

UNIVERSITY OF THE WITWATERSRAND

FACULTY OF SCIENCE

SCHOOL OF ANIMAL, PLANT AND ENVIRONMENTAL SCIENCES



**The Role of Institutional and Policy Frameworks in Biodiversity Offsets
in South Africa: A Review of Offset Frameworks.**

Name: Maybe Mudzamiri

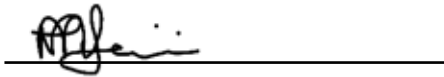
Student Number: 2111718

Supervisor: Prof Mulala Danny Simatele

Ethics Protocol Number: H20/10/1

DECLARATION

I declare that this research report is my original work. It is being submitted in partial fulfilment of the Master of Science Degree in Environmental Science at the University of the Witwatersrand, Johannesburg, South Africa. This work has not been submitted at any other university or for any other degree before.

A handwritten signature in black ink, appearing to be 'M. J. ...', is written over a solid horizontal line.

(Signature of candidate)

Signed on this 2nd day of March 2022 in Braamfontein, Johannesburg, South Africa.

ACKNOWLEDGMENTS

Firstly, I would like to thank God for seeing me through this journey of conducting my research. Great appreciation goes to my supervisor, Professor Mulala Danny Simatele of the School of Geography, Archaeology and Environmental Studies at the University of the Witwatersrand, for his academic support, guidance and patience throughout my study. His encouragement helped me manage the emotional pressure of being a mother to an infant and a toddler yet studying. My heartfelt appreciation also goes to my dear husband Alfonce for helping me select the research topic and being there throughout the journey, supporting me financially and emotionally, and proofreading my work. Together with my children (two boys), I would like to thank them for sacrificing our family time for me to complete my studies.

Special thanks go to Dr Allan Tarugara (who is a friend and former classmate), Dr Richmore Dondofema (who is a friend), Temperance Sebele (who is a friend and fellow Environmentalist), and Gordon Madamombe (who is a friend) for proofreading my work. Also special thank you to my friends, Rugare Nkomo, Daphne Carliez, Nomagugu Chauke and Isabella Dondofema, for the much needed moral support.

My gratitude also goes to my dear mother for her prayers, encouragement and for always believing in me. I also want to thank my family and friends for their continued support.

ABSTRACT

The study investigated the effectiveness of institutional and policy frameworks in promoting successful biodiversity offsetting in South Africa. It argues that the success of biodiversity offsets is hinged on functional institutional and policy frameworks. Biodiversity offsets come as a way to facilitate sustainable developments by ensuring that any biodiversity loss is compensated. The study identified challenges and ways to pursue biodiversity offsets to create a baseline for sustainable development in a country where biodiversity offsets have been implemented for more than a decade without a comprehensive national biodiversity offset policy. The study engaged with literature obtained from globally accepted scientific databases and conducted interviews with industry experts to achieve this. Thematic content analysis was used to analyse that data. The data were coded using a computer data analysis programme called QDA Miner. The findings suggest that despite the provisions for biodiversity offsets in South Africa's legislation, there remain challenges in the offsetting process. These include weak institutional frameworks, the absence of an explicit national biodiversity offset policy, resistance to offsets, and land acquisition issues, among other things. These challenges have made it difficult to develop an effective biodiversity offsetting strategy. The study also discovered that South Africa aligns in principle to the international standards and has adopted the target-based ecological compensation approach in its draft offset policy. However, the mitigation hierarchy is not strictly adhered to, and there is a lack of clarity and guidance on remediation and offsetting agricultural activities, among other things, in the legislation. Some of the recommendations to address the identified challenges included formulating a comprehensive policy supported by a strong biodiversity offsets unit, conducting awareness campaigns for the general public, educating practitioners and regulators, and conducting more scientific research. The study forms a basis for improved biodiversity offsetting in the country and can potentially inform other developing countries in a similar situation.

Key words: biodiversity, offsets, institutional framework, policy, mitigation, hierarchy, no net loss.

ACRONYMS

BBOP	Business and Biodiversity Offsets Program
CBA	Critical Biodiversity Areas
CBD	Convention on Biological Diversity
DLA	Department of Land Affairs
DME	Department of Energy
DWAF	Department of Water Affairs and Forestry
EAPASA	Environmental Assessment Practitioners Association of South Africa
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
ICMM	International Council on Mining and Metals
IFC	International Finance Corporation
IFCPS6	International Finance Corporation Performance Standard 6
IUCN	International Union for Conservation of Nature
NWA	National Water Act
REIPPP	Renewable Energy Independent Power Producer Procurement Programme
SACPCMP	South African Council for the Project and Construction Management Professions
SANBI	South Africa National Biodiversity Institute

Contents

DECLARATION	ii
ACKNOWLEDGMENTS	iii
ABSTRACT	iv
ACRONYMS	vi
LIST OF TABLES	x
LIST OF FIGURES	xi
CHAPTER ONE	1
FRAMES OF REFERENCE	1
1.1 BACKGROUND TO THE STUDY	1
1.2 THEMATIC CONSIDERATION	5
1.2.1 RESEARCH QUESTIONS.	6
1.3 RESEARCH AIMS AND OBJECTIVES.	6
1.4 ETHICAL CONSIDERATIONS.	7
1.5 STRUCTURE OF THE DISSERTATION.	7
CHAPTER TWO	9
LITERATURE REVIEW AND THEORETICAL CONSIDERATIONS	9
2.1 CONCEPTUAL FRAMEWORK ON BIODIVERSITY OFFSETS.	9
2.2 GLOBAL PERSPECTIVE ON BIODIVERSITY OFFSETS.	11
2.3 BIODIVERSITY OFFSET IN THE SUB-SAHARAN AFRICA.	18
2.4 THE CASE STUDY OF SOUTH AFRICA.	21
2.5 SUMMARY OF THEORETICAL CONSIDERATION AND LITERATURE REVIEW.	27
2.6 CONTEXTUALISING THE GAPS IN KNOWLEDGE	29
CHAPTER THREE	31
METHODOLOGICAL CONSIDERATIONS	31
3.1 INTRODUCTION.	31
3.2 RESEARCH DESIGN.	31
3.2.1 DESCRIPTION OF DATA SOURCES/RESEARCH MATERIALS.	31
3.2.2 SELECTION OF RESEARCH MATERIALS.	32
3.2.3 DATA COLLECTION TOOLS.	37
(a) RAPID APPRAISAL OF EXISTING POLICY DOCUMENTS AND LITERATURE REVIEW.	37
(b) INTERVIEWS.	38
3.2.4 DATA ANALYSIS.	39
3.3 SUMMARY OF METHODOLOGY.	42

3.4 METHODOLOGICAL LIMITATIONS.	43
CHAPTER FOUR	45
EMPIRICAL EVIDENCE	45
4.1 BARRIERS AND CHALLENGES THAT EXIST IN BIODIVERSITY OFFSETTING IN SOUTH AFRICA.	45
4.2 EXTENT TO WHICH LEGISLATIVE FRAMEWORK PROMOTE BIODIVERSITY OFFSETS.	49
a) BIODIVERSITY OFFSET INSTITUTIONAL FRAMEWORKS.	49
b) BIODIVERSITY OFFSETTING LEGISLATIVE FRAMEWORK	54
4.3 A COMPARISON BETWEEN SOUTH AFRICA’S BIODIVERSITY OFFSET LEGISLATION AND THE INTERNATIONAL STANDARDS.	65
4.4 SUGGESTED APPROACHES AND STRATEGIES FOR EFFECTIVE OFFSETTING.	68
CHAPTER FIVE	72
ANALYSIS AND DISCUSSIONS	72
5.1 INTRODUCTION	72
5.2 THE INSTITUTIONAL AND LEGISLATIVE FRAMEWORKS FOR BIODIVERSITY OFFSETTING IN SOUTH AFRICA.	72
5. 3 A COMPARISON BETWEEN SOUTH AFRICA’S BIODIVERSITY OFFSET LEGISLATION AND THE INTERNATIONAL STANDARDS.	75
5.4 THE CHALLENGES AND BARRIERS THAT HINDER THE BIODIVERSITY OFFSETTING PROCESS IN SOUTH AFRICA.	77
a) LACK OF BIODIVERSITY OFFSET MANAGEMENT FUNDS	77
b) INADEQUATE WORKFORCE	79
c) RESISTANCE TO OFFSETS	80
d) ABSENCE OF BIODIVERSITY OFFSET REGISTER	81
e) UNRELIABLE EIA PROCESS	82
f) LAND USE PROBLEMS	83
g) ABSENCE OF A CLEAR BIODIVERSITY OFFSET POLICY AND LACK OF CLARITY IN LEGISLATION.	85
h) BADLY FRAMED ENVIRONMENTAL AUTHORISATION CONDITIONS.	86
5.5 SUGGESTED APPROACHES AND STRATEGIES FOR EFFECTIVE OFFSETTING.	87
c) OFFER TRAINING	90
d) IMPROVE THE ENVIRONMENTAL AUTHORISATION CONDITIONS.	92
e) CONDUCT MORE RESEARCH.	93
CHAPTER SIX	94
CONCLUSIONS AND RECOMMENDATIONS	94

6.1 KEY CONCLUSIONS OF THE STUDY.....	94
6.2 RECOMMENDATIONS.....	95
6.3 FUTURE RESEARCH.....	96
REFERENCE LIST.....	97
APPENDIX A	106
APPENDIX B	108
APPENDIX C	110
APPENDIX D	111

LIST OF TABLES

Table 4.1. Summary of institutions that deal with biodiversity conservation.....	50
Table 4.2. Participant knowledge of the institutions responsible for biodiversity management in South Africa.	51
Table 4.3: Summary of laws directing biodiversity offsets in South Africa.	59
Table 4.4: Views of participants on current biodiversity offsetting protocol.	64
Table 4.5. The suggested improvements to biodiversity offsetting in South Africa (from literature).	68
Table 4.6. Suggested approaches and strategies to improve biodiversity offsetting by interview participants.	69

LIST OF FIGURES

Figure 3.1. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analysis) flow diagram for searching and extracting data (adapted from Moher <i>et al.</i> (2009)).....	35
Figure 3.2. A computer screenshot showing an example of coding processing for data analysis. ...	41
Figure 4.1: Total count of challenges/barriers in biodiversity offsetting from literature search n=11.	45
Figure 4.2: Total count of challenges/barriers in biodiversity offsetting from interview participants n=21.	46
Figure 4.3: Graph showing the percentages of studies and participants who mentioned challenges/barriers.	49
Figure 4.4. Pie chart showing the efficiency ranking in percentage on the current biodiversity offsetting process in South Africa according to the interviewed participants.	52
Figure 4.5: Visual graph showing the improvements to biodiversity offsetting as suggested by the industry experts. Each one is given a corresponding percentage representing how many times it was suggested.	70

CHAPTER ONE

FRAMES OF REFERENCE

1.1 BACKGROUND TO THE STUDY

The loss of biodiversity is an urgent and growing global concern (Brooks *et al.* 2006). Alterations to the earth's surface have been going on for centuries leading to biodiversity loss (Chapin *et al.* 2000; Vitousek *et al.* 2008; He & Hubbell, 2011), an increase in the risk of extinction of vulnerable species (Myers *et al.* 2000; Turner *et al.* 1994) and has compromised fragile ecosystems (Moilanen & Kotiaho, 2018). Several scholars argue that biodiversity loss is a significant contributor to natural disasters and global warming (Botkin *et al.* 2007; Kamble *et al.* 2013; Mantyka-Pringle *et al.* 2015), whose phenomena are currently recurring at faster rates than ever recorded in history. This rapid depletion of natural resources warrants urgent and corrective attention (Lukey *et al.* 2017). Human activities and population growth have been blamed for the loss of biodiversity (Kamble *et al.* 2013). According to WWF (2020), 80% of global deforestation is attributed to agriculture, and about 52% of this agricultural production land is degraded. Emphasis has been placed on environmental management and awareness campaigns, educating the populace on the importance of sustainably conserving the environment. The loss of biodiversity over the past centuries has been linked to the absence of robust institutional and policy frameworks that are meant to monitor and enforce conservation policies and strategies. In most cases, it is the immediate communities that bear the effects of biodiversity loss and environmental degradation (Bison 2000; Calvet *et al.* 2015), with the magnitude of such effects being amplified for communities in the developing world, since they largely depend on the natural resources for food, livelihood and sustenance (Zenteno *et al.* 2013).

Across Southern Africa, population growth is fuelling economic and industrial expansion and infrastructure developments (Biggs *et al.* 2008). While this is necessary to sustain growing populations, such expansion and developments often negatively impact the environment (Brasier *et al.* 2011), especially in the absence of strict policy and institutional frameworks to govern the developments. Balancing the benefits of physical development and biodiversity conservation is, therefore, a crucial and requisite step towards sustainable protection of the environment going into the future. There is, therefore, an urgent need for a sound and structured mechanism to facilitate quantification and compensation for the environmental losses brought by development projects. The need for proper institutional frameworks is critical for developing countries like South Africa, where the effects of biodiversity loss go beyond the natural environment, but also social and economic capitals (Jha & Whalley, 2015). For instance, (Skowno *et al.* 2019) indicated that one in seven indigenous species is threatened with extinction in South Africa. This will see thousands of ecosystems face ecological collapse, which will weigh on social and economic capital as there is heavy dependence on these ecosystems.

Policy and institutional frameworks guide and inform the business on how it should operate in favour of the environment (Calvet *et al.* 2015; Ehrke & Ehrke, 2010). Conflict of interest has been ever-present for businesses linked with the environment, with financial performance being prioritized over environmental issues (Guillet & Semal, 2018). Conservation concerns are often inadequately addressed by development works and may sometimes be perceived as incompatible with project objectives (Bull *et al.* 2019). More investments are expected globally in sectors like infrastructure and energy, among others. For example, according to the International Energy Agency (2007), more than \$20 trillion in energy investments is expected up to the year 2030 (Kiesecker *et al.* 2009). According to the World Bank (2007), the global economy is expected to double by 2030, and more investments are expected, especially in developing countries. These developments threaten globally important biodiversity areas since the proposed renewable energy

production can require more land than fossil fuel and thermal facilities to produce the same amount of energy (Miller & Keith, 2018; Rehbein *et al.* 2020).

In the absence of proper institutional and policy frameworks, prospected industrial development may have detrimental effects on the environment. Therefore, it is vital to have functional institutional frameworks and policies to implement effective mitigation and adaptation strategies to deal with biodiversity loss (Chirambo, 2016). Most developed governments, international financial institutions and global businesses have sound institutional frameworks and enforce a no-net-loss of biodiversity policy for new development activities (Griffiths *et al.* 2019). However, most African institutions are not well equipped, which puts Africa's biodiversity at risk. Many unsustainable projects are approved without proper assessment, and monitoring is unrealistic in the absence of appropriate frameworks (Brownlie *et al.* 2017).

To achieve no-net-loss, residual impacts (losses) of developmental activities in one location are, in most cases, compensated with gains realised in another area, commonly known as biodiversity offsetting (Griffiths *et al.* 2019; Guillet & Semal, 2018; Phalan *et al.* 2018). In simple terms, biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development and persisting after appropriate avoidance, minimization and restoration measures have been taken (BBOP, 2009; IFC, 2013). The approach links conservation with industry and provides improved ecological outcomes with development (Bull *et al.* 2019; Buschke, 2017). It is also argued that the use of offsets increases the chances of failure to restore since the promise of effective restoration may increase the likelihood that damage to biodiversity is permitted (Maron *et al.* 2012). Therefore, it is essential to have frameworks in place, to define goals, set the hierarchy and inform the implementation of the offsets.

Offsets should ordinarily come as the last step on the mitigation hierarchy (Bigard *et al.* 2017; World Bank Group, 2016) after avoidance, minimisation, and onsite rehabilitation have been done (BBOP, 2009; Bigard *et al.* 2017; Brownlie *et al.* 2013). Ideally, offsets should result in net gain and not simply a no-net-loss scenario (Guillet & Semal, 2018). When off-setting, a similar landscape to the one disturbed should be created as an offset or preferably a habitat with higher conservation priority than the affected is set aside (IFC, 2013). Biodiversity offsets are mainly used where the environmental impact assessment detects negative or undesirable residual impacts of medium or high significance on the inherent use or cultural values of biodiversity (Botha *et al.* 2013; Von Hase & Ten Kate, 2017). Based on most policies and frameworks, activities with low environmental impacts do not require offsetting and practices with significant and harmful impacts should not be authorized (Kiesecker *et al.* 2009; World Bank Group, 2016).

Interest in biodiversity offsetting is growing worldwide with both governments and the private sector involved. Several International Finance Institutions (IFIs) are investing globally in sectors such as waste management, green development, eco-tourism and renewable energy. These institutions are governed by internationally accepted standards like International Finance Corporation (IFC) Performance Standards, which encourages sustainable development (IFC, 2013). International Finance Institutions often have effective institutional frameworks to implement and enforce the offsets.

In South Africa, biodiversity offsets conform to the important and pivotal polluter-pays principle of the National Environmental Management Act (NEMA) (Brownlie, 2007). This entails that those who cause damage to the environment are held accountable for their actions and are required to compensate. It has been at least a decade since biodiversity offsets have been used in South Africa, but without a formal regulatory policy (Botha *et al.* 2013). Different provinces and organizations in South Africa have come up with offset guidelines specific to their respective provinces and organizations. In 2007 the Western Cape Province came up with provincial guidelines on biodiversity offsets, and in 2013 the KwaZulu Natal Conservancy Agency came

up with wildlife biodiversity offset guidelines. The Department of Water Affairs then developed draft guidelines for wetland offsets in 2014 (de Klerk *et al.* 2016). Like other international institutions, South Africa has also embarked on a journey to develop a National Biodiversity Offset Policy as the Department of Environmental Affairs released one for public comments in March 2017 (Lukey *et al.* 2017). Regardless of all these initiatives, South Africa still has challenges that need to be addressed to ensure the success of biodiversity offsets in the country.

1.2 THEMATIC CONSIDERATION

South Africa is the third most biologically diverse country in the world and an emerging economy with ambitious development plans (Cadman, 2010). It hosts some globally unique habitats, and plant and animal species, which are at high risk of extinction should developmental projects continue without proper management (Brownlie & Botha, 2009). The energy, mining, agriculture, and infrastructure sectors have attracted a lot of attention from foreign investors, making these the country's leading causes of biodiversity loss (Sandham *et al.* 2008; Virah-Sawmy *et al.* 2014; Miller & Keith, 2018). Developments in these sectors pose risks to the country's biodiversity. Strong and functional legislation is required to protect the country's biodiversity, including the biodiversity offsetting policy.

Although South Africa has developed a draft National Policy on biodiversity offsets, the policy is still not comprehensive to allow practical application. According to Brownlie *et al.* (2017), the inconsistencies in offsetting approaches are primarily caused by the absence of an explicit national biodiversity offset policy. Although provisions for biodiversity offsetting are given in several pieces of legislation, there still lacks coherence within legislation and institutions that govern them. For South Africa to develop a comprehensive offsetting agenda, institutions, policies and strategies must be aligned one with another to create a holistic approach to biodiversity offsetting. Special care must be given to ensure that biodiversity offsetting

legislation informs policies and procedures in key sectors like energy, mining, agriculture and infrastructure, which contribute to biodiversity loss. In addition, the Land Reform Act is critical in ensuring the success of biodiversity offsets in the country, therefore it should be aligned with the offsetting policy. Given the above observations, the study investigated the comprehensive institutional and legislative systems that can promote biodiversity offsetting in South Africa.

1.2.1 RESEARCH QUESTIONS.

Given the above considerations, the following research questions will guide the research:

- (i) What institutional and policy frameworks and legislative structures exist within which biodiversity offsetting can be pursued in South Africa?
- (ii) What obstacles and prospects exist that may either facilitate or hamper sustainable development using biodiversity offsets?
- (iii) How do local and international frameworks compare with regards to offset policy goals and their approach to the mitigation processes?

1.3 RESEARCH AIMS AND OBJECTIVES.

This study aimed to investigate how the biodiversity offsetting process can be improved to ensure sustainable development in South Africa. Using institutional and policy frameworks, the study was specifically interested in investigating what approaches and systems can be formulated, adopted and implemented to promote biodiversity offsetting.

Given this, the following were the research objectives;

- (i) To determine the current challenges and barriers that make it difficult to develop an effective biodiversity offsetting strategy in South Africa.

- (ii) To analyse how the current legislative systems impair or promote the development of effective biodiversity offsetting strategies.
- (iii) To determine a comprehensive approach and strategy to establish an effective biodiversity offsetting system.

1.4 ETHICAL CONSIDERATIONS.

According to (1990), it is important to ensure that the participants' feelings, welfare, and rights are protected through ethical considerations for research that involves interviewing people. In addition, Best & Kahn (2006) emphasised that ethical considerations have to be made to conduct effective and meaningful research. The researcher obtained ethics clearance from the Human Research Ethics Committee (Non-Medical) of the University of Witwatersrand in an Ethic Clearance letter dated: 25 November 2020 with protocol number H20/10/19, with a minimal risk level.

Full compliance to the requirements of the ethics clearance was ensured by the researcher, including guaranteeing the privacy and anonymity of participants. The participant information sheet detailing the purpose of the research, its risks and benefits, and a consent form were made available to the participant. The researcher also adhered to ethical requirements such as avoiding discriminatory, offensive or improper language in framing the interview questions. No data were misrepresented and all literature used were referenced.

1.5 STRUCTURE OF THE DISSERTATION.

This research report is structured in the following way: The first chapter introduces and conceptualises the research. Chapter two of the report gives an overview of the literature and theoretical considerations relevant to the topic. Gaps in literature are also discussed under the same chapter in the last section. The research's literature and theoretical considerations section critically engages with both the historical and contemporary literature related

to the current study. It is divided into three different sub-sections: the global perspective, Sub-Saharan and South African perspective. Research methodology is discussed in chapter three, outlining the research positionality, data collection tools and data analysis criteria. Chapter four presents the research results, outlining them without discussing or interpreting them. The research findings are then analysed, interpreted and discussed in chapter five, giving a clear outline of the significance of the results. The research summary, conclusion, and recommendations for further study are outlined in chapter six, the last chapter of the research report.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL CONSIDERATIONS

2.1 CONCEPTUAL FRAMEWORK ON BIODIVERSITY OFFSETS.

To guide and standardise the implementation of biodiversity offsets, offset guiding principles have been set up. These are international principles designed to guide the process of designing and implementing biodiversity offset and verifying their success (BBOP, 2012; IFC, 2013). The principles include (i) adherence to the mitigation hierarchy (i.e. avoidance, minimisation, on-site rehabilitation then offset), (ii) no net loss with the preferred outcome being net gain, (iii) limits to what can be offset, (iv) landscape context, (v) additional conservation outcomes, (vi) stakeholder participation, (vii) equity (meaning fairness should be exercised in sharing responsibilities, risks and rewards with all stakeholders throughout the project cycle) and (viii) long-term outcomes (BBOP, 2012; IUCN, 2012; Von Hase & Ten Kate, 2017).

Adherence to the mitigation hierarchy emphasises avoidance, minimisation, and on-site rehabilitation before considering an offset (IFC, 2013). This entails that every project should anticipate and prevent both environmental and social impacts. Impacts can be avoided by considering options in using different technology, location or scale. However, avoiding impacts can mean terminating the project, which is not always possible (Maron et al. 2016; Bull et al. 2019). The impacts that cannot be avoided are then minimised. This can be done by considering alternatives like cutting the impacts' duration, intensity, and significance (World Bank Group, 2016; Von Hase & Ten Kate, 2017). Through rehabilitation, efforts to return impacted areas close to their initial state are made. After avoidance, minimisation and rehabilitation, an offset can be considered to compensate for residual impacts.

Limits to what can be offset- biodiversity offsets are by definition used to compensate for residual negative impacts on biodiversity (ICMM & IUCN,

2012; IFC, 2013). However, there are cases where the residual impacts are impossible to compensate, for example, when irreplaceable or vulnerable biodiversity is impacted. For instance, impacts that can lead to extinction locally or internationally cannot be replaced or compensated (IFC, 2013). Deliberations on what can or cannot be offset require a thorough consideration of ecological, social, financial and legal factors. It also entails paying attention to other guiding principles like adherence to the mitigation hierarchy, no net loss, long term outcomes, stakeholder participation and landscape context to have a complete picture of the impacts (BBOP, 2012).

The implementation of offsets also has to involve all relevant stakeholders. Stakeholder participation is key in identifying and addressing all impacts caused by a project (IFC, 2013). It also allows for proper identification of social impacts which include recognising project affected people or affected communities, the extent and intensity of the effects. Not only should affected people or communities be identified, but they should participate in decision making on matters that affect them (World Bank, 2016; World Bank Group, 2017). How they are and will be affected by a project and its offset should be thoroughly examined.

Ensuring long term outcomes of biodiversity offsets is also crucial, as they should last in perpetuity (BBOP, 2009). This principle is hinged on all other principles as the outcome of an offset is determined by how detailed was the impact assessment, including whether the impact identification phase involved all relevant stakeholders. It is also influenced by how thorough was the implementation of the mitigation hierarchy, for example whether or not ways to avoid impacts were exhausted (Brownlie *et al.* 2017). Long term offset outcomes are also a product of management and monitoring (Bull *et al.* 2017). Offsets implementation should be monitored for compliance and managed afterwards to ensure that they are achieving what they are supposed to.

Additionally, IFC Performance Standards on Environmental and Social Sustainability, World Bank Environmental and Social Standards and the Business, Biodiversity Offsets Programme (BBOP) Principles on Biodiversity Offsets and the Convention on Biological Diversity have guided the design and

implementation of offsets at an international level, especially in the private sector. These guiding principles and international standards are also the basis through which environmental laws and offsetting policies have been established in many countries worldwide.

2.2 GLOBAL PERSPECTIVE ON BIODIVERSITY OFFSETS.

The use of biodiversity offsets is increasing around the world, with variations from place to place. However, their effectiveness in facilitating sustainable development is questioned (Primmer *et al.* 2019). There is still massive resistance to offsets globally, partly due to a lack of convincing information that supports offsets in literature and inadequate noticeable evidence of successful offsets, among other things. Some countries have established laws to govern the implementation of offsets, however, some are still operating voluntarily (BBOP, 2009; Simmonds *et al.* 2019). According to the Convention on Biological Diversity (CBD), offsetting has been made a legal requirement by about two-thirds of the countries in the world. This comes through policies, procedures and environmental impact assessment legislation. The majority of these are developed countries. Therefore, it is essential to analyse current practices, learn from past mistakes, and strengthen the understanding of biodiversity offset policies going forward (Sonter *et al.* 2018).

Developed countries are generally more advanced in biodiversity offsetting. However, due to disputes in understanding offsets beginning from the very definition of no-net-loss to more complex issues, the way offsets are implemented still varies (Von Hase & Ten Kate, 2017). In Europe, the offsetting goals often extend beyond biodiversity alone, with countries like Germany and France mitigating impacts on cultural landscapes and ecosystem services, respectively (McKenney & Kiesecker, 2010). Goals like these are not shared outside of Europe, although interest is building worldwide (Jones & Schmitz, 2009; Sonter *et al.* 2018).

The United States of America (USA) introduced stringent rules for regulating offsets implementation (McKenney & Kiesecker, 2010; Maron *et al.* 2012; Von

Hase & Ten Kate, 2017), as embedded in Section 404 of the Clean Water Act. For example, the need for wetland offsets to be permanent when the remuneration action is preservation alone, and for restoration or establishment actions, the offsets should be self-sustaining (Hough & Robertson, 2009). Provision to compensate for endangered species where impacts are inevitable is also given in the Endangered Species Act in the USA (Von Hase & Ten Kate, 2017).

Furthermore, the regulations specify the need for the responsible parties to maintain and manage the offsets in the long term and provide the required finances. The frameworks are in consensus on several management and compliance measures, including the need for management plans, performance standards, securing site tenure, restricting harmful activities, monitoring, legal and financial assurances, adaptive management, and contingency and remedial actions in the event of offset failure (McKenney & Kiesecker, 2010).

A legal framework is provided in Australia under the Environmental Protection and Biodiversity Conservation Act 1999 (Act No 91 of 1999). It gives guidance on protecting and managing flora and fauna, places of heritage and ecological communities. Additionally, under this framework, project approvals require a well-documented compensation plan. Different states have legislation that facilitates offsets, giving provisions for compensation measures, for example, the Western Australia- Environmental Protection Act 1986 (Act No. 087 of 1986), New South Wales- Native Vegetation Act 2003 (Act No 103 of 2003), Victoria- Planning and Environmental Act 1987 (Act No 45 of 1987, amended 2004)). The Australian Threatened Species Conservation Act of 1995 also has offset banking systems framed and regulated.

The use of compensation funds seems to be common in the developed world. In China, the national regulatory program emphasises adherence to the mitigation hierarchy of avoiding and minimising impacts on land zoned for forestry. For any residual impacts, the developers are required to pay into a Forest Vegetation Restoration Fee Program. Columbia also, requires compensation for biodiversity loss due to development projects through

reforestation or payment into the reforestation fund. These requirements are embedded in the National legislation Decreto 1753 of 1994 of Columbia. A similar concept is followed in Mexico and Brazil. In Brazil, besides requirements for developers to compensate through providing money to the Protected Area Network, there is also another mechanism where landowners are required to leave part of their land undisturbed (Von Hase & Ten Kate, 2017). Otherwise, they offset through purchasing additional land if they choose to develop the entire land. Similarly, in Mexico, compensation is through paying into the Biodiversity Restoration and Preservation Fund if the developers fail to restore on their own (Vaissière *et al.* 2017).

It is evident that biodiversity offsets are widely recognised in the international fora to counterbalance economic development impacts (ten Kate *et al.* 2004; Bull *et al.* 2013; Sonter *et al.* 2020). Several organisations have also rallied behind offsets, increasing awareness and supporting researches to understand offsets better. The aim is to realise the potential ecological improvements alongside development (Bull *et al.* 2013; Bull *et al.* 2017). Despite the variations in how offsets are implemented, it is important to note that the goal is the same: to achieve no-net-loss or, preferably net gain for biodiversity.

Organisations like Business and Biodiversity Offsets Program (BBOP), International Union for Conservation of Nature (IUCN), the International Council on Mining and Metals (ICMM) and conventions like the Convention on Biological Diversity (CBD) spearheaded the introduction of biodiversity offsets in the international arena around 2004. These organisations have proposed offset best practices, including a list of 10 guiding principles for designing and implementing biodiversity offsets. They continue to push and support the utilisation of biodiversity offsets around the world.

However, the USA and Germany were the first countries to have biodiversity offset legislations in the 1980s. The no-net-loss slogan was popularised by the USA former president George H.W. Bush during his presidential campaign in 1988. He emphasised the need to conserve nature for future generations through protecting species and wetlands, ensuring a no-net-loss. This

resulted in adopting the ‘no-net-loss’ of wetlands goal by the USA (Boisvert, 2015). His words are famous even to date, and they gave birth to the early recognition of biodiversity offsets in the USA.

Furthermore, set targets by conventions such as the CBD’s goal to reverse biodiversity loss by the year 2020 have also contributed to the recognition of biodiversity offsets, as discussions to achieve such targets involve biodiversity offsets. The Ramsar Convention on Wetlands also encouraged the adoption of biodiversity offsets by decision-makers during its Conference of Parties (COP) in 2008. The IUCN has also recently published a policy on biodiversity offsets which is discussed on international platforms. These organisations are fundamental as they influence countries that are signatory to the conventions (ten Kate *et al.* 2004).

Additionally, International Finance Institutions (IFIs) are also putting sustainable development at the forefront by enforcing that all projects they fund must be sustainable (IFC, 2013). For instance, the International Finance Corporation, an IFI that offers investment, advisory, and asset management services to encourage private sector development in developing countries, expresses a pledge to sustainable development (IFC, 2013; Von Hase & Ten Kate, 2017). The institution is guided by the International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability, which emphasises environmental and social sustainability. IFC (2013) states that clients of businesses that follow the IFC Performance Standards must integrate a strong, adequately designed, and long-term biodiversity monitoring and evaluation plan into their management programs. Of particular relevance to biodiversity offsetting is the IFC Performance Standard 6 (IFCPS6), which focuses on biodiversity conservation and sustainable management of living natural resources (IFC, 2013). The mitigation hierarchy is emphasised in the performance standards, advocating for avoiding impacts rather than minimising and emphasising offsetting the residual negative impacts (McKenney & Kiesecker, 2010). This is done after a thorough impact assessment that considers biodiversity and ecosystem services and social impacts, all of which will be considered when designing an

offsetting strategy. With such stringent requirements from investors, companies are forced to comply to secure funding for their projects.

Discussions on biodiversity offsets by financial institutions are also increasing and engaging the international audience. For example, the World Bank held the Inspection Panel virtual discussion on ‘the challenges of implementing biodiversity offsets in development’ on the 20th of May 2020, with the World Bank Executive Director Anne Kabagambe. It involved different panellists with expertise in offsetting, Environmental Impact Assessments (EIA) and business to enrich the audience on the topic. Such programs are informative and bring practical information from the people involved in the actual offsetting process.

Different scholars have also conducted research similar to the present study on offsets, thereby contributing information and guidance to the academic world and lawmakers. Many of the research undertaken covers the developed world, especially countries in America, Australia and Europe. Despite all this, knowledge gaps remain, requiring further in-depth research to ensure more successful offsetting stories.

Despite the popularity of biodiversity offsets globally, numerous criticisms exist, especially regarding offset design, accounting, governance and compliance (Maron *et al.* 2016; Vaissière *et al.* 2017). According to (2015), there are two types of critics to biodiversity offsetting: the reformists and the radical critics. The reformists are against biodiversity offsets because of the perceived risks that come with them, including under-reporting of failed offsets, lack of monitoring, and the risk of developers not adhering to the mitigation hierarchy, among other things (Souza *et al.* 2021). The second group, which is the radical critics, are against the ‘commodification of nature.’ They argue that biodiversity offsetting is not an opportunity for conservation but rather for business, and only a few elites benefit from it (Boisvert, 2015).

Some scholars argue that offsets are merely a license to trash the environment (Martinson, 2014; Lukey *et al.* 2017). It is argued that the main agenda for developers is to make money and environmental conservation is usually a tick box exercise that prevents environmental activists from rallying behind them.

To concur, Kiesecker *et al.* (2010) emphasise how offsets exchange certain losses for uncertain gains. In addition (Kiesecker *et al.* 2009; Kiesecker *et al.* 2010; Maron *et al.* 2012) reiterate the uncertainty of having a successful restoration project because restoration takes time to manifest. McKenney & Kiesecker (2010) add that poorly designed and supervised offsetting strategies lead to biodiversity loss instead of gains.

Furthermore, there is limited evidence on successful offsets to prove that they achieve their intended outcomes (Simmonds *et al.* 2019). The same deduction was reached by the Austrian Senate Environment and Communications References Committee in 2014. This lack of evidence is one of the biggest causes of resistance to offsets, as there is no practical evidence to show for the theoretical success that is claimed. Like Australia, the USA is an early adopter of biodiversity offsets and does not have any proof of successful compensation plans with its species banking program (Bunn *et al.* 2014). McKenney & Kiesecker (2010) argue that it is, therefore, difficult to rely on offsets as a compensation measure for biodiversity loss. Given this, the need for a global offset register is inevitable as this would be a good reference point for all offsets that have been implemented. Such a register should be up to date, transparent and accurate to aid the success of offsetting in the world.

Other offset critics argue that some ecosystems are irreplaceable (Bull *et al.* 2013; Moreno-Mateos *et al.* 2015). Therefore, not everything that is lost can be compensated. This means that the definition of no-net-loss can be misplaced or abused. For example, peat wetlands are developed over geological time and mature forests that grow over hundreds of years; restoration to complete functionality for such is impossible (Botkin *et al.* 2007). Therefore, offsetting biodiversity loss to full 'no-net-loss' is usually uncertain, and often the outcomes are fully reckoned when the project impacts have already been realised.

Biodiversity is complex, consisting of hierarchical levels of organisation from genes to ecosystems (ten Kate *et al.* 2004; Bull *et al.* 2013). These levels interact within and between levels and have temporal and spatial variations making biodiversity a complex entity. This complexity makes it difficult to

determine the biodiversity loss and compensate for it as it is hard to fully capture the extent of biodiversity loss (Bull *et al.* 2013; Bull *et al.* 2017; Simmonds *et al.* 2020). To put into perspective, Margules & Pressey (2000) indicate that to fully compensate for biodiversity loss, species genetic diversity, ecosystem viability and functioning, effects of dispersal, and habitat requirements of the species must be considered.

In examining the biodiversity offsetting mechanisms, Calvet *et al.* (2015) highlight the significance of institutional and policy frameworks in ensuring good performance. Where imprecise rules are set and weak institutions enforce the biodiversity offsetting strategy, this leads to implementation failures (Gordon *et al.* 2015). Calvet *et al.* (2015) add that flexibility is needed to adjust to unpredicted events resulting from environmental factors. Quétier *et al.* (2014) stress that the lack of proper guidance on implementing the mitigation hierarchy sequence of avoidance, minimization, rehabilitation, and then offsetting in offset frameworks motivates offset failures. The discretion to decide the sequence is left to regulatory authorities resulting in inconsistencies (McKenney & Kiesecker, 2010). To promote positive attitudes towards the adoption of offsets, more effective policy frameworks must be put in place, with guidance on implementation, management, and monitoring of offsets (Maron *et al.* 2012).

Quétier *et al.* (2014) likewise acknowledge that biodiversity offsets are in their infancy and require further scientific research and proper monitoring of the identified problems. However, there is still a need to balance economic benefits with biodiversity conservation to promote sustainable development. This necessitates the need to resolve issues around offsets to ensure that they supply sustainable conservation gains on the ground to catch up with the stated theoretical benefits in literature, as they are attracting governments, companies and the financial communities (Maron *et al.* 2016).

In light of the above arguments, it is evident that the developed countries are progressing well in facilitating biodiversity offsets. Although many challenges have been identified, it is thought that with adequate research and time, biodiversity offsetting will prove to be a useful tool in compensating for

biodiversity loss. The following sections discuss the perspectives on Sub-Saharan Africa and then South Africa in detail.

2.3 BIODIVERSITY OFFSET IN THE SUB-SAHARAN AFRICA.

Biodiversity offsets in Sub-Saharan Africa have mainly been done voluntarily or as a response to the mandate of international finance institutions when companies are seeking funding (Kormos *et al.* 2014; Brownlie *et al.* 2017). For example, countries like Madagascar, Kenya, Mongolia, Uzbekistan and Uganda have had project-specific offsetting programs in the energy and mining sectors (BBOP, 2012). Some of these projects were funded by the IFC and hence had to follow the IFC Performance Standards, which require compensation for biodiversity loss. In a research done by the Biodiversity Consultancy, the greater part of Sub-Saharan Africa (hereafter Africa) do not have provisions for biodiversity offsetting (ICMM & IUCN, 2012) in their legislation.

The offsetting concepts are fairly new in Africa, as compared to the developed countries. It was only a decade ago that biodiversity offsetting issues started being discussed in the region. Therefore, some of the problems facing the developed countries are only but magnified in Africa. It is not clear how many offsetting projects have been implemented in Africa due to lack of reporting and absence of offset registers Brownlie *et al.* (2017). This seems to be a global problem that needs to be fixed to improve the offsetting process. In addition to this are issues associated with adhering to the mitigation hierarchy. Research has shown that offsets are being used as the escape route before even impacts are avoided or minimised (Kormos *et al.* 2014; Maron *et al.* 2020; Rehbein *et al.* 2020).

In 2014 Kormos *et al.* (2014) investigated four projects in Sub-Saharan Africa where private sector projects impacted great apes and their habitat. Hence, the developers were seeking to compensate for these impacts using offsets. The projects were; (1) the Bumbuna Hydroelectric Project (BHP) in Sierra Leone (2) the Global Alumina Project (GAP) in the Republic of Guinea, (3) the

Lom Pangar Dam in Cameroon, and (4) the Simandou Project in the Republic of Guinea. In each of these projects, either IFC or the World Bank was one of the investors. To investigate, the researchers measured the projects against six of the BBOP Principles, namely (1) no-net-loss, (2) adherence to mitigation hierarchy, (3) limits to what can be offset, (4) long-term outcomes, (5) additional conservation outcomes and (6) landscape context. This research showed that the level at which international best practices are employed is varied. They also established that some of the projects only implemented the mitigation hierarchy after they had already selected their sites or when some infrastructure had already been built. As a result, there were more residual impacts to be offset since the option to avoid and minimise impacts was not prioritised. Cumulative effects were not fully accounted for as the impacts of other companies operating in the same area were not considered.

These results by Kormos *et al.* (2014) represent the practical side of offset implementation in Africa. In this case, offset guidelines were explicit on paper as international best practice guides were used, but shortcuts were taken when it came to the actual implementation of the guidelines. The projects went ahead despite impacting the great apes listed as critically endangered species under the IUCN Red List and their habitats as critical habitats. This resonates with the concerns raised by Rehbein *et al.* (2020) when they pointed out that many important conservation areas will be lost in the future as African countries pursue aggressive development agendas, with economic growth almost always overriding environmental issues. As Africa is faced with socio-economic issues (Snyman, 2014), priority is inevitably given to deal with such matters (Kleemann *et al.* 2017). According to Rehbein *et al.* (2020), approximately a third of operational renewable energy facilities are located within important conservation areas in Africa and the Middle East. As a result, the conservation assets contained in Africa are exposed and more vulnerable (Vitousek *et al.* 2008).

With the drive to move to renewable energy, which is cleaner and more environmentally friendly, IFC and the World Bank, and other private companies are investing in renewable energy projects in countries like

Zambia, Mozambique, South Africa and Namibia. In South Africa, they have initiated the Renewable Energy Independent Power Producer Procurement Programme (REIPPP) to promote renewable energy projects. Big projects like these tend to destroy large biodiversity areas and habitats, driving populations of endangered and critically endangered flora and fauna species to local extinction. Disturbance on heritage sites and community areas are inevitable in such instances and should be considered when implementing the mitigation hierarchy and when calculating residual impacts.

Due to the lack of robust institutional and policy frameworks in most African countries, biodiversity conservation objectives are not explicitly accounted for (Berkeley & Cancer, 2010). According to Rehbein *et al.* (2020), the International Renewable Energy Agency is identifying zones for a continent-wide energy corridor across Africa without prioritising biodiversity outcomes. Africa, therefore, needs to put proper policies and frameworks in place to govern the implementation of the proposed projects and to safeguard its biodiversity taking into account the prevailing political, socioeconomic and institutional context if the introduction of biodiversity offsets is to be effective (Brownlie & Botha, 2009).

The prevailing socio-economic issues include power shortages, high unemployment rates, low incomes, poor infrastructure and poor medical facilities (Karekezi & Kimani, 2002; Tabuti *et al.* 2003). Most rural areas in Africa have no electricity. About 90% of Africa's power comes from coal-fired power stations, yet these are deemed unsustainable to the environment (Karekezi & Kimani, 2002). Most rural areas in Africa depend on firewood as a source of energy for cooking and lighting (Tabuti *et al.* 2003). Hence, people rely heavily on the natural environment for survival. It is also possibly the only region with the most significant number of people co-existing with wildlife, and some people even live within protected areas. The harvesting of fruits, firewood, medicine and even building material from the forests is widespread and inevitable. A large number of rural society depends on natural resources for livelihood. Therefore, land and resources tenure is a huge issue

in the region, which needs to be understood and considered for offsetting projects to be successful. As a result, there is a strong link between poverty and environmental degradation in Africa (Maitima *et al.* 2009; Zenteno *et al.* 2013; Secretariat of the Convention on Biological Diversity, 2016).

Africa's population is also growing tremendously, putting more pressure on natural resources (World Bank, 2006). Africa has been reduced to a mere state dependent on foreign aid due to the low resources to human ratios, especially in the rural areas. These issues, coupled with poor governance, natural disasters, inequality, gender-based issues, and corruption, take away from proper management of the environment. Social-economic issues tend to get more financial and human resources than environmental issues (Maitima *et al.* 2009). Environmental activists are usually seen as a nuisance by the general public. Unless Africa's socio-economic problems, which are a priority to the continent, are dealt with, environmental degradation will remain inevitable (Jha & Whalley, 2015). There is, therefore, a need for awareness campaigns championed to educate people on the importance of conserving nature aimed to facilitate a paradigm shift if biodiversity conservation should ever be prioritised in Africa. The researcher takes a closer look at South Africa in the following section 2.4.

2.4 THE CASE STUDY OF SOUTH AFRICA.

South Africa is a biodiversity-rich country cited among the top five biologically diverse countries globally (Brownlie & Botha, 2009). It contains pockets of globally unique biodiversity, with some of this being endemic. Three of the 34 global biodiversity hotspots are found in South Africa. At the same time, biodiversity offsetting has been ongoing for over a decade without formal stipulated regulations. There is no provision in the South African law for biodiversity offsets specifically, neither are they mandatory (McKenney & Kiesecker, 2010; Brownlie *et al.* 2017). This situation is not ideal for a developing country with the vast biodiversity it contains. Without careful planning, sound policies and proper institutional frameworks, offsetting services may negatively affect biodiversity (Sonter *et al.* 2020).

The issues surrounding policy and biodiversity offsetting have been well researched and documented in the past (McKenney & Kiesecker, 2010; Brownlie *et al.* 2017; Lukey *et al.* 2017; Von Hase & Ten Kate, 2017; Bull *et al.* 2019), leading to so many standards and guidelines being developed to guide the offsetting process both locally and internationally. South Africa has made provisions in its legislation for biodiversity loss to be compensated in the form of biodiversity offsets. However, no legislation is solely directed to biodiversity offsetting, as the biodiversity offset policy still hasn't been officialised, hence not enforceable. Currently, South Africa's biodiversity is managed by the National Department of Forestry, Fisheries, and Environment (DFFE), being governed by the National Environmental Management Act of South Africa (NEMA, 1998) (Brownlie *et al.* 2017). It is this department that allocates operational responsibility to different provincial departments. The inclusion of biodiversity offsets as a condition for authorisation is also penned down in the National Environmental Management Act of South Africa (NEMA, 1998). Other laws that support biodiversity conservation or offsets include the Protected Areas Act (2003) and the Biodiversity Act (2004).

Programs that encourage private landowners to conserve biodiversity in exchange for tax incentives and rate relief are also available (Brownlie *et al.* 2017). These pieces of legislation have allowed for a case-by-case stipulation of offsets as conditions for environmental authorisation. Efforts to produce the biodiversity offset policy have been made with the first draft produced in 2012 and the second one in 2017 but has not been officialised yet. However, to come up with effective policies, some difficult questions must be asked. There is a need to clearly define what counts as offsets, how they should be implemented and where, their duration and issues of management and monitoring responsibilities, and what needs to be done when they fail (McKenney & Kiesecker, 2010).

In addition, efforts have been made to promote the management and protection of biodiversity. Different programs are dedicated to assessing the country's biological diversity, its status, threats and how it can be protected. An example is the National Biodiversity Assessment (NBA), which is the

primary tool for biodiversity assessment in the country that is facilitated by the South African National Biodiversity Institute (SANBI) in collaboration with several institutions under the Department of Forestry, Fisheries and Environment (DFFE). The framework currently forms the basis of informing the status of the biodiversity in the country, including mapping of protected areas. They produce detailed reports that are publicly available. For example, according to the latest version of the National Biodiversity Assessment (NBA) released in 2019, estuaries and inland wetland ecosystem types are more threatened than other ecosystems. These are naturally diverse ecosystems that might be targeted for development projects if they are not protected. Still, these ecosystems are the least protected (Skowno *et al.* 2019). These assessments are great tools for reporting the state of biodiversity in the country. However, the information only makes a difference when it is utilised in shaping policies and making decisions in favour of the environment.

The South African situation has the potential of offsets becoming political negotiating tools in the absence of an overarching offset policy (Brownlie *et al.* 2017). According to (Brownlie *et al.* 2017; Buschke *et al.* 2019), this primarily affects the mining and public infrastructure industries. The mitigation hierarchy can be intentionally ignored, and biodiversity loss is neglected when the legislation is not comprehensive. While biodiversity offsetting has started to be introduced in environmental legislation, the design of current policy frameworks does not meet expectations because there remain institutional and organizational challenges (Brownlie *et al.* 2017). For example, at the current state, the Department of Mineral Resources (DMR) now facilitates the implementation of NEMA when it relates to mining projects. This arrangement has been criticised for potential conflict of interest (Brownlie & Botha, 2009; Buschke *et al.* 2019). Sonter (2018) encourages the review of offset frameworks, especially in places where biodiversity loss is accelerating, and compensation policies are increasing both in number and complexity.

The introduction of comprehensive biodiversity offsetting policy in South Africa is, therefore, critical. According to Maron *et al.* (2012), the success of offsets is guided by all-encompassing regulations that integrate active

adaptive management, time discounting and clear accounting for uncertainty. The policy should then be supported by a solid governing institution that enforces its requirements (Brownlie & Botha, 2009; Hahn & Richards, 2013). Although an offset policy is long overdue, it is equally important to allow time for it to be tailor-made to suit the local context.

Besides the absence of a comprehensive offset policy, South Africa is faced with other offsetting challenges. These challenges span from design through to the realisation of the offset outcome. They include a lack of clarity on legislation, non-adherence to the mitigation hierarchy and issues of poverty, among other things. The clarity in the legislation is one of the key requirements for comprehensive and useable guidelines. According to BBOP (2012), a developer is responsible for the offset for at least the duration of residual negative impacts on biodiversity. This notion is mirrored in the draft National Biodiversity Offset Policy of South Africa. However, there is no clarity on what happens after this period passes. According to (Brownlie *et al.* 2017), a situation like this where there is no clarity on institutional and financial provisions when the duration of residual negative impacts ends creates loopholes in the system (Brownlie *et al.* 2017). It is a vehicle that can lead to the failure of many offset projects as these projects are abandoned after the stipulated time lapse. No one is held liable by law as it is not specified in the legislation.

It is critical for the success of biodiversity offsets that they are well integrated into the Environmental Impact Assessment (EIA) process. According to Brownlie *et al.* (2017), in the South African context, poor integration of offsets into the EIA process and poor impact assessment are some of the biodiversity offsetting challenges. The success of a biodiversity offset depends on how thorough an EIA is done (Bigard *et al.* 2017). The incorporation of biodiversity offsets into the EIA is increasingly being done with the emphasis being placed on offsets as a last resort in the mitigation hierarchy after avoidance, minimisation and rehabilitation (Hayes & Morrison-Saunders, 2007; Nadeem & Hameed, 2008; George *et al.* 2020; Simmonds *et al.* 2020). The success of offsets depends largely on the success of the EIA as a whole, and this is

because the EIA helps to determine the baselines against which loss and gain can be measured (George *et al.* 2020). Bigard *et al.* (2017) add that only impacts that have been identified can be offset. Hence, if the impact assessment process is poorly done, the effect translates to the offsets too. However, it should be noted that not all projects with an EIA require an offset. According to the law, projects with minimum residual impacts do not require an offset, but those with medium and high residual impact rankings must be compliant (Weaver *et al.* 2008).

In addition, de Witt *et al.* (2019) express the timing of biodiversity offset considerations in the EIA process as an additional challenge. This is because the timing has implications for the success of the offset. Offset study can be done when a project commences (screening or scoping stages), or midway when impact assessment is done or after the EIA process has ended before the Environmental Impact Report (EIR) is written or at authorisation phase, after submission of EIR like in the case of the Construction of a water transfer system and dam in KwaZulu Natal Province (George *et al.* 2020). Therefore, the quality of an offset is as good as when the biodiversity offset study was done during the EIA process. An improperly done EIA process can result in biodiversity offsets being used to compensate for projects that should have been rejected, known as fatal flaws (Retief & Chabalala, 2009).

Having an offset study done after the EIA is finalised means specialists cannot significantly contribute to further avoidance, mitigation and minimisation measures. Some authors posit that it is crucial to involve specialists early on in the EIA process. When an offset study is done before approval for the EIA is given, authorities can know specific offset conditions and make informed decisions about the project. This allows for changes to the design and ensures proper adherence to the mitigation hierarchy (Bigard *et al.* 2017; Simmonds *et al.* 2019; George *et al.* 2020). As such, emphasis on projects subject to the mitigation hierarchy should be sealed by law and governed by a strong institution.

Poverty is another factor driving biodiversity loss in South Africa. South Africa is one of the countries with the highest number of poor communities

(Murombo, 2017). Many underprivileged people invade forests and land that lie idle to build shacks and establish their communities. This has been a problem countrywide, with land-use changes happening due to invasions. As a result, more land is degraded without being mitigated (Sandham *et al.* 2008; de Witt *et al.* 2019). Weak institutions, corruption and bad governance, have contributed to this crisis in this post-colonial era (Sandham *et al.* 2008; Murombo, 2017).

Additionally, there is serious depends on natural resources for livelihood, especially by the rural community (Murombo, 2017). From time past, humans and wildlife have been co-existing harmoniously in Africa. Different African traditions were used to safeguard natural resources, these included taboos and some places being named sacred. Due to colonialism, many of these traditions were lost. Hunting wild animals was seen as poaching as these places were designated protected areas that are only used for tourism purposes (Snyman, 2014). The eco-tourism industry has grown tremendously, and many people have been displaced from their homes, cultures and heritage in the process of expanding conservation areas.

Relocation programs were not always smooth, people did not always get full compensation, and sometimes there were no prior consultations with the people. Therefore, good or bad conservation programs are usually not welcomed by residents staying at the designated area because of the history and what continues to happen even to this day. The success of biodiversity offsets depends largely on how social issues are handled. Socio-economic issues are important as they have a bearing on how decisions for or against environmental conservation are made. The design of an offset, location and management should fully incorporate social issues to achieve its goals (Zhang *et al.* 2013). Ideally, aspects of economic development should alleviate poverty and profit communities affected by the project's impacts and the actual offset implementation process (Campion & Essel, 2013). Efforts to conserve and offset biodiversity loss should be merged with social issues to be relevant to the African context (Retief & Chabalala, 2009; George *et al.* 2020).

In conclusion, biodiversity offsetting should consider local issues and be tailored to speak to South African problems. Society plays a vital role in determining whether offsets will be a success story in the country or not. The three pillars of sustainable development, social, economic and environmental, must be balanced so that solving environmental problems does not lead to social crisis.

2.5 SUMMARY OF THEORETICAL CONSIDERATION AND LITERATURE REVIEW.

Biodiversity offsetting is a mechanism through which the responsibility for restoring and conserving biodiversity is placed on the party responsible for the biodiversity degradation, thereby strengthening the rights of those who benefit from the biodiversity (Primmer *et al.* 2019). Although some question the effectiveness of offsets, it is clear that the use of offsets is increasing worldwide, although there are variations in how biodiversity offsetting is done (Sonter, 2018).

The success of offsets depends on how well they are planned, executed, and located. According to Bull *et al.* (2013), for no-net-loss to be achieved, it is crucial to effectively implement and enforce offsets, as it is to appropriately design them. However, offsetting success can be varied (Ruiz-Jaen & Aide, 2005), with some offsetting projects succeeding in achieving some goals but not others. In Europe, the offsetting goals often extend beyond biodiversity *per se*. Countries like Germany and France mitigate impacts on cultural landscapes and ecosystem services respectively, (McKenney & Kiesecker, 2010), hence their measure of success on offsets is different to countries whose offsetting goals are separate from these.

Numerous criticisms exist against biodiversity offsetting, with some scholars arguing that offsets are merely a license to trash the environment. This is motivated by the lack of proper guidance in offset frameworks on how to critically implement the mitigation hierarchy sequence of avoidance, minimisation, rehabilitation and then offsetting (Quétier *et al.* 2014). To

safeguard against these concerns, more effective policy frameworks must be put in place, with guidance on implementation, management and the monitoring of offsets, governed by formal institutions (Maron *et al.* 2012).

In examining the biodiversity offsetting mechanisms, Calvet *et al.* (2015) highlighted the significance of the institutional and policy frameworks in ensuring good performance. They added that imprecise rules and weak institutions that enforce the biodiversity offsetting strategy lead to offsetting failure in practice; this is evident in the history of the United States of America's (US) legislation (Calvet *et al.* 2015). While biodiversity offsetting has begun to be introduced in environmental legislation, the design of current policy frameworks does not meet expectations because institutional and organisational challenges remain, especially in African countries (Brownlie *et al.* 2017).

In the African context, the main issues have to do with social, political and economic impacts. Most African countries are still developing, and economic growth tends to be prioritised over environmental issues, as many even think that environmental issues hinder the success of development projects. There is a strong link between poverty and environmental degradation in Africa (Biggs *et al.* 2008). Therefore, real issues affecting the continent must be considered as part of the biodiversity offsetting process. Africa, therefore, needs to put proper policies and frameworks in place to govern the implementation of the proposed projects and to safeguard its biodiversity considering the prevailing political, socioeconomic and institutional context if the introduction of biodiversity offsets is to be effective (Brownlie & Botha, 2009).

South Africa as a country has had biodiversity offsets done for a decade now without formal stipulated regulations. Without careful planning, proper policies, and frameworks, offsetting services may negatively affect biodiversity (Sonter *et al.* 2020). As such, the introduction of comprehensive biodiversity offsetting policy in South Africa is essential. The South African situation poses a threat to offsets becoming political negotiating tools if there are no clear requirements stipulated in the national policy, including limits to what can

be offset (Brownlie *et al.* 2017). Therefore, a country needs to have robust institutional and policy frameworks to inform the proper offsetting requirements that are aligned to international standards (Sonter, 2018).

2.6 CONTEXTUALISING THE GAPS IN KNOWLEDGE

Biodiversity offsetting is a relatively new concept introduced in the late 1980s (Boisvert, 2015), with America and Germany being the pioneers. Although there has been considerable progress in developing good biodiversity offsets practices and guidelines (e.g., BBOP 2012), more research is required to clarify, back up, or support issues like no-net-loss (i.e. what it means and how it can be achieved). The past decade has seen more research being conducted globally, with the greater percentage being in developed countries. Studies that have been done have covered the mitigation hierarchy, the challenges of offsetting, policy and offset metrics, among others.

Africa is still behind in carrying out academic studies and also in incorporating biodiversity offsets in environmental laws. The greater percentage of the African countries still doesn't have offset provisioning in their legislation (IUCN, The Biodiversity Consultancy, & IGF, 2018). There is a need for studies that focus on the receptiveness of biodiversity offsets in Africa to be carried out, as the perceptions of a nation have substantial implications on whether or not a country decides to include offsets in the environmental laws. A nation's perceptions also strongly influence the success or failure of biodiversity offsetting strategy.

Among the studies that have been done, research based on case studies has been minimal due to the absence of the offset registers both at global and national levels. The lack of an offset register is blamed on weak institutions (Gordon *et al.* 2015; Sonter *et al.* 2020) and imprecise policies (Brownlie & Botha, 2009; Brownlie *et al.* 2017). The absence of offset registers at global and national levels has made it difficult to understand offsets from a practical standpoint. Further study on offsets is required using more case studies to understand how offsets perform using actual cases. Additionally, the role

played by institutions in ensuring the successful implementation of biodiversity offsets has not yet been thoroughly researched. This has motivated the current study to investigate how the biodiversity offsetting process can be improved for sustainable development in South Africa using institutional and policy frameworks.

Furthermore, there is very limited information on the proper offset design and implementation in the literature. This has led to inconsistencies in the offsetting process (including even the management and monitoring of these offsets) worldwide and even within the South African context (Gardner *et al.* 2013; Brownlie *et al.* 2017). Another common challenge in literature is the lack of clear definitions and guidelines in legislation. Which phenomena brings confusion and results in implementation inconsistencies. The lack of formal institutions and comprehensive policies to guide the offsetting process is emphasised even globally. Imprecise rules and weak institutions that enforce the biodiversity offsetting strategy have been seen to lead to offsetting failures in practice (Brownlie *et al.* 2017).

CHAPTER THREE

METHODOLOGICAL CONSIDERATIONS

3.1 INTRODUCTION.

This study made use of the rapid appraisal of existing policy documents and literature review to collect data. Relevant academic literature for review was obtained from science databases such as Scopus, Web of Science, Google Scholar, Science Direct, Taylor and Francis Online and the Society for Conservation Biology. Policy documents relevant to the study were accessed from publicly available forums or through engaging with the specific organisational departments if they were not readily available on public forums.

Data was also collected through conducting semi-structured interviews with Industry experts such as conservationists, environmental scientists and environmental assessment practitioners (registered with EAPSA and SACNASP). These participants from both the private sector and the government have experience with biodiversity offsetting in South Africa. They were selected using a chain referral method which will be further elaborated in section 3.3.2. Names of interview participants and their organisations are not mentioned in this research for confidentiality purposes. Below is a detailed account of the research methodology.

3.2 RESEARCH DESIGN.

3.2.1 DESCRIPTION OF DATA SOURCES/RESEARCH MATERIALS.

For this research, the researcher reviewed relevant academic and grey literature, policy documentation and legislation. According to Bowen (2009), this data collection method uses already existing data initially collected for a different purpose to the one it is being used. This is a form of qualitative data

collection. An in-depth review of this literature was done, and a rapid appraisal of existing policy documents relevant to the study was also done.

The researcher used published journals on biodiversity offsetting that focus on South Africa obtained from different databases. This is because the researcher wanted to understand this subject from a South African perspective. Policy documentation and legislation were obtained from their respective websites, for example, the National Environmental Management Act was obtained from the Department of Environmental, Forest and Fisheries.

Only material that was relevant to the research was gathered and analysed. Specifically, research material focused on biodiversity conservation or protection, biodiversity offsetting and institutional and policy frameworks in South Africa. Hence, policies, acts, frameworks, reports and any pieces of legislation, journals, books, and any authentic reading materials that could be accessed were used. Detailed explanations of the data collection methods are given in the sections below.

3.2.2 SELECTION OF RESEARCH MATERIALS.

Different sampling methods can be adopted to conduct research, including probability sampling, non-probability sampling, and mixed-method (Onwuegbuzie & Leech, 2005). The choice of a sampling method depends largely on the nature of the research being conducted, for example, the need for an in-depth understanding of a particular subject (Creswell, 2005). This study involved collecting data at two levels, a rapid appraisal of existing policy documents and literature review from different databases and, secondly, telephonic interviews with industry experts directly involved with the biodiversity offsetting process, including policy/guideline development. These two data collections methods are discussed in detail below.

The mixed sampling method was adopted to select data for literature review, whereby a combination of systematic and snowball sampling methods was used. The systematic method is a probability sampling method that involves

the deliberate selection of samples obtained on fixed time intervals (Ranjit Kumar, 2011). The snowball sampling method, also known as the chain-referral method, is an example of non-probability sampling that depends on referrals from existing subjects to find other samples. Therefore, the researcher used the reference list of the articles found to get more articles on the same topic.

To qualify for inclusion, the researcher selected studies that (i) were published from the year 2010-2020 in English (this was done to get the most recent and relevant information on the topic of study, (ii) considered institutions or legislation as a challenge or a prospect (iii) used primary data collection methods for data collection (iv) were specifically about biodiversity offsets in South Africa or strictly theory-oriented.

The researcher systematically sampled academic articles using the following procedural process. Relevant published articles were obtained from science databases such as Scopus, Web of Science, Google Scholar, Science Direct, Taylor and Francis Online and the Society for Conservation Biology. Although there are many platforms where data can be collected, these particular databases were chosen because they are well-known, well-reviewed and accredited sources of data in science in scientific research (Onwuegbuzie & Leech, 2005). A list of search terms was used to extract relevant articles from the databases, for example; *Biodiversity offsetting*, *biodiversity loss*, *biodiversity compensation*, *net gain*, *sustainable development*, *biodiversity offsetting in South Africa*, *offsetting in South Africa*, *the mitigation hierarchy*, *biodiversity offset challenges*, *biodiversity policy* and *no-net-loss*. Some of the keywords on the list were replaced with synonyms, for instance, ecological and environmental would replace biodiversity to avoid repetition. Sometimes environmental compensation replaced biodiversity offsetting.

This literature search yielded 283 articles. These articles were loaded into the Mendeley reference manager, and 97 duplicates were removed by checking the titles. The remaining 186 articles after the removal of duplicates were subjected to a rapid systematic review. A rapid systematic review is where academic papers relevant to the study are identified, evaluated and

synthesised using specific research questions. Therefore, the identification of relevant documents was done by reading the titles and abstracts of the research to see if they were related to institutional or policy frameworks and biodiversity offsets topic. This is a less rigorous process whose key tenets are that of systematic review (see section 3.3.3 a). This approach to reviewing the literature yielded 50 articles. The 50 articles were then systematically analysed through a meta-analysis. A meta-analysis is a process that involves a rigorous comparison of related articles summarising the results to provide a more comprehensive description of a phenomenon. This analysis, for example, checked for similarities in data collection methods (i.e. interviews with industry experts, observations, and questionnaires were the desired methods), and the mention of policy or institutional frameworks as challenges to be addressed or as prospects that enable the biodiversity offsetting process. This screening also included checking if articles were specific to South Africa or theory-oriented papers that met the other criterion mentioned above. A total of 39 papers were discarded as they did not meet the requirements. Therefore, 11 papers were included in the final data set for analysis as they passed the inclusion criteria. Of the selected articles, the least cited article was cited six times, and the most quoted is 246 times. Below is a simplified diagram showing the systematic document selection.

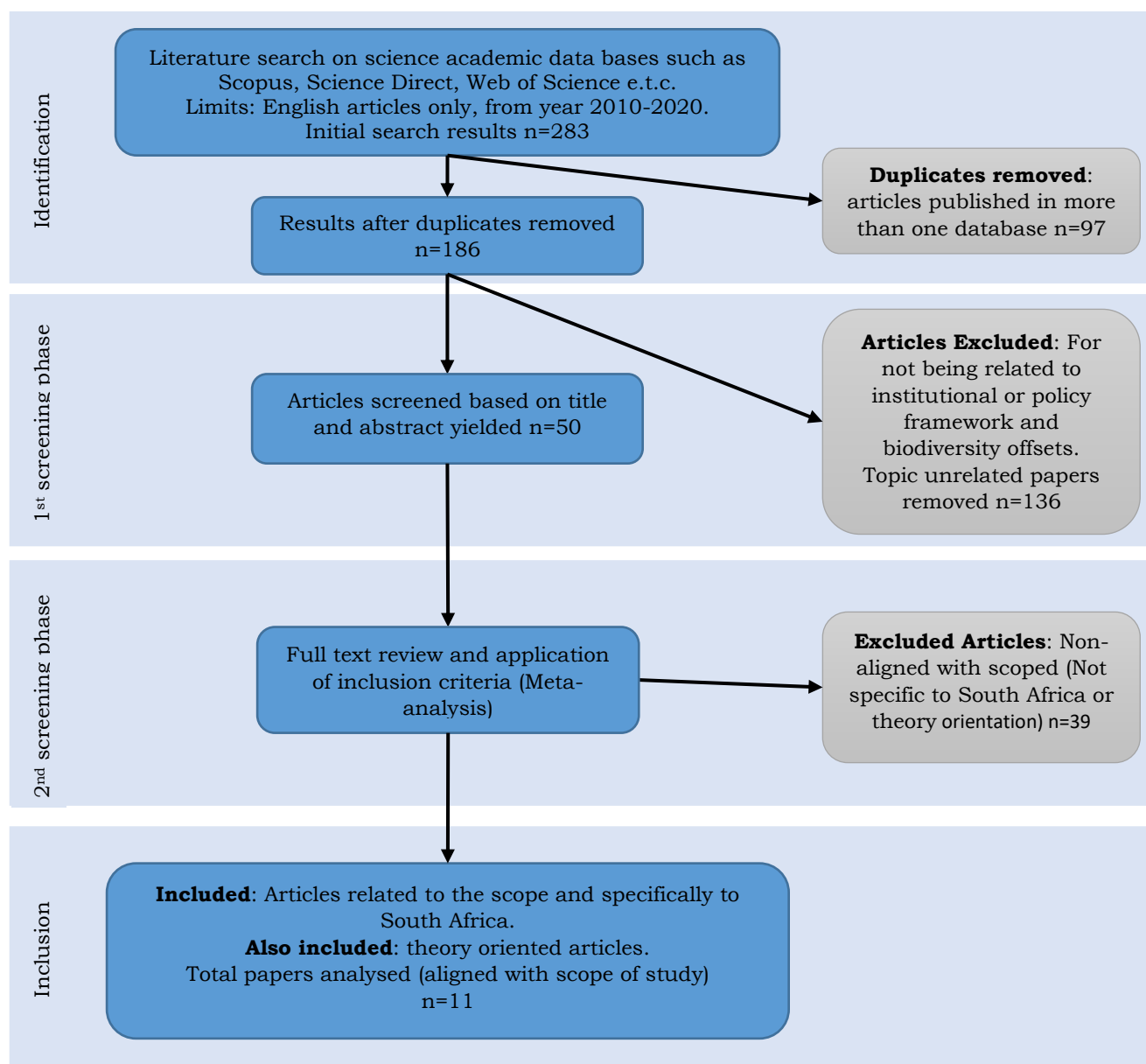


Figure 3.1. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analysis) flow diagram for searching and extracting data (adapted from Moher *et al.* (2009)).

For different policy documents and pieces of legislation, active internet search was the first step to retain the documents. This meant visiting websites of key stakeholders, departments, municipalities and other authorities to get the documents. The second data collection level was by conducting telephonic semi-structured interviews. Semi-structured interviews were conducted to complement the data that was collected from the literature. Experts were selected through judgemental and convenience sampling, a technique where a participant is elected based on their accessibility and ability to participate.

This approach gives the flexibility of approaching one's target audience directly. It tends to be more efficient, especially when dealing with topics requiring specific expertise like the current study.

The first expert was, therefore, an individual referred by a former colleague of the researcher. Then through chain referrals, also known as snowball sampling, the researcher got more participants from both the private sector (non-profit organisations, international organisations) and the government (i.e. provincial conservation agencies). According to Creswell (2005), the snowball sampling method is "a nonprobability form of sampling in which persons who are initially chosen are used as informants to locate other persons having necessary characteristics that make qualifies them to be part of the sample." In this case, a participant refers other people who are experts in the field of study to participate in the interviews. These individuals also referred to other people who are experts in biodiversity offsetting. The process continues until the sample size is reached or until the saturation point is reached. The snowball sampling was most suitable for this study as referrals enabled the researcher to interview people most relevant to the research and unveiled participants who would otherwise be missed if no one had referred them. This method is also time and cost-effective (Alshenqeeti, 2014). Despite being criticised for following a rather complicated ethnical channel and the difficulty in determining the sampling error, it was the best-suited method for the reasons mentioned above. Additionally, having participants from both the private sector and the government was essential in balancing the research findings.

Industry experts registered with SACNASP or EAPASA and knowledgeable about the biodiversity offsetting process in South Africa were interviewed. SACNASP and EAPASA are statutory bodies that register and maintain national Natural Scientists and Environmental Assessment Practitioners registers. These statutory bodies were the best place to get people directly involved in biodiversity offsets design, implementation, and offset policy development. Since the researcher used the chain referral method of getting interview participants, every suggested name was first checked in the

statutory body's database. Only people who were confirmed registered were contacted by email to ask for permission to interview them.

No pre-determination of the final number of participants was done, as the environmental industry in South Africa is extensive. The researcher employed the 'empirical saturation' concept, where interviews continued until no additional insights or information emerged during individual interviews (Bryman, 2012). This concept requires that the researcher stretches the data as much as possible to ensure that saturation is based on a broader range (Creswell *et al.* 2007). However, due to COVID 19, this was not possible as the resources to stretch the saturation further were intermittent. Therefore, the semi-structured interviews were conducted with 21 experts and the findings from these interviews are captured in chapter four of this research report.

3.2.3 DATA COLLECTION TOOLS.

This study collected primary and secondary data. Primary data were collected through conducting interviews with industry experts. Secondary data were obtained by reviewing the literature and different pieces of legislation, including policies, plans, and guidelines on biodiversity offsets. Interviews were only conducted after the ethics clearance was obtained from Wits Human Research Ethics Committee (Appendix D). Qualitative data analysis was then done to obtain relevant insights from the study. Below is a brief description of the qualitative data methods used in this study.

(a) RAPID APPRAISAL OF EXISTING POLICY DOCUMENTS AND LITERATURE REVIEW.

A rapid appraisal is a form of a systematic review used to synthesise evidence more timely. This is achieved by simplifying some components of the systematic review and, in the process, shortening the time required to obtain enough evidence. It allows for the researcher to get an understanding of a subject matter from different perspectives. To achieve this, rapid appraisal makes use of three concepts: (i) a system perspective, (ii) triangulation of data

collection and (iii) iterative data collection and analysis. These concepts allow for a rigorous but flexible way of collecting qualitative data.

Science databases like Scopus, Web of Science, Google Scholar, Science Direct, Taylor and Francis Online and the Society for Conservation Biology were used to obtain relevant data for literature review. Keywords related to the research questions were searched in academic literature and policy documents to assess fitness for inclusion or exclusion in the study. An active web search was used to identify different policy documents and pieces of legislation and visit websites of key stakeholders, departments, municipalities, and other authorities to get the documents. These documents were downloaded and saved for analysis later. The Wits university library was also used to access other documents that were not accessible through a web search. A concept was read across the available literature and understood from different perspectives allowing the researcher to have a solid basis for or against an idea.

Government institutions and legal frameworks that direct biodiversity offsets were identified through understanding their mandate. This included checking institutions' mandates and identifying the legal frameworks directing them. The legal framework was further assessed to check if they had direct or indirect provision for biodiversity offsets. This included the mention of the requirement to compensate for biodiversity loss or environmental damage. This process then informed the formation and structuring of the interview guide used to conduct interviews with the field experts.

(b) INTERVIEWS.

Interviews are a widely used technique for collecting qualitative data. They allow the researcher to meet the research subjects and understand their perceptions, attitudes, and any existing information relating to the study. However, telephonic interviews were used instead for this research due to the world pandemic (COVID 19), which warranted social distancing.

Semi-structured interviews were conducted for this study. The researcher specifically chose semi-structured interviews as these allowed the researcher to probe for more in-depth information from the participant (Cohen *et al.* 2000; Lune & Berg, 2017). This method is encouraged because qualitative research is built on understanding rather than numerical contrasts between data collected through standardised protocols. The semi-structured interviews allowed the researcher to ask follow-up questions and discuss emerging topics from the participant that otherwise were not part of the questions. This approach also gives the flexibility to add more relevant questions to the interview questions as more knowledge is obtained from the participants.

Interviews were conducted in English, and each interview took between 30-45 minutes. Every participant gave consent to participate in the study by signing the consent form or asking the researcher to sign on their behalf. Recording to transcribe was only done when the participant approved; otherwise, notes were taken in the interview guide to be analysed. Participant anonymity was stated before arranging the interview, and it was maintained throughout the process.

The interview guide was divided into two sections. The first section asked participants to provide background information on their role in the organization and their contact with biodiversity offsets. This was done to ensure the authenticity and practicality of the information that was provided. The core of the interview asked participants their opinions of the barriers or challenges within the biodiversity offsetting. The participants were also asked to summarise key issues that needed to be addressed to improve the proposed National Biodiversity Offsetting Policy of South Africa.

3.2.4 DATA ANALYSIS.

As data collection involved two stages, data were analysed following the same criteria. Synthesis of data on institutional and policy roles in biodiversity offsets was done for a total of 11 published academic articles. Of these papers, none looked at the link between institutions and policies in making

biodiversity offsets successful. This lack of context-specific literature cemented the importance of this research study as this study closes that gap. The findings from the literature were verified through having interviews with experts in the field.

Data was synthesised through reading it many times and grouping it into common themes, which were then put and presented as four primary categories, namely: (i) the institutional and legislative structures in South Africa, (ii) South Africa's biodiversity offset goals and approach to the mitigation hierarchy in relation to international standards, (iii) barriers and challenges that exist in biodiversity offsetting in South Africa and (iv) suggested approaches and strategies for effective offsetting. The studies were assessed to see if they included institutional, policy or legislative issues as challenges/barriers or as recommended improvements for biodiversity offsetting to be a success. Of the identified challenges and prospects to biodiversity offsetting, the scores are visualised in graphs included in chapter four of this research report.

Secondly, for the expert interview results, both theory and data-driven coding were employed for qualitative data analysis, using a combination of deductive and inductive approaches. The most common themes that emerged during interviews were identified and noted down. Only responses relevant to the research questions were captured and analysed. Recurring ideas were noted and they aided in the information obtained from the rapid appraisal of literature to provide the four broad categories given above.

Further coding of the interview transcribed data was done using a computer data analysis programme called Qualitative Data Analysis (QDA) Miner. QDA Miner was more appropriate for the researcher as it was easier and quicker to learn. Transcribed interviews were loaded into the data analysis programme and coded to identify all the challenges/barriers and prospects for biodiversity offsetting mentioned by the research participants. The transcribed data was put into three themes namely legislation, offset challenges and offset prospects to come up with information relevant for the four broad categories given above (see figure 3.2). In instances where responses did not match the

existing categories, new categories were added, and where data were deemed irrelevant, it was excluded from the analysis.

Different colour codes were assigned to various themes in the QDA Miner. This is a quicker method than the manual alternatives, and it also allows for easy referencing as everything is within the click of a button. Below is a picture showing the coding process in QDA Miner software.

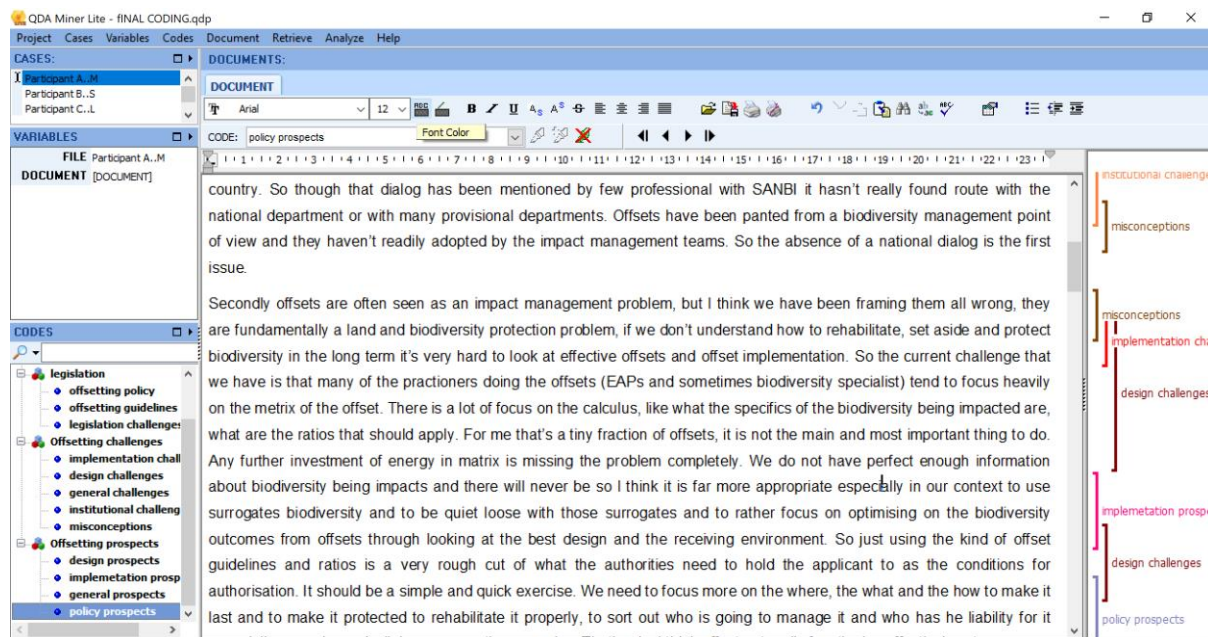


Figure 3.2. A computer screenshot showing an example of coding processing for data analysis.

The researcher checked for information related to the research questions by analysing both manifest and latent content as the researcher sought to understand authors' hidden and underlying meanings. To review these materials, the researcher used a combination of structured and emergent coding. Hence the researcher had a list of codes and themes beforehand that she expected to match with the data but was also open to finding and adding other themes and codes as directed by the information gathered.

There is a possibility that some of the information needed to answer the research questions was not available in written form. The reviewed literature probed more questions such that interviews were done to close these information gaps. The same was done when new insights emerged from the interviews with participants; literature was consulted for clarity.

3.3 SUMMARY OF METHODOLOGY.

This study makes use of the interpretivist philosophy. The interpretivist research philosophy is where the researcher tries to see the world through the eyes of the research participants by reading their actions. This philosophy fits into this research because this study involves getting people's views and opinions on institutional and policy frameworks as well as biodiversity offsets. Participants will respond according to their knowledge and experiences. The researcher will try and understand them from their points of view to understand and interpret the findings of this research. This theory is particularly useful for qualitative research methods.

Data was collected through the rapid appraisal of policy documents and literature review (secondary data search) as well as conducting interviews with industry experts in the fields of biodiversity conservation and environmental management, especially those that have been involved in biodiversity offset design or implementation or in the formation of offset guidelines and policies. All participants were over 18 and were registered with the South Africa Council for Natural Scientific Professions (SACNASP) board or with the Environmental Assessment Practitioners Association of South Africa (EAPASA). This was done to ensure the authenticity of the data collection process. A combination of the systematic and snow-ball methods was used to select the academic articles from databases such as Scopus, Web of Science, Science Direct, Taylor and Francis Online and the Society for Conservation Biology.

The search yielded 11 articles with the addition of legislation that currently direct the implementation of biodiversity offsets in South Africa. Some of the pieces of legislation are the draft National Biodiversity Offset Policy, the National Biodiversity Offset Framework and the National Environmental Management Act obtained through an active internet search or from relevant websites of key stakeholders, departments, municipalities and other authorities. All the published provincial guidelines were also consulted to clearly understand the current approach to biodiversity offsets in South Africa.

All the data was then analysed using the thematic content analysis, where common themes were developed for the data. The data was then synthesised and reported with references to the primary sources, a process commonly known as memoing.

3.4 METHODOLOGICAL LIMITATIONS.

Doing research is one of the fulfilling things as one gets to learn deeply about a specific topic. This study on biodiversity offsets was a new concept to the researcher, which led to many exciting and enhancing discoveries. As interesting as research can be, it comes with its challenges. Research challenges one's intellectual capacity and emotional stamina as it involves a lot of hard work and dedication to be successful.

One of the challenges that the researcher encountered was the failure to conduct physical interviews. Research of this nature is best done using face to face interviews as it is essential to read the actions and facial expressions of people as they respond to interview questions. Conducting interviews was made impossible by the presence of COVID-19, a global pandemic that warranted social distancing.

Research of this nature could have benefitted more from using actual biodiversity offset plans used to execute offsets. However, this was not possible due to the absence of offset registers, making it difficult to know offsets done in the country to date. It must be noted that while expert interviews provided practical knowledge on the subject as data could not be obtained any other way, the findings could be biased towards their individual experiences.

Due to the global pandemic again, the university transitioned to e-learning. This transition presented a considerable challenge in adjusting to the new order of things for the school and the learners. First, the university pushed the coursework learning late in the year such that courses stretched until November 2020, leaving very little time for one to finish the research report in

the same year. For the researcher, it meant that there was no access to the physical school library. Peer social support groups were also impossible to do. Such support groups are an essential part of academics as they provide much needed academic support.

The other challenge was finding participants to interview and get the information required to complete the research. The researcher sent several email requests to prospective participants without getting any responses. This resulted in the researcher interviewing fewer participants than the desired target. However, the researcher managed to get to the empirical saturation point, which makes the findings sufficient.

In conclusion, this methodology chapter details how the research was carried out, allowing the reader to understand the setting under which the research was conducted. The challenges encountered by the researcher throughout the process and how these challenges were solved is captured in this chapter. The findings from this data collection phase are, therefore, presented in chapter four of this research report.

CHAPTER FOUR

EMPIRICAL EVIDENCE

4.1 BARRIERS AND CHALLENGES THAT EXIST IN BIODIVERSITY OFFSETTING IN SOUTH AFRICA.

As a basis for establishing approaches to facilitate successful offsetting in South Africa, it was essential to determine and examine the barriers and challenges in the biodiversity offsetting process. Developing a comprehensive offsetting strategy is met with many challenges and obstacles, as reflected by the research findings below. The researcher engaged with literature to come up with the results from Figure 4.1 below. On the identified barriers and challenges, the absence of a biodiversity offset policy, unreliable EIA process and resistance to offsets emerged as the main challenges to the biodiversity offsetting process. Other challenges included insufficient workforce (human capital) and high costs of offset management. Below is a graph showing the challenges or barriers found in the selected research articles.

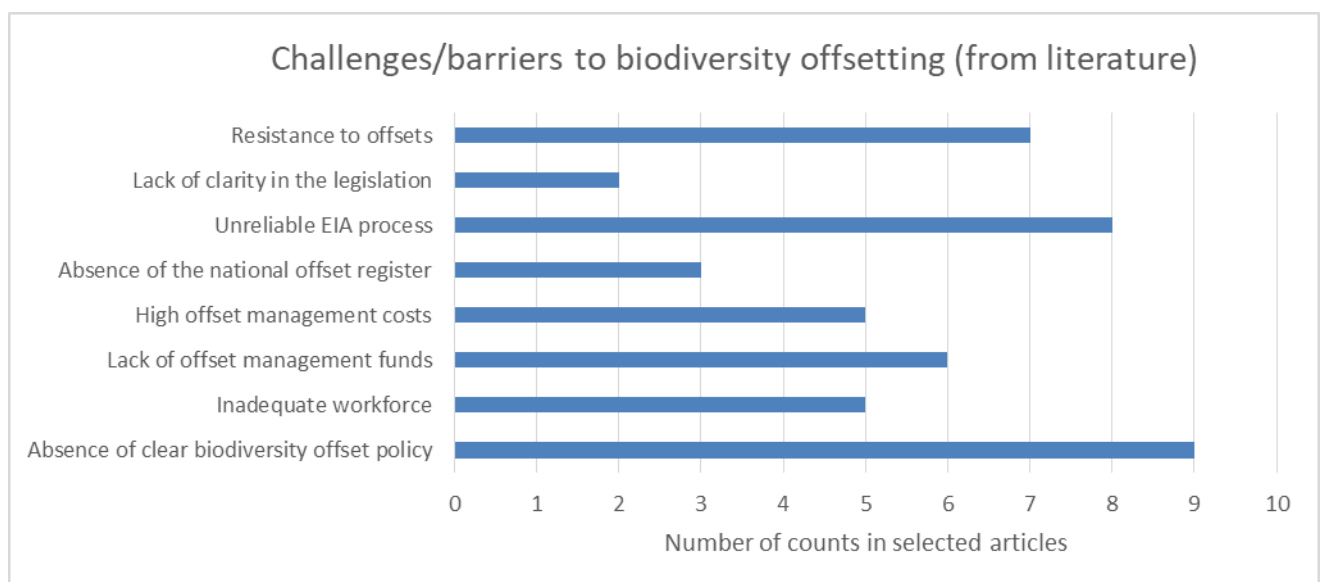


Figure 4.1: Total count of challenges/barriers in biodiversity offsetting from literature search n=11.

Source: Academic literature search (2021)

To clarify the findings from the literature and establish other practical challenges to biodiversity offsetting, the researcher interviewed industry experts. All the experts interviewed demonstrated a high level of understanding of the institutional and policy challenges/barriers to the biodiversity offsetting process. There were several similarities between the challenges established from literature and those expressed by the experts; however, discrepancies were also observed. In literature, 80% of the academic articles mentioned the absence of the offset policy as a challenge to offsetting. None of the participants directly mentioned the absence of offset policy as a challenge, but 70% cited the need for clarity in legislation. There was general agreement among the participants that the legislation was sufficient. Some of the participants even mentioned that an offset policy was not necessary.

The frequently mentioned challenges by the industry experts included the absence of the national offset register, land acquisition issues, lack of offset management funds, and inadequate workforce, among other things. Overall there is agreement that biodiversity offsetting in South Africa is met with many challenges. The interview results are presented in the graph below.

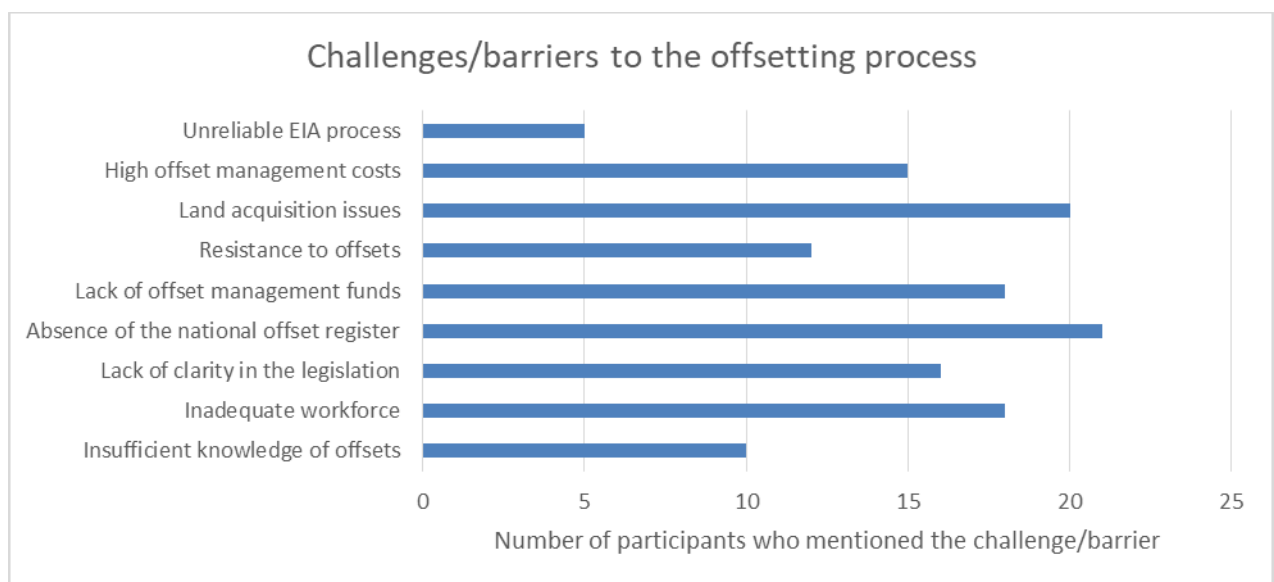


Figure 4.2: Total count of challenges/barriers in biodiversity offsetting from interview participants n=21.

Source: Expert interviews (2021)

Talking on resistance to biodiversity offsets, one participant said;

“Parts of the conservation sector view offsets as a licence for the project proponent to impact on biodiversity & do not view the idea of offset favourably at all.” Pers.com (2021c)

To justify this resistance to biodiversity offsets, “*exchanging certain losses for uncertain gains*” was mentioned as one of the major reasons. However, other participants felt that “*offsets are still in their infancy*” (Pers.com 2021); therefore, it is too early to establish if they are effective or not.

In addition to exchanging certain losses for uncertain gains, some participants expressed time lags:

“It takes more time to implement an offset than it takes to complete a development project. At times, these offsets end up not implemented at all”(Pers.com 2021d)

These are some of the most cited reasons why there is still hesitation in accepting biodiversity offsetting as a development facilitation tool.

Additionally, the absence of a national offset register for all the offsets that have been done in South Africa was mentioned and topped the list of challenges to offsetting in South Africa. One participant mentioned;

“What was suggested in the 2017 draft policy is that every province needs to prepare and maintain their register so that they can keep track of things. However, because of the state of the policy, nothing has happened there.” Pers.com (2021l)

Similar sentiments were shared by all the other participants who were interviewed. Participants emphasised the urgency of having a national biodiversity offset register and how its absence has negatively impacted the progress and success of offsets in South Africa.

Among other challenges, the lack of human capital (expertise) in the country was frequently mentioned. People who understand and are equipped with conservation planning skills are few, and most of them are in the private sector. As a result, the government is incapacitated to deal with complex issues like biodiversity offsets. One participant said:

“One of the biggest barriers I think is the capacity playing field. A handful of people work with biodiversity offsets and understand how they function and what they are supposed to do. These few experts are in the private sector, and a few government organisations in Western Cape and KwaZulu Natal” Pers.com (2021m)

In addition, there is insufficient knowledge of offsets by practitioners and regulators, resulting in inconsistencies in the implementation of offsets. Lack of expertise in regulators who are the reviewers of offset plans has sometimes resulted in poorly framed conditions of the environmental authorisation. Commenting on this, a participant said:

“The conditions of authorisation are vague and unenforceable. Sometimes information on the size offset required, offset financing or who is responsible for what is not mentioned in these conditions which makes it difficult to monitor for compliance as a lot of things are not clear.”

Lack of training has been cited as one of the key causes of the lack of expertise leading to the misunderstandings surrounding biodiversity offset implementation. Emphasising the importance of training programs, one participant said;

“I don’t think we are going to get much benefit by improving the draft policy. The benefit will come by workshopping that draft and training practitioners and regulators to understand what the draft means. There is too much focus on the documents and not on the people, but one cannot use the documents if they do not understand them” Pers.com (2021n)

Strong emphasis was put on training programs to equip practitioners and regulators with the right knowledge that is required for the proper implementation of biodiversity offsets (Table 4.4). Another participant said, “SANBI realised this dire need and made it possible to run several training workshops. We had one in KZN, one in the Western Cape and one in Gauteng and they were well attended” (Pers.com 2021a). In connection to this, it was established that raising awareness on biodiversity offsets to the general public is as important in ensuring the success of the offsetting process.

Adding to the challenges, one participant said;

“The institutions involved in implementation from a statutory point of view are budget constrained. Although we have a protected area expansion strategy in the country, there is no agency involved in expanding the protected areas (PAs) because the perceived management costs are high. Which is the fundamental challenge behind offsets.” Pers.com (2021b)

Below is a graph showing the integrated findings from literature and research participants on challenges/barriers to biodiversity offsets.

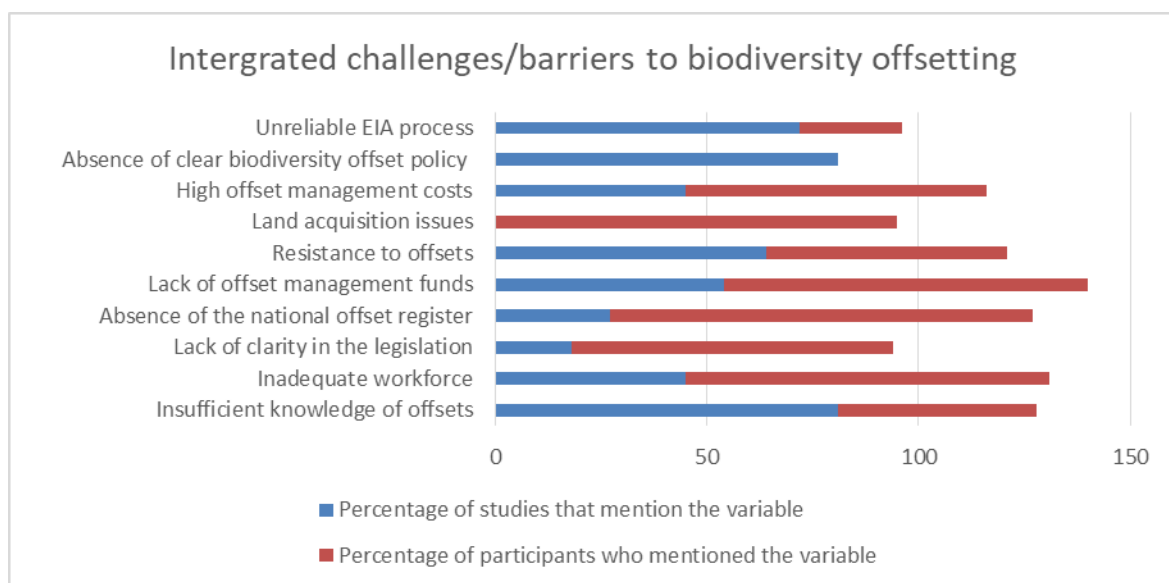


Figure 4.3: Graph showing the percentages of studies and participants who mentioned challenges/barriers.

Source: Expert Interviews and Academic Literature Search (2021)

In conclusion, biodiversity offsetting in South Africa is still met with a lot of challenges. These have been clearly articulated above, paving the way to establishing suggestive solutions to these challenges, which are discussed in the next section of this chapter.

4.2 EXTENT TO WHICH LEGISLATIVE FRAMEWORK PROMOTE BIODIVERSITY OFFSETS.

a) BIODIVERSITY OFFSET INSTITUTIONAL FRAMEWORKS.

Part of this research focused on investigating the institutional frameworks that govern the management of biodiversity offsets in South Africa. This was important as the study argues that an effective and sustainable biodiversity offset strategy is a product of operational and efficient institutions and legislative structures (see part b for legislative structures). The researcher, therefore, embarked on a detailed analysis of the institutions looking at their mandate, the pieces of legislation that given their operations and their level of jurisdiction. A rapid appraisal of the academic literature, internet searches and expert interviews led to the list below. This was done to clearly understand the institutions responsible for managing and protecting biodiversity in South Africa. The summary of the findings is presented in Table 4.1 below.

Table 4.1. Summary of institutions that deal with biodiversity conservation.

Name of Institution	Year of Establishment	Responsibility or mandate of the organisation	Policies governing their mandate	Level of governance/ Jurisdiction
Department of, Forestry, Fisheries and the Environment (DFFE)	DFFE- (2021) Department of Environment, Forest and Fisheries DEFF- (2020-2021) Department of Environmental Affairs DEA (2010-2020)	The DFFE is mandated to protect the environment for the benefit of present and future generations. One of the strategic purposes is to ensure the regulation and management of all biodiversity, heritage, and conservation matters to facilitate sustainable economic growth and development.	NEMA	National
South African National Biodiversity Institute (SANBI) – reports to DFFE	National Botanical Institute (NBI) (1989-2004) SANBI (2004- till current)	The mandate is to explore, reveal, celebrate and champion biodiversity for the benefit and enjoyment of all South Africans, which includes managing the National Botanical and Zoological Gardens as ‘windows’ to South Africa’s biodiversity for enjoyment and education.	NEMA, National Biodiversity Framework (NBF)	National
Provincial Conservation Agency		To promote environmental protection and management as per the mandate of DEFF.	NEMA, National Biodiversity Framework (NBF)	Provincial

Source: Academic literature, internet searches and expert interviews (2021)

The Department of Forest, Fisheries and Environment has the mandate to conserve biodiversity. The department then delegates responsibility to specific organisations like the South African National Biodiversity Institute (SANBI) at the national level and different conservation agencies at the provincial level.

The administration and enforcement of environmental laws are also divided among different government departments (i.e. Department of Water Affairs and Forestry (DWAF), Department of Land Affairs (DLA), Department of Energy (DME)) and government levels (National, Provincial and Local Level). However, these departments are indirectly involved in biodiversity conservation (hence not captured in the table).

Interviews with experts revealed some exciting insights that gave more context to the practicality of these institutions. The selected participants were asked the broad question, which institution(s) exist(s) in South Africa within which biodiversity offsetting can be pursued? This question was then broken into three; the first part assessed whether participants knew the institutions responsible for biodiversity management. The second part asked whether participants thought these institutions were effective or not, and lastly, the participants provided an explanation for their response.

Participants were, therefore, first asked if they were aware of any organisations responsible for biodiversity management in the country and to name these institutions. The results are presented in Table 4.2 below.

Table 4.2. Participant knowledge of the institutions responsible for biodiversity management in South Africa.

Knowledge of responsible institutions	Yes	No	Not sure	Total
Number of participants	21	0	0	21
Percentage	100%	0%	0%	100%

Source: Expert Interviews data (2021).

Based on the findings in Table 4.2, all the experts were knowledgeable about institutions responsible for managing biodiversity in the country. Having

established this, therefore, it was important for the researcher to establish whether the participants believed that these institutions are effective in biodiversity offsetting. Participants were asked to rank the effectiveness from one to five, one being least effective and 5 being very effective. The results are captured in Figure 4.4 below.

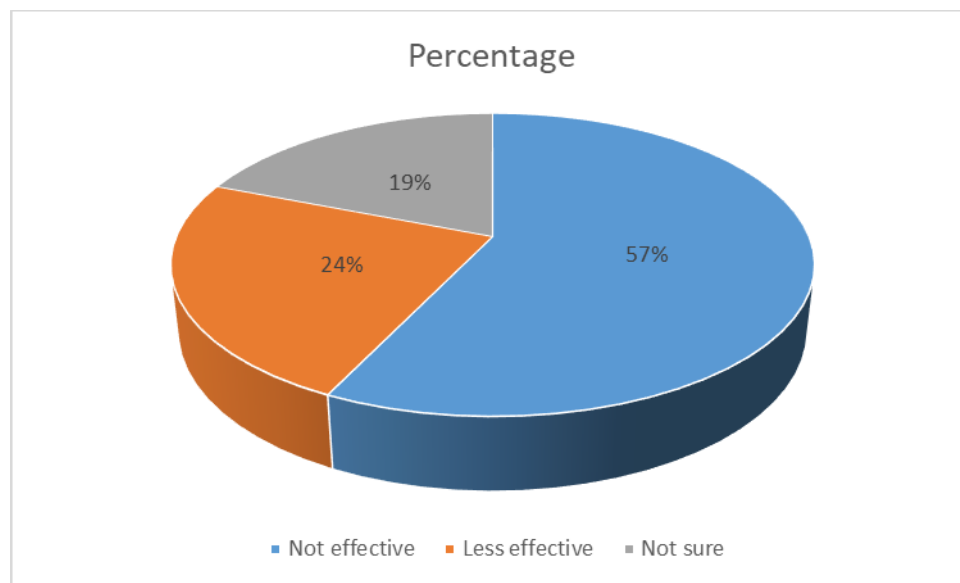


Figure 4.4. Pie chart showing the efficiency ranking in percentage on the current biodiversity offsetting process in South Africa according to the interviewed participants.

Source: Expert interview data (2021).

It is clear from Figure 4.4 that the participants thought that the institutions responsible for biodiversity management were not effective in dealing with biodiversity offsets, as indicated by the 57%. Nineteen percent were unsure, and none of the participants thought these institutions were effective.

Having established this, the participants were then asked to explain why they thought the institutions were not effective. One responded mentioned that:

“There is no institution specifically for biodiversity offsets. Of course, SANBI's mandate is to conserve biodiversity but is limited in expertise to deal with offsets. Offset design is problematic because it is often left up to consultancy. For example, biodiversity specialists usually have skills in understanding particular impacts or plant species but don't

have skills in conservation planning, site selection, or critical biodiversity areas.” Pers.com (2021a)

He adds that:

“The institutions involved in implementation from a statutory point of view are budget constrained. Although we have a protected area (PA) expansion strategy in the country, there is no single agency involved in expanding the PAs because the perceived management costs are so high, which is the fundamental challenge behind offsets. The use of private-sector agency is increasing, but we still have a few.” Pers.com (2021a)

To further understand, a follow-up question was asked; who audits and monitors offsets to see if they deliver what they are supposed to? The response from the participant was:

“The environmental competent authority who is supposed to audit do not if they do they avoid complicated stuff like biodiversity. Also, if they try to audit the offset, the conditions of authorisation have been so badly framed such that they are impossible to audit.” Pers.com (2021a)

On a similar note, another participant added that:

“The environmental competent authority is the main institution. Then the conservation agencies play a powerful role either in commenting or recommending offsets. These agencies are also responsible for reviewing offset proposals, but the environmental competent authority sometimes lacks that expertise.” Pers.com (2021b)

Approximately 80% of the participants shared similar sentiments to those given above by signalling the inadequacy of institutions that govern biodiversity offsets. They also emphasised the lack of offset management funds and the lack of capacity to deal with offsets. Another participant involved in offset implementation expressed how they lack guidance from higher authorities on biodiversity offset projects.

“Lack of clarity in legislation and the poorly structured conditions of authorisation have resulted in some of the failed offsets in the country. We have at times failed to get assistance from the authority on things that only they can clarify, especially pertaining the communal land issues when an offset needs to be designed and implemented” Pers.com (2021d)

b) BIODIVERSITY OFFSETTING LEGISLATIVE FRAMEWORK

Furthermore, the researcher sought to understand the legislative structure that guides the biodiversity offsetting process to address the second part of the first research question. In the absence of explicit offsetting provisioning in the law, there are several laws and guidelines in South Africa that apply to the management of biodiversity, the first one being the constitution. The constitution of the Republic of South Africa, 1996 (act no. 108 of 1996) advocates for the protection of the environment for the benefit of present and future generations. In Article 24 (a)-(b) of the constitution (page 1251-1253), it states that:

“Everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation, and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”

The constitution's environmental mandate is explicitly outlined in the National Environmental Management Act (NEMA), 1998 (Act No.107 Of 1998). This Act aims to guide the protection and governance of the environment by providing a set of principles that help in decision-making on matters that affect the environment. Although the Act does not directly speak to biodiversity offsets, several principles are relevant to offsets. The most

common is the 'Polluter Pays' principle in section 2(4)(p). It emphasises that environmental loss (pollution, degradation, or damage) remediation should be done by those responsible for the damage. They should bear the cost of preventing and minimising further loss to the environment.

Section 2(3) of the Act mentions social, economic, and environmental sustainability on developmental projects. Emphasis is on the balance of these three pillars of sustainable development. Development tends to focus more on economic benefits than environmental and social in the absence of the law. Section 2(4)(a) then details what sustainability according to South Africa's NEMA is and introduces the importance of mitigation hierarchy (where environmental impacts that cannot be avoided are minimised and remedied).

The National Environmental Management Biodiversity Act (NEMBA), 2004 (Act No. 10 of 2004), then narrows down to giving guidelines on managing the country's biodiversity. This Act calls for the protection and management of biological diversity and the sustainable use of natural resources. Threatened species and ecosystems are protected under this Act. It also guides the control of alien invasive species. NEMBA prompted and governs the National Biodiversity Institute (SANBI), which is an organisation that monitors and manages biodiversity issues in South Africa. The National Biodiversity Framework was developed to ensure proper management and conservation of biological diversity, which NEMBA advocates for.

The Draft National Biodiversity Offset Policy came as a response to a long time offsetting practice lacking consistency. It is yet to come into effect, although it was produced in 2012 and revised in 2016. The objective of having this draft is to standardise offset requirements in South Africa, ensuring consistency in methodologies and execution.

According to the draft (page 8), the desired outcome of a biodiversity offset is to ensure that:

- a). "The cumulative impact of development authorisation and land-use change does not: result in the loss of Critical Biodiversity Area's (CBA) or jeopardize the ability to meet South Africa's targets for biodiversity

conservation; lead to ecosystems becoming more threatened than 'Endangered'; and/or cause a decline in the conservation status of species and the presence of 'special habitats'. Unlike the international best practice, which advocates and encourages the no-net-loss/ net gain approach when offsetting, the draft national policy emphasises the country's position to focus on conservation targets.

b). Conservation efforts arising from the development application process, and contributing to improved protection of South Africa's unique species and ecosystems in perpetuity, are focused on areas identified as priorities for biodiversity conservation. Emphasis is on consolidation of priority areas and securing effective ecological links between priority areas; and

c). Ecosystem services provided by affected biodiversity and on which local or vulnerable human communities - or society as a whole - are dependent for livelihoods, health and/or safety, are at minimum safeguarded, and preferably improved."

Although the Draft National Biodiversity Offset Policy is not yet officialised, different provinces have developed guidelines to protect their biodiversity, guided by international best practices. Currently, three provinces of the nine, namely the Western Cape Province, Kwa-Zulu Natal Province and Gauteng Province, have bespoke offsetting guidelines. According to the second edition of Western Cape provincial guideline on biodiversity offsets (section 5.4, page 57), providing an offset may mean one or more of the following;

"Securing habitat for conservation either on the development site or away from the development site; Providing a financial guarantee upfront for a specified period during which the proponent could pursue the securing of habitat for conservation; should the proponent fail to secure habitat during that period, the financial guarantee would be used by the State or designated organization to secure habitat; or Providing monetary compensation in exceptional cases."

The water and mining sectors then produced the wetland biodiversity guidelines. These are practical guidelines that help determine the size and characteristics of a wetland offset. The guidelines also help to determine how the offset is implemented. The Department of Water and Sanitation is responsible for giving authorisations on wetland offsets. The department verifies how sustainable the development project is and how robust the proposed wetland offset by the proponent is before they decide on whether to issue the water use authorisation or not.

The wetland biodiversity guidelines detail the process of calculating residual impacts of development. They also guide how to check the sufficiency of the proposed offsetting receiving area. Water resources and ecosystem services, ecosystem conservation and species of conservation are used as primary determinants to check for area suitability. In addition, the guidelines set out the offset ratios to be used in determining an appropriate offset. The offset ratios applied at the receiving site are designed to accommodate issues of risk and security of tenure and aim to incentivise good practice. An electronic Wetland Offset Calculator supports these guidelines to assist with calculations.

The protection and management of biodiversity are also mentioned in other Acts including the Minerals and Petroleum Resources Development Act (MPRDA), 2002 (Act No. 28 of 2002), the National Water Act (NWA), 1998 (Act No. 36 of 1998), National Environmental Management: Air Quality Act (NEMAQA), 2004 (Act No. 39 of 2004) and the Environmental Conservation Act (ECA), 1989 (Act No. 73 of 1989). In addition, there are policies, plans and guidelines providing direction on biodiversity offsets at different levels. Table 4.3 below summarises the laws that direct biodiversity offsetting in South Africa.

Table 4.3: Summary of laws directing biodiversity offsets in South Africa.

Environmental Legislature	Year	Applicable biodiversity offsetting	Major focus of the legislature regarding biodiversity	Gap or challenge in addressing biodiversity offsets
Constitution of the Republic of South Africa.	1996	Yes (indirectly)	Advocates for natural resource conservation and promotes sustainable development.	It gives a broad overview which is sufficient for a constitution.
National Environmental Management Act 107	1998	Yes (according to section 2(4)(k), section 2(4)(a), section 2(4)(p), and section 24(P))	This Act emphasises the protection of the environment as people's common heritage, and it also highlights the importance of the mitigation hierarchy of avoiding, minimising and remedying. According to section 2(4)(p), the polluter pays principle is reflected here as a way to conserve biodiversity.	The Act does not explicitly mention biodiversity offsets. The use of offsets is deducted from the 'polluter pays' principle. However, there lacks guidance in the Act on how offsets can be implemented guided by the international guiding principles.

National Environmental Management Act: Biodiversity Act 10	2004	Yes (indirectly)	It aims to conserve biodiversity and sustainable use of indigenous natural resources. Developmental activities are restricted on threatened or protected ecosystems, and any such actions trigger compliance with the NEMA EIA regulations, including strict adherence to the mitigation hierarchy.	The Act only refers to the NEMA EIA; however, there are no specifications on compensating for biodiversity loss using biodiversity offsets.
National Environmental Management Act: Protected Areas Act 57	2003	Yes (indirectly)	This Act stresses the importance of protecting and conserving South Africa's biodiversity, landscape and seascape and designation of protected areas.	The Act does not address biodiversity offsets and lacks guidance on how to compensate for biodiversity loss.
National Environmental Management Act: Integrated Coastal Management Act 24	2008	Yes (indirectly)	The Act aims to integrate coastal and estuarine management in South Africa, promote the conservation of the coastal environment, and maintain the natural attributes of coastal landscapes and seascapes. It also aims to ensure that development and the use of natural resources within the coastal zone is socially and economically justifiable and ecologically sustainable. The Act defines a coastal protection zone, coastal public	No direct mention or guidance on biodiversity offsetting. This leaves a loophole where offsets are not a requirement in the legislation.

			property and protected coastal areas and provides development setback lines.	
National Forests Act 84	1998	Yes	This Act specifies compensation for damage to protected tree species or natural forests. Significant damage or loss will require an offset.	This Act specifies the need for offsets where damage is significant. However, like the other Acts, proper guidance on design implementation and monitoring of these offsets is lacking. Promotion of offsets without proper guidance on implementation will not yield to success as long term outcome is difficult to anticipate.

Source: Literature, legal documents and active internet search (2021).

There is, therefore, evidence from the literature that biodiversity offset regulations are captured in South Africa's legislation. To confirm these findings, the researcher engaged the research participants on the same question. The participants were asked whether they thought legislation directing biodiversity offsets in the country was sufficient or not. To this question, the participants' responses showed a general agreement that the pieces of legislation are adequate in terms of quantity but not necessarily quality.

Several issues were raised to support this general feeling, including lack of clarity on many aspects of the legislation, for example, (i) lack of clarity on the recommended offset protocol, (ii) lack of clarity on what the government expects from developers in terms of implementation of offsets, and (iii) lack of clarity on the transition of liability from developers to the state as the custodian of the environment among others.

Besides the lack of clarity, other participants mentioned the absence of essential guidance in the legislation on some crucial issues like how to compensate for cumulative impacts on biodiversity. Furthermore, offset guidance for ongoing impacts are also lacking. These are impacts resulting from permanent or long-lasting infrastructure, for example, railway lines. One participant says this about compensation for ongoing and cumulative impacts during the interview;

“I support the focus on habitats and ecosystems, but the policy should also address how to design offsets for ongoing impacts (e.g. fatalities of individuals of a threatened species (e.g. as a result of roads, rail, powerline or energy infrastructure).” Pers.com (2021c)

Another participant also said;

“There is need for clear guidelines on cumulative impacts, not only of one project over a long time but in combination with other projects, the regulation at the moment is a little thin on that” Pers.com (2021d)

The legislation also lacks in addressing offsets for agricultural activities, one participant said;

“So the biggest gap in offset legislation is inadequate understanding on compensation for biodiversity on agricultural activities. Agriculture does the biggest damage by far but has the smallest offsetting requirements, if at all. That is because much of the agriculture activity in the country is illegal, not permitted through NEMA if it is permitted it's permitted under the Conservation of Agricultural Resources Act which doesn't require the right kind of compensation.” Pers.com (2021e)

The implementation of offsets cuts across several different legislation, as illustrated by a list of laws above. There are currently some contradictions in and among some of these pieces of legislation. Acquiring land for offsets has been one of the biggest problems in offset implementation, especially when dealing with community-owned land. One participant said;

“There are many other legislation that affect the biodiversity offsetting process, such as the land reform policy. This is because we are essentially speaking about land management and land conservation when talking about offsets. I didn't see any of the land issues being mentioned in the draft policy.” Pers.com (2021f)

Another participant also mentioned;

“The issue of land ownership is problematic, especially around communal land that is not owned by an individual community member. In some cases, the land may be owned by the department of land reform, and the title deeds sit with them, however, it will be managed by private authorities. Also, land trusts or Community Property Associations that have title deeds and full ownership, but there is very huge disjuncture from trust members or people who are managing the trust and the community members living on the land. Securing an offset on such land is difficult and will be met with resistance. So there is a huge problem of land ownership in South Africa, and it delays the offsetting process.” Pers.com (2021g)

This lack of connection is seen in the NEMA and Minerals and Petroleum Resources Development Act also, where the latter supersedes the former. Any land with mining rights cannot be declared a protected area, even if suitable for an offset. A participant expressed this;

“Even if you get a perfect site, but it has got mining rights issued over it, there is no way you can declare it a protected area. The national department won’t look at protected areas over places with mining rights or prospecting rights, which is half the country.” Pers.com (2021h)

Some participants felt that a comprehensive offset policy framework or strategy is essential but not the panacea.

To further understand, the researcher wanted to establish whether the participants were satisfied with the way biodiversity offsetting is done in South Africa. The results are captured in Table 4.4 below.

Table 4.4: Views of participants on current biodiversity offsetting protocol.

Response	Frequency	Percentage
Not satisfied (improvement required)	18	86
Partially satisfied	2	9
Not sure	1	5
Very satisfied	0	0
Total	21	100

Source: Expert Interview data (2021)

It is clear from the results above that over 80% of the participants were not satisfied by the way biodiversity offsetting is done currently. However, some participants were reluctant in their responses, stating that the country is doing okay *“at least we are doing something about the environment unlike some of our African counterparts who do not even have offsetting provisioning in their legislations, we will improve with time, so not our best but definitely not the worst”* Pers.com (2021i)

The participants' general agreement emphasised the urgent need to pay attention to the issues raised above. The following section attempts to compare this legislation to international standards.

4.3 A COMPARISON BETWEEN SOUTH AFRICA'S BIODIVERSITY OFFSET LEGISLATION AND THE INTERNATIONAL STANDARDS.

This research also assessed how the draft National Biodiversity Offset Policy aligns with the international best practice. The draft policy was weighed against the IFC Performance Standards and the BBOP Standards (as they are the internationally recognised standards from which many countries draw their offset policies). The draft policy was assessed for its approach to the mitigation hierarchy, and its offset preferred outcome compared to the international best practice guidelines.

Through a review of the academic literature, the draft policy and the international standards coupled with consultations with industry experts, it was established that the draft policy draws from international best practices and aligns in principle with the practices. However, the draft policy suggests using the target-based ecological compensation approach instead of using the averted loss approach that the international standards use. The IFC Performance Standards 6 (IFCPS6) (which covers impacts of development on biodiversity and introduces the requirement for biodiversity offsets) advocates for no-net-loss or net gain for critical habitats (page 46 of the IFCPS6),

“A biodiversity offset should be designed and implemented to achieve measurable conservation outcomes that can reasonably be expected to result in no-net-loss and preferably a net gain of biodiversity; however, a net gain is required in critical habitats” (IFC, 2013).

According to the draft policy (page 6), the landscape approach rather than the site-specific approach allows for accounting of cumulative impacts,

“Biodiversity offsets take an ‘ecosystem approach’ to biodiversity conservation which promotes the integrated management of land, water

and natural capital to achieve conservation and sustainable use of biodiversity. This approach recognizes the interdependence between biodiversity, ecosystems and the benefits they provide for people through use and cultural values. It takes a landscape-scale, rather than a site-specific scale view, to enable consideration of cumulative impacts”.

Adherence to the mitigation hierarchy was also assessed. The draft policy follows the same sequence of avoidance (as priority), minimisation, remediation and then offsetting the residual impacts. However, unlike the BBOP Standards (page 17-22) that illustrate the general approach to implementing the hierarchy by giving a general principle, criteria and indicator approach to mitigating biodiversity impacts, the draft policy lacks guidance on that.

After the relationship between the South African legislation and the international best practice was established from literature, there was a need to get the views of the experts on the same issue. The experts were asked a question: Are you familiar with the draft National Biodiversity Offsetting Policy of South Africa and other pieces of legislation that direct biodiversity offsets in South Africa? If yes, how does it compare to international standards?

The responses from the interview participants shared the same sentiments as what was found in the literature. One participant said;

“South Africa is on track in terms of positioning the guidelines. The challenge is not in guidelines in South Africa but building capacity both in terms of specialists and authorities to implement it properly.”
Pers.com (2021a)

Another one said;

“South Africa is ahead of most international competition regarding the required shift to target based ecological compensation/offset. Most international guidelines talk of no-net-loss or net gain which does not have a bearing on South Africa biodiversity challenges and the rest of Africa.” Pers.com (2021h)

Another one then said;

“The South Africa version is more pragmatic and cognisant of local capacity limitations both in terms of the specialists that are supposed to put things together and the officials who have to process.” Pers.com 2021i)

Other participants further supported this idea;

“The draft policy has drawn on international best practice, namely the international standards on biodiversity offsets prepared by the Business and Biodiversity Offset Programme. So from a principles perspective, our policy is well aligned. However, unlike the typical biodiversity offset practices which are framed in terms of no-net-loss or net gain for biodiversity, our policy advocates for a target based ecological compensation approach.” Pers.com (2021j)

In addition, another participant then explained further what the target-based approach means;

“.....so what we are essentially doing is trading some loss for greater protection and management efficiency over time, and that is not what is pushed internationally.” Pers.com (2021a)

The international best practice also emphasises the adherence to the mitigation hierarchy, which is to avoid, minimise, remedy (restore/rehabilitate) and then offset. However, in South African legislation, remediation is only mentioned in the NEMA section 2(4), but there is no clarity on its meaning and guidance on how to remedy biodiversity loss. One participant said that;

“Section 2(4) of NEMA talks about adherence to the mitigation hierarchy, to avoid, minimise and then remedy. However, this concept of remedying impacts is not picked up anyway else in legislation. The EIA regulations, which are the channel within which biodiversity offsets are required, only mention minimising impacts to acceptable levels. So

there is no clarity on how to remedy, and of course, that opens the door for an endless challenge.” Pers.com (2021k)

Furthermore, another participant expressed that the mitigation hierarchy is not strictly followed in practice.

“In most cases, offsets are opted for without proper implementation of the avoidance, minimise and remediation stages. Alternatives are not fully exhausted, and at times the hierarchy is not used to come up with the project location.” (Pers.com 2021c)

Lack of clarity on how to apply the mitigation hierarchy was also mentioned.

“There is no clear guidance on what the legislation defines as ‘remedy’ and how it should be implemented.”

It is, therefore, established that although in principle South Africa follows the international best practice, it deviates from the averted loss approach to a target-based approach. The next section, therefore, presents biodiversity offsetting challenges.

4.4 SUGGESTED APPROACHES AND STRATEGIES FOR EFFECTIVE OFFSETTING.

After the institutional and policy-related challenges and barriers to offsetting were established, it was inevitable and essential to look at ways to improve and overcome these challenges. Table 4.5 below lists the suggested improvements to biodiversity offsetting in South Africa from academic literature.

Table 4.5. The suggested improvements to biodiversity offsetting in South Africa

Suggested strategy/approach	Author(s)
Formulate and formalise a comprehensive biodiversity offset policy.	(Brownlie <i>et al.</i> 2017; Lukey <i>et al.</i> 2017; Maron <i>et al.</i> 2016; McKenney & Kiesecker, 2010a)
Improve offset awareness and increase the human capital working with offsets.	(Brownlie <i>et al.</i> 2017; Lukey <i>et al.</i> 2017)

The EIA practice should be improved with an emphasis on strict adherence to the mitigation hierarchy.	(Brownlie <i>et al.</i> 2017; de Witt <i>et al.</i> 2019; Gardner <i>et al.</i> 2013)
Make financial arrangements, including reduction of transaction costs for offsets. There is a need to establish a trust fund for rolling out biodiversity offsets.	(Brownlie <i>et al.</i> 2017; Maron <i>et al.</i> 2016)
The environmental competent authority should establish and maintain a national offset register that captures all offsets done in the country. The register should be publicly available to promote transparency.	(Brownlie <i>et al.</i> 2017; Bull <i>et al.</i> 2019; Maron <i>et al.</i> 2016; McKenney & Kiesecker, 2010)
Conduct more research on biodiversity and offsets to stay up to date with the latest information.	(Lukey <i>et al.</i> 2017; Maron <i>et al.</i> 2016)

Source: Academic Literature Search (2021)

Research participants were asked: in your opinion, what approaches and strategies can be used to improve the way biodiversity offsetting is done in South Africa? The responses from interview participants are tabulated below.

Table 4.6. Suggested approaches and strategies to improve biodiversity offsetting by interview participants.

Suggested Improvement	Number of responses	Percentage (%)
There is a need for a national dialogue to promote coherent understanding and interpretation of the legislation.	10	48
Capacitate the competent authority to perform its duties fully	20	95
Establish an offset support unit that focuses on the whole offsetting process and manage offset funds	12	57
Prioritise training of practitioners and regulators, as well as increase public awareness	18	86
Provide clear and detailed guidelines ensuring consistency throughout all sectors and pieces of legislation	15	71
The offset policy should be outcome-based, not a set of instructions.	12	57

Source: Expert Interviews (2021)

The suggested improvements are visualised in a graph showing the percentage of participants who mentioned the improvement in Figure 4.4 below.

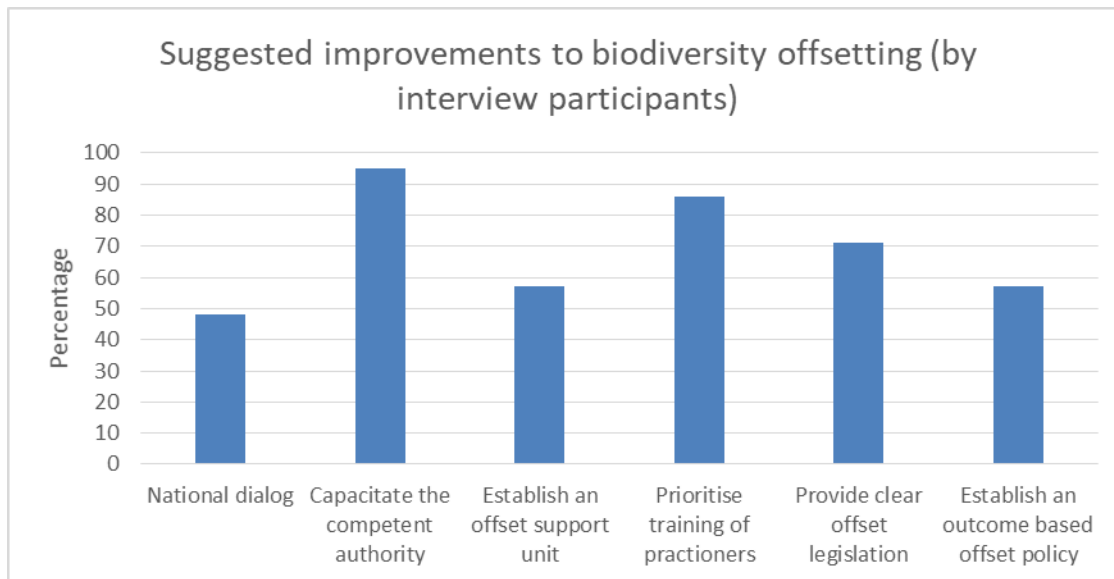


Figure 4.5: Visual graph showing the improvements to biodiversity offsetting as suggested by the industry experts. Each one is given a corresponding percentage representing how many times it was suggested.

Source: Expert Interviews (2021)

The need to promote coherent understanding and interpretation of the legislation was emphasised. To achieve this, one participant suggested a national dialogue that involves all relevant stakeholders;

“There hasn’t been any coherent national dialogue amongst regulators and practitioners about what offsets are, what they are supposed to do and what we are trying to achieve as a country. So though few professionals have mentioned that dialogue to SANBI, it hasn’t found a route with the national department or with many provisional departments.” Pers.com (2021o)

Another participant shared similar sentiments and highlighted that;

“There is still need for a holistic understanding of offsets among all stakeholders, clarity on what offsets are, why we need them, how we design them and how we implement them, according to the country’s needs.” Pers.com (2021p)

Furthermore, another participant adds that;

“There is need for a more inclusive policy development process, with more role players to give input.” Pers.com (2021q)

The need to capacitate the competent authority, train regulators and practitioners, and provide clear offset regulations in the legislation came highly recommended. Consequently, the need for an independent offset support unit was pointed out. A unit whose mandate is to guide the offsetting process from design to monitoring and management. One participant said;

“For me, it would be nice for a unit specifically set up in the DEA national or provincial office to provide offset support in general, from design right up to implementation and closure and handover. An offset support unit that will attend to offset sustainability issues. Because now you give an implementation agent a certain amount to do this for ten years and after that period the money is finish, and there is no permanent office to attend to the offset.” Pers.com (2021r)

Chapter four concludes after presenting the findings that satisfy all the questions raised in chapter one of this research. An in-depth analysis of these findings is done in chapter five below.

CHAPTER FIVE

ANALYSIS AND DISCUSSIONS

5.1 INTRODUCTION

This study aimed to investigate and establish the role of environmental institutions and legislation in facilitating the biodiversity offsetting process in South Africa. Therefore, the research assessed the challenges related to institutional and legislative frameworks faced in the offsetting process and identified ways to promote successful biodiversity offsetting in the country. To achieve this, data was collected through a review of the literature and interviewing industry experts. Based on the research questions, this chapter is therefore divided into four sections. The first section discusses the institutional and legislative frameworks on biodiversity offsets in South Africa. The second section discusses the current offsetting protocol against the international standards. The third section deliberates on the challenges and barriers that hinder the effective biodiversity offsetting process. Lastly, the fourth section of this chapter presents suggested improvements to how biodiversity offsetting is done in South Africa.

5.2 THE INSTITUTIONAL AND LEGISLATIVE FRAMEWORKS FOR BIODIVERSITY OFFSETTING IN SOUTH AFRICA.

The results showed that the institutional and legislative structures on biodiversity offsetting in South Africa are weak. Although institutions like SANBI are responsible for managing biodiversity in the country, there is still no specifically mandated institution to deal with biodiversity offsets. The current institutional framework divides the administration and enforcement of environmental laws among different government departments as gathered from the research findings. For example, the Department of Mineral Resources governs the implementation of offsets for mining projects. In some

instances, this arrangement has proved ineffective as there is potential conflict of interest, resulting in poor offsets performance and enforcement of the regulations. These findings align with (Brownlie *et al.* 2017; Brownlie *et al.* 2013), who express that dividing the administration and enforcement of environmental laws among different government departments creates interpretation and enforcement problems. Lukey *et al.* (2017) share the same sentiments when they express that weak institutional frameworks result in poor administration and implementation failures.

Another finding from the study was that the legislative framework currently directing biodiversity offsetting in South Africa is ineffective and not efficient. It was established that several laws apply to biodiversity offsetting, however, no piece of legislation is solely directed to biodiversity offsets. The biodiversity offset policy is still a draft and hasn't been officialised, hence not enforceable.

From the engagement with literature and the industry experts, it was established that the inconsistencies in the way biodiversity offsetting is done, including variations in the implementation of the mitigation hierarchy, to the general unacceptance of offsets, can be partly attributed to the absence of a clear biodiversity offset policy. This resonates with the findings of Brownlie *et al.* (2017), who emphasised that the absence of a national offset policy result in inconsistencies and varied offset approaches. Without an offset policy to guide the biodiversity offsetting process, South Africa may risk continued biodiversity loss. This idea matches that of Bull *et al.* (2013), who claims that in the absence of a policy, biodiversity offsets will only achieve immediate development and conservation needs and not contribute to perpetual biodiversity management in the long run.

The main objective of the draft policy is to ensure that there is sustainable development. As the desired end goal of biodiversity offsets, sustainable development requires a balance in economic prosperity, environmental sustainability, and social responsibility, commonly known as the triple bottom line. Although the Draft National Biodiversity Offset Policy is not yet officialised, three provinces, Western Cape Province, Kwa-Zulu Natal Province, and Gauteng Province, have developed guidelines to protect their

biodiversity. These guidelines align well with the national position stated in the draft policy and align in principle to the international best practice. However, whether these guidelines are being followed or not is difficult to ascertain in the absence of a national offset register. The need for a national biodiversity offset policy was also highlighted as a matter of urgency by Brownlie *et al.* (2017). Furthermore, the enforceability of these guidelines is difficult in the absence of a formal national policy.

Making more inferences from the findings, it was established that offsets are already being used as conditions for authorisation despite the absence of a formal biodiversity offset policy. Many have commended this approach as the initiative seeks to compensate for any residual impacts from projects. However, due to the state of the biodiversity offset policy, this initiative is vulnerable to legal challenge.

In addition, there is a need to align Acts that affect the offsetting process, for example, the NEMA, the Minerals and Petroleum Resources Development Act, and the Land Reform Act. This is a problem that most participants pointed out. As alluded to by participants, biodiversity offsets are an environmental management issue affected by land availability and land-use regulations. In some cases, it was discovered that the Minerals and Petroleum Resources Development Act supersedes the NEMA, as a piece of land with mining rights cannot be designated as a protected area. The mining sector in South Africa continues to grow and pose a potential threat to the country's biodiversity. This supports Lukey *et al.* (2017), who emphasised the need to incorporate offsets into the mining sector properly. Furthermore, acquiring land for offsets in South Africa is a challenge mainly due to land ownership problems. This issue is significantly magnified in communal lands where there is a disjuncture between the residents and the owners of the land (see section 5.4f, for an in-depth discussion on this).

In conclusion, to realise success in the biodiversity offsetting strategy in South Africa, it is essential to establish strong institutions that govern offsets and to formulate a comprehensive policy that gives proper guidance on the

biodiversity offsetting process. The following chapter discusses this legislation in comparison to the international standards.

5. 3 A COMPARISON BETWEEN SOUTH AFRICA'S BIODIVERSITY OFFSET LEGISLATION AND THE INTERNATIONAL STANDARDS.

This section unpacks the findings on the relationship between the legislative structure that governs biodiversity offsets in South Africa and the international standards. An examination of the offsetting goals and approach to the mitigation hierarchy were examined to make this comparison. The following inferences were made:

South Africa aligns in principle to the international standards. The main differentiating factor is that South Africa follows the target based ecological compensation approach instead of the averted loss approach. As represented by the IFC Performance Standards and the BBOP Principles, the international stance has been promoting the averted loss offsetting, where biodiversity offsets achieve a no-net-loss or a net gain of biodiversity at species and habitat level. Many researchers have criticised this approach. For example, a study by Gardner *et al.* (2013) emphasised the difficulty of defining no-net-loss. Additionally, Maron *et al.* (2018) express that the averted loss approach uses 'relative' instead of absolute no-net-loss as the baseline on which the biodiversity offset is compared. In the absence of an absolute baseline, this approach has the potential of promoting ongoing biodiversity loss.

Recent studies support a more proactive approach to biodiversity offsetting. Simmonds *et al.* (2020) have pushed for the shift to a target-based approach, which is the proactive way of compensating for biodiversity loss. However, according to (BBOP, 2012; Gardner *et al.* 2013; IUCN *et al.* 2018), most aspects of the prevailing approach remain applicable to the target-based approach. South Africa is, therefore, already ahead of the drive to shift from the averted loss offsetting to a target-based ecological compensation approach.

In addition, Simmonds *et al.* (2020) stress that target-based ecological compensation ensures that project-level responses are connected to broad jurisdictional biodiversity targets to achieve the desired outcomes. For this approach to work, jurisdictional biodiversity targets must be set and related legislation aligned. South Africa is still lagging in this respect. Coordination between the institutions and the policy needs to be established to effectively implement the target-based ecological compensation approach in South Africa.

Inferring on implementing the mitigation hierarchy, the findings suggested that the mitigation hierarchy is not strictly adhered to. As alluded to in chapter four by (Pers.com 2021c), who explains that “In most cases, offsets are opted for without proper implementation of the avoidance, minimise and remediation stages. Alternatives are not fully exhausted, and at times the hierarchy is not used to come up with the project location.” Offsets are regarded as the last resort in the mitigation hierarchy, compensating for significant residual impacts after measures have been taken to avoid, minimise, and remedy impacts. They can only achieve their purpose when this sequence is adhered to. However, it has been deducted from the interactions with industry experts that sometimes offsets are used as the only compensation measure for a project, which should not be the case. This problem has been seen in projects of political interest. Such projects tend to evade protocols and scrutiny of the competent authority. This finding resonates with Kormos *et al.* (2014), who conducted a case study in four Sub-Saharan countries and discovered that the mitigation hierarchy was not adhered to. Developers put little effort towards environmental issues as they regarded them as costly.

To implement the mitigation hierarchy properly, a comprehensive policy with clear guidance on the proper application should be supported by a strong institution that enforces and governs the process. Brownlie. (2017) alluded to this when they said; lack of clarity in the legislation frustrates developers as they have to figure things out independently. They add that this often leads to offsets not being implemented at all. A comprehensive offset policy for

South Africa should borrow guidance on applying the mitigation hierarchy from the BBOP principles. Vague guidelines will result in failed offsets as they are difficult to interpret.

5.4 THE CHALLENGES AND BARRIERS THAT HINDER THE BIODIVERSITY OFFSETTING PROCESS IN SOUTH AFRICA.

The challenges and barriers to biodiversity offsets in South Africa are discussed here.

a) LACK OF BIODIVERSITY OFFSET MANAGEMENT FUNDS

The offsetting process is very costly. These high offsetting costs have resulted in some offsetting projects not being completed deliberately (not wanting to part with too much money) or due to genuine financial constraints (the developer not affording the costs). A component of the offset policy should look at financial arrangements coupled with being proactive and making it simple for developers to put offset finances in their budgets as they apply for environmental authorisation.

Currently, no organisation is willing to handle offset funds as they can attract scrutiny to whoever holds them. However, offset trusts or banks have worked in developed countries like the USA and Australia, with independent organisations governing and handling the offset funds. Brownlie *et al.* (2017) alluded to this issue in their study, where they found that an attempt by the Northern and Western Cape provinces to use trust funds for offset financing in South Africa failed. The researcher, however, argues that establishing an independent institution or a unit within DFFE can become a viable option to manage trust funds and oversee the biodiversity offsetting process. This argument aligns with that of Maron *et al.* (2016), who in their study propose a trust fund to be managed by an independent fund administrator.

Besides affecting the developer, lack of funds also affect the environmental competent authority. As national budgets are cut, the regulator is limited on funds to monitor and carry out audits on the offsets. These findings coincide

with those of Lukey *et al.* (2017), who expressed the lack of funds as a challenge to environmental authorities in South Africa which leads to limited monitoring of development projects. One of the fundamental arguments raised by biodiversity offsetting critics is that inadequate monitoring of offsets leads to offset failures. This supports the views of Gordon *et al.* (2015), who claim that insufficient monitoring of offsets has contributed to the lack of robust information around offsets. Similar arguments are echoed by Maron *et al.* (2016), who say obtaining clear evidence of success or failure in offsets is difficult when monitoring and reporting of their performance are limited. Therefore, the government should prioritise offset monitoring funds since monitoring for compliance reviews how and to what extent policy objectives are met.

In the absence of strong institutions to monitor and evaluate biodiversity offsets, developers can be incentivised to under-deliver the offset requirements. For example, a developer or a third party implementing an offset for a developer may choose to ignore its offset obligations if it is known that the regulator is limited on funds to monitor their activities for compliance. Inadequate monitoring also makes it impossible to know the outcomes delivered by offsets, making it challenging to identify and correct any deficiencies in the offsetting process. In their study, Primmer *et al.* (2019) confirmed these points when they articulated that a lack of monitoring has caused a significant number of failed offsets as developers prioritise economic gains.

In addition, as gathered from the research participants, the government does not prioritise the provision of funds to monitor offset projects. Many factors can contribute to this finding. Firstly the knowledge that biodiversity conservation benefits are not universally known and accepted by the general public may incentivise the government to give little attention to monitoring offset projects in the country. Inversely monitoring offsets may not be prioritised to avoid public scrutiny, which is deemed financially and politically costly. Some projects may be linked to high profile developers (politicians), therefore, there will be an unwillingness to pursue non-compliance on such

projects. Therefore, lack of funds is sometimes used as an escape route to fulfilling other agendas. These are views that Brownlie *et al.* (2017) concur with, expressing that biodiversity offsets risk being used as a political negotiating tool.

b) INADEQUATE WORKFORCE

It has been established from interview data that there is a serious lack of human capital to effectively deal with biodiversity offsets (Pers.com 2021m). Both the government and the private sectors in South Africa are incapacitated. These findings are aligned with Brownlie *et al.* (2017). They pointed out in their research that poor performance and inability to deal with biodiversity offsets in South Africa is due to lack of human capital. A study by Duthie (2001) also shared the same sentiments. This shortage has strained the existing workforce resulting in poor administration of biodiversity offsets in the country. This is a view mirrored in Bidaud *et al.* (2018) study, highlighting that the few qualified professionals available are overwhelmed, leading to poor management of the offsetting process. This is further alluded to by Lukey *et al.* (2017), who identified a lack of competent personnel to contribute to poor administration of offsets significantly.

It has been established that biodiversity offsets are still in their infancy; therefore, there is a constant supply of discoveries due to continued research. Commenting on this dynamic nature of information, one participant emphasised that the success of biodiversity offsetting in South Africa lies more on training and educating practitioners and regulators on what legislation entails than on improving the draft policy itself (Pers.com 2021n). This does not discredit the importance of having a comprehensive legislative framework but also highlights the importance of prioritising training programs to ensure the same level of understanding (see Table 4.6). This view resonates with Lukey *et al.* (2017), who recommended training officials on offset governance, standard operating procedure and implementation guidelines to foster mutual understanding. This much-needed knowledge of

the legislation will empower the practitioners to implement offsets properly and the regulatory body to adequately monitor the offsetting process.

The responsibility to train and ensure that there is adequate human capital rests with the environmental department. According to the interview data, SANBI has started training regulators and practitioners (Pers.com 2021a). These training programs and workshops aim to educate people about biodiversity offsets, increase the number of specialists and improve the offsetting process. However, this initiative is still in its infancy and rolling at a slow pace. There is a need for a more aggressive approach in training to improve the understanding of biodiversity offsets and meet the demand for workforce in the private and government sectors.

c) RESISTANCE TO OFFSETS

Data from the interview participants proved that there is massive resistance to offsets in South Africa, even within the practitioners and regulators (Pers.com 2021c). This resistance has been one of the drawbacks of establishing an effective offset strategy in the country. Regarding this subject (Brownlie & Botha, 2009) argue that much of the resistance is caused by regarding an offset as a license to trash the environment and not as a development facilitation tool. The success of offsets is hinged on the presents of comprehensive policy frameworks and strong institutions that govern them. Therefore, ensuring that these two frameworks are functioning correctly is essential in improving the acceptance of offsets.

Another participant expressed that biodiversity offsetting issues have not been adequately deliberated in the country Pers.com (2021), therefore, they are not well understood by the majority. The same problem is faced globally, where information that supports biodiversity offsets is limited. The absence of a national offset register has exacerbated these concerns since there is no proof of successful offsets. This resonates with Brownlie *et al.* (2017), who say that having a national offset register will ensure transparency and provide the much-needed proof of offset success. Lack of clarity in legislation and the absence of an offset policy mean no proper guidance on executing offsets.

Educating the practitioners, regulators and the general populace on biodiversity offsets to demystify the misconceptions has again not been prioritised in the country (Brownlie & Botha, 2009). All the issues stated above have somewhat contributed to the resistance towards offsets, of which solutions should be sort to improve the way offsets are perceived.

d) ABSENCE OF BIODIVERSITY OFFSET REGISTER

The research findings from both the literature and interview participants emphasised the need for a national offset register. This issue was raised by 100% of the participants. They emphasised the importance of a national offset register in keeping track of the offsets. This resonates with the suggestions of Brownlie *et al.* (2017); in their study, they say, “a register of biodiversity offsets must be established to improve transparency, track and evaluate offset performance, aid compliance monitoring and enable emerging trends to inform policy adjustments over time.”

The register is a fundamental part of determining the success of offsets in the long run. It can prove that offsets can work in practice and also help avoid double claims of offset sites. The resistance to biodiversity offsets by the general public can be partially attributed to a lack of tangible proof of offset success. Biodiversity offset critics emphasise that impacts of development on biodiversity are certain but offset outcomes are not known. Detailed documentation of biodiversity offsets is a good reference point for future offset projects. This point corresponds with Bull *et al.* (2019), who, in their study, emphasised that having a national offset register will aid in the understanding of the long term effectiveness of biodiversity offsets. Maron *et al.* (2016) add that having a publicly accessible offset register will improve transparency in the offsetting process. It will also allow policymakers to make informed decisions, evaluate whether offsets are working in the country’s favour, and rectify legislative mistakes with practical examples as their reference.

The draft national biodiversity offset policy of 2017 requires every province to prepare and maintain its register. However, this cannot be enforced as the draft policy is not yet officialised in the country. According to participants, an

attempt was once made by SANBI to put a national offset register in place. However, it did not materialise as other provinces were not in agreement and did not release any information on offsets in their regions. National budget constraints also prevent attempts to keep the register going, as it is expensive to keep up.

e) UNRELIABLE EIA PROCESS

Making more inferences on findings from chapter four, it was established that the EIA process is unreliable. Many participants expressed that although in theory offsets are part of the EIA, in practice, offsets are discussed last in the process. As indicated by the interview participants, offset discussions are only mentioned when giving conditions for authorisation. As a result, they cannot influence the early stages of the EIA process, such as the project design and site selection. This substantiates a study by Brownlie *et al.* (2017), who express that late consideration of offsets prevents them from influencing the project design and further impact avoidance or minimisation.

It is thought that the use of the phrase 'last resort' has contributed to offsets being considered too late. Instead of offsets being part of the mitigation hierarchy, they are considered in isolation, which should not be the case. This resonates with Lukey *et al.* (2017), who express that defining offsets as a last resort has resulted in a misconception that different stakeholders regard them as undesirable rather than least desirable.

There is, therefore, a need for proper integration of biodiversity offsets into the Environmental Impact Assessment (EIA). Late consideration of offsets prevents them from going through public scrutiny, which is not ideal. As Brownlie *et al.* (2017) and Lukey *et al.* (2017) mentioned in their respective studies, stakeholder participation is a crucial stage that should not be evaded. Challenges from improper integration of offsets into the EIA process were illustrated by a study conducted by Kormos *et al.* (2014). Different case studies in four countries in the Sub-Saharan region were investigated and showed a neglect of the mitigation hierarchy in most projects. The mitigation hierarchy was not considered during site selection, and offsets were opted for

without thorough considerations of alternatives which led to the failure of offsets.

These case study based researches, similar to that of Kormos *et al.* (2014), are essential, and there is a need for such to be conducted in South Africa. However, it is only possible to conduct such research when a national offset register is publicly available. According to Maron *et al.* (2016), strong governing institutions must be established to ensure that the mitigation hierarchy is followed thoroughly and that biodiversity offsets are integrated effectively into the mitigation process. In addition, the policy should emphasise the importance of adhering to the mitigation hierarchy and to ensure that biodiversity offsetting discussions are done earlier.

Further, inferences showed that the baseline against which offset success is compared is incorrect as the biodiversity loss estimates are also undependable. The country needs to invest more in research to be up to date with accurate measures of biodiversity being lost. When the baseline is incorrect, the perceived net gain after an offset is implemented cannot be relied on. These findings align with the BBOP (2012), which emphasises that an accurate baseline assessment influences and informs the best offset design. Therefore, there is a need to look at offsets as part of the EIA process's bigger picture and make holistic reforms.

f) LAND USE PROBLEMS

Biodiversity offsets are fundamentally a land and biodiversity protection mechanism, as expressed by one participant (Pers.com 2021f). They are often seen as an instrument for impact management, and therefore, perceived as a problem. To have effective offsets in the long run, there is a need to understand how to rehabilitate, set aside and protect biodiversity. Brownlie *et al.* (2017) highlighted land scarcity in South Africa as a challenge to offset implementation, as approximately 70% of the land is privately owned. Offsets can only work when there is enough land to implement them. Therefore, there should be provision for biodiversity offsets in the Land Reform Act.

According to the data gathered from interview participants, there are serious land ownership issues in South Africa, especially with communal land. One participant expressed a huge ownership dispute between the land trusts or community property associations who hold the title deeds and the actual community members when an offset was proposed for that land. Often proposals to secure an offset in such a situation are met with resistance from the community members, which delays or stops offsets from being implemented.

Designating protected areas may mean that the community members must relocate or their access to some ecosystem services is restricted. Community members are usually not willing to relocate due to social factors (i.e. heritage sites, social bonds and livelihoods). Therefore, acquiring land in such instances requires the agreement of the community members too. This concurs with Murombo (2017), who expresses that environmental management can only succeed when social issues are seriously considered in decision making. The Land Reform Act does not make mention of biodiversity offsets, and this exacerbates the problem. It is essential to take a proactive approach to deal with biodiversity offsets, where land is explicitly designated for offsets instead of acquiring land on a case by case basis. This proactive approach is only achievable if the Land Reform Act and NEMA are aligned one to another. Therefore, the process of formulating these policies and regulations should be inclusive of all relevant stakeholders, especially those who do the practical work in the offsetting process, to ensure that issues of misalignment in Acts are solved.

Additionally, in South Africa, pressure on land is further increased by population growth. As the populations grow, the demand for agricultural and resettlement land increases. The same fertile land suitable for an offset will be targeted for agriculture, resulting in conflicts that may escalate to protests. Established protected areas can also be targeted for agriculture since they can be looked at as idle land by a population that needs land to provide food for their families. This invasion of protected land is a potential threat to established offsets in the long run. Although these are more complex social

issues that require tact and wisdom to solve, it is believed that having comprehensive and aligned legislation supported by strong institutions can form part of the solution to the land-use problems.

g) ABSENCE OF A CLEAR BIODIVERSITY OFFSET POLICY AND LACK OF CLARITY IN LEGISLATION.

As discussed in section 5.2, South Africa's legislation has given provisions for using biodiversity offsets to compensate for biodiversity loss caused by development projects. However, the absence of a specific policy that guides the offsetting process has brought about so much confusion. This resonates with Lukey *et al.* (2017), who say that lack of consistency in the offsetting process is due to policy ambivalence. It is further emphasised by Maron *et al.* (2016), who claim that without robust evaluation frameworks, it is challenging to measure offset success against ecological criteria.

During an interview with one participant, they expressed that practitioners and regulators have to rely on various pieces of legislation that are sometimes contradicting or lack clarity, to implement offsets. However, to them, the challenge was the lack of clarity of the legislation and not necessarily the absence of the policy. This supports the claims of Brownlie *et al.* (2017), who says that lack of clarity contributes to inconsistencies in the offsetting process.

In light of the above, lack of clarity in legislation was one of the popular challenges mentioned by participants. The legislation lacks guidance on how to apply the mitigation hierarchy effectively. Additionally, there is a lack of guidance on critical issues like offsetting cumulative and ongoing impacts on biodiversity (Pers.com 2021c). These are two significant contributors to biodiversity loss, as supported by Bull *et al.* (2013) and Lukey *et al.* (2017) in their respective studies. Without the legislation guiding how these impacts can be offset, there is a continued risk of unaccounted biodiversity loss in South Africa.

In addition, the legislation should also address how to offset biodiversity loss as a result of agricultural activities (Pers.com 2021e). Like most African

countries, South Africa relies on extensive agriculture to provide food and foreign currency. Agriculture requires enormous land, making it one of the most significant contributors to biodiversity loss in South Africa. There is, therefore, a need for guidance on how to offset agricultural activities. Additionally, clarity on whom the financial burden to offset agricultural activities is placed should be provided in the policy.

The research participants indicated that placing the financial burden to offset agricultural activities on the farmers would be unfair as they provide food for the nation. The government is already financially constrained to offset these activities. Therefore, there is a need for a plan to deal with such issues.

h) BADLY FRAMED ENVIRONMENTAL AUTHORISATION CONDITIONS.

The many different pieces of legislation that have made provisions for biodiversity offsetting, directly or indirectly, have made it possible for offsets to be stipulated as conditions for environmental authorisation in some projects. One of the many challenges that participants raised was that these conditions for authorisation are poorly framed. Often the regulator does not include explicit, measurable or auditable outcomes that must be achieved. Some of the requirements are also not complete and vague. For example, they lack suspensive conditions or stipulated implementation timelines on the offset plan. Such imprecise requirements make it difficult to audit for compliance. These confirm the findings of Brownlie *et al.* (2017), who expressed that conditions of authorisation are usually weak and unenforceable.

It was also heightened that sometimes the size of the offset or financial requirements are not specified for the developer. In addition, the location for the offset is often not stipulated. The burden to secure the site is often left to the developer with no proper guidance on the characteristics of an ideal location. When these conditions are not clear, they are hard to understand and implement. This affects the offsetting process, especially the monitoring stage. If not prioritised, this may result in many failed offsets, as monitoring

for compliance is effective when the conditions for authorisation are explicit. As alluded to by de Witt *et al.* (2019), some offsets are only considered after the authorisation has been given, meaning the offsets are not properly incorporated, resulting in poor implementation.

The challenges to offsetting have been discussed in this section. It is clear that the country faces institutional and policy challenges that need to be addressed to have a successful offsetting strategy.

5.5 SUGGESTED APPROACHES AND STRATEGIES FOR EFFECTIVE OFFSETTING.

Now that the challenges and barriers to offsetting have been clearly articulated. Suggestions must be made to improve and enhance biodiversity offsetting in the country. This is an important section of the study as it gives practical suggestions relayed by experts in the field. These suggestions are not arranged in order of importance, therefore, they carry the same weight.

a) ESTABLISH A BIODIVERSITY OFFSETTING UNIT

The biodiversity offsetting process involves a lot of work that requires dedication. As established in this research, a good policy achieves its aim when a strong institution is in place to enforce it. Therefore, it can be argued that a successful biodiversity offsetting strategy is a product of a comprehensive policy and a strong institutional framework. Having an institution dedicated to governing the biodiversity offsetting process can solve some of the challenges identified above. This resonates with Maron *et al.* (2016) study, which recommended an independent offset fund administrator to manage offset trust funds.

The researcher, therefore, suggests that the DFFE should consider establishing a unit within its operations or an independent institution mandated to govern the offsetting process. This unit must be made up of industry experts who are well informed on the subject matter. One of the challenges raised was that of shortage of human capital to deal with

biodiversity offsets. It is, therefore, essential to ensure that the unit that will be set up is not short-staffed to avoid inefficiencies.

A critical part of the offsetting process is the monitoring phase. However, as highlighted by the research participants, monitoring offsets is weak in South Africa (Pers.com 2021a). This compromises offsets' success since monitoring offsets is crucial in ensuring that no net loss or net gain is realised. The department should ensure that enough funds are allocated to this unit to monitor offset projects adequately. Most projects fail when they are not monitored for compliance because nothing incentivises the developer to comply when no one monitors their actions. Project monitoring promotes transparency and helps avoid unnecessary misconceptions. These claims are supported by the findings of Bull *et al.* (2013), who in their study identified a lack of empirical evaluation of projects to be a challenge to the success of biodiversity offsets. Brownlie *et al.* (2013) further expand this thought when they express a lack of institutional capacity causes inadequate monitoring.

Besides implementing the requirements of the policy, having a unit dedicated to biodiversity offsets management will also facilitate the management of offsetting funds. There is a need for proper funding arrangements for offsets to be made. Transparency and security concerning offsetting funds are crucial for the success of offsets. The establishment of an offsetting unit will facilitate the long-term management of these funds in South Africa.

Additionally, the offset unit will facilitate the formulation and management of a national offset register to keep track of all offsets in the country. Without this special offset unit to establish the offset register, it is difficult to ascertain that all the offsets will be registered and monitored as the current environmental authority is overwhelmed. This is a view supported by Maron *et al.* (2016), who expressed that an offset register must be established and made publicly accessible to ensure transparency in the offsetting process.

This unit will also facilitate the training programs of practitioners and regulators to improve the understanding of offsets and catch up with the

dynamic standards and guidelines in this field. This includes the running of awareness campaigns too.

Alternatively, the DFFE can contract an independent consultancy competent to deal with offsets to act on behalf of the department in managing the offset process. Having an independent institution allows for flexible use of the offset budget, avoiding the government financing system that can be complicated. Offset management and monitoring funds can be built into the offset budget instead of relying on government constrained funds. This will facilitate rigorous monitoring to be done by qualified professionals who will then report to the local conservation agency.

b) HAVE A CLEAR BIODIVERSITY OFFSETTING POLICY

Chapter four highlighted that South Africa has legislation that direct the biodiversity offsetting process (see Table 4.3). However, most of the legislature is indirectly applicable to offsetting and is not comprehensive enough. Lack of clarity and absence of guidance on key issues are some of the problems resulting from the current legislative situation. There is, therefore, a need for a comprehensive biodiversity offsetting policy to guide the offsetting process.

It is improbable that biodiversity offsets will succeed in the absence of an explicit offsetting policy. This view is supported by Brownlie *et al.* (2017), who expressed the importance of an offset policy in ensuring the success of the offsetting process in South Africa. It is further emphasised by Bull *et al.* (2013), who in their study say that without an overriding policy to provide guidance, biodiversity offsets will not achieve sustained net gain. The policy will need to set out clear principles relevant for use throughout the offsetting process from design to the offset outcome. Guidance on ongoing and cumulative impacts should be embedded in this policy (Pers.com 2021d), including direction on offsetting agricultural activities with defensible methodologies (Pers.com 2021e).

The policy should address all the challenges and barriers stated above, including integrating biodiversity offsets into the EIA process, institutional and financial arrangements once the developer's responsibility for offsets has

ceased, and enforce strict adherence to the mitigation hierarchy (Pers.com 2021m). Although the mitigation hierarchy is already mentioned in the draft policy, it lacks proper guidance on implementing the hierarchy. There is no clarity on how to remedy biodiversity impacts (Pers.com 2021k). All these issues must be mentioned and clarified in a comprehensive offset policy.

Formulation of the policy must involve all relevant stakeholders, and the policy must be outcome-based, not a set of instructions. A more coherent understanding can be reached when all stakeholders are involved (i.e. the regulators, those involved in biodiversity design, implementation and other processes). This substantiates the conclusions of Grimm & Köppel (2019), who claim that stakeholder involvement increases the acceptability of established offsetting standards. More practical challenges are discussed and considered to inform the contents of the policy when all stakeholders are included in the process. Consequently, these dialogues can aid in the improvement of workforce and awareness creation for both the practitioners and the general public.

The biodiversity offset policy should also promote or put more emphasis on conservation banking. Conservation banking allows individual landowners with conservation worthy land, lying idle, to generate an income by being recipients of offsets. This concept has worked for carbon banking, and the same concept can be applied to biodiversity offsetting. These suggestions are supported by McKenney & Kiesecker (2010), who express that conservation banks are essential for the long-term conservation of species and habitats. They caution against the use of land previously designated for conservation to be used as a conservation bank. However, this policy should be supported and implemented by a strong institution (the suggested unit within the DFFE) that is well informed and well trained to guide the execution of the policy requirements.

c) OFFER TRAINING

Training practitioners and regulators and conducting awareness campaigns for the general public was emphasised by over 80% of the interview

participants. This resonates with Brownlie *et al.* (2017), who in their study claim that training on offsets has been sporadic. They suggest educating specialists and the civil society on biodiversity offsets to build understanding. These training programs may include basics like what biodiversity offsets mean in the South African context up to the more complex stuff. Currently, the focus is on perfecting the legislation than on making people understand it. This approach brings about a lot of challenges, including failure to correctly interpret and implement the legislation resulting in failed offsets (Pers.com 2021n). There must be a balance between efforts put into establishing offsetting legislation and that put in educating the general public, practitioners and regulators to understand the legislation.

One of the reasons offsets fail is that both the implementers and regulators are not well informed. Information is essential when dealing with dynamic and complex issues like biodiversity offsetting. Training programs should aim to instil in their trainees the ability to think proactively. In addition, emphasis should be placed on the outcome-based way of looking at offsets instead of focusing on instructions and formulas. These training programs should be vehicles for change and improvement in how biodiversity offsetting is done in South Africa.

Having an offset policy is essential but not the panacea. For the policy to be implemented, it must be understood and interpreted correctly. Therefore, the policy implementers must have a universal understanding of the policy and sufficient knowledge of applying the policy's requirements. This is a view shared by ten Kate *et al.* (2004), who emphasise that scant knowledge of biodiversity offset directly impacts their success as they are complex and require attention to detail. Training programs aid in the understanding of the policy and how to implement it. These training programs should be made as realistic as possible using practical examples. Without a clear understanding of the policy and regulations that govern biodiversity offsetting, it is impossible to have successful offsetting programmes.

Besides training practitioners and regulators, it is equally important to have awareness campaigns to educate the general public. Informing the human

mind enhances logical thinking. Much of the resistance to offsets is caused by ignorance. Therefore, it is essential to invest in educating the general populace to dissolve any doubts. Dedication and consistency are critical in the success of training programs, hence, the need to have a special unit dedicated to executing this work.

d) IMPROVE THE ENVIRONMENTAL AUTHORISATION CONDITIONS.

Currently, the conditions for authorisation for biodiversity offsets are poorly framed. There is a need to include explicit, measurable, and auditable requirements that the developer can achieve and understand. Guidance on how to implement the offset plans that developers are required to draw up must be given. For the requirements to be enforceable, the regulators must ensure that any reference in the conditions for authorisation refers to an entity or a party bound by law. This supports the requirements of the DEA (2014) to provide clear environmental conditions for developers. However, this process demands more human capital, of which the department is short-staffed and under-resourced to employ more competent staff. Alluding to this issue, Brownlie *et al.* (2017) suggest using independent specialists to improve how these conditions are drafted.

The conditions for authorisation must include suspensive conditions, which state clearly that the activity applied for cannot start until some key components of the offset have been finalised, and evidence provided as an assurance of implementation. These suspensive conditions can include financial arrangements and agreement on the final offset site with the landowner, among other things. In the absence of such suspensive conditions, developments can be forged ahead, causing damage to the environment which may be irreversible. However, the forging ahead of developments can be avoided in the presents of an efficient and effective offset management unit that oversees the whole offsetting process.

To ensure improvement in formulating the conditions for environmental authorisation, it is essential for the authorities responsible for drafting them

to be well trained and experienced. In addition, the implementers should also be trained, to effectively facilitate the implementation process. A special offsetting unit can facilitate the drafting of clear and enforceable conditions.

e) CONDUCT MORE RESEARCH.

Biodiversity offsetting in South Africa is still in its infancy. There is a need for more research to be conducted to cover the knowledge gaps both globally and locally. South Africa should encourage and promote conducting scientific research in this area by providing funding for such to be achieved. Key areas that focus on ensuring successful offsets implementation and the sustainability of offsets should be prioritised. Research should also enable a proactive approach to offsetting in the country by informing the policy ensuring that a precautionary policy approach is implemented. More research is also essential in clarifying some of the major preconceptions and misinformation surrounding offsets. It can bring about transparency and scientific bases to make informed decisions. This suggestion matches recommendations from a report by ten Kate *et al.* (2004) that claim that research help dissolve any misconceptions about biodiversity offsets as it provides scientific evidence. They emphasise research that demonstrates case studies of offset implementation.

In summary, biodiversity offsetting in South Africa is still faced with many challenges. Whether offsets succeed or not now depends on how these challenges are solved. A comprehensive policy supported by a strong institution is believed to form a more significant part of the solution. Therefore, there is a need to make necessary reforms to enable biodiversity offsets to facilitate sustainable development in South Africa.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 KEY CONCLUSIONS OF THE STUDY

This study sought to explore the role of institutional and policy frameworks in facilitating the biodiversity offsetting process in South Africa. The researcher engaged with literature and conducted interviews with experts in the environmental field to gather the information. The most significant finding in this study is that the environmental outcomes delivered from biodiversity offsetting are influenced by both the policy and the institutions that govern them. There is a strong link between these two frameworks, with each influencing the other. An imbalance between the two will result in failed offsets.

This study has established that the legislative framework that currently directs biodiversity offsetting in South Africa is weak and has many contradictions. The absence of an explicit offset policy has resulted in variations in the biodiversity offsetting process in the country. Although South Africa has managed to map its biodiversity through the NBA, a comprehensive offset policy remains vital for the success of biodiversity offsets. The establishment of the provincial offset guidelines by the three provinces in South Africa, coupled with the environmental assessments that have been ongoing for years, including mapping of ecosystems, can provide a solid basis for formulating a comprehensive offset policy.

In addition to this finding, the study revealed that there is no institution specifically mandated to manage offsets in the country. The burden of managing offsets lies with the Department of Forestry, Fisheries and the Environment, which is currently understaffed and overwhelmed with its administrative work. This is an undesired state that has been seen to cause offset failures in other countries. It is, therefore, feared that the department will fail to manage this burden in the long run as offsets are only expected to

rise in number in the country. There is, therefore, a need for a strong institutional framework to be established.

Another key finding noted was that there is a lack of expertise to deal with offsets. The offset implementers are confused about how to implement offsets in the absence of explicit and comprehensive guidelines. The current legislation that directs the offsetting process seems to lack clarity on important issues like the mitigation hierarchy and lacks guidance on offsetting requirements for cumulative, ongoing and agricultural impacts on biodiversity. The department's lack of expertise has been attributed to little or no training initiatives to ensure that biodiversity offsetting is popular among practitioners and regulators. In relation to this finding, awareness campaigns to inform the general public are also recommended as there is a lack of awareness. These campaigns should be aimed at demystifying the misconceptions that people have regarding biodiversity offsetting.

6.2 RECOMMENDATIONS

This study recommends that:

- a) There is a need to establish a comprehensive biodiversity offset policy and formalise it to be enforceable. Formulation of the policy should include all relevant stakeholders and should be informed by practical experience. The policy will provide much needed clear guidance on offsetting in South Africa.
- b) An offset unit within the DFFE (or an independent institution) should be established and mandated to enforce the biodiversity offset policy requirements. This unit must be made up of professionals who are well trained and well informed. Availability of a functional and robust offset unit or institution will facilitate the implementation of offsets and ensure that the monitoring process is done effectively to avoid non-compliance and increase the success of offsets.
- c) Training programs should be prioritised, and funds should be allocated to this initiative. These programs will help to increase the human capital required to carry out the work throughout the offsetting process.

- d) The researcher also recommends having a national offset register. This register should be a well-documented and exhaustive list of all offsets done so that it acts as the reference point for all the offsets done in the country. It should be up to date and publicly available to promote transparency.

6.3 FUTURE RESEARCH

Based on the research findings, the researcher presents the research gaps that can inform areas of future research in South Africa. Firstly, it is important for future research to look at biodiversity offsets and how they fit within the broader framework of the mitigation hierarchy in the South African context. Secondly, future research can investigate the risks and opportunities in implementing the biodiversity offset policy in South Africa. Thirdly, there is also a need to assess the social impacts of biodiversity offsets, where stakeholder perceptions on offsetting programmes are investigated. It is also essential to investigate how the country's political environment affect the biodiversity offsetting process. Lastly, but equally important, is to investigate ways to improve biodiversity offset training programs. These areas of future research have been suggested because they seek to understand biodiversity offsets in the context of South Africa.

REFERENCE LIST.

- Bbop. (2009). *Biodiversity Offset Cost-Benefit Handbook*.
- BBOP. (2009). Biodiversity offset design handbook. In *Forest Trends* (Vol. 5). Retrieved from <http://bbop.forest-trends.org/guidelines/index.php>
- BBOP. (2012). Resource paper: Limits to what can be offset. In *Washington, D.C.*
- Bigard, C., Pioch, S., & Thompson, J. D. (2017). The inclusion of biodiversity in environmental impact assessment: Policy-related progress limited by gaps and semantic confusion. *Journal of Environmental Management*, 200, 35–45. <https://doi.org/10.1016/j.jenvman.2017.05.057>
- Biggs, R., Simons, H., Bakkenes, M., Scholes, R. J., Eickhout, B., van Vuuren, D., & Alkemade, R. (2008). Scenarios of biodiversity loss in southern Africa in the 21st century. *Global Environmental Change*, 18(2), 296–309. <https://doi.org/10.1016/j.gloenvcha.2008.02.001>
- Bison 2000 (Nigeria).pdf*. (n.d.).
- Boisvert, V. (2015). Conservation banking mechanisms and the economization of nature: An institutional analysis. *Ecosystem Services*, 15, 134–142. <https://doi.org/10.1016/j.ecoser.2015.02.004>
- Botha, M., Desmet, P., & Brownlie, S. (2013). Biodiversity Offset Report. *Gamsberg Zinc Project .Offset Report*.
- Botkin, D. B., Saxe, H., Araújo, M. B., Betts, R., Bradshaw, R. H. W., Cedhagen, T., ... Stockwell, D. R. B. (2007). Forecasting the Effects of Global Warming on Biodiversity. *BioScience*, 57(3), 227–236. <https://doi.org/10.1641/b570306>
- Brooks, T. M., Mittermeier, R. A., Da Fonseca, G. A. B., Gerlach, J., Hoffmann, M., Lamoreux, J. F., ... Rodrigues, A. S. L. (2006). Global biodiversity conservation priorities. *Science*, 313(5783), 58–61. <https://doi.org/10.1126/science.1127609>
- Brownlie, S. (2007). Provincial guideline on biodiversity offsets. *Development*, 103.
- Brownlie, Susie, & Botha, M. (2009a). Biodiversity offsets: Adding to the conservation estate, or “no net loss”? *Impact Assessment and Project Appraisal*, 27(3), 227–231. <https://doi.org/10.3152/146155109X465968>
- Brownlie, Susie, & Botha, M. (2009b). Biodiversity offsets: Adding to the conservation estate, or “no net loss”? *Impact Assessment and Project Appraisal*, 27(3), 227–231. <https://doi.org/10.3152/146155109X465968>
- Brownlie, Susie, Hase, A. Von, Botha, M., Manuel, J., Balmforth, Z., Jenner, N., ... Balmforth, Z. (2017). Biodiversity offsets in South Africa –

- challenges and potential solutions. *Impact Assessment and Project Appraisal*, 5517, 1–9.
<https://doi.org/10.1080/14615517.2017.1322810>
- Brownlie, Susie, King, N., & Treweek, J. (2013). Biodiversity tradeoffs and offsets in impact assessment and decision making: Can we stop the loss? *Impact Assessment and Project Appraisal*, 31(1), 24–33.
<https://doi.org/10.1080/14615517.2012.736763>
- Brownlie, Susie, von Hase, A., Botha, M., Manuel, J., Balmforth, Z., & Jenner, N. (2017). Biodiversity offsets in South Africa—challenges and potential solutions. *Impact Assessment and Project Appraisal*, 35(3), 248–256. <https://doi.org/10.1080/14615517.2017.1322810>
- Bull, J. W., Lloyd, S. P., & Strange, N. (2017). Implementation Gap between the Theory and Practice of Biodiversity Offset Multipliers. *Conservation Letters*, 10(6), 656–669. <https://doi.org/10.1111/conl.12335>
- Bull, J. W., Suttle, K. B., Gordon, A., Singh, N. J., & Milner-Gulland, E. J. (2013). Biodiversity offsets in theory and practice. *Oryx*, 47(3), 369–380.
<https://doi.org/10.1017/S003060531200172X>
- Bull, J. W., Suttle, K. B., Gordon, A., Singh, N. J., & Milner-Gulland, E. J. (2019). Review Biodiversity offsets in theory and practice. *Biodiversity Offsets in Theory and Practice*, 47(August 2012), 369–380.
<https://doi.org/10.1017/S003060531200172X>
- Buschke, F. T. (2017). Biodiversity trajectories and the time needed to achieve no net loss through averted-loss biodiversity offsets. *Ecological Modelling*, 352, 54–57.
<https://doi.org/10.1016/j.ecolmodel.2017.02.021>
- Buschke, F. T., Brownlie, S., & Manuel, J. (2019). The conservation costs and economic benefits of using biodiversity offsets to meet international targets for protected area expansion. *Oryx*, 53(4), 732–740.
<https://doi.org/10.1017/S0030605317001521>
- Business and Biodiversity Offsets Programme (BBOP). (2012). Standard on Biodiversity Offsets. *Business and Biodiversity Offsets Programme (BBOP)*, 102.
- Cadman, M. (2010). Biodiversity for Development: South Africa’s landscape approach to conserving biodiversity and promoting ecosystem resilience. *Africa*, 93, 171. <https://doi.org/10.1016/j.apmr.2011.08.012>
- Calvet, C., Napoléone, C., & Salles, J. M. (2015). The biodiversity offsetting dilemma: Between economic rationales and ecological dynamics. *Sustainability (Switzerland)*, 7(6), 7357–7378.
<https://doi.org/10.3390/su7067357>
- Campion, B. B., & Essel, G. (2013). Environmental impact assessment and sustainable development: A critical review. *Environment and Natural Resources Research*, 3(2), 37–51.
<https://doi.org/10.5539/enrr.v3n2p37>

- Chapin, F. S., Zavaleta, E. S., Eviner, V. T., Naylor, R. L., Vitousek, P. M., Reynolds, H. L., ... Díaz, S. (2000). Consequences of changing biodiversity. *Nature*, 405(6783), 234–242.
- Chirambo, D. (2016). Moving past the rhetoric: Policy considerations that can make Sino-African relations to improve Africa's climate change resilience and the attainment of the sustainable development goals. *Advances in Climate Change Research*, 7(4), 253–263.
<https://doi.org/10.1016/j.accre.2016.11.002>
- Committees, R. (2012). *IUCN Policy on Biodiversity Offsets*. 1–14.
- Creswell, J. W., Hanson, W. E., Clark Plano, V. L., & Morales, A. (2007). Qualitative Research Designs: Selection and Implementation. *The Counseling Psychologist*, 35(2), 236–264.
<https://doi.org/10.1177/0011000006287390>
- de Klerk, A. R., Dini, J., Holness, S., & Overholster, P. (2016). *Wetland offsets: A best practice guideline for South Africa* (Vol. 6).
- de Witt, M., Pope, J., Retief, F., Bond, A., Morrison-Saunders, A., & Steenkamp, C. (2019). Biodiversity offsets in EIA: Getting the timing right. *Environmental Impact Assessment Review*, 75(January 2018), 1–12. <https://doi.org/10.1016/j.eiar.2018.11.001>
- Duthie, A. G. (2001). A review of provincial environmental impact assessment administrative capacity in South Africa. *Impact Assessment and Project Appraisal*, 19(3), 215–222.
<https://doi.org/10.3152/147154601781767032>
- Ehrke, A. M., & Ehrke, A. M. (2010). Environmental Policy Framework. *An Ever Cleaner Union?*, 79–112. https://doi.org/10.1007/978-3-531-92278-2_4
- Gardner, T. A., Von Hase, A., Brownlie, S., Ekstrom, J. M. M., Pilgrim, J. D., Savy, C. E., ... Ten Kate, K. (2013). Biodiversity Offsets and the Challenge of Achieving No Net Loss. *Conservation Biology*, 27(6), 1254–1264. <https://doi.org/10.1111/cobi.12118>
- George, T. E., Karatu, K., & Edward, A. (2020). An evaluation of the environmental impact assessment practice in Uganda: challenges and opportunities for achieving sustainable development. *Heliyon*, 6(9), e04758. <https://doi.org/10.1016/j.heliyon.2020.e04758>
- Gordon, A., Bull, J. W., Wilcox, C., & Maron, M. (2015). Perverse incentives risk undermining biodiversity offset policies. *Journal of Applied Ecology*, 52(2), 532–537. <https://doi.org/10.1111/1365-2664.12398>
- Griffiths, V. F., Bull, J. W., Baker, J., & Milner-Gulland, E. J. (2019). No net loss for people and biodiversity. *Conservation Biology*, 33(1), 76–87. <https://doi.org/10.1111/cobi.13184>
- Grimm, M., & Köppel, J. (2019). *Biodiversity Offset Program Design and Implementation*.

- Guillet, F., & Semal, L. (2018). Policy flaws of biodiversity offsetting as a conservation strategy. *Biological Conservation*, 221(September 2017), 86–90. <https://doi.org/10.1016/j.biocon.2018.03.001>
- Hahn, R., & Richards, K. (2013). Understanding the effectiveness of environmental offset policies. *Journal of Regulatory Economics*, 44(1), 103–119. <https://doi.org/10.1007/s11149-013-9211-1>
- Hayes, N., & Morrison-Saunders, A. (2007). Effectiveness of environmental offsets in environmental impact assessment: Practitioner perspective from Western Australia. *Impact Assessment and Project Appraisal*, 25(3), 209–218. <https://doi.org/10.3152/146155107X227126>
- He, F., & Hubbell, S. P. (2011). Species-area relationships always overestimate extinction rates from habitat loss. *Nature*, 473(7347), 368–371. <https://doi.org/10.1038/nature09985>
- ICMM, & IUCN. (2012). Independent report on biodiversity offsets. *Prepared by The Biodiversity Consultancy for The International Council on Mining and Metals and the International Union for Conservation of Nature.*, (January), 60 p.
- IFC. (2013). IFC Performance Standards on Environmental and Social Sustainability - Effective January 1, 2012. *International Finance Corporation (IFC) Website*, 72. Retrieved from http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/publications/publications_handbook_pps
- IUCN, The Biodiversity Consultancy, & IGF (Intergovernmental Forum on Mining, M. M. and S. D. (2018). *Understanding Government Biodiversity Offset Policies in the Mining Sector*. Retrieved from <http://www.csbi.org.uk/>
- Jha, R., & Whalley, J. (2015). The environmental regime in developing countries. *World Scientific Reference on Asia and the World Economy*, 217–242. https://doi.org/10.1142/9789814578622_0024
- Kamble, R., Walia, A., & Thakare, M. (2013). Ecosystem Approach To Flood Disaster Risk Reduction. *International Journal of Environment*, 2(1), 70–82. <https://doi.org/10.3126/ije.v2i1.9209>
- Karekezi, S., & Kimani, J. (2002). Status of power sector reform in Africa: Impact on the poor. *Energy Policy*, 30(11–12), 923–945. [https://doi.org/10.1016/S0301-4215\(02\)00048-4](https://doi.org/10.1016/S0301-4215(02)00048-4)
- Kiesecker, J. M., Copeland, H., Pocewicz, A., Nibbelink, N., McKenney, B., Dahlke, J., ... Stroud, D. (2009). A Framework for Implementing Biodiversity Offsets: Selecting Sites and Determining Scale. *BioScience*, 59(1), 77–84. <https://doi.org/10.1525/bio.2009.59.1.11>
- Kopittke, P. M., Dalal, R. C., Finn, D., & Menzies, N. W. (2017). Global changes in soil stocks of carbon, nitrogen, phosphorus, and sulphur as influenced by long-term agricultural production. *Global Change Biology*,

- 23(6), 2509–2519. <https://doi.org/10.1111/gcb.13513>
- Kormos, R., Kormos, C. F., Humle, T., Lanjouw, A., Rainer, H., Victurine, R., ... Williamson, E. A. (2014). Great apes and biodiversity offset projects in Africa: The case for national offset strategies. *PLoS ONE*, 9(11). <https://doi.org/10.1371/journal.pone.0111671>
- Lukey, P., Cumming, T., Paras, S., Kubiszewski, I., & Lloyd, S. (2017a). Making biodiversity offsets work in South Africa – A governance perspective. *Ecosystem Services*, 27(May), 281–290. <https://doi.org/10.1016/j.ecoser.2017.05.001>
- Lukey, P., Cumming, T., Paras, S., Kubiszewski, I., & Lloyd, S. (2017b). Making biodiversity offsets work in South Africa – A governance perspective. *Ecosystem Services*, 27(April), 281–290. <https://doi.org/10.1016/j.ecoser.2017.05.001>
- Lune, H., & Berg, B. L. (2017). *Methods for the Social Sciences Global Edition*.
- Maitima, J. M., Mugatha, S. M., Reid, R. S., Gachimbi, L. N., Majule, A., Lyaruu, H., ... Mugisha, S. (2009). *The linkages between land use change , land degradation and biodiversity across East Africa*. 3(10), 310–325.
- Mantyka-Pringle, C. S., Visconti, P., Di Marco, M., Martin, T. G., Rondinini, C., & Rhodes, J. R. (2015). Climate change modifies risk of global biodiversity loss due to land-cover change. *Biological Conservation*, 187, 103–111. <https://doi.org/10.1016/j.biocon.2015.04.016>
- Maron, M., Brownlie, S., Bull, J. W., Evans, M. C., Von Hase, A., Quétier, F., ... Gordon, A. (2018). The many meanings of no net loss in environmental policy. *Nature Sustainability*, 1(1). <https://doi.org/10.1038/s41893-017-0007-7>
- Maron, M., Hobbs, R. J., Moilanen, A., Matthews, J. W., Christie, K., Gardner, T. A., ... McAlpine, C. A. (2012). Faustian bargains? Restoration realities in the context of biodiversity offset policies. *Biological Conservation*, 155, 141–148. <https://doi.org/10.1016/j.biocon.2012.06.003>
- Maron, M., Ives, C. D., Kujala, H., Bull, J. W., Maseyk, F. J. F., Bekessy, S., ... Evans, M. C. (2016). Taming a Wicked Problem: Resolving Controversies in Biodiversity Offsetting. *BioScience*, 66(6), 489–498. <https://doi.org/10.1093/biosci/biw038>
- Maron, M., Simmonds, J. S., Watson, J. E. M., Sonter, L. J., Bennun, L., Griffiths, V. F., ... Jones, J. P. G. (2020). Global no net loss of natural ecosystems. *Nature Ecology and Evolution*, 4(1), 46–49. <https://doi.org/10.1038/s41559-019-1067-z>
- Martinson, R. (2014). License to Trash? Can Biodiversity Offsetting Adequately Protect England’s Natural Habitats and Facilitate Development? *Transnational Law & Contemporary Problems*, 24(193), 193–215.

- McKenney, B. A., & Kiesecker, J. M. (2010a). Policy development for biodiversity offsets: A review of offset frameworks. *Environmental Management*, 45(1), 165–176. <https://doi.org/10.1007/s00267-009-9396-3>
- McKenney, B. A., & Kiesecker, J. M. (2010b). Policy development for biodiversity offsets: A review of offset frameworks. *Environmental Management*, 45(1), 165–176. <https://doi.org/10.1007/s00267-009-9396-3>
- Miller, L. M., & Keith, D. W. (2018). Observation-based solar and wind power capacity factors and power densities. *Environmental Research Letters*, 13(10). <https://doi.org/10.1088/1748-9326/aae102>
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., Altman, D., Antes, G., ... Tugwell, P. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Medicine*, 6(7). <https://doi.org/10.1371/journal.pmed.1000097>
- Moilanen, A., & Kotiaho, J. S. (2018). Fifteen operationally important decisions in the planning of biodiversity offsets. *Biological Conservation*, 227(September), 112–120. <https://doi.org/10.1016/j.biocon.2018.09.002>
- Moreno-Mateos, D., Maris, V., Béchet, A., & Curran, M. (2015). The true loss caused by biodiversity offsets. *Biological Conservation*, 192. <https://doi.org/10.1016/j.biocon.2015.08.016>
- Murombo, T. (2017). Beyond Public Participation: The disjuncture between South Africa's Environmental Impact Assessment (EIA) Law and Sustainable Development. *Potchefstroom Electronic Law Journal/Potchefstroomse Elektroniese Regsblad*, 11(3), 105. <https://doi.org/10.17159/1727-3781/2008/v11i3a2769>
- Myers, N., Mittermeier, R. A., Mittermeier, C. G., da Fonseca, G. A. B., & Kent, J. (2000). Biodiversity hotspots for conservation priorities. *Nature*, 403(6772), 853–858. <https://doi.org/10.1038/35002501>
- Nadeem, O., & Hameed, R. (2008). A Critical Review of the Adequacy of EIA Reports-Evidence from Pakistan. *World Academy of Science, Engineering and Technology*, 2(11), 935–942.
- Onwuegbuzie, A., & Leech, N. (2005). On becoming a pragmatic researcher: The importance of combining quantitative and qualitative research methodologies. *International Journal of Social Research Methodology: Theory and Practice*, 8(5), 375–387. <https://doi.org/10.1080/13645570500402447>
- Phalan, B., Hayes, G., Brooks, S., Marsh, D., Howard, P., Costelloe, B., ... Whitaker, S. (2018). Avoiding impacts on biodiversity through strengthening the first stage of the mitigation hierarchy. *ORYX*, 52(2). <https://doi.org/10.1017/S0030605316001034>
- Primmer, E., Varumo, L., Kotilainen, J. M., Raitanen, E., Kattainen, M.,

- Pekkonen, M., ... Ollikainen, M. (2019). Institutions for governing biodiversity offsetting: An analysis of rights and responsibilities. *Land Use Policy*, 81. <https://doi.org/10.1016/j.landusepol.2018.11.040>
- Rehbein, J. A., Watson, J. E. M., Lane, J. L., Sonter, L. J., Venter, O., Atkinson, S. C., & Allan, J. R. (2020). Renewable energy development threatens many globally important biodiversity areas. In *Global Change Biology*. <https://doi.org/10.1111/gcb.15067>
- Retief, F., & Chabalala, B. (2009). The cost of environmental impact assessment (EIA) in South Africa. *Journal of Environmental Assessment Policy and Management*, 11(1), 51–68. <https://doi.org/10.1142/S1464333209003257>
- Sandham, L. A., Hoffmann, A. R., & Retief, F. P. (2008). Reflections on the quality of mining EIA reports in South Africa. *Journal of the Southern African Institute of Mining and Metallurgy*, 108(11), 701–706.
- Secretariat of the Convention on Biological Diversity. (2016). *Biodiversity and the 2030 Agenda for Sustainable Development Biodiversity Is Essential for Sustainable Development*. Retrieved from <https://www.cbd.int/development/doc/biodiversity-2030-agenda-technical-note-en.pdf>
- Simmonds, J. S., Sonter, L. J., Watson, J. E. M., Bennun, L., Costa, H. M., Dutson, G., ... Maron, M. (2019). Moving from biodiversity offsets to a target-based approach for ecological compensation. *Conservation Letters*, (November), 1–11. <https://doi.org/10.1111/conl.12695>
- Simmonds, J. S., Sonter, L. J., Watson, J. E. M., Bennun, L., Costa, H. M., Dutson, G., ... Maron, M. (2020). Moving from biodiversity offsets to a target-based approach for ecological compensation. *Conservation Letters*, 13(2), 1–11. <https://doi.org/10.1111/conl.12695>
- Skowno, A. L., Poole, C. J., Raimondo, D. C., Sink, K. J., Van Deventer, H., Van Niekerk, L., ... Driver, A. (2019). National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report. South African National Biodiversity Institute, an entity of the Department of Environment, Forestry and Fisheries. In *South African National Biodiversity Institute* (Vol. 1). Retrieved from http://bgis.sanbi.org/NBA/NBA2011_metadata_formalprotectedareas.pdf%5Cnpapers2://publication/uuid/786A77C5-B11A-4F8D-B139-F3F626EBC802
- Snyman, S. (2014). Assessment of the main factors impacting community members' attitudes towards tourism and protected areas in six southern African countries. *Koedoe*, 56(2), 1–13. <https://doi.org/10.4102/koedoe.v56i2.1139>
- Sonter, L. J., Gordon, A., Archibald, C., Simmonds, J. S., Ward, M., Metzger, J. P., ... Maron, M. (2020). Offsetting impacts of development on biodiversity and ecosystem services. *Ambio*, 49(4), 892–902. <https://doi.org/10.1007/s13280-019-01245-3>

- Sonter, L. J., Gourevitch, J., Koh, I., Nicholson, C. C., Richardson, L. L., Schwartz, A. J., ... Ricketts, T. H. (2018). Biodiversity offsets may miss opportunities to mitigate impacts on ecosystem services. *Frontiers in Ecology and the Environment*, 16(3), 143–148. <https://doi.org/10.1002/fee.1781>
- Souza, B. A., Rosa, J. C. S., Siqueira-Gay, J., & Sánchez, L. E. (2021). Mitigating impacts on ecosystem services requires more than biodiversity offsets. *Land Use Policy*, 105(January 2020). <https://doi.org/10.1016/j.landusepol.2021.105393>
- Tabuti, J. R. S., Dhillon, S. S., & Lye, K. A. (2003). Firewood use in Bulamogi County, Uganda: Species selection, harvesting and consumption patterns. *Biomass and Bioenergy*, 25(6), 581–596. [https://doi.org/10.1016/S0961-9534\(03\)00052-7](https://doi.org/10.1016/S0961-9534(03)00052-7)
- ten Kate, K., Bishop, J., Bayon, R., ten Tate, K., Bishop, J., & Bayon, R. (2004). Biodiversity offsets: Views, experience, and the business case. In *Diversity*. <https://doi.org/ISBN:2-8317-0854-0>
- The World Bank. (2006). Global Economic Prospects 2007. In *World*. <https://doi.org/10.1596/978-0-8213-6727-8>
- The World Bank. (2017). Environmental and Social Framework Report. *World Bank*, 1–121. Retrieved from www.worldbank.org
- Turner, I. M., Tan, H. T. W., Wee, Y. C., Ibrahim, A. Bin, Chew, P. T., & Corlett, R. T. (1994). A Study of Plant Species Extinction in Singapore: Lessons for the Conservation of Tropical Biodiversity. *Conservation Biology*, 8(3), 705–712. <https://doi.org/10.1046/j.1523-1739.1994.08030705.x>
- Vaissière, A. C., Levrel, H., & Scemama, P. (2017). Biodiversity offsetting: Clearing up misunderstandings between conservation and economics to take further action. *Biological Conservation*, 206, 258–262. <https://doi.org/10.1016/j.biocon.2016.11.036>
- Virah-Sawmy, M., Ebeling, J., & Taplin, R. (2014). Mining and biodiversity offsets: A transparent and science-based approach to measure “no-net-loss.” *Journal of Environmental Management*, 143, 61–70. <https://doi.org/10.1016/j.jenvman.2014.03.027>
- Vitousek, P. M., Mooney, H. A., Lubchenco, J., & Melillo, J. M. (2008). Human domination of Earth’s ecosystems. *Urban Ecology: An International Perspective on the Interaction Between Humans and Nature*, 277(July), 3–13. https://doi.org/10.1007/978-0-387-73412-5_1
- Von Hase, A., & Ten Kate, K. (2017). Correct framing of biodiversity offsets and conservation: A response to Apostolopoulou & Adams. *Oryx*, 51(1), 32–34. <https://doi.org/10.1017/S0030605316001022>
- Weaver, A., Pope, J., Morrison-Saunders, A., & Lochner, P. (2008). Contributing to sustainability as an environmental impact assessment practitioner. *Impact Assessment and Project Appraisal*, 26(2), 91–98.

<https://doi.org/10.3152/146155108X316423>

World Bank Group. (2016). *Biodiversity Offsets: A User Guide*. (October). Retrieved from <https://www.cbd.int/financial/doc/wb-offsetguide2016.pdf>

WWF. (2020). Living Planet Report 2020 - Bending the curve of biodiversity loss. Almond, R.E.A., Grooten M. and Petersen, T. (Eds). WWF, Gland, Switzerland. In *Wwf*.

Zenteno, M., Zuidema, P. A., de Jong, W., & Boot, R. G. A. (2013). Livelihood strategies and forest dependence: New insights from Bolivian forest communities. *Forest Policy and Economics*, 26, 12–21.
<https://doi.org/10.1016/j.forpol.2012.09.011>

APPENDIX A

PARTICIPANT INFORMATION SHEET

Animal, Plant and Environmental Sciences

University of the Witwatersrand

1 Jan Smuts Ave, Braamfontein

Johannesburg, South Africa



Dear Sir/Madam

My name is Maybe Mudzamiri and I am a Masters student in Environmental Science at the University of the Witwatersrand, Johannesburg. As part of my studies, I have to undertake a research project. I am currently working on a project investigating the role of institutional and policy frameworks in biodiversity offsets in South Africa under the supervision of Professor Mulala Danny Simatele. This research project aims to investigate the mechanisms through which biodiversity offsetting can be achieved for sustainable development in South Africa. Using institutional and policy frameworks, the study is specifically interested in investigating what approaches and systems can be adopted and implemented to promote biodiversity offsetting.

As part of this project, and given your expertise in this area, I would like to invite you to have an interview with me. The interview involves answering ten questions and can take about 30-45.

This study will be written up as a research report and the information collected will be used anonymously with no mention of specific persons or organizations if you prefer so. Your participation is voluntary, and you can choose not to answer any or all of the questions if you wish. There are no incentives provided by the researcher or risks associated with this research. If you agree to participate I would like to ask you to provide your signature or provide consent for me to sign on your behalf, on the participant information document which states what I just said and that you agree with being included in the study anonymously. Your name will not be recorded outside of this consent form, and any information you provide will be confidential and not disclosed to other people.

If you have any persons in mind who are experts in this subject matter and believe to be valuable for this research, I would be grateful if you could share their details with me so that I can reach out to them, or please feel free to forward this invitation letter.

If you have any questions during or afterwards about this research, feel free to contact me on the details listed below. If you have any concerns or complaints regarding the ethical procedures of this study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), telephone +27(0) 11 717 1408, email hrec-medical.researchoffice@wits.ac.za

Yours sincerely,

Maybe Mudzamiri

2111718@students.wits.ac.za

Supervisor:

Professor Mulala Danny Simatele

mulala.simatele@wits.ac.za

0117176516

APPENDIX B

INTERVIEW GUIDE FOR BIODIVERSITY OFFSET SPECIALISTS

All answers will be treated as strictly confidential and will be used for academic purposes only.

INTERVIEW QUESTIONS ON THE ROLE OF INSTITUTIONAL AND POLICY FRAMEWORKS ON BIODIVERSITY OFFSETS IN SOUTH AFRICA.

- Thank you for taking the time to take part in this interview.
- The interview will take +/- 30 minutes.
- You are free to withdraw from the interview at any point if you wish to.

Part 1: Background Information

1. Age: _____
2. Gender: _____
3. Please can you briefly outline your job role and responsibilities?
4. How long have you been in your current role?
5. Have you been directly involved in the designing and/or implementation of biodiversity offsets? Yes ☐ No ☐

Part 2: Experience in biodiversity offsetting.

1. How satisfied are you with the way biodiversity offsets are done in South Africa?
2. What do you think are the key elements that a biodiversity offset framework should address?
3. Are you familiar with the draft National Biodiversity Offsetting Policy of South Africa and other pieces of legislation that direct biodiversity offsets in South Africa? If yes, how do they compare to international standards?
4. In your opinion, what barriers or challenges do you think exist in the biodiversity offsetting process in South Africa?
5. What piece(s) of legislation is currently being used as guidance when designing and implementing biodiversity offsets in South Africa? Would you say they are adequate?
6. Which institution(s) exists in South Africa, within which biodiversity offsetting can be pursued?
7. Do you think having a comprehensive biodiversity offsetting framework for South Africa will improve the way biodiversity offsetting is done?

8. What recommendations can you give to improve the proposed draft National Biodiversity Offsetting Policy of South Africa?
9. What recommendations can you give to improve the way biodiversity offsetting is currently done in South Africa?
10. Is there anything else you would like to add to your responses?

Thank you very much for participating in this research!

APPENDIX C

CONSENT FORM FOR RESEARCH PARTICIPANTS



Title of project: The role of institutional and policy frameworks in biodiversity offsets in South Africa: A review of offset frameworks.

Name of researcher: Maybe Mudzamiri

The research has been explained to me and I understand what my participation will involve. I agree to participate in this research project by completing the questionnaire.

Please circle the relevant options below.

I confirm that I am over 18 years old. YES NO

I understand that I can withdraw without giving any reasons YES NO

I agree that the researcher may use anonymous quotes
In her research report YES NO

I agree that my anonymity cannot be guaranteed during the
data collection process YES NO

I understand that I can leave out questions I do not wish to answer YES NO

I agree that the interview may be audio recorded YES NO

I agree that no payment will be received for my participation YES NO

..... (Signature)

..... (Date)

I hereby confirm that the participant has been fully informed about the purpose of the study.

..... (Name of Researcher)

..... (Signature)

..... (Date)

APPENDIX D

ETHICS CLEARANCE



Research Office

HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)
R14/49 Mudzamiri

CLEARANCE CERTIFICATE

PROTOCOL NUMBER: H20/10/19

PROJECT TITLE

The Role of Institutional and Policy Frameworks on Biodiversity
Offsets in South Africa. A Review of Offset Frameworks

INVESTIGATOR(S)

Ms M Mudzamiri

SCHOOL/DEPARTMENT

Animal, Plant and Environmental Science/

DATE CONSIDERED

16 October 2020

DECISION OF THE COMMITTEE

Approved
Risk Level: Minimal

EXPIRY DATE

24 November 2023

DATE

25 November 2020

CHAIRPERSON


(Professor J Knight)

cc: Supervisor : Professor M Simatele

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University. Unreported changes to the application may invalidate the clearance given by the HREC (Non-Medical)

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to completion of a yearly progress report.**

Signature _____

Date _____/_____/_____

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES