2.1 Qualitative Sample

Qualitative sampling encompasses non-probability sampling approaches and consists of smaller study samples (Maree, 2007). This study therefore adopted the purposive sampling method. This method of sampling is widely utilized in qualitative studies (Etikan, Musa and Alkassim (2015). According to Etikan, Musa and Alkassim (2015), a sample is chosen given that it retains abilities and/or characteristics that are significant for the study as well as their knowledge in relation to the research questions of the study (Gentles et al., 2015). According to Gentles et al. (2015), a sample is selected given particular criteria. The researcher purposively sampled eight people (see Table 5.1 below) who assisted in the engagement with the objectives of the study.

First, it was three managers of the respective Protected Areas; one park manager from the Blue John Crow Mountains National Park and two managers from the Okhahlamba-Drakensberg Mountains Park. Park managers were selected given their work which entails working with the adjacent communities regarding the issues of conservation and overall environmental management of the park. Second, five traditional and/or community leaders were also

interviewed in the study. This was because they are the representatives and mediators between the communities as a whole and the park management. As a result, three traditional leaders from the respective traditional areas were interviewed in Okhahlamba-Drakensberg in South Africa and two community leaders were interviewed in Portland, Jamaica (Table 5.1).

Table 5.1 Summary of the qualitative research sample

Study area	KwaZulu-Natal, South Africa	Portland, Jamaica
Participants	Two park managers	One park manager
	Three traditional leaders	Two community leaders
Total number of participants	Eight	

Source: Author (2019)

5.2.2.2 Quantitative Sample

According to Statistics South Africa (2011), the population for the AmaNgwane, AmaZizi and AmaSwazi was 1153, 2792 and 743 respectively. In Jamaica, Moore Town area has a population of less than 1101 people and Charles Town has a population of less than 2000 people (Members of the Council, 2018). The researcher was able to determine the sample size for the study using Cochran (1977) method,

$$n = \frac{n_0}{1 + \frac{n_{0-1}}{N}}$$

Where:

n_0 = Cochran sample size recommendation number

n = number of population to be sampled and

N = population size

The researcher calculated a sample of 92 individuals from AmaNgwane, 113 from AmaZizi and 67 from the AmaSwazi traditional area. In Charles Town the calculated sample was 69 and 111 for Moore Town. All the sampled participants were randomly selected to complete the

questionnaire. The sampling technique was deemed suitable for the study as the area of interest, specifically in the Okhahlamba-Drakensberg area, is divided into different traditional areas (AmaNgwane, AmaZizi and AmaSwazi), as well as the fact that these are predominantly in a rural set up. From Charles Town, 46 participants out of the sampled 69 participated in the study and 61 participants out of the 111 that was sampled participated in the study from Moore Town. The AmaNgwane area had a total of 75 participants, AmaZizi a total of 36 and a total of 34 participants from the AmaSwazi community who completed the questionnaires.

Table 5.2 Summary of the quantitative research sample

Study Area	**KwaZulu-Natal, South Africa**			**Portland, Jamaica**	
Community	AmaNgwane	AmaSwazi	AmaZizi	Charles Town	Moore Town
Population	1153	743	2792	≤2000	≤1101
Sampled size	92	67	113	69	111
No. of participants/Actual number of respondents	75	33	37	49	19
No. of total participants in study	213				

Source: Author (2019)

5.2.3 Data Collection Instrumentation

In an attempt to gather as much information and realities as possible, two types of instruments were used to collect data, face-to-face interviews and questionnaires. This allowed for increased engagement and flow of information between the participants and the researcher. The instruments mentioned above were utilized to collect primary data for the study.

5.2.3.1 Quantitative Instruments

Questionnaires with closed and open-ended questions were utilized to collect quantitative data from the community members. And according to Hyman & Sierra (2016:1), "questionnaires are only good as the questions they ask, questions must be precise and easy to answer." For this study, easy to understand open and closed ended questions, given that it is a mixed method study, were constructed for the questionnaire in accordance to the main themes and/or research

questions of the study. This was done since open and closed ended questions provide an opportunity for the researcher to gain in-depth answers that reflect the respondents' attitudes and experiences (Hyman & Sierra, 2016). At any point where participants did not understand a question, the researcher and research assistants were present in order to explain what was required. Also at some instances, participants did not wish to complete the questionnaire on their own; one of the reasons was illiteracy, the researcher and assistants completed the form for them in their presence.

5.2.3.2 Qualitative Instruments

Face-to-face in-depth and structured interviews were utilized in this study to collect information. The researcher utilized interview guides with main questions constructed in formal English language and further explained the questions were the participants did not understand the question. These in-depth interviews were used to obtain primary source data from the protected area managers and community leaders (Inkosi/Induna and colonels) as well as to provide validation of the quantitative data.

5.2.4 Data Analysis

5.2.4.1 Qualitative Data Analysis

The data obtained from the interviews were analysed using summative content analysis. This is defined by Maree (2007) as a data analysis approach that classifies and summarises message content. In order to gain in-depth responses and themes that are pertinent and satisfactory for the study, the researcher must be creative when developing themes (Vaismoradi, 2016). Here, the data was classified according to the contextual meaning with the use of four steps in content analysis as specified by Erlingsson & Brysiewicz (2017).

The process of condensing or shortening of important text was the first step. This was done after the researcher identified all the significant text and the findings were summarized. Coding was the second step, whereby codes or names were given to the text that has been condensed, this is important as it only includes those that were found relevant in achieving the objectives of the study were identified as a code or significant concept for the study. The third step involved the process of categorizing and/or grouping the text that has been coded according to similarities and/or differences identified. In the study, the researcher grouped all similar or dissimilar categories of text in summaries and/or discussions according to how each of these discussions were responding to the interview. And lastly, the creation of themes in an interpretative and informative level. The latter was done so as to create a better understanding of the findings. Themes are considered very crucial as they provide the significance of the

participants' experiences and perceptions regarding the issue at hand (Erlingsson & Brysiewicz, 2017) and their responses to research questions (Maguire& Delahunt, 2017).

5.2.4.2 Quantitative Data Analysis

Microsoft Excel 2013 was utilized to create and produce maps, graphs and tables to analyse and interpret data for the study. The completed questionnaires were coded by the researcher so as to easily insert the information unto Microsoft Excel 2013 using different numbers as chosen by the researcher. For example, the different ages of the participants were grouped into three and coded using one for the first group, two for the second group and three for the third group. Thereafter, those numbers (1, 2 or 3) were inserted into Microsoft Excel 2013 according to each of the completed questionnaires. Different worksheets for dissimilar communities (AmaNgwane, AmaZizi or Charles Town and Moore Town) were created. Using different codes (for age, gender, etc.), data produced from excel by the researcher was inserted for analysis. As mentioned above, Microsoft Excel 2013 can produce graphs and tables and using Microsoft Word 2013, descriptive summaries were created to present information to broaden the readers understanding of what is illustrated as shown in the next chapter. Given that this study is a comparative one, to assist in the analysis, the Pearson correlation coefficient was utilized. According to Asuero et al. (2006), the Pearson correlation coefficient is utilized to determine the strength of a relationship and/or association amongst two variables in a study. The outcome of this relationship can either be positive (+1) where for example, one variable increases, the other variable also increases, when there is a negative (-1) relationship, this means that when one variable increases, the other decreases (Asureo et al., 2006). This will be achieved using the formula below,

$$r = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{[\, n\Sigma x^2 - (\Sigma x)^2 \,][\, n\Sigma y^2 - (\Sigma y)^2 \,]}}$$

Where:

n= Quantity of Information

Σx= Total of the First Variable Value

Σy= Total of the Second Variable Value

Σxy= Sum of the Product of & Second Value

Σx^2= Sum of the Squares of the First Value

Σy^2= Sum of the Squares of the Second Value

A summary of the mixed method research process is illustrated below in Figure 5.2.

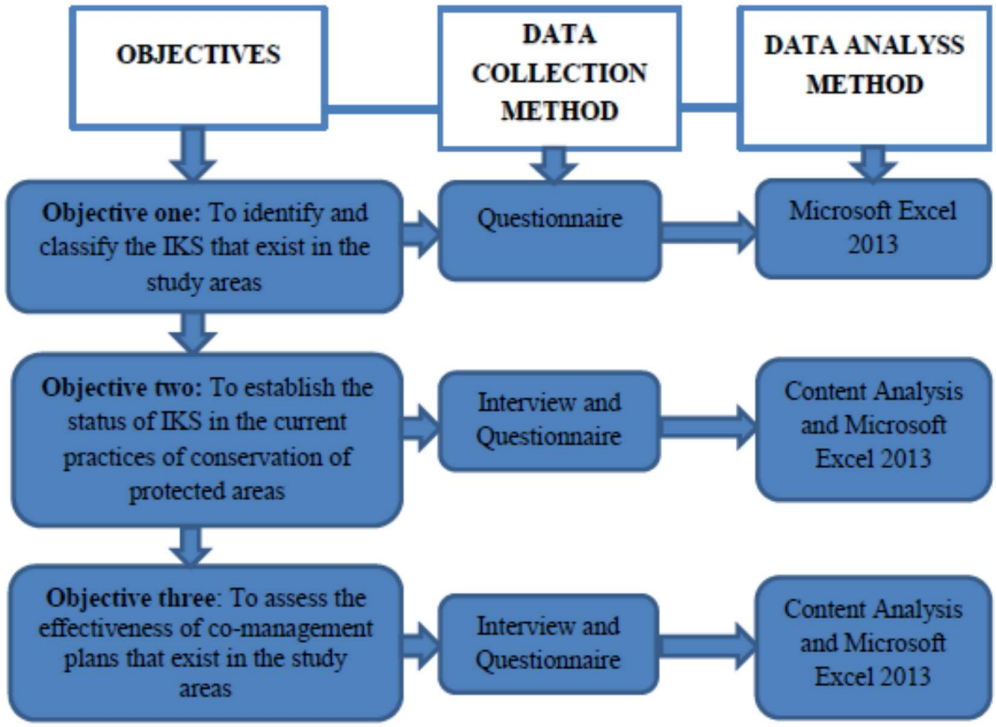


Figure 5.2: Schematic presentation of the mixed method research process

Source: Author (2019)

5.3 Ethical Considerations

David and Resnik (2015:1) define ethics as, "norms for conduct that distinguish between acceptable and unacceptable behaviour or method, procedure, or perspective for deciding how to act and for analysing complex problems and issues during research." And therefore, the researcher is acquainted with the University's policy and procedures on research ethics. This study was subjected to review by the University of Zululand Research and Ethics Committee, which resulted in the issuance of an Ethical Clearance Certificate. As explained above, the study required the researcher to engage with different communities and therefore research ethics that were considered for this study included but were not limited to:

- Firstly, approval was gained from the traditional leaders (Inkosi/Induna) in South Africa and Colonels of the different towns in the case of Jamaica before conducting any research in the areas.
- The safety, anonymity and confidentiality of the participants was maintained at all times. Where participants did not wish to state their names, they were allowed to do so, also the participants were told before their participation to any of the questions that the information received will not in any way be linked to their identity.
- The questionnaires and interview questions for this study were constructed in a manner and language that is not offensive to the participants,
- The participants were allowed to withdraw their participation anytime during the interaction.
- Data collected was referenced accordingly, protected and kept confidential at all times. The completed questionnaires and interview guides were put in sealed envelope in a room only the researcher had access to and softcopies were kept in inaccessible folders in the researcher drive. Dealing with IKS is a very sensitive issue for most communities and therefore the researcher made certain that the data received in protected at all times whether it is the hard copies or softcopies containing sensitive data, as well as participants who wish to remain unidentified was adhered to.
- The researcher has acknowledged the work of others and reference her work accurately according to the Harvard reference style guide updates in 2009 and the final work of the researcher was analysed for plagiarism using the Turnitin programme and participants were notified of the findings of the study before any information was published.

5.4 Limitations of the study

There were challenges which were encountered during data collection, which could have had an impact on this study. First is that, the calculated sample was not reached during data collection. This is because, in the case of South Africa, the sample size was calculated from the total population (including that of children) of AmaZizi, AmaNgwane and AmaSwazi. During data collection it was then discovered that the people who were actually involved in the daily interaction with PAs was actually smaller. The same applies to Jamaica. As a result, there is a gap between the calculated sample size and the actually number of people who were involved in the study. This notwithstanding it is important to state that, the researcher was able

to interview all those who were willing to participate in the research based on the sampling techniques explained in Chapter five. On this basis, these findings should be representative of the reality on the ground. Second, is that traditional authorities in South Africa were reluctant to grant the researcher permission to access the study areas. Permission was finally granted after several visits to the traditional authorities. Taking into consideration the reluctance of the traditional authorities, this could have impacted the answers which were obtained during data collection. However, the researcher fully explained the study objectives, which both the traditional leaders and community members understood and agreed to be part of the study. On this basis, it is anticipated that the responses which they provided were unbiased. Third, there is lack of knowledge concerning the identification and classification of Indigenous Knowledge Systems (IKS) in relationship to environmental conservation in the study area. However, the researcher made every reasonable effort to review all available data on the themes under consideration. Consequently, the quality of findings of this study should be considered in the light of the given limitations.

5.5 Conclusion

This chapter has discussed the research design chosen for the study, research methodology, the sample for the study as well as the data collection and analysis instruments utilized in the study. The next chapter focuses on the analysis of data for the study.

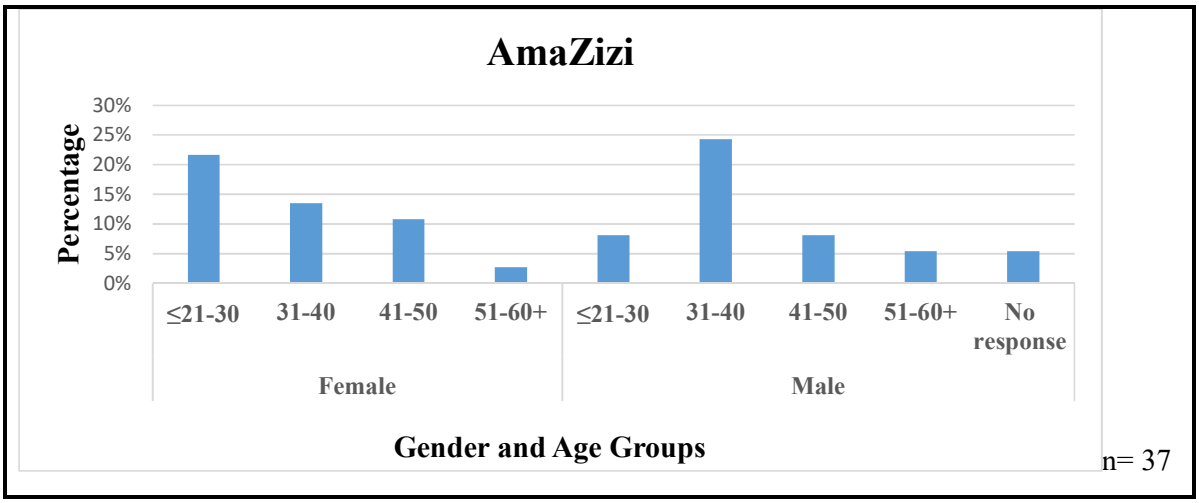
CHAPTER SIX: DATA ANALYSIS AND INTERPRETATION

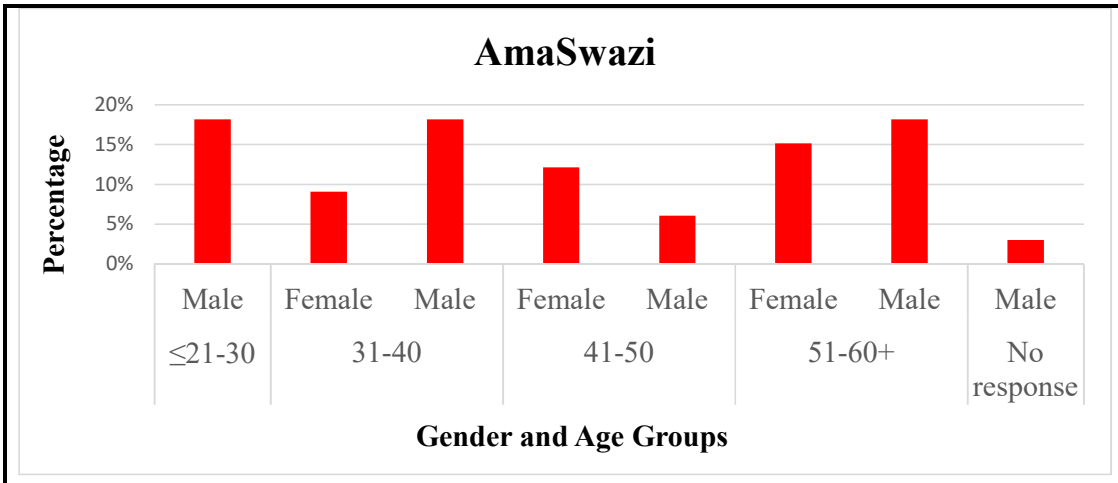
6.1 Introduction

This chapter presents as well as discusses the findings from a comparative investigation of IKS in the conservation of Protected Areas in KwaZulu-Natal, South Africa and Portland, Jamaica. The presentation and analysis of data is organised into four main sections. The first section provides the demographic characteristics of respondents. The second identifies and classifies the IKS that exist in the study areas, while the third discusses the status of IKS in the current practices of conservation of Protected Areas in the areas under study. The fourth assesses the effectiveness of co-management plans that exist in the study areas. By these means, the analysis and interpretation of data follows the sequence of the first three objectives of this study as outlined in Chapter One, Section 1.4.2.

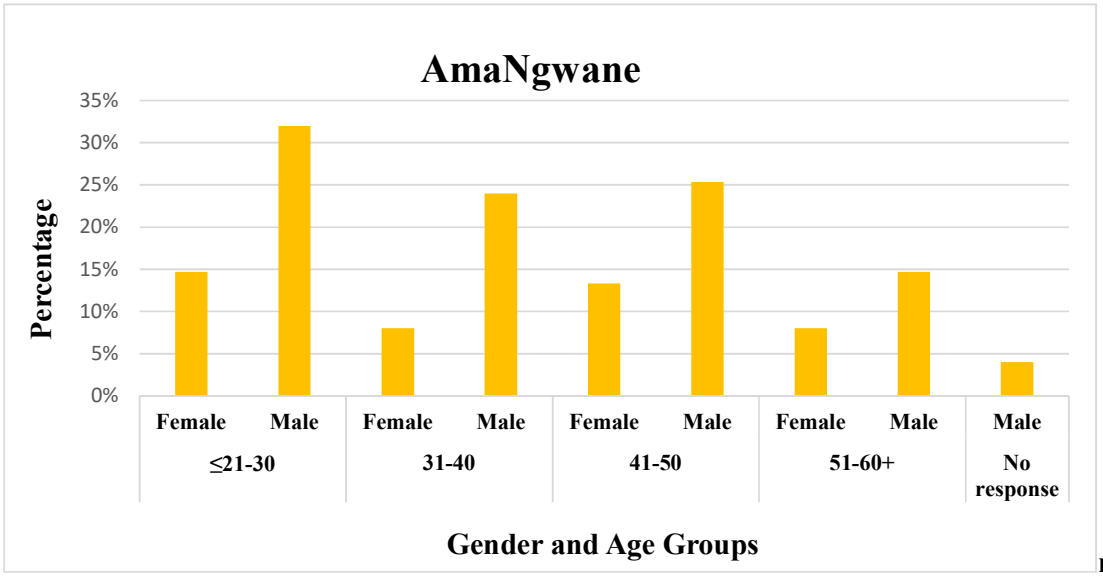
6.2 Demographic characteristics of research participants

Figure 6.1 below, shows the age characteristics of the participants of the study in the respective study areas, namely; AmaZizi, AmaSwazi, AmaNgwane in KwaZulu-Natal, South Africa and Charles Town and Moore Town in Portland, Jamaica. The ages range from less than or equal to 21 and up to 60 years and above.

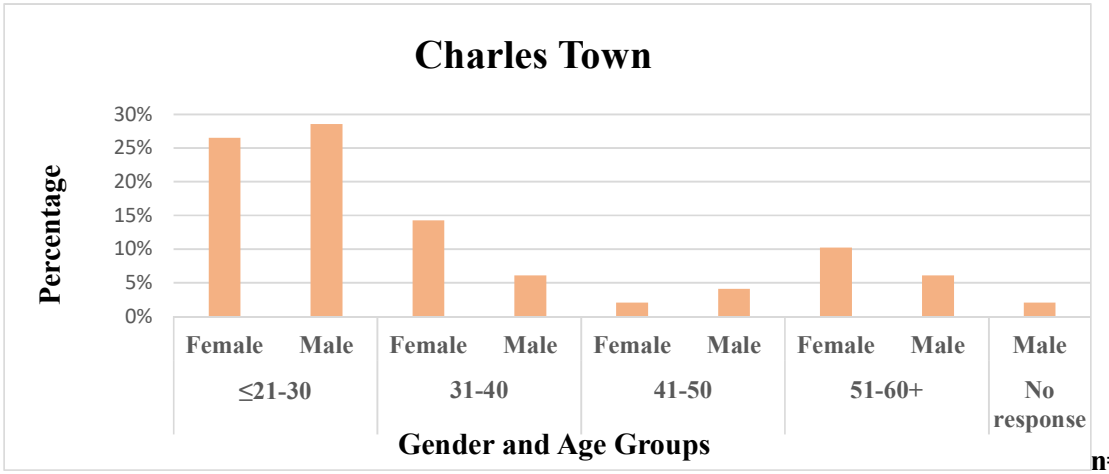



AmaSwazi
Percentage
20%
15%
10%
5%
0%
Male
Female
Male
Female
Male
Female
Male
Male
≤21-30
31-40
41-50
51-60+
No response
Gender and Age Groups

n=33


AmaNgwane
Percentage
35%
30%
25%
20%
15%
10%
5%
0%
Female
Male
Female
Male
Female
Male
Female
Male
Male
≤21-30
31-40
41-50
51-60+
No response
Gender and Age Groups

n=75


Charles Town
Percentage
30%
25%
20%
15%
10%
5%
0%
Female
Male
Female
Male
Female
Male
Female
Male
Male
≤21-30
31-40
41-50
51-60+
No response
Gender and Age Groups

n=49

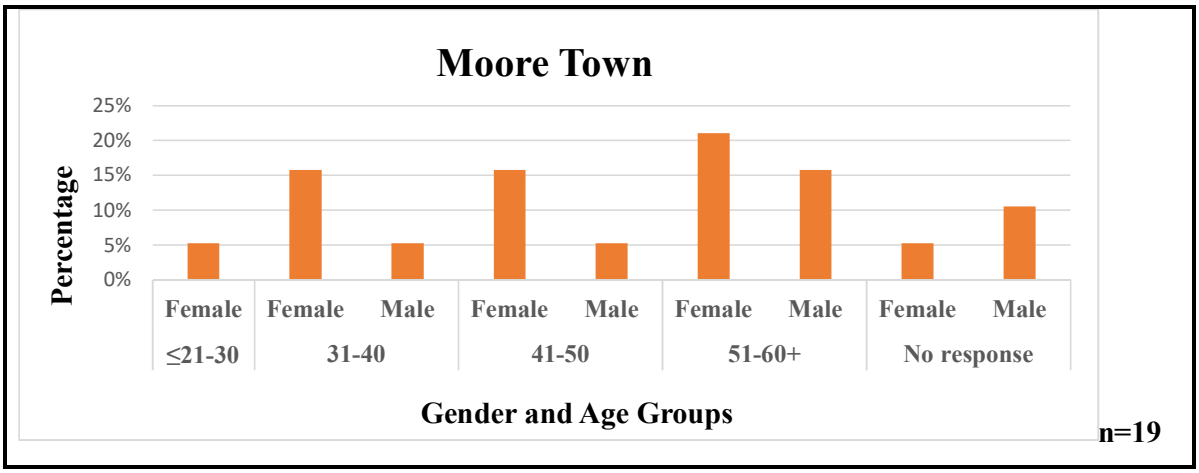
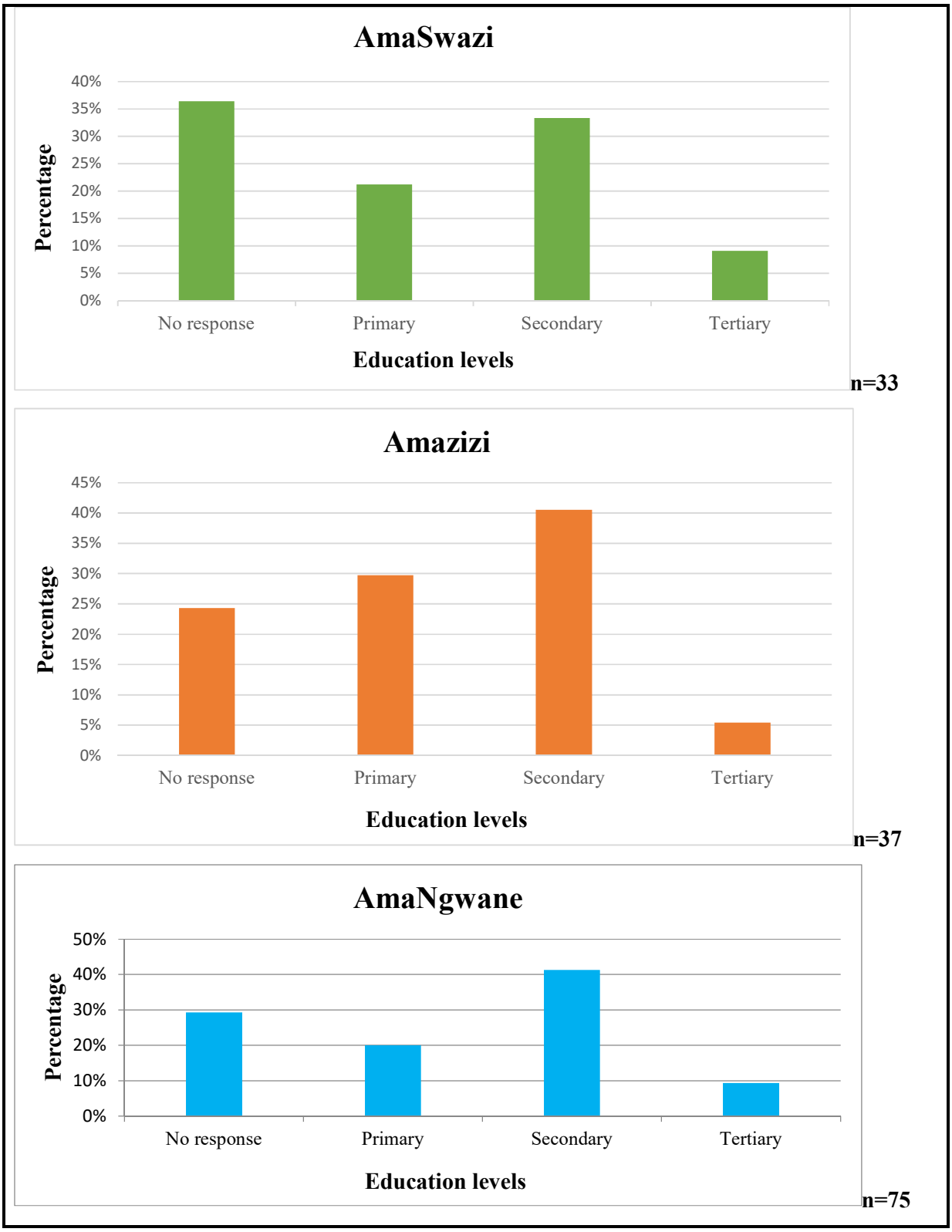


Figure 6.1: Age and gender profiles of research participants

The gender and age group distribution further indicates that out of the total number of 213 participants in this study, 53% are males and 47% are females. The majority of participants in all the study areas ranged between the ages of less than and equal to 21to 30, 31 to 40 and 51 to 60 amongst both the males and females. However, in Portland, there is a higher number of female participants than males who are and below 30 years old. In KwaZulu-Natal, there is a higher number of males in the same age category. In terms education levels, a significant number of participants in the study areas have secondary level education, followed by primary level education and just a few participants with tertiary level education (Figure 6.2).


AmaSwazi
Percentage
40%
35%
30%
25%
20%
15%
10%
5%
0%
No response
Primary
Secondary
Tertiary
Education levels
n=33
Amazizi
Percentage
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
No response
Primary
Secondary
Tertiary
Education levels
n=37
AmaNgwane
Percentage
50%
40%
30%
20%
10%
0%
No response
Primary
Secondary
Tertiary
Education levels
n=75

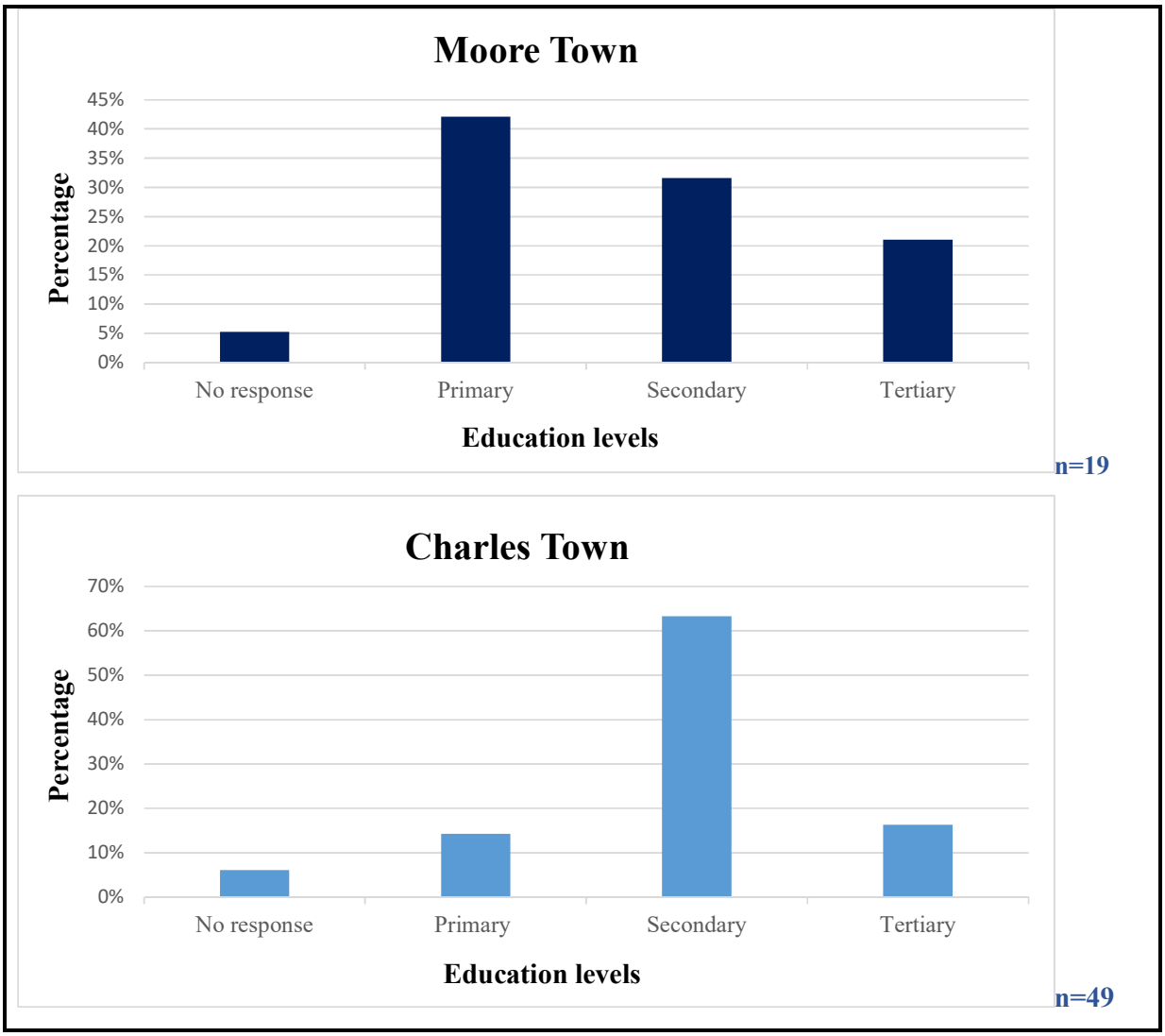


Figure 6.2: Educational levels of research participants

Magni (2017) states that demographic characteristics like gender play an important role in IKS in terms of the transfer of knowledge. Generally, women are overlooked when it comes to the transfer of IKS in most rural communities, because their knowledge is considered dispensable in efforts of environmental conservation (Qun, 2012). As a result, some of the women indeed confirmed that, their roles were disregarded in the development and utilization of certain IKS for environmental conservation in their communities. In light of this, this study deemed it necessary to consider and comment on the demographic characteristics of the participants in relation to how they affect the transfer of IKS.

As represented in the above Figure (Figure 6.1 and Figure 6.2), the majority of the study participants in KwaZulu-Natal are male and the highest number are those who are 30 years old and below. In Portland, there is a high number of female participants and the highest were those

who were 30 years old and below. As mentioned earlier, the overall number of participants in the study was 213 of which 53% were males and 47% were females. A large number of participants in the study areas have secondary level education, followed by primary level education and a few participants with tertiary level education. A few participants have acquired and/or retained certificates from a tertiary institution, non-certificate training, that is, they had received some type of training in their life time, and however, there were no certificates issued. Other participants have acquired "other skills" which were not disclosed, many others had experiential skills for example, arts and crafts while many more responded by "none," meaning they had no qualifications at all. In fact, the majority of the participants had no qualifications at all which could explain the high level of unemployment in both KwaZulu-Natal, South Africa and Portland, Jamaica.

On the issue of lack of education and how it can impact on the transfer of knowledge it is generally assumed that, those with higher education better understand the concept of transferring and maintaining their IKS (Muza, 2014). However, educational levels are not a necessity for the transfer of IKS, because people have always transferred their IKS outside of western education and therefore the assumption that people need to be 'educated' for them to transfer IKS is, in a way simplistic, if not insulting to the indigenous communities. In any case, indigenous communities could be regarded as educated to the extent of their IKS, which is a form of knowledge, which should not always be subjected to Western standards for it to be called true knowledge and education (Keane et al., 2016).

As discussed in chapter four of the study, these areas (AmaZizi, AmaSwazi, AmaNgwane, Charles Town and Moore Town) are predominately rural areas where most community individuals are involved in agriculture. However, a great number of the participants said that they had no access to agricultural land. This is because, these indigenous communities were marginalized to the peripheries of PAs with unproductive soil for agriculture and limited space for livestock (Chomba et al., 2016). For the few participants who had access to land, the extent of the land was less than a hectare. Findings of this study revealed that most of the indigenous communities have occupied the land in and around the PAs since they were born and other households have been in the areas, beyond the parks for almost 28 years and above. The fact that they do not have access to land therefore explains their marginal existence. A detailed discussion on this is provided in the following sections.

6.3 The identification and classification of the IKS that exist in the study areas

In order to identify and classify the IKS that exist in the study areas, the study had to first gather information regarding the background of their (indigenous communities) IKS, what it meant to them, its utilization for conservation and/or environmental management as well as how the communities acquired it. As discussed in the preceding chapters, IKS is an extremely sensitive topic for indigenous communities. Some indigenous people consider disclosing and/or sharing details of their IKS as a taboo (Muza, 2014). And as anticipated, the responses to the question regarding the identification and classification of IKS was not responded to by many of the participants. However, the study found that, at most, the participants of the different study areas stated that their existing IKS was utilised for agriculture, followed by soil conservation, wildlife and fisheries and sometimes catchment area management, forestry and horticulture. A few of the participants classified their existing IKS under medicine and health, for subsistence or commercial farming, conservation and preservation purposes, for adaptation strategies while a large number of participants did not respond to this question.

Table 6.1 below represents the existing IKS identified in the study areas. In the AmaZizi, AmaSwazi and AmaNgwane traditional areas in KwaZulu-Natal, South Africa, the identified IKS that existed in these areas consists mostly of number one to nine. In the study areas in Portland, Jamaica, most of the participants claimed that the existing IKS included mostly the numbers 10 to 11. For most of the participants, their perception of IKS meant their ways of life, their own knowledge of the environment using their history and culture. Others had said that it is their identity, roots and sense of belonging. They believe that before the construction of PAs, they had always effectively sustained and/or constantly managed the environment on their own through utilizing their IKS.

Table 6.1: The identified IKS that exists in the study areas

Identification of IKS	Classification of IKS	Environmental conservation effect of IKS
1. Creation of sacred areas	Protection of animal and plant species	Reduces extinction of plants and animals
2. Seasonal hunting, harvesting and gathering/ burning of grasslands	Protection and preservation of plants and animals	Reduces extinction of plants and animals
3. Urinating in water changes person to opposite sex	Water resources management	Reduces water pollution
4. Creation of mixture of paraffin, salt and water	Soil conservation and management	Used before planting to make sure the soil is fertile
5. Using part of tree/leave that's required and not cutting down the whole plant	Preservation of indigenous plants	Reduces risk of extinction of the species in the area
6. No planting of alien plants along the river	Protection of water/river catchment	Management of the water/river catchment
7. Use of plants and animals to predict the weather or climate	Adaptation strategy to unforeseen environmental dynamics	Strategy utilized to overcome and/or adapt to environmental phenomena such as drought
8. Certain plants, planted along river banks	Soil conservation and management	For soil stability, preventing fertile soil from erosion
9. Some trees and plants must not be harvested during certain seasons or when the weather changes (rain/thunder)	Conservation and/or preservation of the trees and plants	Prevents overconsumption and/or overutilization of indigenous trees and plants
10. Crop rotation/rotational grazing of cows	Land and soil management and preservation	Prevents soil erosion and degradation
11. Planting the coffee plant on slopes, using rocks and stones	Soil management	Prevent land slide or soil erosion

Respondents stated that the way in which their IKS for environmental conservation is/was identified and classified is/was according to how certain techniques were developed and

implemented to conserve certain natural resources and if this worked, the information was distributed to the whole community (Interview with AmaSwazi leader, June, 2019). This was corroborated by traditional leaders in Portland, Jamaica (Interview with Moore Town colonel, June, 2019). However, one of the traditional leaders in Okhahlamba-Drakensburg, stated that it is difficult to distribute this type of information to the parks for the reason that in the past, such information was taken, and modified as scientific knowledge without their consent and acknowledgement (Interview with AmaSwazi traditional leader, June, 2019). The communities' point of view, is that, parks clandestinely use some selected knowledge in the absence of the indigenous community. For example, one for medicinal properties and purposes and the other one to do with environmental conversation is disregarded (Interview with AmaSwazi traditional leader, June, 2019). This is confirmed in literature (see e.g. Risiro et al. (2013). Therefore, indigenous communities have become reluctant to share their IKS. During data collection the researcher realized this and therefore received a few examples or responses to questions regarding the identification and classification of IKS for biodiversity conservation.

According to the traditional leaders, for decades long to the present day they have been living in harmony with the surrounding environment (Interviews with AmaSwazi, AmaNgwane, AmaZizi traditional leaders, June 2019). They stated that the construction of PAs changed this and the managers or authorities do not consider the indigenous people and their IKS. For them their indigeneity is questioned. In this light, one respondent stated that "at most, it is the parks responsibility to communicate with us regarding the identification and classification of IKS that exist in our community for conservation our surrounding environment. They came with idea to establish the park and displace our people and deprive us of our norms." (Interview with AmaSwazi traditional leader, June 2019, Okhahlamba-Drakensberg). According to the participants, traditional leaders set rules and regulations that applicably governed the communities' consumption and protection of their natural resources (Interview with AmaZizi community leader, June 2019). This is still evident in the study areas. Almost all of the participants are still involved in biodiversity conservation using their IKS, for the well-being of their surrounding environment as well as to sustain their livelihoods (Interview with AmaSwazi leader, June 2019 and Charles Town colonel, June 2019).

However, after the creation of PAs, their roles were disregarded over western epistemologies for biodiversity conservation. When the research participants were asked if they utilized IKS for natural resources management, the majority of the participants of the study responded in the affirmative, by asserting that, their IKS has been utilized since the pre and post creation of

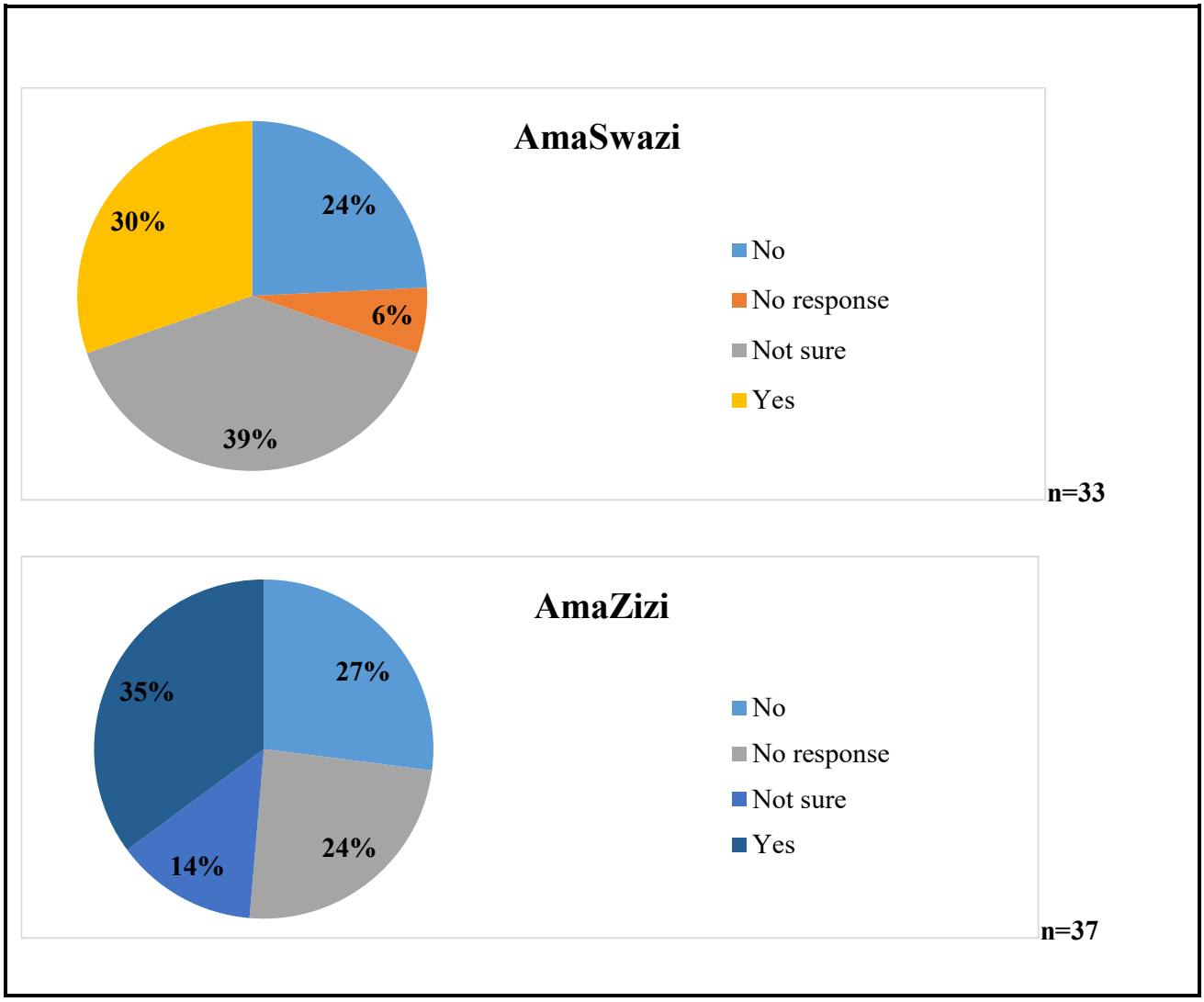
the PAs. In fact, the participants stated that they had acquired their IKS for environmental management from their fore fathers. The correlation coefficient between the identification and classification of IKS in both study areas and the construction of protected areas show a negative relationship. This is because when the development of protected areas led to the decrease of the application of IKS for conservation by indigenous people. This corroborates previous studies (see e.g. Fabricius et al. (2013) on indigenous communities being responsible for and involved in managing their surrounding environment. If and when indigenous communities do not have access to, and/or control of natural resources, it is rather difficult to preserve IKS (Magni, 2017). This, according to the traditional leaders, now makes it difficult to continue identifying and classifying IKS for conservation in their areas since it is difficult to access natural resources in their surrounding environment (PAs). Nevertheless, park representatives said that their current and reviewed policies integrate IKS for conservation of natural resources within the park and educate communities about enhancing their own use of IKS for conservation beyond the park boundaries.

In chapter two of the study, the theory of political ecology was adopted as a theoretical framework of the study. McCarthy & Thatcher (2017) posit that this theory consists of ecological, social, cultural and historical perspectives that are utilized to understand environmental issues and the relationship between natural resources and communities, especially those communities that were displaced for the construction of PAs. Therefore, in a discussion of the identification of the IKS in the study areas, political ecology has assisted in bringing to the fore the fact that given the history of conservation power and/or politics, has played an important role in the implementation of exclusionary policies and the displacement of indigenous communities for the establishment of PAs. This has adversely affected the relationship that has long existed between indigenous communities and their surrounding natural resources. Thus, political ecology has shown that pertinent environmental issues such as access to natural resources, cannot be understood outside of the politics which has led to the reduction of the continued ability and/or capability of indigenous communities in identifying and classifying IKS for environmental conservation. Differently stated, the colonial and apartheid governments had power to dispossess people of their land, create PAs and then discard and reduce their (communities) IKS to the status of a myth. Even after the fall of colonial and apartheid regimes, this asymmetrical power relationship has continued. Those with power (government and their representatives in the form of PAs authorities) also have

power over indigenous communities to the extent of selecting and determining what knowledge guides conservation.

6.3 The current status of IKS in existing policies of conservation of Protected Areas

On the matter of the current status of IKS in existing policies of conservation of Protected Areas, the AmaZizi (35%) area in KwaZulu-Natal, South Africa have a high number of participants than Moore Town (37%), Portland, Jamaica that indicated that IKS is indeed included in the current status of existing policies for conservation of the park. However, a significant number of the participants from AmaSwazi (39%), AmaZizi (24%) and AmaNgwane (27%) as compared to Charles Town (10%) and Moore Town (11%), indicated that they are not sure if IKS is included (Figure 6.3).



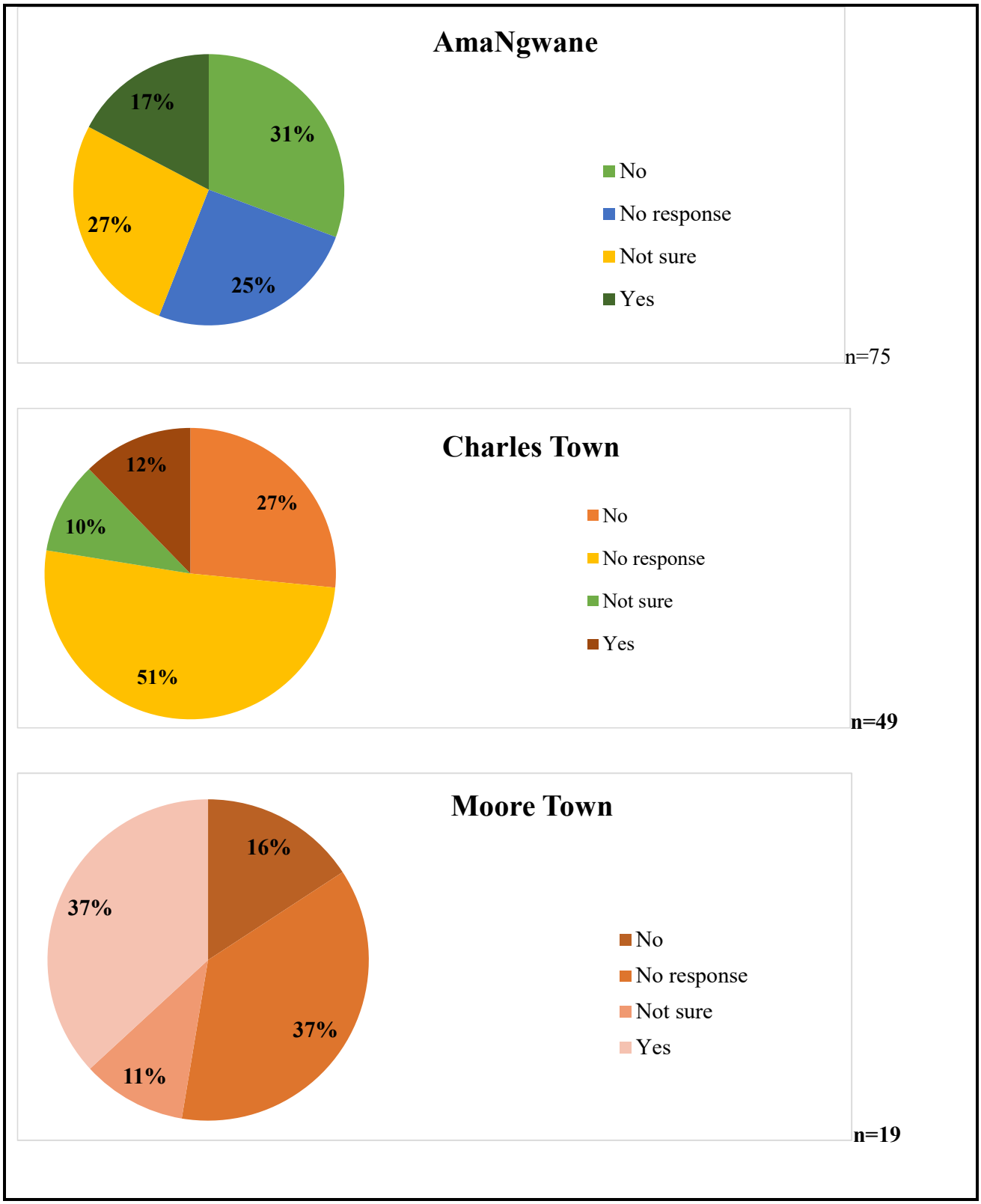


Figure 6.3: IKS in the current practices of conservation of protected areas

Some examples of the IKS included in the current practices of conservation of Protected Areas, similar for both study areas (South Africa and Jamaica), include; no illegal hunting/gathering/burning of grasslands, no harm to trees/animals/rock art, no illegal access/permits required/no building beyond buffer zone, use of rotational crops and grazing of cows. Similarly, Table 6.2 below, indicates plants and animals identified by the participants as "special".

Table 6.2: Common plants and animals identified by participants

Study area	Plants (Indigenous or local name)	Animals (Indigenous or local name)
Okhlamba-Drakensberg Mountains Park	Isiqulaba	Impofu
	Umqanale	Impala
	Umsonti	Impunzi
	Umthole	Inkonka
	Umqundane	
	Umaphipha	
	Intshisthi	
	Umgambi	
	Umhlahlankosi	
	Ubhabhaliya	
	Umbhadlanga	
Blue John Crow Mountains National Park	Coffee tree	Coney
	Mahogany	Swallowtail butterfly
	Epithalial Plant	John Crow Vultures
	Blue Mahoe	Hummingbird

This is either due to the importance of the individual plant and animal for their aesthetic value, cultural practices, totemism and/or special purposes such as medicine and health. According to the community leaders, rural households of the same surname, have their own specific totem they have to protect (Interview, AmaNgwane, May 2019). Totems for different indigenous communities could include restricted animals, plants and objects (Clemence and Chimininge, 2015). The use of totems on objects, plants and animals constitutes a creation of sacredness as a mechanism for environmental conservation. The result of this is that, unapproved utilisation of flora or fauna which are named after totems becomes a violation of the rules and regulations set by the leaders of the community who believe that these are special animals and therefore must be protected. In simple terms, this means that, if a tree or animal is called by the totem of a community, that flora or fauna attains the status of a human being and cannot be 'killed'. It becomes sacred. The result is, such fauna is conserved because IKS is applied. This had led PAs to protect such plants and animals based on the guidance of the indigenous communities. The result is that, these are conserved for future generations to also get a chance to utilise these

resources. However, the participants said that they did not know the exact name(s) of the policies that included these IKS practices.

But, it must be noted that this is only a small fraction of the IKS which is included in the current conservation of the environment in the PAs under study. This is because of colonial conquest, which led to the marginalisation of the great part of the IKS (Reniko et al., 2018). In comparison, park representatives stated that they have integrated indigenous communities and their IKS (Interview, park representative, Okhahlamba-Drakensberg, May 2019). However, as also seen above, traditional leaders disagreed with the park representatives' statement (Interview, AmaSwazi, AmaNgwane, AmaZizi, June 2019). In addition, the relationship between the current status of IKS and the existing policies for the conservation of protected areas, derived using the Pearson correlation coefficient is negative. That is, as the progression and/or implementation of existing policies increases in protected areas, the current status of IKS identified decreases given the diminished integration of IKS in environmental conservation.

In Portland, Jamaica, the traditional leaders, also referred to as colonels (discussed in chapter two of the study), asserted that the only IKS that was included was their cultural practices (because of its tourism potential to Jamaica) and all other aspects linked to environmental conservation were totally ignored. The Blue John Crow Mountains National Park managers agreed, and stated that indeed the culture and heritage of the Maroon communities constitutes a considerable part of the tourism industry in Jamaica (Interview, park representative, June 2019). As a result, in Jamaica, the culture and/or heritage of the indigenous communities, the so-called buffer communities of the park was respected and integrated within the policies for conservation in the Blue John Crow Mountains National Park (see e.g. Blue and John Crow Mountains-National Park Jamaica Management Plan 2011-2016).

The communities were assisted in terms of sustaining and utilizing their IKS (cultural) to its full potential. This was done by providing them with useful information regarding educating their community members and other people outside of their local area about their IKS as well as promoting their IK for tourism purposes in order to help the community to benefit socially as well as economically. On the other hand, traditional leaders of the AmaZizi, AmaSwazi and AmaNgwane stated that their IKS is not fully recognised and acknowledged by the park (Interview, traditional leaders, June 2019). Indeed, the park may be aware of some of their IKS practices in order to conserve the environment but these are not included within their policies.

As far as they know, there is nothing on paper that suggests such. They stated that, even if the policies do exist and include their IKS, they are not aware and also do not know what those documents are called and/or their titles. In the case of Okhahlamba-Drakensburg, the Integrated Management Plan (IMP) which is reviewed after 5 years is one of the policies, according to the park, that includes indigenous people (Interview, traditional leaders, Okhahlamba-Drakensberg, June 2019). However, this plan contains scientific information of conservation regulations which highlight top–down management approaches (Interview, park representative, Okhahlamba-Drakensberg, May 2019). As a result, the traditional leaders of AmaZizi, AmaSwazi and AmaNgwane stated that the plan, even if they do not know it works, does not fully respect their culture and their IKS.

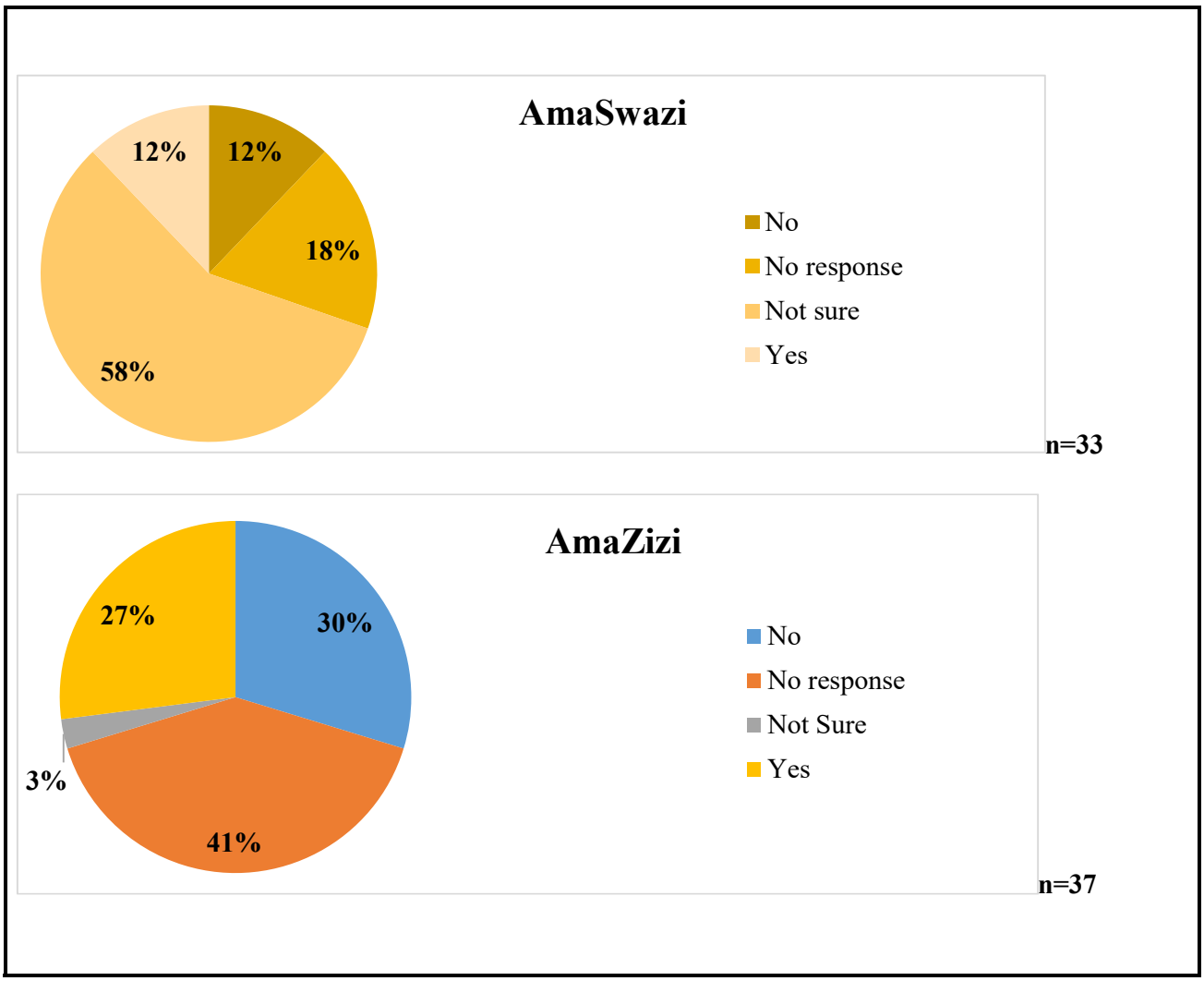
According to the park representatives at Okhahlamba-Drakensberg, these indigenous communities and their IKS are included in the current practices and policies of the park (Interview, park representative, May 2019). These are meant to be communicated to the community during community engagement programmes but attendance to these engagements by community members was limited. The Okhahlamba-Drakensberg Mountain Park considers IKS practices including the access to the Royal burial site, where the Kings (Inkosi in IsiZulu) of the area are buried (Elibeni), in agreement with the traditional leaders. The indigenous community is also granted access to hunt the Eland (*Taurotragus oryx*) which is protected in the park for some cultural practices. For the Kings traditional attire, they (indigenous communities) are permitted to pluck one feather (usiba in IsiZulu) from the blue crane (*Anthropoides paradiseus*), South Africa's national bird (Interview, park representative, May 2019).

Therefore, based on what the indigenous communities stated and what the park managers asserted in the study areas, what comes to light concerning the current status of IKS in existing policies of conservation of Protected Areas is that indigenous communities and their IKS are not well integrated in the policies. One is reminded of the IKS on plants and animals with medicinal properties which was surreptitiously 'integrated' by Park managers in South Africa. This 'integration' was done clandestinely without the consultation and knowledge of communities (See Section 6.3, above). In Jamaica, the IKS on culture which was a tourism product was the only one which was promoted and the other types were ignored. All this suggests the unwillingness of Parks and or governments to clearly and actively integrate IKS in environmental conservation and management unless there are gains which the states anticipate. This demonstrates that the issue of power and politics in environmental conservation

and management continues to be relevant. This finding corroborates several studies on this matter (see e.g. Debelo (2012); Chomba et al. (2016); Dabo (2017); Kashwan (2017); Andersson et al. (2017)

6.4 Assessing the effectiveness of co-management plans that exist in the study areas

A significant number of the participants, in AmaSwazi (12%), AmaZizi (30%) and AmaNgwane (77%) as well as in Charles Town (31%) and Moore Town (37%), stated that IKS for environmental conservation was not included and/or integrated in the co-management plans of the PAs (Figure 6.4 below). However, there were some participants who asserted that, IKS was included in the co-management plans of the Park, AmaSwazi (12%) and AmaZizi (27%).



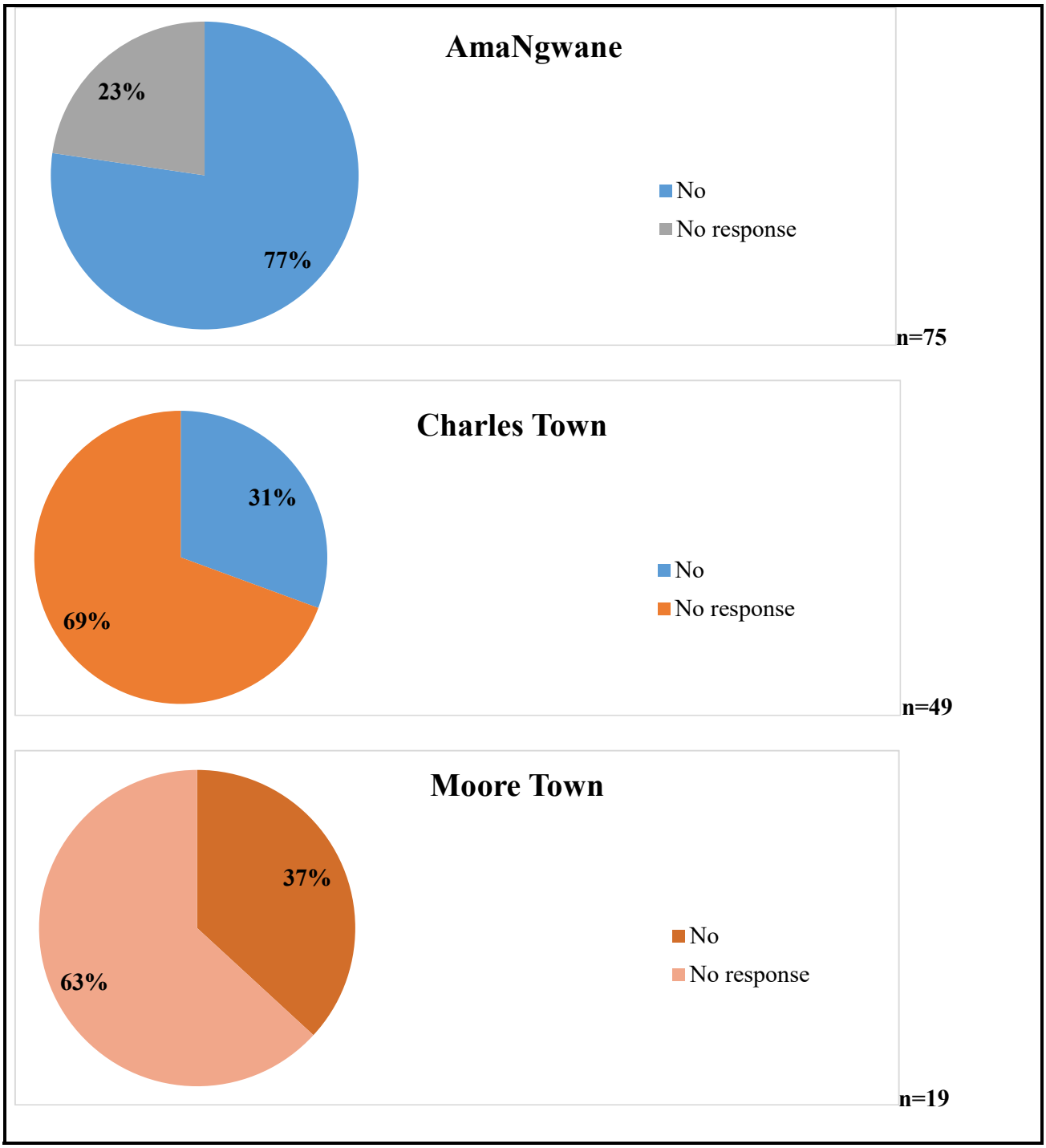


Figure 6.4: Indigenous communities in the co-management plans that exist in the study areas

As discussed in Chapter Three (Section 3.5), co-management is basically a plan that allows for the community to be stakeholders with PAs and other institutions in the management and conservation of natural resources. Communities are meant to retrieve benefits such as access to and consumption of resources. Other benefits include, but not limited to providing the

surrounding indigenous community members with employment opportunities. However, only a small number of the participants in the study know what the co-management plan is and that IKS and indigenous communities are included in such plans by PAs. Nonetheless community members are still not considered as positively contributing their IKS for managing ecological resources in their surrounding environment as well as within the park.

Factors such as the equal distribution of natural resources and other co-management benefits have not been attained by the majority of the indigenous community members. And a few of the participants responded by saying they were not even sure what the co-management plan was or if it even existed. They stated that, they have never heard of the co-management plan and therefore have no knowledge of IKS being included in these plans. When questioned regarding the access to and consumption of natural resources, as outlined in the co-management plans (see Chapter 3, Section 3.6.1), a significant number of the participants said that access was permitted for activities such as seasonal hunting, harvesting and gathering. However, the community members are required to have a permit or what is referred to as the "passport" according to the participants in Okhahlamba-Drakensberg. The most commonly accessed resources include some wildlife, plants, trees or grasslands, some water sources, firewood and sacred areas for cultural practices. Sometimes access is limited or there is not access at all. This analysis is substantiated by literature, for example Thondhlana et al. (2015), Maluleke (2018) and Dube (2018). Also see (Chapter 3 Section 3.5.1).

The livelihoods of these communities were dependent on the natural resources that are protected within the park. These include the inability to access clean water from the river whose mouth is located within the park, access to firewood, certain grasslands, plants, trees and claystone amongst others. At the same time, grazing land was denied for their livestock inside the park. According to the community leaders this was unfair given that they were forcibly moved to unproductive lands in order to construct PAs (Interview, traditional leaders, Okhahlamba-Drakensberg, June 2019). However, park representatives had different opinions. They stated that permits holders who are resources users from the community were allowed access to some resources as per the rules and regulations the park has designed for harvesting, gathering and hunting methods (Interview, park representative, Okhahlamba-Drakensberg, June 2019). But due to miscommunication and conflicts that already exist, the park has had issues of illegal entries for gathering, harvesting and hunting. Also, the traditional leaders complained of employment opportunities that were given to outsourced people rather than the local community members. The community members asserted that the park thought they were

not skilled enough to get jobs in the park and are then given temporary or low income jobs to shut them up (Interview, traditional leaders, Okhahlamba-Drakensberg, June 2019. This then proves that even after the collaborative management plans were implemented after the failure of top-down approaches (Bollig, 2016), they are still failing at collaborating with indigenous communities.

As a result, these issues have led to conflicts between the community and the parks. This, according to Holmberg (2011) is as a result of the exclusion and/or the marginalization of indigenous people and their IKS in conservation management (see Chapter Three, Section 3.4.1). Similarly, the lack of communication between the park and indigenous communities is problematic given that it keeps the indigenous communities outside the co-management plan of the PAs. This argument suggests that, as a result of the lack of collaborations and/or interactions, the more indigenous communities and the parks experienced conflicts and adverse relationships. The AmaSwazi and AmaNgwane traditional leaders asserted that, their communities have no knowledge of what the co-management plan is, the roles and responsibilities of persons involved and if they are even allowed to be a part of such PA plans (Interview, AmaSwazi and AmaNgwane, May 2019). This violates the co-management plan which states that local communities are included in participatory planning and programmes available for managing the park, and that the buffer communities must be involved in park management activities. These are issues which are detailed in co-management plan as discussed in Chapter three, section 3.6.2. Conversely, in the AmaZizi community as well as Charles Town and Moore Town, the leaders were told about the co-management document, but then again have not seen the physical document (Interview, AmaZizi traditional leader, June 2019). In addition, the AmaZizi leader spoke of a conservation forum that they used to have in their community. The forum was made up of active community members, most with an interest in the conservation management of their surrounding natural resources and those within the PA. Members of the forum sat in meetings where the co-management plan and other conservation related policies were discussed. But those invitations to these meetings stopped coming and this led to the forum being disabled. It was not until 2015 that another forum was enacted with the responsibility of safeguarding their natural environment with assistance from external institutions and/or non-government organizations (Interview, AmaZizi traditional leader, June 2019). If all this is viewed through the prism of the Common Property Theory (see Chapter 2 Section 2.3.1), it can be suggested that the indigenous community was not considered and treated as equal partners, but subjects. Thus matters regarding IKS, environmental conservation

and management as well as the utilisation of resources in the PAs were dictated to the community members as to subjects.

However, according to the park representatives, at most times community leaders were the only members of the community who were brought in on such a plan as public participants (Interview, park representative, Okhahlamba-Drakensberg, June 2019). The issue is that such community leaders have come to realize that they do not comprehend what the plan consists of. It therefore becomes difficult for them to understand any direct benefits and new information to communicate back to the community. However, according to the park representatives, IKS and the local communities are included in the co-management plan of the PAs and the communities do benefit from the plan. In the Okhahlamba-Drakensberg area, park representatives maintain that the benefits include educational programmes that are provided to schools, within a 10km radius of the park for biodiversity conservation awareness in their areas and within the park. In line with the primary school's curriculum in the area, the "*Sifundimvel*o Programme" as endorsed by the Department of Education is successfully utilized as an instrument for raising awareness (Interview, park representative, June 2019). This corresponds with the co-management plan of the park (see Chapter Three, Section 3.6.2). Other approaches for raising biodiversity conservation awareness include social gatherings for example, sport days and cultural events that are funded by external institutions.

However, according to the community leader's disagreement around the implementation of these programmes (non-involvement of community members) had generated conflicts (Interview, traditional leaders, Okhahlamba-Drakensberg, June 2019). One of the leaders mentioned that there is a learning centre inside the park but, they have never witnessed school children being invited to utilize those facilities. From this community member's point of view, this was indicative of the fact that, access to PA was restrictive even for school programmes (Interview, traditional leaders, Okhahlamba-Drakensberg, June 2019. In Portland, Jamaica, the community leaders stated that they benefitted in a limited way from the co-management plan through the tourism marketing of the cultural richness of the indigenous communities (Interview, Charles Town colonel, June 2019). Other benefits of the co-management plan, according to the park representatives included consumption of resources and employment for the buffer community members (Interview, park representative, Blue-John Crow Mountains National Park and the Okhahlamba-Drakensberg Park, June 2019).

Given the above analysis, the assessment of the effectiveness of the co-management plans of the study areas shows that the PAs were disingenuous in their relationship with the indigenous community. Indigenous communities are not aware of the plans and those that are, are not receiving the benefits as much as they should. There still exist issues of fair access to, governance and consumption of natural resources as well as beneficiation. Through the deployment of the Common Property Theory, one is led to think that, community members are not equal partners and this makes them exist on the margins in relationship about natural resources which they own and should benefit from.

6.5 Conclusion

This chapter analysed the data which was collected to respond to the objectives of the research. What emerged from the analysis is that, those indigenous communities who were previously marginalized from their aboriginal lands to establish PAs, are still utilizing their IKS for the conservation of their surrounding environment. However, their efforts to identifying and classifying IKS for environmental conservation have been frustrated given that IKS is not integrated within the current plans and policies of PAs. The introduction of the collaborative management plans has been relatively ineffective, many of the indigenous communities are not aware of the plans, what they entail and how they could benefit from their implementations. What is clear is that, indigenous communities have been side lined in decision-making processes that affect their access to and consumption of natural resources as well as their livelihoods (Maluleke, 2018). This is evident in the study areas, given the analysis if the study. This has also contributed and continues to contribute to animosity towards projects and/or programmes established by the parks for indigenous communities for the purposes of environmental conservation. The next chapter will respond to objective four of the study as well as draw a conclusion and make recommendations for future research based on the results from this chapter.

CHAPTER SEVEN: CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

The study consisted of seven chapters. Chapter one provided a background and orientation to the study. Chapter two discussed the conceptual and theoretical frameworks which guided the present research. This was achieved by explaining the concepts around which the research revolved as well as an analysis of the two theories, which guided this study and these being Political Ecology and Common Property Theory. Chapter three critically reviewed literature relevant to the present research. Chapter four presented the physical setting of the study areas in Portland, Jamaica and Okhahlamba-Drakensburg, South Africa. Chapter five described the research design and methodology that was followed in the study. Chapter six focused on a critical analysis and interpretation of the data in response to the first three objectives of the study. In line with the analysis in Chapter six, the following themes emerged, along which the ensuing sections summarise the whole study as well as proposing for strategies for enhancing the integration of IKS in the management of Protected Areas. This addresses the fourth objective of this study. This chapter also outlines possible areas of future research around IKS and environmental conservation in the study areas and also reflects on the contribution of this chapter to the body of knowledge. The final part of this chapter is the conclusion.

7.2 The identification and classification of the IKS that exist in the study areas

What emanated from the study was that even though indigenous people are still very much involved in the conservation of their surrounding environment, their efforts in further identifying and classifying IKS for biodiversity conservation have been hindered by the implementation of exclusionary conservation policies by PAs. This promotes the inaccessibility and inability to consume and utilize natural resources within the parks.

7.3 The current status of IKS in existing policies of conservation of protected areas

This thesis investigated the integration of IKS in the conservation of Protected Areas in the study areas. The analysis revealed that the relegation of indigenous communities along with their IKS had an impact on the integration of their IKS in the current practices of PAs. Indigenous communities are not effectively incorporated within the current practices of PAs. Those community members who were told that they are included, do not have knowledge of how and which policies include their IKS. Through the lenses of Political Ecology (see Chapter 2 Section 2.3), it appears that, there is some unequal power relations between the community members and the PAs. This is why PAs, appear to have the final say on how and if IKS should

be integrated in the management of PAs and the environment. For as long as these power structures and/or relations remain, the meaningful integration of IKS in the management of PAs remains questionable.

7.4 On the effectiveness of co-management plans that exist in the study areas

In an effort to address the marginalisation of indigenous communities in the current practices of PAs as discussed in Section 7.3, co-management plans were introduced. In spite of these efforts, indigenous communities and their IKS are still not completely integrated, they do not have authority in decision-making processes and how the parks are managed. On the one hand, the study found that in the study areas, a significant amount of community members does not even know what the co-management plan is. On the other, indigenous community members were not benefitting as they should from the co-management arrangements. The insights from the Common Property Theory (see Chapter 2 Section 2.3.1), suggests that the co-management agreements and plans were not working well. This had reduced community members to powerless partners. By definition, powerless partners cease to be partners, but subjects.

Since this study was a comparative investigation of the integration of IKS in Okhahlamba-Drakensburg, South Africa and Portland, Jamaica, there is need to address the similarities or differences in this study, as suggested by the findings in Chapter 6 and in light of the themes summarised from Sections 7.2 to 7.4, in this chapter. First, notwithstanding the existence of a negative relationship between community members and parks which affected the level of response of the study participants (to the issue of IKS and its classification), the study indicates that in both KwaZulu-Natal, South Africa and Portland, Jamaica, the continued identification and classification of IKS suitable for natural resources has been hindered by exclusionary policies implemented after the creation of PAs. Second, in both study areas, the integration and/or state of IKS in the current policies that govern PAs in the conservation of the environment, is inefficient or low. Third, with regards to co-management in both South Africa and Jamaica, the indigenous communities are not properly integrated in management agreements as well as beneficiation processes as indicated in the plans. Overall, the results of this comparative study provide similarities in the study areas (as discussed in the preceding chapter). Therefore, the strategies for the integration of IKS will be uniform for both areas.

7.5 Strategies for the integration of IKS

The findings of this research as discussed in Chapter six and summarised in the preceding section, suggest the need for the integration of indigenous communities and their IKS in the conservation of Protected Areas. This then raises the question of how the relationship that exists between the indigenous communities and their IKS on one hand and PAs on the other could be addressed and/or enhanced. Consequently, this part of the chapter suggests strategies, which could be employed so as to achieve the integration of IKS in the conservation of the natural resources in PAs in the study areas. This also addresses the fourth objective of this research.

7.5.1 Introduction of bottom-up approaches- equal governance

The study has revealed that power issues are still persistent in co-management plans. Indigenous communities have no knowledge of the co-management plans and those that do are inefficiently integrated within these plans, as such the management agreement is non-functional (See Section 7.4 above). Protected Areas should ensure that governance embraces a bottom-up approach (Figure 7.1 below). That is, from the community level, within established committees which interact with park management in a transparent manner. This will ensure support, the equal distribution of natural resources, sustainable development of livelihoods and/or the empowerment of indigenous communities and the overall development of good relationships. In this proposed model, indigenous communities, PAs and stakeholders involved should be seen as equal partners.

To ensure this, community members must be included in the planning, designing, implementation, management as well as the monitoring and evaluation of natural resource governance programmes/policies. The interests of and benefits to indigenous communities should be considered at all times. Communication lines between community members and PAs should at all times remain transparent to avoid conflicts. To accomplish this, both parties need to ensure timeous regular, open and face-to-face interactions between PAs and the community, to provide clarity and to circumvent misunderstandings in advance of projects and/or issues that may arise. This does not exist in the current co-management plans.

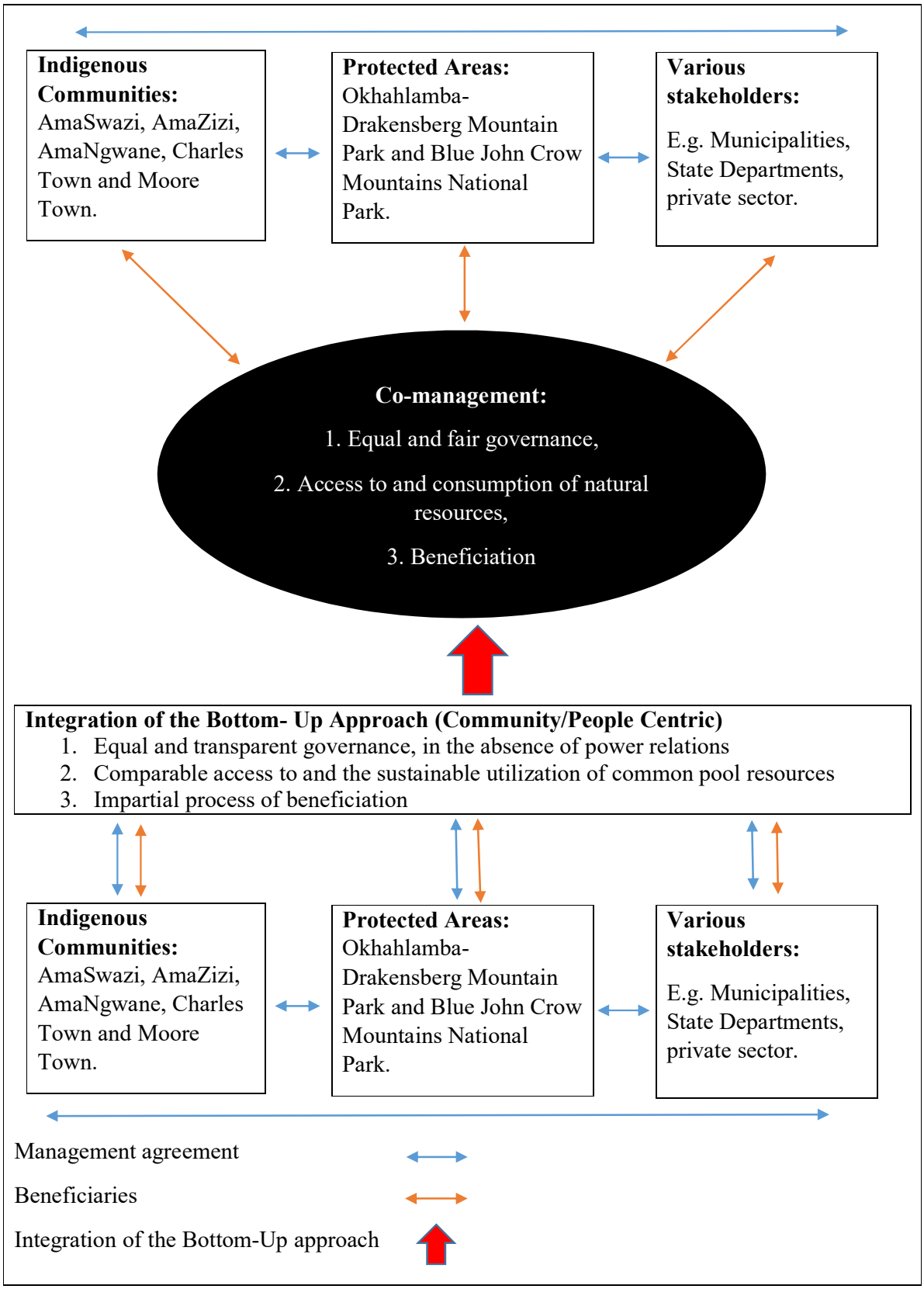


Figure 7.1: Bottom-up approach for natural resources governance

7.5.1.1 Public participation, education and training

Indigenous communities argued that the policies developed by PAs contain scientific terminology that made it difficult for them to comprehend the policies in question. Thus, through a number of public participation engagements, the PAs can facilitate the collaborative programmes involving community members and/or IKS holders. In other words, PAs should approach indigenous communities from whom they could learn and to whom they could also impart knowledge. Approaching indigenous communities from a position of arrogance and authority can only engender animosity and conflict. Differently stated, both the PAs and indigenous communities can and should learn from each other. In addition to this, scientific jargon which is contained in policy documents should be translated to the language spoken and understood by indigenous communities such as IsiZulu, in Okhahlamba-Drakensburg, South Africa, so that these documents become accessible to all the people, for effective knowledge distribution between those who can read and those who cannot. This could assist in making people understand co-management, its processes, the different roles and responsibilities they can assume and ways that they can benefit from co-management. The above can be utilized to enhance the existing co-management plans.

7.5.1.2 Indigenous communities in decision-making processes

Indigenous communities should be incorporated in decision-making processes, not just as general members of the public but rather as role players in such processes (bearing in mind that, these indigenous communities are the IK holders and have the right to distribute as well as protect their IKS in ways that benefit their communities). This could be done by identifying and electing a suitable community representative to be a part of these processes. The park can outline the type of person who might be eligible to play a role in these processes and let the communities decide on their own which candidate can best assume that role. Also, a community representative should at all times consult with the traditional authority and members of their community before making any decision with the park.

7.6 Suggestions for further research

The study was delimited to a particular scope and therefore other elements encountered during the study fell outside of the study's intended investigation. For these reasons, the following are suggested as possible areas for future research;

a) During data collection, the researcher noticed that the issue of power and politics had implications on the efficacy of co-management of PAs. Therefore, further research is

required to examine the effects politics on the efficacy of co-management agreements in the governance of PAs.

b) In both Jamaica and South Africa, the researcher realised that, the IKS which was seriously considered was that which was profitable to the state (such as cultural practices which were harnessed for purposes of tourism). It would be interesting to undertake further research to evaluate the impact of this on the state of IKS in the study areas.

7.7 Final reflections

This study corroborates a considerable body of knowledge (see e.g. Fraser 2006; Dabo, 2017; Gandile et al. 2017; Maluleke, 2018; Thondhlana, 2018) on the marginalisation of IKS as a result of the creation of PAs consequent upon colonial conquest, subjugation and dispossession. The result of this, is that it has been difficult to integrate IKS in the current conservation programmes of the PAs, precisely because Western epistemologies still reign supreme. This has implicated on policy and practice in that, the current policies on environmental management mimic colonial conservation approaches and only render limited attention to IKS and the involvement of indigenous communities in the management of their environment. This is manifest in co-management plans and agreements, which in theory involve indigenous communities and their IKS, but in practice, it is the state (represented by park managers) who design and drive conservation programmes. In most cases, indigenous communities do not have the knowledge of the existence of such plans let alone, the roles they can assume in the management of PAs, the distribution of equivalent access and consumption of natural resources amongst other benefits. Consequently, the present research responded to the main aim of the study, which was to comparatively investigate IKS in the conservation of protected areas in KwaZulu-Natal, South Africa and Portland, Jamaica. Thus, by introducing new insights which suggest that, indigenous communities and their IKS in and around PAs in the study areas continue to suffer displacement, exclusion and/or marginalization.

This is evident in policies, which are either inaccessible to the indigenous people or theoretically pronounce the involvement of indigenous communities. Differently stated, the practice and management of PAs in the study areas continues to be a top-down approach affair, in which IKS and indigenous communities are added as an afterthought, or when they are considered beneficial to the state, such as cultural tourism in Portland, Jamaica. In all this, one sees the power of politics in environmental issues (matters which are propounded in the theory

of Political Ecology which was one of the theories which guided the study). The result is that power and politics do not always respect the rights and privileges of ordinary people (issues which are fully explained in the Common Property Theory, which is the second theory which guided the present research). Therefore, Political Ecology and Common Property theories assisted this study to attempt an in-depth analysis of how and why IKS and indigenous communities continue to suffer marginalisation in policy, practice and management of the environment.

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APPENDICES

APPENDICE A: QUESTIONNAIRE

This study is conducted by a research student from the University of Zululand.With the provisional title: **Investigating Indigenous Knowledge Systems in the conservation of Protected Areas in KwaZulu-Natal, South Africa and Portland, Jamaica: Policy, Practice and Management**. The results of the study will be strictly used for the purpose of the study. It will only take a few minutes to complete this questionnaire. If at any point you do not comprehend the given question, please ask the researcher to elaborate and/or translate. Please complete as honestly as possible.

Name of participant:

Place

Date of completion:

SECTION 1: BASIC HOUSEHOLD INFORMATION

1.1 Household Profile

1.1.1 Gender of respondent (male/female)		
1.1.2 Age		
1.1.3 Position / Standing in the family		
1.1.4 Since when has your household (HH) lived in the area?		
1.1.5 Nearest Services Town(s)	Town 1	Town 2

1.2 Education/ Schooling

1.2.1 Level

Primary	
Secondary	
Tertiary	

1.2.2 Qualifications / Skills

Qualifications / Skills	No.HHMs	Type
Certificate		
non-certificating training		
Other skills		
Experiential skills and type		
None		

1. 3 Sources of Livelihood

1.3.1 Access to Agricultural land

Y/N		Extent	

1.3.2 Livestock

Y/N		Type	Cattle / Goats / Sheep / Other

SECTION 2: CONSERVATION/ PROTECTED AREAS AND INDIGENOUS KNOWLEDGE SYSTEMS

2.1 UNDERSTANDING OF THE CONCEPTS AND KNOWLEDGE STATEMENT

(There may be options to responses e.g. multiple-choice responses)

Question	Response
2.1.1 What does "Conservation" mean to you? Give indications.	
2.1.2 What do you understand about what is called a "Protected Area?" Give examples.	

2.1.3 Have you ever heard about the World Heritage Sites?	
2.1.4 What do you understand about the word "National Park?"	
2.1.5 Do you think some areas should be protected and protected from who or what?	
2.1.6 What do you think is the extent of the Protected Area in your area?	
2.1.7 What are the habitats (plants and animals) of the protected areas? Can you name them?	
2.1.8 What special plants do you know in the Park nearest to you?	
2.1.9 What special animal species do you know habit the Parks near you?	
2.1.10 Why do you think these special plants and animals need to be protected?	
2.1.11 Why do you think they are important?	
2.1.12 What does Indigenous Knowledge Systems mean to you?	
2.1.13 What do you think was done in the past to create more understanding of conservation by the protected area?	
2.1.14 What should be done in future to create a better understanding of conservation?	

SECTION 3: THE HISTORY AND USE OF IKS FOR CONSERVATION AND MANAGEMENT OF THE ENVIRONMENT

3.1 The history and use of IKS for conservation and management of the area by the community

Please use tick or cross

3.1A) Do you use IK for the conservation and management of your surrounding environment?

Yes	01	
No	02	

If no, please explain why?

……

……

3.2B) If you answered **NO** to question 3A above, please ignore. How long have you been using the IK?

Pre the creation of the protected area	01	
Post the creation of the protected area	02	

3.2C) How did you acquire the IK?

……

…….....

3.2 Identifying and classifying IK for the conservation and management of the environment

3.2A) If you answered **YES** to question 3A above. What IK can be identified in your area for conserving and managing the environment?

……

……

3.2B) The identified IK in your area is utilized for:

You can choose more than one

Agriculture/Farming practices	01	
Soil conservation	02	
Catchment/Watershed management	03	
Wildlife/Fisheries	04	
Forestry/Horticulture	05	

3.2C) From the above, for what use can the IK practice be classified?

Health/Medicinal use	01	
Subsistence/Commercial use	02	
Conservation/Preservation strategies	03	
Adaptation strategies	04	
Hunting/Gathering strategies	05	

3.2D) From a scale of 1 to 5, how efficient is the use of IKS in your community? ***1 being insignificant & 5 being very significant.***

…….

3.2E) Do you think that your IK is for the promotion of or the contribution to your natural or cultural heritage?

Natural	01	
Cultural	02	
Both	03	

Please provide a reason for your response?

……
……

3.3 The status of IKS in the current practices of conservation and management of protected areas, policies and management plans in place.

3.3A) Do you know of any current practices or policies of the conservation and management of the protected area?

Yes	01	
No	02	
Not sure	03	

If **YES**, please provide example and if **NO** please provide a reason why?

……
……

3.3B) If you answered **YES** to question **4.3A**, please rate the efficiency of these policies and management plans?

Highly efficient	01	
Moderately efficient	02	
Not efficient	03	

3.3C) Is IKS considered/included in the current practices/policies or the co-management of the protected area?

Yes	01	
No	02	
Not sure	03	

If **YES**, please provide example and if **NO** please provide a reason why?

……
……

3.4D) What would you say is the status of IKS in the current practices and co-management of the protected area?

High	01	
Low	02	

Please provide a reason for your response?

……
……

3.4E) Do you think IKS and the community should be included and/or involved in the current practices and co-management of the Protected Area? Why?

……
……

3.4F) Are there any benefits of the co-management plan attained by community members?

……
……

3.4G) Do you have any access to the Protected Area and natural resources? If yes, please mention which natural resources?

……
……

THANK YOU FOR YOR TIME!!

APPENDICE B: STRUCTURED INTERVIEW GUIDE

The purpose of this discussion is so that the interviewer obtains your point of view regarding Indigenous Knowledge Systems (IKS) in the conservation of Protected Areas. Further, this discussion is to provide context to the study and in-depth information. Therefore, there are no right or wrong answers. Please note, the interview will take less than an hour of your time, the discussions will be recorded so that the interviewer does not miss any information. However, information received will not in any way be linked to your identity.

Name of interviewer:

Name of interviewee:

Place of interview:

Date of interview:

Questions 1:

What is your role in the community/ Protected Area?

Questions 2:

How are people in the local community involved in conservation of the Protected Area? What are their roles?

Questions 3:

How efficient is the use of IKS for conservation in the local community?

Questions 4:

How is IKS identified and classified for conservation?

Questions 5:

Is there a relationship between the local community and conservation officials of the Protected Area? Please provide reasons.

Questions 6:

Who is involved in the co-management of the Protected Area and what are their roles?

Questions 7:

What are your perceptions regarding the existing co-management plans/policies/structures?

Questions 8:

Should IKS be integrated in the conservation of Protected Areas and why?

Questions 9:

Summarizing the key points of the discussion, would you like to add any information?

Questions 10:

Do you have any questions?

THANK YOU FOR TAKING YOUR TIME TO HAVE THIS DISCUSSION WITH ME!

APPENDICE C: ORIGINALITY DECLARATION

ORIGINALITY DECLARATION

Full Names and Surname	Hlengiwe Marvelous Sweetness Cele
Student Number	201330203
Title of dissertation/thesis	Investigating Indigenous Knowledge Systems in the conservation of Protected Areas in KwaZulu-Natal, South Africa and Portland, Jamaica: Policy, Practice and Management

I acknowledge that I have read and understood the University's policies and rules applicable to postgraduate research, and I certify that I have, to the best of my knowledge and belief, complied with their requirements.

In particular, I confirm that I had obtained an ethical clearance certificate for my research (Certificate Number UZREC171110-030) and that I have complied with the conditions set out in that certificate.

I further certify that this research thesis is original, and that the material has not been published elsewhere, or submitted, either in whole or in part, for a degree at this or any other university.

I declare that this research thesis is, save for the supervisory guidance received, the product of my own work and effort. I have, to the best of my knowledge and belief, complied with the University's Plagiarism Policy and acknowledged all sources of information in line with normal academic conventions.

I have subjected the document to the University's text-matching and/or similarity-checking procedures.

Candidate's signature	
Date	01 March 2020

APPENDICE D: ETHCAL CLEARANCE CERTIFICATE

UNIVERSITY OF ZULULAND
RESEARCH ETHICS COMMITTEE
(Reg No: UZREC 171110-030)

RESEARCH & INNOVATION
Website: http://www.unizulu.ac.za
Private Bag X1001
KwaDlangezwa 3886
Tel: 035 902 6731
Fax: 035 902 6222
Email: DlelanaM@unizulu.ac.za

ETHICAL CLEARANCE CERTIFICATE

Certificate Number	UZREC 171110-030 PGM 2018/585							
Project Title	INVESTIGATING INDIGENOUS KNOWLEDGE SYSTEMS IN THE CONSERVATION OF PROTECTED AREAS IN KWAZULU-NATAL AND PORTLAND, JAMAICA: POLICY, PRACTICE AND MANAGEMENT.							
Principal Researcher/ Investigator	HMS Cele							
Supervisor and Co-supervisor	Dr I Moyo							
Department	Geography and Environmental Studies							
Education	ARTS							
Type of Risk	Med Risk- Data collection from people							
Nature of Project	Honours/4th Year		Master's	x	Doctoral		Departmental	

The University of Zululand's Research Ethics Committee (UZREC) hereby gives ethical approval in respect of the undertakings contained in the above-mentioned project. The Researcher may therefore commence with data collection as from the date of this Certificate, using the certificate number indicated above.

Special conditions:

(1) This certificate is valid for 1 year from the date of issue.
(2) Principal researcher must provide an annual report to the UZREC in the prescribed format [due date-14 December 2019]
(3) Principal researcher must submit a report at the end of project in respect of ethical compliance.
(4) The UZREC must be informed immediately of any material change in the conditions or undertakings mentioned in the documents that were presented to the meeting.

The UZREC wishes the researcher well in conducting research.

Professor Gideon De Wet
Chairperson: University Research Ethics Committee
Deputy Vice-Chancellor: Research & Innovation
14 December 2018

CHAIRPERSON
UNIVERSITY OF ZULULAND RESEARCH ETHICS COMMITTEE (UZREC)
REG NO: UZREC 171110-30
04-03-2019
RESEARCH & INNOVATION OFFICE