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THE DEVELOPMENT AND IMPLEMENTATION OF A GREEN POLICY WITHIN THE MINING INDUSTRY AT ROYAL BAFOKENG PLATINUM NORTH WEST PROVINCE.

BY

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Mini-dissertation submitted in partial fulfillment of the requirements for the degree of Masters for Business Administration at the University of North West, Mafikeng Campus.

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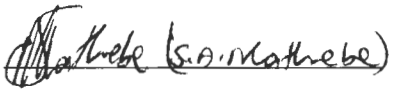
DECLARATION

I, Sibongile Andronica Mathebe hereby declare that this work is as a result of my own research at the North West University under the supervision of Prof S. I. Lubbe.



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ABSTRACT

"Our actions impact the environment."Today we realise that each and everything can help or hurt our planet. Companies need to take ownership of the environmental protection and need to understand the issues that may help to reduce their environmental footprint. Companies and businesses worldwide have been awakened to how important it is for them to adapt their business and processes to be sustainable and positively affect the environment. They have to come to realize that by going green, they can gain lot of positive press and recognition which definitely helps to achieve their profit. The scarcity of resources and increasing environmental issues has caused the government to stipulate stricker environmental regulations or offer innovative programs to address these issues (Wang *et al,* .2004). The Mining Industries need to address and overcome "Green barriers" to improve their environmental performance.

The research presented in this mini-dissertation reviews the environmental issues affecting the mining industries, the importance of going green as a company for sustainable development. The participants in this study were RBPlat employees at Rustenburg mining area, North West Province. Qualitative and quantitative research methods were used on this study. Data was gathered through a questionnaire and was statistically analysed by summarized on a spread sheet and that stats were calculated using SPSS. After the research, there were some findings that were used by the researcher to come up with recommendations that will assist not only RBPlat but also companies which are ready to go green.

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GLOSARY

ACRONYMS	DEFINITIONS
AESs	Agri-Environmental Schemes
BRPlat	Bafokeng Royal Platinum
BRPM	Bafokeng Royal Platinum Mines
CDM	Clean Development Mechanism
CEO	Chief Executive Officer
CCA	Copper Chrome Arsenate
DWEA	Department of Water and Environmental Affairs
EP	Environmental Protection
EMS	Environment Management Systems
EPI	Environmental Performance Indicators
GP	Green Policy
GGC	Green Government of Canada
GSCM	Green Supply Chain Management
HDSA	Historically Disadvantaged South Africans
IT	Information Technology
IMS	Integrated Management Systems
IOS	International Organisation for Standardization
IPAP	Industrial Policy Action Plan
NEMA	National Environment Management Authority

NDP	National Development Policy
NSDE	National Sustainable Design Expo
NMPRDA	National Mineral and Petroleum Resources Development Act
ROI	Return-On-Investment
SO2	Sulphur Dioxide
SD	Sustainable Development
SEPI	Sustainable Energy Policy Initiative
UNFCCCC	United Nations Framework Convention on Climate Change

Chapter 1

Overview of the Study

1.1 Introduction

Royal Bafokeng Platinum was initially known as Bafokeng Rasimone Platinum Mine which has been developed in close co-operation with the Royal Bafokeng Nation. It is a joint venture with Royal Bafokeng Resources as HDSA (Historically Disadvantaged South Africa) partner (a new black-controlled platinum-mining company, says the RBPlat CEO Steve Phiri). Royal Bafokeng Platinum forms part of the Mining consortium around Rustenburg area that mines the Merensky Reef (the principle ore body within the Bushveld Complex).

This mine is facing the problem of environment harness which caused by producing of unwanted waste products whereby environmental problems are now out in the open. When one talks about the environment one is referring to all the conditions that affect living creatures. The environment is all the things one needs to be able to live –clean water to drink and to wash with, space to live and fresh air to breathe and food to eat.

One could not live without plants and animals (Bellamy, 1991). Actions impact the environment in a different ways. Today one realises that most of the things, one do can help or hurt people and planet in many ways. All people need to take ownership of environmental protection. People need to understand the issues that may help companies to reduce their environmental footprint.

This chapter consists of seven sub-headings which include the introduction, the background of the study, objectives of the proposed study, research design covers the context, information on about the study, tools to be used by the study and the layout of the chapter to give its full understanding.

1.2 Background to the problem statement

The inhabitants of South Africa have the constitutional right to an environment that is not harmful to their health or wellbeing. Everyone has the right to have their environment protected through reasonable legislative and other measures that prevent pollution, encourage conservation and ensure the ecological sustainability of resources while promoting economic and social development (NEMA, 2001).

In an era of sustainable development with growing concern about threats to global environment quality and increasing pressures on world resources, mining industries are under pressure to deal with environmental challenges generated from the optimum use of natural resources. The mining activities may have a direct or indirect effect on the environment; there are many things these industries can do to improve the environmental sustainability of their activities (Tucker, 2010).

Tucker (2010) further asserts that the environmental impact must be well defined to ensure that mining companies can operate within these legal boundaries on a range of issues, such as the impact on the environment how they must try to reduce this impact and how they must rehabilitate the area after mining is completed.

The National Sustainable Design Expo brings together students, scientists, engineers, and business leaders whose innovative technologies are designed to advance economic growth while reducing environmental impact. Royal Bafokeng Platinum (RBPlat) focus on mining which creates a serious challenge on the environment. The company is therefore committed to reduce any harm this may cause.

It was also highlighted by RBPlat environmental department from an environmental discussion topic (2011) that:

- ✓ Spillages of expanfo (Explosive) causes water pollution.
- ✓ Leaking compressed air pipes.
- ✓ Electricity consumption is one of the world's biggest environmental problems because it causes global warming.
- ✓ Oil spillages pollute the soil and water.
- ✓ Waste separation and incorrect disposal of waste polluting the underground and surface water.

It has already been established that going green is one of the things that one can do for the environment, the planet and people. This is especially true when it comes to business and we have seen the negative impact companies can have on the environment. This includes rampant water pollution, air pollution, energy wastage, carbon emission, chemical wastes and so much more (Collanters, 2010).

1.3 Problem Statement

Environmental concerns, and most directly pollution, have an impact on the Mining Industry, productions and services as well as choices that the mines may make. South Africa as a developing country has started to emphasize its economic development while, at the same time, increasing its awareness and actions on environmental protection. As a result the government encourages the increasing implementation of Green Policies.

The study needs to address environmental problems within Royal Bafokeng Platinum which are the main issues here. To attain these goals it is necessary that all operational units within the mine adopt Green Environmental Policy that will have measures to promote environmental sustainability.

The Green Policy aims to constantly look for ways in which the mine can improve their green credentials. The implementation of this policy must be monitored to achieve the company environmental goals. A Green Policy does not only demonstrate publicity that the organisation is impacting on the environment but could also save it money. The terms like refuse, reuse, reduce and recycle must always be remembered (KM Group, 2011).

The discussion here will include the content and structure of the Green Policy. It may include, or be accompanied by an action plan that contains:

- ✓ Action points –the practical steps the company will take to meet the objectives.
- ✓ Identified Indicators that will be used to measure the success of the policy.
- ✓ A time for monitoring and review.
- ✓ Measurable objective that the company hopes to achieve.

1.4 Objectives

The objectives of the study are as follows:

- ✓ To investigates the present of Green Environmental Policy.
- ✓ To indicate how a Green Policy can improve the environmental conditions of the company.

- ✓ To review a current status of the company on environmental policies.
- ✓ To highlight a relationship between the Green Policy and Sustainable development.
- ✓ The main objective is to maintain sustainability development within the company.

1.5 Research Design and Methodology

Research design provides an overview of the whole research process. After carefully reading the books and articles pertaining to the Green policies versus Sustainable Development, a matrix will be completed in order to eliminate areas already researched on and to identify areas of further research. Thereafter, articles and journals will be read for further information.

In terms of methodology, probability sampling will be used in this study, data will be collected in the form of questionnaires which will be designed and the answers will carefully be analysed using computer software and the help of a Statistician. For this study a quantitative research will be conducted. The quantitative type of method will be used to analyse numerical data in any process and qualitative method will be on any verbal data. Probability sampling will be used in this study whereby a questionnaire will be used to collect data.

1.6 Plan of the study

This study will be divided into five chapters. Chapter 1 will cover the background of the study including the problem statement.

Chapter 1 will be linked to Chapter 2, the literature review. This will give an idea and provide the context of the study. Chapter two will mainly deal with literature review on Green Policy.

The whole of Chapter 2 will be linked to Chapter 3 which is Research Methodology wherein data will be collected in the form of Questionnaires. Analysis of results obtained from the questionnaires will be included in this chapter.

Chapters 4 will be Data discussion. The interpretation of the results will follow logically from the actual data obtained in the study.

Chapter 5 will cover the main guidelines on the research questionnaire. Finally, based on the findings of the results in the preceding chapter, there will be a conclusion followed by recommendations for further areas of the study.

1.7 The value of the proposed study.

Companies must seek to implement a variety of environmental management practices such as ISO14001 certification and cleaner production (Wang *et al.,* 2004). As a systematic and integrated approach, green policies have emerged as an important new broad-based innovation that helps organisations develop 'win-win' strategies that seek to achieve profit and market share objectives by lowering their environmental risks and impacts while raising their ecological efficiency (Van Hock and Erasmus, 2011).

This study aims to explore the environmental green policy initiatives (implementation). Under the market and regulatory pressures, the mining industries must realise the importance of improving their environmental image. Scarcity of resources and increasing environmental issues caused the government to stipulate stricker environmental regulations or offer innovative programs to address these issues (Wang *et al.,* 2004).

The mining industries need to address and overcome "Green barriers" to improve their environmental performance. Fortunately, because of the consumer and media awareness on this topic, corporations are forced to comply with various environmental standards or face public defamation as well as poor branding if they don't adapt. Many companies have come to realize that by "going green" they can gain a lot of positive press and recognition which definitely helps to achieve their bottom line profit (Zhu *et al.*, 2007).

The company will benefit from the study as it will acquire more information on measures to maintain a healthy environment, to create conditions of economic growth with particular focus on sustainable development. Although implementation of environmental policies usually involves a debate about the relationship between costs and benefits, this might lead to savings in the long run. The Policy is very important to monitor environment issues at a Mining Industry and for legal compliance.

1.8 Conclusion.

In conclusion, this chapter has presented some background information on environmental pollution and Green Policy. The next chapter will study in detail the literature of different authors on the green policy.

Chapter 2

Overview of the literature

2.1 Introduction

Several researches were been conducted on mining and its effects as well as contributions to economic development of countries endowed with mining resources. Some researchers highlighted the benefits of mining to economic development whereas some highlighted the negative impacts. This study indicates the impact of mining on the environment and highlights few solutions on how to overcome these challenges.

The literature review explores the themes of this research as adopted from the research matrix, as environment, environmental issues, impact, pressure and management including greening environment, policy, implementation, sustainable development, green product and environmental performance especially within the mining industry. This was done mainly by take out common words from 60 articles, websites and books. Included in the chapter is the background of green policy, environmental issues, impact, pollution, performance, management, policies and implementation, climate change and sustainable development.

2.2 Background of Green Policy.

Green businesses are considered critical for successful development of Green Policy on environmental issues, environmental impact, environmental protection, policy development and implementation towards sustainable development. However, in many instances green business practices do not exist in isolation, rather they thrive as a comprehensive business philosophy and cultural leading to superior firm performance (Nair, 2004 and Baker and Sinkula, 2005).

The Greening Government initiative represent an attempt to mainstream the environment across the entire work of government, incorporating environmental objectives in operational aspects of departmental performance but also greening the fundamental objectives of departments by ensuring that full weight is give to environmental impacts in policy appraisal and development. According to Ramos *et al.* (2006), the initiative was created in 1997 by the United Kingdom.

Ramos *et al.* (2008) outlines that a part of the Government-wide effort to set common directions for the Sustainable Development operations is intended to promote Green Government of Canada (2000) and recommended best practice. The green paper is the European response to the new generation of ocean strategies that raised with the dawning of the 21st century, the pioneering exponents of which can be found in the initiatives taken by Canada (1996) and Australia (1998) (Vieira, 2007).

The greening campaign after 2000 prevented grassland from continuously decreasing (Zhou *et al.,* 2008). A new golf course in the northeast direction also contributed to the increase of grass land in that area. Zhou (2011) further emphasizes those changes in green space patterns in the metropolitan area of Kunming, China from 1992 to 2009 responded to urbanisation and greening policies. The presence of green space can mitigate these impacts, such as moderating the urban heat island effect (Yuan and Bauer, 2007).

The Chinese Government has introduced the green credit policy to mitigate the environmental impact of industrialisation by reining in credit loans to companies and projects with poor environmental performance. The investigation on implementation of a green credit policy was done both at the national and provincial level whereby the results have shown that the policy was not fully implemented. According to the green credit policy, banks should restrict money loaned to companies with poor environmental performance (Zhang *et al.,* 2011).

At a local level since 2000 the Jiangsu provincial government has developed a green policy. The policy has focused on firms with poor environmental green performance. According to Michelle (2007) most of the banks publically emphasised the implementation of green credit. Banks may combine green credit policy with other local environmental management policies. Successful policy or program implementation requires that those involved have sufficient information. The local protectionism frustrates poor promotion of green credit policy and central government sustainable development requirements (Zhang and Li, 2009).

Green credit is an important policy if banks are to reduce credit risks and to restrict investments that are environmentally destructive. Local Green credit policy which combined with local environmental issues and other environmental management instruments should be encouraged under the basic principles of green credit at national level (Zhang *et al.,* 2011).

The Policy Makers can stimulate the automobile industry to implement improved environmental practices by, for example training organisations to improve their environmental awareness, providing subsidies, and know-how to help them establish environmental management systems (Zhu *et al,* 2007).

Brown *et al.* (2001) found that the further the middle manager perceptions of the attitude to environmental issues is in advance of the legislation, regulation and other firms in the Industry, the more likely the unit is to implement a green supply initiative. Among barriers for the implementation of Green Supply Chain Management such as green purchasing the most critical one appears cost related issues (Zhu and Sarkis, 2006).

Successful implementation and performance for these external Green Supply Chain Management practices would typically need the participation by the dominant organisations, Those that are under higher environmental pressure and the same time have sufficient influence over their supplier and technical competences (Hall, 2000).

According to Swallow (2011), part of selecting the company green team members involves knowing what types of people to look for, specifically those who are concerned with sustainability issues and who display the qualities and skills outlined in 'becoming a sustainable thinker'. The green leaders may come from any and all parts of the company.

Both passion and position are very much important –which is more compelling depends on the business's size, corporate culture, structure (centralised versus decentralised) and a host of other organisation-specific items. Swallow (2011) further emphasises that the key is whether the person has passion or occupies a certain position but that he or she has the core personality traits and business –related skills of sustainable thinker.

For potential green team members, commonality lies in the fact that they're just as concerned about the business potential for doing environmental and social good as they are about personal wealth or career advancement. For a large business with several departments, each business system may be represented either by volunteers or the departmental manager may serve as the department's green team representation. Having management on board can lend credibility to the company's greening initiatives by showing other green team members that top management has bought into the endeavour and is supportive of the team time commitment (Rodrigues, 2009).

It is critical in green IT initiatives to establish a baseline before embarking upon any projects to reduce energy and /or CO2 emissions. The most important for doing this is to ensure that financial and social benefit can be both measured and delivered back to the business. The IT departments need to assess opportunities to lessen the environmental impact of operations (Morris, 2004).

Many countries especially developing countries are facing increased growth in the mining industry. One shared issue facing countries having mining activities is the deterioration of its environmental quality such as surface and ground water, air, coastal and sea areas. Countermeasures to deal with the situation are the introduction of green environmental policies by companies especially mining for sustainable development (Miller, 2007)

Fossil fuels have caused some major human health and human problems, due to their extensive use in various industrial and non-industrial sectors (Midilli e*t al.*, 2006). The state does not have proper environmental funds to use for cleanup operations, says Tucker (2010). The United States companies pay into a fund that used to clean up pollution before legal proceedings are instigated to apportion blame for the pollution. Tucker further states that in South Africa, the Department of Water and Environmental Affairs (DWEA) are significantly involved in the environmental impact assessment processes of mines in terms of the National Mineral and Petroleum Resources Development Act (NMPRDA).

The urgent need in this regard is the development and implementation of green policy in order to maintain sustainable development. According to Legal firm Deneys Reitz mining department director Matlous' comment (Mining Weekly Journal 2010) that mining by definition has an adverse impact on the environment. Environmental impact laws must be well defined so that mining companies can operate within these legal boundaries on a range of issues, such as the impact on the environment, environmental issues, environmental pressures, environmental performance, environmental management, environmental policy, policy implementation and sustainable development.

2.3 Environment

The ecological environment of northern China is fragile; especially in Northwest China. Excessive exploitation of natural biomass and the current types of rural household energy consumption have caused the deterioration of the ecological environment and have badly

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constrained regional, sustainable development in terms of energy, societal needs, the economy, and the environment (Zhou *et al.,* 2008).

In particular, an obvious distinction exists between Northern and Southern China because of the longer cold seasons, more fragile environment, and poorer economic status of Northern China, which appears in the greater heating energy consumption and huge potential for increasing energy demands in the future. With development the rural household energy consumption will change dramatically, and may be a serious challenge to rural energy systems and the environment (Zhou *et al.*, 2008).

Economic conditions are relatively poor in Northern China, but its per capita energy consumption to support human livelihoods is greater than in Southern China because it has a long cold season and more energy is required for heating. The environment is vulnerable, which is demonstrated, for example, by serious soil erosion, soil desertification and salinisation alkalisation, shortages of agricultural water resources, and lowering of groundwater levels.

After having witnessed countless ecological disaster and the progressive degradation of the earth's ecosystems, society is beginning to ask for the environmentally responsible behaviour on the part of both government and businesses (Zhou *et al.,* 2008).

While business managers are left alone to solve the ethical dilemma to make profit or to preserves the environment, the result would be rather predictable. Therefore, there should be a standardised, quantitative way to hold the businesses accountable for polluting and destroying the environment that goes beyond environmental taxation or forcing industries to clean-up what they polluted (Zhou *et al.,* 2008).

Managers must be in a position to help develop information necessary to make environmentally informed decisions those that take into account each environmental footprint. Consumers must support environmental policies, but consumers seem to differ quite significant, they feel responsible to a different extent and they hold different motivations in relation to the environment. In fact, consumers can in principle be categorised into those rather intrinsically or extrinsically motivated to behave in an environmentally friendly way.

Intrinsic motivation is a motivation to act coming from within the individual. If individuals are genuinely concerned about the state of the environment, their behaviour can be guided by

'environmental morale' even if there is a cost involved. But there are limits to how far behaviour is affected by intrinsic motivation. People are prepared to follow their environmental conscience provided the cost of doing so is not too high, environmental improvements have been predicted to a great extent on consumers expressing their environmental interests in purchasing products (Frey, 1999).

Environmental requirements in the design process are described as minimizing raw materials and energy consumption, waste generation, health and safety and ecological degradation. The terms have been defined as, for example, Design for Environment (DFE). It is the systematic process by which firms design products and processes in an environmentally conscious way. The environment is given the same status as more traditional industrial values as for example profit, functionality or image. In view of the volumes of ethamol required under current legislation, eliminating this tariff would have helped.

Ecodesign or environmental conscious design is a relatively new discipline. Both the industry and the academia use success stories to prove conceptually that designing environmental compatibility into a product offers unique opportunities for improving performance in the market place. These are some example of what has been collected in the area of the environment and strategic decision making. It is in the gap between environmental niche and self identity that managers have an access point through which they can learn ways to integrate the environment into business decisions (Baumann *et al.*, 2002).

Frey (1999) emphasises the direct connection between the levels of economic development endangering of the environment. Roome (1992) deals with integrated policy and discusses that only if sense-making and teaching (Michelle, 2007). Systems within organisations begin to reflect these external understandings of the impacts of organisations in the environmental domain, the environment will become integrated into the decisions of business.

The win–win concept supported by among others, Porter *et al.* (2011), encouraged companies to look further to investigate environmental considerations in their business strategies. In addition to the above measures, a good external environment in terms of policies, regulations, and finances should be created to accelerate the sustainable development of rural household energy.

2.4 Environmental Impact

Environmental impact laws must be defined so that mining companies can operate within these legal boundaries on a range of issues. There include the impact on the environment, how they must try to reduce this impact and how they must rehabilitate the area after mining is completed.

Environmental Issues can include erosion, formation of sinkholes, and loss of biodiversity and contamination of soil, groundwater and surface water by chemical mining processes. Besides creating environmental damage, the contamination resulting from leakage of chemicals also affects the health of the local population. The tool introduces long-term concerns into marketing by comparing the estimated production cost (private cost) and the cost of environmental impact public cost (Baumann *et al.,* 2002).

In addition, a driver to minimise environmental impact on product system level is missing too, since this lies beyond the area of responsibility of individual companies and since representatives on the product system level are non-existing (Baumann *et al.,* 2002). According to Baumann *et al.* (2002), the majority of the environmental impacts remain outside the area of influence of producer responsibility. Zhu *et al.* (2009) chose to study Chinese manufacturing and processing industrial sectors which are generally viewed as manufactures with the most direct and observable environmental impact.

Internal performance indicators are a measurement of activities implemented by an organisation in order to reduce its environmental impacts. Mehninger (1999) highlighted that it is very important to ascertain what environmental impacts can be assigned to defence organisations, defining the borders of the sector's environmental influence. Compared to other government domains, defence services potentially have more significant environmental impact than other public institutions.

The development of EPI's has evolved from pressure indicators, reporting on physical amounts based on inputs/outputs (example: air emission, waste production or energy use) to the inclusion of the state of the environment and environmental impacts as reported by Olsthoorn *et al.* (2001). Ramos *et al.* (2007) suggested that the linear relationship in sector activities and environmental impact effects not to obstruct the view of more complex relationship between activities pressures and the state of environmental changes, environmental impact-effect interactions and responses.

Response indicator should be in place not only when environmental effects in the state of the environment or impact-effect on ecosystems and public health are identified but also be directly linked to the first categories of the framework. As stressed by Characklis and Richards (1999) there is no analytical solution to this basic divergence of goals, for example, someone interested in eco-efficiency might see the production-weighted indicator as consistent with the overriding goal of less environmental impact per unit product.

Mehniger (1999) argues that the important number of missions, activities, products and services, its potential environmentally, significant impacts, its large acquisition processes, its significant public expenditure, and its profile and awareness of fair environmental management practices. Taking into account these concerns for future development, the framework seeks to contribute to evaluating the sectors environmental performance and simple relationships between defence missions and operations and environmental impacts-effect.

2.5 Environment Issues

Natural environmental issues are increasingly becoming an integral part of business in every passing day without being recognised as such (Porter and Van der Linde, 1995). Environmental issues are negative aspects of human activity on biophysical environment. The major current environmental issues may include climate change; pollution, environmental degradation, and resources depletion. There are number of environmental issues with mining including erosion, formation of sinkholes, and loss of biodiversity. Indeed there are many examples of mining operations that cause serious damage to the environments (Baumann *et al.* 2002).

Environmental issues that are due to human activities – have an effect on the natural environment. Environmentalism, a social and environmental movement that started in the 1960's, addresses environmental issues through advocacy, education and activism. Environmental issues are addressed at a regional, national or international level also by government organisations.

When entering a company, metaphorically speaking, through the door of the environmental department, many environmental projects were presented. Environmental issues seem to be a much smaller concern (Baumann *et al* 2002). Business is responding already to environmental issues with environmental marketing initiatives geared towards meeting the demand for environmentally friendly processes, products and packaging. Few references

deal with the integration of management issues, environmental issues and product development activities. The term' tool' will be used in the following as shorthand for systematic means for dealing with environmental issues during the product development process (Baumann *et al.,* 2002).

On the other hand, environmental issues may also influence banking management strategy and daily banking activities. Environmental issues did not attract attention from the finance industry. In the past quarter century or so, as, with strengthening of the environmental awareness and stricter implementation of environmental standards, the relationship between the financial industry and environmental protection has come to be acknowledged (Engstrom *et al.*, 2008). Product design constitutes an active interface between the two sides; demand (consumers) and supply (manufacturers), both are responding positively to it. This is why environmental issues need to be considered in the design process. The terminology of product design integrating environmental issues has changed during the last decade. These variations partly represent different priorities on how environmental issues are best tackled (Baumann *et al.*, 2002)

The firms should develop their business strategy accordingly, involving environmental issues into their core decision – making processes. Mehniger (1999) suggests that issues such as environmental concern go through an issue-attention cycle with rising and falling public attention.

The first step was to explore the link between environmental issue characteristics and the level of policy attention. Other explanations are needed to understand which environmental issues get attention in sectoral policy. A synoptic rationality in issue attention would suggest that the most important environmental issues (as measured in some objective way) in the sector would get the most policy attention (Engstrom *et al.*, 2008). In doing this, the link between environmental issue characteristics and the level of policy attention is explored. Although not explicity concerned with environmental issues went further than most in devising a theory to explain agenda setting (Engstrom, *et al.*, 2008).

Furthermore, although the spending pattern could have been interesting as a complement to the contents analysis the published sector budgets do not disclose in a comprehensive or

systematic way the spending related to various environmental issues and it would therefore be associated with severe data difficulties (Engstrom *et al.*, 2008).

Research must be promoted in the following areas: management and social science research to understand and develop the processes and drivers behind the incorporation of socially desirable issues, such as the environmental issues (Baumann *et al.*, 2002). The initial idea of why product development was not green enough was that the product development was maybe not seen in relation with its context: product systems, business processes and the society and the environmental issues at all levels (Baumann *et al.*, 2002).

2.5.1 Climate Change

The subject believe that in the future people will face the problem of climate change, global warming, poverty, hunger, floods, desertification, petrol and fresh water shortage. The policy outlined in the Green Paper serves as the embodiment of the South African Government commitment to a fair contribution to stabilisation of global greenhouse gas concentration in the atmosphere and the protection of the country and its people from their impacts of unavoidable climate change (Pyke *et al.*, 2010).

Climate change impacts on human health will not felt in isolation but will increase in magnitude and severity with corresponding impacts on biophysical, economic and social structures. The Government has a major role to play here in terms creating and enforcing legislation, but of course it is a responsibility of companies as well (Pyke *et al.*, 2010).

The United Nations Framework Convention on Climate Change (UNFCCC) emanated from the Rio Earth summit in 1992 and represents a global agreement to reduce the emissions of green house gases (particularly carbon dioxide, methane and nitrous oxide) to prevent a major impact on global climate change. This convention was ratified by South Africa in 1997. As a developing country South Africa is currently under no obligation to limit its emissions of green house gases, however this may change in the future (UNFCCC, 2001).

The South African Government Gazette (2010) highlighted that the Mining and Quarrying sector has been identified as being considerable risk from the secondary impacts of climate change especially risks relating to regulation that target energy intensive mining companies and with this, potential disparity in relation to key competitor countries such as Canada, the USA, Russia and Australia.

The Government has a role to play here in terms of creating and enforcing legislation, but it is a responsibility of companies as well (Pyke *et al.*, 2010). One of the Government

objectives is to ensure that climate change considerations are fully incorporated into the industrial policy action plan and importantly, these policies, strategies, and plans should aim to effectively manage and reduce economic risks, and build on and optimize the potential opportunities to ensure a smooth and just transition to a lower carbon economy.

To address these challenges, South Africa will be- adopted from Government Gazette (2010)

- By 2015, compile and initiate the implementation of an action plan for the national roll out of appropriate coal-bed gasification projects.
- By 2012, ensure that the industrial policy action plan (IPAP) has fully explored how local and global climate change responses may be fully exploited by the platinum, uranium and copper mining industries.
- Work with mining industry to increase its energy efficiency across its production process.

The environmental interactions between three phases of the atmosphere (solid, liquid and gases) result in air quality affecting the quality of water, the terrestrial environment and ultimately human health and wellbeing, for example acid rain is caused by high sulphur dioxide (SO2) and Nitric Oxide level in the atmosphere, which combines with water droplets in clouds and precipitate into the terrestrial environment. The SO2 and nitric oxide terrestrial environment leading to corrosive effects on building acidification of soils and water thereby impacting on ecosystem (DEAT, 1999).

Environmental impact laws must be defined so that mining companies can operate within these legal boundaries on range of issues, such as the impact on the environment, how they must try to reduce this impact and how the plan must rehabilitate the area after mining is completed.

2.5.2 Air Pollution

The legislative environment pertaining to air pollution in South Africa regulates environments are as follows:

Table 2.1 Air Pollution in South Africa.

LAW	STIPULATES
The Constitution of the Republic of South Africa (Act no 108 of 1996)	Specifies environment which is not harmful to his /her health as a basic human Rights.
The National Environment Management Act (Act no 107of 1998)	States that reasonable legislative and other measures should be taken to: prevent pollution and ecological degradation, promote conservation, secure ecologically sustainable development and use natural resources while promoting justifiable economic and social development and the environment is a functional area concurrent national and provincial legislative competence and all spheres of government all organs of state must cooperate with, consult and support one another.
Environmental Conservation Act (Act no 73 of 1989)	Which specifies that the processes listed in schedule II of the Atmospheric Pollution Prevention Act are activities at work. This includes possible air pollution in the form of noxious gases as well as particulate matter.
Occupational Health and Safety Act (Act no 85 of 1993)	Which is intended to provide for the health and safety of persons at work against hazards arising out of the activities at work .This includes possible air pollution in the form of noxious gases as well as particulate matter.

Government Gazette (2010)

2.6 Environment Pressure

The study targeted two types of manufactures namely those Industrial Sectors that export products or have established relationships with foreign companies within their supply chains and those industry sectors experiencing high environmental regulatory pressure (Zhu *et al,* 2007). Power plants and chemical/petroleum companies were selected because they are traditional polluters and have experienced higher environmental and regulatory pressure (Zhu and Geng. 2001). Chinese automobile companies have opportunities to establish win-win relationships with their foreign customer if they wish to improve both their product quality and environmental image (Zhu and Geng, 2001).

The policy makers can stimulate the automobile industry to implement improved environmental practices by, for example, training organisations to improve their environmental awareness, providing subsidies and know-how to help them establish environmental management systems.

Successful implementation and performance for these external GSCM practices would typically need the participation by the dominant organisations, those that are under higher environmental pressure and at the same time have sufficient influence over their suppliers and technical competencies (Hall, 2000). According to Zhu *et al.,* (2007) it seems, the automobile industry faces relatively less environmental pressure, but can potentially be the most environmentally influential.

The environmental problems that society has to deal with are large and firms could profit from contributing to their solutions. Thus they should develop their business strategy accordingly, involving environmental issues into their core decision making processes. China's environmental problems have attracted worldwide attention, as the country is now the world's largest carbon dioxide emitter as well as the foremost source of air pollution (Zhang *et al.,* 2011). Dissolution and transport of metals and heavy metals by run-off and ground water is another example of environmental problems.

2.7 Environment Performance

Pujari *et al.* (2003) found that for improved effective environmental performance, some of the organisational issues are critical like functional co-ordination, effective environmental information management, and top management support, customer and supplier relationships. A few studies report on the effectiveness of the tools, that is whether the tools have had a directly attributable influence to the environmental performance of the product. There are a small number of companies that are reporting their environmental performance to their stakeholders (Baumann *et al.*, 2002).

Engstrom *et al.* (2008) likewise urging a joint venturing approach, cited British Petroleum as an example of one company that retains both a major public accounting firm for attestation and a consulting firm to solicit feedback on its environmental performance. As more standard-setting bodies worldwide require the inclusion of environmental performance information in annual reports, public accountants will need to develop the necessary expertise to audit these disclosures.

Information Technology (IT) can induce a better use of available capacity and increase energy and environmental performance of the transport of the system according to Boyle (2010) and Devivero (2007). It was provided that 'every Further and Higher Education institution should adopt and implement an appropriately timetabled and strategy for the development of environmental education and also a wider strategy for the improvement of all aspects of its environmental performance as an institution (Golusin *et al.*, 2011).

Zhu *et al.* (2006) have examined the relationship between green supply chain management (GSCM) and other environmental initiatives and performance with many related results, some conclusive and directly positive, some in conclusion with negative relationship. The authors believe that by implementing green supply chain management practices will result in a better environmental performance besides retaining their suppliers or customers.

Singleton (1988) argued that an inter firm linkage facilitated by proximity could lead to improvement in environmental performance .In addition the interaction between customer and supplier staff, partnership agreements and joint research and development lead to

improvements in environmental performance. The proposed framework does not attempt to make one-to-one linkages between each specific indicator category, since the environmental performance depends on the total, multiple and complex relationships between indicators (Ramos *et al.,* 2007).

Zhu, *et al.* (2006) further argued that the automobile industry in China still lags behind other industrial sectors in terms of implementing green supply chain management. Thus, the lack of these pressures and relationships that exist with the other industrial sectors provided little motivation for the automotive industry to improve their environmental performance or adopt environmental practices. With greater environmental awareness and increasing private ownership of the automobiles in China, this industrial sector has to improve its environmental image such as using less materials and discharging less waste due to higher outcomes.

The main purpose of these indicators is to evaluate sectoral environmental performance including the results of the public policies and strategies. The identification of factors that promote environmental NDP for both managers and researchers are covered by other empirical studies. This could, for example be benchmarking processes (for comparing the environmental performance with other products), the role of the environmental co-coordinator for achieving environmental excellence, and the integration of environmental professionals with a business focus in the NDP process (Baumann *et al.,* 2002).

Based on a reasoned rearrangement of the environmental indicator framework (PSR, PSRIE, DPSIR, ISO 14031 and INDICAMP) a conceptual methodology to manage and assess the sectors environmental performance has been presented and discussed. This model allows the incorporation of a systems analysis approach and the identification of the main cause–effect relationships between the different categories of the environmental performance policy indicators. To assure the effectiveness of performance indicators an assessment tool was included in the SEPI framework (Ramos *et al.,* 2007).

To evaluate the effectiveness of the proposed EPPI's real data should be gathered and used for reporting the sectors environmental performance results. The drive to measure corporate environmental performance is the product of several factors, in particular compliance with

legislation, image and reputation enhancement and stakeholder pressure, among others (Ramos *et al.,* 2007).

Although developed for the defense sector, the conceptual work frame developed could be applied to other public sectors thus making the reporting of environmental performance data more comparable among public organisations and making it easier for the decision makers and general public to handle. In large operations such as military facilities, the use of local environmental–related indicators (state and impacts–effects) is important. The major difficulty in accomplishing environmental performance evaluation objectives is to assess whether the environmental changes observed are caused by that specific sector's activity or whether other factors have intervened (Ramos *et al.,* 2007).

In general to evaluate environmental performance the various possibilities are complementary and should be used as a function of the objectives. The environmental performance could ideally be presented with an index for each indicator category: activity, pressure, state, impact –effects, response and meta-performance (Ramos *et al.,* 2007). An indicator framework to manage and assess the sectors environmental performance was developed. Performance measurement for sustainable Government operations of 1999 intended to complement the generic guidelines for planning and implementing the environmental performance measures contained in ISO 14031.

The starting point for establishing environmental performance measures for the operations of federal department is the environmental goals that department agencies have set in their Sustainable Development Strategies (SDS) (Ramos *et al.,* 2007). The SEPI Framework also assumes that the performance of overall environmental performance monitoring indicators can be evaluated at the one main stage with performance indicators. Environmental quality indicators are measures of the effects on the environment of an organisations environmental activities and programmes.

Taking state-of-the-art environmental indicator frame works into account, an attempt was made to use an indicator framework for environmental performance evaluation that could be applied to the public sector in general and its specific domains in particular, including individual organisations (Ramos *et al.,* 2007).

Although the measuring of performance in the public sector is relatively new, an important amount of literature on performance management has developed since the late 1970's (Pujari

et al., 2003). Despite the diversity of methods and tools for measuring environmental performance indicators almost always play a central role.

To assure that environmental performance indicators (EPI) serve the purpose for which they are intended and to control the way they are specifically selected and developed, it is important to organise them into a framework. Though some examples of environmental indicators are integrated in a broader approach to performance management for defence services (including social, environmental, economic/financial performance aspect), the majority are isolated environmental performance frameworks.

Ramos *et al.* (2007) state that public sector environmental performance integrated into overall performance management is substantially new, with little literature available. Environmental performance measurement is just one component of the strategies for greening government or sustainable development in government operations and Public Sector overall. The public sector environmental performance integrated into overall performance management is substantially new, with little literature available according to Ramos *et al.* (2007). Specifically, the method integrates statistical process control, costs and environmental performance as an LCA into a multi-objective design optimisation formulation (Baumann *et al.,* 2002).

2.8 Environment Management

Integration among the various components of performance management and assessment is a fundamental issue. Environmental Management Systems within Portuguese defence Sector, their implementation and certification and any environmental awards obtained by the military units were also identified (Ramos *et al.*, 2007). Many public organizations produce services instead of products. The greatest experience with environmental management tools has been in business, and especially industry. Environmental management tools have been most often applied to manufacturing industries and tangible products. Beyond the traditional manufacturing sector there is a need to go further and address their application to services, an underdeveloped and under researched area of corporate environmental management according to Stranojevic *et al.* (2010).

Vieira *et al.* (2007) state that Environmental Management Systems (EMS) provide ways to cut down energy balance sheet, among other resources but are also useful for marketing purposes and ameliorate their competitiveness. According to White (1994), a zero waste program was established at New Zealand university campus in response to grassroots

students concern over environmental management issues. In order to enable full program development however, a need for linkages between all sectors involved in the program and the introduction of a formal environmental management system was identified.

Their objectives were to outline the environmental management structures at a University campus and to discuss the implementation of a zero waste program within this framework. The researchers further emphasized that the responsibilities for environmental management lay with both the assistant Vice Chancellor (Projects)/Registrar and with the individual campus principals.

Few points were suggested from the researcher's side that includes:

- Provision existing for student input into environmental management issues through student representation on the university council, through the school for environment and through other channels such as the student newspaper (Mason, 2002).

- The funding application proposed the establishment of an ongoing program with the objective of promoting an ongoing commitment to demonstrably sound environmental management practices on each of the Massey University Campuses (Mason, 2002).

- In this case, the absence of both appropriate linkages and environmental management system auditing procedures inhibited the full and widespread adoption of resource recovery and recycling as developed during the program.

- As a research, educational and promotional activity, the role of the program did not include the on-campus implementation of environmental management practices on a permanent basis.

The research was a success and brought some changes within the University whereby catering management recognized the promotional and economic benefits in the scheme and in addition to contributing to the zero waste program objectives .Two further projects were commenced during year one of the program. One involved a study of an environmental management framework for the university and was conducted as a student honours project in resource and environmental planning.

The subsequent environmental management processes involved of gradual creation of working linkages with the facilities management staff, to establish a transition process

between the research /development functions of the program and the adoption of improved environmental practices on a permanent basis (Cook and Cambell, 1979).

An Integrated Management System (IMS) is often understood as a synergy between quality Management Systems (QMS), Environmental Management Systems (EMS), Safety, Health and Social Management Systems. Actually an IMS could integrate anything that influences business (Baker and Sinkula, 2005).

To receive EMAS registration, an organisation must conduct an environmental review, establish an effective environmental management system (EMS), carry out an environmental audit, and prepare a statement of environmental performance outlining its progress on previously established objectives (Pyke *et al.,* 2010).

In 1996, the International Organisation for Standardisation (IOS) issued the first of the ISO 14000 family of Standards .The IOS is a worldwide Federation that establishes standards to facilitate the international exchange of goods and services. ISO 14000 is primarily concerned with environmental management, with IOS14001 addressing environment systems specifically. It remains to be seen whether IOS 14000 standards will become as well-established for business as is ISO 9000 (Pyke et *al.,* 2010).

Australia was recently passed legislation related to mandatory environmental reporting within annual reports. Currently all companies listed on the Australian Stock Exchange that are subject to environmental regulation are required by law to disclose their compliance to the regulations in their annual direct reports (Karakosta, 2010).

Consumers are willing to support pro-environmental policies and which consumer groups favour which In the United States of America, disclosure requirements focus primarily on the impact of environmental issues on the financial results and position of the company, while regulations in many European countries and those mandated by the EU require disclosure on resource consumption and environmental policy in addition to the financial disclosures (Pyke *et al.,* 2010).It is quite important that every individual or a group within the company need to be environmental conscious in order to be part of the concerned teams. Porter and Van Der Linde (1995) have suggested that managers should think 'environmental improvements' in terms of economic and competitive opportunity that adds organisational and customer value.

2.9 Environment Policies

Government policy may thus have a mandate to intervene in the adoption of environmental innovations such as environmentally friendly cars. It is however the intention to decide, which policy would be the most effective with one policy consumers are given information on the state of the environment and on ways how to make their lifestyles less harmful for environment. To be sure, policy makers should be aware of both intrinsic and extrinsic motivation as forces guiding consumer behaviour (Coad *et al.,* 2009).

Frey (1999) added that to be effective, environmental policy needs to take into account both intrinsic motivations. As a result, environmental policy should seek to complement intrinsic motivation with Financial and / legal incentives. An environmental policy would benefit from considering both intrinsic and extrinsic factors in consumer motivation. Environmental policy should also take into account the "cost of price incentives" and also continue to disseminate information in order to maintain sufficient awareness that legal and financial devices have a democratic base.

Once environmental concern becomes legitimate, and norms of appropriate behaviour are widely recognised, the government now has a mandate to act in favor of the environment, and so high taxes (the stick) can be introduced (Coad *et al.,* 2009). The authors further argue that while the direct ecological impact of green electricity might be limited, it deserves a role in environmental policy mixes because it induces as indirect effect "eco-oriented learning" alters consumer attitudes and enhances intrinsic motivation.

The author seeks to analyse consumer opinions towards policy strategies aiming at environmental protection. Coad *et al.* (2009) stated that they are specifically interested to see how consumers evaluate policy suggestions, focusing on either information provision or financial incentives or both. Their research was basically sought to analyze if the type of intervention.

The literature studies the level of policy attention given to different environmental aspects in agriculture and energy policy in Sweden and explores empirically some factors that can explain the level of attention. The level of policy attention was measured through a content analysis of Swedish government bills (Engstrom *et al.,* 2007).

Several authors such as Downs (1972) and Beder (2002) have been interested in the question of issue attention and agenda setting for environmental protection policies and how

environmental information is issued in policy making. The aims was to contribute to this discussion on policy agenda and issue attention and will in particular use Sweden as a critical case setting of rationalistic (or science based) policy agendas.

Swedish environmental policy has often been portrayed as strongly rationalist and realist and been characterized as a seminar culture, suggesting that scientific deliberation is the dominant process in policy making Porter and Van Der Linde (1995). He emphasizes that even though attention to a problem often decreases after a time, institutions, programmes and policies might have been introduced during the period of intensive attention and these continue to work even after interest was diminished.

Applied to questions of agenda setting it suggested that there is normally relatively little change in the policy agenda over time. To get inside access demands sufficient resources to devote to years of policy development and promotion (Engstrom *et al.,* 2007)

2.10 Environment Policy Implementation

As a tool of macroeconomic policy to promote environmental protection, the state of China Environmental Protection Administration, the China Banking Regulatory Commission, and the peoples Bank of China jointly issued suggestions on the implementation of environmental policies and regulations and guard.

Non-implementation or unsuccessful implementation of green credit policy is considered to be the main cause of the failure of green credit policy to produce the expected results or outcomes (Miller, 2007). According to Engstrom *et al.,* 2007, the integration of environmental risk management system is important. Fleicheman (2006) considered one conditions of effective policy implementation is that there is only one implementor, or other implementors have little impact on the main implementation.

The authors further explained that ineffective implementation will be viewed by policy makers as product of bad execution (Morris, (2004) and Sarkis, (2006). Explanations of the problems afflicting policy implementation have long focused on the approach adopted; top-down (Boyle, 2010). In their view, the implementation of public policy results from a negotiation that depends on the structure of the network of stakeholders, their interaction, and the distribution of power among them.

They then identified criteria that explained this successful outcome and tested the criteria on a number of other case studies of policy implementation Coad *et al.* (2009). They summarised their findings by identifying six key criteria determining implementation success, clear objectives, causal linkages between objectives and actions, designation of a sympathetic agency with adequate resources and authority to implement the plan, skilled and committed implementation manager, public and stakeholder support and a supportive socio-economic and policy environment Coad *et al.* (2009).

Milsson (2007) following this approach, intended to make a systematic analysis on how banks implement the green credit policy in China to identify the problems during the implementation and to optimize the green policy. The nature of policy issues, diversity of target group behavior and the extent of behavior change required affects the effective implementation of policies (Fleicheman, 2006).

2.11 Sustainable Development

Sustainable Development has been discussed extensively in the literature since the concept was adopted as an overarching goal of economic, social development and environmental protection. The growth, employment and redistribution macro-economic strategy of the South African Government it is also geared towards sustainable development and it also identified the mining Sector as one of the most important role players (Miller, 2007).

Munitlak *al.* (2009) defines sustainable development as a representative of the unity of all four basic subsystems economic, ecological, social and institutional, is necessary to narrow down all the values of indicators to a simple way of expressiveness in order to show overall results of state of sustainable development in countries which was subjects of research.

2.11.1 Sustainable Development and Climate

In the literature, there is a growing emphasis on the two-way relationship between Sustainable Development and climate change mitigation (Fleischenman *et al.,* 2006), Epstein and Bichard, (1999).The relationship between sustainable development and climate change is of importance to developing countries due to their development process and the particular climate challenges that many of them face. The notion is that strategies pursuing Sustainable development and climate change nitigation can be mutually reinforcing.

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In the frame of climate change, the transfer of low-carbon sustainable technologies could ideally provide a frame work of helping developing counties to find new sustainable development paths. In this frame, the adoption of low–carbon sustainable technologies offers many opportunities to avoid past unsustainable practices and move quickly to environmentally sound and sustainable practices, institutions and technologies (Miller, 2007).

In his approach, a range of energy services and criteria for the assessment were defined, related to stakeholders were also involved so as to identify energy services needs and priorities that are most applicable to the country's Sustainable Development.

Under the Clean Development Mechanism (CDM) Sustainable Development is considered a country context specific aspect which differs across countries .Actual CDM practice has shown that projects are largely initiated by the demand for relatively low-cost certified emission reductions, leading to a series of ad-hoc projects, rather than serving the overall host countries sustainable development needs and priorities (Milsson, 2007).

2.11.2 Sustainable Development and Renewable Energy

Energy is an essential factor to achieve Sustainable development. Renewable energy is not only due to low literacy, availability of multiple education system having no focus on Renewable Energy but also to political and bureaucratic favoritism that is also a key hurdle in poor functioning of educational system. From the above discussion it is quite visible that the basic requirements for sustainable development are awareness, which certainly mainly comes from education and literacy (Bugaje, 2006).

To achieve the aim of Sustainable Development through Renewable Energy in any country can only be possible successfully if the country has enough awareness regarding its importance. Policy dilemmas for Sustainable Development need to be avoided and be given to community participation for the promotion of sustainable development (Zhou, 2008).

However the wide awareness of the sustainability of renewable energy sources is not sufficient to motivate their wider use as long as they are less cost effective , which they definitely are if we use current accounting standards and cost benefit analysis that does not take into account the changes in natural systems. There is a growing concern (by whom) that long-run sustainable development may be compromised unless measures are taken to achieve balance between economic, environmental and social outcomes.

Golusin *et al.* (2011) provide an overview of energy issues and renewable for Sustainable development in Turkey. Countries striving to this end are seeking to reassess their energy systems with a view towards planning energy programs and strategies in line with sustainable development goals and objectives. In this regard, renewable energy resources appear to be the one of the most efficient and effective solutions for clean and sustainable energy development in Turkey

2.12 Research Questions

- How wide is the knowledge of BRPlat employees on environmental issues?
- To what extent do BRPlat employees conscious on their environmental impact?
- To what extent do BRPlat employees care for the environment?
- Is the environmental policy implemented and are the employees aware of it?

2.13 Conclusion

Most of the Governments in the world have been committed to environmental protection as a priority issue. There have been carefully developed environmental policies and regulations to protect the natural environment in many parts of the world. The Green Environmental Policy tried to promote environmental protection and to reduce Environmental Impact within the Mining Industries. If an environmental Management Plan, is properly enforced, however the company will see benefits both to its business and to the environment.

It is widely believed however, that the benefits of an Environmental Management Plan outweigh the costs. These include the prevention of pollution and conservation of natural resources, increased energy efficiency, stronger environmental performance and an attention to and responsibility for taking care of the earth. Making a conscious effort to establish company/ global environmental management policies will result in a better world for future generations.

Lack of environmental information is the main problems in the implementation of green policy (Zhang *et al.*, 2011). Green policies are an ideal opportunity to provide business with quantifiable business benefit based on real data. The study will also help companies to have information on how to reduce a negative impact to human health and environment. The next chapter lays the framework for investigating the green policy development and implementation.

Chapter 3

Research methodology

3.1 Introduction

The purpose of this chapter is to present the philosophical assumptions underpinning this research and the empirical techniques applied. Creswell (2009) define research as a systematic, formal, rigorous and precise process employed to gain solutions to problems or to discover and interpret new facts and relationships. Research is the process of looking for a specific answer to a specific question in an organized and reliable way (Creswell, 2009).

The first phase involved gathering of information in a hard copy using a questionnaire. The questionnaire were drawn up and submitted to Royal Bafokeng Platinum (RBPlat) employees who are randomly selected for a project. The researcher used research a quantitative type of design method. The population were sampled accordingly so that time must not be wasted unnecessary. The researcher explained the term validity in more detail.

Informed consent becomes a necessary condition rather than a luxury or an impediment (Barabs, 2004). A researcher will place emphasis on accurate and complete information so that subjects will fully comprehend the investigation and consequently be able to make a voluntary, thoroughly reasoned decision about their possible participation.

The researcher collected data through surveys that will be distributed out to a number of 250 employees both working surface and underground within Royal Bafokeng Platinum. Participants in the project complete the survey anonymously and fill out a separate consent form, recipient that elected not to participate were asked to return the materials. Respondents were selected in departments like in South Shaft, North Shaft and Central areas including English, Linguistics, Fana Ka Lo. A percentage of respondents were surface employees who are professionals and having all the mandates and responsibilities to develop environmental policies, offer awareness campaigns and training to all employees and other stakeholders including nearby community.

3.2 Data collection

This is the stage where appropriate information for answering the research question is collected. The researcher will select the most appropriate methods of collecting data and the required data collection tools. A data collection method which will be used by the researcher will be a Questionnaire. The New Dictionary of Social Work (1995:51) defines a questionnaire as a set of questions on a form which is completed by the respondent in respect of a research project.

According to questionnaires are inexpensive ways to gather data from potentially large number of respondents. They are the only feasible way to reach a number of reviewers large enough to allow statistically analysis of the results. Mining is a diversified Industry whereby employees are different in age, gender, race, sex, levels of education. The questionnaire is handed to the respondent personally, who completes it on his own, but the researcher is available in case problems are experienced.

Through a questionnaire a researcher will be able to have different views from different respondents on how conscious are they towards the environment. The researcher will personally administer the questionnaire to the organisation. If the organisation disinclined to allow work hours to be spend on data collection and the other way of getting the questionnaire back after completion will have to be found.

Concurrently with the questionnaire process extensive interviews will be held with mine managers, officials and health practitioners to collect more of information on environmental impacts, protection and knowledge.

3.3 Quantitative Methods

Only quantitative method was used by the researcher. Qualitative researchers aim to produce understanding of the environmental issues with focus on interpretation rather than quantification. Qualitative research deals with designs techniques and measure that do not produce discrete numerical data. It involves extensive narrative data in order to gain insights into phenomena.

Quantitative research includes designs; techniques and measures that produce discrete numerical or quantifiable data. Data will be analysed statistical and the researcher analysed the data including the coding of the data and production of verbal synthesis. This is based on a

generally held belief that there are different versions of understanding and the aim is to give an accurate voice to these (Creswell, 2009).

3.4 Basic and Applied Research

Basic research (also called fundamental or pure research) is mainly concerned with generalizations and the formulation of theory. It is driven by curiosity or interest in a subject. The main motivation is to expand man knowledge, not to create or invent something .Many scientists believe that basic research lays the foundation for the applied research that follows.

Applied research is designed to solve practical problems of the society. It can be argued that the goal of applied research is to improve the human condition. Applied research is increasingly gaining favour as it is helps to address the problems facing the world today such as overpopulation, pollution, depletion of natural resources, drought, floods, declining moral standards and disease.

It is a reflective process of progressive problem solving. It is also called" practitioner research" because of the involvement of the actual practitioner in a real life. Action implies that the practitioner or researcher is involved in the collection of data, analysis, and the interpretation of the results. S/he is also involved in implementing results of the research and is thus well placed to judge the effectiveness of the interventions.

3.5 Sampling

Sampling, according to Creswell (2009) therefore means taking any portion of a population or universe as representative of that population or universe .The sample taken is considered to be representative. The researcher will look at different gender; race especially the level of education, positions, area of work when doing sampling. With population Royal Bafokeng Platinum area of operations both surface and underground will therefore serve as a population.

Creswell (2009) define a population as a set of entities in which all the measurements of interest to the researcher are represented. Population here refers to all the members or items under consideration. It is not possible to study the entire population due to consideration of cost, time energy, volume of data .It will not be easy for the researcher to use the whole mine employees of 100 and the participants were selected randomly. The use of samples will be important and fruitful in more accurate information than might have been obtained if one had

studied the entire population. Jackson and Rosenberd, (2006) add that the observation or study of phenomenon in its entirety would be tedious and time – consuming and would produce a massive amount of data, which by implication would be difficult to process, analyse and interpret.

In such cases the researcher often resorts to sampling. Samples can either be probability or non-probability samples. There are four random sampling strategies namely: Simple, stratified, System and Cluster. The researcher will use both stratified and simple random sampling. By combining different sampling methods the researcher will be able to achieve a rich variety of probabilistic sampling methods that can be used in a wide range of social research contexts. When one combines sampling methods and we call this multi-stage sampling.

According to Jackson and Rosenberd (2006), a sample comprises the elements of the population considered for actual inclusion in the study. In a stratified sample, researcher will sample either proportionately or equally to represent various strata or subpopulations. For example the strata will be the mine units of operations; researcher would make sure and sample from each of the three main mine areas. If the strata were religious affiliation, stratified sampling would ensure sampling from every religious block or grouping.

3.5.1 Purposive Sampling.

According to Jackson and Rosenberd (2006), purpose sampling is based on the judgment of the researcher regarding the characteristics of a sample .A sample is chosen on the basis of what the researcher considers to be typical units. This type of sample is based entirely on the judgment of the researcher, in that a sample is composed of elements that contain the most characteristic, representative or typical attributes of the population (Singleton *et al.*, 1988:153).This method will not be used by the researcher due to reliability and validity and also to avoid bias.

3.5.2 Random Sampling

Jackson and Rosenberd, (2006) succinctly states that random sampling is that method of drawing a portion or sample of a population so that each member of the population has an equal chance of being selected. Random sampling is that method of drawing a sample of population so that all possible samples of fixed size n have the same probability of being selected. (Aizawa and Yang, 2010, Zhang and Li, 2009). According to Seaberg (1988:244), a

probability sample is one in which each person or other sampling unit in the population persons from the population is based on some form of random procedure.

The whole RBPlat employees play a role in environmental protection. The researcher will take considerations of age, gender, educational level, occupation and years of experience in collecting the data. The sample consists of 250 employees working at surface and underground. The sample will be selected in different departments like 100 respondents from south shaft, north shaft also 100 employees and central 50 respondents.

3.6 Correlation Research

In general, correlational research examines the covariation of two or more variables. For example, mining industries activities have an impact on the environment .These two variable, mining activities and environmental effects were found to covary together. Correlation research can be accomplished by a variety of techniques which include the collection of empirical data. Often times, correlational research is considered type of observational research as nothing is manipulated by the experimenter or individual conducting the research. Early and previous studies on environmental issues did not manipulate the extend on how can the mining affects the environment .The researcher only collected the data on the two variables. Nothing was controlled by the researcher.

It is important to note that correlational research is not causal research. In other words, we can not make statements concerning cause and effect on the basis of this type of research. There are two major reasons why we can not make cause and effect statements. First, we don't know the direction of the cause. Second, a third variable may be involved of which we are not aware.

Thus, it is unclear whether depletion in serotonin/no repinephrine causes the environmental issues like depression or whether depression causes depletion is neurotransmitter levels. This demonstrates the first problem with correlational research; we don't know the direction of the cause. Second, a third variable has been uncovered which may be affecting both of the variables under study (Creswell, 2009).

3.7 Handling of data

Survey research uses scientific sampling and questionnaire design to measure the level of knowledge RBPlat employees have on environmental issues. The phenomena in a quantitative data form will be analysed statistically. Data will be collected on a wide number of phenomena and quantitatively using a questionnaire. A comparison between the groups will be made based on a survey research.

3.8 Conclusion

The data will be analysed quantitatively and interpreted after this chapter in order to check on the results of what the researcher was investigating as true reflection of the research hypothesis or problem. This will assist the researcher to come up with findings and recommendations on green policy within the company of RBPlat. The results, which derived from survey, will be interpreted in the next chapter.

Chapter 4

Data Discussion

4.1 Introduction

There is a range of environmental issues caused by mining activities. The mining industries face challenges in addressing these issues in order to meet the future needs of the neighbouring communities through a system that will be economically and environmentally sustainable. Lack of Green environmental policy within Royal Bafokeng Platinum for sustainable development is the area of most concern in this study.

The mine workers are not familiar with environmental issues and not conscious of environment unlike with safety. They are unable to distinguish between safety related issues and environmental issues. Lack of environmental information and awareness is a problem. More of environmental information is in English and FANAKALO is main spoken language by underground employees.

This section will unpack the questionnaire and hopefully provide some hints to how it was answered. This will be done through addressing a series of more specific research questions and interpret data using statistics. This section will further focus on the response rate of the research, demographics including age, work area, years of experience represented in figures, results of investigation whereby questions will be answered. The data will be discussed according to the research questions.

4.2 Response rate

The research was conducted recently (May 2011) to gauge the involvement of all employees at Royal Bafokeng Platinum on environmental challenges and issues cause by their operations and these will help the researcher to evaluate the level of greening employees. The survey which was supported by management was distributed to 52 employees within the Mine, especially at central area.

Personal particulars were obtained from respondents during the questionnaire. It included environmental related questions which based on how conscious mine employees are on environment. The researcher presented results from a survey that collected information about development of environmental green policy within the mining.

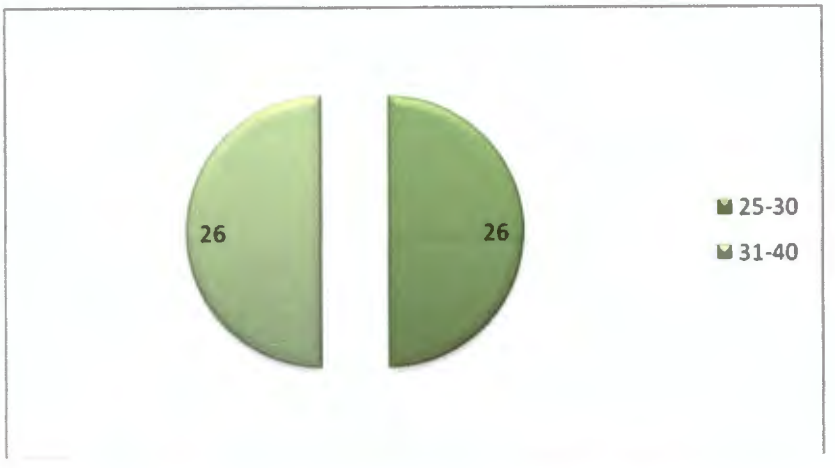
The researcher had a response rate of 52 from a diverse type of Industry Royal Bafokeng Platinum.Taking considerations of age, gender, educational level, work place, occupation, and years of experience in collecting of data. The data was summarised on a spreadsheet and that statistics were calculated using SPSS. The researcher has tried many times to show that she had met the requirements for the sample.

All names were allocated a number and numbers were drawn. If someone did not complete a questionnaire, the next number was drawn and the person used. In this way the sample could be regarded as being representative. It is also acknowledged that, should somebody else want the results, they first test the results before it is used to confirm the results.

4.3 Demographics

In the study on environmental consciousness, some kinds of characteristics such as gender, age, educational levels, department and occupation show differences compared to their responses. All respondent were 52 in number from Royal Bafokeng Platinum and were splits evenly between African males and females, the females outnumber males especially at central area. The educational level is an important predicator on the level of greening employees and how far is their level of understanding on environmental issues in the work place. The majority of employees had a high school and primary level of education at central department, from procurement and geology with age ranging from 25-40.

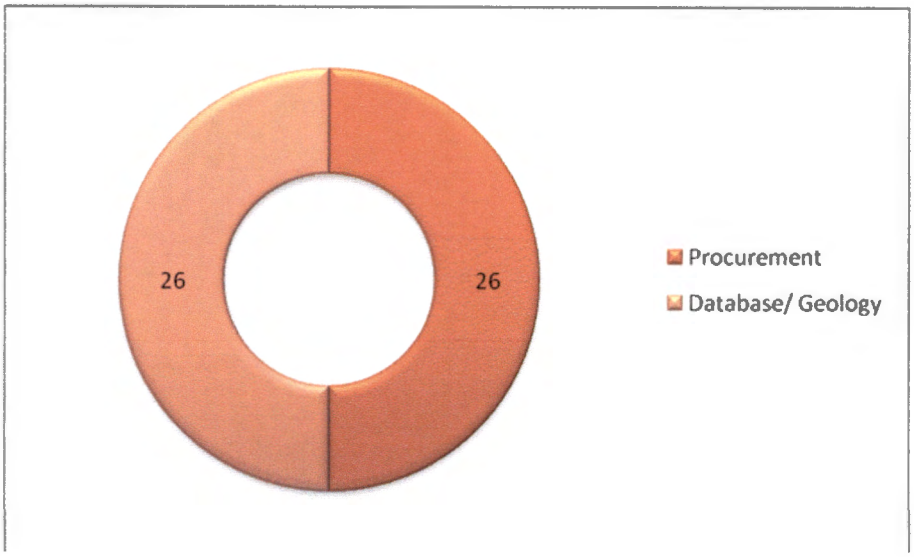
Figure 4.1 Age of Respondent



The people that responded were mostly between 25-40. It shows from the research that the age breakdown is evenly distributed ranging from 25-30 (50%) and 31-40 (50%). It is important that these people inform older and younger about the green policy. This is in

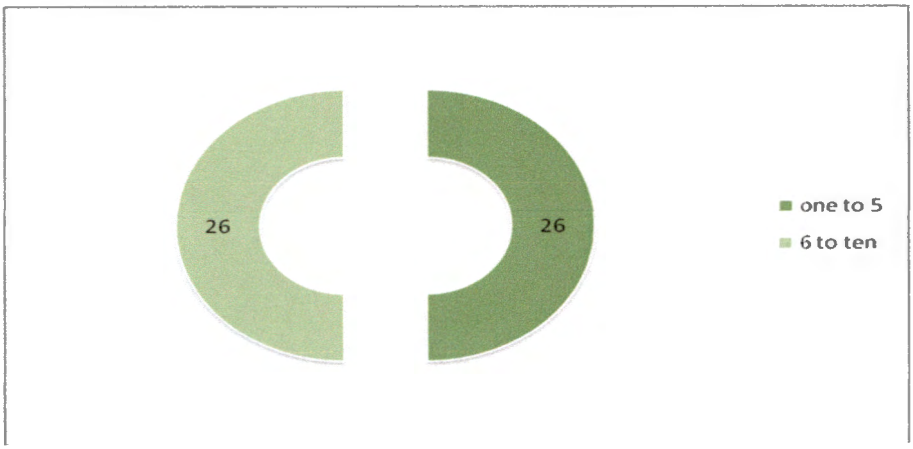
agreement with what Zhou, (2011) stated in his paper. The people in the questionnaire were all educated with a grade 12 or higher qualification.

Figure 4.2 Working at mine



Respondents had out experienced types of pollution according to their units of operations in all areas of Royal Bafokeng Platinum. Only employees of central area were represented. The respondents that answered this section are mostly from procurement and geology. It seems from personal observation that the people do not closely follow green policies. This idea is supported by Mitchele (2007) that stated that respondents must be paid attention.

Figure 4.3 Years experience

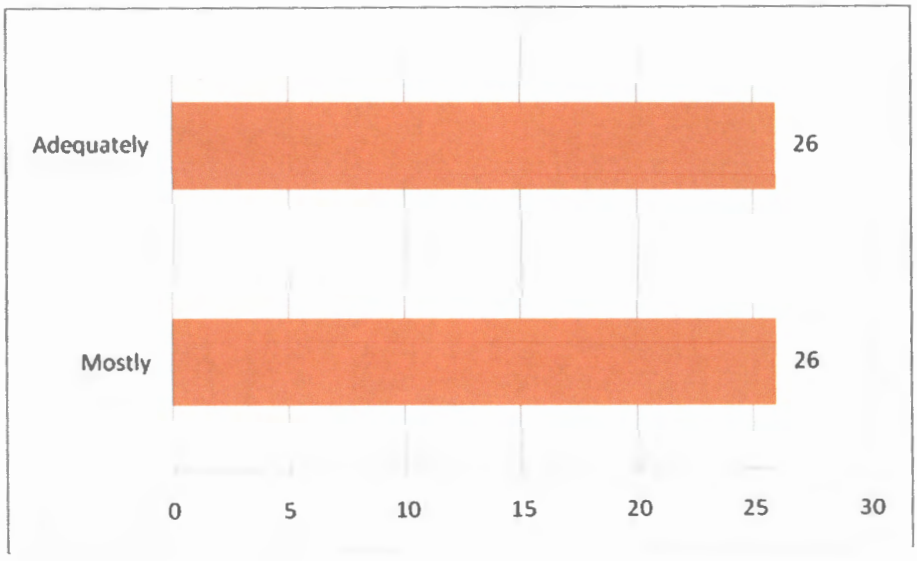


Half of the respondents have 1-5 experience. These results supported the idea of experienced employees are able to acquire information on greening. All respondents stated that they understand the word environment.

4.4 Results of the Investigation

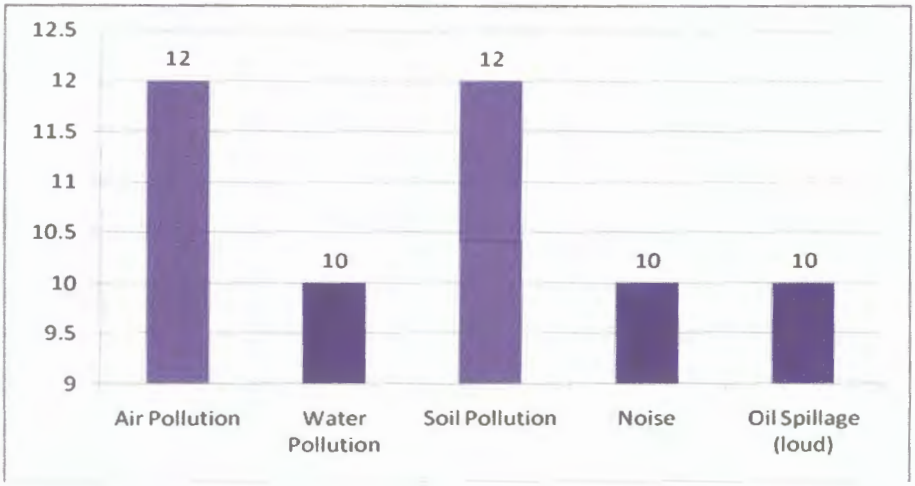
Discussion will be in a form of question elaborations, diagrams and graphs. The questions will be elaborated with the support of Chapter 2.The diagraphs were used as illustrations of the data collected. The researcher will then prove the results formulated for study. Through these results RBPlat will be able to close GAPS on environmental management.

Figure 4.4 Do you have a clue of the environment pollution?



Half of the respondents were informed of the environmental pollution. Since employees have knowledge of environmental pollution they will become involved in environmental monitoring of their air, water and land resources within their work place. Bellamy (1991) argues that all people need to take ownership of environmental protection. People need to understand the issues that may help companies to reduce their environmental footprint.

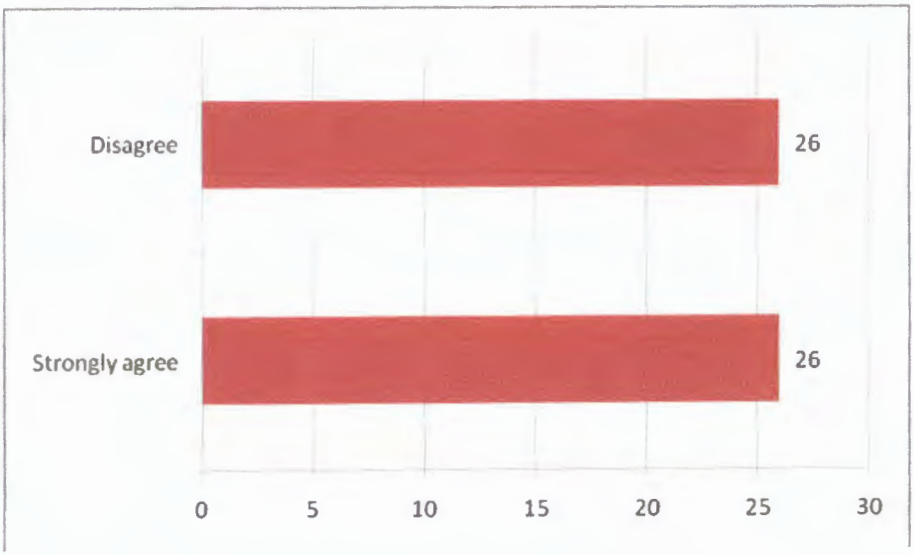
Figure 4.5 What is the most common environmental pollution at your work?



There is a high level of air pollution and soil pollution within Royal Bafokeng Platinum according to this study. The employees are aware of the pollution caused by their work activities and these will help them know how to reduce that.

This pollution within the mining supported by Bench Marks Foundation in 2003 that many mines around Rustenburg area contain rocks that generated acid leacheate and when this acid exposed to water and air, the ground and surface water in the platinum producing area under review is therefore at risk from acid mine drainage.

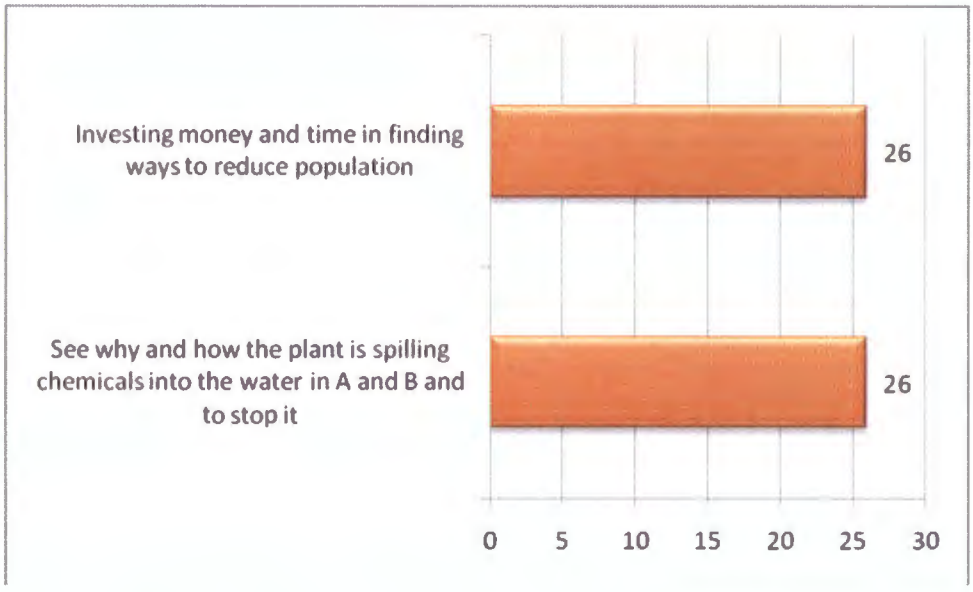
Figure 4.6 Do you think one can prevent pollution at the work place?



From 52 respondents, half of the population do agree that pollution may be prevented. This is contrary to the 100% of respondents who claim to understand environmental pollution at their area of operations and how their work activities may affect the work environment.

Many countries, especially developing countries, are facing increased growth in the mining industry. One shared issue facing countries having mining activities is the deterioration of its environmental quality such as surface and ground water, air, and sea areas. Countermeasures to deal with the situation are the introduction of green environmental policies and strategies by companies especially mining for sustainable development (Miller, 2007)

Figure 4.7 If you agree "How" or if not agree" Why"?



All participants agree that RBPlat has Projects /Teams within each department that deals with environmental related issues like with Safety. Although health and safety representatives take environmental responsibilities within Royal Bafokeng Platinum, most of the respondents are unable to distinguish between safety issues and environmental issues. There is therefore significant scope both to raise the level of educational issues and environmental awareness to each department including employees who cannot read and write English. There is clearly considerable scope to further develop the role of workplace environmental representatives.

Work activities affect the environment

All of 52 respondents strongly agreed that work activities may have an impact on the work surroundings. It shows from the result that environmental department at Royal Bafokeng

Platinum do sensitises employees on how their work activities affect the work environment. It was highlighted by RBPlat environmental department from an environmental monthly discussion topic (Wessel,2011) that spillage of expanfo causes water pollution, leaking compressed air pipes, oil spillages pollute soil and water. This information is distributed to all employees monthly with different themes.

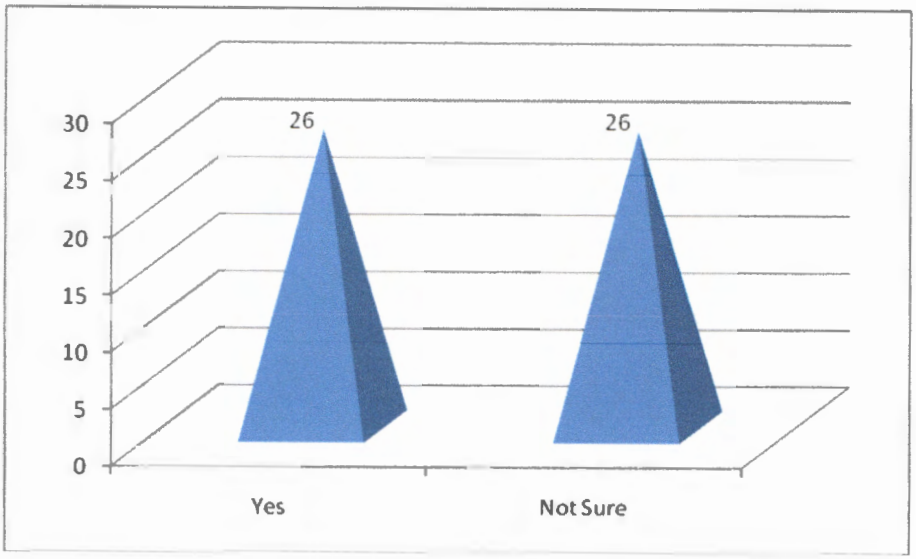
The green environmental policy will be a success if implemented for employees with this background of environmental knowledge. This is supported by Matlou (2010) on weekly mining news that mining by definition has an adverse impact on the environment. Tucker, (2010) argues that environmental impact laws must be well defined so that mining companies can operate within these legal boundaries on a range of issues, such as the impact on the environment, environmental issues, environmental pressures, environmental performance, environmental management, environmental policy, policy implementation and sustainable development.

Environmental issues can include erosion, formation of sinkholes, and loss of biodiversity and contamination of soil, groundwater and surface water by chemical mining processes. Besides creating environmental damage, the contamination resulting from leakage of chemicals also affects the health of the local population. The tool introduces long-term concerns into marketing by comparing the estimated production Cost (Private Cost) and the cost of environmental impact public cost (Baumann *et al.*, 2002).

Wastes are controlled or managed

This is a very positive response from all 52 responded agreed that the wastes at their area of operations are well controlled. The respondents show that they are greening and taking care of their environment.

Figure 4.8 Are these wastes properly managed?



There is a possibility that the environmental waste is properly managed or at Royal Bafokeng Platinum as half of the respondents is sure that waste is properly managed. This half of respondents who are sure it is obvious that they form part of employees who care for the environment. This will minimise the impact to the environment and strive for continuous improvement.

The respondents all claim to be aware of the damages that may cause by non-controlled waste to the environment. In contrast to Figure 4.8 only 50% is sure that wastes are properly managed. All respondents agreed that the waste can cause some damage towards the environment if not well managed. This shows that they are conscious about the environmental related issues. The employees will think about disposal of a product before they make a purchase especially at supply chain department and this will mostly effective minimise waste at a work place.

The respondents all claim that their respective departments are conscious on environmental issues. However this is in contrast with Figure 4.8 where they stated that they are not sure that waste management is handled correctly. They recognise that their work may have a direct or indirect effect on the environment. Environmental issues can include erosion, formation of sinkholes, and loss of biodiversity and contamination of soil, groundwater and surface water by chemical mining processes.

The information that you have about environment is enough

These results are encouraging to hear from 52 respondents that they all need more information on environment. They have all stated that they understand environment but still they need more information on environment. The respondents have an interest on protecting the environment. Green policy will therefore be supported. The policy makers can stimulate the automobile industry to implement improved environmental practices by, for example training organisations to improve their environmental awareness, providing subsidies, and know-how to help them establish environmental management systems (Zhu *et al.*, 2007).

Mining industries need to address and overcome "Green barriers" to improve their environmental performance. Fortunately, because of the consumer and media awareness on this topic, corporations are forced to comply with various environmental; standards of face public defamation as well as poor branding if they don't adapt. Many companies have come to realize that by "going green" they can gain a lot of positive press and recognition which definitely helps to achieve their bottom line profit (Zhu and Sarkis, 2007).

More environmental issues needed

All 52 respondents agreed that they need more information on environment. It will help the company to deal with environmental challenges they are facing. The more employees are informed on environmental issues the easier they will be able to protect it. According to KM Group (2011) the companies must ensure awareness amongst employees at all levels of the importance of environmental issues, and provide training appropriate to their responsibilities.

Lack of environmental information, incomplete supporting policies and laws, unclear implementation standard for different industries, and local protectionism are considered to be the major barriers in the promotion of green credit policy (Aizawa and Yang, 2010, Zhang and Li, 2009).

Company have any environmental policy in place

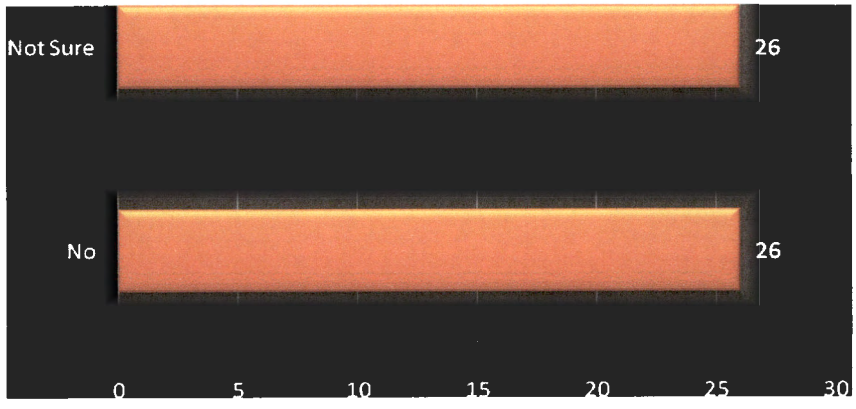
The green environmental paper of South Africa (1996), states that, all South Africans have a role to play in the national efforts to achieve sustainable development and sound environmental management. The development of environmental policy needs to be combined effort which reflects the inputs of the public and all interested and affected parties. The paper

further provides a basis for developing an environmental policy which will help the organisation along the path of sustainable development. This will ensure that they, all of the mine, will have an environment which always caters for their wellbeing.

All RBPlat employees agreed that the company follows an environmental policy in place. It is a very good practice for a company to have a policy in place that will lead in addressing environmental issues. It is in the gap between environmental niche and self identity that managers have an access point through which they can learn ways to integrate the environment into business decisions (Baumann *et al.,* 2002). Several authors, such as Barabs and Squire (2004) and Beder, (2002) have been interested in the question of issue attention and agenda setting for environmental protection policies and how environmental information is used in a policy making.

Green businesses are considered critical for successful development of green policy on environmental issues, environmental impact, environmental protection, policy development and implementation towards sustainable development. However, in many instances green business practices do not exist in isolation, rather they thrive as a comprehensive business philosophy and cultural leading to superior firm performance (Nair, 2004 and Baker & Sinkula., 2005).

Figure 4.9 Does it meets what is suppose to meet?



From 100 respondents 50% are not sure and 50% do not agreed that the environmental policy at Royal Bafokeng Platinum meets what is supposed to meet. This result shows if the green policies are not taken into consideration and if employees are not familiar with green policies. The environmental issue is not only important for managers and environment department

team but also for all employees within the company. According to Coad *et al.* (2009) the environmental policy would benefit from considering intrinsic and extrinsic factors in consumer motivation.

Engstrom e*t al.* (2008) argue that all environmental problems must get the level of policy attention. The link between environmental issue characteristics and the level of policy attention must be explored. Lack of environmental information, incomplete supporting policies and laws, unclear implementation standard for different industries, and local protectionism are considered to be the major barriers in the promotion of green credit policy (Aizawa and Yang, 2010, Zhang and Li, 2009).

Ramos *et al.* (2008) emphasise that the greening government initiative represents an attempt to mains stream the environment across the entire work of government, incorporating environmental objectives in operational aspects of the departmental performance but also greening the fundamental objectives of departments by ensuring that full weight is given to environmental impacts in policy appraisal and development. The policy makers can stimulate the automobile Industry to implement improved practices by, for example training organizations to improve their environmental awareness, providing subsidies and know-how to help them establish environmental management systems (Zhu *et al.,* 2007).

4.5 Measures of association

Correlation is a measure of the relation between two or more variables. The measurement scales used should be at least interval scales, but other correlation coefficients are available to handle other types of data. The simplest question we could ask about two continues variable is whether they vary in a related way, is there a correlation between them.

Pearson's Correlation Coefficient will be used for data interpretation. Correlation Coefficients can range from -1.00 to +1.00.The value of -1.00 represents a perfect negative correlation while a value of + 1.00 represents perfect positive. A value of 0.00 represents a lack of correlation. Refer to table 4.1a, 4.1b and 4.1c the relation ship of variables will be discussed based on years of experience versus department, work experience versus occupation, age versus department, and occupation versus department etc.

Table 4.1a Correlation

			Years	Department	Status	Years
Spearman's rho	Years	Correlation Coefficient	1.000	1.000**	1.000**	1.000**
		Sig. (2-tailed)	.	.	.	.
		N	52	52	52	52
	Department	Correlation Coefficient	1.000**	1.000	1.000**	1.000**
		Sig. (2-tailed)	.	.	.	.
		N	52	52	52	52
	Status	Correlation Coefficient	1.000**	1.000**	1.000	1.000**
		Sig. (2-tailed)	.	.	.	.
		N	52	52	52	52
	Years	Correlation Coefficient	1.000**	1.000**	1.000**	1.000
		Sig. (2-tailed)	.	.	.	.
		N	52	52	52	52
	Qu3	Correlation Coefficient	1.000**	1.000**	1.000**	1.000**

	Sig. (2-tailed)	.	.	.	.
	N	52	52	52	52
Qu4	Correlation Coefficient	.853**	.853**	.853**	.853**
	Sig. (2-tailed)	.000	.000	.000	.000
	N	52	52	52	52
Qu5	Correlation Coefficient	1.000**	1.000**	1.000**	1.000**
	Sig. (2-tailed)	.	.	.	.
	N	52	52	52	52
Qu6	Correlation Coefficient	1.000**	1.000**	1.000**	1.000**
	Sig. (2-tailed)	.	.	.	.
	N	52	52	52	52
Qu10	Correlation Coefficient	1.000**	1.000**	1.000**	1.000**
	Sig. (2-tailed)	.	.	.	.
	N	52	52	52	52
Qu16	Correlation Coefficient	1.000**	1.000**	1.000**	1.000**
	Sig. (2-tailed)	.	.	.	.
	N	52	52	52	52

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Work experience and occupation correlations are refer to 1.0, and this shows a strong positive relationship between these two variables. The more experienced employees are on the job that they are doing, will allow them an opportunity to follow a green policy if it exists.

The chances are that a person will be in a department older and stay in the same department is perfect 1.0. This means that older people think carefully and will save the environment. This means they will share green issues easily within themselves and also to younger ones. Young employees may change to another department and the knowledge of greening will be distributed further to other departments.

The correlation between years of experience and department refer to 1.0. This is a positive relationship between these two variables. The criteria established expresses that correlations that are above the value of 0.5 are considered to have a strong relationship. It is therefore concluded that there is a positive relationship between years of experience and department. The more employees are experienced, the more of different environmental background they have within different department so they will easily adapt to green issues.

The correlation between occupations and department is 1.0. The occupation and departments of employees will influence green issues knowledge of employees. This will bring the different environmental issues according to different department and status within the mining areas of operations. The correlation between age and the knowledge employees have on preventing pollution at work place is 1.0. This means that the older employees are knowledgeable and they will share and transfer this knowledge to younger people.

The correlation between age and the information of employees on common environmental pollution at the work place is .8 and it is therefore concluded that there is a very strong positive relationship between age and knowledge on the most common environmental pollution at the work place. Each and every age group will understand environmental pollution differently and these will assist with the transmission of knowledge amongst themselves with a different insight. Older employees will sensitize younger ones on pollutions and that's where greening employees fit in.

The chances are that companies employ matured people who will be responsible of their negative activities towards the environment. The correlation between age and knowledge on prevention of environmental pollution is 1.0. This shows that maturity of employees who are employed at Royal Bafokeng Platinum go together with responsibility to protect the environment. Reasoning capacity will always determine by age, it is indicated that the

relationship between age and reasons for how pollution can be prevented is 1.0 positive. The correlation between age and the information of employees on common environmental pollution at the work place is 1.0. This shows that older employees are more observant and behave responsible and are able to control the waste caused by their activities at work.

The correlation between work of experience and evaluation of a company policy is 1.0 it is concluded that work experience and policy evaluation has a positive relationship. More experienced employees may easier analyse the success of green environmental policy if it is in place.

Table 4.1b Correlation

			Qu3	Qu4	Qu5	Qu6	Qu10
Spearman's rho	Years	Correlation Coefficient	1.000**	.853**	1.000**	1.000**	1.000**
		Sig. (2-tailed)	.	.000	.	.	.
		N	52	52	52	52	52
	Department	Correlation Coefficient	1.000**	.853**	1.000**	1.000**	1.000**
		Sig. (2-tailed)	.	.000	.	.	.
		N	52	52	52	52	52
	Status	Correlation Coefficient	1.000**	.853**	1.000**	1.000**	1.000**
		Sig. (2-tailed)	.	.000	.	.	.
		N	52	52	52	52	52
	Years	Correlation Coefficient	1.000**	.853**	1.000**	1.000**	1.000**
		Sig. (2-tailed)	.	.000	.	.	.

	N	52	52	52	52	52
Qu3	Correlation Coefficient	1.000	.853**	1.000**	1.000**	1.000**
	Sig. (2-tailed)	.	.000	.	.	.
	N	52	52	52	52	52
Qu4	Correlation Coefficient	.853**	1.000	.853**	.853**	.853**
	Sig. (2-tailed)	.000	.	.000	.000	.000
	N	52	52	52	52	52
Qu5	Correlation Coefficient	1.000**	.853**	1.000	1.000**	1.000**
	Sig. (2-tailed)	.	.000	.	.	.
	N	52	52	52	52	52
Qu6	Correlation Coefficient	1.000**	.853**	1.000**	1.000	1.000**
	Sig. (2-tailed)	.	.000	.	.	.
	N	52	52	52	52	52
Qu10	Correlation Coefficient	1.000**	.853**	1.000**	1.000**	1.000
	Sig. (2-tailed)	.	.000	.	.	.
	N	52	52	52	52	52
Qu16	Correlation Coefficient	1.000**	.853**	1.000**	1.000**	1.000**

	Sig. (2-tailed)	.	.000	.	.	.
	N	52	52	52	52	52

The correlation between employees with clue or understanding of the environmental pollution and to establish as to whether operational wastes are controlled or managed is 1.0. This is concluded that there is a linear correlation between the two variables, this advocates that employees with environmental understanding will be able to control the wastes within there are of operations.

The correlation between ways and reasons to stop environmental pollution to further occur at the work place and prevention of environmental pollution to continue at a work place is 1.0. This suggest that these two variables have a positive relationship. The prevention of environmental pollution can have a positive impact on ways and reasons to stop pollution to further occur at the work place. The correlation between waste controlled and prevention of pollution to continue at a work place is perfect 1.0. According to criteria as those correlations that are above the absolute value of 0.5 will be considered to show a strong relationship. This suggests that environmental pollution can be prevented to occur if waste is controlled r managed at a work place.

The correlation between waste controlled or management within the workplace and reasons for the company not to prevent pollution to continue at a work place is 1.0, a positive correlation between the two variables. Waste management has a positive impact on ways and reasons to stop pollution to further occur at the workplace.

The correlation between waste controlled or management within the workplace and a clue or understanding of environmental pollution is perfect 1.0.The criteria established expresses that correlations that are above the value of 0.5 are considered to have a strong relationship .It is therefore concluded that the clue or understanding employees have on environment the better waste can be managed or controlled within the work area.

The correlation between environmental policy evaluation and understanding of the environmental pollution is 1.0. This suggests that the understanding of environmental pollution the possibility to easy evaluate an existing environmental policy within the company. The correlation between clue or understanding of the environmental pollution and

environmental policy evaluation is 1.0. This suggests that the clue or understanding of environmental pollution the easier to evaluate an existing environmental policy within the company.

The correlation between clue or understanding of the environmental pollution and environmental policy evaluation is 1.0. There is an impact on evaluating environmental policy and prevention of pollution to continue at a work place. The correlation between the evaluation of environmental policy, ways and reasons to stop further pollution to occur at the work place is 1.0. This suggested that the two variables have strong positive correlation .The evaluation of environmental policy can assist on ways to stop environmental pollution.

The correlation between the evaluation of environmental policy and the control or management of waste is 1.0. This demonstrates a positive correlation between the two variables. Policy evaluation has an impact on waste control and management.

The correlation between most common environmental pollution at a work place and a clue or understanding of the environmental pollution is measured as perfect .85 which is 85%. According to criteria as set above, those correlations that are above the absolute value of 0.5 will be considered to show a strong relationship. The clue or understanding that employees have on environmental pollution will influence common environmental pollution.

Table 4.1c Correlation

			Qu16
Spearman's rho	Years	Correlation Coefficient	1.000**
		Sig. (2-tailed)	.
		N	52
	Department	Correlation Coefficient	1.000**
		Sig. (2-tailed)	.
		N	52
	Status	Correlation Coefficient	1.000**

	Sig. (2-tailed)	.
	N	52
Years	Correlation Coefficient	1.000**
	Sig. (2-tailed)	.
	N	52
Qu3	Correlation Coefficient	1.000**
	Sig. (2-tailed)	.
	N	52
Qu4	Correlation Coefficient	.853**
	Sig. (2-tailed)	.000
	N	52
Qu5	Correlation Coefficient	1.000**
	Sig. (2-tailed)	.
	N	52
Qu6	Correlation Coefficient	1.000**
	Sig. (2-tailed)	.
	N	52
Qu10	Correlation Coefficient	1.000**
	Sig. (2-tailed)	.
	N	52

Qu16	Correlation Coefficient	1.000
	Sig. (2-tailed)	.
	N	52

The correlation between age and the evaluation of environmental policy is 1.0, a positive correlation between two variables. According to criteria as set above, those correlations that are above the absolute value of 0.5 will be considered to show a strong relationship .The correlation is significant and has a positive impact. The age of employees can affect the policy evaluation of a company.

The correlation between department and environmental policy evaluation is measured as perfect 1.0 which is positive. According to criteria as set above, those correlations that are above the absolute value of 0.5 will be considered to show a strong relationship. Departments operations are different and these can be affect the policy, the success of the company policy may depend on the department itself.

The correlation between work experience and environmental policy evaluation is measured as perfect 1.0 which is positive. According to criteria as set above, those correlations that are above the absolute value of 0.5 will be considered to show a strong relationship. A policy can be influence by the work experience of employees.

The correlation between environmental policy evaluation and understanding of the environmental pollution is measured as perfect .85. According to criteria as set above, those correlations that are above the absolute value of 0.5 will be considered to show a strong relationship. The more employees are conscious of environmental issues; the policy will be easily implemented and monitored.

The correlation between environmental policy evaluation and most common environmental pollution at work is measured as perfect 1.0. According to criteria as set above, those correlations that are above the absolute value of 0.5 will be considered to show a strong relationship. Employee's knowledge on environmental pollution has an impact on an environment.

The correlation between environmental policy evaluation and prevention of environmental pollution at work is measured as perfect 1.0. According to criteria as set above, those correlations that are above the absolute value of 0.5 will be considered to show a strong relationship. There is strong linear relationship between the two variables and one can influence the other.

The correlation between environmental policy evaluation and ways, reasons for challenges at prevention of environmental pollution is measured as perfect 1.0. According to criteria as set above, those correlations that are above the absolute value of 0.5 will be considered to show a strong relationship. There is strong linear relationship between the two variables and one can influence the other.

4.6 Conclusion

Chapter four provided analysis and interpretation of data gathered using a questionnaire as a method of collecting data, a number of statistics techniques were applied to aide in the analysis. Correlation was used specifically to establish meaning of the analysis of data collected. In some instances the use of charts and tables were used to assist in the presentation of the analysis. The analysis of primary data collected revealed that all respondents 100% understand what is all about environment. This is an encouraging result because it is consistent with the hypothesis that individuals who are conscious about the environment and mining industry has an impact on the environment due to its operation.

After all the researches done so far, the author points out different types of environmental issues within the mining industry that needs to be managed and controlled. This leads to a challenge for environmental protection, development and the implementation of a green policy. In the next and final chapter the researcher will give conclusions and recommendation about the findings of the study and address items as limitations of the research study. Statistical analysis results show that environmental issues do have correlation with environmental policy, waste management, policy evaluation, environmental pollution and others.

CHAPTER 5

CONCLUSION SUMMARY AND RECOMMENDATION

5.1 Introduction

The environment within the Mining Industry is affected by the mining activities and it does not taken care of. The purpose of this research is to unveil the environmental pollution and protection through development and implementation of a green policy. This chapter consolidates the findings of the research, derived through analysis and interpretation of statistical data, discussed in the previous section.

The research questions pertaining to the environmental pollution, importance of the environment, and prevention of environmental pollution, operational wastes management and environmental policy are also answered. This chapter comprises of a summary of the study, addresses the findings per research question, provides environmental protection guidelines within the mine and highlights future research opportunity in this field of study.

5.2 Summary of the study

The study needs to address environmental problems within Royal Bafokeng Platinum through Green Policy. An environmental Green Policy is a written statement that clearly indicates the position and values of a company on environmental and sustainable issues.

The Green paper indicates that there are many areas which the government needs to address in its environment .These includes amongst others to improve pollution and waste control, focusing on people and their participation in environmental decision making, and ensuring that environmental decision making employs an integrated and macroeconomic perceptive.

The research was aimed at addressing environmental problem within Royal Bafokeng Platinum through Green policy. The study analyzed the environmental protection and management through the use of research questions that focus on environmental knowledge, importance, pollution, challenges and environmental issues. The study revealed that all respondents at Royal Platinum understand about the environment, environmental pollution but 100% of them still need more information on environment.

5.3 Response to Research Questions

The main findings of this research in relation to each research question will be discussed. Each question is followed by a discussion of the findings relating to that question.

1. **How wide is the knowledge of BRPlat employees on environmental issues?**

The environment is vulnerable, which is demonstrated, for example, by serious soil erosion, soil desertification and salinisation–alkalisation, shortages of agricultural water resources, and lowering of groundwater levels (Zhou *et al.,* 2008). It was found that most frequent responses to the clue or understanding of environmental pollution are 50% with adequate information and 50% with most of environmental pollution knowledge. For each and every employee to take responsibility of their surrounding they must all have information on environmental pollution. This may only be achieved through training.

From 100% of the population, 12% of the respondents each report a very high level of air pollution and soil pollution, noise, oil spillages and water pollution is reported 10% each. The employees are therefore aware of the pollution caused by their work activities and these will help to prevent it. Information is communicated monthly by RBPlat environmental department on a monthly basis according to researcher's observation. Managers and supervisors must receive more of training so that they may lead informing employees on environmental related issues.

Midilli *et al.,*(2006) proposed study, discusses environmental theme from different perspective, the main aim is to bring a clear light on the impact of human interactions with the environment .Fossil fuels have caused some major human health and human problems , due to their extensive use in various industrial and non-industrial sectors.

2. **How wide is BRPlat employees conscious on their environmental Impact?**

One shared issue facing countries having mining activities is the deterioration of its environmental quality such as surface and ground water, air, coastal and sea areas Miller (2007). According to UNCTAD (2000) it is important for community to become involved in environmental monitoring of its own air, water, and land resources through the life cycle of the mine, and ensures that their rights to a clean and healthy environment are protected and monitored also by appropriate government regulators.

After having witnessed countless ecological disaster and the progressive degradation of the earth's ecosystem, society is becoming to ask for the environmentally responsible behaviour on the part of both government and businesses (Zhou et al., 2008). When the participants were asked about the most common pollution at the work place, they considered the high level of air pollution and soil pollution than noise and water. Employees are also to be encouraged on how to be responsible towards the environment. All these pollution types are the results of their work activities.

According to Baumann *et al.* (2002), a driver to minimise environmental impact on product system level is missing too, since this lies beyond the area of responsibility of individual companies and since representatives on the product system level are non-existing. It is necessary to identify and quantify the environmental impact of the investment project and the cost of annulating this impact (soil remediation, water purification and other clean-up action) not to mention irreversible damage to the environment and human health. Learning is of particular importance for successful adaptation to an environment that is changing rapidly and needs to be integrated further in decision–making (Miller, 2007).

All employees agreed that there is a team working specifically with an environment. This shows confusion to safety representative team and environmental team according to the researcher's observations. Although health and safety representatives take environmental responsibilities within Royal Bafokeng Platinum, most of the respondents are unable to distinguish between safety issues and environmental issues.

For every employee to take responsibility of one's surrounding they must have more information on environmental pollution and this may only be achieved through training. Section 4.4 further revealed that there is a need for environmental awareness, workshops and training, 100% of respondents indicated that they still need more information on environment.

According to Epstein and Birchard (1999) effective environmental awareness and reporting can contribute to reputation building of a company. From the answers 100% participants report that the information they have about environment is not enough and they all need more of it. The company needs to increase the environmental awareness and sensitivity of employees through work shops and visible enough posters around the area.

A "multidisciplinary integration in education so that environmental issues are taught at Business Schools "was proposed (PwC, 2004). This also supported by Miller, (2007) that public and managerial accountants have a role to play in educating corporate management with regard to environmental responsibility.

3. How wide is BRPlat employees care for the environment?

Half of the respondents disagree that one can not prevent pollution at the work place and a half do strongly agree. From all this employees with more information on environmental related issues, who strongly agree that the company can start an environmental team that will specifically deal with environmental issues? This team must be at each and every area of operations like at south shaft, north and central area including at Styldrift project. According to Epstein and Birchard (1999) substantial economic benefits can accrue to firms that bring their pollution under control through the reduction of wastes and energy usage.

Each department at RBPlat must play green by reusing office papers and recycle anything that can be recycled; the information on environmental protection must not be only on paper but practically applied. Producers must also be encouraged to manufacture green products that will not have in impact on the environment. It was found that half of the subjects are not sure if wastes controlled or not, and the other half have agreed that waste are properly managed within their area of operations.

Rodrigues *et al.,* (2009) states that the benefits from recycling and re-use of materials are very important for waste management. To reduce waste at the area of operations, the company must minimize the amount of printed material and direct mail they use and to encourage employees to be responsible, corporate green citizens. Reusing materials at every opportunity and align the company especially supply chain with green suppliers by considering environmental impacts in their purchasing.

4. Is Environmental Policy implemented and are the employees aware of it?

According to Green Paper for Public Discussion (1996), Environmental policy has a major part to play in meeting the development needs of the people in the new democratic South Africa. The country is currently undergoing a major process of social-economic transformation as it attempts to correct the negative impacts caused by previous political regimes. This Green paper indicates that there are many areas which the government needs to address in the environmental policy, these include, amongst others: improved pollution and waste control, focusing on people and their participation in environmental decision making and ensuring that environmental decision making employs an integrated and economic macroeconomic perspective.

All RBPlat respondents agreed that the company has environmental policy in place and this is very much important, as these environmental issues will form part of the policy. The policy

makers should coherently incorporate encouraging "greening "into portfolio of policy instruments to achieve environmental ends. Through green policy employees will also contribute on monitoring and implementation of the policy so they will be able to evaluate it.

The same respondents, 50% are not sure as to whether the environmental policy meet what is suppose to meet and 50% of the respondents totally disagree. Engstrom *et al.* (2008) argue that all environmental problems must get the level of policy attention. The link between environmental issue characteristics and the level of policy attention must be explored. The company must be ready to be proactive if not willing to spend money on environmental protection. Organisations sometimes find themselves incapable of acting. Zhang and Li. (2009) argue that successful policy or program implementation requires that those involved have sufficient information.

Green businesses are considered critical for successful development of Green Policy on environmental issues, environmental impact, environmental protection, policy development and implementation towards sustainable development. However, in many instances green business practices do not exist in isolation, rather they thrive as a comprehensive business philosophy and cultural leading to superior firm performance (Nair, 2004 and Baker and Sinkula,2005).

The Greening Government initiative represent an attempt to mains stream the environment across the entire work of government, incorporating environmental objectives in operational aspects of departmental performance but also greening the fundamental objectives of departments by ensuring that full weight is give to environmental impacts in policy appraisal and development. According to Ramos *et al.* (2008), the initiative was created in 1997 by the United Kingdom.

This was supported by Fleischan and Schuele (2006) that the contents of the government report, which are verified by governmental authorities, are specified and include information on emissions, soil pollution, soil clean up, and the company, environmental policy. Several authors, such as Kingdom (1995) and Beder (2002) have been interested in the question of issue attention and agenda setting for environmental protection policies and how environmental information is used in a policy making.

5.4 Limitations

This study has been limited to all operational units within Royal Bafokeng Platinum, Rustenburg area North –West province especially central area. The data were collected from respondents through a questionnaire. Even though personal observations by the researcher were made for some of the respondents to validate that perception of the respondents were accurate, these observations were not made for all respondents.

5.5 Managerial Guidelines

From the results of this study the following guidelines are given to mining industries that are planning to develop and implement green policy within their work place. BRPlat environmental department must conduct projects to save the environment whereby employees must be involved and may start with grassroots local measures such as training the next generation to lead in environmental management. Managers must employ green changes that will assist in cutting costs by going green. This will be implemented easily as 100% of RBPlat respondents have a clue of the environment pollution and need more of environmental information.

Brown *et al.* (2001) found that the further the middle manager's perceptions of the attitude to environmental issues is in advance of the legislation, regulation and other firms in the Industry, the more likely the unit is to implement a green supply initiative. Among barriers for the implementation of Green Supply Chain Management such as green purchasing the most critical ones appear to be economic reasons and issues related to costs .The company must reduce the organization paper usage, by informing employees to print on both sides of each copy paper if possible and this will half the money the company spend on purchasing copy paper while saving trees and by so doing the company will maintain sustainable development.

Product design constitutes an active interface between the two sides; demand (consumers) and supply (manufacturers), both are responding positive to it. This is why environmental issues need to be considered in the design process. The terminology of product design integrating environmental issues has changed during the last decade. These variations partly represent different priorities on how environmental issues are best tackled (Baumann et al., 2002).

RBPlat must be conscious of raw material supply. It must be aware of the environment protection at every stage of the production process, from product design, production, logistics, to the consumption and disposal of the products. This will assist that company employees

may have knowledge on how to prevent pollution at the work place. From 52 respondents, half of the population do not agree that pollution may be prevented and the other half have a strong belief refer to Figure 4.6.

All employees agreed that there is a team working specifically with an environment. This shows confusion to safety representative team and environmental team according to the researcher's observations. Although health and safety representatives take environmental responsibilities within Royal Bafokeng Platinum, most of the respondents are unable to distinguish between safety issues and environmental issues. There is therefore significant scope both to raise the level of educational issues and environmental awareness to each department including to employees who cannot read and write English. There is clearly considerable scope to further develop the role of workplace environmental representatives.

5.6 Future Research

This study contributes various opportunities for further research, notably.

- ✓ Introduction of green policy within the company.
- ✓ Individual responsibility on going green.
- ✓ Formulation of green environmental teams within departments.
- ✓ A need for environmental policy evaluation .and monitoring.

The researcher will leave for future research the analysis of the knowledge of environmental issues already possessed by the Individuals. It would be interesting to examine whether education can have an impact on environmental knowledge.

5.7 Conclusion

It is vital that unaffected environment should be inherited to the next generations and possible to change the company policy to green policy in the future. This research has demonstrated that government can force a certain group to obey environmental standards. The research also confirms the knowledge that employees have at RBPlat on environment. It is critically important that individuals, managers and communities actively involved in the environmental issues raised by mining as they impact directly on individual and community wellness, health and safety. This research will assist Royal Bafokeng Platinum towards green commitment to increase employee's morale on green practices. Businesses that are responding already to environmental issues with environmental marketing initiatives geared towards meeting the demand for environmentally friendly processes, products and packaging

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	MATRIX	A	B	C	D	E	F	G
Paper No.	Themes	Environment	Environmental Issues	Environmental Impact	Environmental Pressure	Environmental Management	Green	Green Policy
		a	b	c	d	e	f	g
1	Aberdeen, Scotland Sustainable purchasing policy from Green Policy. Adopted in February 2001 www. aberdeencity.gov.uk.	1	1	1	1	1	1	
2	Green Credit Policy, Green Stimulus, Green Revolution, China mobilization of banks for environmental cleanup: The journal of environment	1	1	1		1	1	
3	Alberta Council for Environmental Education: Green operations policy .							1
4	A minerals and Mining Policy for South Africa:	1						
5	Getting Australia active towards better practice for promotion of physical, activity national public health partnership				1		1	
6	Green entrepreneurship and Green Value Added: Retrieved from Goliath echet.com ,	1						
7	Local Economics and Co-production.							
8	The Corporate Assault in Environmentalism Green Book	1	1	1			1	
9	Renewable Energy for Sustainable Development in Africa South Africa review.							1
10	Theory of metabolic rift: Classical Foundations for Environmental sociology,							
11	Comparison of impervious Surface area and normalized difference vegetation index as indicators of surface urban heat .							
12	What is environmental Management.	1	1			1		
13	Green Preferences as regulatory policy instrument							
14	Do Green technology policies need to pass the consumer test / the case of ethanol fuel.							

15	The evolution of environmental performance metrics : trends and challenges , corporate Environmental Strategy							
16	Fighting for Sustainability in the Bank Sector: Published on business feedback magazine.	1	1				1	
17	European vision for oceans and seas social and political dimensions of the Green paper on maritime policy for the European	1				1		
18	, Issue Characteristics and Policy attention in two Swedish Sectors: Agriculture and Energy.		1					
19	Environmental Awareness in the workplace case study					1		
		1					1	
20	Environmental impact is responsibility of mining houses	1			1	1		1
21	Counting What Counts:							
22	Morality and Rationality in Environmental Policy.	1						
23	Guide to environmental issues in the workplace							
24	The review of the achieved degree of sustainable development in South Eastern Europe.						1	
25	Green Economics: an introduction to theory policy and Practice		1					
26	Green Paper for Public discussion: Environmental Policy for South Africa	1				1		
27	Green Technology at work Careers guide							
28	Government Gazette, National Climate change response green paper	1						1
29	ISO –International Organization for standardization. ISO 14040: Environmental Management Life Cycle assessment					1	1	
30	Developing countries" Energy needs and priorities under a sustainable development perspective	1						
31	Directing clean development mechanism towards developing countries, sustainable development priorities							

32	Science and Policy for Sustainable Development.						1	
33	Strategic human resource management:							
34	Green energy strategies for sustainable development.						1	
35	Environmental; Impact to Defence, in Pubmed.			1				
36	Green electricity policies in the in the United States	1	1					
37	Time to go Green: Environmental Responsibility in the Chinese Banking sector, friends of the earth	1						
38	Red light for green paper: The EU policy on energy efficiency	1						
39	Strategy Structure and Environment:	1						1
40	Persectives Sustainable development in countries Southeastern Europe .						1	
41	Net works of agri-environmental policy implementation: a case study of Engands country side stewardship scheme	1						
42	Health and Environment related issues in stone crushing in Pakistan paper submitted on regional research competition of South Asia network of Economic	1						1
43	Green consumers and public Policy: On Socially Contingent moral motivation: Resources and Energy Economics.	1	1				1	
44	Using environmental indicators for business: A literature review and the need for standardisation and aggregation of data.	1					1	
45	Green and Competitive Advantage							
46	Green and Competitive: influences on Environmental new product development Performance							
47	Environmental Risk and Young children,s Cognitive and behavioural development .	1						
48	Green Building and Human experience						1	
49	Environmental Management: Environmental performance policy indicators for the public sector							

Annexure B: Table of Construction

Research Question	Survey Questions	Variable(s) and/or Relationships measured	Question Type	Statistical test to be used
1. What is all about Environment and Pollution?	1.1 Tell me anything you know about an environment.	1.1 Yes/No	Closed-type question.	Measures of association, Phi, crammers V.
	1.2 Is the environment important to us?	1.2 Yes/No	Closed-Type question.	Numerical description, Location, spread, distribution, cross tabulation.
	1.3 Do you have a clue or understanding of environmental pollution?	1.3Yes/No	Open-type Question.	Numerical description, Location, spread, distribution, cross tabulation.
	1.4 What is the most common environmental pollution we have at our mine?	1.4 Not within scope, poorly, fairly, mostly, completely	Open-type Question.	Numerical description, Location, spread, distribution, cross tabulation.
	1.5 How can we stop or prevent	1.5Not within		

	environmental pollution from continuing?	scope, poorly, fairly, mostly, completely	Open- type Question.	
	1.6 Can you identify any of our activities within the mine that can cause pollution?	1.6 Yes /No/Not Sure		
2. Is there serious challenges you are facing on environment within your department?	2.1 Is there any project that you are involved in, to deal with these environmental challenges?	2.1 Yes /No/Not Sure		
	2.2 Is there any waste generated from your activities or generated from your operations.	2.2 Yes /No/Not Sure		

	2.3 If Yes , What are those waste 2.4 How do you control or manage the waste at your department not to further damage the environment.	2.3 Not within scope, poorly, fairly, mostly, completely 2.4. Not within scope, poorly, fairly, mostly, completely.		
3. How conscious you are towards environmental related issues.	3.1 Are you aware of the damage that may cause by our activities towards the environment? 3.2 Can the environment have any impact to our health, economy, social and political development?	3.1 Not within scope, poorly, fairly, mostly, completely 3.2 Not within scope, poorly, fairly, mostly, completely	Closed-Type question Closed-Type question	Convert nominal to rational 0,1,2,3,4 & do correlation co-efficient testing with personal information Measure of association, Phi, crammers V
	3.3 In your department do you have any environmental	3.3 Yes/No/Not sure	Closed-Type question	Measures of association, Phi, crammers V

	committee (Green Team) who are responsible for environmental issues like at safety?			Numerical description, Location, spread, distribution, cross tabulation
	3.4 Do you think this team can be important or is important?	3.4 Yes/No/Not Sure		Normal And Distribution
	3.5 What is your future plan to improve environment within your department?	3.5 Not within scope, poorly, fairly, mostly, completely		Convert nominal to rational 0,1,2,3,4 & do correlation co-efficient testing with personal information
	3.6 Does the Supervisors/HOD, s discuss environmental issues with you like safety issues?	3.6 Yes /No /Not Sure	Closed-Type question	Measures of association, Phi, crammers V
	3.7 Are you satisfied with the information you	3.7 Yes/No/Not Sure	Closed-Type question	Numerical description, Location, spread, distribution, cross tabulation

	committee (Green Team) who are responsible for environmental issues like at safety?			Numerical description, Location, spread, distribution, cross tabulation
	3.4 Do you think this team can be important or is important?	3.4 Yes/No/Not Sure		Normal And Distribution
	3.5 What is your future plan to improve environment within your department?	3.5 Not within scope, poorly, fairly, mostly, completely		Convert nominal to rational 0,1,2,3,4 & do correlation co-efficient testing with personal information
	3.6 Does the Supervisors/HOD, s discuss environmental issues with you like safety issues?	3.6 Yes /No /Not Sure	Closed-Type question	Measures of association, Phi, crammers V
	3.7 Are you satisfied with the information you	3.7 Yes/No/Not Sure	Closed-Type question	Numerical description, Location, spread, distribution, cross tabulation

FOR OFFICE USE ONLY: Respondent Code: _____

VOLUNTARY QUESTIONNAIRE FOR

"Development and Implementation of green environmental policies within Royal Bafokeng Platinum North west"

Graduate School NWU
University of South Africa
Researcher: S. A Mathebe
Supervisor: Prof .S. Lubbe

Note to the respondent

- We need your help to understand the environmental impacts cause by mining activities at Royal Bafokeng Platinum.
- Although we would like you to help us, you have to take part in this survey.
- If you do not want to take part, just hand in the blank questionnaire at the end of the survey session.
- What you say in this questionnaire will remain private and confidential. No one will be able to trace your opinions back to you as a person.

The questionnaire as four parts:
Part 1 asks permission to use your responses for academic research.
Part 2 asks general personal particulars like your age, gender and home language.
Part 3 asks about environmental Issues within the mining work environment RBPlat.

How to complete the questionnaire

1. Please answer the questions as truthfully as you can. Also, please be sure to read and follow the directions for each part. If you do not follow the directions, it will make it harder for us to do our project.
2. We are only asking you about things that you and your fellow researchers should feel comfortable telling us about. If you don't feel comfortable answering a question, you can indicate that you do not want to answer it. For those questions that you do answer, your responses will be kept confidential.
3. You can mark each response by making a tick or a cross, or encircling each appropriate response with a PEN (not a pencil), or by filling in the required words or numbers.

Thank you very much for filling in this questionnaire.

Part 1: Permission to use my responses for academic research

I hereby give permission that my responses may be used for research purposes provided that my identity is not revealed in the published records of the research.

Initials and surname _____

Postal address:

_____

_____

Code :_____

Contact numbers----------
Home: _____ Cell: _____

No.	**PART 2: GENERAL PERSONAL PARTICULARS** ***Please tell us a little about yourself*** Please mark only ONE option per question below.	No.	**PART 3: QUESTION RELATED TO ENVIRONMENT WITHIN THE MINING INDUSTRY.**
1.	I am _____years old.	8	Do you understand this word "environment" □ Yes □ No
2.	I am a: □ female □ male.	9.	Is the environment important? □ I strongly agree □ I agree □ I disagree □ I strongly disagree
3.	I am: □ African □ Coloured □ Indian □ Oriental □ White □ a member of another ethnic group: _____	10.	Do you have a clue or understanding of the environmental pollution? □ Mostly □ Less □ Moderate □ Adequately
4.	I have: □ ABET Level 1-4 □ Primary School level of education. □ high School level of education □ Tertiary level of education □ a post-graduate level of education	11.	What is the most common environmental pollution at your work place : _____ _____
5.	I am working at _____department. □ North Shaft □ South Shaft □ Central Area	12.	Do you think we can be able to prevent pollution to continue at a work place? □ I strongly agree □ I agree □ I disagree □ I strongly disagree
6.	I am working as a (Occupation) _____.	13.	If agree "How" or If not agree "Why" _____ _____ _____
7.	I have _____ years mine experience.	14.	Is there any project/team that deals with environmental challenges within your department? □ Yes □ No
15.	Can our work activities affect the environment? □ I strongly agree □ I agree □ I disagree □ I strongly disagree	20.	Is your department conscious on environmental Issues like with Safety Issues? □ Yes □ No

16.	Can this be prevented? I strongly agree I agree I disagree I strongly disagree	21.	Do you think the information that you have about environment is enough. Yes No
17.	There are wastes generated from our operational units. True False	22.	Or do you need more of it. Yes No
18	Are these wastes controlled or managed? Yes No Not sure	23	Does the company have any environmental policy in place? Yes No Not sure
19	Are you aware of the damage that these waste may cause towards the environment if not well controlled? Yes No	24	Does it meet what is supposed to meet? Yes No Not sure