CLIMATE CHANGE AWARENESS IN THE PUBLIC SERVICE SECTOR: A STUDY OF SIX INSTITUTIONS IN KENYA

BY

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A PROJECT REPORT SUBMITTED IN PARTIAL FULFILLMENT OF REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF ENVIRONMENTAL STUDIES (CLIMATE CHANGE AND SUSTAINABILITY) IN THE SCHOOL OF ENVIRONMENTAL STUDIES OF KENYATTA UNIVERSITY

SEPTEMBER, 2013
DECLARATION

Student’s Declaration

This project report is my original work and has not been presented for a degree in any other university or for any other academic award.

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Supervisors’ Declaration

We confirm that the work reported in this project report was carried out by the candidate under our supervision and has been submitted for examination with our approval as university supervisors.

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DEDICATION

This work is dedicated to humankind in recognition of the challenges posed by climate change and the need to create awareness to combat its effects.
ACKNOWLEDGEMENT

I wish to thank my supervisors for their scholarly guidance, my employer, the Ministry of Environment through Kenya Meteorological Department for funding my studies, my family for their support and encouragement and the August & April 2011 Masters in Climate Change Class for the engaging academic discourse during my studies. Above all, I acknowledge GOD for granting me the wisdom to pursue the studies.
Climate change is one of the most significant environmental challenges of our time. This calls for the adoption of necessary mitigation and adaptation strategies. These strategies include education and public awareness on climate change and its effects. This study assessed the level of climate change awareness among employees of six public sector institutions namely, National Environmental Management Agency, Kenya Meteorological Department, Kenya Electricity Generating Company, Kenya Medical Research Institute and Kenya Agricultural Research Institute. Employees offer non-formal education to the public while providing services and in their social circles. Their awareness is therefore critical. The study also aimed to establish the source of climate information in public sector, whether there are policies on climate change in the public service sector and identify if there are challenges in implementing them. The six public institutions were chosen using purposive sampling due to their roles in climate change. A descriptive survey design was adopted. 20 respondents from each institution were chosen from a sample frame comprising three job categories using simple random sampling techniques. To implement the survey, a structured questionnaire was used for data collection. Data was analyzed using descriptive and detailed statistics and results presented graphically in charts, graphs and tables. From the findings, the study established that there was general awareness about climate change as 97% respondents stated that they have heard of climate change. The difference in respondents level of being informed on causes, consequences, and ways to curb climate change was statistically significant (F=4.592, df=5 and P Value > 0.05 at 0.0132. Media emerged as the main source of climate change information with television leading at 94%. Media had significant impact on creating awareness ($\chi^2=51.425, n=120, df=3, p=0.0001$). The study established that there are policies on climate change at the workplace as reported by 82% of respondents. 82% of the respondents stated that implementation of these policies is hampered by inadequate funding, lack of coordination among the various climate change stakeholders and low level of public awareness about climate change among others. Majority of employees, 85% said there is need for more information on climate change in the workplace. The study established a strong positive and significant relationship between climate change awareness ($r = 0.698, P< 0.05$ at 0.01) on one hand and policies and source of information on the other hand ($r=0.547, P$ Value of 0.02 at 95% precision level). The study also established a strong positive correlation between mitigation and adaptation and climate change awareness ($r =0.698$ and a significance level of 0.006, $P< 0.005$). The study concluded that it is important to enhance awareness among the employees to make them better understand climate change science, especially the support staff. The study recommended enhancement of awareness through seminars, workshops, brochures and memos in the workplace.
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## DEFINITION OF TERMS

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<td>Awareness</td>
<td>Knowledge, understanding, perception and beliefs</td>
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<td>Climate change</td>
<td>Rainfall variability, temperature increase, increase in frequency and severity of extreme weather events (drought and floods)</td>
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<td>Public Service Sector</td>
<td>Government funded institutions providing service to the public</td>
</tr>
<tr>
<td>Rank and File</td>
<td>All categories of employees in an institution</td>
</tr>
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<td>Management staff</td>
<td>Directors, Administrators, Managers</td>
</tr>
<tr>
<td>Technical Staff</td>
<td>Trained in Sciences, Engineering, ICT</td>
</tr>
<tr>
<td>Support staff</td>
<td>Human resource, Finance, Accounts, Secretarial, Driver, Messenger, Security officers</td>
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ACRONYMS AND ABBREVIATIONS

AMB Africa Media Barometer
ANDWP Amended New Delhi Work Programme
CCK Communication Commission of Kenya
COP Conference of Parties to UNFCCC & Kyoto Protocol
ICT Information Communication Technology
IPCC Inter-governmental Panel on Climate Change
KARI Kenya Agricultural Research Institute
KENGEN Kenya Electricity Generating Company
KEMRI Kenya Medical Research Institute
KMD Kenya Meteorological Department
KSOE Kenya State of the Environment and Outlook 2010
MEMR Ministry of Environment and Mineral Resources
NCCAP National Climate Change Action Plan
NCCRS National Climate Change Response Strategy
NEMA National Environmental Management Authority
NGO Non-Governmental Organization
UNFCCC United Nations Framework Convention on Climate Change
CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Climate change is one of the most significant environmental challenges of our time and it poses serious threats to sustainable development in Kenya due to its impacts on ecosystems. Many future impacts of climate change or variability can be reduced, delayed or avoided if the necessary mitigation, adaptation and coping strategies are implemented. These strategies include education and public awareness on climate change and its effects.

Article 6 of the United Nations Framework Convention on Climate Change (UNFCCC) and Article 10(e) of the Kyoto Protocol require all parties to promote and facilitate among others educational and public awareness programs on climate change and its effects (UNFCCC, 1992b.). To implement Article 6, parties adopted the five years New Delhi Work Programme in 2002 to address challenge of communicating, learning and teaching on climate change. In 2007, Amended New Delhi work programme (ANDWP) was adopted whose scope emphasized public awareness, public participation and public access to information to be given more prominence than they had in the previous one (UNFCCC, 1992b.).

In support of Article 6, parties to the UNFCCC also established Climate Change Information Network (CC:INet) to act as the clearance house of climate information sources on public information, education and training in the field of climate change.
According to National Climate Change Response Strategy (NCCRS), the integration of climate information into Government policies is important because climate is a major driving factor for most of the economic activities in Kenya. Climate information has, however, not been easily understandable (Government of Kenya, 2010a). For climate change threats to be appreciated, the NCCRS has recommended massive awareness campaigns so that the public can be sensitised and mobilised to adapt to and mitigate against impacts of climate change (Government of Kenya, 2010a). Also, the Kenya State of the Environment and Outlook Report 2010 highlights the importance of mainstreaming climate issues into the Kenya government’s programmes given that climate is a major driver of the economic activities such as agriculture and tourism which are central to the achievement of Vision 2030 (Government of Kenya, 2010b).

According to a country report on implementation of Article 6 presented by National Environmental Management Authority (NEMA) in a workshop held in September 2010 in Banjul, Gambia, the National Education and Awareness Initiative targeted education institutions, civil societies and media (Muiti, 2010). In 2005, Kenya undertook a capacity needs assessment in the area of climate change awareness. At least four individuals from Government sector, among other sectors, were interviewed. It was found out that Government officials did not find climate change as an issue, could not acknowledge a link between climate change and climate variability.

This study is also hinged on awareness creation through environmental education mainly by non-formal education methods where institutions in this
study create awareness on international days through lectures and exhibitions. The employees in these institutions also interact with the public while providing them with services and in their social settings. It is therefore critical that employees in public service sector should be aware about climate change.

1.2 Statement of the problem

Climate information has not been easily understood according to National Climate Change Response Strategy (NCCRS). NCCRS has therefore recommended massive awareness campaigns so that the public can be sensitised and mobilised to mitigate against and adapt to impacts of climate change. Public service sector employees make decisions and implement policies of the government. Hence, they are expected to mainstream climate change issues in their decisions and in implementing policies. They are also supposed to create awareness among the Kenyan public through non-formal education. The non-formal education includes lectures and exhibitions during international days such as World Environment Day, World Water day, World Health day and World Meteorological day among others. The employees also interact with the public as they provide services and also with their families and neighbours in their social circles. Therefore, employees have the opportunity to create awareness on climate change through such interactions. This is especially true for employees in key public institutions dealing with climate change since the public expect them to respond to their queries about climate change. However, the level of awareness, understanding, beliefs and perceptions about climate change among public sector employees ‘rank and file’ has not been studied in depth and this study aimed to address this problem.
1.3 Research Questions

This study aimed at assessing climate change awareness among employees of key public institutions, determine employees' source of climate change information, and establish if there are policies on climate change and if there are challenges encountered while implementing them. The study set out to answer the following questions;

1. What do employees of public service sector institutions know and understand about climate change?
2. What are the sources of climate change information among employees of public service sector?
3. Are there climate change policies in the public service sector and are there challenges faced while implementing climate change policies?
4. How can climate change awareness be enhanced and promoted?

1.4 Research Objectives

The main objective of the study was to assess climate change awareness among employees in public service sector, determine whether there are climate change policies and if there are impediments in implementing them. The specific objectives for this study were;

1. To assess the level of awareness on climate change among employees.
2. To establish sources of climate change information among employees.
3. To determine whether there are climate change policies in the public service sector and establish whether there are challenges in implementing them.
4. To recommend measures for awareness creation on climate change in public sector.

1.5 Hypotheses

From the above objectives, this study was guided by the following hypotheses;
1. Employees of key institutions involved in climate change are not aware about climate change.
2. The media is not the main source of climate change information among employees.
3. Employees are not aware of climate change policies in the public service sector.

1.6 Justification

The integration of climate information into Government policies is important because climate is a major driving factor for most of the economic activities in Kenya. Climate information has not been easily understood. The National Climate Change Response Strategy (NCCRS) was put in place to ensure robust measures needed to address most of the challenges posed by climate variability and change is addressed. It recommended massive awareness campaigns (Government of Kenya, 2010a).

Public service sector employees are decision makers and they implement policies of the government. The employees interact with the public through service provision and as individuals in a family and society setup. It is therefore necessary for them to be aware of climate change so that they incorporate climate change issues in their decisions and policies while interacting with the public to ensure the public make informed decisions and
adopt appropriate adaptation and mitigation measures. The study will attempt to assess level of awareness of public service employees on climate change.

Six key public institutions involved in climate change namely, National Environmental Management Agency (NEMA), Kenya Meteorological Department (KMD), Kenya Electricity Generating Company (KENGEN) Kenya Medical Research Institute (KEMRI) and Kenya Agricultural Research Institute (KARI) have been chosen in this study representing institutions in-charge of policy and implementation, monitoring and forecasting climate and institutions in sectors affected by or impact climate change in energy, health and agriculture. The public look upon these institutions to respond to enquiries about climate change issues.

1.7 Significance

The aim of the study was to assess the level of awareness among public sector employees and determine if awareness is influenced by factors such as training, sources of information and existence or lack thereof of policies and recommend interventions measures required to address climate change awareness gaps. It is hoped that the study findings will help in developing climate change mainstreaming policies to address awareness among staff in these institutions. The study also adds to the body of knowledge in research science particularly on climate change awareness.

1.8 Conceptual framework

Employees in the public service sector are decision makers and implement policies, plans and programmes of the government. Employees also interact with the public during provision of services and socially with their families and
in their neighborhoods. Their level of awareness about climate change is critical because, if they are not aware, climate change issues may not be mainstreamed into their decisions, policies, plans and programmes and may not be able to provide non-formal education through lectures, exhibitions and in their interactions in social circles. This may lead to maladaptation and lack of mitigation among the citizenry due to lack of appropriate information. Failure to incorporate climate change in policies and plans may lead to poor adaptation and mitigation measures. With lack of appropriate climate change information, mitigation and adaptation initiatives may affect developments plans which exacerbate climate change and its impacts.

Figure 1.1: Conceptual Framework, Source; Author
CHAPTER TWO: LITERATURE REVIEW

2.1 Science of Climate Change and Global Warming

Climate change is defined by The United Nations Framework Convention on Climate Change in Article 1 Para 2 as “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods” (UNFCCC, 1992a).

Global concern on climate change emerged after the Brundtland Report, *Our Common Future*, which stated that humanity had pushed the world’s climate to a warming trend through unsustainable development practices (UNWCED, 1987). This led to formation in 1989 of Intergovernmental Panel on Climate Change (IPCC) by the UN Assembly with a mandate to carryout assessment on climate system. IPCC first assessment report in 1990 confirmed the earth climate system was warming, with subsequent reports especially the fourth report being unequivocal about the warming of the climate system, raising the need to act to curb human induced causes of global warming (IPCC, 1990; IPCC, 2007).

IPCC’s assessments were guided by research findings from an array of researchers. Among them was Charles D. Keeling, an oceanographer. He carried out a study of CO₂ concentration in the atmosphere with result showing increased CO₂ concentration over the decades but varying with seasons. This CO₂ increase had a link to industrial revolution. This marked the first link of the possibility of human influence on the climate system (Keeling, 1960).
IPCC assessment reports show evidence that the earth experienced on average 0.6 °C warming during the 20th Century (IPCC, 2001). IPCC projected a 2-3 °C warming by the end of 21st Century (IPCC, 2007).

2.2 Significance of climate change

The climate change impacts threaten the sustainability of the livelihoods for the majority of the population living in the developing countries. Africa, particularly the sub-Saharan region, is likely to be negatively impacted by climate variability and change. According to the Intergovernmental Panel on Climate Change (IPCC, 2007), Africa’s vulnerability arises from a combination of many factors, including extreme poverty, a high rate of population increase, frequent natural disasters such as droughts and floods, and agricultural systems (both crop and livestock production) that depend heavily on rainfall. Occurrence of extreme natural events such as floods and droughts are becoming increasingly frequent and severe. Africa’s high vulnerability to the negative impacts of climate variability and change is also attributed to its low adaptive capacity (Mwiturubani et al., 2010).

The term adaptation as it pertains to climate change according to Smit et al (as cited in Shahadu, 2012) “includes all adjustments in behaviour or economic structure that reduce the vulnerability of society to changes in the climate system”. It is important to note that human action in adaptation has the greatest potential in reducing the adverse effects of climate change which in itself is a result of the actions of humanity. The United Nations (as cited in Shahadu, 2012) considers climate change as “the defining human development challenge of the 21st century”. Human vulnerability to the effects of anthropogenic
climate change is assuming greater proportions globally with significant devastating consequences on poorer countries especially in Africa. The least responsible, less informed and largely neglected on issues of climate change are the people that carry the greatest burden of climate change (BBC, 2009). The need to develop effective adaptation and mitigation strategies has become very crucial in the global fight against climate change. Understanding the views, attitudes, and beliefs of the public on climate change will be very instrumental in the climate adaptation and mitigation process (as cited in Shahadu, 2012).

2.3 Climate Change Awareness Research

Research findings from current literature demonstrate significant increase in general awareness of climate change among individuals especially in the western world.

A 2003-2006 study by Massachusetts Institute of Technology (MIT) among USA public showed that a sizeable majority recognize global warming as a problem (Curry et al., 2007). A BBC study concluded that African citizens are least responsible for climate change and will be among the most affected; yet, they are poorly informed about climate change (BBC, 2009). A World Bank survey on public attitude about climate change found 75% of Kenyans felt climate change is very serious problem (World Bank, 2010). Another global study conducted by Gallup in 128 countries showed that 44% of sub-Saharan Africans were aware about climate change compared to 88% in Europe (2009). A study done in the Niger Delta of Nigeria to assess level of awareness about
climate change among farmers, found out that about 60% of respondents know little or nothing about climate change and its impacts (Nzeadibe et al., 2011).

In 2005, Kenya undertook a capacity needs assessment in the area of climate change awareness. In this baseline study, four individuals from Government officials among others in the general population were interviewed. The study found out that Government officials did not find climate change as an issue, could not acknowledge a link between climate change and climate variability.

The country report on implementation of Article 6 presented by National Environmental Management Authority (NEMA) in a workshop held in Banjul, Gambia by the National Education and Awareness Initiative targeted education institutions, civil societies and media (Muiti, 2010). This study left out public sector employees as a group that require awareness creation on climate change, and who are important in awareness creation through non-formal education.

These previous studies have largely targeted general population, while this study was focusing on specific sectors in the public service sector. Understanding public knowledge on climate change is important in the global project of reducing the effects and impacts of the subject as well as promoting adaptive and mitigation behavioural changes among vulnerable populations.

2.4 Climate Change Policies and Awareness

Climate change policy can be traced back to United Nations Framework Convention on Climate Change (UNFCCC) which was formed during the 1992 United Nations Conference on Environment and Development (UNCED) in
Rio de Janeiro, Brazil to provide a framework for global action against climate change (United Nations, 1992). This was after IPCC first assessment report in 1990 confirmed the earth climate system was warming, with subsequent assessment reports especially the fourth report being unequivocal about the warming of the climate system, raising the need to act to curb human induced causes of global warming (IPCC, 1990; IPCC, 2007). UNFCCC framework therefore became the first policy instrument to address climate change. The Kyoto protocol emerged from UNFCCC deliberations in 1992 aimed at providing legally binding targets for greenhouse gases reduction to the 1990 levels. Therefore, both UNFCCC and Kyoto Protocol became the initial international policy instruments to address climate change and global warming from the international level perspective.

Following the UNFCCC and Kyoto protocol, countries of the world have designed their national climate change response strategies to address climate change. These strategies form the policy instruments that guide actions from stakeholders on challenges presented by climate change.

Kenya is a signatory and has ratified both UNFCCC and Kyoto protocol. It has domesticated them through NCCRS and National Climate Change Action Plan which guide the Kenyan policy (Government of Kenya, 2013).

Policies on climate change play a key role in addressing adaptation and mitigation strategies. However, these policies are hampered by barriers among them lack of awareness, political and economic commitment. These barriers
can be overcome by raising awareness, closing knowledge gaps, and increasing resources (Lorenzoni *et al.*, 2007; Clar *et al.*, 2013).

Cimato and Mullan (2010) argues that autonomous adaptation (without political intervention) by individuals can fail when those affected by climate change are not aware (Cimato *et al.*, 2010). It is therefore important to create awareness on climate change and adaptation options.

### 2.5 Kenya and Climate change Awareness

First National Communication of Kenya to the Conference of Parties (COP) to the UNFCCC recognized that the public is largely unaware of climate change issues such as sources of green-house gases, mitigation measures and impacts and adaptations measures. It recommended that survey should be done to gauge knowledge and attitudes on global warming and climate change to help in determining the intensity and scale of the required actions in order to address it (Government of Kenya, 2002).

In the First National Communication of Kenya to the Conference of Parties (COP) to the UNFCCC, Kenya planned various actions to communicate, train, educate and raise public awareness on climate change issues. Public awareness was to be conducted through workshops and seminars targeting policy makers and decision makers, local government officers, agricultural extension officers among others (Government of Kenya, 2002).

According to UNFCCC website ‘Many governments and intergovernmental organizations are already working in partnership with civil society to fulfill the
commitments in Article 6. However, the scale of challenges posed by climate change requires an engagement on outreach activities of a greater magnitude. According to National Climate Change Response Strategy (NCCRS), the integration of climate information into Government policies is important because climate is a major driving factor for most of the economic activities in Kenya. Climate information has, however, not been easily understandable (Government of Kenya, 2010a).

NCCRS (2010) stated that the level of understanding of climate change and its impacts is very low countrywide. It therefore calls for a focused awareness campaign that simplifies the science and impacts of climate change in a language that is understandable by all segments of the society. This will help improve national preparedness for the potential impacts of climate change. To this end, forums for engagement and information dissemination to the public on current and future climate change risks, and a concerted, focused and comprehensive approach to managing such risks will be established.

2.6 Communication and Climate Change Awareness

Effective climate change communication is a critical component in the fight against climate change. Effective climate change communication involves the right information getting to the right people; it facilitates accurate decision making and therefore accurate interventions (Corner, 2011). It is a critical element in promoting effective and successful adaptation and mitigation strategies (Harvey et al., 2012). Effective communication among stakeholders can help to identify problems, raise awareness, encourage dialogue and
influence behavior change (Johnson, 2011; Moser, 2010; Nerlich et al., 2010) as sited in Harvey et al., (2012). To tackle the complex issue of climate change challenges, social learning approach has been recommended (Collins et al., 2009; Pahl-Wostl et al., 2008).

Many research based on surveys of public opinion on climate change have been conducted on public perception which have revealed that many people don’t understand the science of climate change and are confused about the nature, causes and consequences of climate change (Sampei, 2009).

According to Johanna, et al., (2011) understanding of climate change is acquiring and employing factually correct knowledge of climate change while perception are the views and interpretations based on beliefs and understanding.

From surveys, most of the populations have heard about climate change. However, Sharples found that understanding is superficial (Susanne et al., 2011). This means that though people have heard about climate change, they don’t quite understand it. Basic understanding of the problem thus remains superficial. Understanding of the causes and effects remains limited even though public awareness is high (Moser, 2010).

Media plays a crucial role as a platform for information sharing, dialogue and debate. It is a tool used to shape public opinion on many issues and climate change is no exception. Messages carried by media messages play a key role in influencing people’s perceptions on social issues (Carvalho, 2010; Silverstone, 2005). To make climate change communication effective, Susanne avers that choosing the appropriate communication channel with a tailored message is
more likely to reach and actively engage a specific audience than just mass media due to its inability to tailor messages to particular audiences (Susanne et al., 2011).

According to Sampei (2009), a study done in Japan showed that most Japanese get environmental information from television and newspapers.

Communication channels in the mass media include, Television, radio, newspapers and the internet. Radio is the most widely available and accessible source of news and information for majority of Kenyans (Friedrich-Ebert-Stiftung, 2012). By March, 2013, Kenya had a hundred and two (102) radio stations (CCK, 2013). Television is another channel and in Kenya, there were about 20 TV channels by March 2013 (CCK, 2013). According to Africa Media Barometer 2012, there were about six daily newspapers, seven weekly newspapers and a score of regional newspapers in Kenya (Friedrich-Ebert-Stiftung, 2012). These communication channels are important in communicating climate change information and should be exploited.
CHAPTER THREE: METHODOLOGY

3.1 Study site

Six key institutions were chosen for this study through purposive sampling due to the fact that they are directly involved in climate change issues. MEMR and NEMA are in-charge of policy and implementation, KMD is in-charge of monitoring and climate forecasts while KenGen, KEMRI and KARI are institutions working in sectors directly impacted by climate change (energy, health and agriculture). The public expects these institutions to respond to concerns and enquiries on climate change. All these institutions are headquartered at Nairobi and survey was carried out among employees in Nairobi.

3.2 Research design

According to Babbie (1995), surveys are the best tools of measuring knowledge and attitudes. Thus this study therefore adopted the survey research design to gather the necessary data to answer the above research questions. The study aimed at capturing the current knowledge, understanding, perception and beliefs of climate change among the employees of the five institutions. Descriptive research is a scientific method of investigation, which collects and analyses quantitative data in order to describe population characteristics in their current conditions or status (Mugenda & Mugenda, 2003). Accordingly, this design utilized conducting a survey using questionnaires to gauge awareness, understanding, beliefs and perception of the study population, and which is the most appropriate for such a study. It enabled in-depth investigation into the subject under study. Primary data sources were used and were collected from
employees of these six key public sector institutions. Primary data sources included questionnaires.

3.3 Population

The study was conducted from a population comprising members of staff from the Ministry of Environment and Mineral Resources (MEMR), National Environmental Management Authority (NEMA), Kenya Medical Research Institute (KEMRI), Kenya Meteorological Department (KMD), Kenya Agricultural Research Institute (KARI) and Kenya Electricity Generating Company (KenGen) Nairobi, identified through purposive sampling techniques. Each institution had 20 respondents chosen for the study. The choice of these institutions was guided by researchers’ assumption that employees in institutions dealing with climate change are better placed to provide informal and non-formal education to the citizen as they provide services during their work and in their social settings.

3.3.1 Sampling procedures

The sample size is arrived at by considering how well the sample was representative of the population as well as time and financial constraints. Employees in each institution were categorized into three sampling frames namely; management staff, technical staff and support staff. Based on researcher’s pre-determine sample size of 20 respondents per institution, the allocation of the 20 respondents was determined based on the number of staff in each sampling frame. Once the employees were categorized into the three sampling frame, a simple random sampling technique was used to select
respondents from each sampling frame in all the institutions namely, MEMR, NEMA, KEMRI, KMD, KenGen and KARI.

3.3.2 Sample size

A sample size of 120 respondents was selected comprising of 20 employees each from MEMR, NEMA, KEMRI, KMD, KenGen and KARI as shown in Table 1 below.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEMR</td>
<td>20</td>
</tr>
<tr>
<td>NEMA</td>
<td>20</td>
</tr>
<tr>
<td>KMD</td>
<td>20</td>
</tr>
<tr>
<td>KenGen</td>
<td>20</td>
</tr>
<tr>
<td>KARI</td>
<td>20</td>
</tr>
<tr>
<td>KEMRI</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>120</strong></td>
</tr>
</tbody>
</table>

3.4 Instruments

These are the tools for collecting data and in this study the questionnaire were used. The target population was literate to fill the questionnaire. The language in the questionnaire was simple to facilitate easy filling.

3.4.1 Data collection procedure

Permission from the institutions being studied was sought to carry-out the study among their employees. Pre-test of the research tools was done to help test the feasibility of the study techniques and to perfect the questionnaire concepts and wording. To achieve 100% response rate, each institution was issued with about 25 questionnaires, 5 more, during distribution. To measure awareness levels, various variables such as gender, education and age were
evaluated. A Likert type items was applied to measure the awareness of employees about climate change. The questionnaire was administered through contact method.

3.5 Data analysis and Interpretation

The researcher employed computer aided statistical packages to analyse the information collected. Statistical Package for Social Sciences (SPSS 18) and Microsoft Excel 2010 were used for data analysis. Questionnaires were examined to ensure that they were consistently filled and complete. The responses to various questions were numerically coded and responses stored in a database template using statistical package for social science (SPSS 18) and MicroSoft Excel 2010 software. The data was then sorted and analyzed.

Simple descriptive statistics and detailed statistics were used in analyzing the data. To summarize the data, use of descriptive statistics such as frequencies counts and percentages were employed. Detailed analysis, Chi-square test, Anova and correlation analysis were done to test significance and relationships among variables. The results were presented graphically in charts, graphs and tables.
CHAPTER FOUR: RESULTS AND DISCUSSIONS

4.1 Introduction to Data Analysis

This chapter presents the results and findings of the study based on the research questions. The findings were given based on the objectives of the study as explored using specific questions in the questionnaire. Of the 120 expected respondents who were the members of staff from the six institutions in Kenya that are working directly in sectors impacted by climate change, all the 120 responded. This represented 100% of the total respondents.

4.2 Personal Information

4.2.1 Age of the respondents

![Figure 4.1: Age of the respondents in public service institutions](image)

The study requested respondents to indicate the age brackets in which they belonged. From the findings indicated in Figure 4.1, 31% of the respondents...
indicated that they were between 31-40 years of age, 31% of the respondents indicated that they were aged between 41-50 years, 24% were aged above 51 years while 14% of the respondents were 30 years and below. This implied that the respondents were of age that commands respect among the populace and therefore can be of valuable importance in creating awareness among the citizen both during service delivery and in their social circles.

4.2.1 Age Influence on Respondents' level of awareness on Climatic change

Table 4.1: Age influence on climate change awareness

<table>
<thead>
<tr>
<th>Age Category</th>
<th>n</th>
<th>X</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 and below</td>
<td>60</td>
<td>54.12</td>
<td>10.24</td>
</tr>
<tr>
<td>31-40 years</td>
<td>35</td>
<td>61.79</td>
<td>13.79</td>
</tr>
<tr>
<td>41-50 years</td>
<td>17</td>
<td>70.12</td>
<td>11.72</td>
</tr>
<tr>
<td>51-above</td>
<td>8</td>
<td>76.48</td>
<td>9.16</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>64.69</td>
<td>100</td>
</tr>
</tbody>
</table>

The results presented in Table 4.1 indicates that respondents in the age category 51 and above recorded the highest mean score of 76.48 (s=9.16) while those who were aged 30 years and below recorded the lowest climate change awareness with a mean score of 54.12 (s=10.24). This clearly indicated that older public officers were more aware about climate change compared to younger ones aged 51 years and below. The findings also indicated that all the respondents were generally aware of climate change indicating that there was no significant relationship between the age and the level of awareness on climate change. This is however at variance with the findings of Adebayo, et
al., (2013) in Adamawa State, Nigeria that found age influences climate change awareness.

4.2.2 Gender of the respondents

![Gender Distribution Chart]

**Figure 4.2: Gender of the respondents**

The study sought to know the distribution of the respondents by gender. From the findings, majority (57%) of the respondents were male while 43% of the respondents were female as indicated in Figure 4.2. This is important because women and men do not experience climate change equally, with women being more vulnerable. Involving more women will ensure gender balance where women play their rightfull role in addressing climate change (UNFCCC, 2012).
4.2.3 Respondents Education level

Table 4.2: Respondents Education level

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>University</td>
<td>60</td>
<td>50</td>
</tr>
<tr>
<td>College</td>
<td>35</td>
<td>29</td>
</tr>
<tr>
<td>Secondary</td>
<td>17</td>
<td>14</td>
</tr>
<tr>
<td>Others</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

The respondents were asked to indicate their level of education. From the findings shown in Table 4.2, majority (50%) of the respondents indicated that they had university degree, 29% of the respondents indicated that they had college level education, 14% had secondary education while 7% of the respondents indicated that they had attained other level of education. This implies that the institution employs highly educated and qualified personnel as part of their staff management and could be exploited as a knowledge resource for information on climate change awareness in the public service sector and beyond.

The significance of the relationship between highest level of education and level of climate change awareness was tested further using a one way Anova and results presented in Table 4.3 below.

Table 4.3: The influence of education on respondent level of awareness

<table>
<thead>
<tr>
<th>Age Category</th>
<th>n</th>
<th>X</th>
<th>S</th>
<th>F</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>University</td>
<td>60</td>
<td>79.34</td>
<td>9.210</td>
<td>5.519</td>
<td>7</td>
<td>0.0132</td>
</tr>
<tr>
<td>College</td>
<td>35</td>
<td>76.98</td>
<td>11.529</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>17</td>
<td>62.17</td>
<td>11.675</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others (Phd, Masters)</td>
<td>8</td>
<td>86.48</td>
<td>9.021</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>74.81</td>
<td>10.01</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results presented in Table 4.3 indicates that increase in level of education increased level of climate change awareness. The respondents with the highest level of education such as those who had doctorate and master degree were more conversant with climate change issues as indicated by a mean of 86.48 (s=9.021) while those who had secondary school education were least conversant with issues on climate change with a mean of 62.17 (s=11.675). The respondents with secondary level education and below had the least awareness of climate change. Further, the differences in respondents' awareness mean score across the various level of education was statistically significant (F =5.519, df=7 and P Value = 0.0132). This indicates that level of education has a significant influence on level of climate change awareness in the public sector. This conforms to the finding of Olajide et al., (2011) who found a significant association between age and knowledge of global warning among undergraduate students of Obafemi Awolowo University (OAU), Ile Ife, Nigeria. Earlier studies by Asfaw and Admassie, (2004) reported that level of education had significant positive effects on improving level of information regarding climate change (as cited in Deressa, (nd)).
4.2.4 Respondent’s Religion

Figure 4.3: Respondent’s Religion

The study sought to know the religion in which the respondents belonged. From the findings indicated in Figure 4.3, most (40%) of the respondents were Christians, 31% were Muslims while 29% of the respondents were from African religions. Religious inclination may affect beliefs about climate change.

4.2.5 Number of persons in the family

On the number of persons the respondent’s family had, respondents stated that they had a family of between two to six members of the family. This implies that the creating awareness in public service would have impact on a large population as the public service employees would share climate change information with their members of the family and influence their behaviour.
4.2.5 Employee by job cadre

Table 4.4: Employees by job cadre

<table>
<thead>
<tr>
<th>Job Cadre</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Staff</td>
<td>17</td>
<td>14</td>
</tr>
<tr>
<td>Technical Staff</td>
<td>53</td>
<td>44</td>
</tr>
<tr>
<td>Support Staff</td>
<td>50</td>
<td>42</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

The study sought to establish the employees’ distribution in the institutions based on job cadre. From the Table 4.4 above, management staff comprised 15%, technical staff 44% and support staff 42% respectively.

4.3 Climate change Awareness

4.3.1 Whether heard about climate change or global warming?

Table 4.5: Whether heard about climate change or global warming

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>117</td>
<td>98</td>
</tr>
<tr>
<td>No</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

The study sought to investigate whether the respondents had heard about climate change or global warming. From the findings, 98% the respondents indicated that they had heard about climate change or the global warming while only 2% of the respondents stated that they have never heard about climate change or global warming as shown in Table 4.5. This indicate that majority of employees are generally aware of climate change and global warming. The finding are similar to Adebayo et al., (2013) who found out that 90% of
population in his study were aware about climate change with 10% not being aware.

4.4 Whether climate change is happening

![Pie chart showing 97% Yes and 3% No]

**Figure 4.4: Believe on whether climate change is happening**

On whether the respondents believed that climate change was happening, 97% of the respondents stated that they believed climate change was happening while 3% of the respondents did not believe that climate change was happening as indicated in Figure 4.4. The finding is significant as acknowledgement of climate change would lead to people getting concerned and doing something about mitigating and adapting to climate change.
4.3.2 What best describing climate change?

Table 4.6: Best description of climate change

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature rise</td>
<td>63</td>
<td>53</td>
</tr>
<tr>
<td>Frequent drought</td>
<td>31</td>
<td>26</td>
</tr>
<tr>
<td>Frequent floods</td>
<td>17</td>
<td>14</td>
</tr>
<tr>
<td>Sea level rise</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Melting of mountain glaciers</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.6 indicates the various responses which best describe climate change according to the respondents. 53%, 26%, 14%, 4% and 2% of the respondents indicated that temperature rise, frequent drought, frequent floods, sea level rise, melting of mountain glaciers best describe climate change. This shows that rise in temperature is perceived by most people as the best indicator of climate change.

4.3.3 Personal experience to make one say there is climate change

The study sought to know what the respondents had personally experienced to make them say climate change is happening. From the findings, respondents stated that climate change is happening due to recurrent drought in the country. Rise in temperature, rise in sea level, extreme weather events such droughts and floods, changing length of growing season, acidification of the oceans and human conflict and insecurity over scarce natural resources were the other experiences employees mentioned that make them say climate change is happening. This is in line with Mwiturubani and Wyk (2010), who stated that
occurrence of extreme natural events such as floods and droughts are becoming increasingly frequent and severe due to climate change.

4.3.4 Do you know causes of climate change?

Table 4.7: Respondents knowledge on what causes climate change

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>108</td>
<td>90</td>
</tr>
<tr>
<td>No</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

Respondents were asked to indicate whether they knew what causes climate change. From the findings, 90% of the respondents stated that they knew the causes of climate change as indicated in Table 4.7. 10% of the respondents said they did not know the causes of climate change. This shows that despite 98% of respondents reporting having heard about climate change and global warming, quite a number (10%) don’t know what causes climate change. This shows gaps in understanding and knowledge about climate change science. There is need to devise measures for employees to understand climate change.
4.3.5 Is climate change caused by human or natural activities?

The study sought to know what the respondents thought was the cause of climate change. From the findings in Figure 4.5, majority (75%) of the respondents indicated that human activities caused climate change while 19% of the respondents indicated that climate change is caused by natural causes and 6% indicated that climate change was caused by both human and natural causes.

4.3.6 Human activities that causes climate change

Table 4.8: Human activities that causes climate change

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Destroying forests</td>
<td>120</td>
<td>100</td>
</tr>
<tr>
<td>Use of petroleum products</td>
<td>120</td>
<td>100</td>
</tr>
<tr>
<td>Air pollution</td>
<td>95</td>
<td>79</td>
</tr>
</tbody>
</table>
The study sought to know the human activities that cause climate change. The study found that destroying forests, use of petroleum products and air pollution causes climate change as indicated by 100%, 100% and 79% of the respondents in Table 4.8. The finding conforms to Idrisa et al., (2012) who found that 91% of the respondents in his study on Analysis of awareness and adaptation to climate change among farmers in the Sahel Savannah Agro-ecological Zone of Borno State, Nigeria perceived climate change as being caused by deforestation.

4.3.7 Understanding and Knowledge

4.3.7.1 How much do you understand about Greenhouse Gases?

Table 4.9: Level of understanding about Greenhouse Gases

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>More</td>
<td>69</td>
<td>57</td>
</tr>
<tr>
<td>Average</td>
<td>25</td>
<td>21</td>
</tr>
<tr>
<td>Less</td>
<td>26</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

The study sought to know how much respondents understood about greenhouse gases. To analyse this question, the 5 possible responses were further condensed to 3 responses for ease of analysis. From the findings indicated in Table 4.9, majority 57% indicated that they understood the greenhouse gases more, 21% understood the greenhouse gases moderately while 22% understood little about greenhouses gases. Among support staff (n=50), 64% indicated that they had low understanding about greenhouse gases as compared to only 35%
and 25% among management (n=17) and technical staff (n=53) respectively. This clearly implies that although there exist knowledge and understanding on greenhouses gases, the level of knowledge and understanding need to be enhanced through creation of awareness among employees. The findings concurred with Nzeadibe et al., (2011) who assessed level of awareness about climate change among farmers in Niger Delta of Nigeria and found that about 60% of respondents knew little or nothing about climate change and its impacts.

4.3.7.2 Respondents view on climate change as problem

<table>
<thead>
<tr>
<th>Respondents view on climate change</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Somewhat serious, 8%</td>
<td></td>
</tr>
<tr>
<td>Too serious problem, 13%</td>
<td></td>
</tr>
<tr>
<td>Very serious problem, 79%</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 4.6: Respondents view on climate change as a problem**

The study sought to establish from respondents whether climate change was a serious problem or not. As indicated in Figure 4.6, Majority 79% of the respondents view climate change as a very serious problem. 13% view climate change as too serious a problem while 8% of the respondents view climate
change as somewhat serious. These responses could be attributed to the heightened activities in the international arena towards taking measures to address climate change.

4.3.7.3 How informed are you about different causes of climate change?

Table 4.10: How informed respondents were about different causes of climate change

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very well informed</td>
<td>92</td>
<td>77</td>
</tr>
<tr>
<td>Fairly well informed</td>
<td>24</td>
<td>20</td>
</tr>
<tr>
<td>Not Very Well Inform</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>120</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

The study sought to establish how informed the respondents were about the different causes of climate change. From the findings shown in Table 4.10, majority 77% of the respondents were very well informed of the different causes of climate change while 20% of the respondents were fairly informed of the different causes of climate change and 3% indicated that they were not very well informed on the different causes of climate change. Respondents explained that the burning of fossil fuels like coal and oil had increased the concentration of atmospheric carbon dioxide and that the clearing of land for agriculture, industry and other human activities have increased concentrations of greenhouse gases. This implies that there was climate change awareness in the public sector. The findings concurred with Muiti (2010) who stated that public sector employees was a critical group that require awareness creation on
climate change, and who were key in awareness creation through non-formal education.

4.3.7.4 How informed are you on consequences of climate change?

Table 4.11: How informed respondents were on different consequences of climate change

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very well informed</td>
<td>106</td>
</tr>
<tr>
<td>Fairly informed</td>
<td>12</td>
</tr>
<tr>
<td>Not Very Well Informed</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
</tr>
</tbody>
</table>

On the different consequences of climate change, 88% of the respondents were very well informed, 10% of the respondents were fairly informed while 2% indicated they were not very well informed about different consequences of climate changes as indicated in Table 4.11.

Table 4.12: How informed the respondents were on causes, consequences and curbing climate change

<table>
<thead>
<tr>
<th>n</th>
<th>X</th>
<th>S</th>
<th>F</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Different causes of climate change</td>
<td>44</td>
<td>61.67</td>
<td>11.14</td>
<td>4.592</td>
<td>5</td>
</tr>
<tr>
<td>Different consequences of climate change</td>
<td>40</td>
<td>71.60</td>
<td>10.51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ways in which to curb climate change</td>
<td>36</td>
<td>53.76</td>
<td>11.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>62.000</td>
<td>11.023</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The results presented in Table 4.12 indicate responses on how well informed the respondents felt they were with regard to causes, consequences and responses to climate change. The respondents were well informed on different consequences of climate change as indicated by a mean of 71.60 (s=10.51) while those who were well informed on different causes of climatic changes had a mean of 61.67 (s=11.14). The respondents who said they were well informed on the ways in which to curb climate change had a mean of 53.76 (s=11.75). Further, the differences in respondents' level of being informed on causes, consequences, and ways of curbing climate change were statistically significant (F = 4.592, df=5 and P Value > 0.05 at 0.0132). This indicated that the level of awareness on climate change plays a great role in informing the public about the impact of climate change. The findings agree with study by Olajide et al., (2011) and Adebayo et al., (2013).

4.3.7.5 Informed on ways in which to curb climate change

On whether the respondents knew the ways in which to curb climate change, majority 57% of the respondents indicated that they were fairly well informed
of ways in which to curb climate change while 43% of the respondents said they were very well informed of ways to curb the climate change as shown in Figure 4.7. The study found that to curb climate change there is need to reduce Greenhouse gas emissions by using renewable energy which produces no emissions, reduce demand for energy in homes, transport and industry.

4.3.7.6 What do you attribute your awareness on climate change to?

Table 4.13: Attributing awareness on climate change

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training through school, college, job seminars and workshops</td>
<td>97</td>
<td>81</td>
</tr>
<tr>
<td>Interest in the subject</td>
<td>72</td>
<td>86</td>
</tr>
<tr>
<td>Media reporting</td>
<td>94</td>
<td>66</td>
</tr>
</tbody>
</table>

The study sought to know what respondents attributed their awareness on climate change to. From the findings shown in Table 4.13, majority 81% of the respondents indicated that they attributed their awareness on climate change to the training through school, college, job seminars and workshops. 94% of the respondents attributed their awareness to interest in the subject while 66% attributed their awareness to media reporting. This is in line with Government of Kenya, (2002) which states that public awareness was to be conducted through workshops and seminars targeting policy makers and decision makers, local government officers, agricultural extension officers among others.
4.3.7.7 Source of climate change information

Table 4.14: Source of climate change information

<table>
<thead>
<tr>
<th></th>
<th>Frequency of yes</th>
<th>Percentages of yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Television</td>
<td>113</td>
<td>94</td>
</tr>
<tr>
<td>Radio</td>
<td>96</td>
<td>80</td>
</tr>
<tr>
<td>Newspaper</td>
<td>77</td>
<td>64</td>
</tr>
<tr>
<td>Internet</td>
<td>67</td>
<td>56</td>
</tr>
<tr>
<td>Brochures/posters/pamphlets</td>
<td>55</td>
<td>46</td>
</tr>
<tr>
<td>Government circulars and memos</td>
<td>66</td>
<td>55</td>
</tr>
<tr>
<td>Seminars &amp; workshops</td>
<td>84</td>
<td>70</td>
</tr>
<tr>
<td>Exhibitions</td>
<td>60</td>
<td>50</td>
</tr>
</tbody>
</table>

Table 4.14 shows the response on the source of climate change information among public service employees. From the findings, 94%, 80%, 70%, and 64% of the respondents indicated that their source of climate change information were television, radio, seminars & workshops and newspaper respectively. 56%, 55% and 50% of the respondents indicated that their source of climate change information was internet, government circulars, memos and exhibitions while brochures, posters and pamphlets were indicated to be the source of climate change information by 46% of the respondents. Climate information has, however, not been easily understandable (Government of Kenya, 2010).
The results presented in Table 4.15 shows that media as a source of climate change information has significant impact on creating awareness on climate change among the public service employees ($x^2=51.425$, $n=120$, $df=3$, $p=0.0001$). The majority of the respondents, 113 indicated that television was the most used media as a source of climate change information in the public service sector with 55% of the respondents indicating use of government circulars and memos as a least source of climate change information in the public sector. While the results may be taken to mean that the government mostly used the electronic media such as Television and radios, this may be misleading since the use of other media sources has been significantly been used.
This implies that media has become the important part of life which informs and educates the people. Awareness plays a key role in reducing impacts of climate change. Media plays an important role in creating awareness about climate change. The findings concurred with a study by Kapoor (2011), who assessed the role different information channel played among the people of Shringverpur village, Allahbad District India. It found that, approximately 40% of the people preferred television programmes whereas 26% of the people showed their interest in radio programmes. Hence, information channels using media can play an important role to bridge the gap between climate change and awareness.

4.3.7.8 Is there need for more climate information in the office?

![Bar chart showing need for more climate information in the office]

**Figure 4.8: Need for more climate information at workplace**

Respondents were asked to indicate whether there should be more climate change information in the office. From the findings, 85% the respondents stated that there should be more climate change information in the office as
illustrated in Figure 4.8. This shows employees desire to get more information to make them knowledgeable about climate change.

4.3.7.9 Have you recently attended a seminar, workshop or training on Climate Change?

![Figure 4.9: Recent attendance in a seminar, workshop or training on Climate Change](image)

Figure 4.9: Recent attendance in a seminar, workshop or training on Climate Change

Figure 4.9 shows the results of the question on whether employee recently attended a seminar, workshop or training on Climate Change. 66% of the respondents stated that they had recently attended a seminar, workshop or training on climate change while 34% said they had not attended any. The study further found that these events had been organized by the government, NGO or development partners.
4.3.7.10 Do you feel sure about yourself when talking to others about climate change or its impacts?

Table 4.16: Feeling sure when talking to others about climate change

<table>
<thead>
<tr>
<th></th>
<th>Management</th>
<th>Technical</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>14</td>
<td>41</td>
<td>25</td>
</tr>
<tr>
<td>Neither Agree nor Disagree</td>
<td>3</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>Disagree</td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>53</td>
<td>50</td>
</tr>
</tbody>
</table>

The study sought to know the extent to which the respondents agreed with the statement that “I feel sure of myself when talking to others about climate change or its impacts”. To analyze this question, the 5 possible responses were further condensed into 3 responses for ease of analysis. From the findings shown in Table 4.16, 50% of support staff disagreed or could neither agree nor disagree that they felt sure about talking about climate change to others as compared to management staff and technical staff who agreed, 82% and 77% respectively. This implies that there is need to enhance awareness mainly among support staff so that they understand and feel confident to talk about climate change to others.

4.3.7.11 Is government doing enough to deal with climate change?

Table 4.17: Whether government is doing enough about climate change

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not enough</td>
<td>97</td>
<td>81</td>
</tr>
<tr>
<td>Right amount</td>
<td>13</td>
<td>11</td>
</tr>
<tr>
<td>Too much</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>
The study sought to find out whether the government was doing enough to deal with climate change. From the findings shown in Table 4.17, 81% of the respondents indicated that they felt the government was not doing enough to deal with climate change, 11% said the government was doing right amount while 8% of the respondents stated that the government was doing too much to deal with climate change. This clearly indicated that the government was not doing much to create awareness on Climate changes. The findings concurred with GOK (2005) findings on baseline reports on capacity needs assessment in the area of climate change awareness which found that individuals from Government did not find climate change as an issue, could not acknowledge a link between climate change and climate variability.

4.3.7.12 Are you aware of any policies on climate change by government?

Table 4.18: Respondents awareness of Kenya Government policies on climate change

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>14</td>
<td>82</td>
</tr>
<tr>
<td>No</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>100</td>
</tr>
</tbody>
</table>

The study sought to know whether the management was aware of policies on climate change by government. From Table 4.18, Majority (82%) of the respondents indicated that they are aware of the policies on climate change by government while 18% of the respondents were not aware. The respondents said government had put in place various policy frameworks to address climate change including NCCRS, National Climate Change Action Plan, Climate Change Authority Bill, Draft Climate Change Policy Law and National
Adaptation Policy. This in line with National Climate Change Response Strategy (NCCRS), which reports that the integration of climate information into Government policies is important because climate is a major driving factor for most of the economic activities in Kenya.

4.3.7.13 Are there challenges encountered when implementing climate change policies?

Table 4.19: Challenges in implementing climate change policies in the Public Service institutions

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>14</td>
<td>82</td>
</tr>
<tr>
<td>No</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>100</td>
</tr>
</tbody>
</table>

The study sought to find out whether there were challenges encountered when implementing climate change policies. From the findings majority (82 %) of the respondents indicated that there were challenges encountered when implementing climate change policies as shown in Table 4.19 above. These challenges included lack of adequate funds to facilitate the projects, lack of public awareness to help support the project, misappropriations of funds and slow approval of bills and implementation of climate change policies. Other included lack of goodwill from the government, ineffective enforcement of guideline by the relevant authorities, ignorance of the public and cultural practices.
4.4 Correlations Analysis

Table 4.20: Correlations analysis of climate change awareness, policies, mitigation and adaptation

<table>
<thead>
<tr>
<th>Policies, Plans &amp; programmes</th>
<th>Pearson Correlation</th>
<th>Climate change awareness</th>
<th>Mitigation &amp; adaptation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policies, Plans &amp; programmes</td>
<td>Pearson Correlation</td>
<td>Climate change awareness</td>
<td>Mitigation &amp; adaptation</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training</td>
<td>Pearson Correlation</td>
<td>Climate change awareness</td>
<td>Mitigation &amp; adaptation</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source of Climate Change Information</td>
<td>Pearson Correlation</td>
<td>Climate change awareness</td>
<td>Mitigation &amp; adaptation</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.01</td>
<td>.007</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>120</td>
<td>120</td>
<td>120</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

The study conducted a Pearson Correlation analysis for the study variables and noted that there existed a very strong positive correlation between climate change awareness in the public service sector at 95% confidence level.
The study revealed a positive, significant correlation between source of climate change information and climate change awareness, $r = 0.698$ with $P < 0.05$ at 0.01. The finding was statistically significant as $P < 0.05$. This indicates that source of information on climate change and awareness about climate change has a positive relationship.

The study revealed a positive, significant correlation between policies, plans and programmes and level of climate change awareness with a correlation coefficient of $r = 0.547$ and a 95% precision level. The correlation was statistically significant since it had a $P$-Value of 0.02 which was less than 0.05 hence statistically significant.

The study also established a strong positive correlation between mitigation and adaptation and climate change awareness with a correlation coefficient of $r = 0.698$ and a significance level of 0.006. This correlation was statistically significant since its $P$-Value was less than 0.005 as shown in Table 4.20 above.
CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the findings of the study that relates to the research questions set out at the beginning of the study, seeking to show these questions have been answered by the study. The chapters also draws conclusion made from the findings of the study for implementation or as a background document for further research.

5.2 Summary of the findings

This study sought to investigate whether public service sectors employees are aware about climate change, their source of climate change information and if there were policies on climate change in public service sector and whether there were challenges encountered while implementing them.

From the findings, the study established that climate change awareness among employees working in key public service sector was significantly high. The respondents believed that the climate change was happening with indicators such as frequent drought, sea level rise, temperature rise, melting of mountain glaciers and frequent floods. 97% of the respondents stated that they were aware of climate change and global warming. Almost an equal number, 75%, believed climate change was happening. 78% of respondents stated that they understood greenhouse gases. 81% of respondents attributed their awareness to training while majority attributed their awareness about climate change to interest in the subject. 79% of the respondents stated that climate change was a
very serious problem. 87% of the respondents stated that they felt confident about themselves while talking to others about climate change.

From the findings, the study established that media was the main source of climate change information among employees. TV was leading with 94% followed by radio, seminars, newspaper, government circulars, exhibitions and brochures at 80%, 70%, 64%, 55%, 50% and 46% respectively.

On the question whether employee recently attended some form of training on climate change, 66% of the respondents stated that they had recently attended a seminar or workshop organized by government, NGOs or development partners such as World Bank. 85% of the respondents stated that there was need for more climate change information in the office.

From the study findings, 81% of the respondents felt that the government was not doing enough to address climate change. 82% of the management staff stated that there were policies on climate change while an equal number stated that there were challenges encountered while implementing them.
5.3 Conclusion

This study sought to investigate public service sectors employees’ awareness about climate change, source of climate change information among the employees and whether there were policies on climate change in the public service sector and if there were challenges encountered while implementing them.

From the findings the study concluded that awareness about climate change is significantly high (97%) among employees within the institutions working directly in sectors impacted by climate change. Climate change understanding and knowledge is above average (57%) as most employees understood greenhouse gases which lead to global warming causing climate change. However, there is need to improve understanding of climate change in workplace so that the employees become ambassadors to the rest of the society through informal education. This is because only 57% stated that they understood more about greenhouse gases.

From the findings, mass media emerged as the main source of climate change information as compared to office communication channels (workshops, seminars, brochures, memos). This lack of office climate change information could be the cause of the low understanding and knowledge of climate change even though general awareness was high. It is one thing to have heard about climate change and another to be able to explain the same to the public who seek services in the public sector offices. This is especially true given that climate change awareness is low countrywide, particularly, among citizen who also happen to be the most vulnerable to the adverse impacts on climate change
because of the dependency on climate-sensitive natural resources and high poverty rates.

The study also concluded that it is important to create awareness targeting those with some understanding of climate change to help them become change ambassadors through non-formal education as they interact with public during service delivery and in the social circles.

From the study, it was found that there are climate change policies in public service sector that are aimed at addressing challenges that climate change portends. Example of policies sited includes NCCRS, National Climate Action Plan among others. The respondents identified various challenges that hinder implementation of these policies. These includes lack of adequate funding, lack of central co-ordination on climate change issues, low level of awareness about climate change among the public and perceived lukewarm support from government.

From the findings, there is positive significant correlation between climate change awareness and policies on one hand and source of climate change information on the other.

The study concluded that there is need for further deepening of climate change awareness and understanding among employees to enhance their knowledge and understanding to promote non-formal education for effective fostering of adaptation and mitigation strategies. There is also need for clear climate change policies, better coordination and funding of climate change activities.
5.4 Recommendations

From the findings and conclusions, the study makes the following recommendations.

1. Activities towards promoting climate change awareness should be enhanced in the workplace through seminars, workshops, brochures and memos targeting all employees to enhance the understanding of the employee so that they feel more confident to talk about climate change to the public during service delivery and in their social settings.

2. Climate change should be further mainstreamed into national climate change strategies and policies to address awareness and public education needs. The institutions should lead in establishing and implementing their climate change awareness strategies in the workplace in a consultative and participatory manner.

3. Further research should be conducted to establish factor that affect awareness about climate change in the public service sector. A sector-wide study in the public sector should also be done to investigate climate change awareness across the wider public service sector.
REFERENCES


Carvalho, A. (2010). Media(ted) discourses and climate change: A focus on political subjectivity and (dis)engagement. *WIREs Climate Change* 1, 172-179.


Sharples, D.M. (2010). *Communicating Climate Science: Evaluating the UK Public’s Attitude to Climate Change. Earth and environment* 5, 185-205


APPENDICES

APPENDIX I: University Research Authorization Letter

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: kubps@yahoo.com
dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 8710901 Ext. 57530

Our Ref: N5C/CE/22543/11
Date: 19th June, 2013

The Permanent Secretary,
Ministry of Higher Education, Science & Technology,
P.O. Box 30040,
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION
MR. ONESMUS KAMIRI RUURIE - REG. NO. N50/CE/22543/11

I write to introduce Mr. Onesmus Kamiri Ruirie who is a Postgraduate Student of this University. He is registered for a M.Sc. (Environmental Education) degree programme in the Department of Environmental Education in the School of Environmental Studies.

Mr. Kamiri intends to conduct research for a thesis entitled, “Climate Change Awareness in the Public Service Sector: A Case Study Analysis of Six Institutions in Kenya.”

Any assistance given will be highly appreciated.

Yours sincerely,

JULIA OSULU
DEAN, GRADUATE SCHOOL

Kenyatta University ... ISO 9001: 2008 Certified
RE: RESEARCH AUTHORIZATION

Following your application dated 26th June, 2013 for authority to carry out research on "Climate Change Awareness in the Public Service Sector: A Case Study analysis of six Institutions in Kenya." I am pleased to inform you that you have been authorized to undertake research in Nairobi County for a period ending 31st December, 2013.

You are advised to report to the Chief Executive Officers, Selected Institutions before embarking on the research project.

On completion of the research, you are expected to submit two hard copies and one soft copy in pdf of the research report/thesis to our office.

DR. M. K. RUGUTT, PhD, HSC.
DEPUTY COUNCIL SECRETARY

Copy to:
The Chief Executive Officers
Selected Institutions.
APPENDIX III: Questionnaire on Climate Change Awareness

QUESTIONNAIRE ON CLIMATE CHANGE

The purpose of this questionnaire is to collect data on climate change awareness in your institution. The information that you provide will be treated with strict confidence. Please do not write your name.

(Kindly fill in this questionnaire by ticking or filling where appropriate)

SECTION A: Personal Information

Q1. Age (years): 30 & below [ ] 31-40 [ ] 41-50 [ ] 51 & above [ ]

Q2. Sex: Male [ ] Female [ ]

Q3. Education level: Secondary [ ] College [ ] University [ ]
   other [ ]

Q4. Religion: Christian [ ] Muslims [ ] African Religions [ ]
   None [ ]
   Others (Specify) .................................................................

Q5. My family has this number of persons: ..................

Q6. Cadre: ..............................................................................

SECTION B:

Q7. Have you heard about climate change or global warming? YES [ ], NO [ ].

Q8. Do you believe climate change is happening? YES [ ], NO [ ], don’t know [ ].

Q9. If yes, which below best describe climate change according to you?
   [ ] Temperature rise
   [ ] Frequent drought
   [ ] Frequent floods
   [ ] Sea level rise
   [ ] Melting of mountain glaciers
   [ ] Others, please
   specify .................................................................

   ..............................................................................
   ..............................................................................
Q10. What have you personally experienced to make you say there is climate change?

Q11. Do you know what causes climate change? YES [ ], NO [ ].
Q12. What do you think is the cause of climate change?
[ ] Human activities
[ ] Natural causes
Q13. If human activities, please indicate which ones below;
[ ] Destroying forests
[ ] Use of petroleum products
[ ] Air pollution
[ ] Others, please specify

Q14. How much do you understand about green house gases?

<table>
<thead>
<tr>
<th>Less</th>
<th>More</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Q15. In your view, is climate change...
[ ] A very serious problem
[ ] Somewhat serious
[ ] Too serious
[ ] Not a problem

Q16. Personally, how well informed do you feel you are about ...

Q16a. The different causes of climate change
[ ] Not at all informed
[ ] Not very well informed
[ ] Fairly well informed
[ ] Very well informed

Q16b. The different consequences of climate change
[ ] Not at all informed
[ ] Not very well informed
[ ] Fairly well informed
[ ] Very well informed

Q16c. Ways in which to curb climate change
[ ] Not at all informed
[ ] Not very well informed
[ ] Fairly well informed
[ ] Very well informed

Q17. What would you attribute your awareness on climate change to?
[ ] Training through school, college and job seminars and workshops
[ ] Interest in the subject
[ ] Media reporting
Q18. Please indicate your source for climate change information
[ ] Television
[ ] Radio
[ ] Newspaper
[ ] Internet
[ ] Brochures/posters/pamphlets
[ ] Government circulars & memos
[ ] Seminars & workshops
[ ] Exhibitions

Q19. Do you think there should be more climate information in your office?
YES [ ], NO [ ].

Q20. Have you recently attended a seminar, workshop or training lessons on Climate Change? YES [ ], NO [ ], don’t know [ ].

Q20a. If “yes” who organized the events?
[ ] Government
[ ] NGO
[ ] Development partners
[ ] Others, Please specify

Q21. I feel sure of myself when talking to others about climate change or its impacts.
[ ] Strongly agree
[ ] Disagree
[ ] Neither agree nor disagree
[ ] Agree
[ ] Strongly disagree

Q22. Do you think government is doing enough to deal with climate change?
[ ] Not enough
[ ] Right amount
[ ] Too much

(Question 23 & 24 to be completed by Management Heads).

Q23 Are you aware of any policies on climate change from government?
YES [ ], NO [ ].
If “yes”, please list them below.
Q24. Are there challenges you encounter when implementing climate change policies? YES [ ], NO [ ].
If “yes”, please list them below.

a) ........................................................................................................

......

b) ........................................................................................................

......

c) ........................................................................................................

......

d). ........................................................................................................

......