

**UNIVERSITY OF KWAZULU-NATAL**

**THE RELEVANCE AND APPLICATION OF BIODIVERSITY OFF-SETS  
INITIATIVES BY COMMERCIAL MINING ENTERPRISES IN  
KWAZULU-NATAL**

**Sifiso Keswa**

**201508066**

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**Supervisor: Dr. Prathana Amrithlal**

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**College of Law and Management Studies**

**Supervisors Permission to Submit Thesis/ Dissertation for Examination**

Name: Sifiso Keswa	No: 201508066	
Title: Mr		
Qualification: MBA	School: Graduate School of Business	
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## **ABSTRACT**

Biodiversity off-sets initiatives are widely utilised and recognised international as in KwaZulu-Natal to compensate for environmental degradation and harm in the development economic beneficial projects. Whilst it's true that South Africa applied also in KwaZulu-Natal have legislated related prescripts and expects compliance as directed by Environment Authorisation as a result Environmental Impact Assessment processes. The extent to which KZN's commercial mining enterprises have been receptive to and applies biodiversity off-set initiatives so as to meet the Global Reporting Initiative expectations while complying with legislative directive is unknown. The data was collected using an electronic system from 11 respondents associated with biodiversity off-sets initiative value chain as descriptive exploratory study. The quantitative methods approach was employing that informed basic statistical analysis and graphic presentation of results. The KZN commercial mining enterprise are receptive to biodiversity off-sets initiatives and the application thereof. The impedances in the application of biodiversity initiatives is reflected by the study results attributed to absence of explicit implementation documentation and human capital appropriate expertise. A collective and consultative biodiversity off-sets initiatives policy development process must be initiated to inform an appropriate implementation approach.

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## **List of Acronyms**

AHRQ - Agency for Healthcare Research and Quality

BBOP - Business and Biodiversity Off-sets Programme

BRICS - Brazil, India, China and South Africa

CBD - Convention on Biological Diversity

CEO - Chief Executive Officers

CFO - Chief Financial Officer

CITES - Convention on International Trade of Endangered Species

EDTEA - Department of Economic Development, Tourism and Environmental  
Affairs

EIA - Environmental Impacts Assessment

EKZNW – Ezemvelo KwaZulu-Natal Wildlife

EU - European Union

GDP - Gross Domestic Product

GRI - Global Reporting Initiative

ICMM - International Council on Mining and Metals

IUCN - The International Union for Conservation of Nature and Natural  
Resources

JSE - Johannesburg Stock Exchange

KPMG - Klynveld Peat Marwick Goerdeler

NGO – Non Government Organisation

NPV - Net Present Value

KZN - KwaZulu-Natal

NPD - National Development Plan

NPAES - South African National Protected Area Expansion Strategy

PwC – Pricewater Coopers

RSA – Republic of South Africa

UNEP - United Nations Environment Programme

UNGC - United Nations Global Compact

USA – United States of America

# **CHAPTER ONE**

## **Introduction**

The biodiversity off-set initiative is a relatively recent conservation mitigatory approach that seek to compensate for the residual, unavoidable harm to biodiversity and ecosystems as a result of commercial development activities, and attains no net loss to biodiversity. Commercial mining activities often have an adverse impact on biodiversity due to habitat transformation and fragmentation as a result of infrastructure construction. The rationale for biodiversity off-sets in South Africa is underpinned by the dual premise of the country having globally unique biodiversity, as well as ecosystems that supports socio-economic development and perform important services, such as the providing a reliable supply of water, while supporting ecotourism and enabling coastal protection. The study is therefore informed by the three sustainability model components of economics, environment and social dimensions, with the focus on the former two.

The relevance and application extent of biodiversity off-sets initiatives within KwaZulu-Natal (KZN) Province's mining enterprises was ascertained by analysing data obtained from questionnaire responses that was administered electronically. The level of receptiveness and perceptions with regard to sustainability benefits and associated challenges was established. The study outcome informed recommendations on biodiversity off-sets initiatives appropriate implementation approach.

Biodiversity offsets initiatives are used by commercial enterprises to resolve and address tension between development and conservation. Some claim that offsets will maintain the natural capital by achieving no net loss of biodiversity from development. The ideal of offsetting is generally expected to be advocated by developers who envisage a 'win-win' solution. Environmental authorisation agencies and interested parties likewise have expectations that allow greater access to natural resource capital for various interest and requirements (Overton and Stephens 2012).

## 1.1 Background

South African Commercial Enterprises listed on the Johannesburg Stock Exchange (JSE) are expected to comply with the Stock Exchange requirement of meeting Global Reporting Initiative (GRI) reporting expectations. These expectations are normally referred to as the G4 Sustainability Reporting Guidelines, as approved in 2016 which will be superseded by the GRI Sustainability Reporting Standards. All published reports will have to comply with these standards with effect from the 1<sup>st</sup> of July 2018, until such time the currently reporting guidelines apply. The Guidelines provide for a specific standard disclosure overview as a management tool approach on categories of economic, environment and social matters (Global Reporting Initiative 2013:23).

Sustainability reporting enlighten consumers, shareholders and stakeholders about the enterprise's economic, environmental and social plans, as well as their projects and governance performance. Opportunities for conflict between economically profitable ventures, such as mineral resource exploitations, and environmental protection and social expectation factors is an ongoing challenge, with companies having to make decisions about how to balance their corporate responsibilities and obligations. The conflicts have manifested in various forms such as natural heritage protection expectations against commercial enterprise financial profitability and shareholders' value (Virah-Sawmy, Ebeling and Taplin 2014:61). The Biodiversity off-sets initiatives are avenues to improve on environmental and social outlook as part on Integrated Sustainability Reporting.

The International Union for Conservation of Nature (IUCN) (2016:10) defines Biodiversity off-sets as measureable conservation outcomes resulting from actions designed to compensate *"for significant residual adverse environmental impacts emanating from economical project development after appropriate prevention and mitigation actions have been employed"*. Biodiversity off-sets initiatives are implemented to attain no net loss to biodiversity, while reconciling the aims of economic development and the environmental conservation. The biodiversity off-sets initiatives are expected to reflect the mining commercial enterprises sustainability intents by demonstrating good environmental stewardship and management of regulatory risks (Business and Biodiversity Off-sets Programme (BBOP) 2012:13).

South Africa has over 95 000 known species of wildlife, making it the third most biologically diverse country in the world, and has three of the 34 biodiversity hotspots. The Brazil, India, China and South Africa (BRICS) association suggest a recognition of the country as one of the five most emerging global economies, and the National Development Plan (NPD 2030) sets out the intention of doubling the gross domestic product (GDP) while eliminating poverty in South Africa by 2030 (Jenner and Balmforth 2015:1). The National Environmental Management Act (107 OF 1998) makes provision for Biodiversity Off-sets implementation through Environmental Impact Assessment (EIA) process.

The United Nations report on Millennium Development Goals (2015) in general indicates that environmental stewardship progress is being made in a number of areas, the 7<sup>th</sup> goal being about ensuring environmental sustainability as a result of consciousness and commitment by society at large, including commercial enterprises on environment issues. The report projects the following:

- The Ozone depleting substance have been reduced since 1990, with the Ozone layer around the globe being expected to recover by the middle of twenty first century.
- The terrestrial and marine protected areas in many parts of the planet have increased substantially since 1990, with Latin America and Caribbean having increased them from 8.8% to 23.4% between 1990 and 2014 respectively. Biodiversity off-sets and stewardship initiatives have contributed substantially to these figures.
- The global population with access to an improved drinking water quality is at 91% in 2015, compared to 76% in 1990, the drinking water target being attained by 147 countries, sanitation targets by 95 countries, while 77 countries met both.

The South African study by Louw (2014:16) aimed *“to compare the current South African biodiversity off-set approach to that of off-set banking and no net loss or net gain principles as a feasible and beneficial alternative”*. The author concluded in that *“the implementation of off-set banking in South Africa will generate further socio-economic benefits through the creation of sustainable jobs for conservation*

*management to monitor, augment and protect new conservation areas*". However, he also expressed the need for additional research on biodiversity off-sets that will *"supplement the current lack of studies aimed at determining the views and perceptions of the parties who practise on the ground of biodiversity off-sets"* (Louw 2014:70). The study by Villarrooy (2014) relieved that Latin American countries used Environmental Impacts Assessment (EIA) laws and related prescripts that facilitate the application of biodiversity off-sets, with Brazil, Colombia, Mexico and Peru having effected relatively explicit and enforceable implantation protocols. The trailblazer in biodiversity off-sets, the United States of America (USA), enacted legislation in the 1970s to mitigate against the destruction of wetlands, while New South Wale, Australia, only legislated off-sets equivalent laws, referred to as BioBanking legislation, in 2006, (Burgin 2008).

## **1.2 Problem statement**

A number of legal prescripts have been promulgated and accepted in all three spheres of government (National, Provincial, Local) within South Africa, their intention being to address the competing demands for the planet's resources in the face of growing populations and their increasing demands. South African is also a signatory to various conventions, this being particularly relevant to a country that has many mineral resources, both above and below the surface of the earth. In ensuring that the concept of sustainability also applies to the industry requires the mines to put measures in place to rehabilitate the areas in which they operate.

Mining is an economic necessity globally, with a growing demand for goods and services that provides for production, and often occurs in natural and undisturbed areas, with their activities negatively impacting on the environment resulting in the loss of habitats and species from the area. Mining companies are required by law to implement plans that return the land to its natural state while averting net loss to biodiversity. However, there is no biodiversity off-sets explicit application approach in South Africa that guides and sets of protocols to ensure that Global Reporting Initiatives are met while being aligned to sustainability models. However, there is an absence of documented information on attitudes of KwaZulu-Natal (KZN) mining enterprises towards biodiversity off-sets initiatives application. There is also little understanding about the extent to which KwaZulu-Natal Province's (KZN's)



commercial mining enterprises have been receptive to, and are applying biodiversity off-set initiatives so as to meet the Global Reporting Initiative expectations

KZN's commercial mining enterprises are not exempted from reporting on the sustainability performance indicators. An assessment of the identified KZN commercial mining enterprises will establish the extent of acceptance and implementation of Biodiversity off-sets, as dictated by Environmental Authorisation as a compliance requirement and sustainability performance enhancer.

### **1.3 Purpose of the study**

The study aims to was established the extent to which KZN's commercial mining enterprises have been receptive to and are applying biodiversity off-set initiatives so as to meet the Global Reporting Initiative expectations.

#### **1.3.1 The research objectives:**

1. To establish the relevance of biodiversity off-sets within the KwaZulu-Natal mining enterprises.
2. To determine the level of receptiveness to applying biodiversity off-sets initiatives by KwaZulu-Natal mining enterprises and the associated challenges.
3. To establish the perceptions regarding KwaZulu-Natal mining enterprises toward biodiversity off-sets contributions to their company's economic sustainability.
4. To show the relationship between biodiversity off-sets and environmental stewardship.
5. To recommend an appropriate biodiversity off-sets implementation approach that will meet the Global Reporting Initiative expectations.

#### **1.3.2 Research question**

To what extent are KwaZulu-Natal Province's commercial mining enterprises been receptive to, and are applying biodiversity off-set initiatives so as to meet the Global Reporting Initiative expectations?

### **1.4 Study limitations**

The sustainability model is characterised by three dimensions that place an emphasis on economics, environmental and social factors. However, for the purposes of this

study, the latter will not be considered, thus limiting the research to economic and environment perspectives. This study area will be confined to two dune mining operations in KwaZulu-Natal Province, which may also affect the contents of an enquiry for other types of mining in other areas.

### **1.5 Summary**

Commercial mining enterprises are not only expected to strive towards reflecting positive economic sustainability, but to demonstrate sensibly consciousness towards environmental and social imperatives so as to attain an overall sustainability outlook. The South African National Protected Area Expansion Strategy (NPAES) was developed to implement expanded cost-effective protected areas to ensure ecological and economic sustainability, while increasing the country's resilience to climate change (Department of Environmental Affairs 2009:1). The adoption of biodiversity off-sets by commercial mining enterprise will contribute significantly towards achieving the NPAES objectives. This study will provide the basis and stimulants to develop an implementation framework that promotes biodiversity off-sets initiatives as tools that justify the "social licence to operate", while at the same time, enabling sustainable economic and environment development. Vos and Reddy (2014:789) indicated that economic sustainability was being affected by environmental sustainability as a proven platform for facilitating social responsibility investment (SRI). The following chapter provides a theoretical framework and review of the available literature on biodiversity off-sets, sustainability reporting context, environmental stewardship and economical relevance.

## CHAPTER TWO

### Literature Review

#### 2.1 Introduction

This section reviews and describes the theoretical framework used to inform the study content, and is followed by a review of relevant literature on the sustainability reporting context, environmental stewardship and economic relevance. Literature reviews provide credibility and validation of the information presented and claimed (Klopper, Lubbe and Rugbeer 2007:262).

Biodiversity off-sets provide a conduit between biodiversity and commercial industries that potentially improves environmental outcomes in addition to economic development intents and sustainability (Bull *et al.* 2012:370). Splash (2015:7) is of the view that Biodiversity off-sets in economic logic are a form of compensation that is expressed by the cost of biodiversity restoration or credit note purchase, as incurred through sustainable economic development intents.

Universal losses in natural ecosystems and continuous development pressures on the environment have resulted in an increasing number of enterprise entities, such as businesses and financial institutions, including government agencies, that are employing prescripts or voluntary mitigatory commitments (Gardner *et al.* 2013:1). These commitments are geared toward attaining nett loss, or preferably a net gain, of biodiversity in areas of the enterprise entities' operational footprint. Goncalves *et al.* (2015) concur that the application and relevance of biodiversity offsets has gained momentum in the last decade in the legislative prescripts arena and within the private sector.

Rainey *et al.* (2014) presented the prominent drivers of environmental opportunities and risks for commercial enterprises, including the mining sector (Table 1). These are similar to those expressed by Hanson *et al.* (2012) and the Pricewater Coopers (PwC) report (2010), which affirmed these to be operational, regulatory and legal, reputational, market and products, and financing.

Table 2.1. Major drivers of environmental opportunities and risks for companies (Rainey *et al.*, 2014:2).

Categories	Opportunity	Risk
Operational	Operational Ecosystem services to support operations.	Reduced productivity; scarcity & increased cost of resources; operational & supply chain disruption.
Regulatory & Legal	Leadership with governments to help shape	Fine and project delays, liability for biodiversity impacts.
Reputational	Preferred operator status; improved quotas; staff loyalty.	Loss of 'social licence to operate': restricted access to land & resources.
Market & Product	Brand differentiation; increased profit margins; compliance with purchaser policies	Damage to brand; boycotts
Financing	Access to finance	Reduced finance opportunities; reduced credit quality

The categories, opportunities and risks are packaged to justify relevancy and regulatory application for sustainability-centric commercial enterprises to meet the Global Reporting Initiatives expectations. The dimensions in Table 1 reflect area of possible focus and mitigate that are consistent with companies that have aspirations for a positive social, economic and environmental sustainability outlook.

The approach that promotes effective management of corporate biodiversity impacts is increasingly being recognized as central to solving environmental crises, as per Rainey *et al.* (2014). Furthermore, a proliferation of vague or specific 'environmentally friendly' labels and quantified corporate environmental goals are increasingly becoming common ideal, such as the United Nations Global Compact (UNGC) signatories of commercial enterprises.

## 2.2 Theoretical framework

Sustainability model consist three components namely economic, environment and social (Figure 2). Sustainability theories attempt to prioritize and integrate response to economic, environmental and social dynamics. An economic dimension is geared to sustain natural and financial capital, whilst environmental dimension looks at biological diversity and ecological integrity. Social dimensions addresses social systems that attain human dignity (Jenkins 2012), which will not be explored in this study.

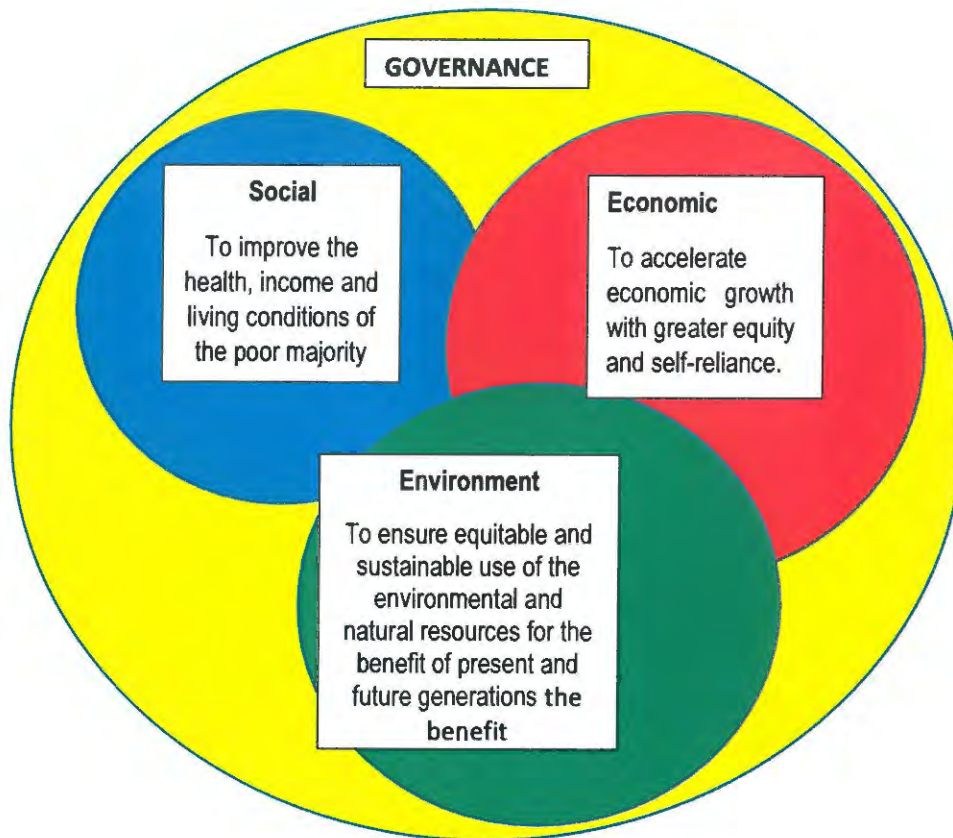


Figure 2.1. Sustainability model

Adapted from Burns, M and Weaver, A. 2008. **Exploring sustainability science. a south africa perspective**. Stellenbosch: African Sun Media.p186 and Weaver, A. 2012. **Can EIA practitioners contribute to sustainability in Africa**. Lecture notes distributed in the Centre fo Environmental Management, Bloemfontein, University of Free State. Juauary 2012. p18

Sustainability theories attempt to prioritize and integrate response to economic, environmental and social dynamics. An economic dimension is geared to sustain natural and financial capital whilst environmental dimension looks at biological diversity and ecological integrity. Social dimensions addresses social systems that attain human dignity (Jenkin 2013).

Mahadea and Youngleson (2013) state that "*history of sustainability as a business concept traces human-dominated ecological systems from the earlier civilisations to present*". Further expatiate on sustainability science as not yet an autonomous field or discipline is studied and manage over many levels or frames of references, in time

and space and in many context of environment, economics and social organisations. Attentions are directed and are from the total carrying capacity or sustainability of the planet to the sustainability of economic sectors, ecosystems, municipalities, neighbouring communities and stakeholders, individual's goods and services, lifestyles and behaviour patterns including business dynamics.

The South African Constitution, and the legislative prescripts stemming from it, recognise the vital role of both ecological and mineral resources in a development path built upon the socially just, environmentally sustainable and economically efficient use of these resource. Hence the need to develop a preliminary biodiversity off-sets implementation framework by establishing the extent to which KwaZulu-Natal commercial mining enterprises have been receptive to and implemented biodiversity off-set initiatives. The overall study outcomes will contribute towards the meeting GRI Sustainability reporting guidelines.

The mining and associated infrastructure development activities are undoubtedly drivers of economic opportunities and growth (Virah-Sawmy, Ebeling and Taplin 2014:61). However, the intention of achieving economic sustainability must not be at the expense of the environmental and social components. For there to true long-term sustainability, all three must carry equal weight in terms of the model intent. The environment and economic attributes will form the basis and focus of the tool development stage, with the social dimension being set aside for further research inclusion.

A balance needs to be attained between economic development and biodiversity integrity, including positive environmental stewardship by various commercial industries, which is expected to be managed by South African commercial enterprises. The biodiversity off-sets are contemporary mechanism employed by the mining sector to reduce the net loss of biodiversity by protecting and mitigating negative impacts on ecosystems (Niemark and Wilson 2015:2).

Sustainability is viewed as the ability to maintain status or process in existing systems, previously mainly used in describing biological or human systems in the context of ecology and complete ignoring economic dimension of the term. Sustainability is

important because all the choices we make as inhabitant of the universe and activities we embark on presently will have ramifications in the future (Sutton 2004). Hence contemporary sound decisions have to be taken as societies of the planet so as to avoid limiting the choices of the future generations.

### **2.3 Biodiversity off-sets**

The formalisation of biodiversity off-sets was pioneered in the USA from 1970 to 1979 (Burgin 2008). The definition of biodiversity off-sets by Burgin (2008) as voluntary conservation activities applied to offset residual, unavoidable negative impacts to biodiversity that are engendered by development and enterprises intents, while not being exploited as an excuse of environmental mismanagement. McKenney and Kiesecker (2010) define bio-diversity off-sets as compensation initiatives for residual environmental impacts that result from planned developments. These initiatives are employed as appropriate interventions to avoid, minimise or restore the consequences of negative impacts on development sites. The similar definition by Bull *et al* (2013) states that it is the mitigatory intents for commercial developers and enterprises when implementing new economic projects that effects land-use transformation or biodiversity exploitation to fully compensate for negative biodiversity potential outlook. Bull *et al* (2013) further express the view that the biodiversity off-sets concepts that have proliferated globally originated from an enactment of US Water Resources Act of 1970. The legislative tool was earmarked to set requirements for the development oriented wetland loss or land degradations of a particular site to off-set by establishing “equivalent” wetlands elsewhere.

There is a view by Marenco-Mateos *et al.* (2015) arguing that true compensation is not necessarily attainable through biodiversity off-sets initiatives. The use biodiversity off-sets as a trading tool for both tangible and intangible ecosystem values results in the loss of biodiversity and ecosystem benefits to societies is a misconception. They argues that anthropic interventions cannot entirely replace or manipulate nature as a technical exercise through restoration hence the unseen loss will continue for the foreseeable future or until the false goal of no-net-loss is replaced by no-loss. Further engage on the matter in that such scenarios will be characterised by further destruction of natural habitats, increasing inequity in the distribution of environmental services and values, the strengthening of power asymmetries in development and conservation

decisions, and the negation of the intrinsic value of nature. An exception may be true in cases of major benefits to society at large such as essential infrastructure or public service depend on that loss, however demonstrating this and the benefits attainment thereof, requires forms of decision making that fully embrace participation, transparency, fairness and legitimacy (Mareno-Mateos *et al.* 2015).

Biodiversity off-sets reviewed in the literature depict concurring views on the relevance and application of off-sets initiatives in curtailing the net loss to natural resource in economic developmental sites. Norton (2008:8) concludes that

*"it is essential that when requiring biodiversity offsetting is included when permitting a project development that consenting or decision making authorities should ensure that the biodiversity offsetting work is substantially implemented prior to that development work commencing."*

Kiesecker *et al.* (2009) recommends a need for strategic thinking in selecting off-sets sites, including developing contemporary and pragmatic application guidelines that will steer a process of social, economic and environmental sustainability.

McKenney and Kiesecker (2010) stated that the essence of appropriate biodiversity off-sets planning needs to be done with appropriate monitoring, legal and financial sustainability, adaptive management and relevant interventions to enhance off-sets initiatives receptiveness, including a beneficial outlook. Bull *et al.* (2013) noted that traditional preservation and unpractical initiatives in securing a net biodiversity loss exemplify static approaches to social, economic and environmental sustainability. As such, they can never be expected to address the vulnerable parts of the affected species life cycles, thus constantly shifting incentives that might meet resource user's expectations and ultimately increasing universal dynamism.

Furthermore Habib *et al* (2013) have also expressed a view on importance of flexible biodiversity off-sets application and relevancy in the approach so as to attain desired economic and ecological outcomes. Suggesting an approach that is geared toward targeting priority features regardless of what features are affected resulting in biodiversity trade-offs that are more explicit including allowing discussion on losses that may be acceptable to the public. The ultimately decision in choosing the



conservation features to be targeted or safeguarded irrespective of the costs must be determined by all relevant stakeholders involved. The suggestion by Habib *et al* (2013) provides estimates that may be employed to determine costs changes with alternative offset strategies approaches. This will allow a platform for stakeholders to make informed decisions that reflect both the conservation features valued by society and the economic realities that must be considered in any offset program.

The misused of biodiversity off-sets is possible reality that must be discouraged, Maron (2015) share an example where government used off-sets to achieve on commitments that otherwise would not be attain in securing a particular percentage of state land under biodiversity conservation. In 2008, the French construction company and its partners invested millions of euros to manage around 1,700 hectares of farmland in southern France to improve the habitat for environmental benefit compensating for a high-speed rail project that will damage the environment. Maron (2015) that the interest in offsetting has surged over the past decade resulting in billions of dollars interments in each year on planning and implementing offsets, and with initiative rollout in nearly forty countries. As the approach has gained popularity, governments rich and poor have increasingly recognised that enterprise funds generated by offsets can allow the attainment of conservation targets to which they have already committed such as expectations of the Convention on Biological Diversity (CBD) which otherwise would have been attained. Such practises are used a diversion of offsets would be to avoid admission of failure. Biodiversity offset must yield conservation benefits that would not otherwise have occurred.

The suggestion by Brownie, King and Treweek (2012) that will ensure equivalent trades in biodiversity offset. Pointing out that the metric and currency used to track biodiversity lost and gained in any exchange must accurately capture the key components that current and future society wants to protect. The may be species, habitat, ecosystems, ecological or evolutionary processes, ecosystem services, economic and social dynamics underpinned by social, environment and economically. Therefore it is crucial to identify losses and gains using a consistent implementation approach and reliable evidence so that role-players can be compared directly.

However biodiversity off-sets should address all impacts, biodiversity surrogates are often used in biodiversity offset implementation design since it is rarely possible or practical to take all components and dimensions of structure and function into account. Economic, social and environmental dynamism dictate practical constraints such as time, costs and technical complexity have worked against the use of sophisticated methodologies and adequate currency and metrics of exchange. An example cited of experience from US wetlands 'mitigation' or biodiversity off-set is that, although measures appear to be efficient, the distributional equity and effectiveness measures are questionable. Biodiversity offset schemes are also often undermined by a poor track record of compliance (Brownie *et al* 2012).

Gardner *et al.* (2013) suggest that biodiversity off-sets are receiving increasing interest from business, government, finance, and conservation sectors across the world. Expectation are high that the associated opportunities and challenges can be effectively and efficiently managed. Furthermore, ambitious and well directed policy goals relating to no net loss of biodiversity, and the contribution that offsets may present, are interpreted and operationalized in a defensible and transparent way.

Sullivan (2013) reflect on choices for offsetting that require development-related environmental harm to be legitimised through legislative "carrot and stick" approaches. The interventions are such that the intent is effecting actions to close off the stakeholders' options and values of other people including the individuals and populations of species affected on-site through development. It is thus relevant to understand the contexts, concepts, and power dynamics that serve such choices and to consider their associated socio-ecological effects.

The instituting of biodiversity offsets in relation to development interventions clarifies the process whereby choices are made that will both affect and effect the continuing presence of biodiversity entities. They beg the asking of questions that are muted in the offsetting discourse, which at its most stark boils down to calculative judgments regarding how many individuals, populations, species, and relationships are worth the maintenance of corporate mining wealth. The legacy of amplified above-ground mining activities and none-environmentally friendly material utilised. These with possible consequences for the management by future generations, the shareholders and

interested parties, and the loss of diverse cultural values associated with these same species and landscapes (Sullivan 2013).

Underwood (2010) also raised a concern associated with biodiversity off-sets implementation a alluding to major challenges with offset programs is the consistency with landscape-level conservation goals. Pointing out that simultaneously on legislative space, merging offset policies and landscape-level conservation planning is thought to provide advantages over a traditional disconnected approach. Underwood (2010) concludes that few such explicit biodiversity off-set implementation plans have been designed and implemented, therefore the effectiveness of off-set implementation strategy will ever remain uncertain.

## **2.4 Sustainability reporting context**

Stakeholders, shareholders and interested parties are expecting to be provided with information or challenges on matters related to the distribution of wealth, black economic empowerment, climate change, scarcity of portable water and other environmental issues (Rea, 2013). The Global Reporting Initiative is an initiative of the United National Environmental Program (UNEP) that provides reporting guideline on a number of sensitive matters, and is regarded as the most applied and popular sustainability reporting platform in South Africa (Vos and Reddy, 2014:808). Furthermore, it promotes the use GRI sustainability reporting as a platform for commercial enterprises to become sustainable and contribute to a sustainable global economy. According to Venter (2015:13), most commercial enterprises are employing the sustainability concept and reporting not solely for their financial outlooks, but also to reflect on their social and environmental contributions.

The Global Reporting Initiative, United Nations Environment Programme (UNEP), Centre for Corporate Governance in Africa and Klynveld Peat Marwick Goerdeler (KPMG) (2013) suggest that global sustainability challenges require a concerted effort from a range of stakeholders, with sustainability reporting being key. National authorities across the globe are increasingly concerned with sustainable development, inclusive economic growth, increasing transparency, and building trust among their constituents. A growing number of commercial enterprises and organisations are

striving to attain operational sustainability and to respond affectively to external dynamics and impacts.

The current approach to establishing sustainability reporting has initiated positive impacts of setting goals, measuring performance and change management. A sustainability report is an ideal platform for communicating the performance information, both favourable and adverse, to external and internal stakeholders, including interested parties. Sustainability reporting is therefore a vital development for managing change towards a sustainable global economy that coalesce long-term profitability with social justice and environmental conciseness.

Biodiversity offsets offer public and private enterprise authorities' mechanisms and platforms to encourage companies to make significant contributions to conservation, and in many cases, without the need for new legislation or governance protocols, and at less cost than alternative policies. Biodiversity off-sets can also help to ensure that development projects intended to meet growing demand for energy, minerals, metals, crops and transport are planned in the context of sustainable development, and accompanied by counterbalancing measures to secure the conservation of ecosystems and species affected by development.

Ballou and Heitger (2005) concludes that for commercial enterprises, the opportunity for misrepresenting information utilising financial reporting mechanisms. This is becoming increasingly difficult based on the ever more stringent requirements to have effective controls in place over financial reporting. These legislative prescripts expectations, coupled with regulated auditors providing reasonable assurance on the fairness of those financial statements and signed statements by the Chief Executive Officers (CEO) and Chief Financial Officer(CFO). In addition it reduces the opportunity and increase the consequences for issuing misleading financial information. Further, there are generally accepted accounting principles guiding the accounting policies and financial reporting practices utilised by commercial enterprises.

## **2.5 Economic relevancy**

Tronox, Sherritt and Rio Tinto are international corporate mining companies, and recently employed progressive image outlook and transformation approaches that

depict environmental stewardship in South Africa and internationally (Niemark and Wilson 2015:2). These accolades and achievements are reflected by their integrated annual reporting mechanisms, which present encouraging outlooks perceptive of economic, environmental and social variables. Vos and Reddy (2014:790) alluded to the King Code on Corporate Governance for South Africa, which directs companies' Boards of Directors to not solely focus on profit, as this have a potential that could result in shareholders' interests including share value being compromised. The Code assists companies to work towards long-term financial sustainability that is complemented by economic, social and environmental imperatives.

According to Lee and Kirkpatrick (2016) there are two theoretical situations where legislative tools Environmental Impacts Assessment (EIA) and Cost-Benefit Analysis should be mutually relevant and consistent. Suggesting that economic driven projects are being appraised including decisions making should be according to economic efficiency criteria and all components of social cost and social benefit are measurable in economic monetary terms. Within the legislative context, firstly *"the EIA provides the physical measures of the expected environmental benefits and disbenefits of the project which are then converted into economic measures for inclusion in a standard social cost- benefit analysis for subsequent use in appraisal and decision-making."* And claim that the perception of the role of EIA in project appraisal is to be found in certain of the environmental economics literature. Secondly, *"there is the situation where projects are being appraised according to commercial with an intent of profit maximising criteria' and all externalities are internalised."* In this case, the internalisation of environmental externalities may be achieved through a system of charges/taxes for negative environmental impacts and grants subsidies including incentives for positive environmental impact (Lee and Kirkpatrick 2016).

Biodiversity off-sets are associated with legislative directive from the tools of EIA nature provides the physical measures of the expected environmental disbenefits and benefits which economic enterprise developers. The harmonising these associations requires some recognition will base on premise of allowing impacts to occur and eventually be reflected, following their valuation, in environmental charges and receipts to them. Where all association are collectively in synch and sustainability as the thrust, this will

*“estimates of these charges and receipts are incorporated into their project appraisals (that is, through the calculation of their expected net present values (NPVs) and these are consistent with the CBA criterion, given that all externalities are assumed to be internalised. In this contest, EIA is supportive of a system of economic instruments which is regarded by many economists as central to any efficient system of environmental controls”*

The implementation and success of biodiversity off-sets that will yield mutual benefits particularly economic reliance. The benefits will be realised where such divergence of views, intents, aspirations and expectations converge in the process economic enterprise project development. (Lee and Kirkpatrick 2016).

There are proponents of market-based biodiversity initiatives claimed by Niemark and Wilson (2015:9) that attest to nature being a repository of inestimable resources that can be transformed into usable metrics for market exchange, including in the green economy. These market exchanges and green economies have a potential to contribute and play a substantial role to contemporary and progressive sustainable development approach.

The more a business enterprise grow, the more potential it has to generate negative and positive effects through its commercial and associates activities. Daub (2014:2) affirms that the more a company is in the public eye and interest, the more it generates liabilities to justify its “licence to operate” in societal perspective. Virah-Sawmy, Ebeling and Taplin (2014:66) concluded that the desired extent of global growth has increased the demands for non-renewable resources, particularly minerals, which will result in increased future intentions of large-scale explorations and mining with its associated infrastructure development. The complementary approach of biodiversity off-sets and long-term financial sustainability will have to be accommodated on an ongoing basis.

Biodiversity offsets can strengthen commercial mining enterprises’ license to operate by encouraging authorities to permit new economic developmental operations and investments. These will offer opportunities for securing the support of local communities and non-governmental organisations. Commercial mining enterprises’ investment in biodiversity offsets can provide a cost effective means to demonstrate

that society should continue to trust enterprises with access to the land and sea that are needed for financially viable operations.

Furthermore Burgin (2008) confirms that embracing biodiversity offsets has been seen as a method for governments to meet their commitments under the Millennium Development Goals and the Convention on Biological Diversity. For environmentalists it may offer the potential to enhance conservation value for money (International Council on Mining and Metals (ICMM) 2005), although the concept of making the 'priceless' 'valuable' through trading tends not to be acceptable to many of the green lobbies.

Pascoe, Wilcox and Donlan (2011) reflection on economic relevance, in the main is aligned to a cost benefit analysis discourse that requires both the outcomes and the costs of the alternative mitigation measures to be valued in monetary terms. However, as the value of the ecological outcomes as it has been always the case is not well quantified thus far however there have been way and means to attached monetary values. The views are as such that biodiversity off-sets implementation is expected to ultimately yields opportunities to ease valuation, cost effectiveness analysis while its also used to determine the most efficient mitigation measure. The cost effective analysis approach is in recent times is being immensely employed to assess the relative benefits of alternative conservation policies when valuing benefits whether difficult or unacceptable.

An implicit assumption expressed by Pascoe *et al* (2011) is that the value of the species or habitat stock recovery should be considered by society and are expected to exceed the costs. The least cost method to deliver any fauna or flora population recovery and landscape should be considered the most efficient. Further argued that biodiversity off-sets objective of social, economic and environmental sustainability is intended to eliminate the problem in the longer term associated with off-sets implementation. The collective objectives are to explore cost-effective ways of allowing commercial mining operations while securing the existence of the fauna or flora species population and landscapes until appropriate implementation protocols are effected.

The dynamics involved in the determination of an appropriate ecological outcome for the purposes of comparing the costs is not a linear process and simplistic. The notions are that cost effectiveness analysis employs an output measure that is not always measured in monetary terms. This is a belief and in all purposes is intended in ensuring sustainability is proportional to the utility derived from commercial mining production. The assumption and expectation is that more species and landscapes improvements are preferred to the contrary, and that the marginal value of landscape and resource extraction activities is constant. This will be such that it increases interest and incentives to the collective of stakeholders whilst also reflects the value of the mitigation activity. Prevailing trends suggests that the marginal value of landscapes and species populations are likely to decrease with increasing population size and other societal demanding expectations. Furthermore with an assumption that monetary costs to the mining enterprise and benefits occur with different magnitudes at different points over certain duration, these future costs and benefits are converted into a net present value for comparison between mining enterprises' management options (Pascoe *et al* 2011).

Therefore according Pascoe *et al* (2011) the choice of an appropriate discount rate in such a case is complex, and there are many arguments for the use of a low discount rate when measuring changes in values of environmental assets over time, particularly when the resource is non-renewable or the environmental impacts effectively irreversible in a reasonable time frame. Further expressing that certain economists literatures provide an argument that the discount rate should decline over time to attach greater weight to the welfare of future generations. These are particularly a reality when negative externalities may necessitate increased environmental expenditures over time or uncertainty about future outcomes is high. While others argue that resource scarcity in the future will increase the value of the environmental asset and a more appropriate approach is to factor in these higher values and discount using an unmodified social discount rate.

## **2.6 Environmental stewardship**

Environmental stewardship initiatives are employed to address environmental issues either directly or indirectly, such as riparian restoration, fund raising, political activism, natural resource monitoring, community outreach and education. Such engagement



has become the lifeblood of the environmental movement and has the potential to preserve, build and restore significant environmental and civic capacity of local communities (Bramston, G. Pretty, G. and Zammit, C. 2015). The biodiversity off-sets initiatives are geared to address such environmental challenges within commercial enterprise domain.

Burgin (2008:808) presents a perspective that the biodiversity off-sets are not earmarked to compensate for poor environmental management, but to off-set residual and unavoidable damage to biodiversity caused by development activities. Conserving the environment in general, ecosystems and biodiversity in particular as “a way of life” is an unquestionable imperative, as it contributes to human wellbeing in the form of material welfare, livelihoods, health, security and sustainability, be it financially or otherwise (Gordon 2011:1481).

Maron *et al.* (2012: 144) suggest that ecological restoration is retarded by three main factors that do not complement successful off-sets intents, these being broadly categorised as poor measurability, uncertainty and time lags. They further noted that there are limitations regarding the technical effectiveness of biodiversity off-sets, the diminishing ability to define and quantify the biodiversity value to be off-set, a growing uncertainty over the ability to restore and extended time lags expectations.

The South African context is characterised by deficiencies in relevancy and application as result of the absence of an overarching national biodiversity off-set policy, resulting in inconsistency in the implementation across different spheres of government and commercial industry (Jenner and Balmforth 2015:5). Despite the lack of a national policy, various initiatives have resulted in successful off-set stories, namely the South African Department of Energy expectation of off-set commitment from renewable energy developers, such as solar and wind farms.

According to Norton (2009:1), biodiversity off-sets are underpinned by six principles excerpting that:

1. *“biodiversity off-sets should only be used as part of a hierarchy of actions that first seeks to avoid impacts and then minimise the impacts that do occur;*

2. *a guarantee is provided that the proposed off-sets will occur;*
3. *biodiversity off-sets are inappropriate for certain ecosystem (or habitat) types because of their rarity or the presence of threatened species within them;*
4. *off-sets most often involve the creation of new habitat, but can include protection of existing habitat where there is currently no protection ;*
5. *a clear currency is required that allows transparent quantification of values to be lost and gained in order to ensure ecological equivalency between cleared and off-sets areas;*
6. *that off-sets must take into account both the uncertainty involved in obtaining the desired outcome for the off-set area and time-lag that is involved in reaching that point."*

The environmental stewardship authorities can use and influence biodiversity offsets to secure greater conservation efforts, and obtain additional funding for certain endeavours, for instance, to establish properly financed ecological corridors or strengthen networks of protected areas. Biodiversity off-sets initiatives have a significant potential to afford opportunities that ensure the integration of national or regional priorities into business planning.

Guimaraes, T. and Liska, K. (1994) concurs as reflected by their research outcomes that companies showing higher degrees of environmental stewardship will derive greater business benefits than organizations which aim at minimum compliance with government regulations in this area. As such commercial enterprise have employed "green business" programs and initiatives for external reasons. These approaches are intended to address enterprises image with customers, government, and environmental groups, the long list of management and personnel benefits, including monetary benefits. The benefits realisation is being derived to provide ample support for the notion that environmental activities deserve special managerial attention.

Kolk (2004) concludes by expressing an opinion that the more specific and comprehensive all this information in the sustainability reporting documentation is, the higher the implementation likelihood by commercial enterprises. And although this might will not necessarily provide an unequivocal answer to the question of whether companies have really implemented (and internalised) the things that they have

included in their sustainability reports, it represents a step in right direction. He further express a view that “ *hypothesised that the higher the implementation likelihood, the higher the chance that companies will continue to publish sustainability reports and, more importantly, feel responsible for the societal and environmental implications of their activities, and act accordingly* ”.

Pilgrim *et al* (2013) suggests that commercial enterprise driven development lacks environmental capacity. The capacity shortcomings are attributed on particular proven successful experience in similar types and scales of developments. These are largely determines by the degree to which developers pose a threat beyond predicted residual impacts. This leads the practise of only paying attention to developer capacity is a key compliance consideration for Environmental Management legislative prescripts. Recommending that the developers with less environmental capacity might not be permitted to conduct developments in situations of higher biodiversity conservation concern, or might only be permitted to do so with additional precautionary measures.

The notion that there will be greater confidence in offset success where adequate financing is in place before project impacts in further confirmed by Pilgrim *et al* (2013) , reflecting on a sound financial mechanism such as a sound costed business plan or endowment fund. These will entail likelihood of achievement and long term management of offset gains. Financial assurance such as insurance, bonds and trust funds could provide a relief often required at particular stages in the development process, and could ensure security of offsets in case of divestment or commercial failure.

## **2.7 Summary**

The literature review depicts the relevance of biodiversity off-sets in context of economic, social and environmental discourse. Sustainability reporting tools are also claimed to be receiving substantial attention in commercial enterprise operating space. While the negative legacy of the mining industries towards social and environmental impacts is well documented, biodiversity off-sets are providing an opportunity for the mining sector to mitigate and reduce impacts on land use, greenhouse gas emissions, water and biodiversity. Furthermore and importantly, biodiversity off-sets initiatives could enhance sustainable societal benefits and financial profitability.

Biodiversity off-sets are avenues that provide possible platforms for reconciling the often conflicting objectives of development and conservation. In addition, they are viewed as a key tool for multinational mining enterprises to depict good governance while committing to good environmental stewardship and managing regulatory risks, thus ensuring long-term financial sustainability.

The report commissioned by the International Union for Conservation of Nature and Natural Resources (IUCN), and compiled by Kate, Bishop and Bayon (2004), on biodiversity off-set business case, views and experience depicts the benefits and relevance of using off-sets initiatives. The benefits are articulated as being unlimited to the environment as compensation for the residual, unavoidable harm to biodiversity caused by development projects. Current trends reflect the application of regulatory regimes of wetland and conservation banking in the USA, tradable forest conservation obligations in Brazil, and habitat compensation requirements in Australia, Canada and the European Union (EU), which are all complemented by commercial enterprise interests of the potential voluntary application of biodiversity off-sets. These trends and experiences suggest a biodiversity offsets relevance that is associated with adding value to business, government, local communities and conservation groups alike.

While the benefits in applying biodiversity offsets are potentially considerable, several significant impediments have to be addressed so as to attain the desired outcomes. The main challenge being the absence and need for a shared vision of the meaning and application of standards required to effect off-sets among commercial enterprises, governments, communities and conservation Non-Governmental Organisations (NGOs). Furthermore, the creation of conducive platforms of securing consent and building trust among key stakeholders is essential. These will assist in ensuring commercial enterprises are adopting suggested off-set approaches. These will further strengthen the business case needed to motivate companies, establish the application frameworks that underpin offsets initiatives, and address some question that impedes the benefit of offsets to conservation and business. The views appear to suggest compelling reasons to stimulate discussions on further enhancing the relevance and application of biodiversity offsets within commercial mining enterprises (Kate *et al*, 2004).

## **CHAPTER THREE**

### **Research Methodology**

#### **3.1 Introduction**

The word “methodology” indicates the way in which one goes about researching or solving the research problem (Williams, 2011). This chapter details the methods used to conduct the study, and indicates the study area and population, sampling methods used and sample size, as well as the tools used to collect the data. It outlines the pre-test methods, describes the data collection process, and data analysis. The study entailed the analysis and integration of data from an online questionnaire tool *QuestionPro* sourcing economic and environmental attributes. Purposive sampling was used as it informed the study participants, due to the specific nature of the study.

The research methodology for this descriptive exploratory study was a quantitative methods approach. The research design, sampling, data collection, and the statistical methods used to analyse the results were complementary to the research methodology approach. . An exploratory research approach that was used for this study, as defined by Zikmund, Babin, Carr and Griffin (2013:54), as a study that is conducted with the expectation that a formal study will be needed to provide more conclusive evidence by addressing the research questions or hypothesis developed in the exploratory phase. It is an approach preferably to be undertaken when not much is known about a phenomenon, or no information is available on how similar problems or research issues have been solved in the past as Ives and Bekessy (2013:570) confirms.

The quantitative research method is one of the ideal and viable options in identifying factors and interventions, and to understand variables and outcomes. Thus a particular research method and approach, the three important criteria that need to be considered are the research problem/question, the personal experiences of the researcher, and the audience of the report (Creswell 2013). Both primary and secondary were sourced and provided the gathered data, while the former included original statically information from questionnaire tool relevant to the study while the latter will be sourced

from existing literature by subject relevant authors, researchers and scholars including books, journal articles, published and unpublished dissertations.

The data generated from questionnaire responses was coded and edited, with SPSS Data Editor used as an analytical tool of the captured data. Furthermore coded questionnaire was checked for accuracy using systematic sampling procedure so as to mitigate any possible coding errors resulting from human. Hewson and Laurent (2012) demonstrated that careful planning, design and testing are key to completing successful studies, and that cost and time efficiency are vital components of all research. Hence the quantitative research methods was viewed as most appropriate in terms of the research question, researcher experience, audience, and cost and time factors. In addition was also viewed as a relevant approach in meeting study objectives and guided possible application recommendations that will enhance relevancy.

Table 3.1. The study objectives and data recruitment methods.

Objective		Methods
1	To establish the relevance of biodiversity off-sets within the KwaZulu-Natal mining enterprises.	Questionnaire survey using quantitative analysis
2	To determine the level of receptiveness to applying biodiversity off-sets initiatives by KwaZulu-Natal mining enterprises and the associated challenges	
3	To establish the perceptions of the KwaZulu-Natal mining enterprises toward biodiversity off-sets contributions to their company's economic sustainability	
4	To show the relationship between biodiversity off-sets and environmental stewardship.	
5	To recommend an appropriate biodiversity off-sets implementation approach that will meet the Global Reporting Initiative expectations	Collate all the data

### 3.2 Study Area

The study area was the Northern Coastal areas of KwaZulu-Natal (KZN) Province, Republic of South Africa (RSA), on the mineral sand mining operations backed by the multinational enterprises of Tronox and Rio Tinto. Tronox KwaZulu-Natal Sands

mineral sand operations are situated within the uThungulu District Municipality, with operation consisting of Fairbreeze Mine and the Central Processing Complex in Empangeni in the Mhlathuze and Mlalazi Local Municipalities respectively. The mine operations are hosted by the Mkhwanazi and Nzuza Traditional Councils. Rio Tinto Richards Bay Minerals (RBM) is a mineral sand producer, and extracts heavy minerals from the dune sand along the Northern Coastal region. The mining enterprise is located within the uThungulu District Municipality, operating on leased properties within Mbonambi and Mhlathuze Local Municipality of host communities, the Traditional Councils of Mbonambi, Sokhulu, Mkhwanazi and Dube. The mining operations of these enterprises are effected along the environmental sensitive coastal ecosystems and contribute significantly toward economic activities as well as social perspectives within the uThungulu District Municipality.

### **3.3 Population, sampling technique and size**

Rio Tinto Richards Bay Minerals (RBM) mining operations footprint is 5 500 ha whilst Tronox KwaZulu-Natal Sands covers an area of 4143.32 ha also along Northern KwaZulu-Natal coastal dune and some of the endangered north coastal dunes forests. Rio Tinto Richards Bay Minerals and Tronox KwaZulu-Natal Sands have staff complement of 850 and 700 respectively.

The term “offset” encompasses a range of approaches to comprehensive biodiversity compensation, from habitat-specific calculations to generalisable frameworks (Bull *et al.* 2014). Bull *et al.* (2014) further express an opinion on the several different methodologies exist for calculating the gains required to compensate any given development project, in other cases, areas are used as a proxy for habitat losses and gains. The opinion suggestions points out that many US Wetland Banking offsets effectively employ an area-based approach while others prefer a combination of area and ‘functionality’ of the habitat like with Canadian Fish Habitat. Another approach that will involve combining an area and ‘condition’ and compare this against some benchmark pristine state as practised in Australian vegetation offsets. US Conservation Banking also focus on species, calculating the area of habitat necessary to support a given population. However recent developments include a pilot UK policy and a South African policy which incorporates consideration of ecosystem services (Brownlie and Botha, 2009).

Some methodologies were developed for specific circumstances, such as those governing native grassland clearances in Victoria, Australia; others, such as US Wetland Banking, are intended as general frameworks. The chosen methodology was viewed as an ideal sampling technique that captured information as expected as opposed to choosing some approaches that have been employed across the globe which rather could miss critical information. In the main, it allowed for a method that conceptualised exploring efforts of relevancy and application of biodiversity initiative within context of the sustainability model focused on two model dimensions, economic and environment for the purposes of the study excluding social dimension. The size of the sample was also dictated by limited choices of mining enterprises exposed to biodiversity off-sets expectations within KwaZulu-Natal province that allowed such study to justifiable yield desired intents.

The purposive sampling technique was employed to extract statistical data from identified personnel of public and private entities relevant to study. Three executive management level incumbents preferably the Managing Director, Chief Financial Officer and Managing Executive responsible for Sustainability reporting from each mining entities were expected and complied in responding to a structured questionnaire including one environmental consultant from each private Environmental Consultancy entities. In addition two personnel from the environmental authorisation entity, Department of Economic Development, Tourism and Environmental Affairs (EDTEA) also responsible for compliance and monitoring as well as two scientific service planners from the nature conservation authority, Ezemvelo KZN Wildlife (EKZNW) that had commented and recommended mitigatory interventions, were also requested to participate.

Levy and Lemeshow (2013) defined a sample survey as “a study involving a subset (or sample) of individuals selected from a larger population”. The purpose of such sample surveys is to observe or measure the factors of interest on the sample population, aggregate the findings, and extrapolate them to generalise the results for the entire population. Issues of validity and reliability may materialise if the sample is not appropriately selected, hence there are various methods of sample selection that



may be applied. Levy and Lemeshow (2013) also explain that when the entire population, i.e. the target population, is selected, the study is called a census.

### **3.4 Research Tools**

Two research tools were used in the study, the one being a thematic review of the literature and the other a questionnaire survey, from which quantitative data was extracted. The online structured questionnaire tools *QuestionPro*, was used to acquire data for Objectives 1 - 4. The questionnaire was divided into four sections, the first obtaining demographic details regarding the participant's qualifications and work experience to contextualize their replies. In the remaining three sections, the participants were required to select one reply from a range of options, which were aggregated for presentation, with the mean, confidence interval standard deviation and error as basic statistical analysis. The data recruitment tool of quantitative analysis was used for each of the first four research objectives. This was utilised to acquire data on both economic and environmental dimensions. Whilst also assisted in exploring the economic sustainability benefits of biodiversity off-sets and the challenges relating to its implementation in relation. The relevancy and application of biodiversity in the said mining enterprises was thus established.

A survey method, administered via email, with a predetermined questionnaire containing a set of predefined answers for the respondents to choose from, is cost and time efficient in this research (Blair, Czaja, & Blair, 2013). Since using an electronic survey method can accommodate the participation of a distant targeted respondents and can participate in the research with ease.

### **3.5 Pre-testing**

A pilot study was carrying to pre-test the tool for all cited objective at an alternative Msebe opencast anthracite mining enterprise within the Nongoma Local Municipality and the greater Zululand District Municipality, KwaZulu-Natal Province. KwaZulu-Natal. The mining enterprise had recently acquired an Environmental Authorisation that include a directive to effect biodiversity off-sets initiative as an environmental impacts compensatory intervention. The commercial development will be constructed over a period of 6 months and will operate for approximately 20 years, mining at a rate of 600 000 tons per year and will eventually employ up to 145 people. The participants

in the position similar to that identified for the main study was asked to complete the same questionnaire. Furthermore one individuals from public and private sectors namely government and consultancy entities will be served and subjected to similar pre-testing processes.

Pretesting was a vital part of survey-based research and is an important tool to identify any potential problem areas, as well as to increase measurement accuracy, identify any areas that might negatively affect the participants' ability respond appropriately, and assist in improving the validity and reliability of the research. Pretesting also allowed the researcher to obtain an independent opinion on the survey instrument, such as its comprehensiveness, articulation and the time it took to complete (Ruel, Wagner & Gillespie, 2015).

The questionnaire was administered electronically via email using *QuestionPro*. To mitigate against the challenge of emails containing the survey link being delivered to the respondents' junk or spam folder of their inbox, a follow-up email was sent to advise them to check the junk or spam folder if they did not receive the survey link. In addition, the pre-test respondents cited none significant spelling and tense mistake that were corrected.

### **3.6 Validity and Reliability**

A questionnaire was designed to ensure validity and reliability. The respondents were requested to choose the most appropriate answer from a selection provided. In addition, *QuestionPro*, an independent research system, provided further measures to ensure validity and reliability, including assurance of confidentiality to the respondents.

### **3.6 Data Collection Process**

The Agency for Healthcare Research and Quality (AHRQ) (2012) study confirmed that despite the use of the best recruitment strategies and tools, the recruitment of participants for research usually takes longer than anticipated and thus results in delays and higher costs. In order to curtail the anticipated challenges the identified respondent were initially contacted and engaged through personal visits to explain the

objectives and benefits of the study, while providing assurance of non-adverse depiction of commercial mining entity's outlook.

The nature of data that was required to explore for this topic was quantitative, hence the methods and instruments of collecting such data falling under exploratory research design. An exploratory research approach that was employed for this study as defined by Zikmund, Babin, Carr and Griffin (2013:54) as the study that is conducted with the expectation that a formal study will be needed to provide more conclusive evidence by addressing the research questions or hypothesis developed in the exploratory phase. It is an approach preferably to be undertaken when not much is known about a phenomenon, or no information is available on how similar problems or research issues have been solved in the past as Ives and Bekessy (2013:570) confirms.

The respondents were expected to choose pre-fabricated responses, as they have to express their opinions on biodiversity relevancy and application including economic relevance and environmental stewardship. These also expressed perceptions on benefits and challenges with regard to biodiversity off-sets implementation, attained through identified respondents answering a structured questionnaire. Both primary data to respond to all the study objectives 1, 2, 3 and 4 and secondary data for objective 5 sources was obtained respectively the first four objective will include original statically information from questionnaire tool of the study while the fifth will be informed the preceding objectives.

Interviews, with or without a predetermined set of questions, need to be conducted in person, normally necessitates the services of a skilled interviewer, which invariably increases the cost and time required to perform the research. Because interviews are unobtrusive methods of data collection based on observation, a major advantage is that respondents are often able to communicate their messages accurately. The disadvantage is that the factors of interest must be observable, hence data which requires input from thoughts, attitudes, mental states and intentions cannot be processed. Surveys, on the other hand, make use of a pre-determined questionnaire and can be administered using a variety of media, e.g. email. By presenting a predefined set of possible answers to the set questions, the researcher is able to maintain some level of control without being present. A survey method, administered

via email, with a predetermined questionnaire containing a set of predefined answers for the respondents to choose from, is cost and time efficient in this research (Blair, Czaja, & Blair, 2013). Since using an electronic survey method can accommodate the participation of a distant targeted respondents and can participate in the research with ease.

### **3.8 Data Analysis**

Sekeran and Bougie (2013) affirmed that an initial step of data analysis involves getting the data ready. This entails collecting the data, performing data coding, editing and categorising. Online data analysis was conducted by the electronic tool, *QuestionPro* for Objectives 1 – 4 as the data was quantitative in nature, this being done using descriptive statistics (sum, percent, mean, standard deviation, standard deviation and standard error). The data generated from the questionnaire responses was coded and edited, with SPSS Data Editor of the said analytical tool of the captured data. The coded questionnaire replies were checked for accuracy using systematic sampling procedure so as to mitigate any possible coding errors resulting from human.

The demographic data was summed and presented in tables to provide the context to the participants. In the following three sections, the answers for each question were summed by response option, and presented as number and percentage in tables and graphs. For the first three objectives, the mean, confidence interval standard deviation and error as basic statistical analysis are also presented. Objective 4 consisted of three tables, each one asking the participants opinion, with the results being presented by line item in each table, not by table. To clarify, each of the three tables had 13 questions, with question 1 from each table being presented together.

### **3.9 Ethical Considerations**

The ethical consideration will upheld through securing ethical clearance from UKZN, mining enterprise consent to conduct the study in form of the letter of consent and online informed consent for questionnaire.

- Ethical clearance was obtained from University of KwaZulu-Natal (UKZN) Human and Social Sciences Research Ethics Committee to conduct the study protocol reference number: **HSS/0345/017M**

- Permission was obtained from the Richards Bay Mineral, Tronox, Ezemvelo KZN Wildlife and KZN Department of Economic Development, Tourism and Environmental Affairs. Executive management of where respondents' entities are employed.
- The participants were required to sign consent as accepted UKZN Human and Social Sciences Research Ethics Committee

The management of the data will be securely stored and confidentiality standards adhered to.

### **3.10 Summary**

Research methodology is a way in which one determines the results of investigations into a given problem on a specific matter, also referred to as the research problem. In defining a methodology, researchers use different criteria and methods for solving/researching the given research problem. The word "methodology" indicates the way in which one goes about researching or solving the research problem (Williams, 2011). The section, as stated, will focused on the different criteria and explored the most efficient and effective options available in order to obtain the information required to meet the objectives of the research. This information also enabled the development of the questionnaire, which explored relevant participants' opinions.

Aydelotte, Fogel and Bogue (2015) asserted that "what is attempted in a quantitative method research, as in other research, is not a full knowledge of reality but an increasingly closer approximation of it". The research aims will be to further the understanding the success extent in implementation of biodiversity off-sets from the perspective of identified role-players. Furthermore there is no intend to find a perfect solution, however suggested approach that might enhance receptive view of the Mining industry towards biodiversity off-set whilst realising economic and environmental sustainability will possible add value. The following chapter, the researcher will present the research results in text and graphic diagrams

## CHAPTER FOUR

### Presentation of Results

#### 4.1 Introduction

This chapter presents the respondents' demographics, including their experience and academic qualification. This is followed by the responses to the study's first four Objectives, which are used to inform the last objective's recommendations. Of the population of 12 participants who were identified to participate in the survey, 11 responded agreed voluntarily to participate on the survey as indicated on Table 4.1. In the context of the research design and methodology set out in the previous chapter, this chapter describes and interprets the findings of the research.

Table 4.1. Respondent's participation consents

Response	Percentage	Count (N)
I agree	100%	11
I do not agree	0.00%	0

In the context of the research design and methodology set out in the previous chapter, this chapter describes and interprets the findings of the research.

#### 4.2 Respondents' demographics

The respondents' demographics information is presented in the four categories namely their work portfolio or area of responsibility, years of service, education level and workstation base, Table 4.2 shows that nine (81.81%) of the 11 respondents were employed as managing executives responsible for sustainability and state officials, with the same number being employed for more than 10 years. . Most (n=10, 90.91%) had a post graduate education, and nine worked at the head or regional offices. In all four categories, at least one person preferred not to disclose any information.

Table 4.2 Respondents area of responsibilities, years of work experience, level of education and workstation base.

Category	No.	%	Basic Statistics Analysis	
Area of Responsibility				
Managing director	0	0.00	Mean	3.91
Managing executive responsible for sustainability	4	36.36	95% Confidence Interval	2.976 – 4.842
Chief financial officer	0	0.00	Standard Deviation	1.578
Environmental consultant	1	9.09	Standard Error	0.476
State Official	5	45.45		
Prefer not to disclosed	1	9.09		
Years Experiences				
< 5 years	0	0.00	Mean	3.00
5 – 10 years	1	9.09	95% Confidence Interval	2.736 – 3.264
>10 years	9	81.82	Standard Deviation	0.447
Prefer not to disclose	1	9.09	Standard Error	0.135
Postgraduate highest qualification				
Matric	0	0.00	Mean	3.09
Undergraduate	0	0.00	95% Confidence Interval	2.913 – 3.269
Post graduate	10	90.91	Standard Deviation	0.302
Prefer not to disclose	1	0.00	Standard Error	0.091
Other				
Workstation base				
Head office	5	45.45	Mean	1.73
Regional office	4	36.36	95% Confidence Interval	1.263 – 2.192
Prefer not to disclose	2	18.18	Standard Deviation	0.786
Other	0	0.00	Standard Error	0.237

#### 4.2 Biodiversity off-sets

The results presented are aligned towards attaining study Objective 1, to establish the relevance of biodiversity off-sets within the KwaZulu-Natal mining enterprises, and is depicted on Table 4.3. It presents the extent to which they consider various biodiversity initiatives in their corporate strategies.

The results regarding their consideration of biodiversity issues varied, with six (54.55%) fulling considering biodiversity offsets, and four (36.36%) considering its benefits, the sustainability model and global reporting initiatives. The other responses indicates some level of consideration, with some participants in each category

indicating that they had no idea about the strategic if any consideration was made.

Table 4.3 Biodiversity Off-sets and related concepts consideration during strategy development process.

Category	No.	%	Basic Statistics Analysis	
Strategic consideration of biodiversity offsets				
Fully	6	54.55	Mean	1.64
Almost certain	3	27.27	95% Confidence Interval	1.158 – 2.114
No idea	2	18.18	Standard Deviation	0.809
To a certain extent	0	0.00	Standard Error	0.244
Not at all	0	0.00		
Strategic consideration of Biodiversity Offsets Benefits				
Fully	4	36.36	Mean	2.09
Almost certain	4	36.36	95% Confidence Interval	1.419 – 2.762
No idea	1	9.09	Standard Deviation	1.136
To a certain extent	2	18.18	Standard Error	0.344
Not at all	0	0.00		
Strategic consideration of Sustainability Model				
Fully	4	36.36	Mean	2.36
Almost certain	2	18.18	95% Confidence Interval	1.603 – 5.24
No idea	2	18.18	Standard Deviation	1.286
To a certain extent	3	27.27	Standard Error	0.388
Not at all	0	0.00		
Strategic consideration of Global Reporting Initiative				
Fully	3	27.27	Mean	2.64
Almost certain	1	9.09	95% Confidence Interval	1.876 – 3.397
No idea	5	45.45	Standard Deviation	1.286
To a certain extent	1	9.09	Standard Error	0.388
Not at all	1	9.09		



### **4.3 Sustainability reporting context**

The purpose of Objective 2 was to determine the level of receptiveness to applying biodiversity off-sets initiatives by KwaZulu-Natal mining enterprises and the associated challenges, the results for which are presented in Table 4.4.

The participants indicated their familiarity with biodiversity off-sets related concepts, namely biodiversity offsets Benefits, the sustainability Model, Global Reporting Initiative and Biodiversity Offsets Implementation framework. These familiarity results will be analysed within the context of the consideration of the very concepts when in the development of enterprise corporate strategies. All participants were either very familiar or familiar with the biodiversity offsets, with less being very familiar in the other categories. A number of participants were unsure or unfamiliar with the offset benefits, sustainability model, global reporting initiative and implementation framework. While all indicated having some familiarity with biodiversity offsets, a number of participants were unsure or unfamiliar with the other categories

Table 4.6 Familiarity on Biodiversity Off-sets and related concepts

Category	No.	%	Basic Statistics Analysis	
Familiarity with biodiversity offsets				
Very familiar	7	63.64	Mean	1.36
Familiar	4	36.36	95% Confidence Interval	1.065 – 1.662
Unsure	0	0.00	Standard Deviation	0.505
Unfamiliar	0	0.00	Standard Error	0.152
Very unfamiliar	0	0.00		
Biodiversity Offsets Benefits				
Very familiar	5	45.45	Mean	1.64
Familiar	5	45.45	95% Confidence Interval	1.238 – 2.035
Unsure	1	9.09	Standard Deviation	0.674
Unfamiliar	0	0.00	Standard Error	0.203
Familiarity with Sustainability Model				
Very familiar	3	27.27	Mean	2.00
Familiar	5	45.45	95% Confidence Interval	1.542 – 2.458
Unsure	3	27.27	Standard Deviation	0.775
Unfamiliar	0	0.00	Standard Error	0.234
Very unfamiliar	0	0.00		
Familiarity with Global Reporting Initiative				
Very familiar	2	18.18	Mean	2.45
Familiar	5	45.45	95% Confidence Interval	1.737 – 3.172
Unsure	2	18.18	Standard Deviation	1.214
Unfamiliar	1	9.09	Standard Error	0.266
Very unfamiliar	1	9.09		
Familiarity with Biodiversity Offsets Implementation Framework				
Very familiar	3	27.27	Mean	2.00
Familiar	5	45.45	95% Confidence Interval	1.542 – 2.458
Unsure	3	27.27	Standard Deviation	0.775
Unfamiliar	0	0.00	Standard Error	0.234
Very unfamiliar	0	0.00		

#### **4.4 Economic relevance**

Objective 3 established the perceptions of the KwaZulu-Natal mining enterprises toward biodiversity off-sets contributions to their company's economic sustainability economic relevance, as depicted in Table 4.5. The respondents indicated their level of agreement regarding their Mining Enterprises benefitting from bio-diversity offset initiatives, improving their company's sustainability outlook performance, if the global reporting initiative (GRI) expectation are met as a tick box exercise and added no real value, was a hindrance to company sustainability performance and viewed as something that respondents' were not interested in. Regarding whether they perceived their company to have realised any benefits from the bio-diversity offsets, the results are as 18.18% respondents strongly agreeing in expressing opinion on that the Mining Enterprise benefits from entertaining expectations of the Global Reporting Initiative in yielding and realisation of company benefits while 27.27% agreed, 45.45% were unsure and 9.09% disagree, 18.18% respondents strongly agreeing in expressing opinion on that the Mining Enterprise benefits from entertaining expectations of the Global Reporting Initiative in sustainability outlook performance while 36.36% agreed, 36.36% were unsure and 9.09% disagree, 18.18% respondents agreed in expressing opinion on that the Mining Enterprise benefits from entertaining expectations of the Global Reporting Initiative add in non-value of GRI while 45.45% were unsure and 36.36% disagreed, 9.09% respondents strongly agreeing in expressing opinion on that the Mining Enterprise benefits from entertaining expectations of the Global Reporting Initiative in sustainability performance hindrance while 63.64% were unsure, 18.18% disagreed and 9.09% strongly disagreed and 9.09% respondents strongly agreeing in expressing opinion on that the Mining Enterprise benefits from entertaining expectations of the Global Reporting Initiative as a non-interesting activity while 54.55% unsure and 36.36% disagreed.

Table 4.7 Perceived biodiversity off-sets contributions to their company

Category	No.	%	Basic Statistics Analysis	
The company realise benefits				
Strongly agree	2	18.18	Mean	2.45
Agree	3	27.27	95% Confidence Interval	1.902 – 3.007
Unsure	5	45.45	Standard Deviation	0.934
Disagree	1	9.09	Standard Error	0.282
Strongly disagree	0	0.00		
Improve Company Sustainability outlook performance				
Strongly agree	2	18.18	Mean	2.36
Agree	4	36.36	95% Confidence Interval	1.817 – 2.910
Unsure	4	36.36	Standard Deviation	0.924
Disagree	1	9.09	Standard Error	0.279
Strongly disagree	0	0.00		
GRI expectation are met as a tick box exercise and no value add				
Strongly agree	0	0.00	Mean	3.18
Agree	2	18.18	95% Confidence Interval	2.738 – 3.625
Unsure	5	45.45	Standard Deviation	0.751
Disagree	4	36.36	Standard Error	0.226
Strongly disagree	0	0.00		
Viewed as hindrance to Company performance and operation efficiency				
Strongly agree	1	9.09	Mean	3.18
Agree	0	0.00	95% Confidence Interval	2.602 – 3.762
Unsure	7	63.4	Standard Deviation	0.982
Disagree	2	18.18	Standard Error	0.296
Strongly disagree	1	9.09		
Non-interesting activity				
Strongly agree	1	9.09	Mean	3.18
Agree	0	0.00	95% Confidence Interval	2.65 – 3.698
Unsure	6	54.55	Standard Deviation	0.874
Disagree	4	36.36	Standard Error	0.263
Strongly disagree	0	0.00		

## 4.5 Environmental Stewardship

The relationship between biodiversity off-sets and environmental stewardship is shown by the views of respondents' motivating factors for mining enterprises in being part of the Biodiversity Offsets Initiatives application ranging from not important to very important. Furthermore by the current level of satisfaction based on status-quo ranging from not satisfied to very satisfied in as far as South African Biodiversity Offsets prescripts expectation and guidance are concern, the current level of satisfaction based on status-quo ranging from not satisfied to very satisfied as dictated by Global Reporting Initiative expectation all rated from 1 to 5 scale depicted from Figure 4.1 to 4.12 on the following dimensions: Top management team views; appropriate management; explicit corporate strategic intents; effective corporate communication; complementary business units; elimination of bureaucratic process; supportive and receptive leadership biodiversity off-sets associated benefits, collective implementation intents; mining enterprises' public image; various stakeholder support and resource allocation for implementation. The respondents results are also an attempt to partially respond on the research question that intent to ascertain the extent are KwaZulu-Natal Province's commercial mining enterprises have been receptive to, and in applying biodiversity off-set initiatives so as to meet the Global Reporting Initiative expectations.

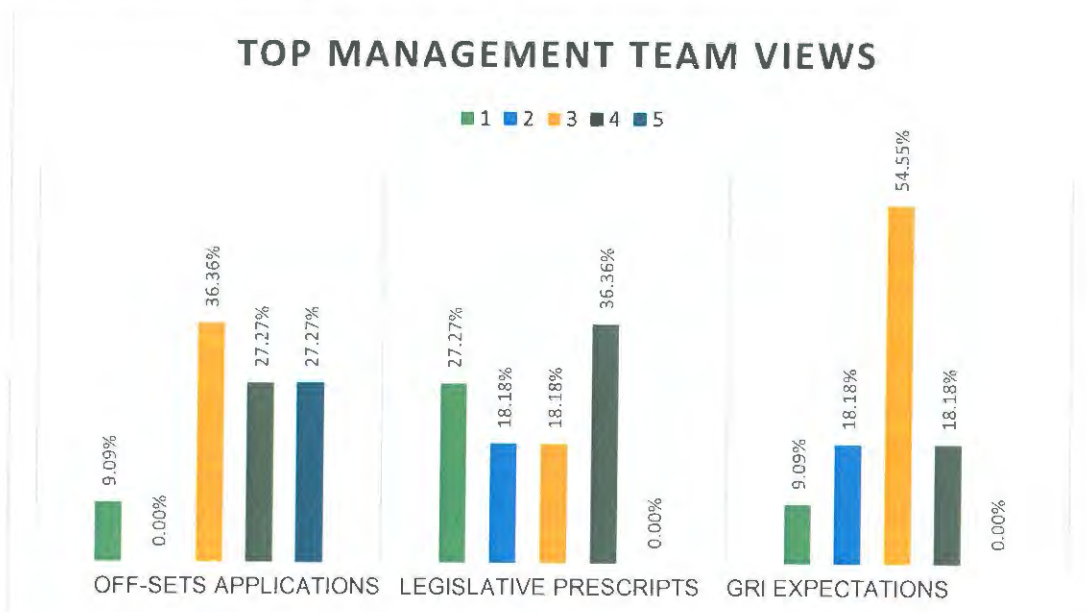


Figure 4.1 Top management views

Figure 4.1 shows respondents' rating on motivating factors of mining enterprises in being part of the Biodiversity Offsets Initiatives application ranging from not important

to very important 9.09% gave a rating of 1, 36.36% of 3, 27.27% of 4 and 27.27% of 5 in relation to top management views while rated current level of satisfaction based on status-quo ranging from not satisfied to very satisfied in as far as South African Biodiversity Offsets prescripts expectation and guidance with regard to top management team views, 27.27% gave a rating of 1, 18.18% of 2, 18.18% of 3 and 36.36 of 4 and current level of satisfaction based on status-quo ranging from not satisfied to very satisfied as dictated by Global Reporting Initiative expectations rated on top management team views 9.09% gave a of 1, 18.18% rating of 2, 54.55% of 3 and 18.18% of 4.

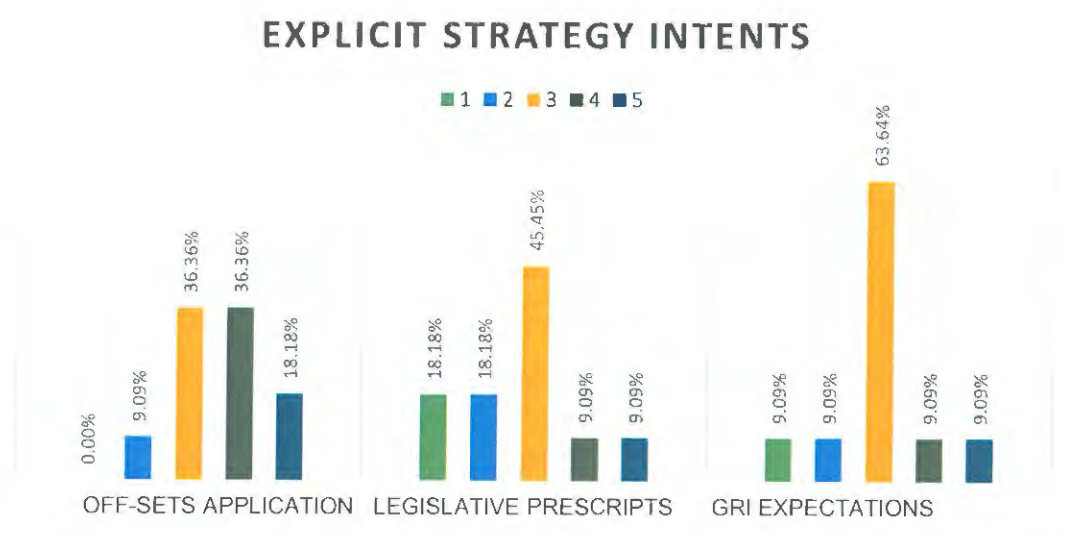
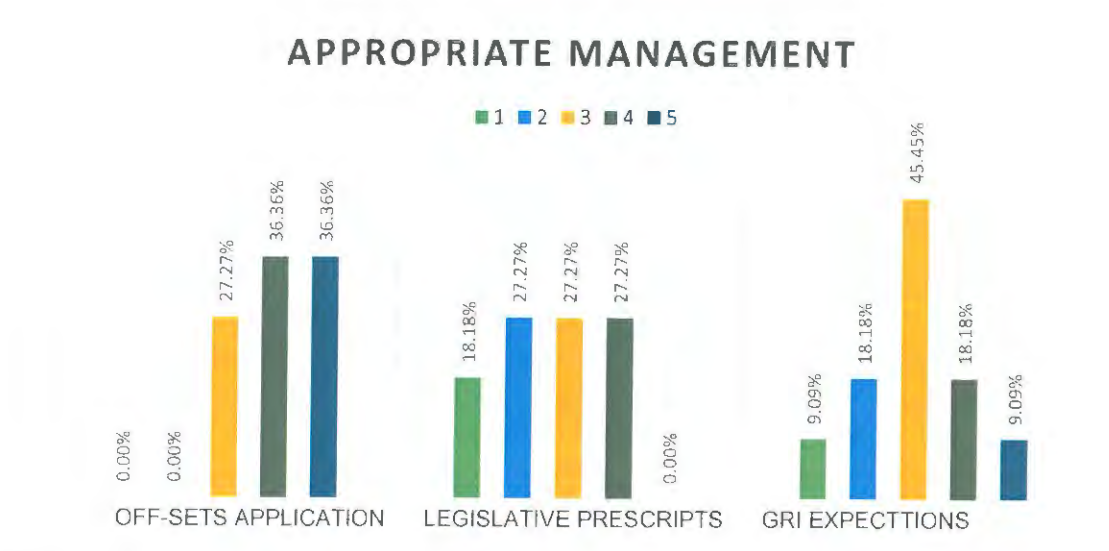


Figure 4.2 Explicit strategy intents

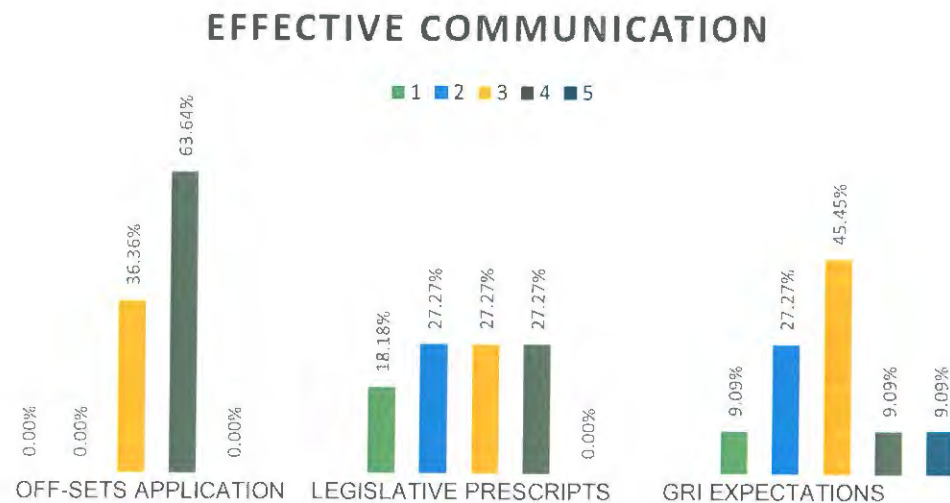
Figure 4.2 shows respondents' rating on motivating factors of mining enterprises in being part of the Biodiversity Offsets Initiatives application ranging from not important to very important 9.09% gave a rating 2, 36.36% of 3, 36.36% of 4 and 18.18% of 5 in relation to explicit corporate intents while rated respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied in as far as South African Biodiversity Offsets prescripts expectation and guidance with regard in relation to explicit corporate strategic intents, 18.18% gave a rating of 1, 18.18% gave a rating of 2, 45.45% of 3, 9.09% of 4 and 9.09% of 5 and current level of satisfaction based on status-quo ranging from not satisfied to very satisfied as dictated by Global Reporting Initiative expectations rated on explicit corporate strategic intents, 9.09% gave a rating of 2, 9.09 of 2, 63.64 of 3, 9.09% of 4 and 9.09% of 5.





**Figure 4.3 Appropriate management**

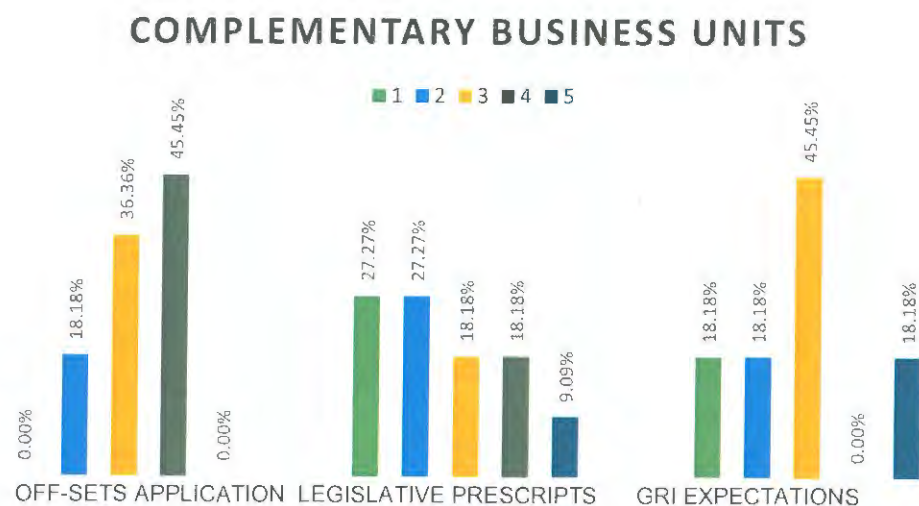
Figure 4.3 shows respondents' rating on motivating factors of mining enterprises in being part of the Biodiversity Offsets Initiatives application ranging from not important to very important, 27.27% gave a rating of 3, 36.36% of 4 and 36.36% of 5 in relation to appropriate management application, while rated respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied in as far as South African Biodiversity Offsets prescripts expectation and guidance with regard in relation to appropriate management, 18.18% gave a rating of 1, 27.27% of 2, 27.27% of 3 and 27.27% of 4 and respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied as dictated by Global Reporting Initiative expectations rated on appropriate management, 9.09% gave a rating of 1, 18.18% of 2, 45.45% of 3, 18.18% of 4 and 09.09% of 5.



**Figure 4.4 Effective communication**

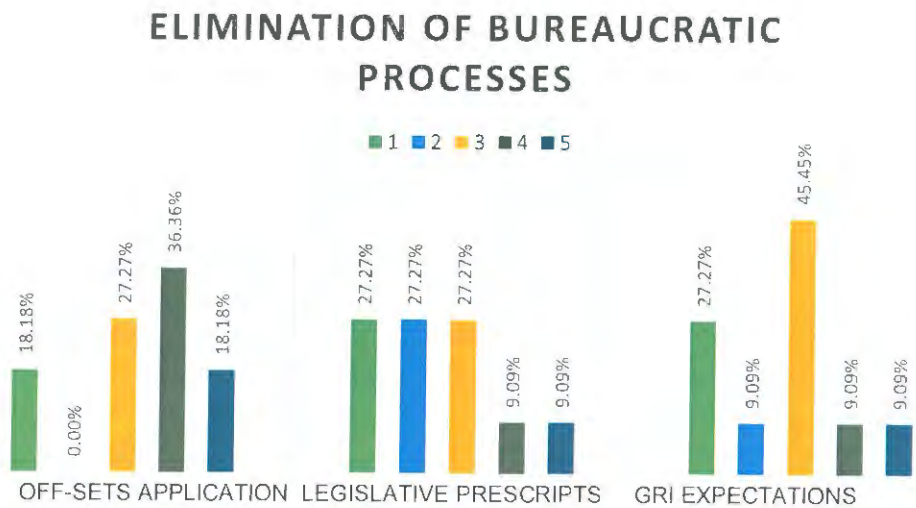
Figure 4.4 shows respondents' rating on motivating factors of mining enterprises in being part of the Biodiversity Offsets Initiatives application ranging from not important to very important, 36.36% gave a rating of 3, and 63.64% of 4 in relation to effective communication, while rated respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied in as far as South African Biodiversity Offsets prescripts expectation and guidance with regard in relation to effective corporate communication, 18.18%.gave a rating of 1, 27.27% of 2, 27.27% of 3 and 27.27% of 4 and respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied as dictated by Global Reporting Initiative expectations rated on effective corporate communication, 09.09% gave a rating of 1, 27.27% of 2, 45.45% of 3, 9.09% of 4 and 9.09% of 5.





**Figure 4.5 Complementary business units**

Figure 4.5 shows respondents' rating on motivating factors of mining enterprises in being part of the Biodiversity Offsets Initiatives application ranging from not important to very important, 18.18% gave a rating of 2, 36.36% of 3 and 45.45% of 4 in relation to complementary business units, while rated respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied in as far as South African Biodiversity Offsets prescripts expectation and guidance with regard in relation to complementary business units, 27.27% gave a rating of 1, 27.27% of 2, 18.18% of 3, 18.18% of 4 and 9.09% of 5 and respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied as dictated by Global Reporting Initiative expectations rated on complementary business units, 18.18% gave a rating of 1, 18.18% of 2, 45.45% of 3 and 18.18% of 5.



**Figure 4.6 Elimination of bureaucratic processes**

Figure 4.6 shows respondents' rating on motivating factors of mining enterprises in being part of the Biodiversity Offsets Initiatives application ranging from not important to very important, 18.18% gave a rating of 1, 27.27% of 3, 36.36% of 4 and 18.18% of 5 in relation to elimination of bureaucratic processes, while rated respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied in as far as South African Biodiversity Offsets prescripts expectation and guidance with regard in relation to elimination of bureaucratic process, 27.27% gave a rating of 1, 27.27% of 2, 27.27% of 3, 9.09% of 4 and 9.09% of 5 and respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied as dictated by Global Reporting Initiative expectations rated on elimination of bureaucratic processes, 27.27% gave a rating of 1, 9.09% of 2, 45.45% of 3, 9.09% of 4 and 9.09% of 5.

## SUPPORTIVE AND RECEPTIVE LEADERSHIP

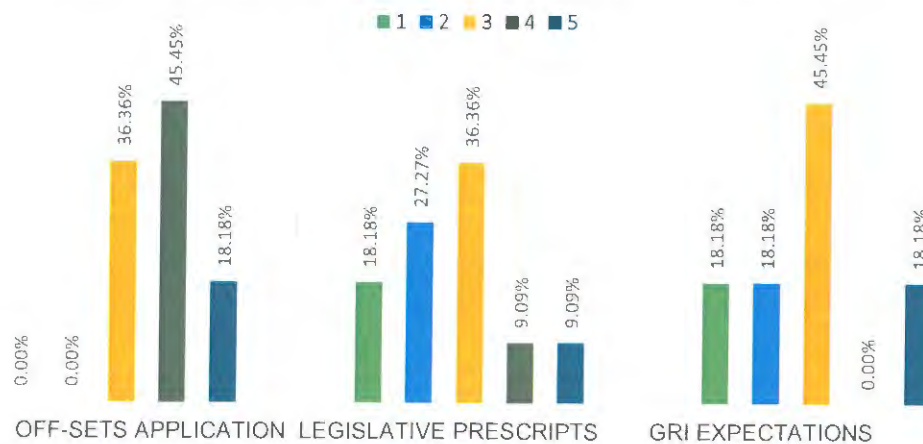
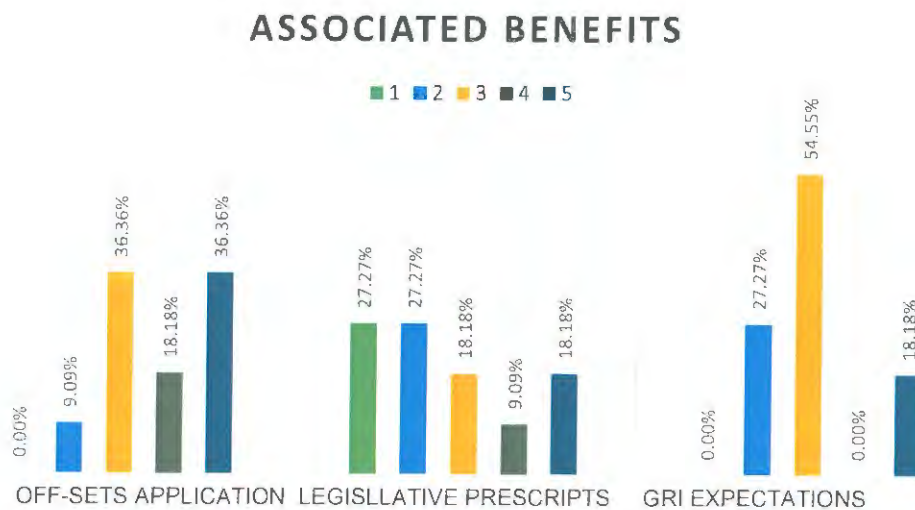


Figure 4.7 Supportive and receptive leadership

Figure 4.7 shows respondents' rating on motivating factors of mining enterprises in being part of the Biodiversity Offsets Initiatives application ranging from not important to very important 36.36% gave a rating of 3, 45.45% of 4 and 18.18% of 5 in relation to supportive and receptive leadership, while rated respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied in as far as South African Biodiversity Offsets prescripts expectation and guidance with regard in relation to supportive and receptive leadership, 18.18% gave a rating of 1, 27.27% of 2, 36.36% of 3, 9.09% of 4 and 9.09% of 5 and respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied as dictated by Global Reporting Initiative expectations rated on supportive and receptive leadership biodiversity, 18.18% gave a rating of 1, 18.18% of 2, 45.45% of 3 and 18.18% of 5.



**Figure 4.8 Associated benefits**

Figure 4.8 shows respondents' rating on motivating factors of mining enterprises in being part of the Biodiversity Offsets Initiatives application ranging from not important to very important 09.09% gave a rating of 2, 36.36% of 3, 18.18% of 4 and 36.36% of 5 in relation to biodiversity off-sets associated benefits, while rated respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied in as far as South African Biodiversity Offsets prescripts expectation and guidance with regard in relation to biodiversity off-sets associated benefits, 27.27% gave a rating of 1, 27.27% of 2, 18.18% of 3, 9.09% of 4 and 18.18% of 5 and respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied as dictated by Global Reporting Initiative expectations rated on biodiversity off-sets associated benefits, 27.27% gave a rating of 2, 54.55% of 3 and 18.18% of 5.



## COLLECTIVE IMPLEMENTATION INTENTS

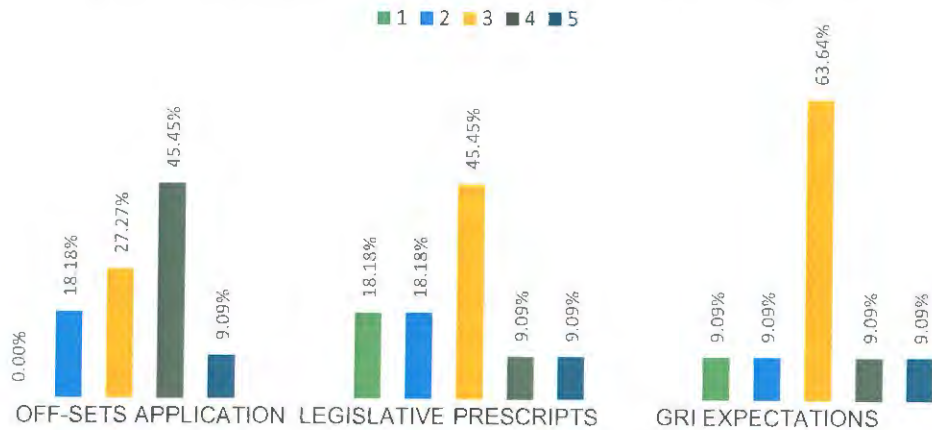


Figure 4.9 Collective implementation intents

Figure 4.9 shows respondents' rating on motivating factors of mining enterprises in being part of the Biodiversity Offsets Initiatives application ranging from not important to very important, 18.18% gave a rating of 2, 27.27% gave a rating of 3, 45.45% of 4 and 9.09% of 5 in relation to collective implementation intents, while rated respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied in as far as South African Biodiversity Offsets prescripts expectation and guidance with regard in relation to collective implementation intents, 18.18% gave a rating of 1, 18.18% of 2, 45.45% of 3, 9.09% of 4 and 9.09% of 5 and respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied as dictated by Global Reporting Initiative expectations rated on collective implementation intents, 9.09% gave a rating of 1, 9.09% of 2, 63.64% of 3, 9.09% of 4 and 9.09% of 5.

## ORGANISATION PUBLIC IMAGE

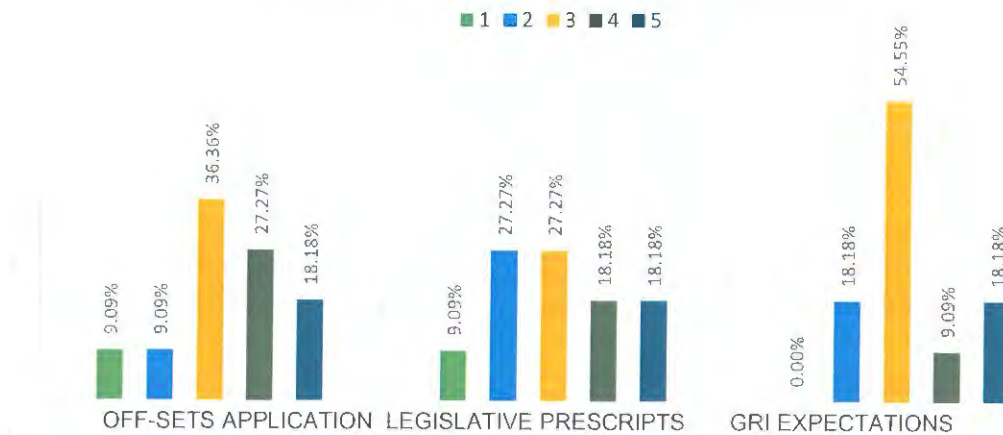


Figure 4.10 Public image

Figure 4.10 shows respondents' rating on motivating factors of mining enterprises in being part of the Biodiversity Offsets Initiatives application ranging from not important to very important 9.09% gave a rating of 1, 9.09% gave a rating of 2, 36.36% of 3, 27.27% of 4 and 18.18% of 5 in relation to enterprise public image, while rated respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied in as far as South African Biodiversity Offsets prescripts expectation and guidance with regard in relation to mining enterprises' public image, 9.09% gave a rating of 1, 27.27% of 2, 27.27% of 3, 18.18% of 4 and 18.18% of 5 and respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied as dictated by Global Reporting Initiative expectations rated on mining enterprises' public image, 18.18% gave a rating of 2, 54.55% of 3, 9.09% of 4 and 18.18% of 5.

## VARIOUS STAKEHOLDERS SUPPORT

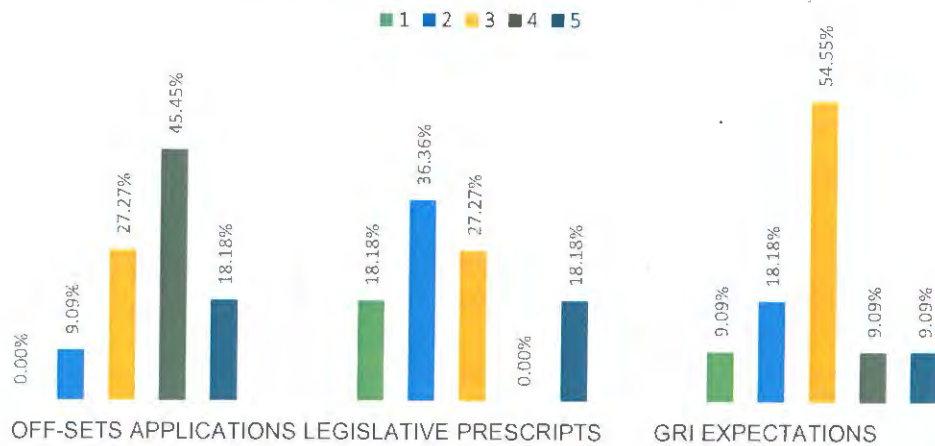


Figure 4.11 Stakeholders support

Figure 4.11 shows respondents' rating on motivating factors of mining enterprises in being part of the Biodiversity Offsets Initiatives application ranging from not important to very important 27.27% gave a rating of 3, 45.45% of 4 and 18.18% of 5 in relation to various stakeholder's support, while rated respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied in as far as South African Biodiversity Offsets prescripts expectation and guidance with regard in relation to various stakeholder support, 18.18%.gave a rating of 1, 36.36% of 2, 27.27% of 3 and 18.18% of 5 and respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied as dictated by Global Reporting Initiative expectations rated on various stakeholder support, 9.09% gave a rating of 1, 18.18% of 2, 44.44% of 3, 9.09% of 4 and 9.09% of 5.



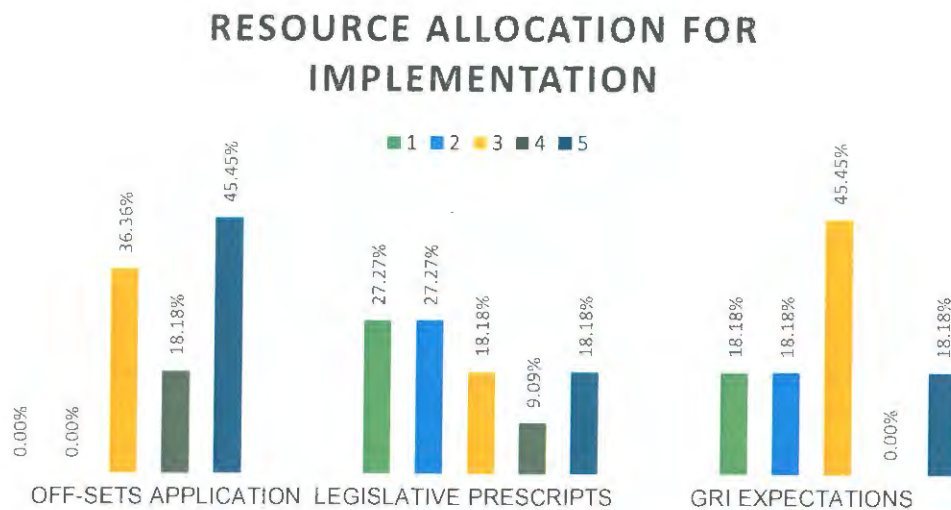


Figure 4.12 Resource allocation

Figure 4.12 shows respondents' rating on motivating factors of mining enterprises in being part of the Biodiversity Offsets Initiatives application ranging from not important to very important, 36.36% gave a rating of 3, 18.18% of 4 and 45.45% of 5 in relation to implementation resource allocation, while rated respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied in as far as South African Biodiversity Offsets prescripts expectation and guidance with regard in relation to resource allocation for implementation, 27.27% gave a rating 1, 27.27% of 2, 18.18% of 3, 9.09% of 4 and 18.18% of 5 and respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied as dictated by Global Reporting Initiative expectations rated on resource allocation for implementation, 18.18% gave a rating of 1, 18.18% of 2, 45.45% of 3 and 18.18% of 5.

#### 4.4 Summary

The presentation of results was an attempted to present the results of the survey conducted, the intent is to ensure that the presentation is in a clear and logical format. The respondents' demographics and identified some important characteristics of the participants in terms of their field of work or area of responsibility, length of service, education level and work stations were presented. The raw data presented in graphic diagrams with basic statistical analysis for simplicity in understand the main features of the report being presented. The analysis and discussion were structured to respond to the objectives of the research. The following chapter is a discussion in attempt to



analyse the results in terms and to respond to the research question and attainment of the said research objectives.

## CHAPTER FIVE

### Discussion

#### 5.1 Introduction

The study attempt was to establish extent of KwaZulu-Natal Province's commercial mining enterprises receptiveness towards and in the application of biodiversity off-set initiatives so as to meet the Global Reporting Initiative expectations. This was achieved by **(Objective 1)** establishing the relevance of biodiversity off-sets, **(Objective 2)** determination of the level of receptiveness to application of biodiversity off-sets initiatives within the KwaZulu-Natal mining enterprises, the **(Objective 3)** establishment of the perceptions of the KwaZulu-Natal mining enterprises toward biodiversity off-sets contributions to their company's economic sustainability and the **(objective 4)** reflect on the relationship between biodiversity off-sets and environmental stewardship. The ecumenical view expressed is of biodiversity off-sets initiatives as a potential contributor to commercial mining enterprise sustainability chosen focused on economic and environmental benefits.

#### 5.2 Biodiversity off-sets

The establishment of the relevance of biodiversity off-sets within the KwaZulu-Natal mining enterprises is depicted by the result from the following respondents' knowledge of Commercial Mining Enterprises' adequately consideration whilst developing the current corporate strategy of Biodiversity Offsets, Biodiversity Offsets Benefits, Sustainability Model, Global Reporting Initiative and Biodiversity Offsets Implementation Framework as illustrated in Figure 5.1.



Figure 5.1. Mining Enterprises' consideration in the development corporate strategy

Though Figure 5.1, shows biodiversity offsets less considered in the corporate strategy development process, the relevance is reflected supported by related elements related benefits, sustainability model and GRI. The analysis suggest the need for biodiversity implementation approach and legislative prescripts intervention.

Further illustration by respondents' view on Mining Enterprise Biodiversity Offsets efforts in relation to the Sustainability Model on strategy map, measures of achievement, alignment of budget, alignment of resources, cascading to lower levels, project planning, monitoring & evaluation and corrective measures this is illustrated in Figure 5.2.

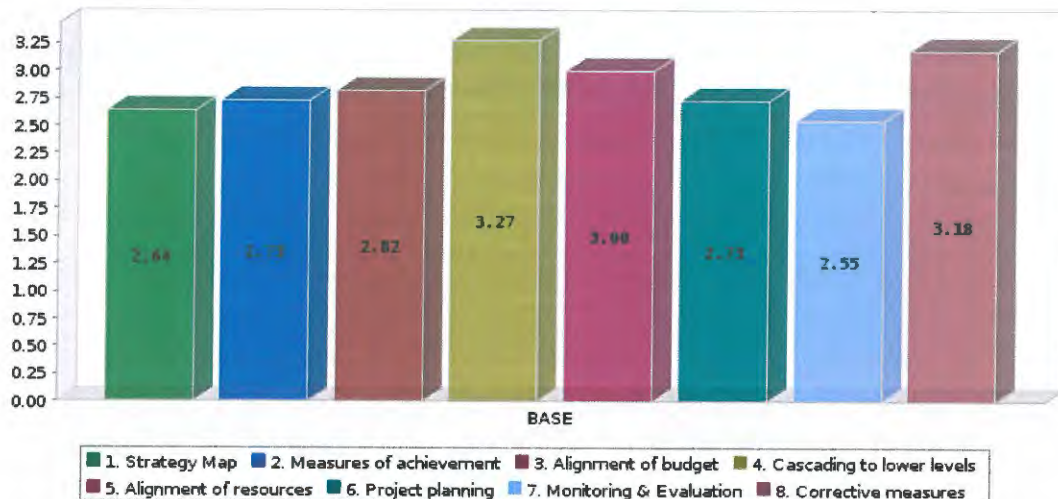


Figure 5.2. Mining Enterprise Biodiversity Offsets efforts in relation to the Sustainability Model

The reflection as depicted on Figure 5.2, of mining enterprise interest and efforts in biodiversity off-sets initiatives in relation to high rating of information being cascaded to lower levels, alignment of resource and correctives measure. This further confirmation of necessity of the mining sector in KwaZulu-Natal to assisted, guided and monitored in the application of biodiversity off-sets initiatives.

The biodiversity relevance is confirmed by Kiesecker *et al.* (2009) that in commercial enterprise in the recommendations of strategic thinking in selecting off-sets sites, including developing contemporary and pragmatic application guidelines that will steer a process of social, economic and environmental sustainability.

Hence the view that relevance of Biodiversity is argued to be true as conclusively confirmed by respondents' rating of the following statements based on the Mining Enterprise Executive Management understanding of South African Biodiversity Offsets prescripts (Legislative, norms and standard including guidelines), namely Mining Enterprises understand GRI expectation, Mining Enterprises understand related responsibilities, appreciation societal value, delivery of expected services economically, delivery of expected deliver services effectively including expected support of the Biodiversity Offsets operations as illustrated on Figure 5.3.



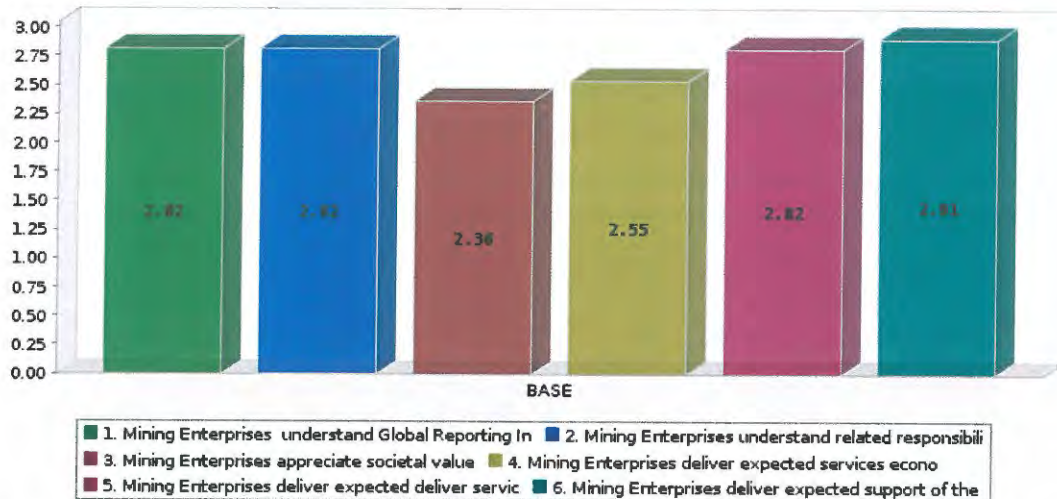


Figure 5.3. Mining Enterprise Executive Management understanding of South African Biodiversity Offsets prescripts.

The legislative prescripts and implementation guidance importance in the biodiversity off-sets initiatives within the commercial mining enterprise sector is attest by depictions of Figure 5.3. The rating mining enterprises appreciation of societal value and delivery of expected services economically is the case in point.

### 5.3 Sustainability reporting context

The sustainability reporting expectations as either dictated by legislative statute or Global Reporting initiative, these expectations assist in assessing commercial enterprises' intent on environmental, social and economic outlook as well as receptiveness of compliance. The determination of the level of receptiveness to application of biodiversity off-sets initiatives by KwaZulu-Natal mining enterprises and the associated challenges is expressed by the respondents' opinions on familiarity of biodiversity off-sets related concepts including rating on Global Reporting Initiative (GRI) and lower rating on biodiversity off-sets understanding.

The result show the mining enterprises in KwaZulu-Natal do have an appreciation of biodiversity off-sets role hence positive receptiveness, the Figure 5.4 illustrates and support the argument.

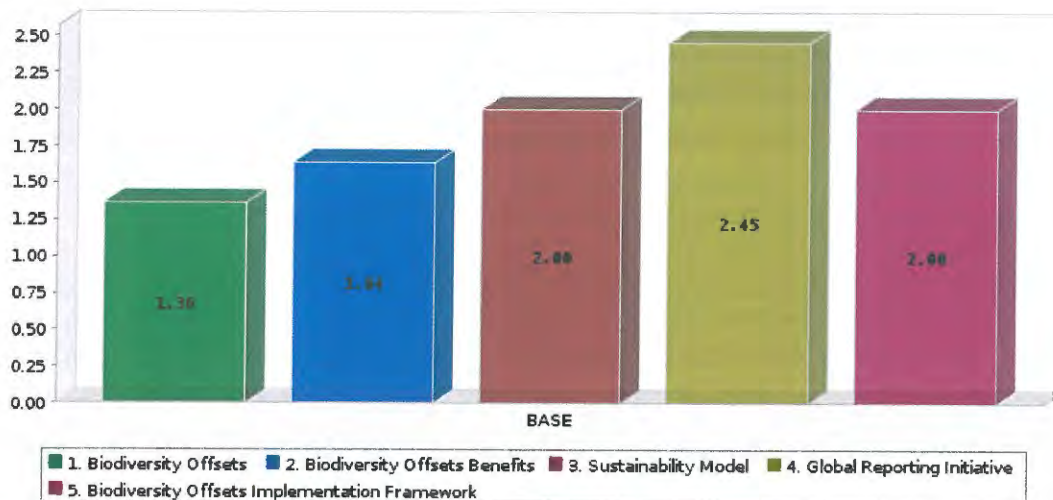


Figure 5.4. Relevant concept familiarity

Kolk (2004) argues that the more specific and comprehensive all this social, environmental and economic information in the report is, the higher the mitigatory initiatives implementation likelihood. Furthermore and despite the view that this analytical scheme will not provide an unequivocal answer to the question of whether companies have really implemented either through reflection of receptiveness or internalisation the mitigatory interventions, the reflection and inclusion in commercial enterprises' reports, hence a view of a step in that direction. Concluding in hypothesising that *"the higher the implementation likelihood, the higher the chance that companies will continue to publish sustainability reports and, more importantly, feel responsible for the societal and environmental implications of their activities, and act accordingly"*.

The respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied as dictated by Global Reporting Initiative expectation on the following: top management team views; appropriate management; explicit corporate strategic intents; effective corporate communication; complementary business units; elimination of bureaucratic process; supportive and receptive leadership biodiversity off-sets associated benefits, collective implementation intents; mining enterprises' public image; various stakeholder support and resource allocation for implementation. The reflection of results suggest persuasive of acceptance to the application of biodiversity off-sets initiatives by KwaZulu-Natal mining enterprises and the appetite to address associated challenges illustrated on Figure 5.5.



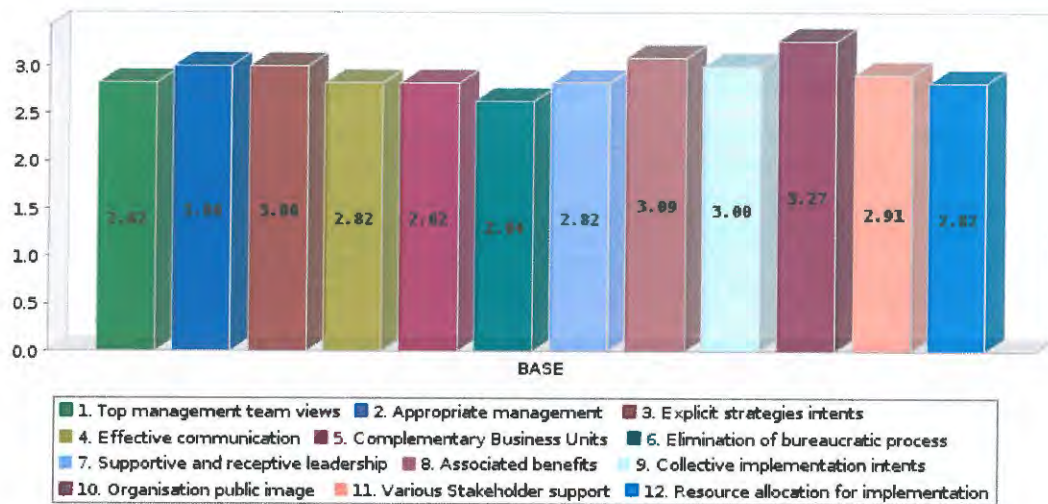


Figure 5.5. Global Reporting Initiative expectation

The consistence in rating as reflected by Figure 5.5 confirmed the appreciation of the global reporting initiative expectations particularly in the context of sustainability.

#### 5.4 Economic relevance

The economic sustainability of commercial enterprise with biodiversity off-sets as a significant contributor will always enhance economic relevance of such mitigatory interventions within the business arena. The acknowledgment and appreciation of such successes have potential for commercial enterprise to generate negative and positive effects through its commercial and associates activities if not well nurtured as deserved. Daub (2014:2) affirms that the more a company is in the public eye and interest, the more it generates liabilities to justify its "licence to operate" in societal perspective. Pilgrim *et al* (2013), reflecting on a sound financial mechanism such as a sound costed business plan or endowment fund. These will entail likelihood of achievement and long term management of offset gains. Financial assurance such as insurance, bonds and trust funds could provide a relief often required at particular stages in the development process, and could ensure security of offsets in case of divestment or commercial failure Therefore establishment of the perceptions of the KwaZulu-Natal mining enterprises toward biodiversity off-sets contributions to their company's economic sustainability is paramount and appropriate.

The respondents' opinion on the Mining Enterprise benefits from entertaining expectations of the Global Reporting Initiative yielding and realisation of company

benefits, improvement of company sustainability outlook performance, global reporting initiative expectation are met as a tick in the box exercise and add no real value, as a hindrance to company sustainability performance and one's work and viewed as something that respondents' want nothing to do with. The result presented justify and confirm the relevance of biodiversity off-sets in commercial transactions that have potential of yielding business desired outcomes as illustrated on Figure 5.6.

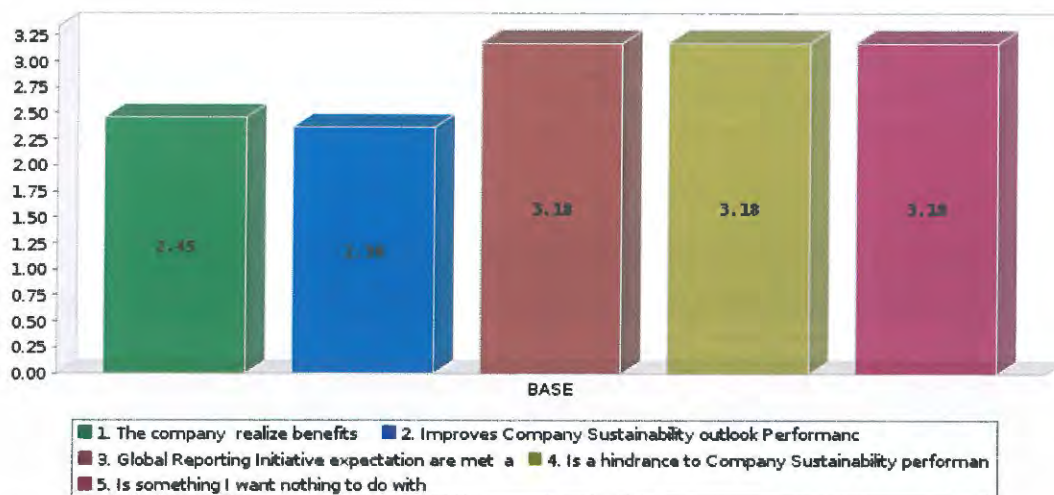


Figure 5.6. Global Reporting Initiative Perceptions

The higher than all rating of global reporting initiative expectations of emphasis on consistent appreciation of economic, environment and social considerations in persuasion commercial mining sustainability aspirations. The views on hindrance to company sustainability performance and as non-value adding activity is concerning and requires mitigatory interventions.

Furthermore the consistency in results from respondents' rating further confirmed importance of the Biodiversity Offsets Initiatives application in relation to the top management team views; appropriate management; explicit corporate strategic intents; effective corporate communication; complementary business units; elimination of bureaucratic process; supportive and receptive leadership biodiversity off-sets associated benefits, collective implementation intents; mining enterprises' public image; various stakeholder support and resource allocation for implementation. The results also confirms positive sentiments and perceptions of the KwaZulu-Natal mining enterprises toward biodiversity off-sets contributions and application thereof. Hence viewed as vital for commercial mining enterprises' economic sustainability while pointing out biodiversity off-sets' economic relevance as illustrated on Figure 5.7.



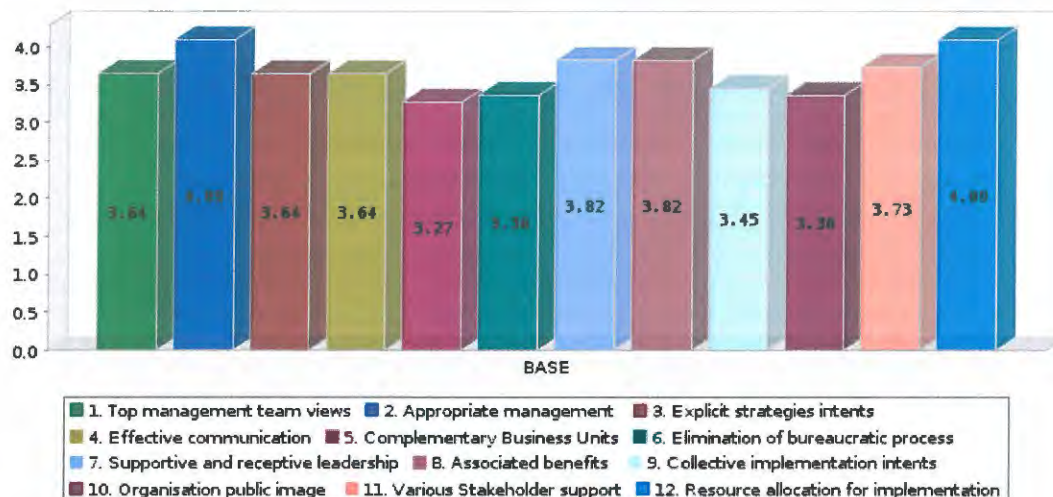


Figure 5.7. Biodiversity Offsets initiative application

The executive management embracement of biodiversity off-sets initiative application within the commercial mining business arena is critical and necessary with the support of appropriate legislative prescripts and approach.

### 5.5 Environmental stewardship

Commercial mining enterprises adoption of environmental stewardship can yield sustainability not only for environmental gains, economics and social must also feature prominently for an overall mining enterprises intents. The attainment of such intents could only be a reality an appropriate biodiversity off-sets implementation approach that will meet the Global Reporting Initiative expectations is recommended and applied. Thus the relationship between biodiversity off-sets and environmental stewardship is reflected.

The respondents' current level of satisfaction based on status-quo ranging from not satisfied to very satisfied in as far as South African Biodiversity Offsets prescripts expectation and guidance with regard to the following: top management team views; appropriate management; explicit corporate strategic intents; effective corporate communication; complementary business units; elimination of bureaucratic process; supportive and receptive leadership biodiversity off-sets associated benefits, collective implementation intents; mining enterprises' public image; various stakeholder support and resource allocation for implementation. The results affirms the expectation from society and appropriateness of biodiversity off-sets initiative in the embracement of

such environmental stewardship initiatives as illustrated on Figure 5.8.

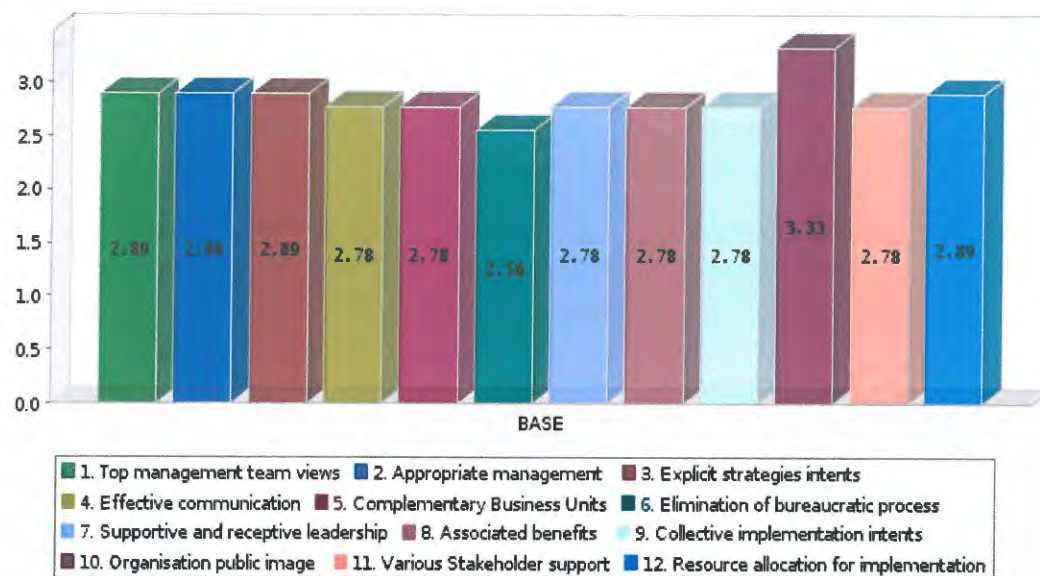


Figure 5.8. South African Biodiversity Offsets prescripts expectation and guidance

The overall rating expressed in Figure 5.8 also shows consistence in the prevailing state of affairs and perception of various stakeholders towards biodiversity off-sets related legislative prescripts and implementation protocols. Therefore attesting the essential expectation and interest in the development biodiversity off-sets implementation framework in support of commercial sustainability. Therefore the relationship between biodiversity off-sets and environmental stewardship thus confirmed.

Ott (2015) concludes that strong sustainability leaves room for the dynamics of natural systems. It is by no means morally repugnant because it does not grant absolute priority to nature conservation in any single case. The opportunity costs of implementation are not unbearable. Strong sustainability is compatible with market-based economics, a liberal culture, and a democratic state. It does neither require nor support policies that neglect the production of other types of capital. The view suggest that permitting some substitution of 'pristine' natural capital with 'cultivated' or "pristine equivalent" natural capital is sound investment both for economic and environmental gains.

## **5.6 Summary**

The collective respondents' result presentation have shown an extent of KwaZulu-Natal Province's commercial mining enterprises receptiveness towards and in the application of biodiversity off-set initiatives so as to meet the Global Reporting Initiative expectations. The research question and objectives intendedly responded to through reflection on biodiversity off-sets, economics relevance, environmental stewardship and ultimately sustainability reporting context. The focus was on environmental and economics dimension of the sustainability model have allowed this research present arguments and show the relevance and application extent of biodiversity off-sets initiatives within with the commercial mining sector of KwaZulu-Natal.

## **CHAPTER SIX**

### **Conclusion and Recommendations**

#### **6.1 Introduction**

The research outcomes suggested a conclusion that depict commercial mining enterprise receptiveness of biodiversity off-sets initiatives and the relevance thereof while the application the said initiatives is concerning. These concerns will be reflected on in this chapter and suggestions on implementation guidance will be shared

#### **6.2 Key findings**

The depiction of lower understanding score of biodiversity off-sets concept (1.36) being below average (1.891) relative to highest global reporting initiative expectations (2.45). The particularity consideration in the scoring is of the eleven respondent's involvement in either ensuring compliance or application of biodiversity as expected by legislative prescripts and Global Reporting Initiative (GRI) including 90.91% postgraduate education level. The result appears to present a negative outlook toward biodiversity off-sets that suggest a particular approach in the management of biodiversity off-sets concepts within the mining sector that requires better appreciation and insight from of relevant all role-players throughout the value chain from the environmental authorisation to application and management stages. The same is reflected Mining Enterprises' consideration in the development corporate strategy of biodiversity off-sets (1.64) below average (2.182) as oppose to highest score against global reporting initiative expectations (2.636).

The Mining Enterprise Executive Management understanding of South African Biodiversity Offsets prescripts scoring reflect average (2.712). The scores ranged from the lowest of appreciating societal value (2.364) to highest score of delivery expected support of the Biodiversity Offsets operations (2.909). The minimum deviation from the mean suggested mining sector understanding of biodiversity legislative prescripts in relation to the dimensions scored against. Furthermore the scoring consistency attested the relevance biodiversity offsets and receptiveness and the intent to the application of the biodiversity off-sets initiatives. Hence the appetite to meet Global

Reporting Initiative expectations as premise for economic, social and environmental sustainability.

The research findings lower average score of 2.667 satisfaction level views on current *status quo* in relation to South African biodiversity off-sets prescripts and expectations against the average scoring global reporting initiative expectations of 2.917 and importance of participation of biodiversity off-sets application of 3.659 ascertained from similar elements. These point out to positive perception of mining enterprises to biodiversity off-sets as contributor to economic sustainability. However the requirement for improved implementation protocols including continuous applications management and support is imperative in ensuring biodiversity off-sets initiative that yields desired outcomes.

The level of receptiveness in applying biodiversity off-sets initiatives by KwaZulu-Natal mining enterprises and the associated challenges is further determine through the analysis presented that reflect the positive levels. The mining enterprise efforts in relation to the sustainability model particularly the above average score of cascading to lower levels and allocation of resources of 3.273 and 3.000 respectively against the average score of 2.864.

The perceptions establishment of the KwaZulu-Natal mining enterprises toward biodiversity off-sets contributions to their company's economic sustainability. This is established through the analysis of Mining Enterprise benefits from entertaining expectations of the Global Reporting Initiative with the average of 2.873 against the enterprises benefits realisation of 2.455, improvement of enterprise sustainability outlook of 2.364 with negative reflection similar scores of 3.182 in viewed as a none value adding exercise, hindrance to enterprise sustainability performance and activity not paying attention to.

Therefore the said analysis and interpretations confirmed the relevance and receptiveness of biodiversity off-sets initiatives within the KwaZulu-Natal mining enterprises. However the perception towards economic benefits will require certain intervention inputs that will yield desired improvements.

### **6.3 Recommendations**

The absence of understanding business dynamics by public services personnel namely from the Authorising Authority and Commenting Agency is very recognised by the results of the study. There is evident lack of capacity in understanding business operations and dynamics involved that contrary to norm of doing business in the public service (Macfarlane 2017, pers. comm.). The difference of opinions by National Departments of Environmental Affairs, Mineral Resources, Water Affairs and Sanitation and Agriculture Forestry and Fisheries, Provincial Department of Economic Development, Tourism and Environmental Affairs and Ezemvelo KZN Wildlife and lack of alignment of policies on biodiversity off-sets. The prevailing state of affairs depicted by the research results.

The recommendation is that the Provincial Department of Economic Development, Tourism and Environmental Affairs as an Environmental Authorising Authority develop a policy with subsequent prescripts such regulations, norms and standards including implementation guidelines. This will address among others, the lack of guidance for implementers, set implementation time frame that will assist in business planning and budgeting, improve business acumen to Public Service personnel while address lack of capacity and enhance understanding of the whole biodiversity off-sets value chain. The policy development process must be widely consultative, particularly with relevant State Entities to ensure policy synergy culminating to align and consistence approach.

Biodiversity off-sets implementation approach will be explicit with expectations articulated for all interested parties sustainability. The time frame dictated for compliance by the Environmental Authority for economic development must be well specified, assisting in planning and budgeting within the business sector. Thus the possibility of having biodiversity off-sets implemented before the developments commence.

### **6.2 Future studies**

The study to be commissioned by the Department of Economic Development Tourism and Environmental Affairs that will assist the Department to align the diverge areas of disciplines (Economic Development, Tourism and Environment) so as to ensure



common departmental branches intents as reflected on the reviewed 2016 Provincial Growth and Development Strategy and National Development Plan 2030.

### **6.3 Summary**

The research outcomes have adequately responded to know the extent KwaZulu-Natal Province's commercial mining enterprises have been receptive to, and in applying biodiversity off-set initiatives so as to meet the Global Reporting Initiative expectations. The KwaZulu-Natal commercial mining are receptive to the Biodiversity off-sets however the application of such have challenges as shown by the study results. The Department of Economic Development, Tourism and Environmental Affairs should initiative a process of ensuring better management of biodiversity off-sets initiatives.

## REFERENCES

- Agency for Healthcare Research and Quality (AHRQ). 2012. Participant Recruitment for Research. *Agency for Healthcare Research and Quality*.  
(<https://healthit.ahrq.gov/ahrq-funded-projects/emerging-lessons/participant>)  
recruitment-research; accessed 29 September 2015).
- Aydelotte, W.O., Fogel, R.W. and Bogue, A.G. 2015. *The dimensions of quantitative research in history*. Princeton: Princeton University Press.
- Ballou, B. and Heitger, D.L. 2005. *The rise of corporate sustainability reporting: a rapidly-growing assurance opportunity*. Oxford. Richard T. Farmer School of Business Miami University.
- Blair, J., Czaja, R.F. and Blair, E.A. 2013. *Designing surveys: A guide to decisions and procedures*. Thousand Oaks, CA: Sage Publications.
- Bramston, G. Pretty, G. and Zammit, C. 2015. Assessing Environmental Stewardship Motivation. *University of Southern Queensland*. 1-23.
- Brownlie, S. and Botha, M., 2009. Biodiversity offsets: adding to the conservation estate, or 'no net loss'? *Impact Assess. Proj. Appraisal* 27 (3), 227–231.
- Brownie, S., King, N. and Treweek, J. 2012. Biodiversity tradeoffs and offsets in impact assessment and decision making: can we stop the loss? *Impact Assessment and Project Appraisal*. 31(1): 24-33.
- Bull, J.W., Suttle, K.B., Gordon, A., Law, E.A., Suttle, K.B. and Milner-Gulland, E.J. 2014. Importance of baseline specification in evaluating conservation interventions and achieving no net loss of biodiversity biodiversity off-sets in theory and practice. *Conservation Biology*. 28(3): 799-809.
- Bull, J.W., Suttle, K.B., Gordon, A., Singh, N.J. and Milner-Gulland, E.J. 2012. Biodiversity off-sets in theory and practice. *Oryx*. 47(3): 369-380.
- Bull, J.W., Suttle K.B., Singh, N.J. and Milner-Gulland, E.J. 2013. Conservation when nothing stand still: moving targets and biodiversity offsets. 11(4): 203-210
- Burgin, S. 2008. Bio banking: an environmental scientist's view of the role of biodiversity banking off-sets in conservation. *Biodiversity Conservation*, 17(3008):807-816
- Burns, M. and Weaver, A. 2008. *Exploring sustainability science*. Stellenbosch: African Sun Media



- Business and Biodiversity Off-sets Programme. 2012. Standards on biodiversity off-sets. *Forest trends and the wildlife conservation society*. 1-29.
- Creswell, J.W. 2013. *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, CA: Sage.
- Daub, Clause-H. 2014. Assessing the quality of sustainability reporting: an alternative methodological approach. *Institute of Sustainable Management*. 1-12.
- Gardner, T.A, Von Hase, A., Brownlie, S., Ekstrom, J.M.M., Pilgrim, D.J., Savy, E.C., Stephens, R.T.T., Treweel, J., Ussher, G.T., Ward, G. and Kate, K.T. 2013. Biodiversity off-sets and the challenges of achieving no net loss. *Conservation Biology*. 1-11.
- Global Reporting Initiative, 2013. *Sustainability reporting guidelines*. Amsterdam: Netherlands.
- Global Reporting Initiative, United Nations Environment Programme (UNEP), Centre for Corporate Governance in Africa and KPMG. 2013. *Carrots and sticks: sustainability reporting policies worldwide – today's best practice, tomorrow's trends*. New York: United Nations.
- Goncalves, B., Marques, A., Morta'gua, A., Da Maia Soares, V. and Pereira, H.M. (2015) Biodiversity offsets: from current challenges to harmonize metrics. *Current Opinion in Environmental Sustainability*. 14(2015):61-67.
- Gordon, A., Landford, W.T., Todd, J. A., White, M. D, Mullerworth, D.W. and Bekessy, S.A. 2011. Assessing the impacts of biodiversity off-set policies. *Environmental modelling and software*, 26(2011):148-1488.
- Guimaraes, T. and Liska, K. 1994. Exploring the business benefits of environmental stewardship. *Business Strategy and the Environment*. Winter: 1-32.
- Habib, T.J., Farr, D.R., Schneider, R.R. and Boutin, S. 2013. Economic and Ecological Outcomes of Flexible Biodiversity Offset Systems. *Conservation Biology*. 6(27):1313 -1323.
- Hanson, C., Ranganathan, J., Iceland, C. and Finisdore, J. 2012. The corporate ecosystem services review: Guidelines for identifying business risks and opportunities arising from ecosystem change. Version 2.0. *World Resources Institute*.
- Hewson, C. and Laurent, D. 2012. Research design and tools for Internet research. In: J. Hughes (ed.), *Sage Internet Research Methods, Vol. 1*. London: Sage.

- ICMM (2005) Biodiversity offsets: a briefing paper for the mining industry.  
*International Council on Mining and Metals*, London
- Ives, C.D. and Bekessy, S.A. The ethics of off-setting nature. *The ecological Society of America*. 563-573
- Jenkin, W. 2013. The spirit of sustainability. *Berkshire Encyclopedia of Sustainability*. 380 – 385.
- Jenner, N. and Balmforth, Z. 2015. Biodiversity Off-sets: Lessons Learnt From Policy and Practise. Country Summary Report: South Africa. Business and Biodiversity Programme Fauna and Flora International. United Kingdom. Fauna & Flora International.
- Kate K., Bishop J. and Bayon, R. 2004. Biodiversity offsets: views, experience and business case. *International Union for Conservation of Nature and Natural Resources and Insight Investment Management (Global) Ltd*. London, UK. 1-94.
- Kiesecker, J.M, Copeland, H., Pocerwicz, A., Nibbelink, N. McKenney, B., Dahlke, J., Matt Holloran, M., and Stroud, D. 2009. A framework for implementing biodiversity offsets: selecting sites and determining scale. *BioScience*. 59(1):77-84.
- Klopper, R., Lubbe, S. and Rugbeer, H. 2007. The matrix method of literature review. *Alternation*, 14,1 (2007): 262 – 276.
- Kolk, A. 2004. A decade of sustainability reporting: developments and significance. *Environment and Sustainable Development*, 3(1):51-64.
- Lee, N. and Kirkpatrick, C. 2016. Relevance and consistency of environmental impact assessment and cost-benefit analysis in project appraisal. *Project Appraisal*. 11(4):229 – 236.
- Levy, P.S. and Lemeshow, S. 2013. *Sampling of populations: methods and applications*. New York: John Wiley & Sons.
- Mahadea, D. and Youngleson, J. 2013. *Entrepreneurship and small business development*. Cape Town. Pearson.
- Maron, M. 2015. Stop misuse of biodiversity offsets. *Nature*. 1 (523): 401-408.
- Maron, M., Hobbs, R.J., Moilanen, A., Matthews, J.W., Christie, K., Keith, D.A., Lindenmayer, D.B. and McAlpine, C.A. 2012. Faustian bargains? Restoration realities in the context biodiversity off-set policies. *Biological Conservation*. 155(2012): 141- 148.

- McKenney, B.A. and Kiesecker, J.M. 2009. Policy development for biodiversity offsets: a review of frameworks. *Environmental Management*. 45(2010):165-176.
- Moreno-Mateos, D., Maris, V. Be'chet, A. and Curran, M. 2015. The true loss caused by biodiversity offsets. *Biology Conservation*. 1- 8.
- Niemark, B.D. and Wilson, B. 2015. Re-mining the collection: from bioprospecting to biodiversity off-setting in Madagascar. *Geoforum*, 66(2015):1-10.
- Norton, D.A. 2008. Biodiversity off-sets: two New Zealand case studies and an assessment framework. *Environmental Management*. 1-9
- O'Leary, Z. 2013. *The essential guide to doing your research project*. London:Sage.
- Otty, K. 2015. The case for strong sustainability. *Biology Conservation* .56-64.
- Overton, J. M., Stephens, R. T.T and Ferrier, S. 2012.Net Present Biodiversity Value and the Design of Biodiversity Offsets. *Royal Swedish Academy of Science*. 42(2013):100-110.
- Pascoe, S., Wilcox, C. and Donlan, J. 2011. Biodiversity offsets: a cost-effective interim solution to seabird bycatch in fisheries? *Plosone*. 6(1):1-10.
- Pilgrim, J. D., Brownlie, S., Ekstrom, J. M. M., Gardner, T. A., von Hase, A., Ten Kate, K., Savy, C.E., Stephens, R. T. T., Temple, H. J., Treweek, J. Ussher,G.T. and Ward, G. A process for assessing the off-setability of biodiversity impacts. *Conservation Letters*. 6(5):376-384.
- PWC (Price Waterhouse Coopers). 2010. *Biodiversity and Business Risk*. PWC, London and World Economic Forum, Geneva.
- Rainey, H.J., Pollard, E.H.B., Ekstrom, G.J.M.M. Livingstone, S.R., Temple, H.J. and Pilgrim, J.D. 2014. A review of corporate goals of no net loss and net positive impact on biodiversity. *Fauna and Flora International*. 1-7.
- Ruel, E.,Wagner,W.E. and Gillespie,B.J.2015. *The practice of survey research: theory and applications*. Thousand Oaks, CA: Sage. (Sample chapter "Pretesting and Pilot Testing"  
[https://us.sagepub.com/sites/default/files/upmbinaries/68507\\_Ruel\\_Chapter\\_6](https://us.sagepub.com/sites/default/files/upmbinaries/68507_Ruel_Chapter_6) ; accessed 01 October 2016).
- Sullivan, S. 2013. After the green rush? Biodiversity offsets, uranium power and the 'calculus of casualties' in greening growth. *Human Geography*. 6(1): 80 -101.
- South Africa. Department of Environmental Affairs. 2009. *National Protected Area Expansion Strategy for South Africa*. Pretoria: Government Printer.

- Sekeran, U. and Bougie, R. 2013. *Research methods for business* (6<sup>th</sup> ed.). United Kingdom: John Wiley & Sons Ltd.
- Splash, C.L.2015. Bulldozing biodiversity: the economics of off-sets and trading-in nature. *Biological Conservation*.
- Sutton, P.2004. What is sustainability? *Eingama*. 27(1):4-9.
- Underwood, J.G. 2010. Combining landscape-level conservation planning and biodiversity offset programs: a case study. *Environmental Management*. 2011(47): 121-129.
- United Nations. 2015. *Millennium Development Goals Report 2015*. New York: United Nations.
- Venter, P. ed. 2015. *Practising strategy: a southern African context*. Cape Town: Juta.
- Villarroy A., Barros, A.C., and Kiesecker, J. 2014. Policy Development for Environmental Licensing and Biodiversity Offsets in Latin America. *Plos one*. 9(9):1-13.
- Virah-Sawmy, M. Ebeling, J. and Taplin, R. 2014. Mining and biodiversity: A transparent and science-based approach to measure “no-net-loss”. *Journal of Environmental Management*, 143(2014):61-71.
- Vos, B.S. and Reddy, T.L. 2014. The use of environmental sustainability reporting by South African companies to promote environmental sustainability. *Actuarial Society of South Africa's 2014 Convection*. Cape Town Convention Centre, 22 – 23 October 2014. 787- 814.
- Williams, J. 2011.What is research methodology and its importance. Dissertationhelpservice.com (<http://www.howtodo.dissertationhelpservice.com/what-is-research-methodology-and-its-importance/>; accessed 20 September 2016).
- Weaver, A. 2012. Can EIA practitioners contribute to sustainability in Africa. Lecture notes distributed in the Centre fo Environmental Mnagement, Bloemfontein, University of Free State. January 2012.
- Zikmund, W.G., Babin, B.J., Carr, J.C. and Griffin, M.2013. *Business research methods*. Mason. South-Western.
- Personal Communication.
- Macfarlane D. (Pr.Sci.Nat.) 2017.06.23

## APPENDIX A: QUESTIONNAIRE

Hi,

As our previous communicate' mentioned in the email, I will request you to participate in a survey to explore the relevancy and application of biodiversity offsets including the challenges relating to its implementation

This survey targets Mining Enterprises' Management Executive level specifically the Managing Director, Managing Executive responsible for Sustainability and the Chief Financial Officer as well as appointed Environmental Consultants, State Officials from Commenting and Environmental Authorisation Entities. The survey seeks to understand your views on biodiversity offsets and associated implementation challenges where present.

Your participation in this study is completely voluntary. There are no foreseeable risks associated with this project. However, if you feel uncomfortable answering any questions, you can withdraw from the survey at any point. It is very important for us to learn your opinions. Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. Your information will be coded and will remain confidential. If you have questions at any time about the survey or the procedures, you may contact me on the details specified below We have contracted with QuestionPro, an independent research firm, to field your confidential survey responses. Please tick I Agree box, hereby declaring that your participation is voluntary, and click continue, complete the survey and express your views.

Kind Regards,

Sifiso Keswa

Tel: 0338451440/0824653664

Email: fiso.keswa@gmail.com

Within which of the following portfolio do you work?

1. Managing Director
2. Managing Executive responsible for Sustainability.
3. Chief Financial Officer
4. Environmental Consultant
5. State Official
6. Prefer not to disclose

How many years of service do you have?

1. Less than 5 years
2. Between 5 and 10 years
3. More than 10 years
4. Prefer not to disclose

What is your highest education level?

1. Matric
2. Undergrad
3. Postgrad
4. Prefer not to disclose
5. Other

Where is your work station based?

1. Head office
2. Regional Offices
3. Prefer not to disclose
4. Other

How familiar are you with the following:

	Very unfamiliar	Unfamiliar	Unsure	Familiar	Very familiar
Biodiversity Offsets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biodiversity Offsets Benefits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sustainability Model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Global Reporting Initiative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biodiversity Offsets Implementation Framework	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

According to your knowledge, whilst developing the current strategy, has the organisation adequately considered the following:

	Not at all	To a certain extent	No idea	Almost	Fully
Biodiversity Offsets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biodiversity Offsets Benefits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sustainability Model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Global Reporting Initiative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Mining Enterprise Biodiversity Offsets efforts in relation to the Sustainability Model:

	Not at all	To a certain extent	No idea	Almost	Fully
Strategy map	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Measures of achievement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alignment of budget	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cascading to lower levels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alignment of resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Project planning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Monitoring & Evaluation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Corrective measures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

In your opinion, is the Mining Enterprise benefits from entertaining expectations of the Global Reporting Initiative?

	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
The company realise benefits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improves Company Sustainability outlook Performance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Global Reporting Initiative expectation are met as a tick in the box exercise and add no real value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is a hindrance to Company Sustainability performance and my work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is something I want nothing to do with	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Please rate the following statements based on the Mining Enterprise Executive Management understanding of South African Biodiversity Offsets prescripts (Legislative, norms and standard including guidelines)

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Mining Enterprises understand GRI expectation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mining Enterprises understand related responsibilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mining Enterprises appreciate societal value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mining Enterprises deliver expected services economically	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mining Enterprises deliver expected deliver services effectively	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mining Enterprises deliver expected support of the Biodiversity Offsets operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Motivating factors to you in being part of the Biodiversity Offsets Initiatives application  
[Not Important, Very Important]

	1	2	3	4	5
Top management team views	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Appropriate management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Explicit strategies intents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Effective communication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Complementary Business Units	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Elimination of bureaucratic process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Supportive and receptive leadership	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Associated benefits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collective implementation intents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Organisation public image	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Various Stakeholder support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Resource allocation for implementation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Your current level of satisfaction based on status-quo [Not Satisfied, Very Satisfied] in as far as South African Biodiversity Offsets prescripts expectation and guidance.

	1	2	3	4	5
Top management team views	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Appropriate management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Explicit strategies intents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Effective communication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Complementary Business Units	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Elimination of bureaucratic process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Supportive and receptive leadership	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Associated benefits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collective implementation intents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Organisation public image	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Various Stakeholder support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Resource allocation for implementation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Your current level of satisfaction based on status-quo [Not Satisfied, Very Satisfied]  
as dictated by Global Reporting Initiative expectation

	1	2	3	4	5
Top management team views	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Appropriate management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Explicit strategies intents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Effective communication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Complementary Business Units	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Elimination of bureaucratic process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Supportive and receptive leadership	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Associated benefits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collective implementation intents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Organisation public image	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Various Stakeholder support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Resource allocation for implementation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16 May 2017

Mr Sifiso Keswa (201508066)  
Graduate School of Business & Leadership  
Westville Campus

Dear Mr Keswa,

Protocol reference number: HSS/0345/017M

Project title: The relevance and application of biodiversity offsets initiatives by commercial mining enterprises in KwaZulu-Natal

**Full Approval – Expedited Application**

In response to your application received on 05 May 2017, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and FULL APPROVAL for the protocol has been granted.

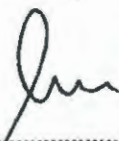
Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

**PLEASE NOTE:** Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully



.....  
Dr Shenuka Singh (Chair)

/ms

Cc Supervisor: Dr Prathana Amrithlal  
Cc Academic Leader Research: Dr Muhammad Hoque  
Cc School Administrator: Ms Zarina Bullyraj

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Humanities & Social Sciences Research Ethics Committee


Dr Shenuka Singh (Chair)






Westville Campus, Govan Mbeki Building

Postal Address: Private Bag X54001, Durban 4000

Telephone: +27 (0) 31 260 3587/8350/4557 Facsimile: +27 (0) 31 260 4608 Email: [ximbap@ukzn.ac.za](mailto:ximbap@ukzn.ac.za) / [snymanm@ukzn.ac.za](mailto:snymanm@ukzn.ac.za) / [mohuno@ukzn.ac.za](mailto:mohuno@ukzn.ac.za)

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