

THE ROLE OF COMMUNICATION IN PROMOTING GREEN ENERGY  
IN THE KING CETHSWAYO DISTRICT

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IN THE KING CETSHWAYO DISTRICT

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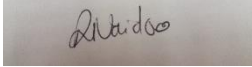
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## ETHICAL STATEMENT BY RESEARCHER

With the signature below I, **Rekha Naidoo**, hereby declare that the work that I present in this thesis is based on my own research and that I have not submitted this thesis to any other institution of higher education to obtain an academic qualification.



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**R Naidoo**

05 April 2018  
**Date**

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***“But from everlasting to everlasting the Lord’s love is with those who fear him, and his righteousness with their children’s children.”- Psalm 103:17***

## **WRITING CONVENTIONS**

The following conventions are used in this study:

1. The researcher uses the abbreviated Harvard style of referencing, for example Regan (2006: 71), which means Regan. 2006, page 71.
2. Illustrative tables and figures are all given as Figure 1-24 and Table 1- 9 in their chronological sequence of appearance.
3. For commonly used terms full terms are used in heading.
4. South African English is used.
5. Relevant material relating to the green economy was downloaded from websites. Such website addresses are included in the thesis, both for verification purposes, and for acknowledgement of the source of information. An example of a typical website address is: <http://www.biogasassociation.co.za/about-us/what-is-biogas/>
6. In instances where the electronic document has been downloaded from a website, the author is given, followed by the year as in: (Sudman and Bradburn,1973:208-228).
7. The bibliography has been organised alphabetically.

## **Abstract**

University of Zululand

Renewable energy is considered to be a viable and cost-effective solution to the problem of providing electricity to rural regions in many developing countries. The infrastructure challenges experienced by South Africa's energy parastatal Eskom in providing a stable and affordable electricity supply to the country is compounded by criticism of Eskom's continued use of coal-powered stations.

The King Cetshwayo District has a high unemployment rate, with thousands of rural residents living in poverty, without access to water or electricity. The possibility of utilising organic waste to create biogas is an untapped market that would provide many advantages for rural dwellers. From a communications perspective, this study analysed how communications theories could be utilised to stimulate interest in renewable energy. The feasibility of using renewable energy as a source of electricity for households was considered, while the potential for job creation and other economic activities emanating from the production and sale of biogas, was also examined.

The study examined how the proximity of cattle herds on a substantial proportion of rural land could offer the opportunity to access animal waste, which is a core fuel source for biogas. If communities are amenable to the concept of a cheap and environmentally-friendly energy option, it would mean huge implications for the future of creating a green economy in the region. The research has found that biogas can also be bottled and sold at a fraction of the cost of purchasing conventional grid electricity. This will mean cost-savings for poor households as well as job creation for entrepreneurs who preserve and sell the gas. The study delved into the socio-economic advantages of using green energy in the King Cetshwayo District and the reasons why communication theories and strategies are critical to the further progress of renewable energy projects in the district.

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## *Chapter 1*

### **ORIENTATION**

#### **1.1. INTRODUCTION**

Proponents of green practices have realised the massive potential of renewable energy to provide sustainable energy solutions to millions of rural households. This is of paramount importance, especially for developing countries which have not been exposed to the concepts of energy conservation and renewable power sources, nor do they have access to it. Renewable energy is economically feasible for a wide range of reasons, but its potential has not been reached due to limitations on accessibility, knowledge of its application and ability to execute it at a local level (Wharton, 2015). One of the most striking barriers is ignorance and another is poverty. If greater awareness of renewable energy, its affordability and accessibility, are communicated to rural households, the possibilities for green energy would be limitless (Wharton, 2015). The rising costs of purchasing electricity and criticism over the continued use of coal-powered stations are added incentives for going green.

The possibility of utilising organic waste to create biogas is a relatively unknown market that poses many advantages for rural dwellers. This research has analysed how communication strategies can be utilised to promote green initiatives. It also looked at the green economy as a source of job creation and local economic development. The research further questioned the feasibility of using renewable energy as a source of

electricity for households. The study questioned the potential for job creation and other economic activities emanating from the production and sale of biogas.

The King Cetshwayo District (formerly uThungulu) has a high unemployment rate, with thousands of rural residents living in poverty, without access to water or electricity. The research was confined to the King Cetshwayo District area, in the North Coast of KwaZulu-Natal, where the majority of its one million residents work and live in rural areas; and the burden of most rural households in poverty. The King Cetshwayo District is a predominantly rural region, with about twenty (20) percent being urbanised and the remaining eighty (80) percent comprising deep rural areas. With little or no access to running water, electricity and economic activities, there is a dire need for alternative sources of energy and job creation opportunities (uThungulu, 2012b:10).

The author of the dissertation is the Public Relations Manager of the King Cetshwayo District Municipality, Ms Rekha Naidoo. As the district is currently involved in promoting green energy initiatives, a number of the activities mentioned hereunder are confirmed by the author herself.

## **1.2. LITERATURE REVIEW**

The literature review summarises the findings of the various scientific bodies of knowledge already available on the subject of the research. The literature is presented in alignment with the study objectives, which to a large degree analyse the role of communication in raising awareness of and promoting interest in renewable energy projects. The findings most suitable to the area of study are notably included in the

literature review. The summary also allowed the writer to expand on the problems raised in the introductory chapter and helped to isolate the 'gaps' in knowledge which led to the writer conducting further research (Ashton, 2015).

It also highlights the ineffectiveness of current literature in expounding or resolving the research problem whilst simultaneously giving adequate coverage of previous research articles on the subject. The concepts of renewable energy, green economy and climate change are all relatively new issues that have come to the fore in recent years due to the effects of climate change. The information, which has been compiled from primary sources, a review of peer articles, annual reports and other literature, provides a rich analysis of the problem and related solutions as proposed by the authors cited therein.

The Literature Review highlights programmes undertaken internationally and nationally, to conserve energy and create economic opportunities in the field of renewable energy, and focuses on the role of communication in ensuring the success of these programmes. Chapter 2 provides a detailed review of the literature available on the subject and thereafter examines the strides taken in the King Cetshwayo District to meet its climate change objectives.

### **1.3. STATEMENT OF THE PROBLEM**

Green energy is cheaper and more environmentally friendly than conventional electricity supplies (Vaughn, 2017). There is a high rate of unemployment in the King Cetshwayo region and the poverty-stricken rural areas struggle without access to electricity and water due to the inability of the government to provide services efficiently and affordable. The role of communication in raising awareness of renewable energy is critical to the success of the study. The research aims to analyse how communication can be utilised to promote green initiatives. The study questions the potential for job creation and other economic activities emanating from the production and sale of biogas.

The knowledge gap that will be filled through this research is; awareness of renewable energy and its multi-faceted response to the effects of climate change, the provision of safe and inexpensive energy sources, and to the unemployment rate in our country. The study aims to bridge the knowledge gap regarding renewable energy by examining how green initiatives can become a source of job creation and local economic development, and the use of renewable energy a source of electricity for households. It further aims to shed light on the role of community and government leaders in the communication process, and whether the success of renewable energy projects can be influenced by the support of political leaders, both at a local level by Mayors, and at an international level by programmes such as the annual U.N. Framework Convention on Climate Change talks (UNFCCC, 2016).

Therefore, the core question for this study is:

*What is the role of communication in promoting green energy in the King Cetshwayo District?*

#### **1.4. OBJECTIVES OF THE STUDY**

The study objectives were as follows:

- To determine how communication can be used to promote green initiatives more effectively.
- To determine how to introduce green initiatives to contribute towards community development through the use of communication tools such as testimonials from previous beneficiaries of similar projects.
- To determine how to inform the community of projects that will contribute to green living and have the potential for economic benefit.
- To determine whether the success of renewable energy projects can be influenced by the communication, using the statements made by political leaders, such as Mayors and international climate change programmes.

#### **1.5. INTENDED CONTRIBUTION TO THE BODY OF KNOWLEDGE**

It is anticipated that the study will enable the Municipality and the community to help improve their communication with each other, by creating an opportunity for learning and economic growth. This study will assist the Department of Communication Science by contributing to research work and teaching material. It will bridge the gap in knowledge about the efficacy of biogas technology in reducing our carbon footprint,



whilst resolve the electricity deficiency in the rural areas of the district. It will further contribute to the study of communications as a means of breaking the language and literacy barriers in the green economy.

## **1.6. RESEARCH METHODOLOGY**

Quantitative research methods have been used in this study. The study also features an analysis of current case studies and reports from various stakeholders who have initiated the concept of green activities, such as biogas production, as well as those who have never been introduced to the concept. The research methodology is outlined in detail in chapter 4.

## **1.7. DEMARCATION AND LIMITATIONS OF STUDY**

The language barrier is crucial to the study, as the majority of people living in rural and peri-urban areas in the district speak isiZulu. A Zulu-speaking translator was utilised when administering the questionnaire. The study was based in a rural community where water and sanitation facilities are not available. This study can be utilised to inform and educate other areas of the country where similar living conditions exist.

## **1.8. ETHICAL REQUIREMENTS**

It is important to consider the human element when conducting research, as people are often distrustful of being asked questions and may be sceptical of the researcher's motives. It is, therefore, important to have documentation confirming the authenticity of the research, such as a letter explaining the purpose of the questionnaire, preferably on the letterhead of the commissioning authority, such as the University of Zululand. This must also be accompanied by a letter of consent (see Appendix A) that respondents should sign, indicating their willingness to answer the questions and that they fully understand the reason for the research. The competence of the respondent must also be considered, as the subject of environmental sustainability and green energy is not commonly understood.

## **1.9. CHAPTER OUTLINE**

These following chapters make up the structure of the thesis:

**Chapter Two:** Literature Review. In this chapter, the researcher discusses the background to the development of environmental protection efforts and programmes.

This chapter is sub-divided into three parts, as follows:

2.1. An international perspective on renewable energy: This section examines the impact of climate change on the world, and the action taken by the international community in response to the effects of global warming.

2.2. National overview - South Africa: The study analyses the progress made in South Africa to promote renewable energy.

2.3. Local overview – King Cetshwayo District Municipality: This section takes a close look at the various strategies and programmes initiated within the King Cetshwayo District to respond to the energy needs of rural communities.

**Chapter Three:** Conceptual Model: This chapter discusses the communication theories used to bring into focus greater awareness and information around the concept of green economies. The selected theories will assist in evaluating the role of communication in the research, as they give credibility to the argument that human beings can be made to think a certain way based on how you communicate the message or based on their particular needs at a certain point in their lives. By using more than one theory the researcher is able to ensure that the message reaches all members of the target population based on their individual and complex situations and experiences.

**Chapter Four:** Research Methodology and Research Instrument: This chapter delves into the techniques used to gather research in the study and an explanation of the methods that are most suitable to attain the objectives of the study. The study sample and research instrument are also discussed in greater detail, with an emphasis on the sampling procedure and the influence of the target audience on the choice of instrument and language. This chapter also outlines the data analysis process and discusses the research instrument in greater detail, with a breakdown of the questions asked in the questionnaire.

**Chapter Five:** In this chapter, the researcher presents the study outcomes. The various responses by participants in the study are consolidated and presented through the use

of graphs, tables and charts. The MoonStats statistical programme is used to analyse the responses elicited through the research instrument. The findings are also summarised in written words to clarify the statistics further. The researcher also accounts a statistical analysis of the data.

**Chapter Six:** This chapter highlights the recommendations and conclusions of the study. The researcher gives commentary on the implications of the results in terms of the study objectives. The researcher thereafter presents recommendations based on the analysis of the data, with emphasis on the communication implications of such data.

## **1.10. CONCLUSION**

This chapter provided a broad outline of the research. The ensuing chapter is the Literature Review, wherein the relevant literature is reviewed to create a better understanding of the concepts of green initiatives, sustainability and renewable energy. More importantly, the literature review also examines the role of communication in the various initiatives undertaken across the world and within South Africa. The research shows the varied attempts by both developing and developed nations, to find clean energy sources and provide income-generating activities for both businesses and rural areas.

## *Chapter 2*

### **LITERATURE REVIEW**

#### **2.1. INTRODUCTION**

Having introduced in the preceding chapter the reasons why renewable energy is a reliable and sustainable solution to the environmental problems facing the world at present, an overview of the study is now presented. The information sourced and presented in the Literature Review is aligned to the study objectives, which aim to determine the effectiveness of communication initiatives in the promotion of green economies.

In the chapters to follow, the study analyses the progress made in South Africa to promote sustainable energy programmes and the plans for the future. The research also examines in greater detail the worldview on climate change and how this has impacted on the need for clean energy sources in various countries across the globe. Ultimately the study objectives of examining the role of communication and the motivation by the political leadership in the process of going green, (Busch and McCormick, 2014), is a critical focus of the chapter.

The research compares currently available data on the growth of renewable energy projects in the country and internationally, with a view to determining the role of communication in promoting its growth.

The literature review comprises three parts, which each highlight the international perspective, national (South African) view and the local (King Cetshwayo District) outlook of the effectiveness of green energy on the respective sectors.

## **2.2. INTERNATIONAL PERSPECTIVE ON RENEWABLE ENERGY**

In the 1990's the world began to seriously consider the dangers of burning fossil fuels and its impact on the environment. Fossil fuels are not renewable; they draw on finite resources that will have a limited lifespan (Resnick, 1994). According to Resnick (1994) research conducted by Hawaii National Laboratory found that fossil fuels became too costly to access, and it became apparent that their continued use would cause irreparable harm to the environment. On the other hand, renewable energy resources such as the wind and solar energy were infinite and could be used forever.

Living in a highly urbanised society that is fast growing in terms of population, we see the constant expansion of the built environment (Turcu, Rydin and Pilkey, 2014) which in turn puts a strain on the existing energy resources of the earth. Turcu, Rydin and Pilkey (2014) found that about 40% of the world's energy goes into the maintenance and operations of buildings. The energy use referred to includes construction of buildings, maintenance (lighting and air conditioning) and also for demolishing buildings. They claim that our hunger for energy poses the following challenges:

- We need to mitigate the environmental risks of using fossil fuels;
- The world faces a security threat caused by our need to use energy; and
- The rising costs of fuel should not contribute to poverty.

An alternate use for methane gas is another factor that could contribute to the appeal for biogas technology. Methane gas emitted from cows and other grass-consuming livestock is a much higher contributor to global warming than anticipated, according to scientific data released by the UN's Intergovernmental Panel for Climate Change (Hood, 2017). According to the research findings, it is estimated that the global methane emissions from livestock were 11 percent higher than previously estimated. Hood (2017) reports in the Daily Maverick that methane emissions, in general, have risen tenfold in the past ten years. The main sources of the gas (which has no odour or colour), are natural (wetlands and peat land) and that which is leaked during the transport of coal and natural gas. A further contribution towards emission levels is flatulence by grass-eating livestock and the decomposition of landfill waste (Hood, 2017). According to Hood (2017), methane gas is a strong greenhouse gas that is more powerful than CO<sub>2</sub> in terms of its effects on the ozone layer, however, it is much more easily dispersed into the air.

The redirection of methane for positive uses is a solution that forms part of this research study. The city of Oslo in Norway has viewed the freely available methane gas as a power source for its public transport network (Shufflebotham, 2009). The progressive city has turned the problem of disposing of its raw sewage waste into an advantage, by investigating the possibility of powering its bus transport system with biomethane gas. According to the Guardian (Shufflebotham, 2009), the city began the process of trapping and converting its biomethane in 2009 as a means of saving costs on fossil fuels while also being carbon efficient. Shufflebotham (2009) reports that Oslo has sewage

treatment plants which produce sufficient methane to power about 80 buses, however, there are plans to increase this number should the plan succeed.

### **2.2.1.      *Successful renewable energy projects influenced by communication***

Many countries have implemented policy changes and introduced economic activities directed towards a change in attitude by their citizens. The actions of the respective governments have communicated their commitments to conservation, and consequently, influenced the citizens to adopt a more enthusiastic approach to renewable energy.

One country that has promoted the policy of renewable energy to great effect is China (Lewis, 2014). China's policies include incentives where domestic technologies and industries are developed. As the world looks for new and improved ways to deal with the challenges of climate change and environmental degradation, the concerns over the sustainability of our energy resources have led many governments to implement policies to promote renewable energy (Lewis, 2014.) This will require greater collaboration and trade internationally, as more and more countries aim to remain competitive yet clean in their energy use. The amendment of national policy has helped these governments to promote the cause for energy conservation, as businesses are more likely to improve their emission controls when faced with either the negative implication of law enforcement penalties, or the positive implication of receiving government incentives for reducing their carbon emissions.



It is abundantly clear that there is a need, as well as a national imperative, to develop the green economy both from a socio-economic and an environmental perspective. According to ITUC (2012, p3), a green economy is “an economy where investment in sustainable production and in cleaner technologies is shaped by key principles of social justice, social protection and decent work” (ITUC, 2012). In developing countries, the need for decent work is as important as the quest for sustainability, as you cannot reasonably expect people to conform to environmentally correct principles when they are hungry and in need of an income. Thus initiatives like the National Biomass Cookstoves Initiative in India (Gupta and Purohit, 2013) have been welcomed for their joint benefits of providing clean, efficient and cheap energy through the installation of biomass cookstoves.

A 2013 investigation in Kenya showed that it was possible for a biogas reactor fed with pig manure to produce biogas for cooking and also could be connected to a water pump if sufficient gas could be produced (Arntzen, 2013). Indonesia has also recognised that anaerobic digestion systems can feed the high fuel demands of its rural households (Usack *et al.*, 2014). The Indonesian government has sponsored these low-cost systems in households where cows were available, making use of the animal waste to generate methane to power cooking stoves. Indonesia is a largely rural country, with the majority of its people living in remote villages without access to traditional electricity systems. Rural villagers were utilising woody biomass (Usack *et al.*, 2014) to cook and provide heat.

The biomass projects discussed above have contributed towards both economic development and safer living conditions for the citizens of the respective countries. This leads one to deduce that the actions of political leaders and the introduction of government programmes send a message to communities that a change of behaviour is necessary. The objectives of communicating the benefits of renewable energy to the public are easier to achieve when civil society takes action to influence government behaviour. Communities are sometimes spurred into action when they feel that the government is doing too little to protect their interests (Oosthuizen, 2016).

Recently researchers from a European non-profit organisation announced that the world can successfully convert to using 100% renewable energy within 30 years (Hanley, 2017). The scientists who presented the research, hailing from the German non-profit Energy Watch Group (EWG) and the Finland-based Lappeenranta University of Technology, claimed that by 2050 or sooner, the switch to renewable energy will not devastate the world economic markets, but rather, lead to the creation of 36 million more jobs across the globe (Hanley, 2017).

The report by Energy Watch Group President, Hans-Josep Fell, presented at the COP23 climate summit in Bonn, indicated that the complete eradication of emission-based power systems would be cheaper than the current energy systems powered by nuclear energy and fossil fuels. Hanley (2017) reported in the Clean Technica journal that the EWG presentation was well-received however the greatest obstacle to implementation was political leadership in taking forward the programme of utilising 100% renewable energy. The report indicated that civil society needed to mobilise against the use of fossil

fuels to break its hold on our economies and to demand that governments increase the pace of implementation, (Hanley 2017).

### ***2.2.2. Green initiatives that utilise communication tools***

In 2000 the United Nations initiated the Millennium Development Goals, eight goals which were aimed to have been achieved by 2015 (Regan, 2006:71). The interrelated goals are all contributors to the common aim of development. Goal seven was to “Ensure Environmental Sustainability,” (Regan, 2006:71). The aims of Goal seven were to encourage member nations to incorporate sustainable development principles into their national policies to counter the damage already inflicted on the environment, increase access to safe drinking water and improve the living conditions of those living in informal settlements (slums).

The Millennium Development Goals Report (2015) indicates that many of the aims have been achieved, whilst shortfalls still exist in others. By the end of 2015 the following achievements were celebrated (MDG Report, 2015):

- 98 percent of elements believed to have contributed to the depletion of the ozone layer has been eliminated and the ozone layer is anticipated to recover from the damage caused in the 1990's.
- About 147 countries have increased access to drinking water, 95 countries have met the target for sanitation and 77 countries have achieved success in both.

However, the post-MDG period (MDG Report, 2015) has shown that information is key to sustaining the momentum. The role of communication is critical at this juncture as we

analyse the information revolution and track the performance of those we hold accountable for saving the earth. According to the MDG report (2015), communication technologies provide for data collection and information distribution at an unparalleled level. With the growth of the internet, social media and cellular networks, we are now able to access data and statistics at the click of our fingers and are able to reach deep rural areas that were once inaccessible. With this type of accessibility to development issues, it has become easier to show the world that it is time for a change when it comes to energy supplies.

One of the major options available to those seeking change is the move towards renewable energy. Renewable energy is being courted as the 'clean' alternative to the current fuel production options, but it has not been developed to the point where it can take the place of conventional energy systems (Turcu *et al.*, 2014). Therefore, most developed countries are achieving success through a mix of renewable and conventional technology. When used in poorly ventilated homes the burning of wood results in air pollution, whilst also degrading the forestry ecosystem. The production of biogas from animal manure through the anaerobic digestion system provides safer, alternative fuel and heat. According to Usack, *et al.* (2014), developing countries such as Indonesia, India and China have made small-scale cheap anaerobic digesters available to rural households and they have become a reliable source of cooking fuel for poor villagers.

A study of household air pollution between biogas and firewood users by Maniraj *et al.* (2014) found that 75 percent of Nepalese households use biomass fuel for cooking. The burning of fuels results in the (mainly) women being exposed to pollutants within the

confined spaces of their households. Maniraj *et al.* (2014:58) investigated “the prevalence of airway obstruction” in cooks who had been using firewood or biogas for cooking for at least a decade. The authors studied the ventilation and other characteristics of the households and measured the lung function of the participants. It was found that biogas, being a ‘clean fuel’ posed a significantly lower chance of obstruction to the airways of the participants in the survey. The above study is a testimony of how the quality of life of Nepalese citizens has been enhanced due to the health benefits of clean fuels.

### **2.2.3. Contributing to green living**

The United Nations Environmental Programme (UNEP) (2012) believes that it is time for governments to play a role in promoting alternative sources of energy. The UNEP (2012) has stated that economies can be grown and stabilised through the use of alternative energy instead of continuing to utilise fossil fuels, which are unsustainable and a risk to the environment. Many organisations that promote sustainable energy believe that energy plays a critical role in sustainable development, and can have a significant impact on the lives of people, economic growth and reducing the global environmental footprint. “Efficient use of biomass in Africa can meet both cooking and electricity generation needs,” (Dasappa, 2011, p 211). The scenario put forward by such organisations is that people should focus on improving their energy output by making it more efficient to distribute.

The introduction of village schemes run by communities is also being advocated by environmentalists. Renewable energy activists have begun to experiment with the concept of community renewable energy schemes, and the idea is quickly gaining

ground in the United Kingdom (Catney *et al.*, 2014). The role of the community has been incorporated into UK policy discussions, leading to actions such as the 2002 Community Renewables Initiative, which provided financial backing to train rural communities in the development of community renewable energy projects. The concept of community energy schemes can be found in the 2003 Energy White Paper, as well as the Climate Change and Sustainable Energy Act of 2006. These policies aim to promote community energy projects (Catney *et al.*, 2014).

In Germany, many villages and communities are also producing their own energy, through the principle of a community-related energy supply (Wuste and Schmuck, 2012). Following energy supply challenges with nuclear and fossil fuels, a large number of communities have turned to renewable energy that is available locally, to feed their needs for electricity and heat. It is estimated that about 50 villages have embraced the bioenergy village concept (Wuste and Schmuck, 2012). Bioenergy Village is a concept that includes the members of the town in the planning, funding and implementation of the energy plan for the village. The energy plan involves converting from fossil fuels to biomass as the source of energy. A study conducted in the German village Juehnde by Wuste and Schmuck (2012), found that the village produced electricity and heat by burning biogas in a heat and power station, which created electrical power, which was thereafter converted to heat and distributed to households as hot water. The study also focused on the psychological consequences of the project and found that the project brought about a sense of belonging and increased the feeling of togetherness and wellbeing amongst the villagers (Wuste and Schmuck, 2012).

An important element of the study was the communication approach used to invite community involvement in the project (Wuste and Schmuck, 2012). It is interesting to note that the earlier the involvement of the inhabitants of the town, the greater the chance of the project succeeding. Early public participation and information sessions lead to an earlier acceptance of the project by the community (Wuste and Schmuck, 2012). A two-way communication process allows the community to learn about the project's development but also be willing participants in the implementation. The communication methods utilised include face-to-face interviews, personal conversations with leaders and sceptics, as well as village meetings. This created trust and transparency, which was integral to the success of the project. Aside from the opportunity to make use of the community's individual expertise and abilities, the early involvement of the villagers also allowed for a sharing of responsibilities and tasks.

Governments in the United Kingdom (UK) and Scotland have also gone a step further by turning attention to the community ownership of such projects, which includes sharing of the investment to the point where the project can be commercialised (Haggett and Aitken, 2015). This participation of civil society in the production of energy has changed the traditional landscape of a centralised energy market. The benefits for communities are obvious, as the interest of government eliminates the obstacles posed by a lack of experience and funding. Government participation provides access to start-up finance for communities, expertise from experienced market analysts and energy experts and the added benefit that government start-up projects are, in the majority of instances, handed back to the community with little or no expectation of shareholdings or repayment by the beneficiaries of the project (Haggett and Aitken, 2015).

#### **2.2.4.        *Renewable energy projects influenced by communication***

The road to green efficiency is paved with good intentions, and many countries have endeavoured to reduce their carbon footprints, burn fewer fossil fuels, and introduce resource preservation measures. They aim to balance the perceived advantages of economic growth compared with the risks to environmental quality. At the 2015 United Nations Framework Convention on Climate Change (UNFCCC) talks in Paris (Diringer, 2015), member nations agreed that there is a need to reduce carbon intensity, promote resource efficiency while at the same time lessening environmental degradation. The world was captivated by the concept of sustainability due to the high media interest in the UNFCCC (Lindeque, 2017) offering a communication overload of information on the need for the world to reduce its carbon emissions. The need to promote clean energy solutions and the successes of member countries in establishing green economies was brought to the fore during the Paris talks (Diringer, 2015), thereby achieving the objective of using communication to promote green initiatives effectively.

The Paris Accord has recently highlighted once again when US President Donald Trump shocked the environmental world by withdrawing his country from the conditions of the agreement. The Paris Agreement, which is commonly known as the Paris climate accord is an agreement that was formed at the culmination of the 21st Conference of Parties (COP 21) by 196-member countries of the United Nations Framework Convention on Climate Change (UNFCCC) on 12 December 2015 (UNFCCC, 2016). The agreement states that each signatory will regularly give feedback on its efforts to respond to the threats of global warming, which includes reducing the emission of greenhouse gases. The communication implications are extremely positive, as each country will be waited



upon for feedback on its reduction efforts. The Paris Accord was a positive step towards committing countries to setting transparent, achievable targets with timelines that would be monitored and reported on (UNFCCC, 2016). One of the main targets is to maintain the global temperature rise to below two degrees Celsius. The US President at that time, Barack Obama, stated that the agreement would not only “delay the consequences of climate change,” (UNFCCC, 2016) but would also provide a transparent record of the progress achieved by each country.

In an unexpected move in late May 2017, current US President, Donald Trump announced the decision to withdraw from the Paris Agreement, saying that the accord would negatively impact the economy of the United States, lead to job losses and place the country at a ‘disadvantage’ to other nations (Lindeque, 2017). South Africa’s International Relations Department issued a statement on 2 June 2017 voicing criticism of Trump’s decision, saying that his action would impact on South Africa as many of the conditions of the Paris Agreement had been a result of the negotiations that began in Durban, South Africa, during the COP17 conference in 2011 (Department of Environmental Affairs, 2017).

In response to Trump’s announcement, the leaders of Germany, Italy, Canada and China issued statements showing their disappointment (Lindeque, 2017), but re-committed themselves to move forward with speed to fight climate change and improve their own economies in line with clean growth plans. In contrast to Trump’s decision, one of the largest cities in the US, San Diego, has taken the bold step to move towards using 100 percent renewable sources of energy, following a vote by the San Diego City

Council immediately after the signing of the Paris Agreement (Richtel, 2015). The City has undertaken to make the transition complete and halve its emission of greenhouse gases by 2035. As part of the transition plan, San Diego is to start using electric vehicles in its fleet and to recycle 98 percent of the methane that emanates from its water and sewage treatment plants (Richtel, 2015).

The media backlash from Trump's statement (Lindeque, 2017) created a communication spin-off for proponents of climate change, as more attention was drawn to the topic. The role of political leaders in influencing renewable energy programmes was once again highlighted by the immediate opposition to his words, as countries such as Germany, Italy, Canada and China renewed their commitment to green economic policies.

The role of politics in the success of the energy projects is identified as crucial (Busch and McCormick, 2014). Political support, from the local council and the mayor, are deemed necessary for the sustainability of the project, and in cases where it has become the flagship project, it has made it easy for funding to be sourced and construction permissions to be authorised (Busch and McCormick, 2014). This theory has also assisted towards the success of the biogas project in the King Cetshwayo District Municipality, as it initially started off as a Mayoral project, and has been funded until now through government grants.

An investigation by Busch and McCormick (2014) on the decision-making processes of municipal Mayors and the impact of this on the success of the renewable energy policies, supports this theory. The research indicates that proponents of renewable

energy policies should show municipalities the benefits applicable to them, rather than warn them of their climate change obligations. The study (Busch and McCormick, 2014) shows that the success factor increased when the Mayors of the municipalities were convinced of the viability of the projects. This was increased where the impact of the project included what was good for the municipality as well.

### **2.3. NATIONAL OVERVIEW OF GREEN ENERGY: SOUTH AFRICA**

The spread of information through various channels of communication can influence the way the public views climate change and the need for sustainability. The objectives of the study are to analyse the role of political leadership, governments and community leaders in promoting the need for conservation of our energy resources. The literature reviewed in this sub-chapter analyses what the South African government is doing to combat the effects of climate change.

The national power utility, Eskom, recently announced its intention to raise electricity tariffs by 16 percent each year for the next five years. This proposed doubling of tariffs has not been well-received by the public. Critics have reprimanded Eskom (De Vos, 2015), saying that the proposed increases would hit small businesses and the poor particularly hard. The 50-kilowatt free electricity provision for indigent households is also considered too low to allow the use of an electric geyser or stove. This is one of the main reasons why many people continue to use paraffin heaters and cookers (De Vos, 2015). Eskom's former CEO Tshediso Matona mentioned that due to limited capacity the parastatal has sacrificed maintenance on the Eskom power plants to avoid further electricity cuts to consumers (De Vos, 2015).

As far back as 1957, the first commercial anaerobic digester was constructed in South Africa, by a former World War II British fighter pilot who settled in South Africa (ESI Africa, 2016). John Fry built the digester on his pig farm and produced biogas from pig manure. A year later he was able to generate electricity using the biogas to power his pumps. Almost 70 years later there about 300 bio-digesters in South Africa, and about 50 of these are commercial biogas plants producing more than 100 kilowatts of power. The Southern Africa Biogas Industry Association (SABIA) was formed in 2014 by a group of interested parties with a common need to be part of the development of biogas industries in South Africa (SABIA, 2014). SABIA members believe that biogas presents several opportunities for South Africa. The opportunities include:

- To increase the South African energy mix;
- The potential to increase the generation of electricity;
- It is sustainable and renewable;
- It can help to combat poverty;
- It can promote energy jobs; and
- It is easy to distribute and can be distributed to all parts of the country.

### **2.3.1.        *Renewable energy projects influenced by communication***

The role of political leaders in communicating the message is considered critical in the process of creating awareness, as the grassroots community trusts the government to a large extent.

In a parliamentary address during a debate on drought and climate change in November 2015, Environmental Affairs Minister, Edna Molewa said that national policy supported our efforts to reduce the emission of greenhouse gases (Molewa, 2015). She said that the Renewable Energy Independent Power Procurement Programme (REIPPP) had enabled the country to procure over 5000 megawatts of energy, and more than 6300 megawatts was planned for the following five years, allowing the country to generate clean energy. Other programmes aimed at energy efficiency include the reduction of CO<sub>2</sub> emissions in industries, which also reduces air pollution. Other green activities that the government is involved in include the transport sector, where rail was being prioritised over road travel, (Molewa, 2015) which also reduces the CO<sub>2</sub> emissions. The Minister added that 14 000 taxis were undergoing a transition to compressed natural gas to further reduce emissions.

South Africa has risen to the challenges of climate change by making bold political statements to influence public opinion towards energy conservation. The government has initiated policy changes such as increasing carbon tax, penalising those who contribute to waste management costs, and more positively, granting incentives to businesses that apply for renewable energy permits.

Following the hosting of the 2011 Conference of Parties (COP17) in Durban, KwaZulu-Natal, South Africa was well prepared to adapt to the Paris Agreement on climate change that was crafted at the 2015 COP 21 summit in France (Department of Environmental Affairs, 2017). Speaking to journalists at a press briefing during the Paris Conference, Minister of Environmental Affairs, Edna Molewa said the impacts of climate

change affected all citizens and could derail the technological advancements of the new democratic dispensation if we did not promptly respond to it. (Department of Environmental Affairs, 2017). Molewa warned that African countries had suffered the consequences of climate change and that their environments would deteriorate further if global efforts to reduce greenhouse gas emissions did not succeed (Department of Environmental Affairs, 2017).

Molewa said that worst affected sector would be agriculture, which would compromise food security. Climate change leads to the deterioration of arable land, making it arid and unsuitable for food production and thus leading to poverty and hunger for the farmers and women in particular, who are subsistence farmers and are relied upon to feed their families (Department of Environmental Affairs, 2017). She said that high temperatures also contribute to drought conditions and the country was already facing water security threats, which was dangerous for the economy of the country and the health of its citizens. In addition, global warming has also led to rising sea levels, which affects the coastal economy, as fish could die and there could also be coastal flooding.

In mitigation of these threats, the Minister said that the National Development Plan was a policy document that spelt out South Africa's proactive approach to sustainable development, with a National Strategy for Sustainable Development, a National Climate Change Response Policy and a Green Economy Strategy (Department of Environmental Affairs, 2017).

### ***2.3.2. Projects that will contribute to green living and have the potential for economic benefit***

Research by ESI: Africa Power Journal (2016) indicates that biogas has the potential to supply 2,500kW of grid electricity, which is equal to the output of Eskom's Mpumalanga coal-fired power station. There are currently a number of biogas plants operating successfully in South Africa. These include the Bio2Watt five-megawatt biogas plant in Bronkhorstspuit which powers the BMW auto plant. In addition, Clean Energy Africa's New Horizons and Anaegia companies have begun construction of three commercial plants as a starting point to building at least three per year going forward.

The City of Johannesburg has been successfully operating a biogas-to-energy plant at its Northern Wastewater Treatment Works (Odendaal, 2013) and there are plans to roll out biogas technology to its other wastewater plants where energy potential is high. The current biogas operation at the Diepsloot treatment plant is valued at R38-billion, and it fuels three engine-powered biogas generators, replacing 15percent or 1,2 megawatts a day. The plant uses 8,8 megawatts of energy daily. The biogas is produced from domestic waste collected from Alexandra, Sandton, Randburg, Bedfordview and parts of Edenvale and Germiston. The City of Johannesburg is also implementing similar projects to supply 60percent of the energy requirements at its remaining five wastewater treatment plants, which includes the Bushkoppie and Driefontein plants (Odendaal, 2013).

SABIA (Southern Africa Biogas Industry Association) President, Mark Tiepelt said in an interview with Engineering News Journal (Odendaal, 2013), that the renewable energy

sector could potentially create 1,9 million jobs for every megawatt produced. He predicted that the sector could generate R10 billion in income and create between five to ten times more jobs than other renewable energy projects.

### ***2.3.3. Using communication to promote green initiatives more effectively***

The research aimed to examine the manner in which those in positions of influence could communicate the economic potential of renewable energy to the communities in their areas of influence. Through the use of media, the local government and education sector has highlighted the socio-economic benefits of converting waste to energy. This has helped to change public perception and increased citizen awareness around the subject.

The eThekweni Metro municipality also operates a successful waste of energy project at its Buffelsdraai Landfill site in Durban (New Age, 2015). The project involves the conversion of landfill gasses into energy that in turn is fed into the city's electricity grid. City Manager Sibusiso Sithole told the New Age (2015) that the municipality has made "good progress in developing and implementing climate change mitigation and adaptation initiatives." He said the internationally recognised Buffelsdraai Waste to Energy Project was a "good example for embedding climate change consciousness within the existing operations of the municipality (The New Age: 2015, p7)".

The city of Pietermaritzburg in KwaZulu-Natal, South Africa has also embraced the concept of energy production. The municipal council has approved a proposal by an energy company to begin the installation of energy generation equipment that will



generate at least one megawatt of electricity at the city's landfill site (Regchand, 2016). The municipality has contracted the company to extract methane gas from the landfill site, which would, in turn, be converted into energy and fed to the Eskom grid. Regchand (2016) indicates that the municipality is attempting to manage harmful greenhouse gases through this project and aims to be a leading municipality in the country in terms of contributing towards the reduction in the emission of greenhouse gases.

#### ***2.3.4. Introducing green initiatives through the use of communication tools***

This research is also aimed at introducing green initiatives that contribute towards community development through the use of communication tools such as testimonials from beneficiaries. A research project undertaken at a rural school is one such project that contributes to the above objective. The National Research Foundation conducted a study aimed at discovering whether biogas technology could “provide a school with an acceptable, affordable, efficient and sustainable alternative energy resource, thereby providing opportunities for cost savings, income generation and greater opportunities for education,” (Sibisi, 2005, p45). The case study has proven to be one of the first successful large-scale biogas projects in rural KwaZulu-Natal. The project involves the construction and operation of a floating dome digester at the Myeka High School, situated in Maphephetheni Village (Sibisi, 2005).

Without access to grid electricity, Myeka High School had been sourcing power for its facilities through solar panels and LP gas. At the start of the study, the school received a donation of a floating dome biogas system, which is capable of being fuelled by human

excreta and cow dung. With the use of biogas energy, the school is able to provide power to its stoves and fridges, among other uses. The biogas is generated from human excreta which was supplied from pit toilets and later flush toilets, at the school, and the study involved a comprehensive study of the eating and defecation patterns of the learners in order to calculate the amount of energy that could be produced (Sibisi, 2005). The advantage of the study conducted by Sibisi (2005) was the opportunity to monitor and evaluate the project from inception to completion. The study also investigated the opportunities for income generation through the marketing of the biogas energy and found that this was possible if the right market and support was made available to the school. It was envisaged that the end product of the biogas generation process could be utilised as fertiliser to enable the establishment of a community garden to generate income through the sale of the green produce.

From a communication science perspective, it is interesting to note that several sessions had to be arranged to educate the learners on the value of the project, a survey had to be carried out to analyse the reluctance of learners to use the school toilets and to convince them of the benefits they would derive from participation in the project. The researcher found that “lack of involvement translated into lack of support,” and it was, therefore, necessary to inculcate communication methods to get them physically and emotionally invested in the project (Sibisi, 2005).

The need for greater awareness of biogas technology goes further than simply the changing perceptions of the end-users. It is also very crucial to bring attention to investors and international donors who may be willing to sponsor funds and

technological expertise to disadvantaged communities. Communication efforts should be focused on bringing attention to the electricity needs and poverty in rural South African communities.

The Limpopo Mpfuneko project (Chauke, 2011) which involves the processing of cow dung into biogas, is a recipient of donor support. The Gawula and Mahlathi villages outside Giyani in Limpopo established a thriving biogas project through Mpfuneko, which was in turn supported by the Netherland Wild Goose Dutch Development Organisation (Hlungwani, 2009). According to an article published in the Sowetan newspaper (2009), biogas is regarded as a healthy, reliable source of energy and as being environmentally-friendly, in the Netherlands. Mpfuneko received R500 000 in donations from various organisations in the Netherlands to construct a biogas digester that would serve 180 households in the village of Giyani (Hlungwani, 2009). It was hoped that the success of the project would draw sufficient attention to attract further support from the South African government, and in doing so, inspire world confidence in biogas technology, as one of the measures to counter the effects of global warming. (Hlungwani, 2009).

The Limpopo provincial government has since created more opportunities to roll out the project. In 2014, the Limpopo Department of Economic Development, Environment and Tourism formed a partnership with the University of Venda, the Vhembe Further Education and Training (FET) and several local non-governmental organisations to implement the Provincial Green Economy Plan (University of Venda, 2014). The Plan includes the establishment of a green economy centre of excellence, towards which the University of Venda committed R1-million, and the Department sponsored R237 000 for

the training of local bricklayers to construct a biogas digester (University of Venda, 2014). The biogas energy provides a power source for the kitchens where cooking lessons are held at the university, as well as the canteens and street lighting. The University was praised for its efforts and achievements in “intensifying the research, advocacy, training and technical support it had provided in the promotion of the green economy and sustainable development” (University of Venda, 2014, p1).

New Horizons Energy has kick-started a range of biofuel projects across the Western Cape, in partnership with a range of other companies like Afrox and Waste Mart (SAAEA, 2016). The first plant is the Athlone-based Afrox gas facility which is set to begin production of biogas in April 2017. Under the agreement, Afrox will distribute the methane or natural gas to customers in the form of either diesel or LP gas. According to a report in the South African Alternative Energy Association journal (SAAEA, 2016), bio-methane can replace existing fuels for the purpose of heat, food production or power generation. It is created by New Horizons through the heating up of organic waste. The fuel is clean burning and is beneficial to the environment, reducing the need for a large quantity of waste to be sent to the landfill and consequently for less toxic greenhouse gases being generated.

The City of Cape Town is also facing a problem where landfills are not sufficient, especially due to the growth of the city, therefore, the project is a win-win solution for the municipality and the company (Owen-Jones, 2017). The waste used for the production of methane is sourced mainly from residential waste and food outlets that generate a high quantity of organic food waste. Owen-Jones in Gasworld Journal

(Owen-Jones, 2017) writes that a total of 60percent of the project is boosted by financing from the government-funded IDC (Industrial Development Corporation). At the moment South Africa derives its natural gas from Mozambique but once the plant is operational there are plans to create additional plants across the country and improve the local supply of the methane (Owen-Jones, 2017).

The New Horizons project with Waste Mart is valued at R400-million and was opened in January 2017 (SAAEA, 2016). The biogas plant is based in Athlone and converts solid waste from the municipal landfill into gas. The economic benefit includes the creation of 80 jobs for the beneficiation of renewable energy that is clean and utilises almost all of the refuse collected from households in the region.

## Overview of biogas market in South Africa

### Changing regulatory framework

- South Africa's energy crisis & power outages in 2008.
- Raising electricity costs (Eskom application to NERSA - 12% per year over the next 5 years).
- South Africa ratified the Kyoto protocol and committed to reduce GHG emissions (34% reduction by 2020, 45% by 2030).
- Introduction of the carbon tax between 2015-2019 (~R12- R48/tonnes) /Carbon labelling for farmers produce in the European market.

### Increasing waste management costs (the National Environmental Management: Waste Act, 59 of 2008 act)

- Increasing gate fee/amending the definition of waste will fast-track the process.
- Waste Minimisation & Separation at Source (e.g. garden waste & waste tyres) Speculation that organics might be banned from landfill in the next 5 years /Abattoirs.

### Government incentives for renewable energy applicable to biogas projects

- Eskom Industrial Demand Side Management (IDM)/Standard Offer Programme (SOP) rebate programme (R10 mil/MW)
- Grants from the Department of Trade and Industry (DTI)'s Manufacturing Competitiveness Enhancement Programme (MCEP)
- Loans from the Industrial Development Corporation (IDC) Green Energy Efficiency Fund (GEEF, prime less 2%) in partnership with KfW

Figure 1 The Case for a Strong Biogas/Bioenergy Industry in SA. (Source: Munganga, 2013. Overview of biogas market in SA.)

## **2.4. LOCAL OVERVIEW OF GREEN ENERGY: KING CETSHWAYO DISTRICT MUNICIPALITY**

The King Cetshwayo District Municipality is one of many government organisations around the country who have pioneered the implementation of biomass energy programmes to enhance the living standards of its citizens (uThungulu, 2013) and it will not be the last. The green economy has been defined as an economic system that promotes better living standards and lifestyles for people, whilst also protecting the environment and reducing ecological degradation (The Guardian, 2011). It has been described as an economic development model rooted in the core values of sustainability and ecological protection (The Guardian, 2011).

Climate concerns have not left rural people unaffected, as changes to the environment affect their subsistence farming to a large extent. Global warming has aggravated the weather patterns, especially in regions prone to drought, and it is imperative that awareness of climate change is raised amongst our communities. (uThungulu, 2012a:10). The region's urban economic powerhouse, Richards Bay, is heavily dependent on the environment (processing driven industry) as a driver for economic growth. The area already faces severe environmental constraints, in terms of air and water pollution and a refocus on green development is needed to overcome these obstacles. Sound green economic principles will assist poor rural areas to grow in a sustainable manner.

In the face of a growing number of constraints on society, the economy and the environment, which can be evidenced by climate changes, famine, drought, extreme

weather conditions and the worldwide recession, King Cetshwayo District Municipality in KwaZulu-Natal has responded with the development of a district strategy titled: Local Economic Development Framework towards a Green Economy (uThungulu, 2012a). The strategy is designed to respond to the combined effects of socio-economic and environmental degradation by boosting economic and sustainable development. The strategy (uThungulu, 2012a) notes that the economy is interlinked with the biophysical surroundings.

Due to a lack of knowledge of the subject matter, the recipients of the project will need to be exposed to awareness programmes showing the benefits of the project to their quality of life and the economic benefits of producing their own gas. The role of the researcher will be foremost as that of a communicator, using case studies of successful projects in the neighbouring municipalities (uThungulu, 2013) to convince them that the project is feasible for their rural community. Face-to-face meetings and written communication in the form of testimonials from previous recipients will form part of the communication strategy to be implemented.

There are a large variety of green initiatives which can be used for the provision of water and electricity. Green initiatives can be identified as possible local economic development opportunities for rural dwellers and urban communities with high rates of unemployment. A green economy can be developed to create employment while also promoting economic benefits for the community without harming the environment or depleting valuable resources. The study is motivated by the need to bring about awareness through communication in the way people perceive the dangers of climate



change and simultaneously respond to the need for job creation in a society riddled with poverty and hunger. The changing weather patterns, which have caused unusually hot temperatures and a food crisis in many countries, and the high costs of energy production, have led many countries to look at green technology as a lifeline as environmental degradation and the declining resources of nature slowly make it difficult to live off the land's bounty. The King Cetshwayo District is no exception, and many people are living below the breadline and therefore unable to meet the high costs of food production and energy. If the people of the district can be educated about conservation and the use of sustainable practices to produce food and energy, then we will be able to change the way society treats the earth and makes use of its resources. We need to act global but think local.

Many rural communities in the King Cetshwayo District Municipality still do not have access to electricity and will have to wait for at least ten years before they could be served. For these communities, firewood is the main supply of energy. Collecting firewood is not an easy task for a variety of reasons, including environmental concerns (uThungulu, 2013). The King Cetshwayo District Municipality, therefore, initiated a pilot renewable energy project after visiting a biogas project in Limpopo, where the community is successfully utilising this alternative source of energy for cooking and lighting. King Cetshwayo District Municipality initially implemented the biogas project in two of its local municipalities, namely the uMlalazi Municipality and the Mthonjaneni Municipality. Six biogas units were installed in these two local municipalities as a pilot project (uThungulu, 2013).

According to a business proposal compiled to seek grant funding for the project (uThungulu, 2013), a standard biogas digester unit is constructed from cement and bricks. It consists of an inlet, a large dome (depending on the size selected) and an outlet. The dome on the inside is plastered and carefully sealed with a gas pipe outlet at the highest point. Cow dung is mixed with water (approximately 25 litres per day, depending on the size) and poured into the digester where gas is formed in the dome. After a while, it starts to produce methane, which goes through the gas pipe to a modified gas stove. The slurry is eventually pushed out by the gas as new cow dung is poured into the inlet every day. The municipality installed three biogas units in each local municipality for an overview of the project and this also entailed a transfer of skills by the service provider to the local people and municipal staff. In July 2016 the King Cetshwayo District Municipality was recognised by the Minister of Environmental Affairs for its successful implementation of the project. This recognition received attention in the regional media in the form of an article published in the Zululand Observer, (Cajee, 2016).

The municipality thereafter took it a step further in the deep rural area of Edakeni. King Cetshwayo Municipality took a decision to implement the construction of approximately 70 biogas digesters there, upon discovering that Eskom will only provide electricity in about seven to ten years' time. Edakeni has only 70 households, however, all are living in abject poverty and most are dependent on government grants. It is situated in the deep rural part of the uMlalazi Municipality, on the border of King Cetshwayo and iLembe districts, near the Tugela River. The area has no electricity but they have more than enough cattle in their kraal to feed the digester. An agricultural training programme was

established to encourage beneficiaries to also make use of the bio-slurry (i.e. digested cow dung that is a by-product of biogas production) as organic fertiliser to further increase household benefits.

The project is about service delivery and job creation through training and supporting entrepreneurs in renewable energy (RE) with a strong emphasis on biogas technology (uThungulu, 2013). After having completed the training, the biogas entrepreneurs will be assisted to start their own businesses. A renewable energy fund will be established to provide the biogas entrepreneurs with start-up capital and to ensure the technical and financial sustainability of the digesters (which supplies 70 households with biogas), funded by the Department of Cooperative Governance and Traditional Affairs (COGTA). According to the proposal, the aim of the project was to develop and implement a Village-Scale Biogas System. The system was developed to supply as many households in poor rural areas as possible with biogas. The core of the Village-Scale Biogas System is the construction of one or more large biogas digesters to which several households are connected by a simple pipeline system. The system is operated by a Small, Micro or Medium Enterprise (SMME) in return for a small monthly fee that is paid by the households. The proposal indicated that the use of biogas by a larger number of households improves the health of more people and results in a larger reduction in deforestation and CO<sub>2</sub>-emissions. The local people from around the identified sites have been given training in various fields related to biogas production, (uThungulu, 2013). The training focused on construction, operation and maintenance of the biogas systems as well as management of the projects, including financial management.

Based on experience in the pilot project, it is estimated that in each project in year one at least 25 people will be employed and in year two and three at least 65 people will be employed by the project. It is forecast that in subsequent years at least 20 people will be permanently employed as a direct result of the project, and that additional employment will be created as a result of spill-over effects in agriculture, fertiliser and other areas, and that the revenue from the project will be used to extend the project and create more permanent jobs. During this stage, small companies/cooperatives or closed corporations will be established. The identified people to run them will be trained. The Edakeni project was completed in early 2017 and 70 biogas digesters were constructed. The project also received attention in the media following the State of the District Address in 2015, where the Zululand Observer highlighted the district's response to the Eskom electricity supply challenges (Ramsamy, 2015).

#### ***2.4.1. Relevance to study objectives***

The review of the projects undertaken in the King Cetshwayo District Municipality indicates the achievement of all the study objectives:

- To utilise communication to promote green initiatives more effectively: The articles published in the Zululand Observer newspaper have created awareness of the King Cetshwayo District's contribution to renewable energy projects (Ramsamy, 2015) and recognised the success of the project in achieving its aims, (Cajee, 2016).
- To introduce green initiatives to contribute towards community development through the use of communication tools such as testimonials from previous

beneficiaries of similar projects: The success of the pilot biogas projects at Mthonjaneni and uMlalazi municipalities led to the implementation of the larger project at the rural Edakeni area. The positive reports from the first two projects enabled the provision of funding for the third project, which has the immense economic potential for the local community (uThungulu, 2013).

- To inform the community of projects that will contribute to green living and have the potential for economic benefit: The Integrated Development Plan and Annual Reports of the King Cetshwayo District Municipality detail the contribution the district has made towards the implementation of the green economy (uThungulu, 2012a and uThungulu 2012b).
- To determine whether the success of renewable energy projects can be influenced by the communication, using the statements made by political leaders, such as Mayors and international climate change programmes: The District Mayor has publicly voiced her support for the programme by petitioning the Department of Cooperative Governance to fund the biogas pilot programmes (uThungulu, 2013) and thereafter in her State of the District Address in 2015 (Ramsamy, 2015).

## 2.5. CONCLUSION

The Hindu term '*Swadeshi*', coined by Mahatma Gandhi, refers to self-sufficiency (Lawbuary, 2015), a state whereby India is called upon to supply itself with a dependable and sustained source of income using the local environment. In his dissertation titled: *Biogas Technology in India: More than Gandhi's dream* (2015), Jo Lawbuary draws a connection between the '*Swadeshi*' of Gandhi's time and the current energy crisis facing many of the world's over-populated nations, most notably India. Just like India, the world needs to view biogas technology as a government-initiated programme to combat poverty in rural areas and as a means of developing rural communities on a broader scale (Lawbuary, 2015). This can be replicated in South Africa, as this country shares many of the same characteristics as India, particularly in reference to the rural poverty and the inability of the rural poor to afford the high costs of conventional grid electricity. Just as Mahatma Gandhi's role as a community leader helped influence India's road to sustainability, those who hold positions of power in the King Cetshwayo District Municipality should encourage the promotion of renewable energy and sustainable economic activities amongst its population of citizens. The next chapter illuminates the conceptual framework which forms the basis of the research and gives insight into the research concepts that are utilised.

## *Chapter 3:*

### **CONCEPTUAL FRAMEWORK**

#### **3.1. INTRODUCTION**

The previous chapter gave insight into the progress made throughout the world in the field of renewable energy. This chapter will focus on the conceptual framework. The research concepts used in this study will be discussed in greater detail in this chapter. The variables involved in a particular study can be plotted together to form a coherent set of actions that will determine the method of research. This makes up the conceptual framework (Regoniel, 2015). According to Regoniel (2015), the conceptual framework helps to break down the variables which needed to be sought out during the research. Regoniel (2015) stated that it is imperative to use well-known and accepted theories to support the study's hypothesis and build up the reasons for the research.

#### **3.2. COMMUNICATION THEORIES**

This chapter investigates the use of communication theories to propagate the creation of green economies. The green economy is a fairly unknown subject for the average person, and many people living in small towns seem to believe they are unaffected by the effects of global warming and climate change. Communication efforts need to be focused on changing public perception of climate change and to introduce the concepts of conservation and sustainability to the population living in the King Cetshwayo region. The selected theories will assist in evaluating the role of communication in the research,

as they give credibility to the argument that human beings can be made to think a certain way based on how one communicates the message or based on their particular needs at a certain point in their lives. By using more than one theory the researcher is able to ensure that the message reaches all members of the target population based on their individual and complex situations and experiences.

The role of communication in the research will be the most important factor to be considered, as the research aims to create awareness around the subject matter and to introduce the concept of green energy to a community where the majority of the residents have low levels of education due to them living very far from schools and modern society. Communication is about giving, receiving, developing an understanding of data, information, and other output (Griffin, 2002). From the very start, communication was viewed as a process where the speaker builds an idea in the form of a message to be sent to the recipient to create the desired outcome. However, if the recipient does not understand the message due to 'noise', then the communication has failed. The Agenda-Setting theory (McCombs and Shaw, 1968) and the Social Exchange Theory (Sabatelli and Shehan, 1993) will be used to conceptualise this study. Maslow's Hierarchy of Needs (Maslow, 1943) will also be used to analyse the effects of the project.

The Agenda-Setting Theory (McCombs and Shaw, 1968) is concerned with understanding the importance of public ideology. Agenda-setting ascribes to the media being a powerful influence over the public, stating that the media has the ability to tell us what issues are important. The Agenda-Setting Theory states that mass media organisations determine what the general population considers newsworthy by deciding



how much attention a news story receives. The term 'salience transfer' is commonly used and refers to the ability of the media to transfer their agendas onto the public (McCombs and Shaw, 1968). Research conducted by McCombs and Shaw (1968) on presidential campaigns shows that the mass media exerts a significant influence on what voters consider to be major issues of the campaign. In the same vein, we can assume that those who exert influence on the media, e.g. a government-controlled media, can also influence opinion. If we accept the core assumptions of this theory that agenda-setting involves the role of news media in raising attention and leading the public to focus on certain selected issues, (McCombs and Shaw, 1968), then we can assume that political leaders and the media can be used to filter and shape opinion on the importance of creating a green economy.

The second theory which will be beneficial in promoting the cause of the green economy is the Social Exchange Theory. This theory takes up the position that the major force in interpersonal relationships is to satisfy the self-interest of both partners in the communication process (Fourie 2010). The Social Exchange Theory suggests that the communities who are encouraged to establish green economies and biogas facilities could be convinced of the benefits to be gained by both society and themselves, should they accept. Those communities who embrace the biogas project will see that the benefits to the environment are society's gain, whereas the individual will benefit from cheaper electricity, job opportunities and also profits for those who sell harvested energy.

The study also examines the link between acceptance of the renewable energy concept and Maslow's Hierarchy of Needs (Maslow, 1943). Abraham Harold Maslow, in his 1943 paper: A Theory of Human Motivation, states that each person has a different set of needs as they face different situations in life. "Human needs arrange themselves in hierarchies of pre-potency," (Maslow, 1943, p370). In stating this, he means that the more 'potent' or significant a need, the higher its importance will be on a person's list of priorities. Therefore, Maslow believes that a person will move higher on the ladder of priorities only after the priority (need) on the lower level of the ladder has been satisfied. In the Literature Review, the researcher discusses the National Biomass Cookstoves Initiative in India (Gupta and Purohit, 2013), which offers the benefits of clean, efficient and cheap energy through the installation of biomass cookstoves, which simultaneously gives the beneficiaries a means to prepare their meals. In the same way, the research further envisages how the needs of rural communities will influence their acceptance of renewable energy.

### **3.3. A CONCEPTUAL MODEL FOR ENTRENCHING GREEN ENERGY**

The Agenda-Setting Theory allows us to closely examine how the media as a communication channel can influence the success of renewable energy projects by using the statements of political leaders and promoting certain agenda's as perpetuated by the climate change programmes. The study indicates the effects of media attention on the 2015 United Nations Framework Convention on Climate Change (UNFCCC) talks in Paris (Diringer, 2015) and how member countries have rallied to voice their commitment to reducing the effects of global warming, in particular, the responses to

US President Donald Trump's withdrawal from the Paris Agreement (Lindeque, 2017). Shortly after Trump's announcement, South Africa issued a statement condemning his decision, which immediately created an opportunity for South Africa to dominate the media space. The media gave attention to climate change due to the fact that the subject had become controversial, which in turn created public interest in the subject. It is proposed that media campaigns be initiated by celebrities or well-known environmentalists who will keep the message alive through documentaries or competitions that offer incentives to those who contribute to energy saving.

In terms of the Social Exchange Theory, it is interesting to note the enthusiasm of residents in the King Cetshwayo District Municipality, where the poverty-stricken Edakeni community embraced the biogas project because of the benefits they will reap in the future (uThungulu, 2013). It is hoped that if the community is made aware of the economic benefits of renewable energy projects they may be more likely to embrace the concept. This can be done through the testimonials of residents who have successfully introduced biogas projects at their households and will be able to recount the progress they have made in creating energy from livestock waste. There will be a benefit for those who participate in the green projects, as they will not abandon the project as soon as the first profit (or reward) is attained. The theory suggests that those who accept the concept of a green economy will be more likely to sustain their participation as long as they are being rewarded.

The Social Exchange Theory suggests that the communities who are encouraged to establish green economies and biogas facilities could be convinced of the benefits to be

gained by both society and themselves should they accept. Those communities who embrace the biogas project will see that the benefits to the environment are society's gain, whereas the individual will benefit from cheaper electricity, job opportunities and also profits for those who sell harvested energy. When aligning the implications of Maslow's Hierarchy of Needs to the conceptual framework, the socio-economic status of the rural residents living in the King Cetshwayo District Municipality should be taken into consideration. Poor communities will embrace biogas programmes not because it offers a pollution-free alternative to burning firewood, but rather because cow dung is freely available for the production of methane gas, and because biogas can be bottled and sold as an income-generator for enterprising residents

### **3.3.1.        *Conceptual Model***

The following model conceptualises the link between the Agenda-Setting and Social Exchange Theories when provided with the correct communication tools and channels. Through the use of media, one can see the potential level of influence on the public when considering the main principles of the communication theories mentioned above. The model is adapted from the core ideologies of the Agenda-Setting and Social Exchange Theories, as well as the Hierarchy of Needs as expressed by Maslow (1943), with the objective of changing public perceptions about renewable energy through the use of media channels that target the needs and aspirations of the community.

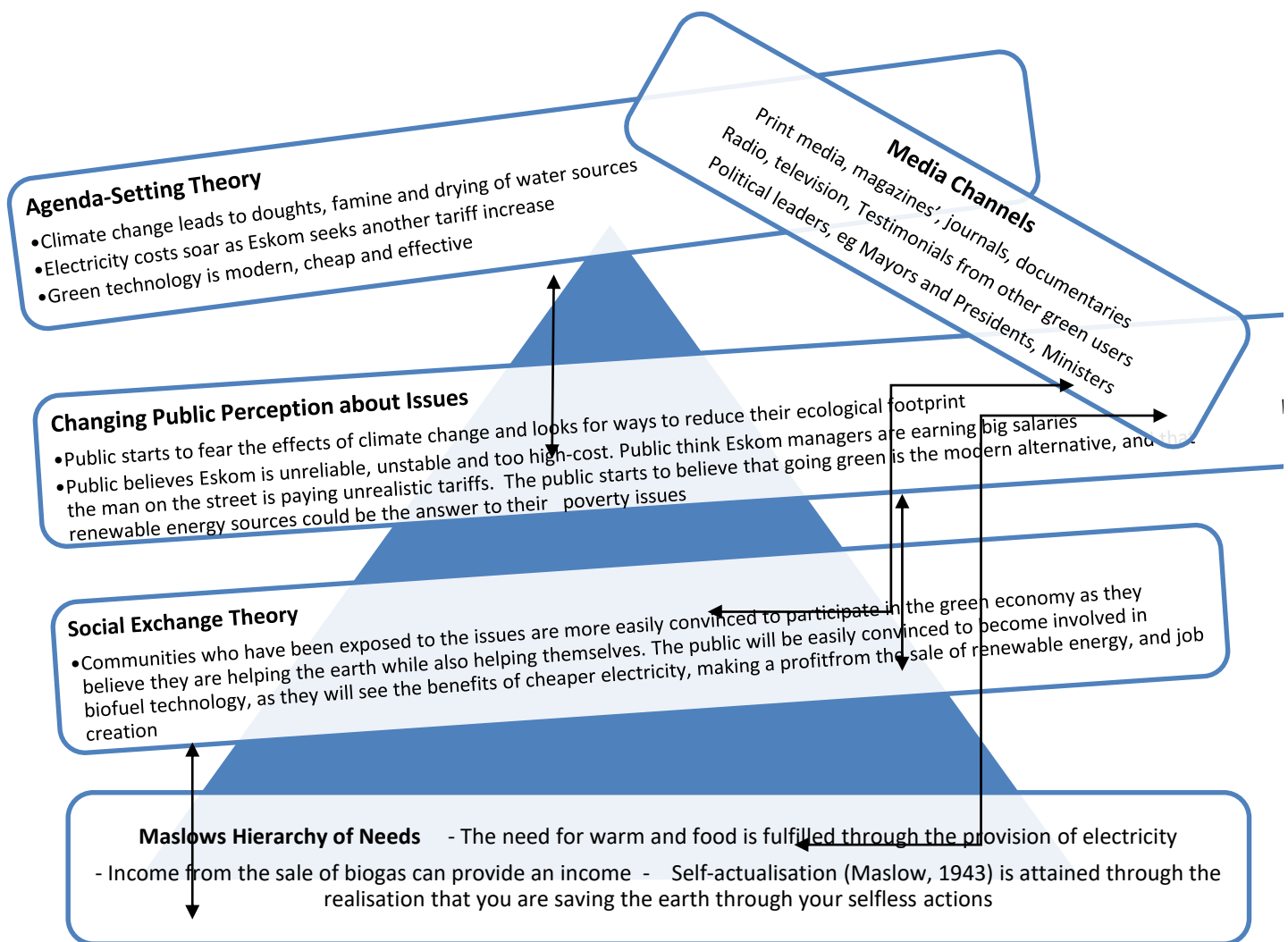


Figure 2 Conceptual Model Based On The Model Of Maslow's Hierarchy Of Needs (Maslow, 1943), Agenda-Setting Theory (McCombs And Shaw: 1968) And Model Of Social Exchange Theory (Sabatelli & Shehan: 1993)

The model above triangulates the two theories of communication (Agenda Setting theory and Social Exchange Theory) with the Hierarchy of Needs as expressed by Maslow (1943) and describes how the use of a variety of media channels could change the manner in which the public perceives renewable energy and the effects of climate change. Through an understanding of Maslow's Theory (1943) the model depicts that

the primary need for warmth and food is met through the provision of electricity. Through the use of media, the public is able to appreciate the economic benefits of green projects and eventually attain self-actualisation.

The attainment of self-actualisation (Maslow, 1943) is linked to the Social Exchange Theory (Sabatelli and Shehan, 1993), whereby the public is influenced to participate in the green economy when they realise that the economic potential of going green will also enable them to contribute to conservation and job creation. Through the use of documentaries, print media and speeches, the public is witness to a barrage of criticisms levelled at Eskom (De Vos, 2015), which is supported by progressive electricity increases each year. This form of agenda-setting using communication tools such as the media leads to changing public perceptions regarding the use of green energy.

### **3.5. CONCLUSION**

The green economy is a fairly new topic for the average person, and many people living in small towns seem to believe they are unaffected by the effects of global warming and climate change. Communication efforts need to be focused on changing public perception of climate change and to introduce the concepts of conservation and sustainability to the population living in the King Cetshwayo District. Conceptualising the communication theories helps one to develop the correct communication strategy for the promotion of clean energy practices.

The theories help to define the reasons for particular responses to questions contained the research instrument. They also assist in compiling the correct course of action in the implementation of the recommendations.

The next chapter summarises the research methodology and explains the methods used to collect data as part of the research process.

## *Chapter 4*

### **RESEARCH METHODOLOGY**

#### **4.1. INTRODUCTION**

The conceptual framework discussed in the previous chapter posed the challenge of ignorance of the environment among the communities of this district. It was deemed necessary that people be introduced to the concepts of renewable energy and sustainability, as a lack of knowledge was the greatest obstacle to communication. This chapter takes a closer look at the methods of research utilised in this study. The researcher delves into the techniques used to gather research in the study and provides an explanation of the methods that are most suitable to attain the objectives of the study.

The study sample and research instrument are also discussed in greater detail, with an emphasis on the sampling procedure and the influence of the target audience on the choice of instrument and language. The research focuses on the perceptions that the community has of conservation efforts and the level of importance that they ascribe to the state of the environment. The research findings lead to an understanding of the participant's knowledge of the subject matter, and the gaps in knowledge that need to be addressed.



## 4.2. RESEARCH DESIGN

Kirshenblatt-Gimblett (2006:234) refers to research design as the approach that one uses to assimilate the different components of the study in a rational and logical manner, to enable one to resolve the problem statement in the research. Kirshenblatt-Gimblett (2006:235) states that a research design constitutes the outline in which one would collect and interrogate data. The function of a research design is to ensure that the evidence obtained can be measured and analysed within clear parameters, with no risk of misinterpretation. In social sciences research, obtaining evidence relevant to the research problem generally entails specifying the type of evidence needed to test a theory, to evaluate a programme, or to accurately describe a phenomenon.

According to Creswell, (1994:24-229), the following types of research design can be used in data collection:

- Historical Research Design – This type of research uses data collected to establish whether a theory is true or false. Evidence that is collected is verified and can consist of primary and secondary sources. The political statements by the South African Ministers in the departments of Energy (Molewa, 2015), as well as the King Cetshwayo District Integrated Development Plans (uThungulu, 2012a) are examples of primary sources of information utilised in this study.
- Descriptive or Survey Research Design – This design attempts to give meaning to a theory by use of surveys – both written and verbal. The three biogas projects established by King Cetshwayo District Municipality permitted the researcher to observe at a close proximity the applications of the biogas projects and the

systems that were installed to accommodate the production process (uThungulu, 2013).

- Qualitative Research - Qualitative research is first-hand research that is not expressed numerically (Punch, 2000:4).
- Quantitative Research - Quantitative research refers to research that is quantified or proved by use of numbers or statistics. Most research studies make use of qualitative and quantitative designs.

A quantitative research method was used in this study. A self-administered questionnaire distributed to residents of rural and semi-urban areas in the King Cetshwayo District provided the basis for this type of research. As a means of understanding how this type of research impacts on the manner in which the study was conducted, quantitative research is summarised by Burns (2000) below:

#### ***4.2.1. Key Characteristics of Quantitative Research***

The defining characteristics of quantitative research: (Burns, 2000:6-7) include:

- Control: This allows the researcher to ask specific questions in an attempt to uncover a particular thought process without risk of misinterpretation. The use of experiments helps to isolate the reasons or circumstances around a particular phenomenon. The research instrument used in this study included closed-ended questions which helped eliminate ambiguity and provided a clearer understanding of the financial status of the respondents and their willingness to adapt to sustainable lifestyle practices.

- Operational Definition: This refers to terms used in the study. They must clearly identify the manner in which the data will be collected so that there is no deviation from the operational method of data collection.
- Replicable: This refers to the reliability of the data, in such a way that if the study is carried out again using the same method, the result will be the same.
- Hypothesis testing: When a theory is established and thereafter tested for validity.
- The above characteristics maintain the reliability of the data collection process and ensure the integrity of the research analysis. The population targeted in the data collection process should be confident that the results are indicative of the information shared through the questionnaire.

#### **4.3. THE TARGET POPULATION**

Welman, Kruger and Mitchell (2005:26-47) describe population as an element to be studied, comprising either different groups of people or even one person. The target can also be a company, corporation or a campaign or a set of circumstances. Leedy (1997:208-210), describes a population as a targeted group of people or things that share some element which the study is focusing on. The target population for this research are residents of the King Cetshwayo District, particularly those residing in the Richards Bay and surrounding areas, and of an employable age, that is, between the ages of 18-55 years.

#### **4.4. RESEARCH QUESTIONNAIRES**

Sudman and Bradburn (1973:208-228) describe a research questionnaire as a productive survey that is compiled with the aim of eliciting a cumulative response from participants in the research study. The questionnaire should pose questions that delve into the subject matter and lean towards a particular objective in terms of the type of data the researcher is seeking to elicit. The research instrument will lead towards enhancing the outcome of the study (Sudman and Bradburn,1973:208-228).

The design of a questionnaire will depend on whether the researcher is seeking qualitative information that will create an understanding of the research subject or quantitative data to compare data from a previous study. According to Sudman and Bradburn (1973:208-228), the following types of questionnaires are most commonly used:

- Exploratory questionnaires: These questionnaires explore the subject and give the participant an opportunity to share information through open-ended questions. These are used when there is no need to derive a quantitative response that will be statistically analysed.
- Formal standardised questionnaires: This type of questionnaire is used to elicit a response that will be analysed using a statistical model and where a hypothesis is being tested. In such cases a prescribed questionnaire is designed, allowing each participant to respond to the same model of answers, example Yes or No, or True and False. There is a standard format used so that the respondents do

not have to spend time composing an answer, and the responses can be decoded in a prescribed manner.

Fink and Arlene (2005:99) indicate that questionnaires can be given directly to respondents or mailed to them. The respondent is required to respond to the instructions and questions contained in the questionnaire. The questionnaire was self-administered and distributed in a hard copy format to the respondents.

According to Fink and Arlene (2005:108) the advantages of self-administered questionnaires are:

- Confidentiality is assured for the respondents and
- The hard copy questionnaires were able to be distributed to rural-based citizens who had no access to technology such as emails and faxes.

There are also disadvantages of self-administered questionnaires (Fink and Arlene (2005:108):

- The researcher may not be present when the respondents are answering the questionnaire, and therefore be unable to clarify matters that may be unclear and
- Respondents who cannot read or write may not be able to participate in the study.

#### **4.5. INSTRUCTION AND PERMISSION SECTION**

Section A and B assured respondents of the confidentiality of the questionnaire and confirmed that their private information would be treated as confidential. The data form

is evidence of the fact that authorisation was given for the researcher to utilise their responses as part of the data analysis process. The researcher thanked the respondents for their participation in the research.

**Section A:** deals with questions that establish the socio-economic and demographic status of the participant.

**Section B:** is broken down into five sub-sections that are aligned with the objectives of the research.

#### **4.6. OUTLINE OF THE QUESTIONNAIRE**

**Section A:** Questions 1 to 4: These questions elicit personal information from the respondents.

**Section B (A):** Question 5-8: These relate to how communication can be utilised to promote green initiatives more effectively.

**Section B (B):** Question 9-13: These questions are about the respondents' general perceptions about how green initiatives have brought about an improvement in economic growth.

**Section B (C):** Question 14-18: These questions seek to establish whether the respondents are aware of any green initiatives that may have contributed towards community development.

**Section B (D):** Question 19-25: The questions in this section help to determine if the respondents have knowledge of any projects that have the potential for economic benefit.

**Section B (E):** Question 26-28: The questions in this section aim to establish whether the respondents are interested in mitigating the dangers posed by climate change.

#### **4.7. SAMPLE OF THE STUDY**

Self-administered questionnaires were used in this study. The sample size was 384 respondents, however, a total of 500 questionnaires were circulated. In keeping with the sampling technique proposed by Du Plooy (2009), the first 384 unspoilt questionnaires were analysed for this study.

The sampling technique that was best suited to this research was simple random sampling to enable all members of the target community to be given an equal chance of selection. Simple random sampling provides an opportunity for the target sample group to be fairly selected (Welman *et al.*, 2005:59). A questionnaire was administered to residents from rural and peri-urban communities within the King Cetshwayo District, particularly those who are of employable age (18-55 years). Sampling is widely regarded as an objective method whereby a portion of the group is selected to signify the interests or opinion of the entire group so that the results can be generalised (Bertrand and Hughes, 2005:65). According to Du Plooy (2009:113), the sample that will be surveyed will represent the larger population.

The table below offers a 95% level of certainty that the correct sample quantity is being selected (Du Plooy, 2009).

<b>Population size</b>	<b>Sample size</b>
<b>Infinity</b>	384
<b>500 000</b>	384
<b>100 000</b>	384
<b>50 000</b>	381
<b>10 000</b>	370
<b>5 000</b>	357
<b>3 000</b>	341
<b>2 000</b>	322
<b>1 000</b>	278

**Table 1 Sample Size at 95 Per Cent Confidence Level, Source: Du Plooy (2009:113)**

#### **4.8. DATA ANALYSIS PROCESS**

As soon as all questionnaires were collected the researcher assigned numbers to each questionnaire. By doing this the researcher was able to detect any variables that may have been omitted and it allowed for corrections to be made to the dataset. The coding of each question was done in consultation with both supervisors. It was important to insert numeric codes into each question that was used in the research instrument (Kothari, 2004:124).

The responses from the respondents were codified numerically as illustrated in Table 2.

<b>Salary/Wage</b>	<b>1</b>	<b>Social grant/pension</b>	<b>2</b>	<b>No income</b>	<b>3</b>	<b>I do not want to answer this question</b>	<b>4</b>
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**Table 2 Numeric Coding of Responses (Source: Researcher)**



Data was captured using the MoonStats (2002) statistical programme, and thereafter the generation of tables and graphs was done. Pre-coding of the data helped to evaluate the data using the statistical package offered by MoonStats (2002). Following the recommendations of du Plooy (2009:195) the pre-coding was done when the questionnaire was compiled and prior to distribution to the respondents.

#### **4.9. RELIABILITY OF THE DATA**

During the analysis of the questionnaire, the numeric codes were entered into the statistical programme. This helped to ensure the trustworthiness and reliability of the data. The questions were closed-ended and exhaustive, thereby leaving less room for error (du Plooy, 2009:133). Joppe (2000:1) defines reliability as: “The extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable.” The citation refers to the extent to which the results could be replicated. The instrument utilised in this research, which is the questionnaire, was unchanged for all respondents and the data analysis was the same for all responses. The stability of the instrument was critical to the reliability of the data.

#### **4.10. CROSS TABULATION**

DeFranzo (2012) indicates that when conducting an analysis of a survey, cross tabulations (also known as cross-tabs) are used frequently in quantitative research to examine the link between two or more variables in the study. Through cross tabulation

the researcher can compare the results of one variable against that of another (DeFranzo, 2102) using simple data tables. It offers a means of analysis that breaks down the relationship between variables in a simplified format that may not be easily recognizable when looking at a survey result in totality. The analysis conducted in the cross tabulation aims to show a correlation between the role of the municipality in promoting green energy and its actions in encouraging conservation. This is linked to the objective of how communication can assist in the promotion of green practices. The cross tabulation is depicted in the next chapter.

#### **4.11. CONCLUSION**

This chapter detailed the methodology used to conduct research on the subject matter. A questionnaire was administered to residents from rural and peri-urban communities within the King Cetshwayo District, particularly those who are of employable age (18-55 years). Data were analysed using the statistical programme MoonStats and the Microsoft Excel programme. The research aims to analyse the feasibility of green initiatives as a source of job creation and local economic development and the questions in the research instrument are aimed at eliciting responses that will aid this feasibility study. In the next chapter, the researcher presents a graphical and tabulated analysis of the responses and its correlation to the study objectives.

## *CHAPTER 5*

### **DATA PRESENTATION AND FINDINGS**

#### **5.1. INTRODUCTION**

The research methods and data analysis process discussed in the previous chapter indicated the process of collecting the data and the sampling technique utilised. This chapter draws an interpretation of the data collected and attempts to give meaning to the results. The results are summarised in terms of the study objectives. The chapter also gives emphasis to the communication implications of such data.

Data Analysis is a method of utilising statistics and logic to summarise and interpret data that has been gathered. According to Shamoo and Resnik (2003:40), the conclusions drawn from the published research data should be consistent with the data.” The purpose of this study is to analyse the role of communication in promoting green energy in the King Cetshwayo District. The data was captured and analysed using MoonStats (2002).

#### **5.2. ANALYSIS OF THE DATA**

There were 384 questionnaires analysed, which makes up 100 percent of the respondents.

The following table (**Table 3**) indicates a response to the statement: “Green activists are making a fuss about pollution and damage to the environment to give them a sense of importance.”

Response	Frequency	Percentage
<b>Yes</b>	96	33.80
<b>No</b>	122	42.96
<b>Not sure</b>	66	23.24
Total	<b>284</b>	<b>100.00</b>

**Table 3. Green Activists**

A larger proportion of respondents (43%) agreed that green activists were not over-emphasising the severity of the effects of climate change. About 34 percent felt that activists were making a fuss over nothing serious. This statement was one of the most significant in the questionnaire and was placed there to signify either the level of scepticism or in contrast, the trust that the public places in the threats of global warming and environmental degradation. It is therefore noteworthy that the community is to a large degree, considerate of the concerns posed by environmental activists.

**Figure 3 (below) displays:** Distribution of the respondents' age

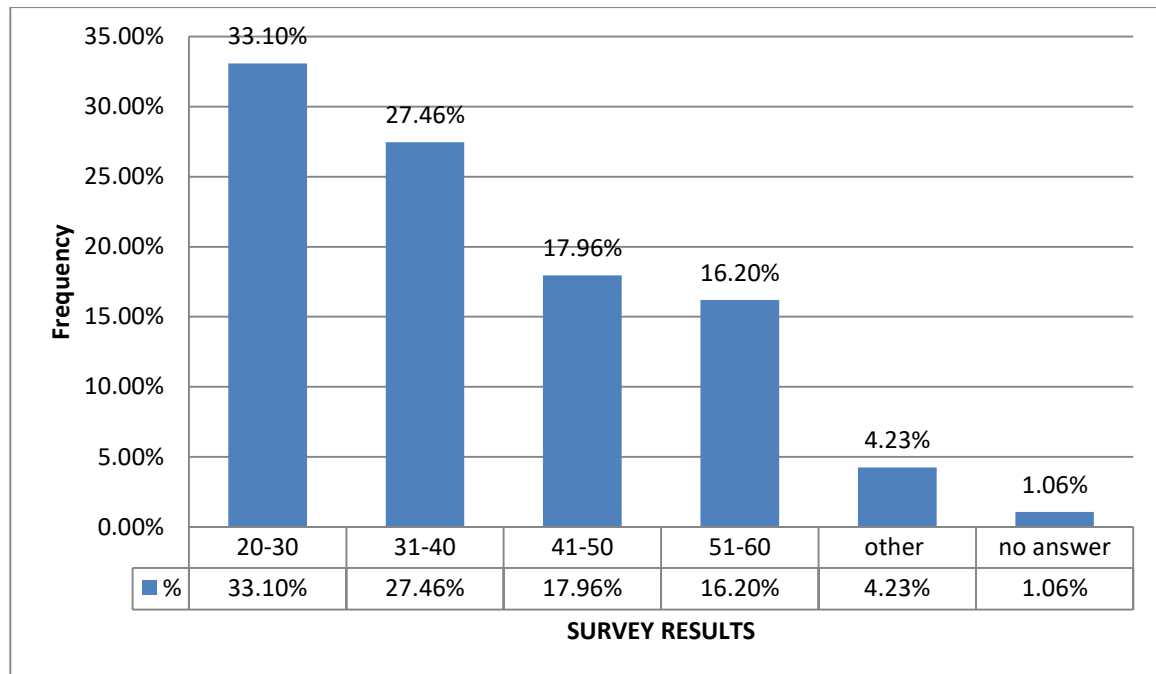


Figure 3: Respondents' age

The highest proportion of respondents was in the 20 to 30-year age group, which made up 33 percent of the respondent population, or 94 out of the sample of 284 people. The second highest age group was 31-40 years, making up 27 percent (78 respondents). Of the remaining respondents, 18 percent (51 respondents) were between 41-50 years old, 46 people (16 percent) were between 51-60 years old and just over 5 percent (15 respondents) did not specify their age.

**Figure 4** displays the distribution of respondents according to their **employment profile**.

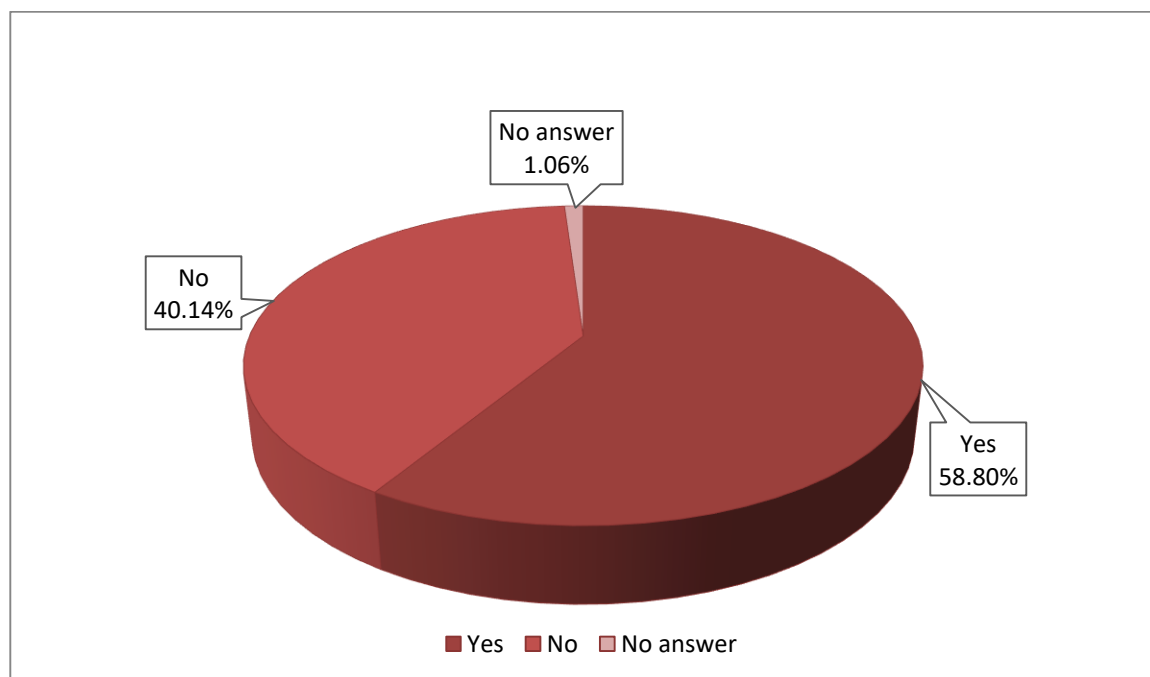


Figure 4: Employment profile

The analysis shows that just under 59 percent of the respondents are employed, which is 167 out of 284. While three respondents did not specify their employment status, the research shows that about 114 respondents (40%) do not have a job. The high unemployment rate indicates that the level of poverty in the region is also high.

**Figure 5** displays the distribution of respondents according to their **years of employment**.

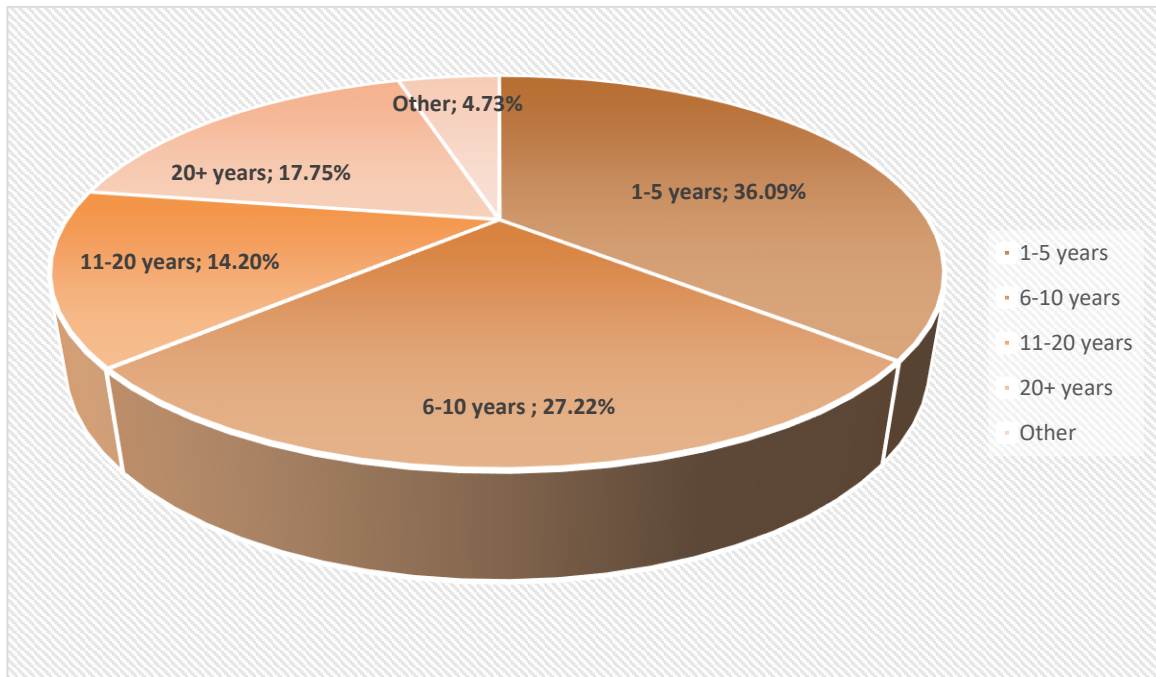


Figure 5: Years of employment

The chart above indicates the years of employment of the respondents who are employed. Just over 36 percent have been working for between one-five years, 27 percent for six-ten years, 14 percent for 11-20 years, 18 percent for over 20 years and just under 5 percent did not specify the years of employment.

Figure 6 shows the response to the question: “What is your primary form of income?”

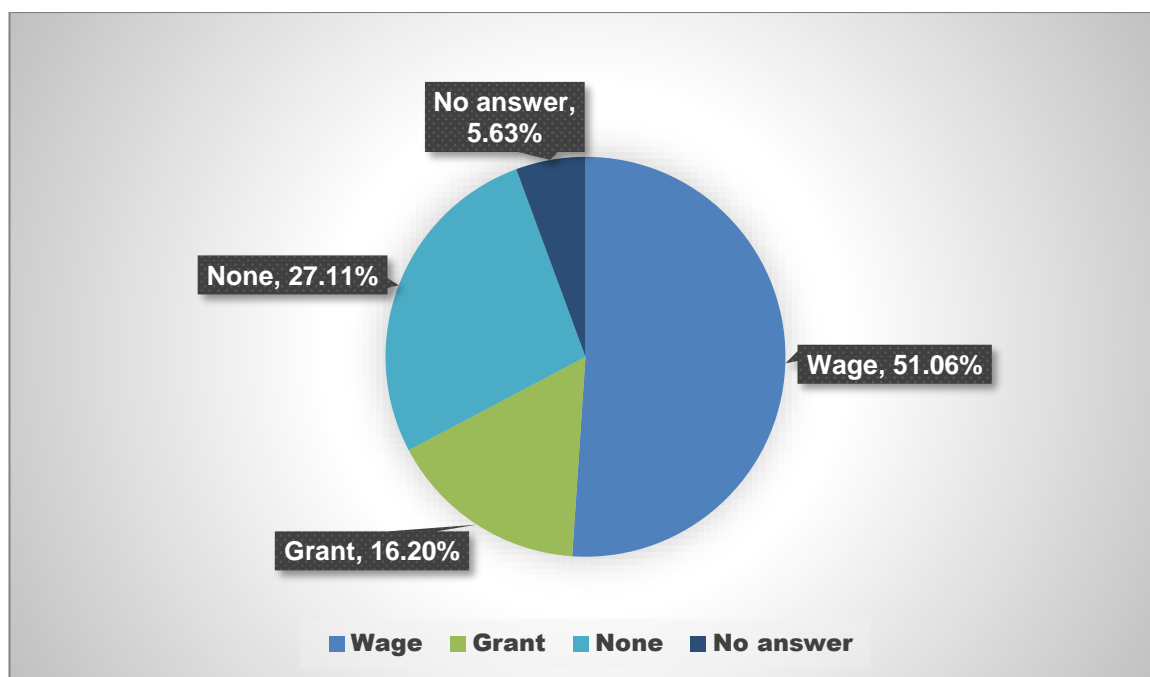

















Figure 6: Primary form of income

The chart above shows that 51 percent of the respondents (145 out of 284 people) receive a salary or wage, while 27 percent receive no income at all (77 people), 16 percent receive a grant or pension and about six percent (16 people) did not wish to answer this question. This chart indicates that about 43% of the respondents are not receiving an income from regular employment. These are the members of the community who may benefit the most from economic projects in their communities.



**Table 4** shows a response to the question: “I believe that most people understand the concept of renewable energy.”

Response	Frequency	Percentage
		
 Agree	 102	 35.92
 Disagree	 157	 55.28
 Not sure	 25	 8.80
 Total	 284	 100.00

**Table 4: Renewable energy**

A large number of respondents (55%) indicated that they disagreed that most people understood the meaning of renewable energy. About 35 percent agreed with the statement and a small number (8%) were not sure. This indicates that most people are not convinced that the general community is aware of the concept of renewable energy. The consequence is that most people are not aware that energy can be created from their own surroundings without harming the environment.

Figure 7 displays the distribution of respondents who believe that most people understand the meaning of the word sustainability.

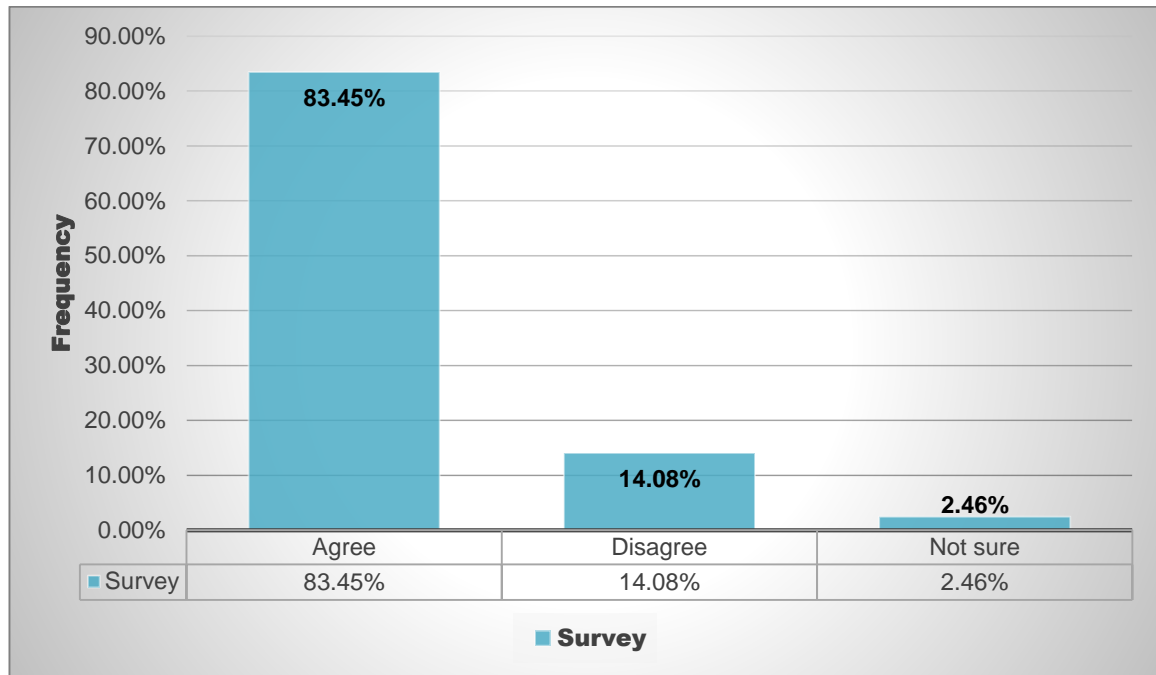


Figure 7: Understanding sustainability

A large number of respondents (83%) indicated that they agreed that most people understood the meaning of sustainability. The remaining proportion was divided into 14 percent who disagreed and two percent who were not sure. This indicates that people have a global acknowledgement of the concept of sustainability. The question that arises is whether this sense of understanding has an impact on the community's response to the threats to the environment.

Figure 8 shows a response to the statement: “I don’t think that we need to worry about pollution. Nature has a way of replenishing itself.”

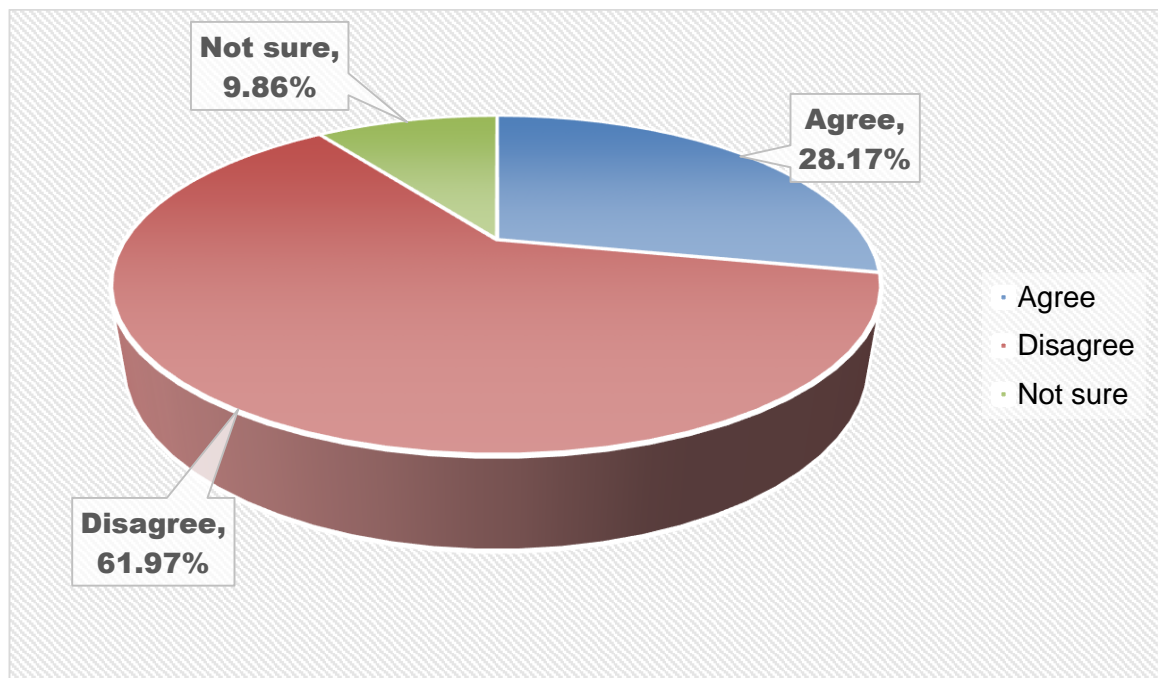


Figure 8: Pollution

The majority of respondents (62%) disagreed with the statement, however, at least 28 percent agreed with the statement. This does, however, reinforce the views in the previous figure, in that it shows that a sizeable portion of the community is worried about the dangers of pollution. This is a step in the right direction in the battle to save the earth from environmental degradation. When society develops a conscience regarding the destruction of the environment, it is a step in the right direction.

The following figure (**Figure 9**) shows a response to the statement: “**Pollution is a major problem** which requires government intervention.”

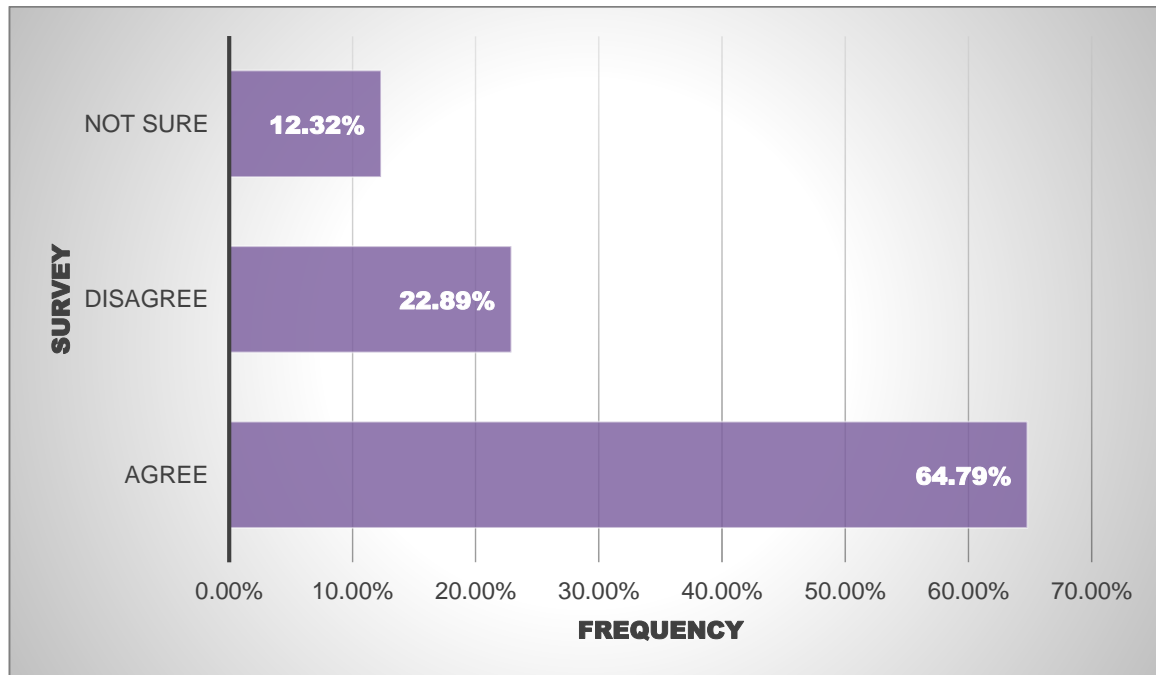


Figure 9: Government intervention

The majority of respondents (64.79%) agreed with the statement, with a minority of 22.89% disagreeing that pollution poses a major problem. The data indicate that pollution is considered to be a serious challenge to the respondents and that the community does view pollution as a threat to the future of Planet Earth. A comparison of responses to other questions in the questionnaire leads to the deduction that the community is aware of global warming and climate change and does believe that this can be caused by pollution.

**Figure 10** Indicates a response to the statement: “**Many jobs will be created** for many people if we begin renewable energy programmes.”

Response	Frequency	Percentage
True	185	65.14
False	61	21.48
Not sure	38	13.38
<b>Total</b>	<b>284</b>	<b>100.00</b>

Figure 10: Many jobs will be created

The majority of respondents (65%) believed that the statement is true. This means that more people are confident of the job opportunities that will become available if we start focusing on eradicating the effects of global warming. The unemployed section of the community is often keen to try new programmes that may lead to job creation and this enthusiasm can be exploited to initiate renewable energy projects in the areas where poverty is at its worst.

The following pie chart (**Figure 11**) indicates a response to the statement: “**Very few jobs** will be created if we attempt to create our own renewable energy.”

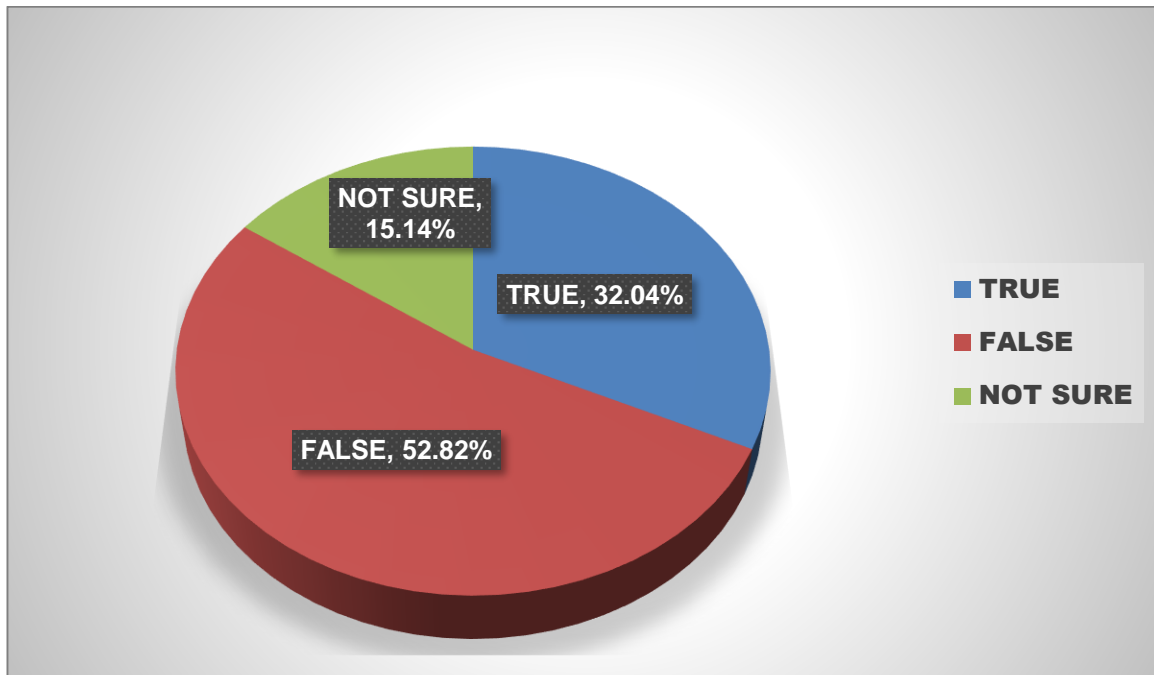


Figure 11: Employment shortages

Just over 50 percent of respondents (52, 82 %) indicated that the statement is false. This indicates that a fair number of people have been exposed to energy recycling businesses. The consequence of this is that people are confident that energy recycling is a viable career choice. Recycling is not well-supported by local government in the province, and in the King Cetshwayo District, there are no incentives for recycling. Communities, therefore, dispose of plastic and other non-degradable items with very little regard for the environment.

The following figure (**Figure 12**) Indicates a response to the statement: “**My local municipality** supports many energy-saving projects.”

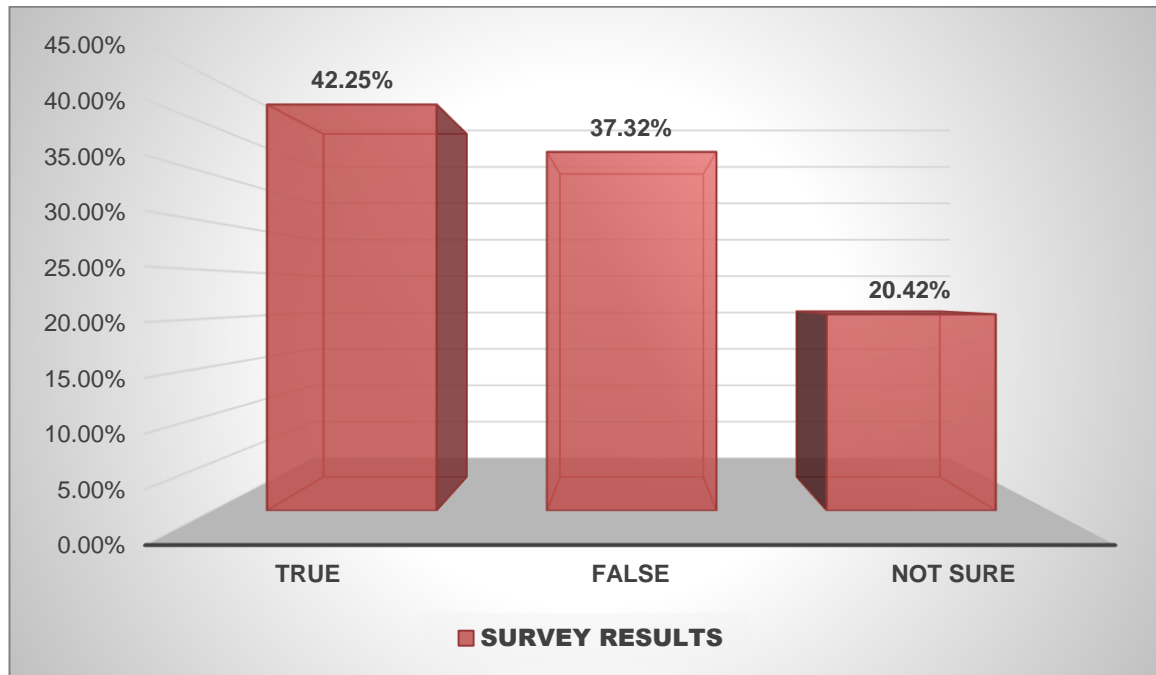


Figure 12: Local Municipality support

Only 42 percent of the respondents indicated that the statement is true and a large number (20% or 58 respondents) were not sure of what the local municipality was doing to conserve energy. This indicates that the municipality, and government in general, needs to be more vocal about energy conservation. The consequence of this is that people are not confident that energy recycling is a viable career choice.

The following figure (**Figure 13**) indicates a response to the statement: “My local municipality encourages **recycling of waste products** and provides opportunities to recycle.”

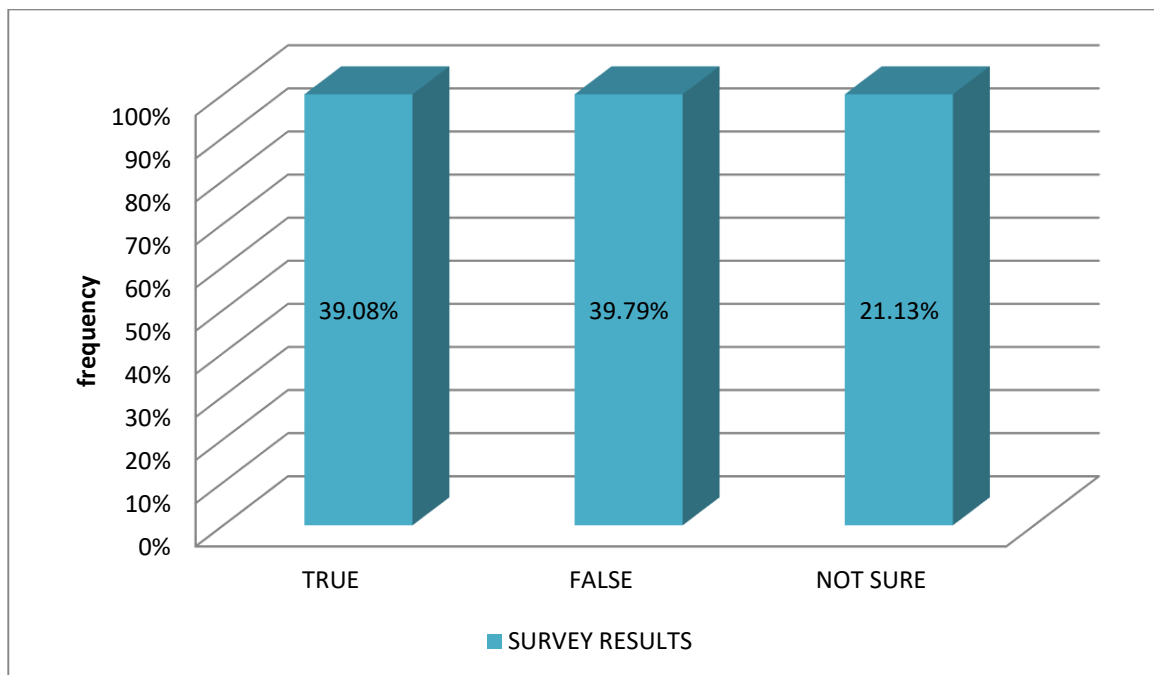


Figure 13: Local Municipality support: Recycling

The respondents are equally unconvinced about the role the municipality plays in the recycling of waste and provisions for residents to recycle their own waste. It is unclear if the municipality does offer incentives or encourages recycling through any waste removal processes. This information should raise concern within local government as it depicts a picture of an uncaring government that does not care for the environment. The municipality should initiate recycling initiatives such as separating of paper and plastic items to prevent recyclable materials from being dumped at landfill sites.



The following figure (**Figure 14**) indicates a response to the statement: “I know of someone who **has a job because of energy recycling.**”

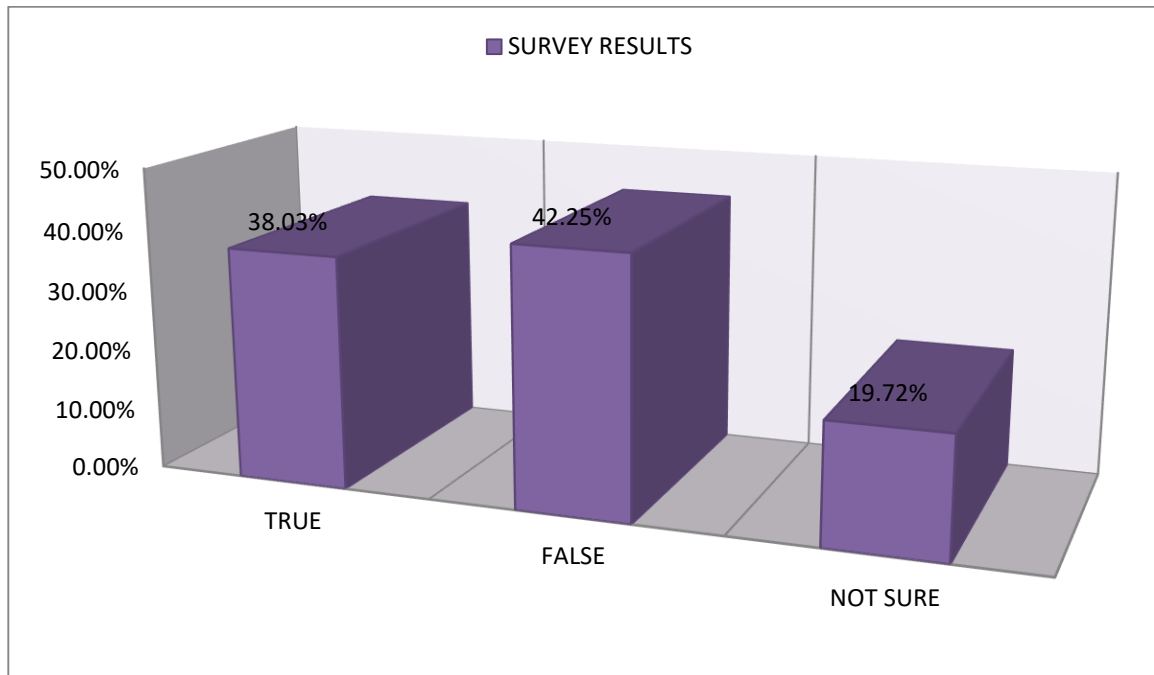


Figure 14: Jobs from recycling

A larger proportion of respondents (42%) indicated that the statement is false. This indicates that people are not aware of a large number of energy recycling businesses. The consequence of this is that people are not confident that energy recycling is a viable career choice.

**Table 5** below indicates a response to the statement: “I know of at least one person who **uses biogas in his/her household.**”

Response	Frequency	Percentage
Yes	133	46.83
No	125	44.01
Not sure	26	9.15
Total	284	100.00

Table 5: Uses biogas in household

Less than half of the respondents (47%) believed that the statement is true. The concept of biogas is still relatively new to most people. It is also true that the use of biogas technology is not a standard practice in the district and still requires considerable marketing and exposure to create awareness and interest in the concept. An advertising campaign featuring interviews and photos with the beneficiaries of the successful pilot projects may provide a human element to the subject matter and encourage community interest.

The following figure (**Figure 15**) indicates a response to the statement: “I would like to **use a gas stove** rather than an electric stove at home.”

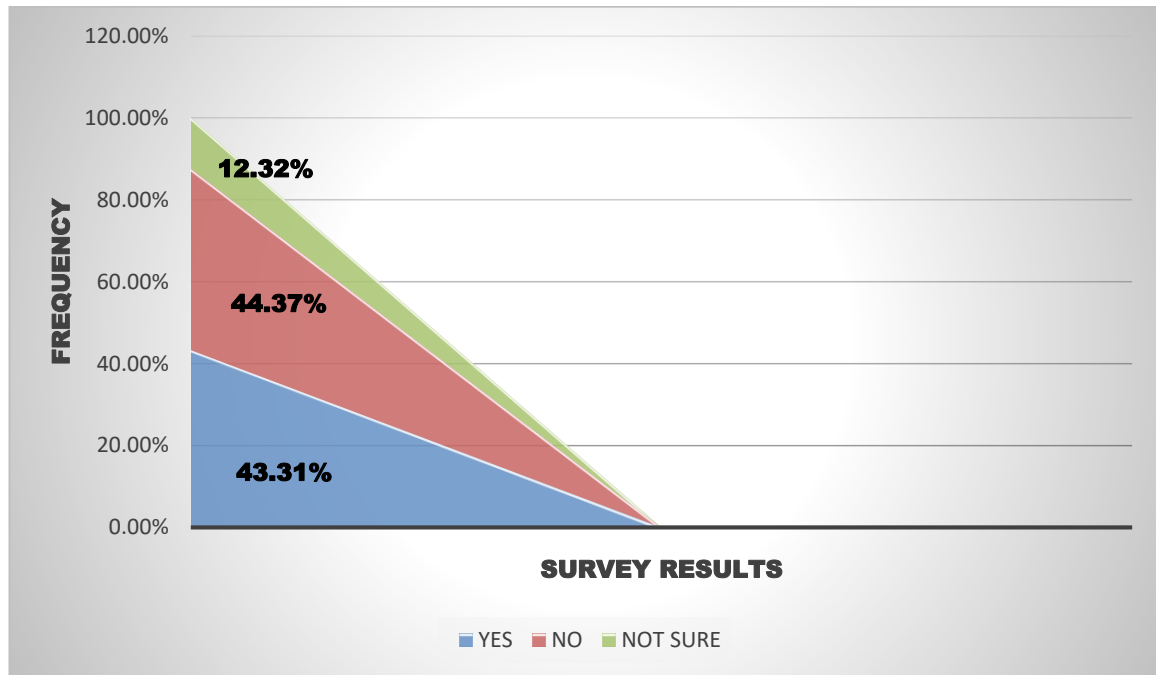


Figure 15: Gas stove preference

An equal proportion of respondents selected a choice of a gas stove over an electric stove. This could be indicative of the fact that most respondents come from areas where there has never been electricity in the past, therefore to some of them the idea of an electric stove is more appealing than the gas stove they have been using all their lives.

The following figure (**Figure 16**) shows a response to the statement: “**I use a gas stove at home.**”

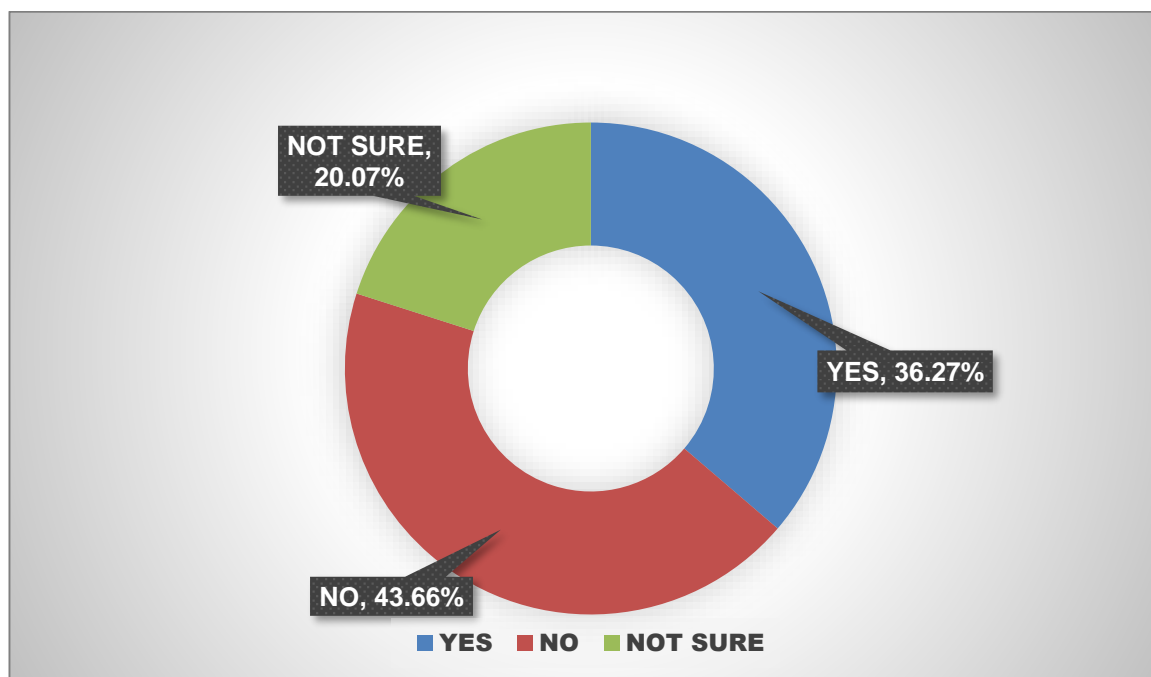


Figure 16: Uses a gas stove

The majority of the residents do not use gas stoves and many have indicated that they are not sure. This could mean that many of them are still using traditional wood fires to cook their food, as electric stoves are not an option for the many of the respondents due to a lack of access to conventional grid electricity in the rural areas of the district.

**Table 6** below indicates a response to the statement: “I **switch off my geyser** when not in use.”

Response	Frequency	Percentage
<b>Yes</b>	104	36.62
<b>No</b>	135	47.54
<b>Not sure</b>	45	15.85
<b>Total</b>	284	100.00

**Table 6: I switch off my geyser**

A large number of respondents (48%) indicated that they do not switch off their geyser when not in use, while about 37 percent do so. This indicates that we still have a long way to go in conserving electricity and taking action to ensure that energy is not wasted. It must also be noted that many of the respondents do not have geysers as they do not have access to electricity.

The following figure (**Figure 17**) indicates a response to the statement: “Energy saving is the government’s problem, not mine.”

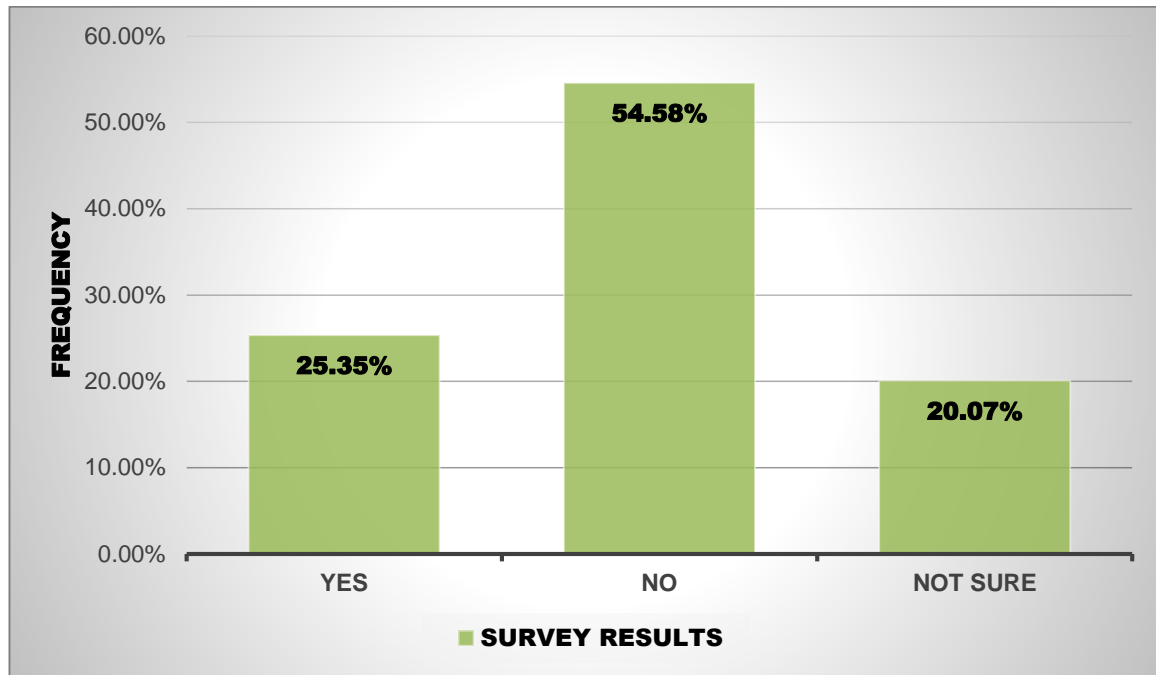


Figure 17: Energy Saving

A large number of respondents (55%) indicated that the statement is false. This indicates that people are aware that energy conservation is not only the government's problem but that we all have a role to play in protecting our resources.

The following figure (**Figure 18**) indicates a response to the statement: “I would be **interested in being trained** in creating my own renewable energy source.”

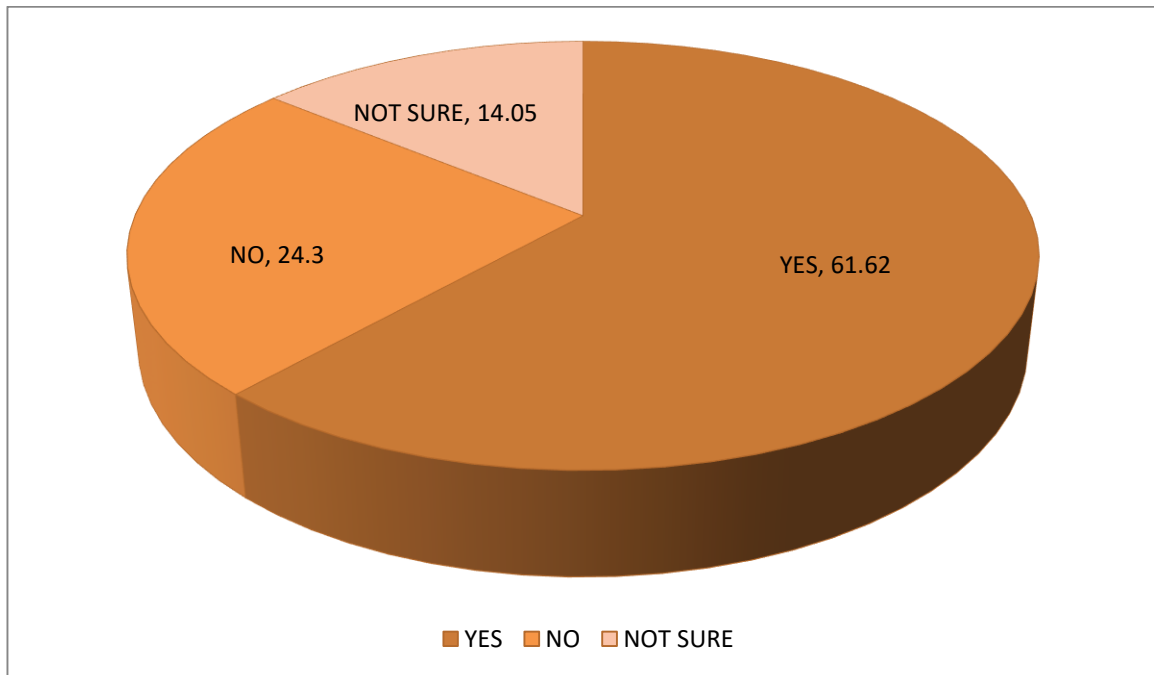


Figure 18: Interest in training

A large majority (61% or 175/284) have shown interest in being trained to create renewable energy sources. This is a positive sign that respondents are enthusiastic about conservation. Companies that are involved in the green economy should offer training opportunities to prospective entrepreneurs who can subsequently establish greening programmes in their communities. Examples of these are the collection of recyclable materials and the resale thereof or biogas projects in areas where animal waste can be easily accessed.

The following figure (**Figure 19**) indicates a response to the statement: “I would be interested in **earning an income** without moving away from my home.”

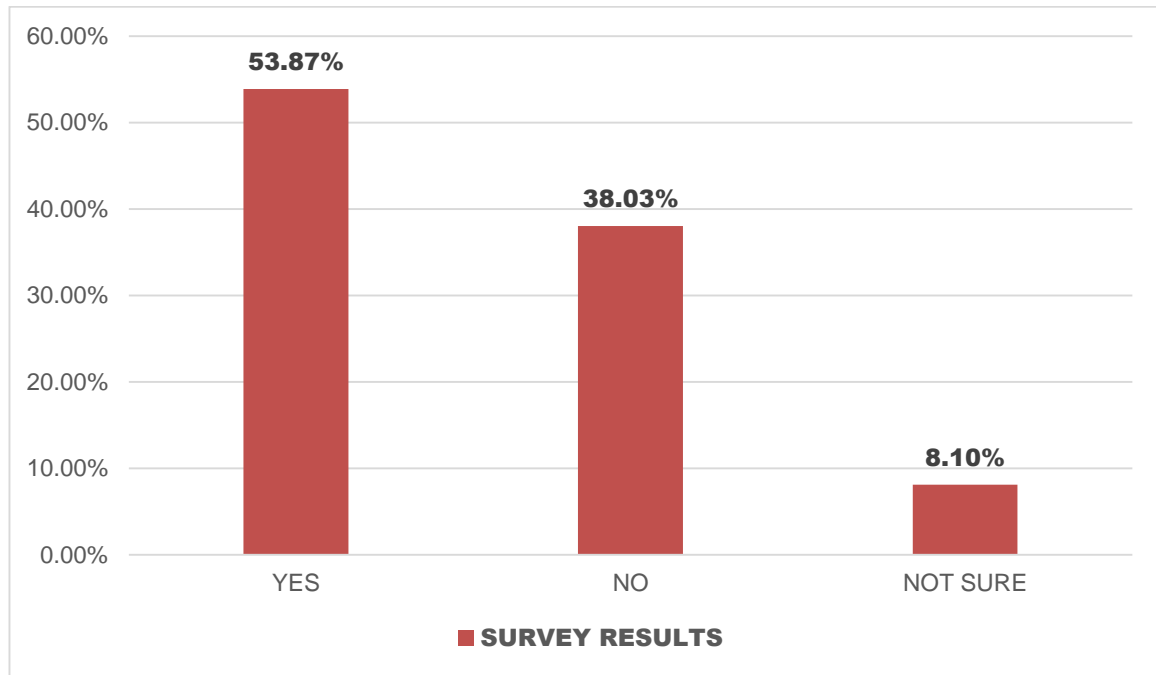


Figure 19: Earning an income

A 54 percent majority of respondents (153 out of 284) are reflected as showing an interest in earning an income while working from home. This is a good sign of the potential for energy saving projects to be implemented in the rural areas.



The following figure (**Figure 20**) indicates a response to the statement: “I would be interested in helping to **protect the environment**.”

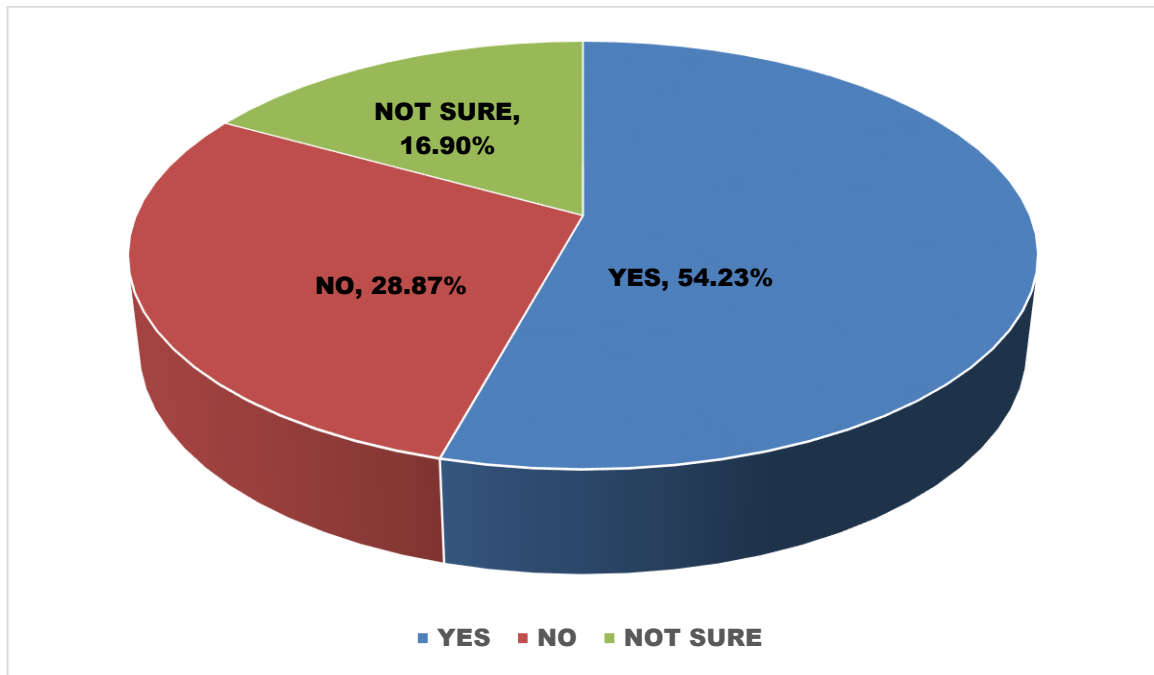


Figure 20: Protect the environment

A majority of the respondents (54%) were interested in helping to protect the environment. This is another positive step towards all efforts to save the earth and its resources. The government needs to initiate campaigns or programmes to harness this interest and create projects that will save the environment while public interest is high.

**Table 7** (below) indicates a response to the statement: “I would be interested in **using waste from animals** in my area to create renewable energy.”

Response	Frequency	Percentage
<b>Yes</b>	119	41.90
<b>No</b>	94	33.10
<b>Not sure</b>	71	25.00
<b>Total</b>	284	100.00

**Table 7: Using waste to create energy**

This was an interesting question as many of the respondents had not even been aware that animal waste was a source of energy. However, a majority of those who responded (42%) showed a positive attitude towards the idea. This was also considered an option for rural respondents as livestock was plentiful in rural areas and a regular supply of dung or animal waste was guaranteed.

The following pie chart (**Figure 21**) indicates a response to the statement: “I would be interested in helping to **create jobs** for people in my community.”

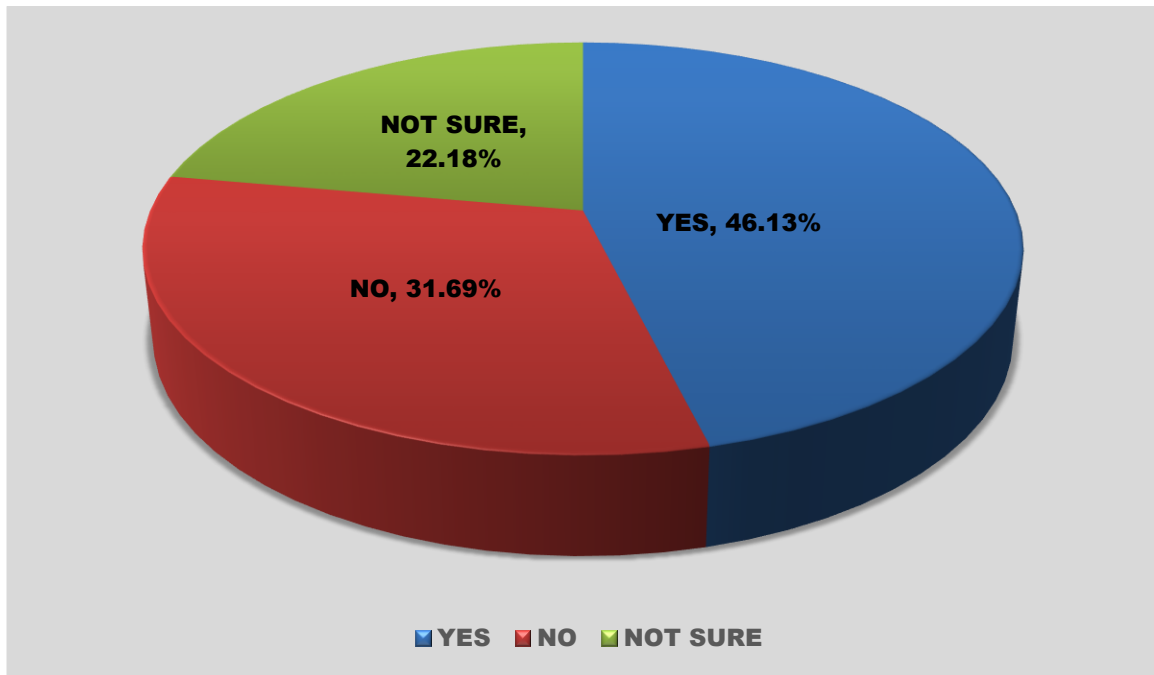


Figure 21: Interested in helping to create jobs

More respondents (46%) were interested in helping to create jobs than those who were not. This is a sign that the community is concerned about the future of the country and its people. Due to the high unemployment rate, the community is aware that job creation is a much-needed solution to raise the economic profile of the region.

The following bar chart in **Figure 22** indicates a response to the statement: “I would be interested in a **cheaper, safer source** of fuel for heat, light and cooking in my home.”

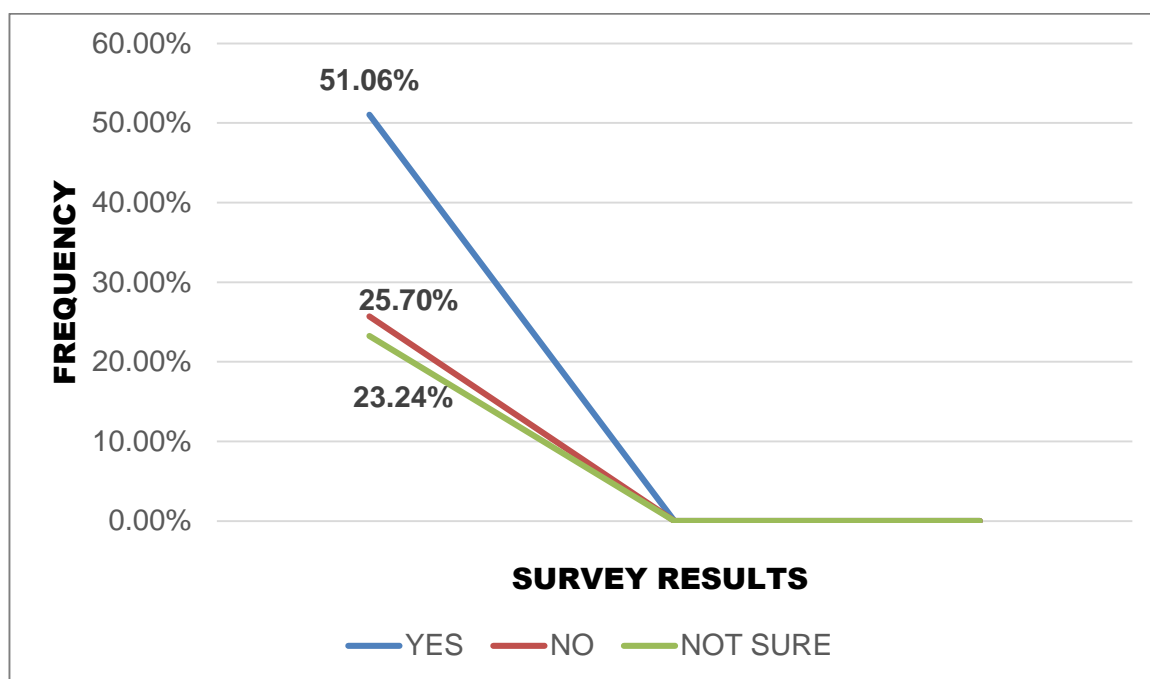


Figure 22: Cheaper, safer source of fuel

About 51 percent, or 145 respondents out of 284, were interested in a cheaper source of energy. The country is currently paying very high electricity tariffs and residents who have access to conventional power sources are struggling to meet the costs associated with their energy demands. Less expensive power sources are therefore welcomed.

The following table (**Table 8**) indicates a response to the statement: “I know of many **energy-saving projects** which are being implemented in my community.”

Response	Frequency	Percentage
Yes	89	31.34
No	152	53.52
Not sure	43	15.14
Total	284	100.00

**Table 8: Energy-saving projects**

The majority of the respondents (152 out of 284 or 54%) were not aware of energy saving projects in their community. This indicates that communication efforts need to be increased to create awareness of this concept, and also to encourage more conservation projects to be implemented.

The following pie chart in **Figure 23** indicates a response to the question: “I believe that the **earth and its resources are in danger** of being depleted/damaged.”

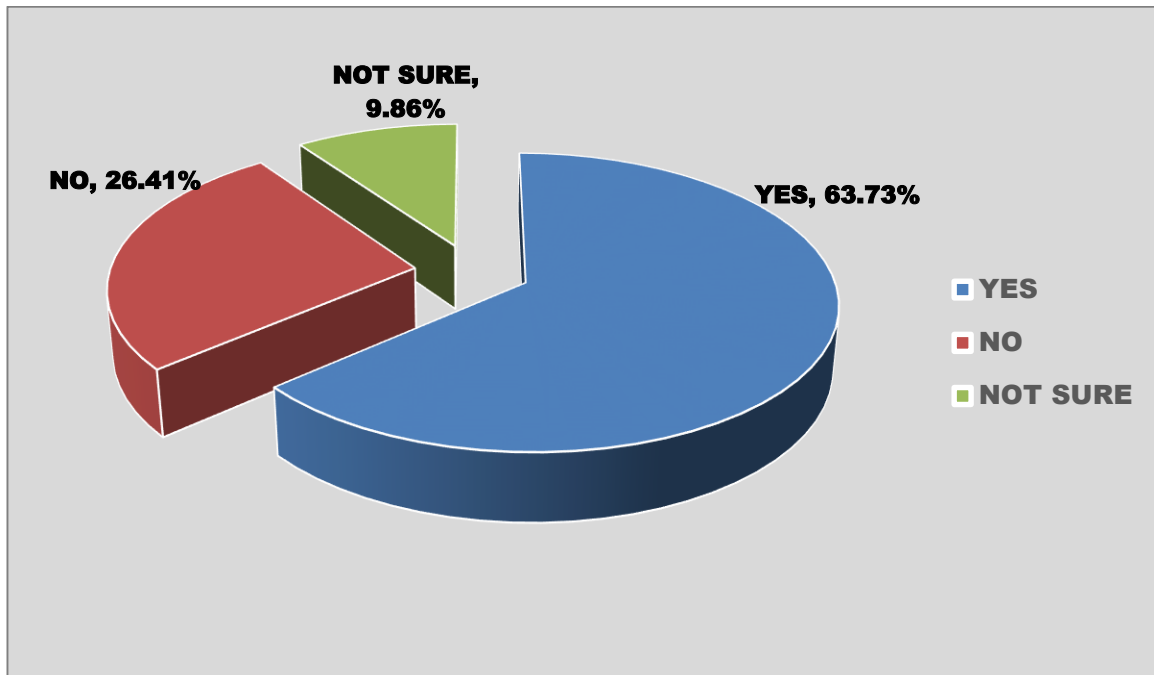


Figure 23: The earth's resources are in danger

A large number of respondents (64%) indicated that the earth and its resources are in danger of being depleted or damaged. This means that people are genuinely concerned about the state of the environment. The consequences are positive in that it highlights the fact that the majority of the respondents are aware of the degradation of the earth's natural resources.

The following bar chart in **Figure 24** indicates a response to the statement: “I think that soon most of our **water supply** will be polluted and we will have a serious water shortage.”

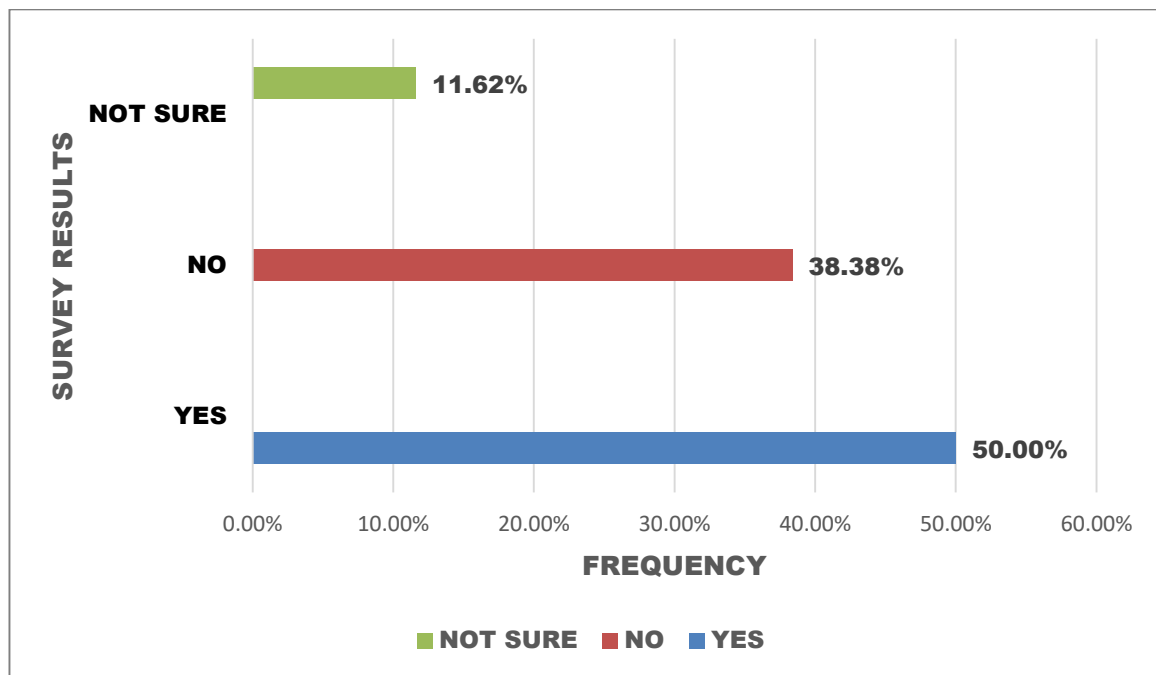


Figure 24: Water

Half of the respondents (50%) were concerned that our water resources are in danger of being depleted or polluted. This indicates that the current drought facing the country has affected or attracted the attention of the respondents. Many residents are unaware that drought conditions are a consequence of global warming, which in turn is caused by poor environmental management. Communities need to be informed of the dangers of burning fossil fuels, and how the degradation of the earth is affecting climate conditions.

### **5.3. SUMMARY OF THE RESPONSES**

5.3.1. A brief summary of the responses to the research instrument indicates that:

- At least 40 percent of the respondents do not have a fixed income or steady form of employment. This is an important factor in the analysis of their hierarchy of needs, as the quest for daily bread is usually a higher priority than a concern about the damage caused by burning fossil fuels. A large number of respondents believe there is a global acknowledgement of the concept of sustainability. A small number of people believe that the communities around them do not regard the risk to the environment as a serious threat.
- The majority of respondents are not convinced that the general community is aware of the concept of renewable energy. The research shows that people believe that the communities around them are not sufficiently aware of alternative energy sources.
- It is concerning that many respondents (37%) felt that their municipality did very little to promote energy conservation and a considerable percentage (20%) were not aware of any energy saving projects in their municipality. The municipality is at the coalface of citizen interaction and service delivery, and therefore in the most influential position to turn public opinion towards green energy. This is a gap in communication that needs to be addressed.
- Many respondents were ignorant of job opportunities in the conservation industry. This indicates that people are not aware of the existence of energy recycling businesses. The consequence of this is that people are not confident that energy recycling is a viable career choice.



- A substantial number of respondents (64%) indicated that the earth and its resources are in danger of being depleted or damaged. The majority of people are therefore aware that our natural resources are finite and will not be sustainable for future generations if we continue to use them indiscriminately.
- The majority of respondents (65%) agreed that pollution is a problem to society. This is a step in the right direction in the battle to save the earth from environmental degradation and it reinforces the views that the people of the King Cetshwayo district are concerned about curbing pollution.
- The majority of people interviewed do not use gas stoves. This indicates that while people are conscious of the need to conserve energy, they are not making a conscious effort to do so. Even more alarming, is that a sizeable proportion of respondents do not switch off their geysers when not in use. It could also be due to the fact that many of the respondents do not have access to electricity, and therefore do not own geysers. In the same line of reasoning, those who have no access to electricity would value electric stoves over gas stoves, as a symbol of progress or prosperity.
- The majority of respondents were interested in a cheaper source of energy. Also, a majority of respondents (54%) were interested in helping to protect the environment. This is a positive step towards all efforts to save the earth and its resources.

### 5.3.2. Cross tabulation of the relationship between municipality support of green energy and municipal recycling:

The study shows a correlation (DeFranzo, 2102) between what the respondents perceive to be the role of the municipality in supporting energy-saving and the opportunities that the municipality provides for recycling. The table below indicates that less than half of the population believe that the municipality is actively supporting the promotion of green energy and is doing very little to encourage recycling as well.

RELATIONSHIP	TRUE	FALSE
BELIEVES THE MUNICIPALITY SUPPORTS ENERGY SAVING PROJECTS	42%	37%
BELIEVES THE MUNICIPALITY PROVIDES OPPORTUNITIES FOR RECYCLING	39%	40%

**Table 9: Cross tabulation: Municipal support of green energy**

## 5.4. CONCLUSION

The data collected via the research instrument is presented in this chapter. The collected data is interpreted and analysed by the researcher. The researcher gives a summary account of the statistical information provided in the form of charts, graphs and tables. The next chapter provides commentary on the implications of the results in terms of the

study objectives and offers recommendations based on the analysis of the data, with emphasis on the communication implications of such data, thereby concluding the study.

The study has shown that the community does associate a linkage between pollution, (which includes the burning of fossil fuels), global warming and climate change, but at a minimal level. It is important to reiterate the chain reaction that is caused by the depletion of the ozone layer and the reckless use of natural resources. If communities are educated about the need for sustainability the government may find it easier to promote a change in attitude towards conservation issues.

## *CHAPTER 6*

### **RECOMMENDATIONS AND CONCLUSIONS**

#### **6.1. INTRODUCTION**

The data obtained from the responses to the questionnaire was presented graphically and in tabulated form in the previous chapter, with interpretations derived from the responses received. In this chapter, the researcher will present recommendations based on an analysis of the data. The recommendations will provide a way forward on the role that communication plays and needs to play in the promotion of green energy in the King Cetshwayo District. Recent climate change talks and conferences have confirmed the potential of green energy in being a new vehicle for industrial development in South Africa and the world in general. It is part of the national industrial policy action plan and nations across the globe have committed to going green.

#### **6.2. RECOMMENDATIONS AND CONCLUSIONS**

The research has provided a broad picture of the state of environmental awareness in the King Cetshwayo District Municipality. Residents are interested in the future of the earth and its resources but are unaware of the causes of environmental degradation and furthermore are ignorant of their respective abilities to contribute towards sustainability and conservation. It was significant to note in the analysis of the results that the majority of the target population is either unemployed or surviving without a fixed

form of income. This data reinforces the information presented in the King Cetshwayo District Municipality's Integrated Development Plan (uThungulu, 2012b:10). Communities are aware that global warming and climate change are a reality but they are unaware of their individual roles in causing damage to the environment. Respondents are interested in projects that will enhance their quality of life, such as the cheap provision of electricity, as well as the opportunity to commercialise the sale of gas through the biogas programme. A communications strategy should be developed by the municipality to drive awareness of the effects of climate change and the benefits of going green and to market the renewable energy programmes being undertaken by the municipality.

In alignment with the literature review and the conceptual framework, the recommendations are also aligned with study objectives. The objectives are reiterated below:

- Objective 1: To determine how communication can be used to promote green initiatives more effectively.
- Objective 2: To determine how to introduce green initiatives to contribute towards community development through the use of communication tools such as testimonials from previous beneficiaries of similar projects.
- Objective 3: To determine how to inform the community of projects that will contribute to green living and have the potential for economic benefit.
- Objective 4: To determine whether the success of renewable energy projects can be influenced by the communication, using the statements made by political leaders, such as Mayors and international climate change programmes.

### **6.3.1. Recommendations**

The analysis of the research has shown quite distinctly that there exists a lack of knowledge and interest in conservation and climate change. It is therefore very important to increase communication efforts on matters affecting the environment. In correlation with the objectives of the study the following recommendations are proposed:

- **Objective 1:** To determine how communication can be used to promote green initiatives more effectively.

The King Cetshwayo District Municipality needs to include climate change awareness as part of its communication strategy, and ensure that all communicators representing the municipality include conservation issues in their future press releases and communication campaigns. A marketing campaign to promote renewable energy, and educate the community of the advantages of biogas technology needs to be implemented within the rural areas of the district. This can be communicated by arranging roadshows to various communities where videos of the successful biogas projects in other municipal areas can be screened, and testimonials shared. The District Mayor should initiate an advertising campaign highlighting the benefits of renewable energy and the cost-effectiveness of going green.

- **Objective 2:** To determine how to introduce green initiatives to contribute towards community development through the use of communication tools such as testimonials from previous beneficiaries of similar projects.

Schools and community centres need to create an environment for people to learn about the need for sustainability. It is important that society inculcates the behaviour of

recycling and protecting natural resources. The Miyeka School project (Sibisi, 2005) discussed in the Literature Review is a commendable example of a biogas success story. The case study should form part of a school campaign to encourage renewable energy programmes at other rural schools. Many people are aware that our resources will not last forever and that today's negligence will leave tomorrow's children in great need. This concept needs to be explored further as an incentive to mobilise people into conserving our natural resources.

- **Objective 3:** To determine how to inform the community of projects that will contribute to green living and have the potential for economic benefit.

The municipality should subsidise entrepreneurs who wish to engage in recycling enterprises. This will encourage job creation and assist the community to contribute to the economy while also saving the environment. The use of gas stoves should also be incentivised, as is the case with solar geysers and solar panels at present. RDP homes currently being built by municipalities are fitted with solar geysers as standard fittings on all homes. More information on the benefits of switching off geysers and using gas stoves should be made available so that people could make informed choices to conserve energy.

- **Objective 4:** To determine whether the success of renewable energy projects can be influenced by the communication, using the statements made by political leaders, such as Mayors and international climate change programmes.

The department responsible for the rollout of the Biogas Project should work closely with the Office of the Mayor to launch and create awareness of the biogas projects that are

currently successfully operating within the municipal boundaries. The use of biogas technology can be introduced in other communities where animals are kept, as animal waste is a viable and freely available source of fuel for biogas. Municipalities need to introduce the concept of renewable energy to poor communities as part of their local economic development mandate.

### **6.3.2. Conclusion**

The King Cetshwayo District Municipality has initiated a credible and sustainable method of responding to the triple challenges of climate change, high electricity costs and rising poverty levels. The various biogas technology projects have been included in the municipal Integrated Development Plan, however, renewable energy programmes have not been prioritised for further rollout to other areas. An intensive communication campaign and the development of policy to support the inclusion of renewable energy in the annual budget of the municipality is the first step towards achieving the objectives of this study.

This study was initiated with the intention of improving the communication between the Municipality and the community, and creating opportunities for economic growth. In the Literature Review chapter the researcher outlined the development of environmental protection programmes in three sectors, that is, globally, nationally and locally. In Chapter Three, the researcher discussed how the Conceptual Model was used to evaluate the role of communication in the study, and in Chapter Four, the research methods and sampling procedure were explained. In Chapter Five, the researcher presented the outcomes of the study and summarised the responses as consolidated in



the data analysis, through graphs and tables. In this final chapter, the researcher presented recommendations based on the analysis of the data, with emphasis on the communication implications of such data.

There is also a potential for further studies in the field of renewable energy, some of which were touched on in the Literature Review. These include the use of methane to power buses and trains, as is currently being implemented in Norway (Shufflebotham, 2009). This innovation has the potential to transform the motor industry and it is believed that future research from the South African context could greatly benefit our country. The impact of renewable energy on society should not be limited to electrical supply but should be viewed in line with the infinite possibilities that its resources have the potential to provide.

The outcome of this research study will enable the King Cetshwayo District Municipality to enhance its policy on the green economy and move forward as a leader in the implementation of renewable energy programmes.

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**APPENDICES:**

ANNEXURE A: INFORMED CONSENT DECLARATION – ENGLISH

ANNEXURE B: LETTER OF INFORMED CONSENT – ENGLISH

ANNEXURE C: RESPONDENT STATEMENT - ENGLISH

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ANNEXURE E: INFORMED CONSENT DECLARATION – ZULU

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ANNEXURE G: RESPONDENT STATEMENT - ZULU

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RESEARCH

ANNEXURE I: QUESTIONNAIRE – ZULU

## **ANNEXURE A: PARTICIPANT INFORMED CONSENT DECLARATION**

### **INFORMED CONSENT DECLARATION**

**(Participant)**

**PROJECT TITLE:THE ROLE OF COMMUNICATION IN PROMOTING GREEN ENERGY IN  
THE KING CETSHWAYO DISTRICT**

*Rekha Naidoo* from the Department of Communication Science, University of Zululand has requested my permission to participate in the above-mentioned research project.

The nature and the purpose of the research project, and of this informed consent declaration have been explained to me in a language that I understand.

I am aware that:

1. The purpose of the research project is to determine:
  - how communication can help *topromote renewable energy as an alternative to conventional electrification in the King Cetshwayo District.*
2. The University of Zululand has given ethical clearance to this research project and I have seen/ may request to see the clearance certificate.
3. By participating in this research project I will be contributing towards promoting green initiatives in my community.
4. I will participate in the project by answering questions as set out in the questionnaire provided by the researcher.
5. My participation is entirely voluntary and should I at any stage wish to withdraw from participating further, I may do so without any negative consequences.
6. I will not be compensated for participating in the research, but my out-of-pocket expenses will be reimbursed.

7. There may be risks associated with my participation in the project. I am aware that
- The following risks are associated with my participation: Some questions may cause discomfort or embarrassment.
  - The following steps have been taken to prevent the risks: Respondents are not compelled to answer all questions. No respondent will be coerced into participation. Respondents will not be misled into providing specific responses.
  - There is a medium chance of the risk materialising.
8. The researcher intends publishing the research results in the form of a thesis. However, confidentiality and anonymity of records will be maintained and that my name and identity will not be revealed to anyone who has not been involved in the conduct of the research.
9. I will not receive feedback/will receive feedback in the form of a full research report regarding the results obtained during the study.
10. Any further questions that I might have concerning the research or my participation will be answered by:
- Ms Rekha Naidoo – Cell: 0836399028 . Email :[rekha.naidoo13@gmail.com](mailto:rekha.naidoo13@gmail.com)
  - Dr GM Naidoo – Email: [Naidoog@unizulu.ac.za](mailto:Naidoog@unizulu.ac.za)
  - Prof, H Rugbeer – Email: [Rugbeerh@unizulu.ac.za](mailto:Rugbeerh@unizulu.ac.za)
11. By signing this informed consent declaration I am not waiving any legal claims, rights or remedies.
12. A copy of this informed consent declaration will be given to me, and the original will be kept on record.

I, ..... have read the above information / confirm that the above information has been explained to me in a language that I understand and I am aware of this document's contents. I have asked all questions that I wished to ask and these have been answered to my satisfaction. I fully understand what is expected of me during the research.

I have not been pressurised in any way and I voluntarily agree to participate in the above-mentioned project.

.....

**Participant's signature**

.....

**Date**

## ANNEXURE B: LETTER OF INFORMED CONSENT



**Department of Communication Science**  
**Masters Communication Science Research Project**

**Researcher:** Mrs R Naidoo (Cell: 083-6399028)

**Supervisor:** Professor H. Rugbeer (035-9026210)

**Co-supervisor:** Dr. G. M. Naidoo (035-9026164)

Dear Respondent,

My name is Rekha Naidoo (student number: 201330173). I am a Masters student in the Department of Communication Science at the University of Zululand. You are invited to participate in a research project entitled: **The role of communication in promoting green energy in the King Cetshwayo District.**

Through your participation, I hope to:

1. Determine whether the community believes that green initiatives have brought about an improvement to economic growth.
2. To determine how green initiatives have contributed towards community development.
3. To inform the community of projects that will contribute to green living and have the potential for economic benefits.

The results of this survey are intended to contribute to the general body of knowledge surrounding green energy and the feasibility of renewable energy projects for community development.

Your participation in this project is voluntary. You may refuse to participate or withdraw from the project at any time with no negative consequence. There will be no monetary gain from participating in this research project. Confidentiality and anonymity of records identifying you as a participant will be maintained by the researcher. If you have any questions or concerns about participating in this study, please contact me or my supervisors at the numbers listed above. It should take you about 10 - 30 minutes to complete the questionnaire. I hope you will take the time to complete the questionnaire.

Sincerely

Investigator's signature

A rectangular box containing a handwritten signature in black ink, which appears to be 'Rekha Naidoo'.

Date\_19 January 2017\_\_\_\_\_



## **ANNEXURE C: RESPONDENT STATEMENT**

For office use: Respondent number: \_\_\_\_\_

**UNIVERSITY OF ZULULAND**  
**Department of Communication Science**



**Masters Communication Science Research Project**

**Researcher:** Mrs R Naidoo (083-6399028)

**Supervisor:** Professor H. Rugbeer (035-9026210)

**Co- supervisor:** Dr. G. M. Naidoo (035-9026164)

### **CONSENT**

I \_\_\_\_\_ (full name of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project. I understand that I am at liberty to withdraw from the project at any time, should I so desire.

\_\_\_\_\_  
**Signature of Participant**

\_\_\_\_\_  
**Date**

## ANNEXURE D: ENGLISH QUESTIONNAIRE

For office use only: Respondent Number: \_\_\_\_\_

Voluntary questionnaire for research on:

THE ROLE OF COMMUNICATION IN PROMOTING GREEN ENERGY IN THE KING  
CETSHWAYO DISTRICT

University of Zululand  
Department of Communication Science

Researcher: REKHA NAIDOO (Student Number: 201330173)

Supervisors: Prof. H. Rugbeer & Dr. GM Naidoo

### SECTION A: INFORMATION ABOUT YOURSELF

Place either a tick (✓) OR a cross (X) in the appropriate box (where necessary)

**Your gender**

Male ☐ 1 Female ☐ 2 I do not want to answer this question ☐ 3

#### 1. Your age

20 to 30 years	<input type="checkbox"/> 1
31 to 40 years	<input type="checkbox"/> 2
41 to 50 years	<input type="checkbox"/> 3
51 to 60 years	<input type="checkbox"/> 4
Other	<input type="checkbox"/> 5
I do not want to answer this question	<input type="checkbox"/> 6

#### 2. Are you currently employed?

Yes ☐ 1 No ☐ 2 I do not want to answer this question ☐ 3

**3. If Yes, how long have you been employed?**

1 to 5 years	1
6 to 10 years	2
10 to 20 years	3
More than 20 years	4
Other	5
I do not want to answer this question	6

**5. What is your primary form of income?**

Salary/Wage	<input type="text" value="1"/>	Social	<input type="text" value="2"/>	No	<input type="text" value="3"/>	I do not want to	<input type="text" value="4"/>
		grant/pension		income		answer this question	

**SECTION B**

Green initiatives are projects or activities that use sustainable practices to cause limited harm to the environment, such as making fuel out of animal waste, or recycling plastic containers.

A) Utilising communication to promote green initiatives more effectively

Please insert a tick (✓) or a cross (X) on the box that corresponds to your response.

	STATEMENT	AGREE	DISAGREE	NOT SURE
6.	<i>I understand the meaning of sustainability.</i>	1	2	3
7.	<i>I believe that most people understand the concept of renewable energy.</i>	1	2	3
8.	<i>I don't think that we need to worry about pollution. Nature has its way of replenishing itself.</i>	1	2	3
9.	<i>Pollution is a major problem which requires government intervention.</i>	1	2	3

B) Have green initiatives brought about an improvement to economic growth?

Please insert a tick (✓) or a cross (X) on the box that corresponds to your response.

	STATEMENT	TRUE	FALSE	NOT SURE
10.	<i>Many jobs can be created for many people if we begin renewable energy programmes.</i>	1	2	3
11.	<i>Very few jobs will be created if we attempt to create our own renewable energy.</i>	1	2	3
12.	<i>My local municipality supports many energy saving projects</i>	1	2	3
13.	<i>The local municipality encourages recycling of waste products and provides opportunities to recycle.</i>	1	2	3
14.	<i>I know of someone who has a job because of energy recycling.</i>	1	2	3

C) Have green initiatives contributed towards community development?

*Please insert a tick (✓) or a cross (X) on the box that corresponds to your response.*

	I will be interested in the following	YES	NO	NOT SURE
15.	<i>I know of at least one person who uses biogas in his/her household(Biogas is energy made from animal waste)</i>	1	2	3
16.	<i>I would like to use a gas stove rather than an electric stove at home</i>	1	2	3
17.	<i>I use a gas stove at home.</i>	1	2	3
18.	<i>I switch off my geyser when not in use.</i>	1	2	3
19.	<i>Energy saving is the government's problem; not mine</i>	1	2	3

D) Are there projects that have the potential for economic benefit?

*Please insert a tick (✓) or a cross (X) on the box that corresponds to your response.*

	I will be interested in the following	YES	NO	NOT SURE

20.	<i>Being trained in creating my own renewable energy source</i>	1	2	3
21.	<i>Earning an income without moving away from my home</i>	1	2	3
22.	<i>Helping to protect the environment</i>	1	2	3
23.	<i>Using waste from animals in my area to create renewable energy</i>	1	2	3
24.	<i>Helping to create jobs for people in my community</i>	1	2	3
25.	<i>A cheaper, safer source of fuel for heat, light and cooking in my home?</i>	1	2	3
26.	<i>I know of many energy saving projects which are being implemented in my community.</i>	1	2	3

E) To mitigate possible danger.

Please insert a tick (✓) or a cross (X) on the box that corresponds to your response.

	I will be interested in the following	YES	NO	NOT SURE
27.	<i>I believe that the earth and its resources are in danger of being depleted / damaged.</i>	1	2	3
28.	<i>I think that soon most of our water supply will be polluted and we will have a serious water shortage.</i>	1	2	3
29.	<i>Green activists are making a fuss about pollution and damage to the environment to give them a sense of importance.</i>	1	2	3

Thank you for completing this questionnaire.

## **ANNEXURE E: INCWADI YESIVUMELWANO**

### **INCWADI YESIVUMELWANO (MHLANGANYELI)**

### **ISIHLOKO SEPROJETHI: INDIMA KWEZOKUXHUMANA**

### **NOKUGQUQUZELA IZITHELO ZOHLAZA E-KING**

### **CETSHWAYO DISTRICT MUNICIPALITY**

uRekha Naidoo oweziMnyango Zokuxhumana , eNyuvesi yakwaZuu , ubecela imvumo ukuthi ningenelele kwi projethi yakhe ebhalwe phezulu.

Isizathu sale projethi nale ncwadi yesivumelwano sibhalwe ngolwimi elingilaziyo.

Ngiyazisa ukuthi:

1. Isizathu sale projethi ukuthi:
  - Ekwezokuxhuma kungasiza kanjani ngokugququzela ukusetshenziswa kwa gesi ovuselayo, kunokusebenzisa ugesi ovamile esifundeni sika King Cetshwayo.
2. iNyuvesi yakwaZulu ikhiphe incwadi yesivumelwano mayelana nale projethi, futhi sengike ngayibona/ngingayicela ukuyibona isitifiketi sesivumelwano.
3. Ukungenela le projethi , ngiyavuma ukuthi ngizogququzela ukuthi emphakathini kuzosetshenziswa izithelo zohlaza.
4. Ngizongenelela kule projethi ngokuphendula imbuzo ehlanganiswe umsunguli wale projethi.
5. Ukuphendula lembuzo, ngiyiphendula ngokwe mvumo yami, angiphoqiwe, kepha uma sengifisa uhhoxa nginga hhoxa ngaphandle ngokudicelela phansi iprojethi.
6. Angeke ngize ngihhole noma ngithole imali ngokuphendula lembuzo yale projethi, kepha uma kukhona imali engisebenzisayo ngizokhokhelwa yona.
7. Kungaba nobungozi ukungela le projethi, kepha ngiyazi ukuthi :
  - a) Ubungozi nokungenelela kwami kungadala ukube nemibuzo engangiphazamisa umoya wami, noma ngingaba namahloni.
  - b) Kepha angiphoqiwe ukuphendula imibuzo engingayifisi ukuyiphendula.
  - c) Mancane amathuba ukuthi lobungozi kungenzeka.
8. Umsunguli wale projethi uzoyikhipha impendulo zembuzo ngokwe thesis, kepha amagama abantu abaphendulile azobe egodliwe.
9. Angeke ngiyithole imiphumela ngophenyo lwale projethi.
10. Onemibuzo mayelana naloluphenyo angathinta laba:

- Ms Rekha Naidoo-083 639 9028 email: [rekha.naidoo13@gmail.com](mailto:rekha.naidoo13@gmail.com)
- DR GM Naidoo- email : [Naidoog@unizulu.ac.za](mailto:Naidoog@unizulu.ac.za)
- Prof H Rugbeer- email: [Rugbeerh@gmail.ac.za](mailto:Rugbeerh@gmail.ac.za)

11. Ngokusayina lecwadi ngivuma ukuthi angeke ngize ngibabophise abenza loluphenyo noma ngithathe umsebenzi ube owami.

12. Ikhophi yalesvumelwano sizosala nami, bese ikhophi yokuqala isale nomsunguli.

Mina \_\_\_\_\_ ngiyavuma ukuthi ngifundile konke okubhalwe ngaphezulu futhi ngiyavuma ukuthi konke okhubhaliwe kuchazwe ngolimi engilaziyo nokuthi ngiyakwazi okubhaliwe. Sengiyibuzile imibuzo ebengiyifisa ukuyibuza nokuthi iphendulwe ngokugculiseka. Ngiyazi ukuthi yini elindelekile kumina kuloluphenyo.

Angiphoqiwe umuntu , konke ngikwenza ngokuvuma kwami kulelophenyo lwe-projethi.

\_\_\_\_\_  
Sayina (umngeneleli)

\_\_\_\_\_  
Usuku

*Siyabonga ngokuqeda lenhlolovo*

## ANNEXURE F: INCWADI YESIVUMELWANO

**Umyango wezeSayensi Yezokuxhumana Enyuvesi yaKwazulu**  
**Umsunguli: Mrs R. Naidoo (Cell: 083 639 9028)**  
**Umpathi: Professor H, Rugbeer (035 902 6210)**  
**Usekela kaMphathi: Dr. G.M. Naidoo(035 902 6164)**

Mhlanganyeli othandekayo,

### **iMasters ezoXhumana zoSayensi Research Project:**

Igama lami uRekha Naidoo (Inombolo Yomfundi 201330173), ngingumfundi weMaster's kweziMnyango kwezokuXhumana zoSayensi kwiNyuvesi yakwa Zulu. Ngiyacela ungenele le projethi ebizwa: **Indima kwezokuxhumana ukugqugquzela usebenzisa izihlelo zohlaza endawene yase King Cetshwayo.**

Kulokhu ngenela kwakho ngiyefisa ukuthi :

- Ngazi ukuthi umphakathi uyakholelwa yini ukusebenzisa izihlelo zohlaza ,nokuthi akwazile yini ukulekelela ukuzuza umnotho.
- Ukwazi izihlelo zohlaza zikwazile yini ukusiza umphakathi.
- Ukwazisa amalunga omphakathi ngama projethi azosiza ngokusebenzisa izihlelo zohlaza, nokusiza ngenzuzo zomnotho.

Imiphumela yale mcwaningo azosiza ekunikelekeni ekwazini kangcono ngezohlelo zohlaza kanye nezagesi ukuze kukwazi ukuthuthukisa umphakathi.

Ungenela kwakho kule projethi kungokuthanda kwakho, awuphoqiwe. Unalo ilungelo lokunqaba noma uhhoxe kule projethi ngaphandle nokuba nemiphumela emibi. Akekho umuntu ozohhola noma ozothola imali ngokuphendula lemibuzo. Amagama abantu abaphendule imbuzo ngeke avezwe, azogcina kumsunguli we-projethi. Uma unemibuzo or noma ufuna ubeka umbono , sicela uthinte mina (Rekha Naidoo) noma abaphakathi bami kuzi nombolo ezibhaliwe phezulu. Imbuzo ingathatha imizuzo ephakathi ka 10-30 ukuyiphendula. Ngiyacela uzinikeze iskhathi esanele ukuphendula imbuzo.

Ozithobayo,

Owenza uphenyo\_\_\_\_\_

Usuku\_\_\_\_\_



## ANNEXURE G:

Owasehho visi: iNombolo yomsuguli \_\_\_\_\_

**Umyango wezeSayensi Yezokuxhumana Enyuvesi yaKwazulu**  
**Umsunguli: Mrs R. Naidoo (Cell: 083 639 9028)**  
**Umphathi: Professor H, Rugbeer (035 902 6210)**  
**Usekela kaMphathi: Dr. G.M. Naidoo(035 902 6164)**

### ISIVUMELWANO:

Mina, \_\_\_\_\_ (igama nesbongo  
ngokuphelele)ngiyevuma ukuthi ngiyazazi izinto ezibhaliwe kulezincwadi zonthathu, nokuthi ngiyavuma  
ukuthi ngizongela. Ngiyazi ukuthi nginalo ilungelo lokhu hoxa kule projethi noma inini la ngifisa khona.

\_\_\_\_\_  
Sayina

\_\_\_\_\_  
Usuku

## **ANNEXURE H: ACCESS LETTER REQUESTING PERMISSION TO CONDUCT RESEARCH**

University of Zululand  
PO Box X1001  
KwaDlangezwa  
3886

Mr MH Nkosi  
The Municipal Manager  
King Cetshwayo District Municipality  
Private Bag X1025  
Richards Bay  
3900

**Date:** 22 August 2016

**Dear Mr MH Nkosi**

### **REQUEST FOR PERMISSION TO CONDUCT RESEARCH**

I am a registered Master's student in the Department of Communication Science at the University of Zululand. My supervisors are: Prof Vijay Rugbeer and Dr GM Naidoo.

The proposed topic of my research is: **The role of communication in promoting green energy in the King Cetshwayo District.** The objectives of the study are:

- (a) To determine whether the community believes that green initiatives have brought about an improvement to economic growth.
- (b) To determine how green initiatives have contributed towards community development.
- (c) To inform the community of projects that will contribute to green living and have the potential for economic benefits.

I am hereby seeking your consent to conduct interviews with staff members who are working in the field of renewable energy.

To assist you in reaching a decision, I have attached to this letter:

- (a) A copy of an ethical clearance certificate issued by the University

(b) A copy the research instruments which I intend using in my research

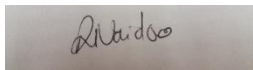
Should you require any further information, please do not hesitate to contact me or my supervisor. Our contact details are as follows:

1. Ms Rekha Naidoo – Cell: 0836399028 . Email : rekha.naidoo13@gmail.com
2. Dr GM Naidoo – Email: Naidoog@unizulu.ac.za
3. Prof, H Rugbeer – Email: Rugbeerh@unizulu.ac.za

Upon completion of the study, I undertake to provide you with a bound copy of the dissertation.

Your permission to conduct this study will be greatly appreciated.

Yours sincerely,



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**REKHA NAIDOO**

## ANNEXURE I: ZULU QUESTIONNAIRE (ISITATIMENDE SAMMANGALELWA)

For office use only: Respondent Number: \_\_\_\_\_

Inhlolovo/Imibuzo Yobuvolontiya Yocwaningo:

### INDIMA YEZOKUXHUMANA EKUPHAKAMISENI EZAMANDLA ALUHLAZA ESIFUNDENI SASE KING CETSHWAYO

Umyango wezeSayensi Yezokuxhumana Enyuvesi yaKwazulu

UMCWANINGI: REKHA NAIDOO (Inombolo Yomfundi: 201330173)

Supervisors: Prof. H. Rugbeer & Dr. GM Naidoo

#### ISIGABA A: ULWAZI OLUPHELELE NGAWA/IMININGWANE

Shicilela (✓) Noma (X) endaweni efanelekile (lapho kunesidingo)

##### 1. Ubulili Bakho

Awesilisa ☐ 1 Owesifazane ☐ 2 Angifuni ukuphendula lombuzo ☐ 3

##### 2. Iminyaka yakho yobudala

20 kuya ku 30 ubudala	1
31 kuya ku 40 ubudala	2
41 kuya ku 50 ubudala	3
51 kuya ku 60 ubudala	4
Eminye	5
Angifuni ukuwuphendula lombuzo	6

##### 3. Ingabe uyasebenza?

Yebo ☐ 1 cha ☐ 2 Angifuni ukuwuphendula lombuzo ☐ 3

**4. Uma kungu yebo, usunesikhathi esingakanani usebenza?**

1 kuya ku 5 iminyaka	1
6 kuya ku 10 iminyaka	2
10 kuya ku 20 iminyaka	3
Ngaphezulu kwengu 20 iminyaka	4
Eminye	5
Angifuni ukuwuphendula lombuzo	6

**5. Hlobo luni lomholo owutholayo?**

**Isigaba B**

iholo  Isibonelelo/impesheni  lutho  Izethulo zohlaza izinhlelo ezisebenzisa, izeniwayezo, Angifuni ukuwuphendula, ezinqinile lombuzo ukwenza

ukuvikela ukulimala kwemvelo, njengokwenza uwoyela ngokungcola kwezilwane, nomangokuqoqa kuphinde kugaywe kabusha kwezigubhu zika pulasitiki.

F) Ukusetshenziswa kwezokuxhumana ukuphakamisa izethulo zohlaza ngendlela ezwakalayo ebantwini

Shicilela (✓) Noma (X) ebhokisini elibambelana nempendulo yakho.

	ISITATIMENDE	YEBO	CHA	ANGAZI
6.	Ngiyayiqonda incazelo yokuvikeleka.	1	2	3
7.	Ngiyakholwa ukuthi abantu abaningi bayaliqonda iphuzu lokuvuselela kabusha kwezamandla kagesi.	1	2	3
8.	Angicabangi ukuthi siyadinga ukuthi sizikhathaze ngokungcola komoya ngoba imvelo iyakwazi ukuzibuyisela yona esimweni.	1	2	3
9.	Ukungcola komoya kuyinkinga enkulu edinga ukungenelela kuka Hulumeni.	1	2	3

G) Ingabe izethulo zohlaza zilethelwe ukuthuthukisa umnotho nokukhula kwawo?

*Shicilela (✓)Noma (X) ebhokisini elihambelana nempendulo yakho.*

	ISITATIMENDE	IQINISO	AMANGA	ANGAZI
<b>10.</b>	Amathuba amaningi omsebenzi angadaleka kubantu uma singaqala izinhlelo zokuvuselela amandla kagesi.	1	2	3
<b>11.</b>	Mancane kakhulu amathuba omsebenzi angadaleka uma singazama ukuvuselela amandla kagesi.	1	2	3
<b>12.</b>	umasipala wangakithi uyazeseka izinhlelo zokongiwa kwamandla kagesi.	1	2	3
<b>13.</b>	Umasipala wangakithi uyakugqugquzela ukubuyiselwa kwemikhiqizo esiwudoti ukuba igaywe kabusha ukunikeza amathuba.	1	2	3
<b>14.</b>	Ukhona engimaziyo osethole umsebenzi ngokuqoqa nokubuyisela okusebenzile.	1	2	3

H) Ingabe izethulo zohlaza zikwazile ukuhlomulisa ngakwezentuthuko yomphakathi?

*Shicilela (✓)Noma (X) ebhokisini elihambelana nempendulo yakho.*

	Ngingakuthokozela lokhu okulandelayo	YEBO	CHA	ANGAZI
<b>15.</b>	Ukhona oyedwa osebenzisa i-biogas emzini wakhe ( i-biogas amandla ka gesi enziwa ngokungcola kwezilwane)	1	2	3
<b>16.</b>	Ngingathanda ukusebenzisa isitofu segesi kunesikagesi ekhaya	1	2	3

17.	Ngisebenzisa isitofu segesi ekhaya.	1	2	3
18.	Ngiyayicima igiza uma ingasebenzi.	1	2	3
19.	Ukongiwa kwamandla kagesi okukaHulumeni akusiyo inkinga yami	1	2	3

I) Ingabe zikhona izinhlelo ezinamandla anenzuzo kwezomnotho?

*Shicilela (✓)Noma (X) ebhokisini elihambelana nempendulo yakho.*

	<b>Ngingakuthokozela lokhu okulandelayo</b>	<b>YEBO</b>	<b>CHA</b>	<b>ANGAZI</b>
20.	ukuqeqeshwa ukudala owami umthombo wezokuvuselelwa kwamandla kagesi	1	2	3
21.	Ukuthola umholo ngaphandle kokushiya ikhaya lami	1	2	3
22.	Ukusiza ukuvikeleka kwemvelo	1	2	3
23.	Ukusebenzisa ukungcola kwezilwane ukuvuselela amandla kagesi.	1	2	3
24.	Ukusiza ukudala amathuba omsebenzi emphakathini wami.	1	2	3
25.	Indlela eshibhile, umthombo ophephile kawoyela wokushisa, ukukhanya kanye nokupheka ekhaya	1	2	3
26.	Ngiyazazi izinhlelo eziningi esezilethiwe emphakathini wami.	1	2	3

J) Ukubheka ingozi engase yenzeke.

*Shicilela (✓) Noma (X) ebhokisini elibambelana nempendulo yakho.*

	<b>Ngingakuthokozela lokhu okulandelayo</b>	<b>YEBO</b>	<b>CHA</b>	<b>ANGAZI</b>
<b>27.</b>	Ngiyakholwa ukuthi umhlaba nemthombo yawo kusengozini yokushabalala nokulimala.	1	2	3
<b>28.</b>	Ngicabanga ukuthi maduze ukusabalaliswa kwamanzi kuzongcoliseka futhi sizoba nesimo esibucayi sokushoda kwamanzi .	1	2	3
<b>29.</b>	Izishosovu zohlaza zenza ukukhathazeka ngokungcola nokulimala kwemvelo ukubanikeza umcabango wokubaluleka.	1	2	3