ADOPTION OF THE GREEN CONCEPT IN NAIROBI FOR BIODIVERSITY CONSERVATION, ENVIRONMENTAL MANAGEMENT AND SUSTAINABLE DEVELOPMENT GOALS IMPLEMENTATION

KATHAMBI BESSY EVA

BA: Community Development (Daystar), MA: International Conflict Management (UON)

REG No. A82/99367/2015

A THESIS SUBMITTED TO THE UNIVERSITY OF NAIROBI IN PARTIAL FULFILMENT OF THE DOCTOR OF PHILOSOPHY DEGREE IN ENVIRONMENTAL GOVERNANCE AND MANAGEMENT

WANGARI MAATHAI INSTITUTE FOR PEACE AND ENVIRONMENTAL STUDIES

2018

DECLARATION

This project is my original work and has not been presented wholly or partly in any other university for any award.

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Signed: _____ Date_____

Name: Kathambi BessyEva

This research project has been submitted for examination with my approval as the University supervisor.

Signed: _____ Date_____

Name: Prof. Mutembei, Henry

Signed: _____ Date_____

Name: Prof. Nyamasyo, Gideon. H. N

DEDICATION

To my mother the late Janice Kamami and my grandmother the late Tabitha Mwariwanja, whose wisdom and love for education has been a driving force in my life and was a constant encouragement in this project.

ACKNOWLEDGEMENT

Foremost, I would like to thank Almighty God, who has bestowed on me: knowledge, wisdom and favor without measure; to start and finish this project. Secondly I would like to acknowledge my Supervisor, Prof Mutembei, who was very patient, informative, encouraging, above all he has offered me a laborith of knowledge that I find myself so privileged to have drawn from. Thanks also to Prof. Nyamasyo for his wise guidance. To my sisters, thank you for your continued encouragement, I truly appreciate it. To all those who contributed to my study feel appreciated.

May the Almighty God bless you all dearly and continually shower you with His unfailing love and Blessings.

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LIST OF ABBREVIATIONS

ABS Access and Benefit Sharing

CBD Convention on Biological Diversity

CGIAR Consultative Group of Agricultural International Research

CITES Convention on International Trade in Endangered Species of Fauna and flora

COP Conference of Parties

DEA Data Envelope Analysis

GBM Green Belt Movement

GDC Geothermal Development Company

GDP Gross Domestic Product

ICDC Industrial Commercial Development Corporations

ICIPE International Centre for Insect Physiology and Ecology

ICRISAT International Crops Research Institute for the Semi-Arid Tropics

ILRI International Livestock Research Institute

IRRI International Rice Research Institute

KARI Kenya Agricultural Research Institute

KEFRI Kenya Forestry Research Institute

KESREF Kenya Sugar Research Foundation

KFS Kenya Forestry Service

KMD Kenya Meteorological Department

KNBS Kenya National Bureau of Standard

KNCP Kenya National Cleaner Production

MoE	Ministry of Environment
MSL	Metres above sea level
NBSAP	National Biodiversity Strategy and Action Plan
NEAP	National Environment Action Plan
NEMA	National Environment Management Authority
NES	National Environment Secretariat
OWG	Open Working Group
SDG	Sustainable Development Goal
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nation Development Programme
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
UN-REDD	United Nations REDD Program
WARMA	Water Resources Management Authority

ABSTRACT

This study dwelt on the role adoption of green concept plays in environmental management and implementation of sustainable development goals in Kenya. This was studied using the case of Nairobi County. The theoretical framework was based on institutional and resource based theory where coercive push and resource benefits for society were expected to influence adoption of green concept. The conceptual framework, a design that assumed actors (society and institutions) willingness to adopt green concept was dependent on existing governance instruments and their level of compliance, public perceptions and awareness level, and public knowledge, attitudes and practices. Data was collected using surveys conducted via semi structured questionnaires and key informant interviews. Data Envelopment Analysis (DEA) model was used to evaluate how determinants of human perceptions, decisions and activities related to implementation of green concept in environmental management and implementation of sustainable development goals. The constructs of the determinant frontier of the DEA model took into account the impacts of the decisions on people's knowledge, attitudes and practices on governance instruments as they affected adoption of the green concept. Qualitative and quantitative questions were used. The indicators were weighted based on their importance in adoption of green concept and significance tested using chi-square statistic at ($P \leq 0.05$) significance level. Respondents' understanding of green concept in environmental management was significantly low (33.0±2.11) although majority seemed to be aware of the existence of governance instruments regulating environmental management (56.7±1.62). Majority also neither knew the implication (64.9±1.90) nor complied (69.1±2.11) with the governance instruments in environmental management. However, 35.1% of respondents neither knew the implication of the legal instrument nor complied with them. Majority of the respondents

(50.7±1.44) agreed compliance to governance instruments would enhance waste management but majority were on contrary view on use of clean energy (71.7±1.66) and its role in industries (64.9±1.90). Majority of the respondents (57.6±1.36) indicated that lack of awareness affected compliance with governance instruments but agreed benefits could result from compliance with governance instruments in environment management. Majority were willing to comply with the governance instruments after awareness creation, civic education and strict enforcement of the instruments. The respondents' knowledge (33.0%±2.11), attitudes (30.4%±1.56) and practice (26.3%±0.08) on implementation of SDGs through green concept in environmental management was significantly low. About sixty (60.7%±1.24) thought SDG 1 would be enhanced through attributes that protect the environment while (52.5%±1.59) attributed implementation of SDG 3, 9 to preserved environment. Again, majority of them (57.6±1.36) perceived SDG 7 would be implemented through use of clean energy devices. However, it's only the minority that thought SDG 13 would be implemented through conservation of the environment (24.1±1.89). Majority of respondents were of the view that increased awareness (78.2%±2.61), improved institutional capacity (58.7%±3.01), enhanced enforcement (83.2%±1.77), and individual aptness (61.7%±3.04) would enhance implementation of the SDGs through adoption of green concept in environmental management. This implied Kenyans had differences on levels of understanding of the green concept and its application in biodiversity conservation but were practicing the concept and also were willing to adopt the same in biodiversity conservation. This serves to providing evidence to inform policy decisions that support implementation of governance strategies for the adoption of green concept to sustain biodiversity-conservation.

CHAPTER ONE

1.0 INTRODUCTION TO THE STUDY

1.1 Introduction

The Green concept has been defined and applied in various sectors without much results being achieved. However if properly implemented the green concept could serve as an approach to better living and also safeguarding a cleaner and safe environment (Hultman and Sierra, 2013). Green concept in environmental management is mostly perceived as tree planting, maintaining the natural ecosystem, use of clean energy technologies, use of cleaner production in industries and better waste management (Jacobs, 2013).

Green concept has also been underscored as a goal in averting climate change (Jupesta *et al.,* 2011). In this context, meaning maintaining and conserving a sustainable natural environment that cushion against climate change. Despite this role, literature points a sluggish path of adoption of green concept in global economies (Ellis *et al.,* 2012; Kiah *et al.,* 2012; UNEP report, 2014)

To address the sluggish path of adoption has been efforts by international environmental actors who have intensified in the last decade the push for promotion of the green concept across the world (UN, 2005). The pressure for the adoption of the concept has been linked to the increasing environmental and economic challenges and need for protection and conservation of the environment from climate change.

However, despite the fact that holding on to this international momentum could assist the world in accelerating progress in adopting the green concept in realizing the sustainable environmental protection, the problem has been maintaining the momentum globally (UN, 2005). Global economies would benefit through adoption of green concept to help in sustainable usage of natural resources like energy and in maintenance of ecosystem to protect biodiversity and their habitats.

The green concept is a development agenda likely to spur sustainable development that support economic policies tailored towards inclusive economic growth through efficient use of scarce natural resources, and sustainable restoration and conservation of the environment (Jacobs, 2013). The green concept for the sustainable growth was emphasized in the 2009 Global Economic stimulus initiatives across the globe through short term, middle term and long term job creation stimulus programmes (UN, 2005). Among the advocated initiatives for green growth include use of low carbon technologies and cleaner productions.

Green concept has been embraced by developing economies like Kenya, who have also considered the need to utilize informal sectors in ensuring its implementation (The Environmental Management and Co-ordination Act, 1999). This is significant development based on the fact that contribution of the Kenyan economy is from the informal sectors that need to be utilized to ensure sustainability in green concept implementation in environmental management (The Environmental Management and Co-ordination Act, 1999).

Important to successful implementation of green concept is the responsibility of governments to ensure synergies on implementation of its policies with environmental management policies, political-economic institutions and national development policies. Thus, the establishment of green concept guidelines that are mainstreamed across all other sectors is important in creating an emphasis on the importance of adopting the concept.

To this point Kenya has been at the forefront in formulating and establishing environmental laws and regulations that embrace and become embedded in mandated institutions such as National Environment Management Authority (NEMA) to enhance the enforcement of sound environmental policies and practices (EMCA, 1999). However such institutions need to fully create structures for adoption of Green concept by establishing standards that exhibit the understanding of what it entails and how it can transform the current environmental challenges encountered (EMCA, 1999).

1.2 Statement of the Research problem

It has been noted that all stakeholders including government agencies, development firms, and manufacturing and construction firms in Kenya need to embrace adoption of green concept for enhanced environmental management in their business operations and end products (Smith and Melnyk, 1996).

Many stakeholders cite expense as a reason for low adoption rates of green concept but cost benefit analysis has shown the potential environmental impact of failing to embrace the green concept, would definitely outweigh the expressed expenses (Van Der Vorst *et al.*,

2009). Adoption of green concept has been proven to lead to environmental protection; integrated waste management, utilization of recyclable materials to ensure efficient and effective use of natural resources and reduced hazardous elements (Dallas, 2008).

Despite studies establishing that the adoption of the green concept has connotation of positive impact on the organizations' performance, especially within the industrial production (Mohamed, 2011), adequate research is yet to be done on how the concept could be adopted sustainably in Kenya.

Ong'ong'o (2012) pointed out that government regulations and guidelines are critical to adoption of green concept in Kenya. This makes it important for detailed studies on how institutions and governance enforcement could synergistically be applied to accelerate this concept. International awareness and international push for legislations and policies on importance of green concept has been going on (UN, 2014).

However there still exist evidence of reluctance of stakeholders in adopting the concept in industries, trade, technology and innovation (Jacobs, 2013). Emphasis on creation of jobs for the youth through green concept, use of cleaner productions in the industries and environmental restoration through re-forestation and afforestation is yet to yield the desired results globally (UN, 2014). It is prudent to study how stakeholders by taking up their responsibilities to ensure proper use of raw materials, water and energy could realize this goal.

Despite numerous legislations and policies passed in Kenya, there is continued destruction of the environment where we have riverbeds being destroyed by construction sectors, creation of dumping sites for waste in cities and town centers, destruction of water catchment areas, over- exploitation of endangered species and destruction of natural habitats for bio-diversity (EMCA, 1999; NEMA, 2014).

Thus, there exist research gaps to understand how the green concept could be adopted sustainably in Kenya. Additionally there is need to create evidence to application of the concept in environmental management. As such, the study sought to evaluate the adoption of the Green Concept in biodiversity management, environmental management and Sustainable Development Goals implementation in Nairobi, Kenya.

1.3 Objectives

General Objective

To study factors affecting adoption of green concept in environmental management and implementation of the SDGs in Nairobi County.

Specific Objectives

i. To assess perception on adoption of green concept in biodiversity conservation in Nairobi County
ii. To evaluate determinants of compliance with governance instruments for adoption of green concept in environmental management in Nairobi County
iii. To examine implementation of SDGs 1, 3.9, 7 and 13 through adoption of green concept in Nairobi County

1.4 Justification of the study

In Kenya, like in other developing countries, there is continued environmental degradation despite being signatory to many environmental treaties and local environmental legislations and policies (UN, 2014). This in itself warrants studies to generate evidence to push Kenya back to the drawing board in order to address the root cause of the continued breakdown in environmental management.

Globally, there are increased climate change effects that also affect Kenya which require urgent studies that push for adopting green practices in environmental management (Steiner, 2006). Poverty, biodiversity loss, deteriorating human and animal health, together with degrading ecosystem health require urgent studies to fill in those gaps so as to push stakeholder's involvement in environmental management using the green concept (UN, 2014). Proper environmental management requires supportive governance structures that are also backed up by implementation of SDGs (UN, 2014).

Thus, the study on factors affecting adoption of the green concept in environmental management and implementation of SDGs is timely and responsive to the global and Kenyan needs. Nairobi is host to a vibrant ecosystem with approximately three million inhabitants capable of shedding light on what affects adoption of the green concept in Kenya.

The study contributes to the body of information and knowledge on adoption of the green concept itself, its application in environmental management, and its application in implementation of the SDGs. The study provides evidence to inform policy for guidelines on adoption of green concept in Kenya.

1.5 Scope and limitation

The study focused on the adoption of the green concept in environmental management and implementation of SDGs in Nairobi, Kenya. The focus was limited to the green concept as it applied in environmental conservation, protection and preservation, governance processes for adoption of green concept in environmental management and contribution of green concept adoption in the implementation of sustainable development goals in Nairobi. The scope focused on government, NGO, public and private sectors stakeholders. Based on logistical arrangements and limited resources, representations as described in the materials and methods section were adapted for sampling.

1.6 Conceptual Framework

Green concept under this study is linked to three key theories; institutional, resource based view and resource dependence theories (Fig. 1).

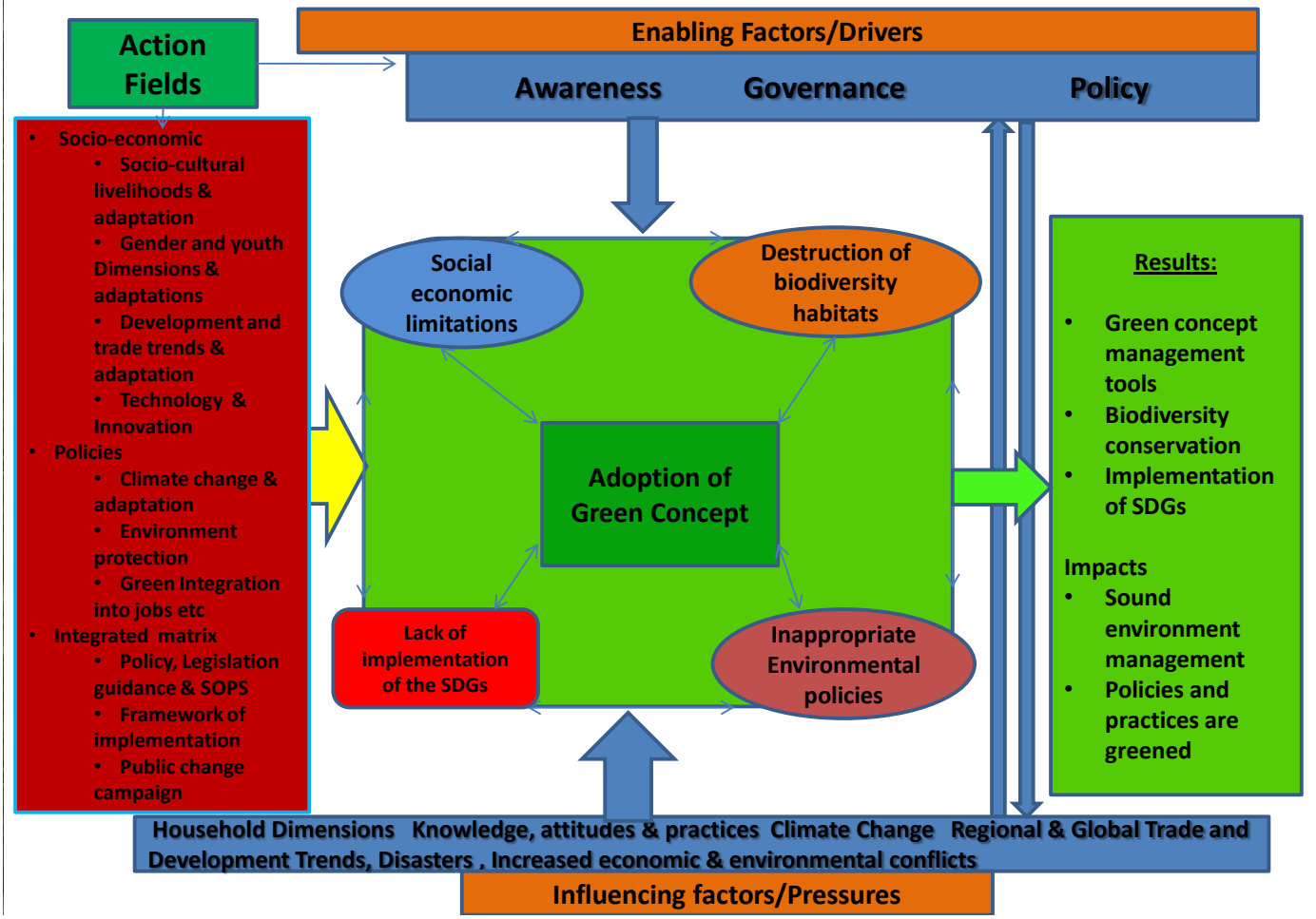

Figure 1: Adoption of the green concept in environmental management and SDGs implementation in Nairobi

The descriptions and elaborations of the capability of the green concept to contribute to the environmental sustainability and economic development advocate that the green concept must realize inclusive sustainable development (World Bank, 2012). The green concept advocates for efficiency in economic development and it is key to the achievement of sustainable development goals in individual nations as well as within the international community (OECD, 2013). Thus, the green concept is adapted for realization of long-term social and economic development.

To conceptualize adoption of the green concept sustainably it is important to understand that its applicable policies involve the common decisive actions of bringing on board environmental factors that have synergy with economic matters focusing on natural resource efficiencies, energy system transformations, natural capital in economic agenda and costing of externalities to environmental factors (Pierre *et al.,* 2013).

Globally equitable green concept can only be achieved when there is strong bond between environmental sustainability and the social development (Kiah *et al.,* 2012; UNEP, 2013). Successful adoption of the green concept is lined to its integration into development agenda (Sternera and Damon, 2011; Jacobs, 2013).

The links between institutions, governance and economic empowerment have been demonstrated as key in adoption of green concept in environmental management (Huberty *et al.,* 2011; Dercon, 2012; Janicke, 2012; Schmalensee, 2012). The green concept adoption is affected by among others the cost of the process (Resnick *et al.,* 2012). Public awareness, sound planning that involve stakeholders and good governance structures that embrace participatory approaches in design and implementation are vital to adoption of green concept in environmental and natural capital management (Strand and Toman, 2010; World Bank, 2012).

Thus there must be strong linkages between NGOs, government, governance and end-users for sustainable adoption of green concept in environmental management. Therefore the green concept growth cannot be achieved unless answers are sort for questions on whether any particular green concept approach will realize the gains for which it as argued (Jacobs,

2010). This is why tools for global adoption of green concept need to be well conceptualized to imbed limitations for incorporating environmental considerations into the economic policies (Kosoy *et al.*, 2012).

1.7 Theoretical Framework

1.7.1 Institutional theory

Green concept growth cannot be achieved unless answers are sort for questions on whether any particular green concept approach will realize the gains for which it as argued (Jacobs, 2010). Thus there is an institutional theory perspective to push factors for adoption of green concept based on ISO 14001 environmental management system (EMS) (Delmas and Toffel, 2002). Different levels of coercive push that is put on different industries could result in different environmental strategic approaches on the adoption of the concept (Jacobs, 2013).

Institutional theory takes into account the role and functions of cultures and social dictates that affect decisions of institutions and organizations as they influence adoption of green concept (Delmas and Toffel, 2002). The influence is through institutional structured culture of normative approach, coercive and mimetic gestures that yield to and directs an agreed set of values, norms and the set out procedures and rules to lead to same outcome across the organization irrespective of the departments within the same organization (Delmas and Toffel, 2002).

Institutional coercive force through laid down rules and regulations affects decisions on environmental management (De Boer and Zandberg, 2012). In Kenya, institutions like NEMA, Kenya Forest Services (KFS) and others influence how the green concept is adopted in Kenya.

Under this theory it can also be urged that organizations and firms may be forced to adopt the green concept within specific guidelines without prior involvement in leading non-comprehended participation (Sharma, 2000). Such actions on institutions may yield positive or negative results depending on management and employee level of cooperation (Nelson and Winter, 2002).

1.7.2 Resource Based View Theory

It is argued that in order for organizations to attain sustainable competitive advantage, more resources are needed to match as well as be above the competitors (Florida and Davison, 2001). The competitive advantage of the organization depends on its capability through the available resources to beat the competitors.

This could be a limiting factor in adoption of the green concept by organization in that resources for its adoption could be rare and non-substitute (Hart, 1995). The expected organizational resources in terms of financial and physical assets, employees' skills, and knowledge could influence the decisions for adoption of the concept. The success of such process would therefore be dependent on the organizations' ability to cope with the

required resources, internal resilience and ability to undergo strategic asset re-organization (Hart, 1995).

1.7.3 Resource Dependency Theory

This is a theory that takes care of the organization that rely on resources availed by others to adopt the green concept and contribute to green growth sustainability (Wathne and Heide, 2004). This scenario makes such institutions to only push agendas of funding donors without their own independence. This could be a major limitation in green concept adoption in that such organization are dictated in terms of what to adopt and for which resources in order to justify their existence and survival (Wathne and Heide, 2004).

Thus, some of the adoption procedures, material allocation, standards and guidelines of adoption, technological skills of adoption and distribution channels of adoption may not be in tandem with the realities of the countries and societies for which they are being adopted. Additionally the inability of organizational independence may force them to establish partnership with donors who don't add value to green growth strategies.

CHAPTER TWO

2.0 THE GREEN CONCEPT: AN OVERVIEW

2.1 Introduction

2.1.1 Historical background of Green Concept

Green concept emerged in the late 2008 as an international policy agenda to address environmental issues in development (OECD, 2011). The concept addresses management of environmental in a way that takes care of natural resource scarcity and climate change (UN, 2005). This also critically considers sustainable and inclusive economic development as an instrument of reducing poverty and generating resources for improved wellbeing of the citizens while using the planet's scarce resources (OECD, 2011). The green concept was emphasized through the push for adoption of economic stimulus packages in 2008 and 2009 across the globe (UN, 2005).

The adoption of the green concept is perceived differently from one country to another. Some countries viewed this as short term perspective for job creation through low carbon technology investment while others viewed the same through a lens of environmental engagement for economic gain (UNEP, 2012). Those that saw a chance for environmental sustainability looked at green concept as an opportunity to push for global policy formulation and decision making to save the mother planet (UNEP, 2012).

In the developing countries the focus has been on inclusion and equity in the green concept.

The argument is that growth should be inclusive in serving those countries that have for a long time been excluded in the global economic system (Satterthwaite, 2011). The transition to green concept adoption in developing countries is informed by the need to ensure resilient livelihoods for the majority poor people without contributing to environmental hazards (Satterthwaite, 2011).

In Kenya, the adoption of the green concept has been embraced but the resultant effects are still minimal. Like in other countries, policies have been put in place but the destructive practices in various sectors continue albeit (Steiner, 2006).

2.1.2 The Green Concept in Developing Countries

There exists scarce literature focusing on adoption of green concept in developing countries (Jupesta *et al.,* 2011). The push in these countries has been for government policies to incorporate green concept in national economic agenda, design and formulation of green concept strategies and awareness creation, rapid and steady growth of green economies by addressing greenhouse gas emissions and environmental degradation (Jupesta *et al.*, 2011).

Additionally, there is a push for documentation of lessons learnt from their experience in adoption of the green concept in environmental management (Ellise *et al.,* 2012). Continued debates has indicated that adoption of green concept and green growth in low income countries requires strengthening to fully address social and environmental issues (Bass *et al.,* 2013).

2.1.3 Adoption of Green Concept in Technology and Innovation

The pursuit of economic development and growth leading to poverty reduction requires environmental sustainability through innovation and adoption of new green technologies although majority of industries in both developed and developing countries are yet to fully embrace this strategy (Glachant, 2013). Strategies for supporting this push in innovating green activities like ecosystem service payoffs, development subsidies and carbon trade-offs are being applied (Ploeg and Withagen, 2013).

Initiatives for collective global agreement at the international level have yielded about 150 international initiatives aimed at supporting developing countries' innovation development trajectories for enhanced adoption of the green concept (Hultman and Sierra, 2013). Green advances in agriculture, energy, medicine and manufacturing have offered hope for continued human development and a cleaner environment (UNDP, 2004).

Remarkable green farming technologies and practices related to water use, fertilizer and plant breeding have transformed agriculture, increased food production and addressed under nutrition and mitigated chronic famine in some regions giving a lot of credit to the global push for adoption of green concept (UNDP, 2004).

Increasing population and demand for innovative food production to meet consumption demand in all global regions continue to give value to adoption of green concept in innovative processes for economic development (UN, 2000). Population growth has pushed this agenda for the ability to meet future food demand where 11% of the world's land is

used for agriculture, making green concept adoption in technology and innovation the only option for sustainability (UN, 2000). Green concepts in biotechnologies, nanotechnology, environmental management and implementation of SDGs are needed to advance human health and wellbeing (UNDP, 2004).

2.1.4 Adoption of Green Concept and Job Creation

In recent years the push for 'green jobs' or 'green growth' policies have become increasingly prominent in solving environmental challenges associated with climate change and unemployment problems observed globally (Deschenes, 2013).

The shift to greener economies is creating employment across a range of sectors with documented assessments showing net gains whenever green concept is adopted (ILO, 2012a). Although focus is mainly on creation of direct employment, it is also documented that most gain is through creation of indirect jobs (Bowen, 2012). For example, within the energy sector, green concept policies are most likely to be labour intensive when compared to utilization of traditional fossil fuels (Wenjia *et al.*, 2011). It is documented that mitigation policies in China's power sector resulted in 470,000 net job creation between 2006 and 2010 (Strieyska *et al.*, 2011). This dispels the fear that green concept results in job cuts and gives hope that skills are critical to adoption of the green concept (ILO, 2012a).

2.1.5 Adoption of Green Concept and Trade

The UNEP Green Economy Report (2011) defines a green economy as one that 'results in improved human well-being and social equity, whilst significantly reducing environmental risks and ecological scarcities' (UNCSD, 2011). The development pathway in a green economy helps to deliver resilient, equitable and pro-poor development agenda through investments that reduce carbon dependency, promote resource and energy efficiency, and lessen environmental degradation (UNEP, 2015).

The international trends toward green economy trade approach are a noble strategy in nature to safeguard scarce natural resources (Fankhause *et al.,* 2013). Thus countries can engage on trading that embraces the adoption of green concept economic development by facilitating well laid out procedures and policies. Green concept in trade can be capitalized by the developing countries to utilize renewable resources within their territories to trade with industrialized countries (UNEP, 2013).

2.1.6 Adoption of Green Concept in Kenya

Kenya is implementing the green concept in her economy through domestic political goodwill, policy and legal support (UNEP, 2015). The government, development partners and other non-state actors are supporting and implementing green economy-related policies and initiatives in Kenya (UNEP, 2011). Key programmes on adopting the green concept in Kenya include investments in renewable energy, promotion of resource-efficient programs and promotion of clean production (UN, 2014). A renewed push for restoration of water

towers has been noted recently with creation of National Task Force Committee. Creation of institutions like NEMA, Water Resources Management Authority (WARMA) and National Drought Management Authority speaks well for Kenya (UNEP, 2014).

In the mitigation of climate change, Kenya has developed a national climate change response strategy and an action plan to implement the strategy which underpins the importance of the green concept (GoK, 2010). Additionally, Kenya seeks to embrace a low-carbon climate resilient development pathway that is inclusive, equitable and contributes to Kenya's global competitiveness when they enhance the adoption of green concept (UNEP, 2015).

Through the initiatives like Greening Kenya Initiative (GKI), the government has a database on green economy activities, which include the manufacture of eco-friendly materials, tree planting, organic farming, fish farming, renewable energy, and eco-labeling, which formalize the adoption of the green concept (GoK, 2010).

2.2 Adoption of Green Concept in Biodiversity Conservation

2.2.1 Definition of Biodiversity

Biological diversity is defined to include the variability among living organisms from all sources including aquatic ecosystems and their ecological complexes; includes diversity within species, between species and of ecosystems (CBD, 2005). In the world there are about 13 million species where approximately 1.75 million have been identified with

estimates indicating that 90% of animal biodiversity has been identified, 80% of plants also identified but only 10% of microorganisms are identified (Otswongo, 2009).

Biodiversity is considered at three main levels including species diversity, genetic diversity and ecosystem diversity (Mutia, 2009). It has also been shown that biodiversity provides for about 40% of the global market goods and services (Lusweti, 2011).

Biodiversity is acutely under threat from world human population exploitation in the recent past leading to biodiversity loss due to overuse, loss of habitat, and environmental pollution (CBD, 2005; Steiner, 2006). The MDG 7 and the Convention of Biological Diversity (CBD) emphasize the need for environmental sustainability in order to meet life demands on earth (Steiner, 2006).

2.2.2 Conventions on Adoption of Green Concept in Biodiversity Conservation

The growing concern for biodiversity loss and its adverse implications on humanity attracted global attention leading to the proliferation of conventions, protocols and declarations aimed at encouraging countries to take serious actions to curb biodiversity decline (UNEP, 2016).

There has been establishment of global institutions, regional institutions and research institutions to highlight the gravity of biodiversity decline and to formulate sustainable policy strategies and interventions to address the situation. However, the impact of these

institutions, their strategies and interventions on curtailing biodiversity loss are yet to fully prevent biodiversity losses (CBD, 2010; Butchart *et al.*, 2010).

Kenya is party to the CBD and under Article 6 of the Convention it is expected to report regularly to the Conference of Parties (COP) on the progress made in the implementation of the Convention (NEMA, 2009). Kenya has signed and ratified the international Conventions that enhance biodiversity conservation. These include:-

a. Convention on International Trade in Endangered Species of Wild Fauna (CITES);
b. Convention on the Conservation of Migratory Species of Wild Animals;
c. Convention on Wetlands of International Importance especially as waterfowl habitats (the Ramsar Convention);
d. United Nations Framework Convention on Climate Change (UNFCCC);
e. Vienna Convention on the Protection the Ozone Layer;
f. United Nations Convention to Combat Desertification (UNCCD);
g. United Nations Convention on Biological Diversity (CBD).

2.2.3 Kenyan Initiatives for Green Concept in Biodiversity Conservation and the Supporting Laws

Efforts to mainstream the biodiversity conservation within government activities picked up in 1994 leading to drafting of the National Biodiversity Strategy and Action Plan (NBSAP) in 2000. Concurrently, several related activities started and the driving force aimed at helping to meet the 2010 Aichi targets of Biodiversity (KNR, 2015). Though the matters of national environmental management matters are currently crosscutting among various

agencies, NEMA is the one mandated with coordination and establishment of appropriate legal and institutional framework for management and conservation of biological diversity (NEMA, 2009).

Kenya has also a rich background in attempting to implement the CBD, meeting MDGs through her vision 2030 agenda (Vision 2030, 2010). Currently, several line ministries have a portfolio of environmental conservation. These include; Ministries of Environment and Mineral Resources, Forestry, Lands, Finance, Special programs in the Office of the President, Fisheries and Agriculture. In all ministries there is direct link between environmental management and biodiversity conservation. However more coordination is needed (MoE, 2000).

The main challenges and weaknesses cited in Kenya on biodiversity conservation include low public awareness, low synergy between implementing actors and conflicting regulatory frameworks (UNEP, 2014). There are a number of national institutions mandated to enhance Kenya's biodiversity conservation that requires synergetic coordination. These includes:-

a. National Environment Management Authority (NEMA)
b. Kenya Forestry Research Institute (KEFRI)
c. Kenya Agricultural Research Institute (KARI)
d. Kenya National Bureau of Standard (KNBS)
e. Kenya Sugar Research Foundation (KESREF)
f. Lake Victoria Environment Management Project

g. Coast Development Authority
h. Lake Basin Development Authority
i. Uwaso Nyiro (N & S) Development Authorities
j. Tana River Development Authority
k. Kerio Valley Development Authority
l. Environment and Natural Resources Management Universities and research institutions
m. National Museums of Kenya
n. Kenya Forest Service
o. Kenya Wildlife Services

Besides the national institutions, there are several Consultative Group of Agricultural International Research (CGIAR) centers; International Centre for Insect Physiology and Ecology (ICIPE), International Livestock Research Institute (ILRI), International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), and International Rice Research Institute (IRRI) and also national and international NGOs involved in biodiversity conservation in Kenya (KNR, 2015).

2.2.4 Biodiversity Status in Kenya

Since Kenya ratified the CBD (CBD, 2010) she has made significant progress in putting in place the proposed measures for biodiversity use and conservation (NEMA, 2009). Kenya participates in the CBD's international programmes for biodiversity conservation (dry and

sub-humid lands biodiversity, forest biodiversity, inland waters biodiversity, island biodiversity, mountain biodiversity and marine and coastal biodiversity (NEMA, 2009).

Although largely the biological diversity of Kenya remains protected there are many unprotected habitats whose biodiversity is declining leading to biodiversity conservation challenges (Lusweti, 2011). The major threats to biodiversity in Kenya include growing population pressure, increased poverty index, intercommunity conflicts, poor land use, inadequate biodiversity laws, non-enforced policies, poor education and inadequate involvement of communities (UNEP, 2012). Other threats are invasive species, land degradation and pollution resulting from poor land use practices (NEMA, 2009).

It is worth noting that indigenous biodiversity continue to decline in Kenya especially with over 70% of this happening in unprotected ecosystems where human and wildlife interlope leading to conflicts (NEMA, 2009). Sectoral laws and policy are needed to harmonize coordination for better output (MoE, 2000). Capacity building and adequate resource allocation are also needed for biodiversity conservation in Kenya.

Community participation in biodiversity conservation needs to be put at the front whenever projects for biodiversity conservation are designed; community mobilization, awareness creation, training, and demonstration of best practices (Lusweti, 2011; UNEP, 2014). Budgetary allocation also needs to be adequate for any meaningful biodiversity conservation.

2.2.5 Biodiversity Conservation and Green Concept

Kenya exploits her biodiversity primarily through industries, food production, tourism, and ecosystem services. Biodiversity support almost all livelihoods and lifestyle activities for mankind (Lusweti, 2011). Therefore, human utilitarian values could be utilized to push for green economy through adoption of green concept.

Green concept in biodiversity conservation advocates for sustainable utilization of biodiversity services through preservation, conservation and protection for enhanced economic gains (Mutia, 2009). Thus, green concept supports biodiversity utilization through sustainability; use of resources that meets the needs of the current generation without compromising the ability of future generations. It encompasses intra and intergenerational equity whereof a balance between the environment, development and society results to sustainable development through green economies (Mutia, 2009).

The global push for adoption of Green Concept as a sustainability measure of environmental biodiversity seeks to protect, conserve and preserve biodiversity for economic development (Spellerberg and Hardes, 1992; UNEP Report, 2016). Kenya has embraced green concept for economic benefits from biodiversity resources and their associated processes (Swanson, 1995; MoE Report, 2000; EMU-GOK, 2010; Kenya Vision 2030, 2010; Lusweti, 2011).

Tragically, today biodiversity is disappearing at alarming rate due to human civilization (UNEP Report, 2016). This is mainly related to economic needs leading to a threat due to

processes or events, mainly human induced that cause adverse effects on the status or sustainable use of any component of biodiversity (Swanson, 1995).

2.3 Governance Processes for Enhanced Adoption of Green Concept in Environmental Management

2.3.1 Definition of Governance in Environmental Management

Environmental Governance consists of rules, practices, policies and institutions that outline how humans interact with the environment (UNEP, 2014). Environmental governance can be perceived as 'the establishment, the reaffirmation and or change of institutions (policies, laws, procedures, practices and organizations) to resolve conflicts – overt or latent – between actors over environmental resources (DIIS, 2013).

Environmental governance comprises of many levels of society through statutory as well as through customary institutions and organizations which involve a wide range of actors. Notably, good environmental governance accounts for the role of all actors that impact the environment, including governments, NGOs, the private sector and civil society (DIIS, 2013; UNEP, 2014). As communities evolve and new economic and development actors emerge requiring establishment of a statutory framework for environmental governance is accentuated (DIIS, 2013).

Environmental governance in relation to environmental impacts have mistakenly been an imposition on developing countries by donor agencies and governments from high-income

countries leading to failed compliance (DIIS, 2013). Thus, governance need to be viewed as "the interactions among structures, processes and traditions that determine how power and responsibilities are exercised, how decisions are taken, and how citizens or other stakeholders have their say" (Graham *et al*., 2003).

Effective governance is the approach in which decisions on environmental issues need to be made and collective involvement of who is to decide and what is decided (Maathai, 2009). Consequently, effective governance is fundamental to sustainability and defines the difference between environmental gain and loss (UNDP/UNEP/WB/WRI, 2004).

2.3.2 Evolution of Environmental Governance

Governance in environmental management became important in addressing environmental threats facing life support functions on planet earth that included biodiversity loss, water scarcity, pollution and climate change (UNEP, 2012). It was evident that the threats were caused by factors emanating from crisis of bad environmental governance (Lange *et al.*, 2013). The birth of modern environmental regulation in the 1970s led to design and implementation of effective, efficient and legitimate regulation and governance structures whose continuous improvement is still needed (Maathai, 2009).

After the 1970s birth of modern environmental governance, governments and their agents started to handle environmental problems through enforcement of strict rules and standards set out in legislation and treaties (Gunningham, 2009).

In 1980s, the neoliberal ideals for governments took a shift from Westphalian vision where state power was through hierarchy to handling of environmental degradation through market-based approaches, voluntarism and other 'light-handed policy initiatives such as partnerships and cooperation (Gunningham and Holley, 2010).

Towards the end of the 1990s continuing ecological degradation and the increasing complexity of social and environmental problems led to a new shift towards environmental governance referred to as 'new environmental governance' (Driessen *et al.,* 2012; Holley *et al.,* 2012). This arrangement involved inclusion of social organizations to the list of governance priorities (Bessa *et al.,* 2007).

Progressively it has been seen that although state-centered governance approaches to law and regulation had yielded relative effectiveness in achieving gains in halting and reducing environmental degradation (Cole and Grossman 1999; Najam *et al*., 2006), the same also suffered from a number of weaknesses that limited their effectiveness (Maathai, 2009).

The last quarter of the twentieth century witnessed environmental issues that warranted global attention to address environmental issues using different types of management and institutional coordination (Maathai, 2009). Accordingly, cooperative frame arrangements became increasingly being used to handle environmental problems to provide consented solutions through dialogue and participation with various sectors and sub-sectors in partnership and network building (Hochstetler and Keck, 2007).

2.3.3 Trends of Environmental Governance in Kenya

Prior to 1999, cohesive environmental law systems in Kenya were nonexistent. What existed was piecemeal utilization of policies and laws (Maathai, 2009). This led to a need to remedy this through establishment of an appropriate legal and institutional framework for the management of the environment in Kenya. This informed the process of coordination and functional laws for enhanced environmental management.

The policy processes started and culminated into the Sessional Paper No. 6 of 1999 entitled *Environment and Development.* The legislative process gave forth the Environmental Management and Coordination Act (EMCA) No. 8 of 1999, Kenya's first environmental law framework. The Act together with the two Sessional Paper added value to existing policies dealing with the environment (MEMR, 2013). With the realization of the Environmental Management and Co-ordination Act, 1999 (the EMCA, 1999), Kenya joined forty-two countries that agreed to implement national environmental governance structures (Okidi, 2008).

Kenya has a long history of unsuccessful enforcement of environmental governance frameworks due to interdepartmental rivalries fueled through the fear that an independent environmental authority would veto the economic and political agenda of rival ministries (Hirji, 1991). Thus, despite enactment of the EMCA ACT of 1999, actual implementation became slowed by rivalries caused by key personnel seconded to implementing authorities (Mumma, 2006). Logistical and financial limitations also derailed functionality of bodies such as the National Environment Tribunal (Mumma, 2006).

NEMA has slowly and progressively become felt and by now it has evolved and constituted five operational policies that enforce environmental regulations and standards (NEMA, 2006). Currently NEMA is capable of enforcing solid waste management operational framework, water quality operational framework, incident management operational framework, enforcement and prosecution framework and public ban of plastics.

2.3.4 Conventions and Laws supporting Environmental Governance and Management in Kenya

The National Constitution of Kenya underpins effective implementation of sustainable conservation, use and development of the environment through legislative instruments (CoK, 2010). Some of the legal instruments in support of the constitution include:-

a. Environmental Management and Coordination Act (EMCA 1999) providing for establishment of an appropriate legal and institutional framework for the management of the environment and related matters.
b. Water Act, 2002. The Act No 8 of 2002 provide for the management, conservation use and control of water resources and for the acquisition and regulation of rights to use water, to provide for the regulation and management of water supply and sewerage services (CoK, 2010).

c. National Land Commission ACT, 2012 providing for the establishment of an independent government commission mandated to oversee management of public land

on behalf of the National and the County governments, initiate investigations into present or historical land injustices and recommend appropriate redress and monitor and have oversight responsibilities over land use planning throughout the country among other provisions (CoK, 2010).

d. Wildlife Conservation and Management Act 2013 guiding principles of devolution in conservation and management of wildlife to landowners and managers in areas where wildlife occurs through recognition of wildlife conservation as a form of land use, better access to benefits from wildlife conservation and adherence to the principles of sustainable utilization.
e. Land Registration Act, 2012 mandated to revise, consolidate, and rationalize the registration of land, to give effect to the principles and objects of devolved government in land registration (CoK, 2010).
f. Land Act focusing on conservation and protection of ecologically sensitive areas such as riparian reserve.
g. Forest Conservation and Management Act 2016 providing for the establishment, development and sustainable management including conservation and rational utilization of forest resources for the socio economic development of the country.
h. The Law of the Sea governing the resources and the uses of the coastal and ocean areas and also recognizes the interrelationship among the various coastal and marine ecosystems and associated multiple uses.

Kenya is also signatories to many conventions and treaties. These include:-

i) The Nagoya Protocol adopted on 29th October 2010 that focus on fair and equitable sharing of benefits arising from the utilization of genetic resources, thereby contributing to the conservation and sustainable use of biodiversity.

ii) The Kyoto Protocol adopted in December 1997 contributing towards stabilizing atmospheric greenhouse gas through enhancing carbon sinks, promoting agricultural activities, promoting energy efficiency and use of renewable energy. This has therefore promoted environmental integrity and enhanced biodiversity conservation.

iii) Paris Agreement, 2015 seeking global action to combat climate change in reduction of the carbon emissions and mitigate all climate change effects around the global through partnerships and networks and adopted in June 2016.

The Kenyan laws and international conventions form the basis for enhancement of the environmental governance in management of environmental resources in Kenya. However sectoral rather than integrated and ecosystem approach to management of natural resources still remain an impediment to adequate governance (MEMR, 2013).

2.3.5 Environmental Governance and Adoption of Green Concept

The adoption of green concept is anchored on sustainability which is related to environmental and economical governance aspects (Leff, 2012, Saito, 2018). Thus, sustainability has two implications: where one involves the internalization of environment and supporting economic processes (Leff, 2012).

In the context of environmental governance, adoption of the green concept, sustainability depends on instruments that support democratic involvement of implementing actors because perceived contradictions in actor interests lead to failure of adoption (Leff, 2012). Effective governance processes for sustainable adoption of green concept mutes for utilization of utilitarian theory for sustainability through reconciliation of developmental interests within biodiversity conservation and environmental management that underscores the essence of co-design and co-implementation of projects (Sachs, 2000; Saito, 2018).

2.3.6 Utilitarianism in Environmental Governance

Utilitarianism, in its most traditional form, is both a theory of the good and a theory of the right. It holds that the greatest good is happiness and freedom from pain and suffering. Acts that promote the greatest good (i.e., have the greatest utility) are morally right. Acts that reduce overall happiness and/or promote pain are morally wrong (Wolff, 2008). Moreover, utilitarianism in environment has played a role to justify protecting wilderness, ecosystems, and species (Wolff, 2008). Utilitarianism is an ethical theory which evaluates ethics and the environment and seeks to look at the end result and not necessarily the action. Similarly, utilitarianism is a teleological theory that focuses at the purpose or the end goal of an action (Wolff, 2008).

Although some institutions are created to manage environment, the same institutions/policy fail to internalize the environmental values within the decision making process of their nations and individuals (UNEP, 2016). When institutions/policies fail to adopt a holistic approach towards environmental conservation, the outcomes only end up achieving partial

conservation (Swanson, 1995). The result of failed institutions/policies is the lack to utilize the peoples' utilitarian values of conservation. Utilitarian value strategy entails a holistic approach to conservation that takes into account the peoples' material well-being, besides the feelings and emotions that give them satisfaction in conservation, including utilization of conservative and productive materials from biodiversity e.g. agricultural materials or food sources, medicine, industrial raw materials, educational values and scientific research (Swanson, 1995; Lusweti, 2011; UNEP, 2016).

Incorporation of utilitarian values in conservation in countries would relieve continuous pressure on the ecosystem from rural- urban migration and conversion of parks and farming land into housing facilities (Lesschen *et al*., 2004). All these factors are causing major shift in biodiversity landscape mosaic and the entire environment to take place that impact negatively on urban and peri-urban ecosystems (Lesschen *et al*., 2004).

Therefore, in Kenya, the dynamism of environmental conservation in Nairobi County ecosystem, which hosts a national park, is likely to be beneficial through adoption of the green concept in environmental conservation by underscoring the importance of conservation as a valuable. This way, promoting the adoption of the green concept in environmental conservation through utilitarian theory could sustainably reap benefits in environmental management and implementation of SDGs. Since Kenya utilizes biodiversity to support her GDP, implementing SDGs through utilitarian values would enhance her economic status via tourism (MoE, 2000; Kenya Vision 2030, 2010). Subsequently, adoption of the green concept in biodiversity conservation, environmental governance and

implementation of SDGs in Kenya could therefore be driven by potential for profitability and support for the economy (Lusweti, 2011).

Thus, despite the eminent threat to the ecosystems and biodiversity in Kenya ecosystems, there exists an avenue to utilize the utilitarian value drive to conserve the biodiversity and environment so as to halt the existing threat (Spellerberg and Hardes, 1992; Swanson, 1995; Lusweti, 2011; UNEP, 2016).

2.4 Adoption of the Green Concept and Implementation of Sustainable Development Goals

2.4.1 Genesis of the Sustainable Development Goals (SDGs)

The idea of Sustainable Development Goals (SDGs) can be traced more than 30 years ago as created by the World Conservation Union (Association of African Universities, 2009; Adams, 2006). The agenda lays emphasis on the interconnectedness of three dimensions of sustainable development to correct weakness noted during implementation of Millennium Development Goals (MGDs) (UN, 1993).

In addition, the MDGs focused majorly on selected social and human development priorities, it was noted there was need to address current world emerging challenges aggravated by multiple financial, economic, food, and energy crises that threatened the ability of countries to achieve sustainable development (WESS, 2013). As a result, the United Nations Conference on Sustainable Development reiterated their political

commitments on the international community to pursue SDGs for sustainable development under Agenda 21 (WESS, 2013).

The SDG Agenda gives a plan of action for people, planet and prosperity as well as seeking to strengthen universal peace. For this to take place, 17 Sustainable Development Goals were constituted to be both complementary and complimentary to the MDGs to realize human rights, achieve gender equality by empowering all women and girls. A need for integrated and indivisible and balancing of the three dimensions of sustainable development (economic, social and environment) informed the SDG Agenda (SDG, 2015).

The birth of SDGs took place in Rio de Janeiro, Brazil leading to a focus in political outcome document dubbed 'The Future We Want' with clear and practical measures for implementation through agreement by Member States to launch a process to develop a set of Post-2015 development agenda that build on the lessons of the Millennium Development Goals (MDGs) (SDG, 2015). This was followed by Member States calling for the establishment of the Open Working Group (OWG) to elaborate the successor global development agenda to the MDGs leading to consultations that agreed on 17 Sustainable Development Goals (SDGs) and 169 targets to the UN General Assembly in July 2014 (SDG, 2015; UN, 2015).

2.4.2 Sustainable Development Goals (SDGs)

There are 17 SDGs goals:-

a) Goal 1: End poverty in all its forms everywhere

Goal 1 target eradicating extreme poverty for all people everywhere by 2030 by reducing at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions.

b) Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

   This target by 2030 to end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all through the year.

c) Goal 3: Ensure healthy lives and promote wellbeing for all at all ages

   Goal 3 target to reduce the global maternal mortality ratio to less than 70per 100,000live births by 2030 through an end to epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, waterborne diseases and other communicable diseases. Additionally, reduce by one third premature mortality from non-communicable diseases through prevention and treatment.

d) Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning Opportunities for all

   This goal targets that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes and by 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education. It also seeks to ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university and substantially increase the supply of qualified teachers, including through

international cooperation for teacher training in developing countries, especially least developed countries and Small Island developing States.

e) Goal 5: Achieve gender equality and empower all women and girls

Some of the targets in this goal include an end to all forms of discrimination against all women and girls everywhere and also eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation. Similarly, eliminate all harmful practices, such as child, early and forced marriage and female genital mutilation by 2030.

f) Goal 6: Ensure availability and sustainable management of water and sanitation for all

The goal seeks that by 2030; achieve universal and equitable access to safe and affordable drinking water for all and also achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations. It also will improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated waste water and substantially increasing recycling and safe reuse globally. Subsequently, by 2030, substantially increase water use efficiency across all sectors and ensure sustainable withdrawals and supply of fresh water to address water scarcity and substantially reduce the number of people suffering from it.

g) Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all

The goal seeks to ensure universal access to affordable, reliable and modern energy services as well as to increase substantially the share of renewable energy in the

global energy mix by 2030. Additionally, double the global rate of improvement in energy efficiency and enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil fuel technology, and promote investment in energy infrastructure and clean energy technology.

h) Goal 8: Promote sustained, inclusive and sustainable economic growth, full and Productive employment and decent work for all

   This goal targets to sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7% Gross Domestic Product (GDP) growth per annum in the least developed countries and also achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high value added and labour intensive sectors. Moreover, to promote development oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro, small and medium sized enterprises, including through access to financial services.

i) Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

   This goal targets to develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human wellbeing, with a focus on affordable and equitable access to all. Also to promote inclusive and sustainable industrialization and, significantly raise industry's share of employment and GDP, in line with national circumstances, and double its share in least developed countries by 2030. Additionally, increase the

access of small-scale industrial and other enterprises, particularly in developing countries, to financial services, including affordable credit, and their integration into value chains and markets and significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020.

j) Goal 10: Reduce inequality within and among countries

This goal targets that by 2030 to progressively achieve and sustain income growth of the bottom 40% of the population at a rate higher than the national average. It also seeks to empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status. Moreover, to ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action as well as adopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality.

k) Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable

This goal targets that by 2030 there is access to adequate, safe and affordable housing and basic services to all through upgrading slums. It also targets to provide access to safe, affordable, accessible and sustainable transport systems for all, improve road safety expand public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons. It also targets that by 2030,there will be enhanced inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human

settlement planning and management in all countries as well as strengthen efforts to protect and safeguard the world's cultural and natural heritage. It will also significantly reduce the number of deaths and the numbers of people affected and substantially decrease the direct economic losses relative to global GDP caused by disasters, including water related disasters, with a focus on protecting the poor and people in vulnerable situations.

l) Goal 12: Ensure sustainable consumption and production patterns

The goal targets to implement a 10 Year Framework of Programmes on Sustainable Consumption and Production Patterns. It will involve all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries. Also, by 2030, achieve the sustainable management and efficient use of natural resources and halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.

m) Goal 13: Take urgent action to combat climate change and its impacts

The goal targets to strengthen resilience and adaptive capacity to climate related hazards and natural disasters in all countries and integrate climate change measures into national policies, strategies and planning. Additionally, improve education, awareness raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

n) Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development

The goal targets by 2025 to prevent and significantly reduce marine pollution of all kinds, in particular from land based activities, including marine debris and nutrient

pollution. By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts; including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans. Additionally, minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels.

o) Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

By 2020 the goal targets to ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.

By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally. Moreover, by 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation neutral world. The goal seeks to ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development by 2030 and take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.

p) Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.

The goal seeks to significantly reduce all forms of violence and related death rates everywhere and end abuse, exploitation, trafficking and all forms of violence against women and torture of children. Also promote the rule of law at the national and international levels and ensure equal access to justice for all by 2030. Also, significantly reduce illicit financial and arms flows, strengthen the recovery and return of stolen assets and combat all forms of organized crime and substantially reduce corruption and bribery in all their forms. Equally, develop effective, accountable and transparent institutions at all levels and ensure responsive, inclusive, participatory and representative decision making at all levels.

q) Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

The goal seeks to strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection. Moreover, developed countries to implement fully their official development assistance commitments, including the commitment by many developed countries to achieve the target of 0.7 of gross national income for official development assistance (ODA/GNI) to developing countries and 0.15 to 0.20% of ODA/GNI to least developed countries; and mobilize additional financial resources for developing countries from multiple sources.

2.4.3 Adoption of the Green Concept and its Contribution to the Implementation of Sustainable Development Goals 1, 3, 7, 9, and 13 in Kenya

The achievement of SDG 1 requires both the provision of basic income and social protection to eliminate extreme poverty, and effective and equitable processes of wealth creation and distribution (Mosse, 2010). The key success of this goal is awareness and prevention of negative tradeoffs between achieving sustainability and eliminating poverty as elucidated in the adoption of the green concept (Mosse, 2010).

The relations between climate, clean energy sustainability and poverty suggests that SDG 1 needs to be at the center of all other targets in order to avoid inequitable transformation to a low carbon future or the use of the poor as a card for preventing the needed change towards a sustainable future (UN, 2014).

Kenya has made notable progress in the fight against poverty. Although the proportion of population living below the poverty line increased from 52.3 per cent in 1997 to an estimated 56 per cent between 2000 and 2002, by 2005/06, it had dropped to 45.9 per cent (GoK, 2007). Access to basic services can easily be boosted through adoption of green concept (PMA, 2015).

Health as envisaged under SDG 3 constitutes incorporation of ecosystem health for human capital in sustainable development and creates resilience to shocks as critical elements of green concept adoption cycle of sustainable development. Sustainable ecosystem health through adoption of green concept helps implement SDG3 through wide-ranging strategies that curb non-communicable diseases, mental health, disease prevention, tobacco control,

disaster risk reduction and intellectual property. This include acknowledgement of the role of the global food system, the built environment, and socioeconomic factors such as education and working conditions/occupational health which are all determinants of the global disease burden which could be addressed through stronger links with Goals 4, 8, 10, 11, 12 and 16 (ICSU, 2015).

Specifically Kenya has continued to make strides in assuring equity in sustainable human development (PMA, 2015). Human health is likely to be affected by various climate change-related health factors, including the altered distribution of some infectious diseases and disease vectors (IPCC, 2008). Projected trends in climate change-related exposures could be curbed through adoption of green concept by decreasing malnutrition and consequent disorders; decrease in number of people suffering from disease, injury from heat waves, floods, storms, fires and droughts. Green concept will reduce infectious disease vectors and burden of diarrheal diseases (Confalonieri *et al*, 2007; KNBS, 2017; Steiner, 2006).

Goal 7 provides inter-linkage with Goal 3 on Health in particular with target 3.9 on reducing deaths and illnesses from pollution (Ren21, 2014). The SDG7 contains a relatively balanced representation of the three dimensions of development pivoted on adoption of green concept in terms of clean energy (Ren21, 2014). Kenya has strategies for increasing forest cover and use of renewable energy (PMA, 2015; GoK, 2007).

Under SDG 9 Kenyan road transport is the predominant mode of transport and carries about 93% of all cargo and passenger traffic in the country with the established road network

estimated at 160,886 km long. About 61,945 km of these roads are classified while the remaining 98,941km are not classified (UNDP, 2012). Although faced with myriads of challenges (UNDP, 2012), Kenyan infrastructure is transforming through adoption of green concept in telecommunication and road sectors (KPMG, 2016).

Between 1999 to-date, the Kenyan government has implemented green concept policy reforms that have resulted in a number of structural changes redefining roles for policymaking, market regulation, dispute resolution and operation of service providers (KPMG, 2016).

Goal 13 is the centre of global focus in economies, societies and environmental resource sustainability. Global warming and climate change is one of the most daunting global challenge that the world faces currently (Maslin, 2009). The global nature of the problem demands that all states or nations or recognized forms of government be involved in addressing this global threat. In addition, it demands an international participatory, collaborative approach involving the public sectors, private sectors and civil societies (IPCC, 2007).

Industrialized nations and the developing economies have created an impasse centered on self-interest and blame games that question feasibility of meeting SDG 13 (Bausch, 2011). Despite this Kenya has adopted green concept initiatives to increase agricultural productivity by curbing soil erosion, loss of soil fertility, flooding, and biodiversity loss (Government of Kenya, 2000; Survey of Kenya, 2003).

Kenya's wide range of biodiversity is characterized with over 35,000 species of flora and fauna that support her tourism sector (Steiner, 2006). Kenya has also adopted the concept to conserve her biodiversity (Kabubo-Mariara, 2007; KFSSG, 2008; USAID, 2008).

CHAPTER THREE

3.0 Materials and Methods

3.1 Common Materials and Methods for all Objectives

3.1.1 Study Design

The research focused on adoption of green concept in environmental management, governance of the adoption of the green concept and how adoption of the green concept contributed to implementation of sustainable development goals. The design was to use the case study of Nairobi County (Fig 2) as a representative of Kenyan situation on green concept. Nairobi harbors all Kenyans and its choice was also based on its administrative, commercial and industrial activities. It is also a host for major international agencies headquarters such as UNEP, UN- HABITAT, and global environmental watchdog institutions.

The study utilized a cross sectional design because of its appropriateness in determining the co-relations among the various variables as similar to design other study designs on environmental system within the industrial areas (Florida, 2001). The study design incorporated both descriptive and analytical approach that incorporated field observations (Shields and Tajalli, 2006). Naturalistic observations were used to uncover unknown phenomena and behaviors (Shuttleworth, 2009).

Data Envelopment Analysis (DEA) method was utilized to evaluate the determinants of human perceptions, decisions, activities and their related influence on environmental management (Reinhard *et al.,* 2000; De Koeijer *et al.*, 2002; Sipiläinen *et al.,* 2008). The DEA method compares various organizational units (individual and institutional) decisions and output activities as they impacted on the environment (Boussonfiane *et al.,* 1991). The DEA constructs the determinant frontier (the most preferred combinations of decisions) and takes into account the impacts of the decisions on people's knowledge, attitudes and practices in environmental conservation (De Koeijer *et al.,* 2002).

Surveys were used to collect data that focused on the prevailing individual and institutional decisions that affected the green concept itself, its governance, and its influence on implementation of SDGs (Solovyeva *et al.,* 2011). The framework of the research tried to present the possible theories of statistical variety represented by the decisions of the randomly chosen respondents (Fare and Grosskopf, 2004).

The green concept component was incorporated into the DEA research model as an input representing the main focus as the driver for the output, which in this case was environmental management as measured by biodiversity conservation. The influence of human activity and in particular the uptake of the green concept (conservation/preservation/protection), became the pillar of the research (Kuemmerle *et al.*, 2008). In the considered theoretical context, depending on which biodiversity parameters are chosen, the aggregated environmental conservation index was determined to be that combines with the quantitative and qualitative evaluation of the parameters as differently weighted (MacDonald *et al.*, 2000; Tasser and Tappeiner 2002; Dullinger *et al.,* 2003). The

resultant percentages of the people who were knowledgeable on the green concept, those who adopted it; and the attitudes and practices of the respondents and the outcome of their decisions were vital (Kuosmanen and Kortelainen, 2004 and 2005).

Ninety two (92) households were surveyed and five (5) key informant interviews conducted (n=97). The main prerequisite for choosing respondents for the survey was being residents of Nairobi and/or being the head of the environmental department of the ministry or institution dealing with environment issues (key informant).

The study focused on perceptions of the respondents on the green concept, knowledge on governance structures of its adoption and its contribution to implementation of SDGs. Open and closed questions as well as qualitative and quantitative questions were used (Jahnke and Jahnke, 1982; Fare and Grosskopf, 2004). The indicators were weighed according to their importance for the adoption of green concept through chi-square significance level ($P \leq 0.05$, n=97). Bias likely to result from utilization questionnaire surveys (i.e. social desirability bias, leniency bias) were minimized by adapting methodological separation amongst different measurements of the study in order to get temporal and psychological separation (Michelsen and de Boer, 2009).

In order to minimize the items ambiguity, ambiguous or unfamiliar terms were not used, vague concepts or complicated syntax were avoided and questions were simple, specific, and concise. To minimize socially desirable, lenient, acquiescent, and consistent bias, all respondents were guaranteed anonymity. The data was further strengthened by information sought from key informant interviews.

Here topics on the understanding of the green concept and its application, ability to assess uptake of green were covered. The test of the validity of data provided was done by asking many respondents similar questions and posing same question to key informants in addition to their specific extra questions on the green concept and its uptake.

3.1.2 Study Area

The study was carried out in Nairobi County (Fig 2). Nairobi (*'the city in the sun'*) has a national park and green spaces. It is located at the south-eastern end of Kenya's agricultural heartland, 1° 9'S, 1° 28'S and 36° 4'E, 37° 10'E and occupies an area of about 696km2. Its altitude varies between 1,600 and 1,850 metres above sea level (KNBS 2010; Mitullah 2003). The Nairobi's western part is on high ground (approximately 1700–1800 metres above sea level (msl) characterized with rugged topography, while the eastern side is generally low (approximately 1600 msl) and flat (Saggerson, 1991). Key physical features notable in Nairobi County includes; Ngong and Mathare rivers and the indigenous Karura forest in northern Nairobi. The Ngong hills stand towards the west and Mount Kenya towards the north while Mount Kilimanjaro is towards its south-east (Saggerson, 1991). Nairobi County is divided into eight sub- counties namely Dagoretti, Embakasi, Kasarani, Kibera, Westlands, Ziwani, Nairobi Central and Makadara.

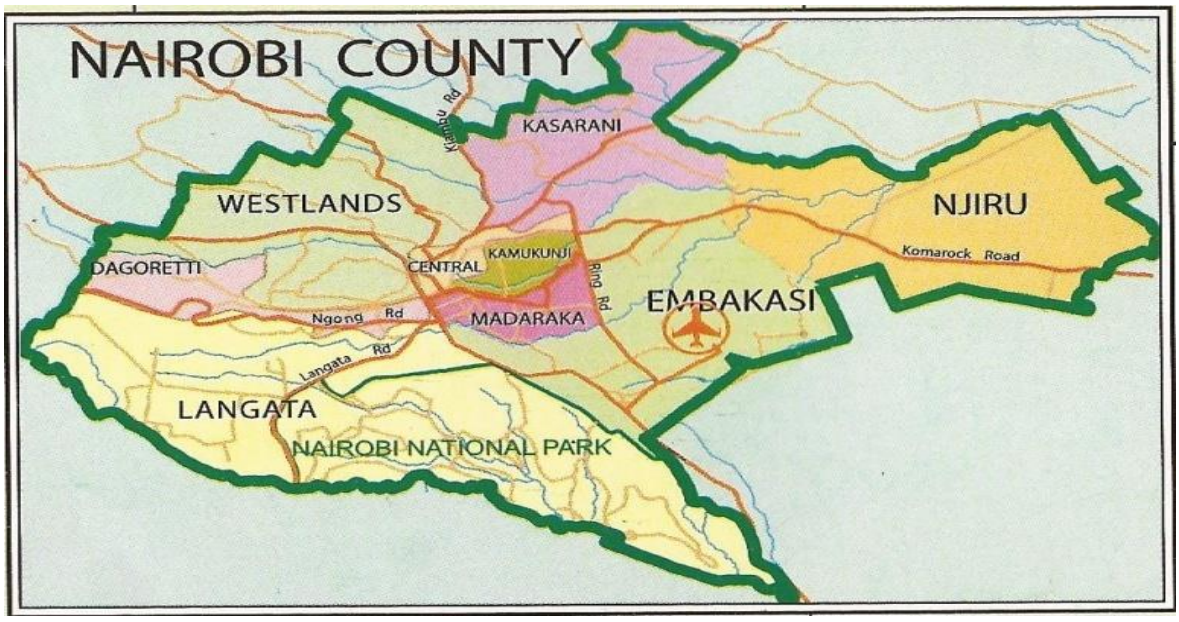

Figure 2*:* A Map of Nairobi County

Nairobi has a temperate tropical climate with two rainy seasons with the highest rainfall received between March and May and the short rains between November and December. Nairobi has mean annual rainfall ranging between 850-1050mm and has warm temperatures ranging from a mean daily temperature of between 12 and 26°C. Nairobi usually experiences dry and cold season between July and August and hot and dry season in January and February. The mean monthly relative humidity varies between 36 and 55 per cent (KNBS, 2010). The mean daily sunshine hours varies between 3.4 and 9.5 hours (KNBS, 2010).

3.1.3 Data Collection Tools

Primary data was collected using structured questionnaires, standardized interviews and field observations. The primary data collecting tools were pre-tested for reliability.

Questionnaires captured information to test the study overall objective and specific objectives of the study. The interview approach was supplemented through interviews with the researcher's own observations (Wagner, 1997).

The instruments were standardized, structured and confidential. Each interview was followed with informal discussions to ascertain the qualitative data obtained. Quantitative data was mainly numerical and explored traits and situations (Tabachnick and Fidell, 2007). Responses to the open-ended items in the questionnaires, interview responses and observation data was quantified, recorded, edited and coded. The Likert scale and closed ended questions were analyzed to produce relationships.

The use of descriptive statistics was used (Hvenegaard, 2009). All respondents were adult family head (a man or woman) or head of environmental organizations. The interview and discussion with each interviewee was independently conducted. To ensure the credibility of the data interviews, were made separately where 46.4% men and 53.6% women were interviewed. Age was considered as well as levels of education.

To capture the city residents 'attitudes towards adoption of green concept in the study area, a five-point Likert scale with several statements was developed. This scale was initially subjected to a one pilot study in order to check its validity and reliability. This was done by first pre-testing the items using selected respondents in Westlands and Kibra areas. The issues pre-tested were grammar, layout and comprehension before it was administered to the final sample as previously described (Aylward, 2003; Sirikrai and Tang, 2006).

Secondary data was obtained from documents including reports, newspaper articles, institutional brochures, academic journals, specialized magazines and the internet. Nonetheless, care was taken in the reliability of the sources where data was drawn from (Bartlett *et al.*, 2001).

The instruments for this study were validated after analysis of the data collected during piloting (Golafshani, 2003). Content validity was used as a non-statistical method to validate the content as determined by researchers' judgment, (Henson, 2008). In essence, this validation determined whether the tool content measured what it was supposed to measure or not. Conclusion validity was tested to check whether there was a relationship between variables (Shuttleworth, 2009). Similarly, internal validity was also tested to check whether there was a causal relationship between variables, while external validity was tested to check the general study results (Bartlett *et al.*, 2001; Kumar, 2002).

Instrument reliability was based on repeatability across the study area and consistency of measuring an attribute (Kulendran and Witt, 2001). The data reliability was checked through internal consistency checks.

3.1.4 Sampling Frame

Non-probability sampling method of purposive sampling was used because the sample selection was done based on the nature of the research objectives. Non-probability sampling implies that the samples were chosen due to their relevance to the study topic

rather than their 'representativeness', which determines the way in which people to be studied are selected (Neuman, 2006).

The sample size was 97. Purposive sampling approach was used to ensure that a reasonably representative sample is picked for the Key Informants. Purposive sampling considered most common characteristics of the desired sample and tried to figure out where these individuals can be found.

This sampling was the only logical option because of financial and travel constraints, and the respondents' accessibility within the population to be studied as described previously for other cities (Adèr *et al.,* 2008). This has also added advantages of decreasing variances of sample estimates since the sampling techniques also involved random purposive data (Allen and Babbie, 2008). Purposive sampling technique was also used to select the study area and to identify the key informants (Lucas, 2012).

3.1.5 Study Target Population

The study target population was categorized in to three parts which include: Policy makers- National government, implementers- Nairobi County government, NEMA and consumers- who are in private and public sectors, non-governmental organizations and the UN environmental agencies in regard to Key Informants.

The target population was all households in the 8 sub-counties in Nairobi County where the accessible population were the men and women who represent the low income, middle

income and high income and also are from the residential areas, market places and industrial or artisans. According to Fraenkel and Wallen (2000), a simple random sample is one in which each member of the population has an equal and independent chance of being selected, while a proportional sample is where the sample size is a fraction of the whole sample size. Proportional random samples of the respondents were selected from the sub-counties zone respectively (Table. 1).

Table 1*:* Respondents Representative samples in the Nairobi Sub-Counties

Nairobi Sub-Counties Zone	**Total**
Kenyatta Market/ Ngummo	12
Kibra	15
Embakassi	18
Kawangware	10
Kangemi	8
Westlands	10
Muthaiga/ Pagani	7
Mombasa Road/ Industrial Area	12
Jogoo Road/ Buruburu	5
Total	**97**

When the population is more than 10,000 individuals, 384 of them are recommended as the desired sample size (Mugenda & Mugenda, 1999). However since the target population to the study is less than 10,000, the final sample size estimate could be adjusted as recommended by Mugenda (2003).

Mugenda and Mugenda recommend the formula;

$$nf = \frac{n}{1+{}^{n}/_{N}}$$

Where:

nf = is the sample size when population is less than 10,000

n = the sample size when the population is above 10,000

N = the population of the target sub-population

The study used sub-counties as it is applicable if a population from which a sample is to be drawn does not constitute a homogeneous group (Mugenda and Mugenda, 2003).

3.1.6 Data Analysis

Qualitative data from questionnaires and household surveys was examined and grouped in themes while quantitative data was analyzed using descriptive and inferential statistics using Statistical Packages for Social Sciences (SPSS Version 20). Results were presented in percentages, pictorial graphs and pie charts (Yalta, 2010; Robert, 2004; Levesque, 2007). Descriptive statistics was used to produce percentages, means and frequencies. Inferential statistics such as Chi-square was used to analyze parametric data and identify significant differences between frequencies and level of significance among the variables (Glover *et al.*, 2008).

The standard error (SE) of the mean was taken to be an estimate of the standard deviation of the error in the computed sample mean of the data relative to the true mean. This was presented as plus or minus (±) the computed value since the sample mean of the analyzed data was an unbiased estimator. This approach helped in identifying the confidence value of the computed data. SE was estimated using the formulae:

$$SE_{\bar{x}} = \frac{s}{\sqrt{n}}$$

With SE being estimated from the sample estimate of sample standard deviation divided by the square root of the sample size:

Where:

s = the sample standard deviation,

n =the sample size.

Frequencies as well as differences in frequencies of a particular response from the interviewed household heads were summarized and the equality of proportions in each category to specific values was tested using Chi-square level of significance (Glover *et al.*, 2008). To establish factors influencing certain responses and particular relationships with

specific attributes, a chi-square analysis was employed using SPSS Version 20.0 for Windows (Levesque, 2007).

Statistical tests were considered significant if p-values were equal to or less than 0.05 (Glover *et al.*, 2008). For a p-value that was equal to or less than 0.05, then the frequencies were significantly different while in cross tabulations, if p-value was equal to or less than 0.05, then the response was dependent on an attribute. The results were presented in frequency distribution tables, bar graphs and pie charts.

The specific objectives used a shared method which was anchored on a non-parametric model called Data Envelopment Analysis (DEA). DEA is a relatively new "data oriented" approach for evaluating the performance of a set of peer entities called Decision Making Units (DMUs) which convert multiple inputs into multiple outputs where the definition of a DMU is generic and flexible (Cooper *et al*.,2000).

DEA is a linear programming which is a based technique for measuring the relative performance of organizational units where the presence of multiple inputs and outputs. DEA requires few assumptions thus has been fundamental in opening up possibilities for use in cases which have been resistant to other approaches because of the complex seldom unknown nature of the relations between the multiple inputs and multiple outputs involved in DMUs (Cooper *et al*., 2000).

DEA uses the measure of efficiency, i.e.:

$$\text{Efficiency} = \frac{\text{Output}}{\text{Input}}$$

This is often inadequate due to the existence of multiple inputs and outputs related to different resources, activities and environmental factors. DEA is the non-parametric mathematical programming approach to frontier estimation. DEA is receiving increasing importance as a tool for evaluating and improving the performance of environmental and service operations. It is most useful when a comparison is sought against "best practices" where the analyst doesn't want the frequency of poorly run operations to affect the analysis (Fare and Grosskopf, 1984).

CHAPTER FOUR

4.0 The Perspective on Adoption of Green Concept in Biodiversity Conservation: Case of Nairobi, Kenya (Journal of Biodiversity and Environmental Science 12(1), 73-82)

4.1 Abstract

Biodiversity is disappearing at an alarming rate due to human civilization. The paper documents the benefits of adopting green concept environment ecosystem to salvage biodiversity loss through protection, conservation and preservation. Data was collected by surveying 97 households and five key informants using semi-structured questionnaires, interviews and observations. The nonparametric *Data Envelopment Analysis (DEA)* was used to determine the degree of connectivity between the society/institutions and the existing biodiversity conservation trough green concept adoption. Fifty three (53.6%) of the female gender understood and adopted the green concept in biodiversity conservation when compared to the male gender (46.4%). Overall, 33% of the respondents understand the green concept compared to those who did not understand (67%). The awareness level of the respondents on the existence of legal instruments (laws, policies and regulations) for the green concept was high (56.7%, $P \leq 0.05$, n=97). On the contrast, 35.1% of respondents neither knew the implication of the legal instrument nor did they comply to the same (30.9%) when compared with those who knew the implication (64.9%) and complied with the same (69.1%), respectively. Notably Kenyans had differences on levels of understanding of the green concept and its application in biodiversity conservation but were

practicing the concept and also were willing to adopt the same in biodiversity conservation. This serves to provide evidence to inform policy decisions that support implementation of governance strategies for the adoption of green concept to sustain biodiversity conservation.

Keywords: Biodiversity, Green concept, Negative and Positive Externalities, Kenya

4.2 Introduction

The Convention on Biological Diversity (CBD) defines biodiversity as the variety of all living organisms including ecosystems, plants, animals their habitats and genes (CBD, 2010; Lusweti, 2011). Biodiversity is rarely linked directly to the development index of human population but it directly and indirectly affect human development through contribution of up to 40% of global market of goods and services (Thompson *et al.,* 2011). Tragically, today biodiversity is disappearing at alarming rate due to human civilization (UNEP Report, 2016).

A threat on biodiversity refers to any process or event whether natural or human induced that is likely to cause adverse effects upon the status or sustainable use of any component of biological diversity (Swanson, 1995). These processes or events are often stimulated by misguided economic and faulty institutions (Lusweti, 2011). Although some institutions are created to manage biodiversity, the same institutions/policy fail to internalize the values of biodiversity within the decision making process of their nations and individuals (UNEP Report, 2016). Institutions/policies that fail to put in place a holistic approach towards biodiversity conservation only end up achieving partial conservation (Swanson, 1995).

The result of failed institutions/policies is the lack to utilize the peoples' utilitarian values of conservation. Utilitarian value strategy entails a holistic approach to conservation that takes into account the peoples' material well-being, besides the feelings and emotions that give them satisfaction in conservation, including utilization of conservative and productive materials from biodiversity e.g. agricultural materials or food sources, medicine, industrial raw materials, educational values and scientific research (Swanson, 1995; Lusweti, 2011; UNEP, 2016).

The gross domestic product (GDP) for developing countries is heavily driven by sectors like tourism and agriculture that depend on conserved biodiversity (Thornton, 2010; FAO, 2017). Thus, failure to incorporate utilitarian values in conservation in these countries would not only lead to biodiversity losses but also affect their economy (Fonderflick *et al.*, 1982).

The biodiversity losses are more likely to be in urban and peri-urban ecosystems that host national park (UNEP report, 2016). In addition, in developing countries, there exist continuous pressure on the ecosystem from rural-urban migration and conversion of parks and farming land into housing facilities (Lesschen *et al.,* 2004). All these factors are causing major shift in biodiversity landscape mosaic to take place that impact negatively on urban and peri-urban ecosystems (Lesschen *et al.,* 2004). Therefore, in such countries like Kenyan, the dynamism of biodiversity conservation in Nairobi ecosystem, which host the national park, is likely to be determined by decisions made individually by the residents and supporting institutions/policies (Lambin and Meyfroidt, 2010).

There is a global push for adoption of Green Concept to promote biodiversity conservation (UNEP Report, 2016). This concept is a sustainability measure of environmental biodiversity that integrates protection, conservation and preservation activities geared towards biodiversity conservation (UNEP Report, 2016). In this case, conservation activities, in one hand would entail sustainable use of biodiversity resources by encompassing protection and restricted exploitation of biodiversity. On the other hand, preservation would be the aspect of conservation that maintains the existing biodiversity without altering or changing it (Spellerberg and Hardes, 1992).

In order to adopt the green concept in biodiversity conservation, there would be need underpin the importance of undertaking research to provide evidence-based legislations/policies that promote conservation (MoE Report, 2000; Kenya Vision 2030, 2010). This way, the countries promoting the adoption of the green concept in biodiversity conservation could sustainably reap economic benefits through public good resulting from citizens' utilitarian values for biodiversity resources and their associated processes (Swanson, 1995; Lusweti, 2011).

This approach for biodiversity conservation applies to Kenya because biodiversity is the main support of her GDP, which is heavily dependent upon tourism sector to sustain the economy (MoE Report, 2000; Kenya Vision 2030, 2010). Adoption of the green concept in biodiversity conservation in Kenya could therefore be driven by potential for profitability and support for the economy (EMU-GOK, 2010; Lusweti, 2011). Thus, despite the eminent threat to the ecosystems and biodiversity in Kenya ecosystems, an avenue to utilize the utilitarian values drive to conserve the biodiversity exist and can be used to halt the existing

threat to biodiversity through human civilization (Spellerberg and Hardes, 1992; Swanson, 1995; Lusweti, 2011; UNEP Report, 2016).

However, despite the need and importance of adopting the green concept in biodiversity conservation in Kenya, there exists very scanty information on individual/institutional strategies that embrace adoption of the green concept in Kenya. It therefore became prudent to conduct research to inform policy based on peoples' perceptions, knowledge, attitudes and practices on green concept in biodiversity conservation in Kenya. The data generated would be useful in formulating national strategies and action plans for sustainable utilization of biodiversity and its resources. This paper seeks to present data that promotes a paradigm shift from myth of perceptions to education, public awareness, community participation and policy implementation.

4.3 Materials and Method

The theoretical framework of the research was based on institutional and resource based view where coercive push and resource benefits for societal utilitarian values of biodiversity conservation are deemed to influence the implementation of actions like adoption of Green Concept in biodiversity conservation (Florida and Davison, 2001). In applying this theory, the design was to conceptualize a framework (Fig 3) that considers engagement in protection, conservation and preservation of the environment as the inputs of green concept, and the societal values as regulated by institutions/policies considered as drivers that influence the adoption of concept in biodiversity conservation. Data collected in Nairobi County served to represent Kenyan perspective because Nairobi is host to key

environmental organizations like UNEA, government ministry and other NGOs that formulate and implement policies on environmental management and conservation. In addition, Nairobi is the only city with a national park ecosystem.

Surveys were conducted using questionnaires, key informant interviews and observations. The attributes of the green concept in biodiversity (conservation, preservation and protection of biodiversity species) formed the focus of the survey. *Data Envelopment Analysis (DEA)* method was utilized to evaluate the determinants of human perceptions, decisions, activities and their related influence on biodiversity conservation (Reinhard *et al.,* 2000; De Koeijer *et al.,* 2002; Sipiläinen *et al.,* 2008). In brief, DEA method compared various organizational units (individual and institutional) decisions and output activities that impacted on biodiversity conservation (Boussonfiane *et al.,* 1991). The DEA constructs the determinant frontier (the most preferred combinations of decisions) and takes into account the impacts of the decisions on people's knowledge, attitudes and practices on biodiversity conservation (De Koeijer *et al.,* 2002).

The surveys focused on the prevailing individual and institutional decisions that affected the green concept itself, and their influence on the biodiversity conservation (Solovyeva *et al.,* 2011). The framework of the research tried to present the possible theories of statistical variety represented by the decisions of the randomly chosen respondents (Fare and Grosskopf, 2004). The green concept component which was incorporated into the research model as an input represented in the main focus as the driver for the output, which in this case was biodiversity conservation. The influence of human activity and in particular, as based on the uptake of the green concept (conservation/preservation/protection)

(Kuemmerle *et al.,* 2008), on biodiversity conservation, became the pillar of the research. In the considered theoretical context, depending on which biodiversity parameters are chosen (MacDonald *et al.,* 2000; Tasser and Tappeiner 2002; Dullinger *et al.,* 2003), the aggregated biodiversity index was determined that combines the quantitative and qualitative evaluation of the following parameters as differently weighted: percentage of the people who were knowledgeable on the concept, those who adopted it, and the attitudes and practices of the respondents (Kuosmanen and Kortelainen, 2004 and 2005).

Ninety two (92) households were surveyed and five (5) key informant interviews were conducted. The main prerequisite for choosing respondents for the survey was being a resident of Nairobi and/or being the head of the environmental department of the ministry or institution dealing with environment (key informant). Factors considered included the perceptions of the respondents on the green concept, knowledge on waste management, attitudes and practices on green concept in biodiversity conservation, and attitudes on technologies that promote the adoption green concept. In the survey, open and closed questions as well as qualitative and quantitative questions were used (Jahnke and Jahnke, 1982; Fare and Grosskopf, 2004). The indicators were weighed according to their importance for the adoption of green concept in biodiversity through chi-square significance level ($P \leq 0.05$, $n=97$).

Bias likely to result from utilization questionnaire surveys (i.e. social desirability bias, leniency bias) were minimized by adapting methodological separation amongst the different measurements of the study in order to get temporal and psychological separation (Michelsen and de Boer, 2009). In order to minimize the items ambiguity, ambiguous or

unfamiliar terms were not used, vague concepts or complicated syntax were avoided, and questions were simple, specific, and concise. To minimize socially desirable, lenient, acquiescent, and consistent bias, all respondents were guaranteed anonymity. The data was further strengthened by information sought from key informant interviews. Here topics on the understanding of the Green Concept and its application, ability to assess uptake of green concept biodiversity conservation were focused on. Additionally, to test the validity of data provided by other respondents, similar questions were posed to key informants, although extra questions on the Green Concept and its uptake were included.

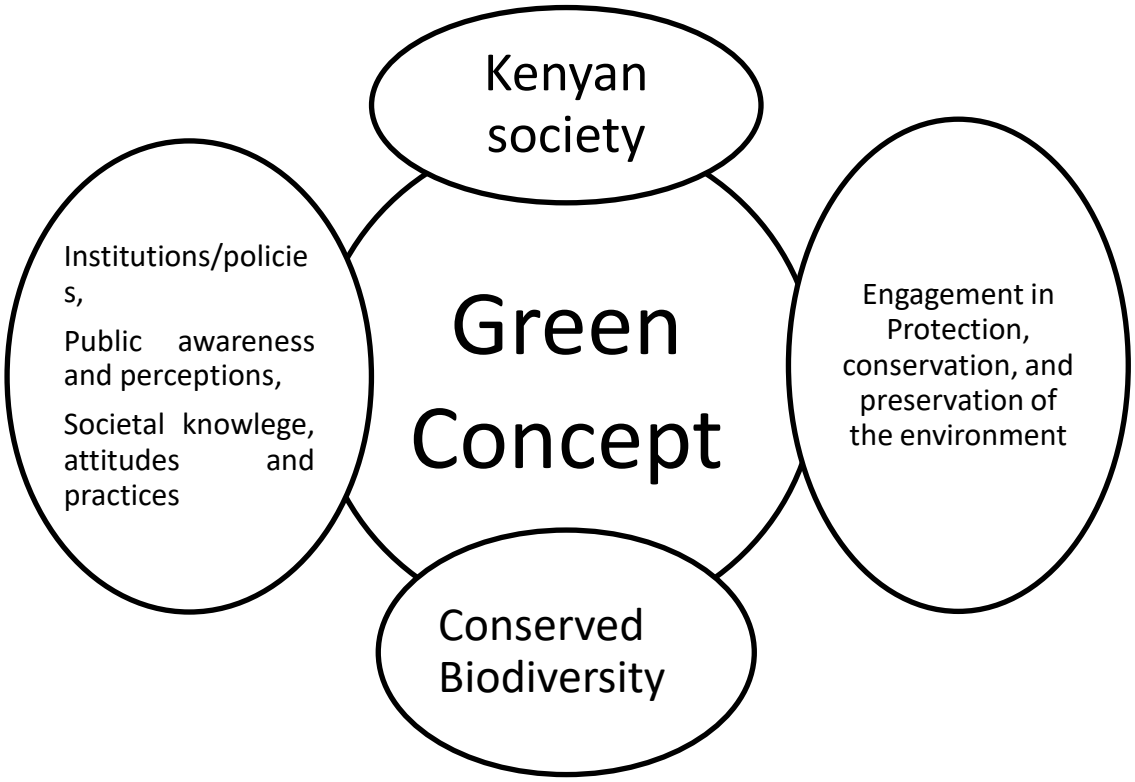

Figure 3: Conceptual framework of adopting Green Concept in Environmental Conservation

4.4 Results and Discussions

4.4.1 Results

From the data presented (Table 2-4; Fig. 4-6), the gender demographic of the respondents significantly ($P \leq 0.05$, n=97) affected the adoption rate of the green concept in Kenya. On average more women respondents understood and adopted the green concept in biodiversity conservation (Fig. 4). However, it is also noted that significantly lower number of the respondents (Table 1; 33%, $P \leq 0.05$, n=97) understood the green concept and its application in biodiversity conservation (Table 2). Again, it is evident that the respondents awareness level on existence of legal instruments for the green concept regulation was significantly high (Table 1; 56.7%, $P \leq 0.05$, n=97). However, as shown on Table 2, significantly lower number of respondents neither knew the implication of the legal instrument (35.1%, $P \leq 0.05$, n=97) nor did they comply on the same (30.9%, $P \leq 0.05$, n=97). As indicated in Table 3 and Figure 4, the majority of the respondents significantly perceived that green concept could contribute to biodiversity conservation through use of environmentally friendly sources of energy (65.3%), practice of environmentally better practices (64.4%) and adherence to environmental laws and regulations (67.9%).

Majority of them (62.9%) also significantly practiced tree planting for protection of the biodiversity and also significantly engaged in practices that they perceived protected the biodiversity (Table 4 and Figure 4; $P \leq 0.05$, n=97). Majority of respondents were significantly willing to adopt the green concept to conserve biodiversity as they also perceive it as a means of wealth creation (Fig. 4-6; $P \leq 0.05$, n=97).

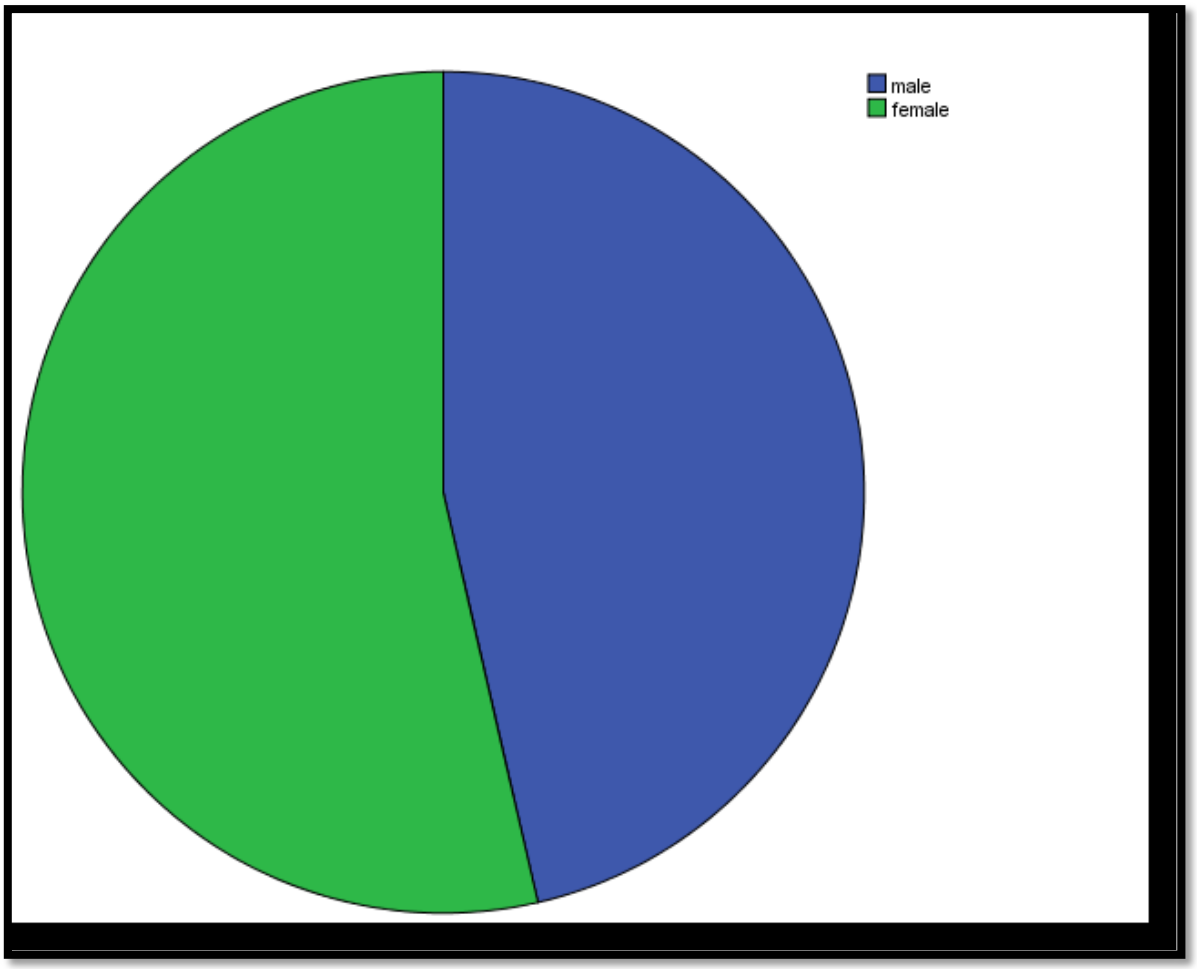

Figure 4: Role of gender in adoption of green concept in biodiversity conservation; **blue=men adopting the concept (46.4%[a]), green=women adopting the concept (53.6%[b]). [a,b] indicates significant difference in chi-square, p≤0.05, n=97**.

Table 2: Respondents knowledge, attitudes and practices on green concept and the governance (legal instruments) that promote adoption of green concept in Environmental Management *(n=97)*

Parameter	Yes (positive) (%)	No (negative) (%)
Understanding of concept	33.0±2.11[a]	67.0±2.17[b]
Awareness of existing legal instruments	56.7±1.62[a]	43.3±1.67[a]
Knowledge of the Implication of legal instruments	35.1±1.89 [a]	64.9±1.90[b]
Compliance to the legal instruments	30.9±2.05[a]	69.1±2.11[b]

[a, b] *Different letters in the same row differ statistically by Chi-square, P<0.01; Positive: respondents aware of existence of legal instruments, their implication on conservation and compliance on biodiversity conservation; Negative: respondents of the contrary views of the positive responses*

Table 3: Respondents perceptions on green concept as applied in biodiversity conservation (n=97)

Parameter	No (Negative) (%)	Yes (Positive) (%)
Use of environmentally friendly sources of energy	34.7±1.81[a]	65.3±1.78[b]
Practice of the environment better practices	37.6±1.69[a]	64.4±1.59[b]
Adherence to environment laws and policies	32.1±2.45[a]	67.9±2.81[b]

[a, b] *Different letters in the same row differ statistically by Chi-square, P<0.01;significant majority of respondents could attribute the practices to green concept*.

Table 4: Respondents practices of the green concept that promote attributes of biodiversity conservation (n=97)

Green concept parameter	Protection (%)	Conservation (%)	Preservation (%)
Planting trees	62.9±0.22[a]	20.6±0.48[b]	2.1 ±0.61[c]
Building gabions and restoring riparian	5.2±0.44[d]	1.0±0.49[e]	2.1±0.37[e]
Waste management	4.1±0.05[d]	1.0±0.50[e]	1.0±0.19[e]

[a, b, c, d, e] *Different letters in the same row and column denotes significantly different statistically by Chi-square, P<0.01; differences in practices were noted for different purposes of* biodiversity conservation.

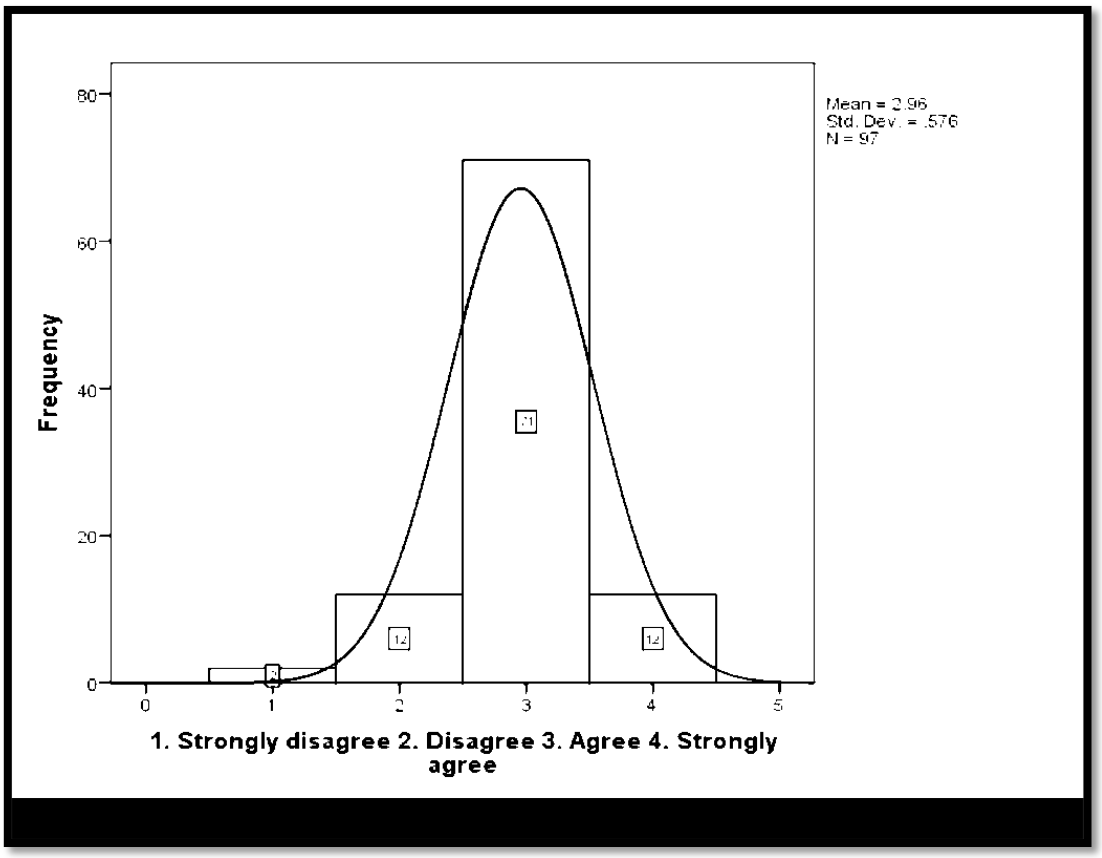

Figure 5: Perception of respondents on adoption of green concept in biodiversity conservation; utilization of environmental conservation practices as means to wealth creation and innovations like brisket production. Majority of respondents significantly perceived green concept could conserve biodiversity in environment and help create jobs; $P \leq 0.05$, n=97.

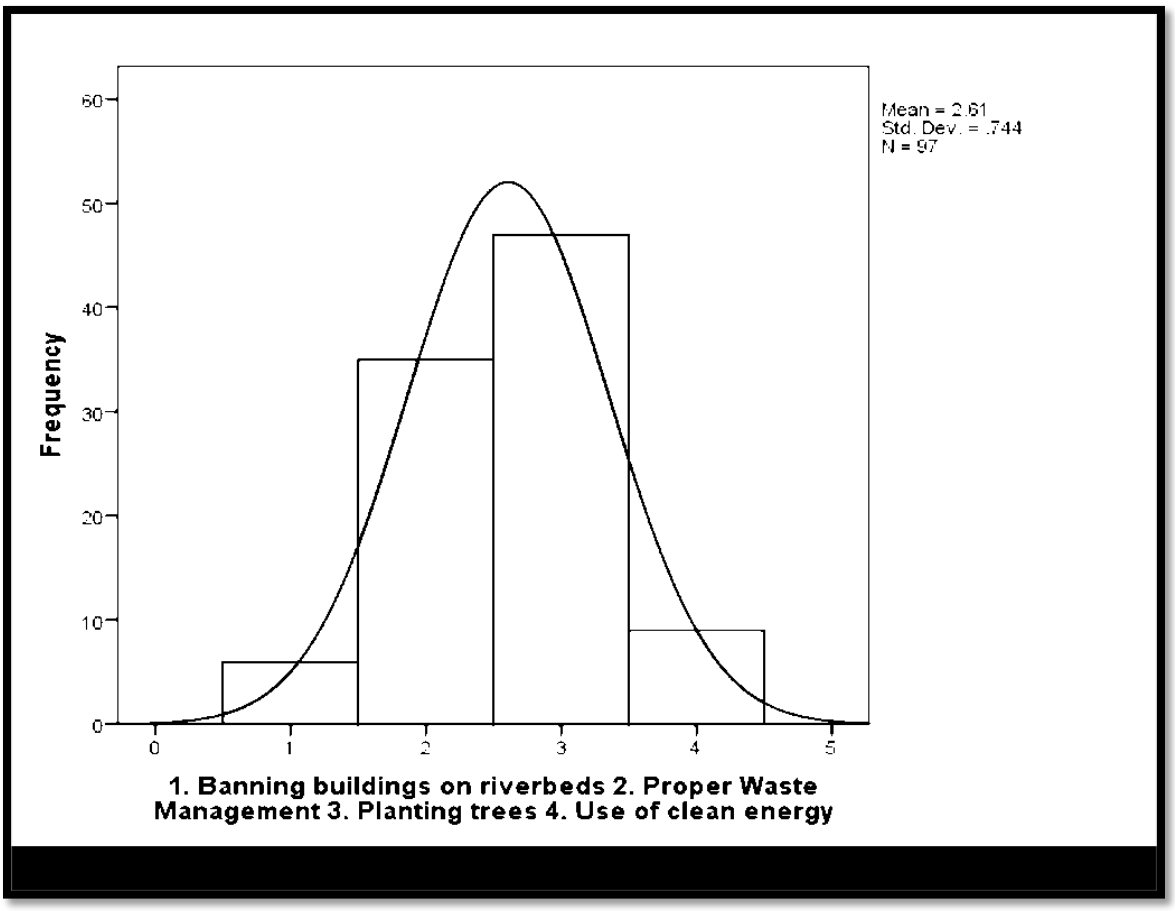

Figure 6: Respondents willingness to adopt green concept in biodiversity conservation; utilization of environmental management through various practices (planting trees, advocating for ban on protection of riparian). Majority of respondents significantly willing to adopt green concept in biodiversity conservation; $P \leq 0.05$, n=97.

4.4.2 Discussion

The results reported in this paper indicate differences in knowledge, attitudes and practices of the respondents for the green concept and its legal regulation based on gender demographic, respondent's personal perceptions, knowledge, attitudes and practices. Similar observations on biodiversity conservation have been reported (Jahnke and Jahnke,

1982; Cooper *et al.,* 2002). This find was not surprising based on the theoretical context of the DEA method of analysis, which allows the data to "speak for itself" (Cooper *et al.*, 2002; Kuosmanen and Kortelainen, 2004 and 2005).

Although the results indicate a low understanding of the green concept in Kenya the findings also indicate that Kenyans are willing to adopt the green concept in biodiversity conservation through utilitarian values as a means for wealth creation through biodiversity resources and their associated processes (Swanson, 1995; Lusweti, 2011).

This aspect supports the initial theoretical framework of this research that took a closer look on individual personal willingness/lack of willingness to adopt the concept in achieving biodiversity conservation (positive environmental externality through protection, conservation and preservation of biodiversity).

The DEA approach that let the data "to speak for itself" provided an avenue to clearly understand how adoption of the green concept could impact on conservation of biodiversity. In this aspect, it was clear that the respondents understood the concept to mean use of environmentally friendly sources of energy, better environmental practices and adherence to environmental governance instruments (laws, regulations and policies).

This is in agreement with others, who reported, for instance, how individual decisions and practices affected natural environment (Reinhard *et al.,* 2000). The Kenyan majority were also practicing the planting of trees, building gabions, restoring riparian, and waste management, all of which contributed to green concept that lead to biodiversity

conservation. This therefore shows that the practices of respondents influenced not only the environment but also the existing biodiversity.

Thus, as reported previously, the adoption of the green concept in Kenya is dynamically causing changes in the biodiversity towards conservation (Van Huylenbroeck and Whitby, 1999; Schader, 2009). Of great value in conservation is the noted perception by the respondents that adoption of the green concept could be a means for wealth creation. Thus, sustainable biodiversity interest in Kenya can be driven though utilitarian value as means for wealth (Van Huelenbroeck and Whitby, 1999; Kleijn *et al.*, 2009; Fonderflick *et al.*, 2010; Singer, 2011).

Thus, the adoption of the green concept through the driver of societal utilitarianism, as reported by (Singer, 2011) could be the practical way to conserve biodiversity in Kenya (positive environmental externality). This already agrees with the noticed willingness by the respondents to adopt the green concept as means for wealth creation. The thresholds of the research were based on a conceptual framework (Fig. 3), which predicted utilization of the green concept to promote biodiversity conservation. Adoption of the concept through practices of tree planting, restoration of riparian etc. impacted on biodiversity conservation through gain of unique local natural biodiversity, presence advocacy services, mass re-appearance of the threatened biodiversity, and resurgence of support institutional structures for the activities that promote biodiversity conservation. This has been demonstrated elsewhere through promotion of utilitarian values of conservation for job creation that led to increase in diversification of household income and restoration of affected biodiversity (Solovyeva *et al.*, 2011).

The differences in individual respondent knowledge, attitudes and practices decisions on the adoption of the green concept in biodiversity conservation in Kenya were inherently connected to society-specific expectation like gender, upbringing status and economic stability. Therefore, such demographic characteristics, as they influence local situations, need to be considered as evidence for effective governance strategy that enhance natural adaptive characteristics of the people of Kenya as a solution for sustainable biodiversity conservation. This is in line with the UNEP report (2016) which recommends countries to embrace gains perceived by the society relation to the adoption of the green concept in biodiversity conservation; residents need to see this as avenue for job creation and economic empowerment.

4.5 Conclusion

The reported data indicate that despite the low understanding of green concept in biodiversity conservation, residents of Nairobi in Kenya practice and are also willing to adopt the green concept for biodiversity conservation. However a gap is noted in awareness level and lack of an implementation strategy for effective governance that promote green concept in biodiversity conservation.

4.6 Recommendations

The results of this research can contribute to the adoption of the green concept through formulation of evidence-based policies for sustainable biodiversity conservation.

CHAPTER FIVE

5.0 Determinants of Compliance with Governance Instruments for Adoption of Green Concept in Environmental Management: Case of Nairobi (Journal of Biodiversity and Environmental Science 12(3), 28-38).

5.1 Abstract

The constitutional guarantee to a clean and healthy environment was a win in Kenyan environmental space as safeguarded by her 2010 constitution. However, environmental governance in Kenya still lacks enforcement and compliance at institutional and citizen levels. This paper documents peoples' perceptions and factors that influence compliance with governance instruments that regulate adoption of green concept in environmental management; protection, conservation and preservation. Data was collected by surveying 92 households and five key informants (n=97) using semi-structured questionnaires, interviews and observations. The nonparametric *Data Envelopment Analysis (DEA)* was used to determine the degree of connectivity between the society/institutions and the environmental governance. Respondents' understanding of green concept in environmental management was significantly low (33.0±2.11, n=97, P≤0.05) although majority seemed to be aware of the existence of governance instruments regulating environmental management (56.7±1.62, n=97, P≤0.05). Majority also neither knew the implication (64.9±1.90, n=97, P≤0.05) nor complied (69.1±2.11, n=97, P≤0.05) with the governance instruments in environmental management. Majority of the respondents (50.7±1.44, n=97, P≤0.05) agreed compliance to governance instruments would enhance waste management but majority

were on contrary view for use of clean energy (71.7±1.66, n=97, P≤0.05) and its role in industries (64.9±1.90, n=97. Majority of the respondents (57.6±1.36, n=97, P≤0.05) indicated that lack of awareness affected compliance with governance instruments but agreed that benefits could result from compliance with governance instruments in environment management. Majority were willing to comply with the governance instruments after awareness creation, civic education and strict enforcement of the instruments.

Keywords: Green concept, Environmental management, Governance, Kenya

5.2 Introduction

Governance refers to rules, processes, and behaviour by which interests are articulated, resources are managed, and power is exercised (European Commission, 2004). This means instruments are the laws, regulations and policies that guide the process of governance. Thus, governance framework includes laws and regulations, local and international conventions, policies and administrative structures including local and international institutions, social norms and traditions (HLPE, 2014). Biodiversity is under threat from human civilization requiring regulation to counter this threat (UNEP, 2012). Increased biodiversity loss, pollution, and climate change scenarios persist because of many factors that also include a gap in environmental governance (Lange *et al.*, 2013). Effective environmental governance embraces three elements at three different levels: formal and informal rules, the way and process they are established, and who contribute to it (HLPE,

2014). Thus, effective environmental governance encompasses national rules, international rules, local and customary practices (HLPE, 2014).

Since introduction of modern environmental regulation in 1970s there has been continuous challenge in design and implementation of effective, efficient and legitimate regulation for governments and society (Gunningham, 2009). Governments and their agents initially tried to manage environmental problems by enforcing strict rules and standards set out in legislation and treaties (Gunningham, 2009). However neoliberal ideals arose in 1980s that forced the governments to shift towards a curbed via market-based approach of governance that embraced voluntarism and other 'light-handed policy initiatives such as partnerships and cooperation (Gunningham and Holley, 2010). Eventually in 1990s ecological degradation and other issues resulting from complex social and environmental problems started to be managed through what is increasingly being called 'new environmental governance' (Driessen *et al.,* 2012; Holley *et al.,* 2012).

Green concept in environmental management was introduced in 2000s for protection, preservation and conservation of the environment via resource-efficient throughout the life-cycle of the affected biodiversity (Ji and Plainiotis, 2006). To achieve effective implementation of the concept, its planning, design, and implementation required close cooperation of the stakeholders through effective governance instruments and compliance practices (Najam *et al.,* 2006; Bessa *et al.,* 2007; Cole and Grossman, 1999; U.S. Environmental Protection Agency, 2009; Asare and Okyere, 2012; Aguilera *et al.,* 2015).

Environmental governance via state-centered approaches to law and regulation in Kenya achieved some gains in halting and reducing environmental degradation. However this approach, suffers from a number of weaknesses that limit its effectiveness in grassroots movements involved in management of the environment (Osborne and Gaebler 1993; Graham *et al*., 2003; James, 2003; Maathai, 2009; Driessen *et al.*, 2012; Holley *et al.*, 2012). Notably, governance of environmental issues have been demonstrated to face complex types of management and institutional coordination problems that require a cooperative frame of approach in order to provide consented solutions via dialogue and participation (Hochstetler and Keck, 2007; Maathai, 2009).

It is envisaged that green concept implementation requires active engagement of various sectors and sub-sectors working closely in partnerships and networks (Stoker, 1998; UNCED, 1992; Cerqueira, 2006). This paper seeks to address deficiencies in environmental governance on adoption of the green concept by studying governance interactions among structures, processes and traditions that determine how power and responsibilities are exercised, how decisions are taken, and how citizens or other stakeholders have their say in the adoption processes. The data will contribute to practical ways of enhancing governance compliance through education and awareness via inclusivity, participation and involvement.

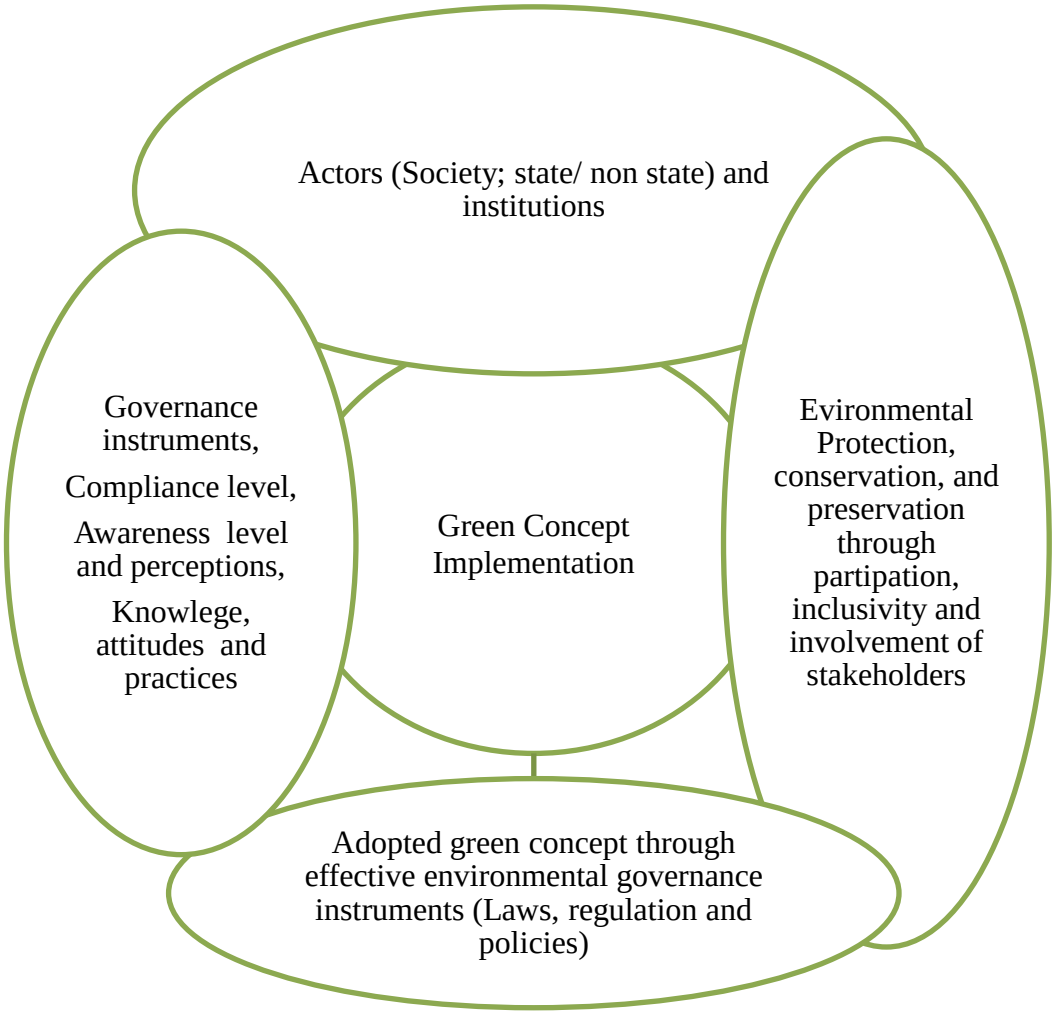

Figure 7: The conceptual framework on adoption of green concept anchored by effective governance instruments.

5.3 Materials and Method

Based on a previous approach, the theoretical framework of the research was based on institutional and resource based view where coercive push and resource benefits for society were expected to influence adoption of green concept in environmental management

(Florida and Davison, 2001). Thus, in brief a conceptual framework (Fig. 7) was utilized to design the study that assumed that the actors (society and institutions) willingness to adopt the green concept in environmental management was dependent on existing governance instruments (laws, regulations and policies) and their level of compliance, public perceptions and awareness level, the public knowledge, attitudes and practices.

Data was collected in Nairobi because it is a host to key environmental organizations like UNEP, government ministry and other NGOs that formulate and implement policies on environmental management. Surveys were conducted using semi structured questionnaires and key informant interviews. The questionnaires and interviews focused on attributes of environmental governance as applied to green concept in environmental management (activities of conservation, preservation and protection). *Data Envelopment Analysis (DEA) method* was used to evaluate the determinants of human perceptions, decisions, activities as they related to governance of implementation of green concept in environmental management (Reinhard *et al.,* 2000; De Koeijer *et al.,* 2002; Sipiläinen *et al.,* 2008).

In brief, DEA method compared various individual and institutional decisions as they impacted on the governance and these were considered to be based on homogenous set of decisions made by individual respondents as previously described (Boussonfiane *et al.,* 1991; De Koeijer *et al.,* 2002). The constructs of the determinant frontier (the most preferred combinations of decisions) took into account the impacts of the decisions on people's knowledge, attitudes and practices on governance instruments that affected adoption of the green concept in Nairobi.

As previously described, since the surveys aimed to analyse individual and institutional decisions that affected the governance on the adoption of green concept itself, and the influence the governance had on management of the environment (Solovyeva *et al.,* 2011), possible theories of statistical variety on each decision type of the randomly chosen respondents were considered (MacDonald *et al.,* 2000, Tasser and Tappeiner 2002; Dullinger *et al.,* 2003, Fare and Grosskopf, 2004; Kuosmanen and Kortelainen, 2004 and 2005; Kuemmerle *et al.,* 2008).

Ninety two (92) household heads were surveyed and five (5) key informants interviewed. Data on perceptions, knowledge, attitudes and practices on governance of green concept implementation process was collected. Open and closed questions as well as qualitative and quantitative questions were used as previously described (Jahnke and Jahnke, 1982; Fare and Grosskopf, 2004). The indicators were weighed according to their importance in adoption of green concept in environmental management using chi-square test of significance level ($P \leq 0.05$, $n=97$). Statistical bias resulting from utilization of questionnaire surveys (i.e. social desirability bias, leniency bias) was minimized by adapting a previously described methodology (Michelsen and de Boer, 2009).

5.4 Results and Discussions

5.4.1 Knowledge, Attitudes and Practice on Green Concept and its Governance instruments in Environmental Management

The data presented in Table 5 and 6 indicate that the respondents' understanding of green concept in environmental management was significantly low (33.0±2.11, n=97, P≤0.05). However, majority seemed to be aware of the existence of governance instruments regulating environmental management (56.7±1.62, n=97, P≤0.05). Surprisingly, majority also neither knew the implication (64.9±1.90, n=97, P≤0.05) nor complied (69.1±2.11, n=97, P≤0.05), with the governance instruments in environmental management. Majority of the respondents (50.7±1.44, n=97, P≤0.05) agreed compliance to governance instruments would enhance waste management but majority were on contrary view for use of clean energy (71.7±1.66, n=97, P≤0.05) and its role in industries (64.9±1.90, n=97, P≤0.05).

Table 5: Respondents knowledge, attitudes and practices on green concept and the governance instruments on adoption of green concept in Environmental Management (n=97)

Parameter	Yes (positive) (%)	No (negative) (%)
Understanding of concept	33.0±2.11[a]	67.0±2.17[b]
Awareness of existing governance instruments	56.7±1.62[a]	43.3±1.67[a]
Knowledge on the implication of governance instruments	35.1±1.89[a]	64.9±1.90[b]
Compliance to the governance instruments	30.9±2.05[a]	69.1±2.11[b]

[a,b] Different letters in the same row differ statistically by Chi-square, P<0.01; Positive: *respondents aware of existence of governance instruments, their implication on environmental management and compliance to the same; Negative: respondents of the contrary views of the positive responses*

Table 6: Respondents perceptions on importance of compliance with governance instruments for adoption of green concept in waste management, use of clean energy and in industries (n=97)

Parameter	agree (positive) (%)	disagree (negative) (%)
Waste management	50.7±1.44[a]	46.3±1.49[b]
Clean energy	25.3±1.59[a]	71.7±1.66[b]
Industries (formal & Non-formal)	35.1±1.89[a]	64.9±1.90[b]

[a,b] *Different letters in the same row differ statistically by Chi-square, P<0.01; Positive: respondents agree compliance with governance instruments will enhance adoption of green concept on the various aspect of environmental management; Negative: respondents of the contrary views of the positive responses*

5.4.2 Factors Affecting Compliance with Governance Instruments for Adoption of Green Concept in Environmental Management

The data presented in Table 7 and Figure 8 indicates the factors affecting the compliance with governance instruments for adoption of the green concept. From data in Table 6, majority of the respondents (57.6±1.36, n=97, P≤0.05) were of the view that lack of awareness was the factor affecting compliance with governance instruments for adopting green concept in environmental management. Also majority of the respondents were of the view that corruption of the enforcement officers (64.9±1.90, n=97, P≤0.05) and individual defiance (58.3±2.11, n=97, P≤0.05) contributed to lack of compliance to governance

instruments for adoption of green concept in environmental management. There was an equivocal (48.7±1.42[a], 51.3±1.48[a], n=97, P≤0.05) view for lack institutional and state good will on compliance to governance instruments. When combined together, majority of the respondents listed three main factors for non-compliance to governance instruments in environmental management; lack of awareness, lack of public education and lack of proper enforcement (Fig. 8, n=97, P≤0.05).

Table 7: Respondents perceptions on factors affecting compliance with governance instruments for adoption of green concept in environmental management (n=97)

Parameter	agree (positive) (%)	disagree (negative) (%)
Lack of awareness	57.6±1.36[a]	39.4±1.48[b]
Lack of institutional and state good will	48.7±1.42[a]	51.3±1.48[a]
Corruption of enforcement officers	35.1±1.89 [a]	64.9±1.90[b]
Individual defiance	38.7±1.97[a]	58.3±2.11[b]

[a,b] *Different letters in the same row differ statistically by Chi-square,* P≤0.05*; Positive: respondents agree the factor affected compliance with governance instruments on adoption of green concept in environmental management; Negative: respondents of the contrary views of the positive responses*

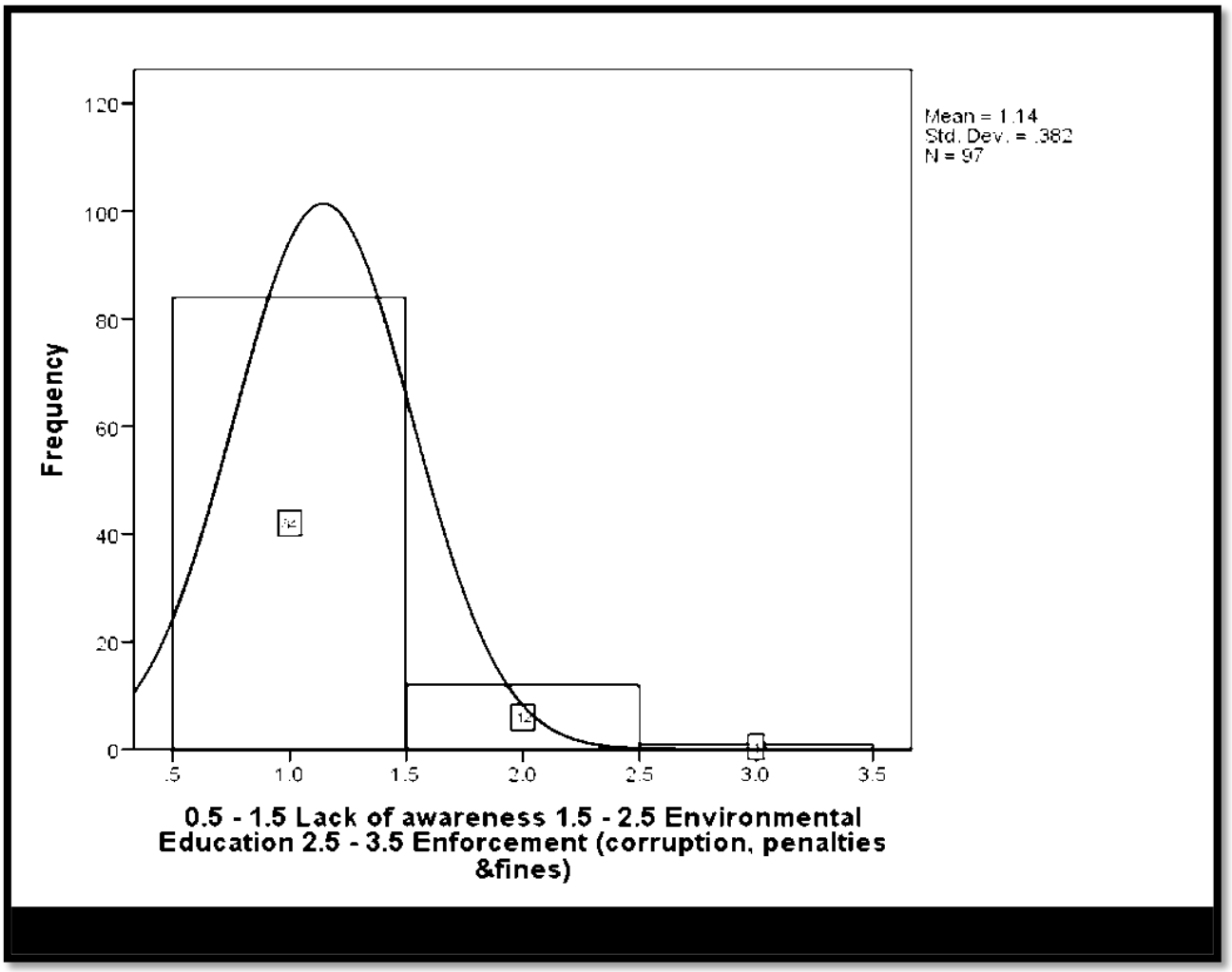

Figure 8: Respondents views on factors affecting non-compliance to governance instruments for adoption of green concept in environmental management

5.4.3 Perceived Benefits on Compliance with Governance Instruments for Adoption of Green Concept in Environmental Management

The data presented in Figure 9 indicate that the respondents had significantly ($P \leq 0.05$) different views on benefits that could result from compliance with governance instruments in environment management. In order of ranking, the respondents indicated clean, safe and healthy environment (61.5%, n=97) would be the main benefit followed by sustainable wealth creation (27.1%, n=97), then low cost of production (9.4%, n=97) and finally strong institutions (2.1%, n=97). Majority of the respondents were also willing to comply with the governance instruments after awareness creation, civic education and strict enforcement of the instruments (Fig. 10, n=97, $P \leq 0.05$).

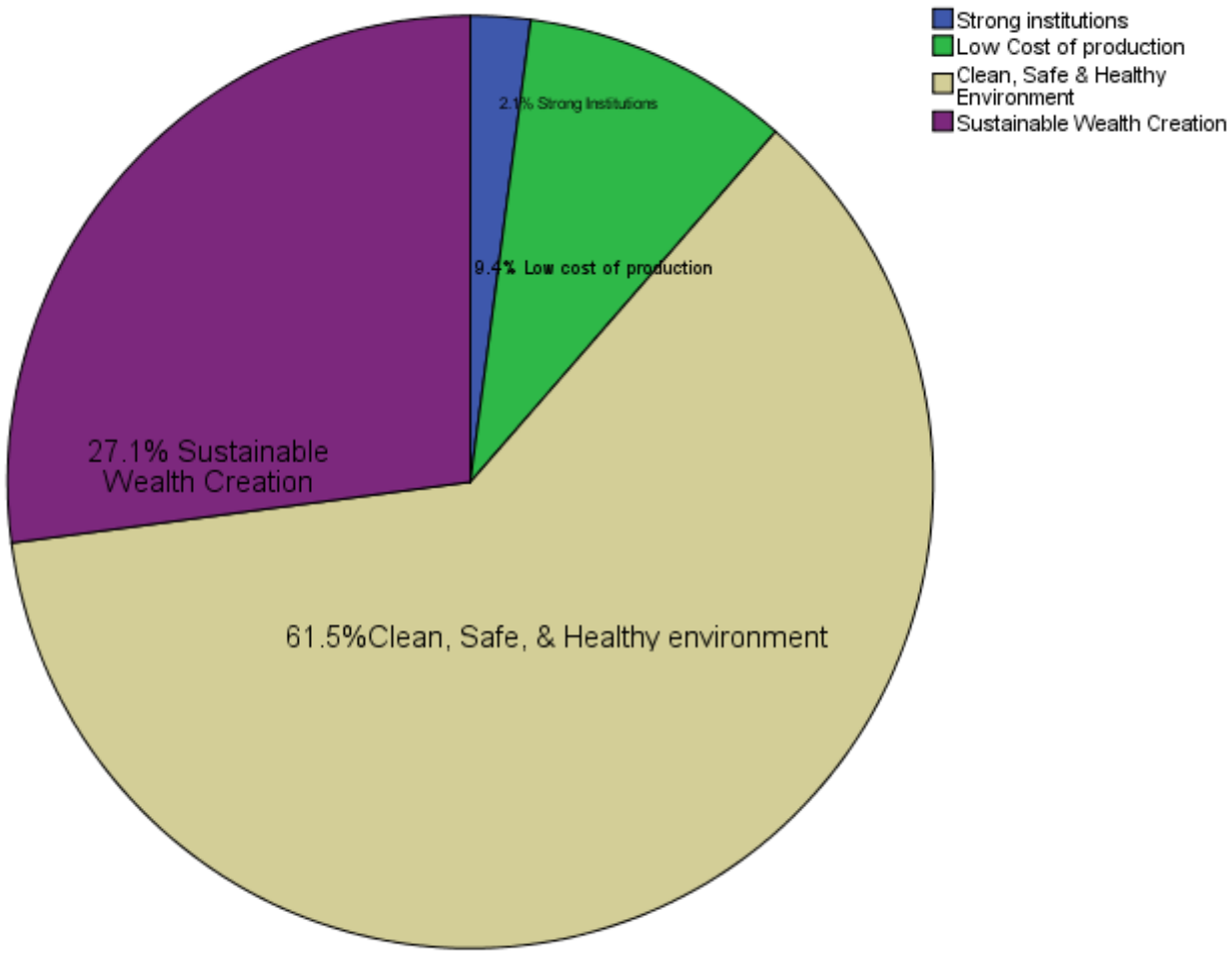

Figure 9: Respondents perceived benefits for compliance to governance instruments for adoption of the green concept in environmental management

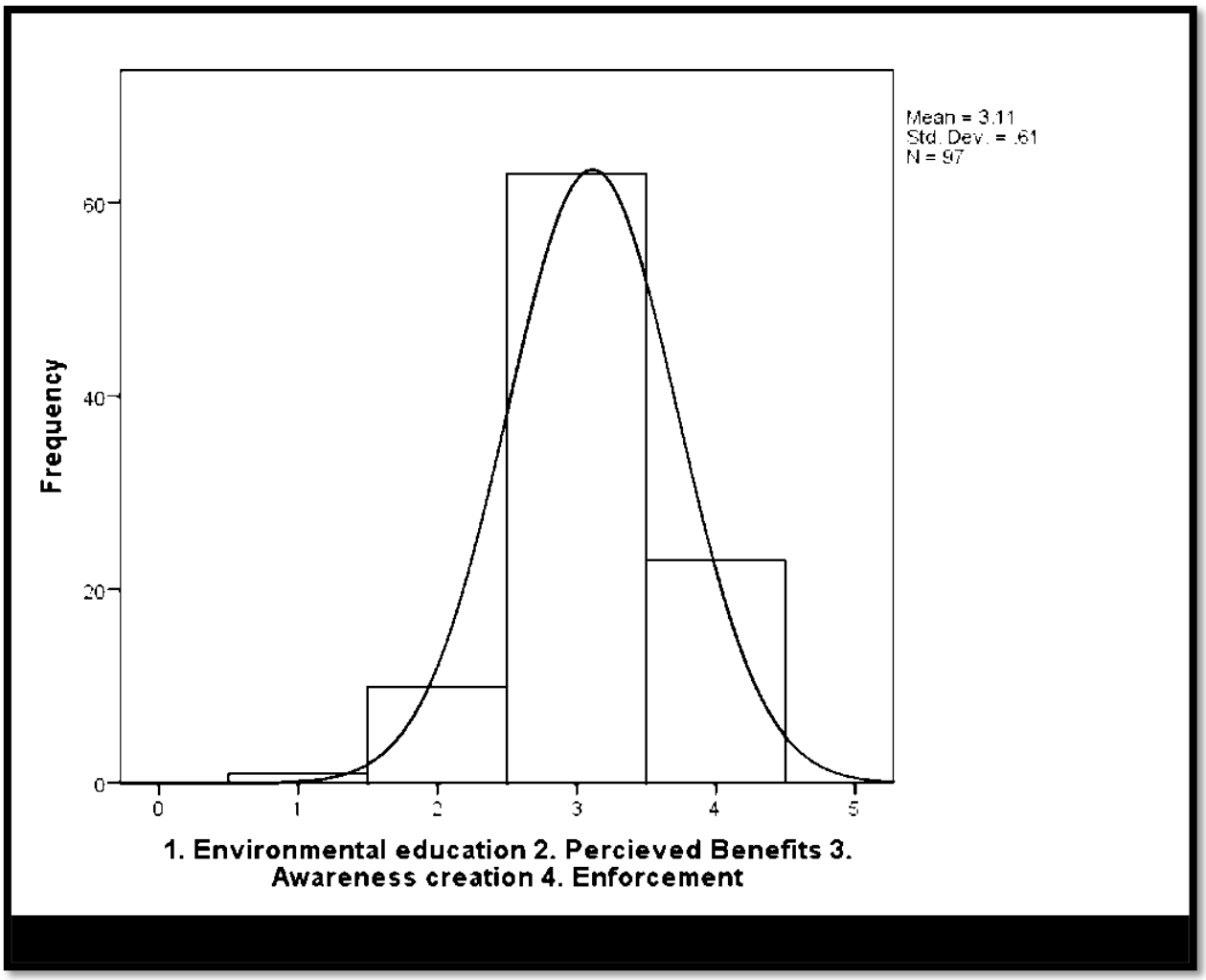

Figure 10: Respondent's willingness to comply with governance instruments for adoption of green concept in environmental management after awareness creation, education and enforcement of the instruments

5.5 Discussion

The finding that respondents' views were different supports the fact that data "spoke for itself" (Kuosmanen and Kortelainen, 2005). These data indicating that understanding of green concept in environmental management was significantly low is similar to other

observations (Cooper et *al.,* 2002; Kuosmanen and Kortelainen, 2004; Kuosmanen and Kortelainen, 2005). Also as reported by Winchester (2009), majority of the respondents seemed to be aware of the existence of governance instruments regulating environmental management but neither knew the implication nor complied with the governance instruments in environmental management.

These data, as suggested by other previous authors also seems to suggest that governance of environmental issues have been demonstrated to face complex types of management and institutional coordination problems that require a localized cooperative frame of approach to provide consented solutions via dialogue and participation (Hochstetler and Keck, 2007; Maathai, 2009).

This also agrees with others who suggested that in order to understand the environmental management as impacted by activities (for instance, individual and institutional decisions and practices) there is a need to shift from state-centered approach of governance and adopt the grassroots approach for inclusivity, involvement and participation in management of the environment (Osborne and Gaebler 1993; Reinhard *et al.,* 2000; Graham *et al.,* 2003; James, 2003; Maathai, 2009; Driessen *et al.,* 2012; Holley *et al.,* 2012).

This approach to law and regulation in Kenya could help reduce weaknesses that limit its governance effectiveness on natural environment based on our finding that is supported by the data that shows respondents agreed there were benefits attributed to adoption of green concept in environmental management. This is so because majority of the respondents agreed compliance with governance instruments would enhance attributes of green concept

like in waste management (Swanson, 1995). Thus, this is suggestive of the fact that once institutions/policies put in place a holistic approach towards environmental management, the same can end up achieving complete adoption of green concept in Kenya.

Our results show that respondents were willing to comply with governance instruments for adoption of green concept in environmental management after awareness creation, education and enforcement of the instruments. This is in agreement with previous authors like Maathai (2009), who suggested a bottom-up approach for effective management of natural resources. The data also agrees with others who suggested exploitation of the utilitarian value strategy to entail a holistic approach to conservation by taking into account the peoples' material well-being, besides the feelings and emotions that give them satisfaction in conservation. These include utilization of conservative and productive materials from biodiversity e.g. agricultural materials or food sources, medicine, industrial raw materials, educational values and scientific research (Swanson, 1995; Lusweti, 2011; UNEP Report, 2016).

The data supports a dynamic approach to compliance with governance instruments based on peoples' views and practices like others have previously reported (Lesschen *et al.,* 2004. Therefore, the dynamism of environmental management in Nairobi ecosystem, which host the national park, is likely to be affected by complex social and environmental problems that require to be managed through the so called 'new environmental governance' (Driessen *et al.,* 2012; Holley *et al.,* 2012). The data however gives a ray of hope for compliance with governance instruments on adoption of green concept in environmental management to

protect, preserve and conserve the environment in Kenya as also reported by others for other ecosystems (Ji and Plainiotis, 2006).

The fact that respondents were willing to comply with governance instruments after civic education, awareness creation and enforcement, this illustrates the effective implementation of the green concept (planning, design, and implementation), as achieved through close cooperation of the stakeholders through effective governance instruments and compliance practices.

This agrees with previous reports for other countries (Najam *et al.*, 2006; Bessa *et al.*, 2007; Cole and Grossman, 1999; U.S. Environmental Protection Agency, 2009; Asare and Okyere, 2012; Aguilera *et al.,* 2015). Environmental governance in Kenya is therefore faced by two possible alternatives of either adoption of the green concept or lack of adoption of the same. This would then lead to various states of affairs in environmental governance (Kleijn et al., 2009, Van Huelenbroeck and Whitby, 1999).

Thus, good environmental governance in Kenya, where environmental institutions still use traditional management practices, is significantly influenced by the willingness and/or the unwillingness of the people to comply with instruments that governing practices of green concept in protection, conservation and preservation of the environment. This agrees with previous authors who reported that adoption of green concept through environmental governance (positive environmental externality) would help conserve biodiversity (Van Huelenbroeck and Whitby, 1999; Kleijn *et al.,* 2009; Schader, 2009; Solovyeva *et al.*, 2011). This suggest that for sustainability, a solution to the enhancement of environmental

governance in Kenya could consider the relative gains perceived by the respondents in relation to the adoption of the green concept; residents will see this as avenue for wealth creation and economic empowerment (UNEP Report, 2016).

5.6 Conclusion and recommendations

The findings indicate peoples' willingness to comply with governance instruments for adoption of green concept as long as there were perceived benefits coupled with awareness creation, civic education and enforcement of the instruments. This finding can contribute to inform policy on environmental management through grassroot inclusiveness, involvement and participation of the stakeholders in decision making processes for enhanced compliance in adopting green concept.

CHAPTER SIX

6.0 Implementing Sustainable Development Goals 1, 3, 7, 9, and 13 through Adoption of Green Concept in Environmental Management: Case of Nairobi, Kenya (Journal of Biodiversity and Environmental Science 12(3), 1-10).

6.1 Abstract

The Sustainable Development Goals (SDGs) emerging from the Rio Earth Summit had substantial synergy on environmental management. Kenya in her Vision 2030 agenda prioritized implementation of SDGs. This paper documents the evidence of the process for the implementation of SDGs in Nairobi through adoption of green concept in environmental management. The emphasis is on the SDGs dependent on protected, conserved and preserved environment. Data was collected by surveying 92 households and five key informants (n=97) using semi-structured questionnaires, interviews and observations. The non-parametric *Data Envelopment Analysis (DEA)* was used to determine the degree of connectivity between the process of implementation of SDGs and adoption of the green concept in environmental management. The respondents knowledge (33.0%±2.11, n=97, P≤0.05), attitudes (30.4%±1.56, n=97, P≤0.05) and practice (26.3%±0.08, n=97, P≤0.05) on implementation of SDGs through green concept in environmental management was significantly low. About sixty (60.7%±1.24, n=97, P≤0.05) thought SDG 1 would be enhanced through attributes that protect the environment while (52.5%±1.59, n=97, P≤0.05) attributed implementation of SDG 3.9 to preserved environment. Again majority of them (57.6±1.36, n=97, P≤0.05) perceived SDG 7 would

be implemented through use of clean energy devices. However its only the minority that thought SDG 13 would be implement through conservation of the environment (24.1±1.89, n=97, P≤0.05). Majority of respondents were of the views that increased awareness (78.2%±2.61, n=97, P≤0.05), improved institutional capacity (58.7%±3.01, n=97, P≤0.05), enhanced enforcement (83.2%±1.77, n=97, P≤0.05), and individual aptness (61.7%±3.04, n=97, P≤0.05) would enhance implementation of the SDGs through adoption of green concept in environmental management.

Keywords: Green concept, Sustainable Development Goals, Environment, Kenya

6.2 Introduction

The United Nations Assembly adopted Sustainable Development Goals (SDGs) for Sustainable Development (CGAP, 2016). There are 17 goals within the SDGs framework (Fig. 11). The SDGs serve as milestones and benchmarks for achieving sustainable development with measurable targets and clear-cut timetables (UN, 2000; CGAP, 2016).

Amongst the issues addressed by implementation of SDGs are inequality, unsustainable consumption patterns, weak institutional capacity, and environmental degradation. Implementation of SDGs is also expected to halt human activities threatening the environment through increased biodiversity loss, water scarcity, pollution, and climate change (UNEP, 2012). Environmental goods and services support economic and social development. Thus, the sustainability of the environment's viability in urban cities like Nairobi is essential to fully implement SDGs through protection, preservation and conservation of the environment (green concept) (Sterner, 2006).

Once the environmental resources and services are taken care of through adoption of the green concept, the resultant value would have a great impact on sustainable implementation of the related SDGs (Steiner, 2006). Thus, SDGs that include goal 1 (end poverty), which requires both the provision of basic income and social protection through wealth creation and distribution would be implemented (Mosse, 2010).

In addition goal 3.9 (reducing deaths and illnesses from pollution) and goal 7 (ensure access to affordable, reliable, sustainable, and modern energy) will also be guaranteed through adoption of green concept in environmental management) (Ren21, 2014; UN, 2014). The main SDG (Goal 13: Take Urgent Action to Combat Climate Change and Its Impacts) that is the centre of global focus in economies, societies and environmental resource sustainability could benefit substantially through adoption of green concept in environmental management (Maslin, 2009; PMA, 2015).

One approach muted for sustainable implementation of SDGs through adoption of green concept is international participatory via collaborative involvement of public and private sectors, and civil societies (IPCC, 2007; Bausch, 2011). However the smooth implementation of SDGs in countries require constant monitoring through evidence gathering to inform policy for necessary shifts to be undertaken from time to time within the implementation time frame (Survey of Kenya report, 2003; Kabubo-Mariara, 2007; KFSSG, 2008; USAID, 2008). This so because a number of social and political factors continue to put pressure on natural resources and could easily compromise on the sustainable implementation of SDGs in countries like Kenya (UNDP, 2005). This paper

seeks to provide evidence on factors that affect implementation of SDGs in Nairobi through adoption of the green concept in order to inform policy for appropriate action plan for sustainability.

Figure 11: The Sustainable Development Goals - Source: https://sustainabledevelopment.un.org/sdgs

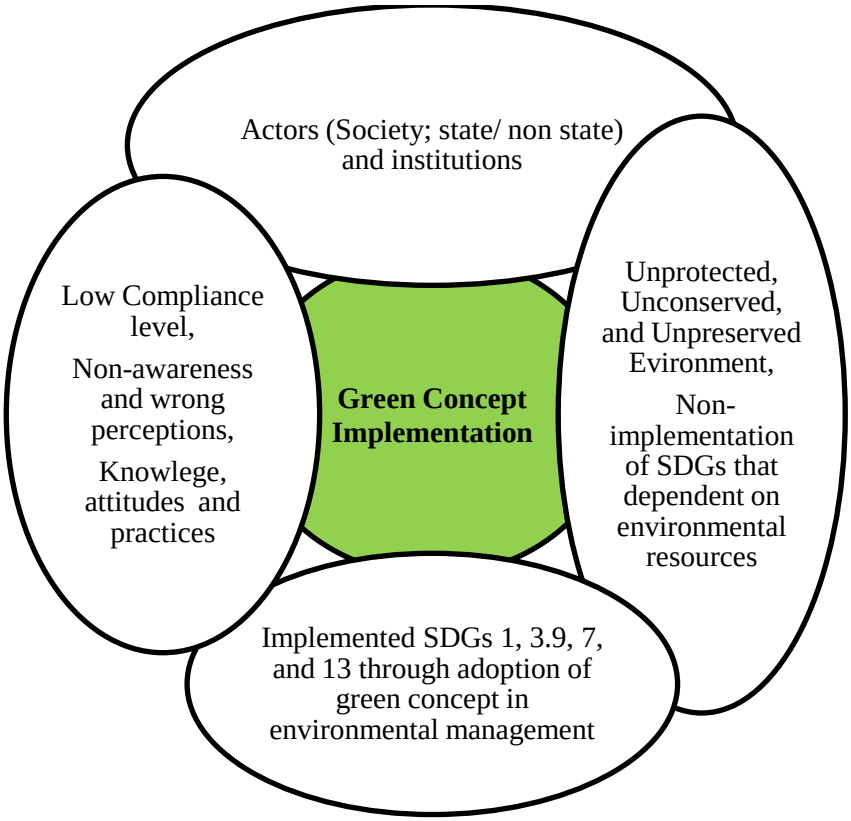

Figure 12: The conceptual framework for implementation of SDGs 1, 7, 13.9 and 13 through adoption of green concept in environmental conservation.

6.3 Materials and Method

The theoretical framework of the research (Fig. 12) was based on institutional and resource based view where coercive push and resource benefits for society are expected to influence adoption of green concept in environmental management (Florida and Davison, 2001). In brief the study design assumed that adoption of the green concept in environmental management would enhance the implementation of SDGs that depend on environmental resources and services (SDGs 1, 3.9, 7, and 13). Data was collected from Nairobi County.

Surveys were conducted using semi-structured questionnaires and key informant interviews.

The questionnaires and interviews focused on attributes on implementation of SDGs through adoption of green concept in environmental management (activities of conservation, preservation and protection of the environment). *Data Envelopment Analysis (DEA) method* was used to evaluate the determinants of implementation of SDGs as affected by respondents' perceptions, knowledge, attitudes and practices in environmental management (Reinhard *et al.,* 2000; De Koeijer *et al.,* 2002; Sipiläinen *et al.,* 2008). Briefly, the DEA method compared various individual and institutional decisions for adoption of the green concept as they impacted on the implementation of SDGs, as also evaluated by others (Boussonfiane *et al.,* 1991; De Koeijer *et al.,* 2002).

The analysis aimed to determine how individual and institutional decisions on adaption of green concept affected implementation of SDGs 1, 3.9, 7 and 13 (Solovyeva *et al.,* 2011). The possible theories of statistical variety on each type of decision of the randomly chosen respondents were applied in the analysis of the data (MacDonald *et al.,* 2000, Tasser and Tappeiner, 2002; Dullinger *et al.,* 2003, Fare and Grosskopf, 2004; Kuosmanen and Kortelainen, 2004 and 2005; Kuemmerle *et al.,* 2008).

Ninety two (92) household heads were surveyed and five (5) key informants interviewed. Open and closed questions as well as qualitative and quantitative questions were used (Jahnke and Jahnke, 1982; Fare and Grosskopf, 2004). The indicators were weighed according to their importance in the implementation of the said SDGs through adoption of

green concept in environmental management. Chi-square was used to test significance (P≤0.05, n=97). Statistical (social desirability bias and leniency bias) was minimized by adapting previously described methods (Michelsen and de Boer, 2009).

6.4 Results and Discussions

6.4.1 Knowledge, Attitudes and Practice on implementation of SDG 1, 3.9, 7, and 13 through adoption of green concept in environmental management

The respondents knowledge (33.0%±2.11, n=97, P≤0.05), attitudes (30.4%±1.56, n=97, P≤0.05) and practice (26.3%±0.08, n=97, P≤0.05) on implementation of SDGs 1, 3.9, 7, and 13 through green concept in environmental management was significantly low (Table 8). However, majority seemed to recognize how benefits of adopting the green attributes can enhance the implementation of the SDGs (Table 9). About sixty (60.7%±1.24, n=97, P≤0.05) thought SDG 1 would be enhanced through attributes that protect the environment while (52.5%±1.59, n=97, P≤0.05) attributed implementation of SDG 3.9 to preserved environment. Again majority of them (57.6±1.36, n=97, P≤0.05) perceived SDG 7 would be implemented through use of clean energy devices. However its only the minority that thought SDG 13 would be implement through conservation of the environment (24.1±1.89, n=97, P≤0.05).

Table 8: Respondents knowledge, attitudes and practices on green concept and the Sustainable Development Goals (SDGs) Goal 1, 7, 13 (n=97)

Parameter	Yes (positive) (%)	No (negative) (%)
Understanding of green concept	33.0±2.11[a]	67.0±2.17[b]
Awareness of the existence of SDGs	30.4±1.56[a]	69.6±1.14[b]
Involved in implementation of SDGs	26.3±0.08[a]	83.7±0.82[b]

[a, b] Different letters in the same row differ statistically by Chi-square, P<0.01; Positive: respondent's knowledge of the green concept, aware of existence of SDGs and their implementation through adoption of green concept in environmental management; Negative: respondents of the contrary views of the positive responses

Table 9: Respondents perceptions how benefits of adopting the green concept attribute enhanced the implementation of SDGs 1, 3.9, 7, and 13 (n=97)

Parameter	agree (positive) (%)	disagree (negative) (%)
SDG 1 through protection of the environment	60.7±1.24[a]	36.3±1.04[b]
SDG 3.9 through preservation of environment	52.5±1.59[a]	44.5±1.36[b]
SDG 7 through use of clean energy devices	57.6±1.36[a]	39.4±1.48[b]
SDG 13 through conservation of environment	24.1±1.89[a]	72.9±2.54[b]

[a, b] Different letters in the same row differ statistically by Chi-square, P<0.01; Positive: *respondents are aware the benefits of adopting green concept attribute enhanced the implementation of SDGs; Negative: respondents of the contrary views of the positive responses*

6.4.2 Drivers for Enhancing Implementation of SDG 1, 3.9, 7, and 13 through adoption of green concept in environmental management

Majority of respondents were of the view that increased awareness (78.2%±2.61, n=97, P≤0.05), improved institutional capacity (58.7%±3.01, n=97, P≤0.05), enhanced enforcement (83.2%±1.77, n=97, P≤0.05), and individual aptness (61.7%±3.04, n=97, P≤0.05) could enhance implementation of the SDGs through adoption of green concept in environmental management (Table 10).

Table 10: Respondents perceptions on factors affecting adoption of green concept in Sustainable Development Goals (SDGs); Goal 1, 7, 13 implementation (n=97)

Parameter	agree (positive) (%)	disagree (negative) (%)
Increased awareness	78.2±2.61[a]	21.8±2.43[b]
Improved institutional capacity	58.7±3.01[a]	41.3±2.74[b]
Enhanced enforcement	83.2±1.77[a]	16.8±2.63[b]
Individual aptness	61.7±3.04[a]	38.3±2.59[b]

[a, b] Different letters in the same row differ statistically by Chi-square, P<0.01; Positive: *respondents perceive the parameter could enhance implementation of SDGs through adoption of green concept in environmental management; Negative: respondents of the contrary views of the positive responses*

Specifically the respondents indicated that the use of clean alternative energy options of solar, biogas, wind and geothermal wind power would enhance implementation of SDG 7 (Fig 13; n=97). Again the majority of the respondents (Fig. 14-15) were willing to adopt SDGs 1 and 13 for improved livelihood and mitigation of climate change, respectively.

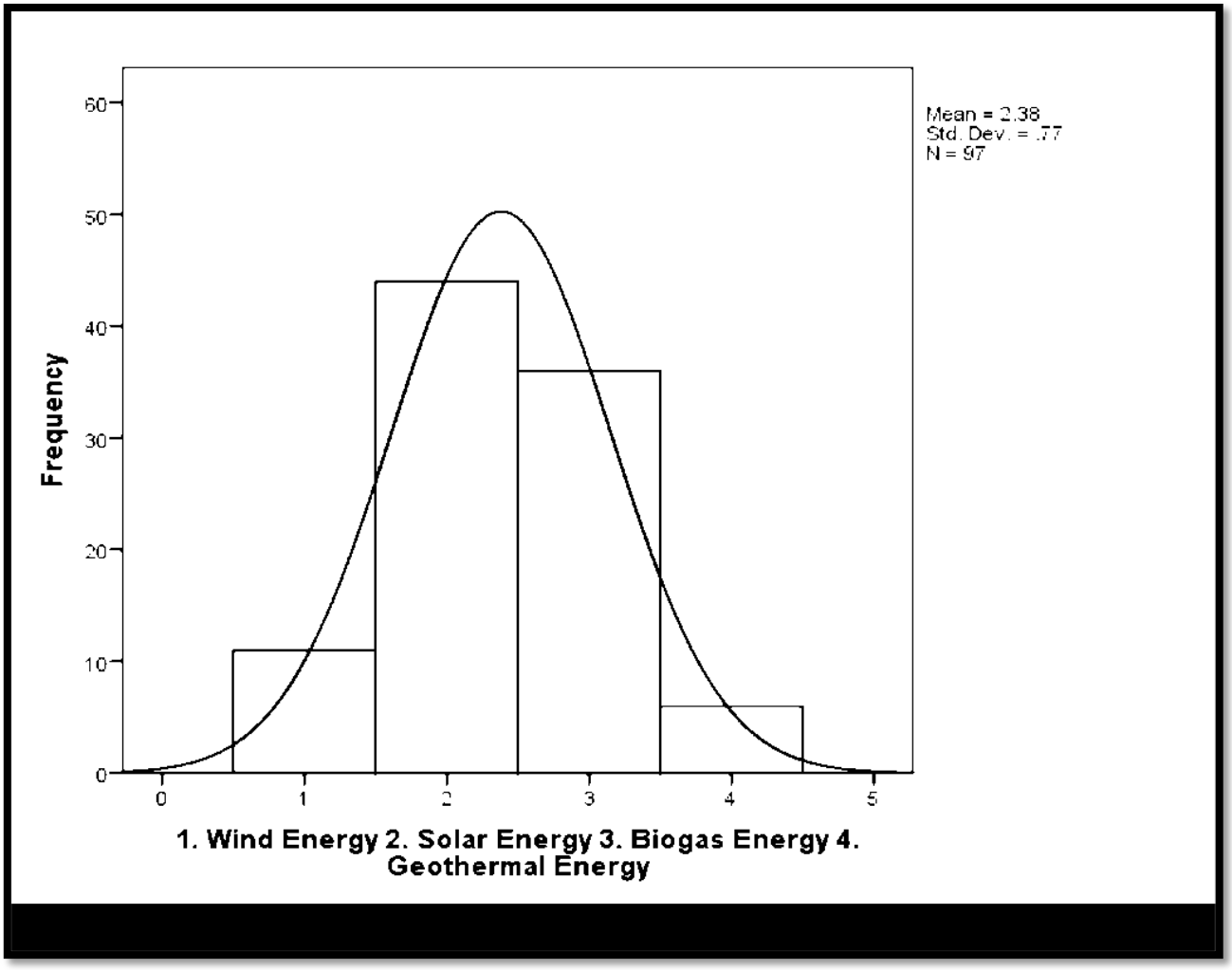

Figure 13: Respondent's willingness to implement SDGs as driven by adoption of use of clean energy

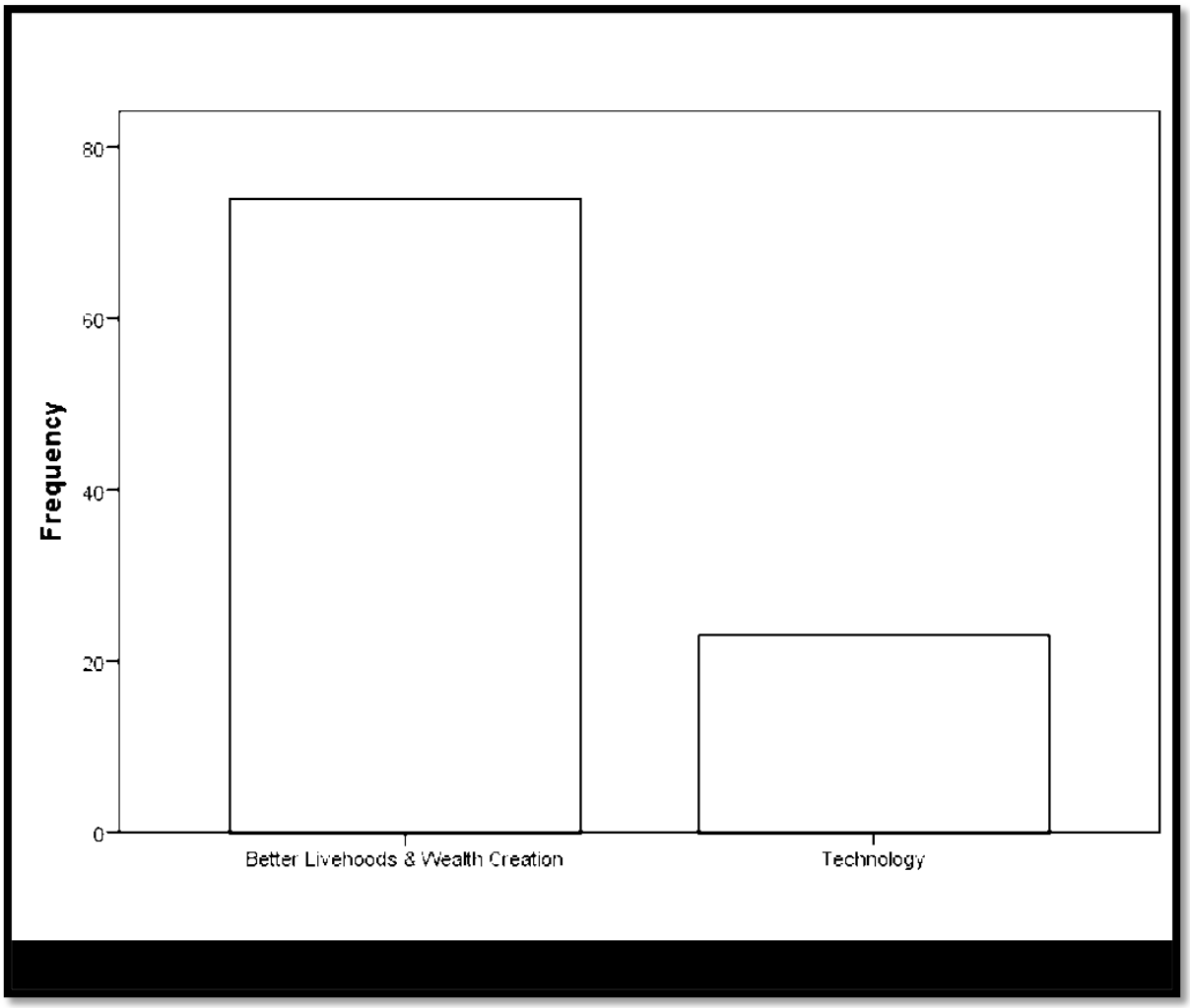

Figure 14: Respondent's willingness to implement SDGs as driven by the need to adoption green concept for better livelihoods and wealth creation

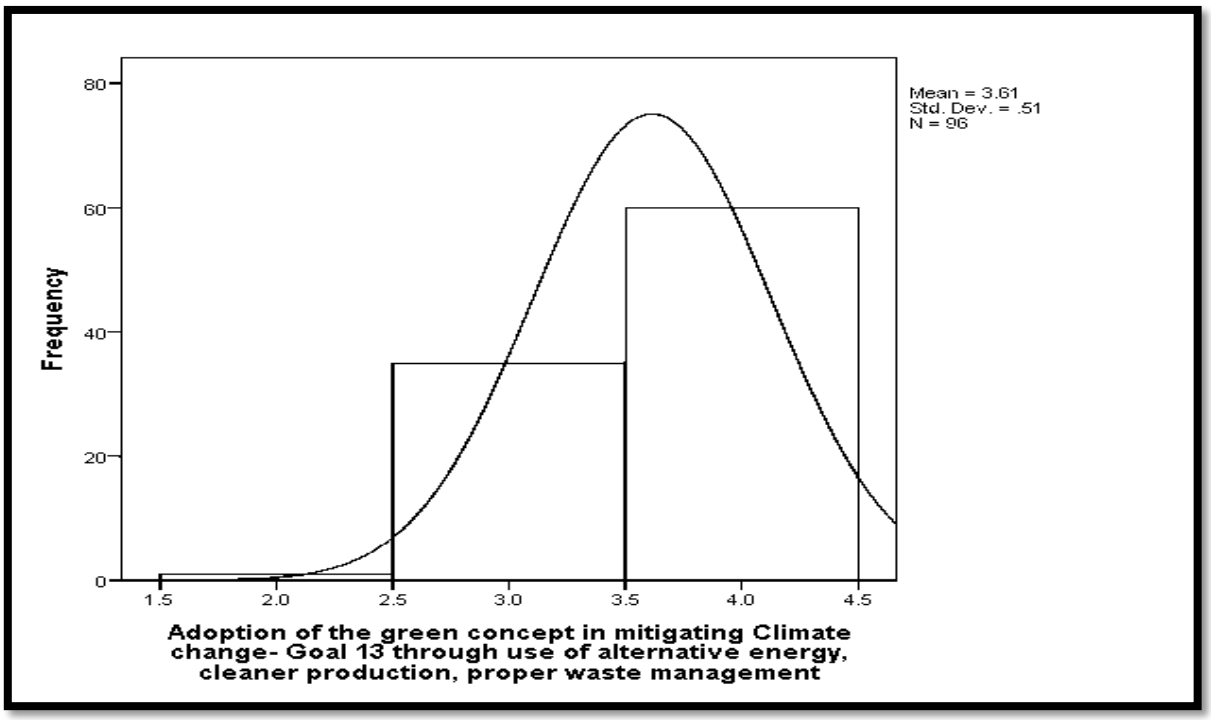

Figure 15: Respondent's willingness to implement SDGs as driven by adoption of the need to protect the environment to mitigate against undesirable climate change

6.5 Discussion of the Results

The respondents' knowledge, attitudes and practices on implementation of SDGs 1, 3.9, 7, and 13 through green concept in environmental management was significantly low as reported by others (Cooper et *al.*, 2002; Kuosmanen and Kortelainen, 2004; Kuosmanen and Kortelainen, 2005). Different views also supported the fact that the data "spoke for itself" as also explained by Kuosmanen and Kortelainen, (2005). The fact that the majority seemed to recognize how benefits of adopting the green attributes can enhance the implementation of the SDGs supports theories that concerted efforts are needed for implementation of SDGs by various stakeholders as previous reported (Hochstetler and

Keck, 2007; Maathai, 2009). This would explain the finding that only minority thought that SDG 13 would be implement through conservation of the environment. This also agrees with others who suggested that in order to implement the SDGs successfully using green practices and activities, the approach for inclusivity, involvement and participation in management of the environment has to be adopted (Swanson, 1995; Reinhard *et al.*, 2000; GOK, 2007; Driessen *et al.,* 2012; Holley *et al.,* 2012; IPCC, 2014; UN report, 2014; PMA, 2015).

The fact that majority of respondents were of the views that increased awareness, improved institutional capacity, enhanced enforcement, and individual aptness could enhance implementation of the SDGs through adoption of green concept in environmental management explains a case that supports a dynamic approach in the implementation of SDGs based on peoples' views and practices as reported by Lesschen *et al*. (2004). Also the willingness by the respondents to implement the SDGs as driven by perceived accrued value suggested an avenue for exploitation of the utilitarian value strategy for implementation of SDGs through conservation of environment by taking into account the peoples' material well-being, besides the feelings and emotions that give them satisfaction in conservation. This has been previously explained (Swanson, 1995; Steiner, 2006; UNEP, 2016).

Thus, good environmental management through adoption of green concept in countries like Kenya could enhance implementation of SDGs dependent on well managed environment as influenced by the willingness and/or the unwillingness of the people to comply with instruments that govern protection, conservation and preservation of the environment. This

approach is supported by the reported data and also agrees with previous authors (Van Huelenbroeck and Whitby, 1999; Kleijn *et al.*, 2009; Schader, 2009; Solovyeva *et al.*, 2011). This suggest that for sustainability, a solution to implement such SDGs lies on the ability to embrace environmental governance that promote gains perceived by the society in relation to the adoption of the green concept; residents will see this as avenue for wealth creation and economic empowerment (Ji and Plainiotis, 2006; Schader, 2009; Solovyeva *et al.*, 2011; Driessen *et al.*, 2012; Holley *et al.*, 2012; UNEP Report, 2016).

6.6 Conclusion and recommendations

This data indicates that the peoples' willingness to support implementation of SDGs through adoption of green concept in environmental management whenever supported through increased awareness creation and perceived benefits from such activities. This can inform policy for enhanced implementation of SDGs through adoption of green concept in environmental management.

CHAPTER SEVEN

7.0 DISCUSSION, CONCLUSION AND RECOMMENDATIONS

7.1 DISCUSSION

The study reports significance differences in knowledge, attitudes and practices of the respondents for the green concept, its legal regulation and its role on implementation of SDGs. These differences were dependent upon gender, demographic factors, respondent's personal perceptions, knowledge, attitudes and practices.

Similar observations to those reported in this study have been reported for green practices on biodiversity conservation (Jahnke and Jahnke, 1982; Cooper *et al.*, 2002). Our findings were also not surprising because based on the theoretical context of the DEA model of analysis the data to "speak for itself" (Cooper *et al.*, 2002; Kuosmanen and Kortelainen, 2004 and 2005). Thus, the differences in level of understanding of the green concept for Kenyans were expected.

The noted differences in individual respondent knowledge, attitudes and practices on decisions for the adoption of the green concept in Kenya were inherently connected to society-specific expectation like gender, upbringing status and economic stability. Therefore, such demographic characteristics, as they influence local situations, need to be considered as evidence for effective governance strategy that enhance natural adaptive characteristics of the people of Kenya (UNEP, 2016).

The finding that Kenyans are willing to adopt the green concept in biodiversity conservation through utilitarian values for wealth creation through biodiversity resources and their associated processes (Swanson, 1995; Lusweti, 2011) was also not surprising. This is not unique to any society because a closer look on individual personal willingness/lack of willingness to adopt the concept boils down to his/her perceived benefits (Lusweti, 2011).

The DEA model of analysis that allows the data "to speak for itself" provided for clear distinction and understanding of how adoption of the green concept impacted on decisions that affected environmental management. Basically such decisions are expected to be informed on perceived individual/household benefits (Lusweti, 2011).

This study found out that the respondents understood the green concept to mean use of environmentally friendly sources of energy, better environmental practices (tree planting etc) and adherence to environmental governance instruments (laws, regulations and policies). Such findings have been reported previously (Reinhard *et al.*, 2000).

Many Kenyans practice tree, gabion building, riparian restoration and waste management. This is why the finding that majority easily associated such activities with green concept was not surprising. However, as also reported by others, adoption of the green concept in Kenya is dynamically applied towards conservation (Van Huylenbroeck and Whitby, 1999; Schader, 2009). The value that could be utilized to promote the concept is the observed willingness by the respondents to adopt the concept for wealth creation as also explained by

others (Van Huelenbroeck and Whitby, 1999; Kleijn *et al.*, 2009; Fonderflick *et al.*, 2010; Singer, 2011).

Adoption of the green concept through the driver of societal utilitarianism has been reported before as a practical way to conserve the environment (Singer, 2011). This is referred to as positive environmental externality (Solovyeva *et al.,* 2011). This augurs well with our finding that respondents were willing to adopt the green concept as means for wealth creation.

Adoption of the green concept through practices such as tree planting, and restoration of riparian would impact positively on environmental management through gain of unique local natural biodiversity, presence advocacy services, mass re-appearance of the threatened biodiversity, and resurgence of support institutional structures. These activities that promote biodiversity conservation as demonstrated elsewhere through promotion of utilitarian values of conservation for job creation that led to increase in diversification of household income and restoration of affected biodiversity (Solovyeva *et al.,* 2011).

The finding that respondents' views were different supports the fact that data "spoke for itself" (Kuosmanen and Kortelainen, 2005). This explains why understanding of green concept in environmental management was significantly low in some respondents' as also observed by others (Cooper et *al.,* 2002; Kuosmanen and Kortelainen, 2004; Kuosmanen and Kortelainen, 2005).

The finding that majority of the respondents seemed to be aware of the existence of governance instruments regulating environmental management agrees with finding of Winchester (2009). Data suggested by other previous authors also seems to suggest that governance of environmental issues have been demonstrated to face complex types of management and institutional coordination problems that require a localized cooperative frame of approach to provide consented solutions via dialogue and participation (Hochstetler and Keck, 2007; Maathai, 2009).

It has also been suggested that in order to understand the environmental management as impacted by activities (for instance, individual and institutional decisions and practices) there is a need to shift from state-centered approach of governance and adopt the grass-root approach for inclusivity, involvement and participation in management of the environment (Osborne and Gaebler 1993; Reinhard *et al.,* 2000; Graham *et al.,* 2003; James, 2003; Maathai, 2009; Driessen *et al.,* 2012; Holley *et al.,* 2012). This finding came out of our study when respondents suggested an approach of governance based on their perceived benefits. This agrees with others who suggested compliance with governance instruments requires such approaches (Swanson, 1995; Maathai, 2009).

Our results show that respondents were willing to comply with governance instruments for adoption of green concept in environmental management after awareness creation, education and enforcement of the instruments. This is in agreement with previous authors like Maathai (2009), who suggested a bottom-up approach for effective management of natural resources. The data also agrees with others who suggested exploitation of the utilitarian value strategy to entail a holistic approach to conservation by taking into account

the peoples' material well-being, besides the feelings and emotions that give them satisfaction in conservation. These include utilization of conservative and productive materials from biodiversity e.g. agricultural materials or food sources, medicine, industrial raw materials, educational values and scientific research (Swanson, 1995; Lusweti, 2011; UNEP, 2016).

Our findings support a dynamic approach to compliance with governance instruments based on peoples' views and practices like others have previously reported (Lesschen *et al.*, 2004. Therefore, the dynamism of environmental management in Nairobi ecosystem, which host the national park, is likely to be affected by complex social and environmental problems that require to be managed through the so called 'new environmental governance' (Driessen *et al.,* 2012; Holley *et al.,* 2012).

A ray of hope for compliance with governance instruments on adoption of green concept in environmental management to protect, preserve and conserve the environment in Kenya as been reported was also reported by others (Ji and Plainiotis, 2006). The fact that respondents were willing to comply with governance instruments after civic education, awareness creation and enforcement shows that effective implementation of the green concept (planning, design, and implementation) is achievable through close cooperation of the stakeholders. This agrees with previous reports for other countries (Najam *et al.*, 2006; Bessa *et al.*, 2007; Cole and Grossman 1999; U.S. Environmental Protection Agency, 2009; Asare and Okyere, 2012; Aguilera *et al.*, 2015).

Therefore our findings indicate that environmental governance in Kenya faces two possible alternatives of either adoption of the green concept or lack of adoption of the same based on the governance approach employed as also noted by others for other countries (Kleijn *et al.*, 2009, Van Huelenbroeck and Whitby, 1999). Thus, good environmental governance in Kenya, where environmental institutions still use traditional management practices, is significantly influenced by the willingness and/or the unwillingness of the people to comply with instruments governing such practices.

Previous reports indicate that adoption of green concept through environmental governance (positive environmental externality) could help conserve the environment (Van Huelenbroeck and Whitby, 1999; Kleijn *et al.,* 2009; Schader, 2009; Solovyeva *et al.*, 2011) as also observed by this study. The respondents' knowledge, attitudes and practices on implementation of SDGs 1, 3.9, 7, and 13 through green concept in environmental management was significantly low as reported by others (Cooper et *al.,* 2002; Kuosmanen and Kortelainen, 2004; Kuosmanen and Kortelainen, 2005).

The fact the majority seemed to recognize that benefits of adopting the green attributes can enhance the implementation of the SDGs gives a unique Kenyan opportunity to enhance adoption of the concept and implement SDGs by various stakeholders (Hochstetler and Keck, 2007; Maathai, 2009). This also agrees with others who suggested that in order to implement the SDGs successfully, adoption of green practices and activities are needed through an approach for inclusivity, involvement and participation in management (Swanson, 1995; Reinhard *et al.*, 2000; GOK, 2007; Driessen *et al.,* 2012; Holley *et al.*, 2012; IPCC, 2014; UN, 2014; PMA, 2015).

7.2 CONCLUSSION

The following conclusions could be drawn from this study:-

- ✓ There was low understanding of green concept by respondents.
- ✓ There was willingness to comply with governance instruments on adoption of green concept driven by perceived benefits, awareness creation, civic education and enforcement of the instruments.
- ✓ The respondents indicated willingness to implement SDGs through adoption of green concept.

7.3 RECOMMENDATIONS

Based on the observed conclusions, this study recommends the following:-

- ✓ There is need to enhance training on green concept to address the observed low understanding of the concept by respondents.
- ✓ There is need to exploit willingness to comply with governance instruments on adoption of green concept by the respondents by creating awareness, conducting civic education and enforcing governance instruments that promote perceived mutual benefits.
- ✓ There is need for evidence-based policies that support implementation of SDGs based on willingness of respondents to adopt the green concept.

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APPENDICES

APPENDIX 1: LOGICAL FRAMEWORK ANALYSIS

Objective	**Independent Variables**	**Indicators**	**Measurement**	**Measurement Scale**	**Data Collection method**	**Data Analysis**
1. To determine the extent of green concept adoption in Nairobi as relates to environmental management and implementation of the SDGs.	Awareness of green concept	Number of respondents applying green practices and activities in green concept answering the questions on green	No of initiatives on green concept for growth	Nominal and Ratio	Questionnaires, interviews and stakeholder desktop analysis i.e. strategic plans, annual reports, green initiatives and activities	Descriptive statistics and content analysis

		practices in the question naires				
2. To evaluate determinants of green concept adoption in biodiversity conservation in Nairobi	Monitoring of applications of green concept	Number of green practices and activities embraced i.e. in building, industries, energy alternatives, waste management, forest management, biodiver	Stakeholder work plans, monitoring reports and follow up actions	Nominal and Interval	Questionnaires, interviews and stakeholder desktop analysis i.e. strategic plans, annual reports, green initiatives and activities	Content Analysis and frequency distribution tables

		sity preservation and ecosystem restoration				
3. To examine factors influencing governance on adoption process for green concept in environmental management in Nairobi	Level of public participation in green concept applications, governance and compliance	Estimate % of Community awareness of the value of green concept	Questionnaires, interviews and stakeholder desktop analysis i.e. strategic plans, annual reports, green initiatives and activities	Ordinal	Questionnaires, interviews and field visits	Content Analysis and descriptive statistics

4. To assess how adoption of green concept in Nairobi contributes towards the implementation of the SDGs	Implementation of SDGs using the Green concept	Number of policies and programs that support on Green concept in SDGs implementation	Stakeholder's i.e. Environmental policy frameworks, strategic plan Mechanisms for SDGs implementation	Ordinal	Questionnaires, interviews and REA reports, desktop analysis	Descriptive and content analysis

APPENDIX 2: QUESTIONNAIRE

Adoption of the Green Concept in Nairobi for Biodiversity Conservation, Environmental Management and Sustainable Development Goals Implementation

Section A: Personal information

1. Name:(Optional)……
2. Age:

   ☐18years- 20 years ☐21years- 25years ☐26yers- 30years

   ☐31 years –35years ☐ 36years- 40yeas ☐41years- 45years

   ☐46years- 50years ☐51years-60years ☐61years and above
3. Gender: ☐Male ☐Female
4. Marital status: ☐Single ☐Married ☐Widowed ☐Divorced
5. County…… Sub county……
6. How long have you lived here?

   ☐ 1- 5 years ☐6- 10 years ☐ 11-15 years ☐16- 20years ☐over 21 years
7. Occupation: ……
8. Level of Education: ☐ Primary ☐ Secondary ☐ Tertiary ☐ None
9. Highest form of education; ☐ Certificate ☐ Diploma ☐ Degree ☐ Masters ☐ Doctorate

Section B: Understanding of the Green Concept in Environmental Management and Compliance

10. Do you know that you have a right to a clean and healthy environment?

    ☐Yes

    ☐No

11. Do you know any legal provisions that guarantee environmental management?

    ☐Yes ☐No

12. Do you know any local legal provisions that encourage environmental management compliance?

    ☐Yes ☐No

    If Yes, give your comment;

    ……

    ……

    ……

13. Are you aware of the environmental impacts caused by lack of proper environmental management?

    ☐Yes ☐No

    If yes, please list them below and support your answer;

    ……

    ……

    ……

14. Below are statements that relate to your perception on the adoption of the Green Concept in Environmental Management Compliance. For each statement indicate your level of agreement/disagreement by checking the box.

Key **SD=Strongly Disagree, D=Disagree, A=Agree SA=Strongly Agree**

Statements	**SD**	**D**	**A**	**SA**
The government officials have the necessary knowledge, skills, and attitude to carry out environmental management compliance				
The county government has enacted laws and policies that encourage and enhance compliance to environmental management				
Community members of my county understand their environmental rights in environmental management and compliance				
Community members of my county enhance compliance to environmental management e.g. have clean-up days in the weekend, sort out their wastes properly, use clean energy.				
As an individual, you feel empowered to adhere to proper environmental management and comply with the laws willingfully				
People throwing waste anywhere contribute to poor				

environmental management				
Fines and penalties be put in place for those who do not comply with the environmental management laws and regulations				
Proper environmental management can be used to create jobs and promote innovations in dealing with environmental problems				

15. Are you aware of green practices that promote environmental management?

☐Yes ☐No

If Yes, briefly explain the ways;

……

……

……

16. What would motivate you to comply with environmental management practices as a Green Concept? Kindly list and support answer;

……

……

……

17. In your view, what more can be done to enhance the environmental management using the green concept

.....

.....

.....

Section C: Factors influencing adoption of the Green Concept in Environmental Governance

18. Do you understand what environmental governance is about?

☐Yes ☐No

19. In your own words, define what environmental governance is?

.....

.....

20. Do you know any legal provisions that promote adoption of the green concept?

☐Yes ☐No

Please enumerate the ones you know in the spaces provided below;

……

……

21. Are you aware of the environmental impacts caused by lack of compliance with environmental governance?

☐Yes ☐No

Briefly explain your answer above;

……

……

22. Below are statements that relate to your perception on the factors influencing the adoption of the green concept in environmental governance. For each statement indicate your level of agreement/disagreement by ticking the box.

Key **SD=Strongly Disagree, D=Disagree, A=Agree, SA=Strongly Agree**

Statements	**SD**	**D**	**A**	**SA**
The government officials have put the necessary measures to enhance the adoption of Green Concept in governance such as institutions, laws, policies etc.				
The county government has enacted laws and policies that encourage adoption of the green concept				
Community members of my county have knowledge of the various green concept practices that enhance governance				
Community members of my county have been taught on green concept practices & policies in environmental management e.g. Switching off lights that are being used, using window panes as solar panels, use of biogas instead of charcoal.				
As an individual, you are willing to adopt the Green Concept as a way to ensure environmental governance				
You feel that the adoption of the green concept would have benefits in environmental governance enhancement.				
The cost of adopting the Green Concept in environmental governance would be cost effective and cheaper.				

23. What would motivate you to adopt the green concept practices in environmental governance?

……

……

24. Do you think institutions and organizations adopting the green concept in environmental governance would create jobs and increase production?

☐Yes ☐No

Give reasons for your answer…

……

……

Section D: Biodiversity Conservation and Management as a Green Concept

25. Do you understand what environmental conservation and management is?

☐Yes ☐No

26. In your own interpretation, what you understand biodiversity conservation and management is?

……

……

27. Do you know any legal provisions that encourage biodiversity conservation and management?

☐Yes ☐No

If Yes, kindly list them;

……

……

28. Below is a table with various biodiversity conservation and management practices, tick which you have practiced;

    Tick your choice;

Environmental Conservation &Management	**YES**	**NO**
Planting trees		
Managing plastic and solid wastes properly		
Support anti-poaching		
Protecting biodiversity spots		
Adopting alternate energy		
Use of cleaner production in industries		

29. Are you aware of the impacts caused by lack of compliance with Biodiversity Conservation and management?

    ☐Yes ☐No

    If Yes, give your comments;

    ……

    ……

30. Below are statements that relate to your perception on the adoption of the green concept in biodiversity conservation and management. For each statement indicate your level of agreement/disagreement by ticking the box.

Key **SD=Strongly Disagree, D=Disagree, A=Agree SA=Strongly Agree**

Statements	SD	D	A	SA
The government officials have put the necessary measures to implement biodiversity conservation and management.				
The county government has enacted laws and policies that encourage biodiversity conservation and management				
Community members of my county have been empowered on the various biodiversity conservation and managements practices such as planting trees, conserving wetlands, water conservation, anti-poaching etc.				
Community members of my county are aware of the environmental impacts when they do not take up biodiversity conservation and management approaches.				
As an individual, you are engaged in biodiversity conservation and management through various practices such as planting trees, banning building on riverbeds etc.				
You feel that biodiversity conservation and management practices can be an alternative in job creation and innovation				
You feel that the penalties and fines for lack of biodiversity conservation and management are adequate				

31. Which forms of biodiversity conservation and management activities and practices have you engaged in and why?

    ……

    ……

32. Why would you engage yourself in biodiversity conservation and management as a measure of the Green Concept? Please give reasons below…

    ……

    ……

Section E: Green Concept practices and approaches that enhance Implementation of Sustainable Development Goals

33. In your own understanding, define the Sustainable Development Goals?

.....

.....

34. Do you think adopting green concept in SDGs implementation would enhance environmental stewardship?

    ☐Yes ☐No

    Please support your answer above

    ……

    ……

35. Do you think the legal provisions that have encourage green concept adoption in SDG implementation?

    ☐Yes ☐No

36. Do you feel if the green practices such as recycling, planting trees, use of solar energy would be adopted will enhance implementation of various SDGs?

☐Yes ☐No

If Yes, kindly state your reasons

……

……

37. Are you aware of the environmental impacts caused by lack of implementation of the SDGs?

☐Yes ☐No

If Yes, support your answer;

……

……

38. Below are statements that relate to your perception on the adoption of the Green Concept in the implementation of the SDGs. For each statement indicate your level of agreement/disagreement by ticking the box.

Key **SD=Strongly Disagree, D=Disagree, A=Agree, SA=Strongly Agree**

Statements	SD	D	A	SA
The government officials have put the necessary measures and legislation to enforce the adoption of Green practices in SDGs implementation such as use of solar energy, use of Bio-degradable packages etc.				
The county government has enacted laws and policies that enforce adoption of the green concept in SDGs implementation				
Community members of my county have knowledge of the Sustainable Development Goals				
Community members of my county are empowered on the importance of the Sustainable Development Goals in environmental management e.g. managing the waste properly, enhancing food security etc.				
As an individual, you are aware of the 17 Sustainable Development Goals				
You feel that the use of green concept in SDGs implementation will create more jobs that are environmental friendly				
The implementation of SDGs would enhance the adoption of the green concept in environmental management				

39. In your own view, what would motivate you to implement the Sustainable Development Goals? Briefly explain your answer;

    ……

    ……

40. Do you feel failure to adopt the green concept in implementation of SDGs by the government should have heavy fines and penalties?

    ☐Yes ☐No

Give reasons for your answer…

……

……

Section E: Personal perception to Green Concept practices, approaches and Compliance

41. Below are statements that relate to your understanding to the adoption of the Green Concept practices and compliance. For each statement indicate your level of agreement/disagreement by ticking the box.

Key **SD=Strongly Disagree, D=Disagree, A=Agree, SA=Strongly**

Statements	**SD**	**D**	**A**	**SA**
I would adhere to environmental practices that are green for fear of penalties and fines.				
I adopt green practices and approaches because it is driven by a personal choice and consciousness				
I believe green practices have benefits and the benefits encourage me to adopt the green practices				
My personal knowledge on environmental laws encourages me to adhere to the environmental laws, policies and practices				

42. In your own words, define the 'Green Concept'?

……

……

43. In your view, the 'Green Concept can be used to protect the environment, briefly explain your answer,

.....

.....

44. In your own view, how can the 'Green Concept can be used to create jobs and enhance technology, Support your answer;

.....

.....

45. In your own view, what has stopped the adoption of the green concept as a measure of protecting the environment? Briefly explain your answer;

.....

.....

APPENDIX 3: KEY INFORMANT INTERVIEW GUIDE

General information

Name of the institution/work department …….……

Geographical location of the institution/work station ……..

Position at the institution …….

Number of years working ……

Personal characteristics

Gender ……. (Male), (Female), -Please tick the answer

Education: ……. (Primary), (Secondary), (University), (None of the above)

Age: …….. (20-30), (31-40), (41-50) (51 and above)

Religion: …….. (Christian), (Muslim), (Any other-Specify----------)

Individual / Institutional' perspective on the Green Concept in Kenya

1. It is perceived that the green concept is the new way to save the environment. How do you see the Green concept: as a source of job creation, trade or innovation?

2. Based on your answer for the above question, would you please explain why?

3. Do you think that the adoption of the green concept could resolve potential environmental disasters such as climate change effects?

A. No

B. Yes

C. If yes or no is your answer, would you please explain how……

4. Recently, many institutions both private and public have adopted various green concept initiatives. Do you see any remarkable change in practice, attitude and knowledge?

5. Do you think that the adoption of the green practices would end forecasted environmental disasters such as climate change, increase food security, enhance public health?

6. Do you think the implementation of SDGs using the green concept would enhance environmental stewardship in Nairobi County?

7. How do you see the green concept decelerating the environmental degradation and enhancing the adoption of green practices?

8. What do you suggest as measures for increased green concept adoption and governance in the Nairobi County?

9. What do you think would happen if the green concept was fully adopted in every sector of development and economy in the county?

10. What would you suggest so that the adoption of the green concept in Nairobi County is realized as a national vision of environmental stewardship, conservation and preservation?