EVALUATION OF FACTORS INFLUENCING RESIDENTS' ENVIRONMENTAL SATISFACTION OF FOUR HOUSING DEVELOPMENT ESTATES IN MARALAL TOWN, SAMBURU COUNTY, KENYA

Dominic Moi Obita

A Thesis Submitted in Partial Fulfilment of the Requirements
for the Award of the Degree of Master of Science in Environment and Natural Resources Management in the Department of Environment and Natural Resource Management and the School of Science and Technology
of Africa Nazarene University

May 2022

DECLARATION

I declare that this document and the research that they describe are my original work and that they have not been presented in any other university for academic work.

_____ _____

Dominic Moi Obita
16J01DMEV003

This research was conducted under our supervision and is submitted with our approval as university supervisors.

Dr. Mark Ndunda Mutinda

_____ _____

Dr. Sharon Margret Atieno Jones

_____ _____

Africa Nazarene University
Nairobi, Kenya

DEDICATION

This research thesis proposal is dedicated to my wife Spirinah Kerubo, and my two sons Gerald Moi and Philip Moi for their encouragement during my studies. Their support has been my greatest motivation that has enabled me to work hard and to excel in life.

ACKNOWLEDGEMENTS

I most sincerely thank the almighty God for giving me good health to carry out this research. I appreciate my supervisors Dr. M.N. Mutinda and Dr. S.M.A. Jones for their assistance throughout the research and thesis writing. I also thank all the staff in the Department of Environment and Natural Resource Management and the School of Science and Technology of Africa Nazarene University.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

The concept of environmental satisfaction by estate residents can be used to gauge the condition of the environment and policies on the provision of environmental services. The environmental conditions within four housing estates (Sunrise, Loresho, Milimani, and Town estates) in Maralal town, are in a poor state and need to be addressed. The concept of environmental satisfaction by the residents can be used to gauge the level of this problem and in the process seek environmental solutions and develop a policy to guide environmental activities in the estates. The study was guided by the following objectives: to evaluate the influence of socioeconomic factors (age, plot size and household number) on residents' environmental satisfaction, to assess the influence of environmental knowledge on environmental satisfaction of residents, to determine the level of influence of collective action on residents' environmental satisfaction, to assess the influence of place identity on the level of residents' environmental satisfaction and to determine the level of influence of place dependency on environmental satisfaction of residents in four housing estates in Maralal town. The *ex-post facto* research design was adopted. A stratified random sampling was used to select households. A researcher administered structured questionnaire was used to collect information from 269 residents of the housing estates. The data was analysed using descriptive and inferential statistics at 95 % level of confidence in a Statistical Package for the Social Sciences (IBM SPSS version 26). The residents' environmental satisfaction of the four housing estates was found to be high (M=4.75, SD= 1.09) based on a scale of 1-7. Positive statistically significant influences were found to exist between residents' environmental knowledge (β = .639, t=13.58, p<.001), collective action (β=.687, t=15.46, p=.001), residents' place identity (β=.597, t=12.16, p<.001), and residents' place dependency (β=.629, t=13.21, p<.001). Non-significant (p>.05) influences were found between residents' environmental satisfaction and age of the residents and size of plot owned by the residents. The Findings of this research may provide useful quantitative data on environmental conditions and quality of services provided to members of the four housing estates in Maralal town and to the stakeholders involved in environmental management. This information will also assist the National and County governments in formulating policies applicable environmental policies that have the greatest impact on well-being of the people.

DEFINITION OF TERMS

Environmental Management is defined as a process to efficiently and systematically consume the environment by planning, operating, monitoring, improving, and enhancing, which concern saving, highest utilizing, sustainable, long-lasting, and providing most benefit to human and nature. It ensures the healthy state of our planet for future generations and works towards preserving all forms of life (Krishna et al., 2017)

Environmental Satisfaction which is defined as contentment with local environmental conditions and government environmental policies (Chen et al., 2019; Pelletier et al., 1996)

Housing development Estates is an area containing a large number of houses or apartments built close together at the same time (Chen et al., 2019).

Sustainability: defines meeting the needs of the present without compromising the ability of future generations to meet their needs. The concept of sustainability is composed of three pillars: economic, environmental, and social—also known informally as profits, planet, and people (Moldan et al., 2012).

LIST OF ABBREVIATIONS AND ACRONYMS

EFI: European Forest Institute

FAO: Food and Agriculture Organization

FRA: The Global Forest Resource Assessment

KFS: Kenya Forest Service

MEF: Kenya Ministry of environment and Forestry

NEMA: National Environment Management Authority

UNEP: United Nations Environment Program

UNFCCC: United Nations Framework Convention of Climate Change

UNICEF: United Nations International Children's Emergency Fund

WCED: World Commission on Environment and Development

CHAPTER ONE

INTRODUCTION

1.1 Introduction

This section of the thesis covers the background of the study, statement of the problem, objectives of the research, research question, significance, limitations, delimitations, and the conceptual framework of the study.

1.2 Background of the Study

Residents' Satisfaction with environmental conditions and satisfaction with environmental policies have been used as possible determinants of individual attitudes and behaviours towards the environment (Mendonca & Zhou, 2019; Pelletier, Tuson, Green-Demers & Noels, 1998), pro-environmental behaviour (Krajhanzl, 2010), community environmental satisfaction (Lin & Huang, 2018) and life satisfaction (Fernández-Ballesteros, 2001). Environmental Satisfaction can be explained as satisfaction with environmental quality. This means that when one is satisfied with the environment, the quality of the environment is normally good (Pinquart and Burmedi 2003), and a good environment normally improves ones' satisfaction in life (Shi, 2015). Studies have shown that higher environmental quality has a significant impact on life satisfaction (Rehdanz and Maddison 2008; Levinson 2012). This relationship is explained in a theory of environmental satisfaction and human comfort developed by Shin (2015).

Pro-environmental behaviour is a set of behaviours practiced by individuals that seek to take measured actions to promote positive changes in the natural environment or built environment and limit the effects of human negligence (Carmi, Arnon, & Orion, 2015). Pro-environmental behaviours (PEBs) are termed as conscious efforts undertaken by an individual (Kurisu, 2015). The human behaviour to the environment is influenced by three factors, external factors (that means the environment of an individual) and internal factors (physical and mental aspects of an individual) and personal relationship of an individual to nature (Krajhanzl, 2010).

Pelletier, Louise, Legault and Tuson (1996) constructed and validated the Environmental Satisfaction Scale (ESS) that has been used to measure individuals' satisfaction with environmental conditions or with government environmental policies. A client refers to a regular customer or one who receives professional services from an individual or organization. Client satisfaction or environmental satisfaction can be measured using a scale. A similar scale, Residential Environmental Satisfaction Scale (RESS) was developed by Dutch scholars for assessing environmental satisfaction in different housing estates (Andriaanse, 2011). Cruz and Manata (2020) made a compressive review of the measurement scales in use in measuring environmental satisfaction.

In Kenya, the Public Complaints Committee (PCC) is an environmental ombudsman that was established under Sections 31 to 36 of the Environmental Management and Co-ordination Act, 1999 with the mandate to investigate allegations or complaints

regarding the condition of the environment in Kenya, or on its own motion, suspected cases of environmental degradation (EMCA, 1999). This body can benefit a lot from studies measuring Client satisfaction or environmental satisfaction using the environmental Satisfaction Scale as public satisfaction with environmental governance can be regarded as an important indicator to measure the effect of government environmental regulation (Geng & He, 2021).

Housing development and the provision of adequate, affordable, and sustainable housing for the citizens has become one of the top agendas for the Kenyan government currently (GOK, 2020). Since 2010, there has been a new dispensation in the governance structures in Kenya at the National and county levels following the promulgation of Constitution of Kenya, 2010 (GOK, 2010). Article 43 (1) (b) of the Constitution states that “every person has a right to accessible and adequate housing and to reasonable standards of sanitation”. The government has therefore taken steps towards ensuring proper housing that is not only satisfactory but affordable (GOK, 2016; GOK, 2018; GOK, 2020; KAHP, 2018). Low income affordable housing has remained to be inadequate; costly, the rent being more than 30 % of monthly income earned; unaffordable to purchase and subsequently 56 % of urban dwellers live in slums (GOK, 2018; Kieti et al., 2020).

The response has come in the form of both government and private investors, taking time and money to build and develop new housing projects. Culhane (2002) highlights that whereas housing projects and development of housing resolve some problem,

which is the lack of housing and provision of shelter; it often falls short in other areas. Often such housing projects are not properly evaluated with regard to the impact on the environment during the building process and after the provision of accommodation. Environmental impacts from housing are far and wide and often lead to many challenges related to the environment.

Secondly, affordable housing as is shown by Keare and Jimenez (2003) often comes with decreased customer satisfaction. While the homes and houses seem adequate, the challenge is often in ensuring sustainability of such quality. Over a short period of occupancy, clients experience challenges and disappointments, which lead to increased customer dissatisfaction.

This study assessed the level of residents' satisfaction towards environmental services in four housing development estates in Maralal town, Samburu County (Sunrise, Loresho, Milimani, Town estates), whose environmental conditions were wanting. The study specifically assessed the level of resident satisfaction towards the following three (3) environmental services, which included physical infrastructure within the housing estates, waste management services, building policies that enhance sustainable environmental management, sustainable clean water services. The dependent variable residents' environmental satisfaction was used to assess the level of satisfaction towards the six independent variables of the study

1.3 Statement of the Problem

The Constitution of Kenya and the Kenya Vision 2030 recognize the importance of the housing sector as a foundation for sustainable socio-economic development of the country. The Article 43 (1) (b) of the Constitution of Kenya provides for "accessible and adequate housing, and to reasonable standards of sanitation". In addition, the Article 43 (1) (d) places the provision of safe water in adequate quantities as a basic economic and human right for all Kenyans. The provision of adequate water, housing in sustainable human settlements and clean environment is critical in the realization of the Vision 2030 and the aspiration of the Constitution (GOK, 2007; GOK, 2010).

Housing estate development provides a strong foundation for the curbing of the problem of homelessness. With more housing shelters developing in rural and urban regions, housing is quickly becoming more affordable and stable for a large portion of the population. However, it is important to note that housing estate development is a complex and dynamic field and has effects beyond the simple provision of proper housing. On the one hand, with more people settling in an area, both the physical and social environment are put to test (Cheserek & Opata, 2011; Ochola, 2018). On the other hand, little has been done to understand such impacts and the far-reaching consequences of such estates. In addition, fast and affordable housing may result in quick solutions for those without homes, yet there are many cases of increasing client dissatisfaction (Kumssa & Mwangi, 2011). Currently Maralal's four estates that is, Loresho, Milimani, Town and Sunrise have grown at a faster rate than the provision of environmental services leading to an increase in population density without proper amenities. This has resulted in the degradation of the environment within these estates

due to the lack of environmental management services that would ensure increased environmental conservation, management of natural resources within the area and residents' satisfaction. This study aimed at investigating the satisfaction of the residents (clients) in these estates regarding environmental management and provision of services to the estates.

1.4 Objectives of the Study

1.4.1 General Objective

To determine residents' environmental satisfaction of four housing estates (Sunrise, Loresho, Milimani, Town estate) in Maralal town, Samburu County.

1.4.2 Specific Objectives of the Study

The specific objectives of this study are to:

(i) Evaluate the influence of socioeconomic factors (age, plot size and household number) on residents' environmental satisfaction of four housing estates in Maralal town.

(ii) Assess the influence of environmental knowledge on environmental satisfaction of residents of four housing estates in Maralal town,

(iii) Determine the level of influence of collective action on residents' environmental satisfaction of four housing estates in Maralal town,

(iv) Assess the influence of place identity on the level of residents' environmental satisfaction of four housing estates in Maralal town,

(v) Determine the level of influence of place dependency on environmental satisfaction of residents of four housing estates in Maralal town.

1.5 Research Questions

(i) How do socioeconomic factors (age, plot size and household number) influence residents' environmental satisfaction of four housing estates in Maralal town?

(ii) How does environmental knowledge influence residents' environmental satisfaction of four housing estates in Maralal?

(iii) How does collective action influence residents' environmental satisfaction of four housing estates in Maralal town?

(iv) How does place identity influence residents' environmental satisfaction of four housing estates in Maralal town?

(v) How does place dependency influence residents' environmental satisfaction of four housing estates in Maralal town?

1.6 Significance of the Study

The sturdy aims to create awareness of the importance of environmental services for residents within the housing estates in Maralal town. The infrastructural services will enable easy access to the estates, which will allow the clients to get services like firefighting when there is a fire outbreak. Access to clean water is essential will allow the clients to get clean water that will reduce outbreaks like cholera and typhoid. Finally, access to proper disposal of garbage waste by the provision of garbage collection bins will help control the spilling waste in town and improve the hygiene within the estate. The study will contribute to scientific knowledge though a publication in peer reviewed journals.

1.7 Scope of the Study

The study was conducted in four estates that is Loresho, Sunrise, Milimani, and Maralal town in Samburu County. The study dealt with the assessment of residents' environmental satisfaction in the housing estates and determined the relationship between the dependent variable (residents' environmental satisfaction) and five independent variables (socioeconomic factors, residents' environmental knowledge, collective action, place identity and place dependency).

1.8 Limitations of the Study

This researcher faced two main challenges during the data collection for this study. First was the reluctance of the developers of the estates to supply information relating to the management and provision of environmental services. To overcome this challenge, the researcher explained the importance of incorporating environmental management services in their estate's development plans. The second challenge was the time needed to conduct the research considering the large number of samples needed for the study. The researcher was not familiar with Samburu County and had to hire a guide and enumerators to help him with data collection and to save time needed for the collection of data.

1.9 Delimitations of the Study

This study was delimited to Maralal town in Samburu County, Kenya. The study focussed on four estates namely, Sunrise, Loresho, Milimani, and Town. The study covered only five independent variables and one dependent variable.

1.10 Assumptions of the Study

The researcher assumed that the development estates in Samburu County were in consideration of the recommended environmental management systems. The researcher also assumed that all the participants (household heads) were honest and when they answered the questionnaire.

1.11 Theoretical Framework

This study was founded on the theory of sustainable development. The concept of sustainable development began to be used officially with the publication of the World Commission on Environment and Developments' (WCED) report *Our Common Future*. According to this report, "Sustainable development has been defined as "development that meets the needs and aspirations of the present without compromising the ability to meet the needs of those of the future" (WCED, 1987). For Sartori et al. (2014), the intended sustainable development can be achieved through a process and a mechanism called sustainability. The concept of sustainability development is based on three pillars of sustainability (Figure 1.1), which includes economic prosperity, social equity, and environmental integrity (Purvis et al., 2019; United Nation, 2015).

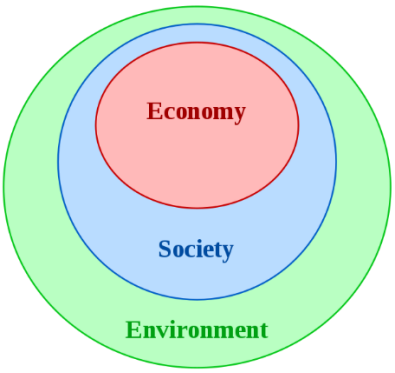

Figure 1.1: Concentric circle model of the three pillars of sustainability

The three pillars of sustainability are interrelated as shown in Figure 1.2.

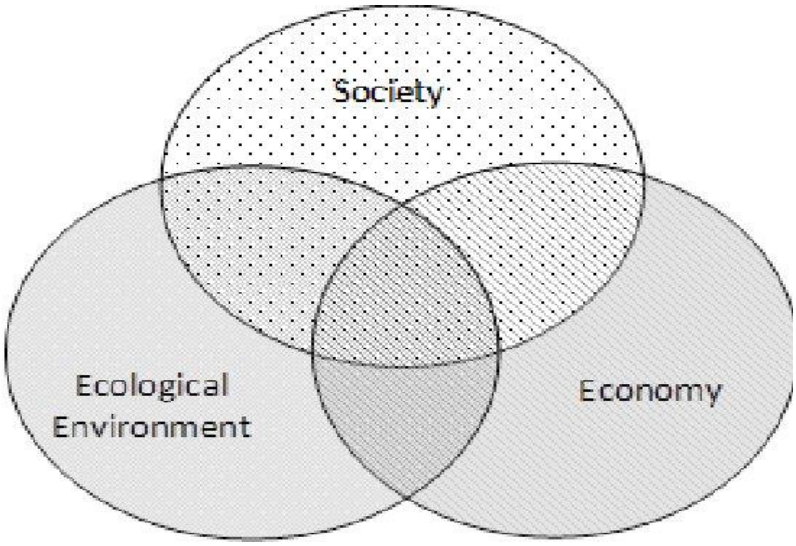

Figure 1.2: Relationship between social, economic and ecological/environmental development

These pillars are not universal, though they are commonly depicted together in literature. Some works consider additional pillars such as institutional (Spangenberg et al., 2002); Turcu, 2012), cultural (Soini & Birkeland, 2014), and technical (Hill & Bowen, 1997). Other frameworks bypass the compartmentalization of sustainability completely. Milbrath for example presents a vision of a 'sustainable society' based on a set of defined values (Milbrath, 1989). More recently too, the SDGs developed by the UN have evolved an 'integrated' approach adopting 17 broad goals over a smaller number of categorizations. Three additional dimensions were recognized by Mihalie (2009), forming the complex nature of sustainability, these included customer satisfaction, environmental education, and political power. This study will lay emphasis

on two dimensions of the sustainability theory; the environmental dimension and customer satisfaction. The environmental dimension (Sloan, Legrand, & Chen, 2009) focuses on the impact of the organization on the ecosystem, which includes the flora, fauna, clean air, water for drinking and the land we enjoy (or aesthetics). In connection with this study, the theory of sustainable development is relevant in that for any development to be sustainable it must consider ecological aspects, social aspects and the economics involved.

1.12 Conceptual Framework

In this section, the relationship between dependent and independent variables is presented through graphical depiction. The framework conceptualizes that there is a direct relationship between the six independent variables and the dependent variable level of residents' satisfaction. The five independent variables include socioeconomic factors, residents' environmental knowledge, collective action, place identity and place dependency.

The level of residents' environmental satisfaction was the dependent variable, which was conceptualized as an index called the residents' environmental satisfaction scale (RESS). The variable was created from the responses and feedback of the residents of the four estates on their satisfaction to the different independent variables. The variable was rated on a rating scale ranging between 1 and 7, where 1 will signify very low satisfaction and 7 very high satisfaction. The whole framework can be affected by government policies, which are conceptualized as an intervening variable; the framework is depicted in Figure 1.3.

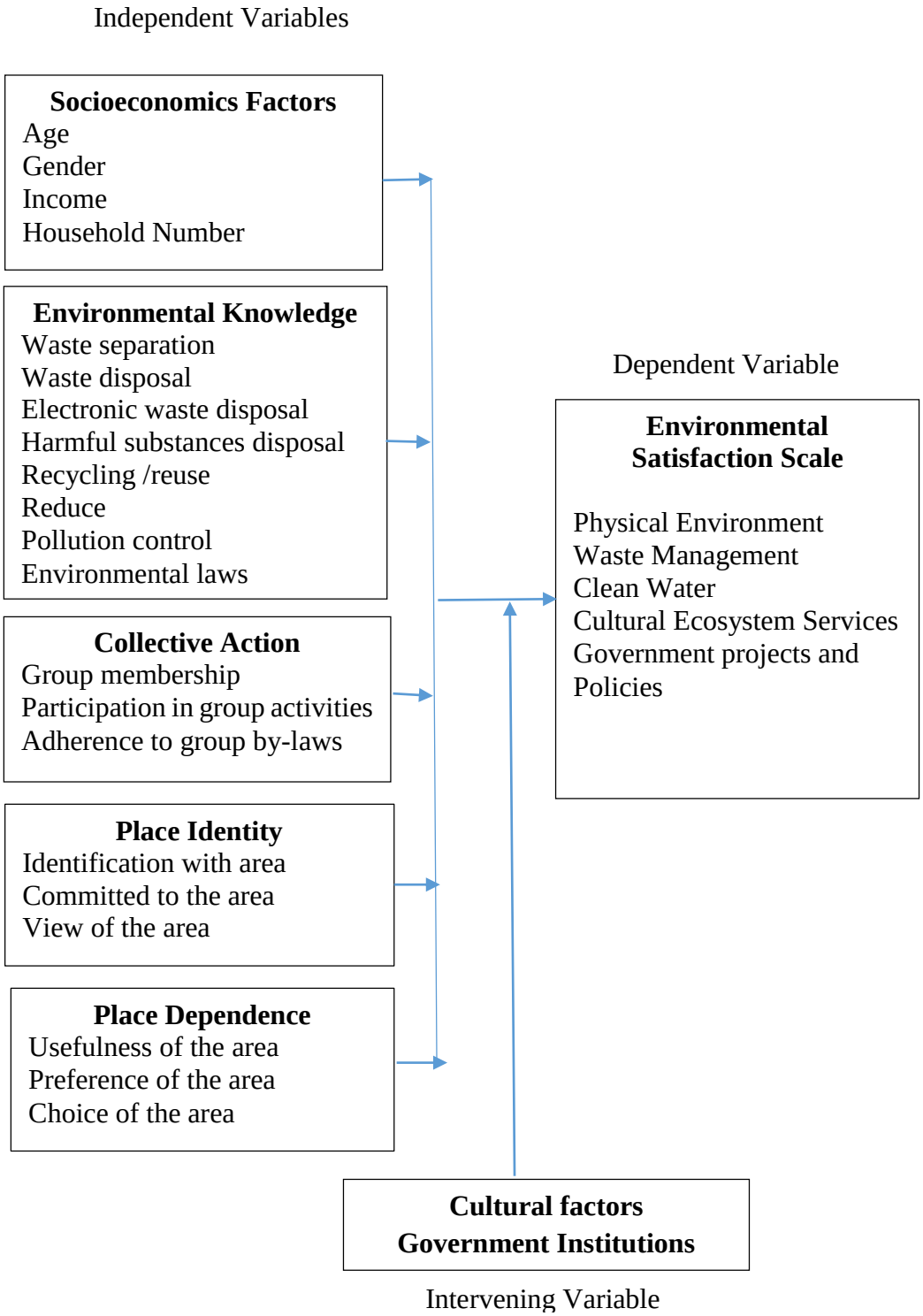

Figure 1.3: Conceptual framework depicting the relationship between resident factors and Environmental satisfaction.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this section, the researcher will provide empirical literature on client satisfaction towards environmental management services in housing developments. The factors identified by the researcher are housing estates and environmental management, housing estates and infrastructure development, housing development, and clean water supply, and how they influence the satisfaction of the clients towards them. There is an intervening variable which is Government policies.

2.2 Housing Estates and Environmental Management

Residential satisfaction can be influenced by both objective and subjective factors. These include the attributes of the house or home itself, which include the physical design, and fixtures that are available for the residents, the psychological satisfaction that comes with being in the house, and the management attributes of the environment within and around the home. According to Payne (2002,), while most of the time, investors focus efforts on ensuring good fixtures and finishing of the house thereby meeting the objective factors of satisfaction, they often ignore the importance of the subjective factors that would ensure long term satisfaction. Management of the environmental features is to ensure that the client's health is protected, and that the client is mentally satisfied both within and without the home. Environmental integrity also plays a major role in ensuring the sustainability of the household features.

The development of housing estates continuously overlaps with concerns of climate change. Wells (2015) states that housing development not only affects land use patterns but also resource development such as clearing of forests, cutting down of trees, and development of trenches to address soil erosion. Warner et al. (2009) agrees with this concept indicating that 90% of all sand harvesting is credited to housing development especially in third world countries. What is of concern is that even after settlement, residents often affect the biodiversity of the environment through poor sanitation, water use, and clogging among other environmental concerns. Without the full participation of residents and a proper management structure, it should be impossible to address and combat the environmental challenges that are brought about by housing estate development.

2.3 Housing Estate and Infrastructure Development

Galiani et al. *(*2007) in their study suggested that housing estates often have positive effects on infrastructure. They considered a multifaceted approach in the building of housing estates. First, the investors and builders, whether government or privately funded often need to access the area of building easily, raw materials and workers need to access the building site. This means that such investors either invest in developing simple roads or lobby for the county governments to develop the same. Kenya has seen huge growth and development in infrastructure as related to real estate, energy, and transport. This can mainly be traced to the increased demand for housing by the significantly growing population, infrastructure demands by investors in the real estate industry, and the focus on the 2030 goals which include the provision of affordable

housing to all. Ofori (2002) indicates that the role of infrastructure is to mainly remove barriers towards access of the resources. Investors need to access land, water, and energy too grow estates and provide housing for residents. On the other hand, citizens need to access the same houses, water, and energy in order to be satisfied. The Kenya government has introduced many major projects as documented by Abdulla and Markandya (2012) such the Rural Electrification project have been driven mainly by refreshed and renewed demands for good housing. Energy networks have grown more than 12% in the past decade with a focus on accessing the affordable housing within the rural areas and attracting investors to ensure continued development of such housing projects. However, it is important to note that while infrastructure is theoretically positive and pleasing, there are the situations where such infrastructure could lead in reduction n of property prices. The possibility of disruption when the energy lines and transport networks are constructed lead to increased sales which lower the value of any real estate property. The majority of the landowners are drawn towards selling at what they consider to be a high demand point for their now accessible land. This could lead to increased land degradation, as much of the sale is done in small tracts of broken-down pieces of land. What remains to be seen is the balance if any that is created through infrastructure development driven by house estates especially within peri-urban areas.

2.4 Housing Development and Waste Management

While the Kenyan government itself has consciously attempted to ensure that investors work together to ensure proper estate management, it is crucial to note that this is the

leading factor for poor environmental management and practices and peri-urban housing development. According to Chandanachulaka and Bussarangsri (2013) cities are grappling with the large amount of waste that is produced in households, and there lack proper structure that allows for good disposal. Landfills continue to develop in cities in addition to garbage points, which then produce a centre for future disease infection. The challenge is not only managing single household disposal but also sewage waste that comes from continued development of housing structures. Mannan and Kilpatrick (2000) indicates that perhaps an ideal step in managing waste is the introduction of segregated waste, which in turn leads up to 80% reduction of the waste dumped in landfills. However, the caution comes in that for waste to be properly segregated, segregation must happen within the house Bio -waste and plastic waste for example need to be disposed separately thereby allowing for recycling and proper re-use of the waste. Oyugi (2005) shows that European countries have managed to introduce and engage residents in ideal and sustainable waste disposal. This has in turn led to increased proper use and management of the waste. He highlights that a proper waste management technique for any residential premise must cover the following to ensure increased and sustainable participation by households:

The first focus of any waste management technique is the health of the environment. Greenhouse gas reduction and carbon footprints need to be at the forefront of any planning in terms of waste reduction. Furthermore, there are possibilities that designs of waste management could increase environmental challenges. Housing development has often come under fire for allowing mediocre designs, especially in sewage

treatment. This ends up with waste sewages and garbage collection within the area of residence, which in turn exposes residents to diseases. This is likely to cause a very high client dissatisfaction rate.

Secondly, he continues to state that waste disposal must be economical, for residents to willingly participate, there must be an assurance of best value for money and returns on their participation. Waste segregation for example requires that households invest in new forms of biodegradable garbage bags as well as containers which they are to use for disposal. The more costly the strategy is, for both investors and the residents the less likely it will be adopted and remain sustainable.

Thirdly, waste management is based on social development. Residents may require training and education to understand the value of the investment. Housing welfare needs to take time to explore opportunities and ideas presented by residents. This will allow insight into areas that have proven less satisfactory for the residents as well as possible opportunities for growth in the waste management process.

When it comes to waste management for residents, and especially solid waste in the form of sewage and/or garbage it is important to focus efforts on ensuring that all residents are satisfied. This means applying innovation and creativity, which stimulates the market needs. It also produces a sustainable and practical decision that allows full participation.

2.5 Housing Development and Water Supply

Clean, accessible water for all is an essential part of the world we want to live in and there is sufficient fresh water on the planet to achieve this. However, due to bad economics or poor infrastructure, millions of people including children die every year from diseases associated with inadequate water supply, sanitation, and hygiene (Mayo et al., 2002).

Water scarcity, poor water quality and inadequate sanitation negatively affect food security, livelihood choices and educational opportunities for poor families across the world. At the current time, more than 2 billion people are living with the risk of reduced access to freshwater resources and by 2050, at least one in four people is likely to live in a country affected by chronic or recurring shortages fresh water. Drought in specific afflicts some of the world's poorest countries, worsening hunger, and malnutrition. Fortunately, there has been great progress made in the past decade regarding drinking sources and sanitation, whereby over 90% of the world's population now has access to improved sources of drinking water. Buckley et al. (2005) indicate that water continues to be the number one concern for all residents when selecting an area to live in. while space and design may play a crucial role, majority of people move homes and seek out lesser attractive possibilities including further places from work and other social amenities simply for assurance of water supply.

2.6 Residents' Satisfaction

Public satisfaction with environmental governance can be regarded as an important indicator to measure the effect of government environmental regulation (Geng & He, 2021). Project success is a complex and often illusory construct. Nonetheless, it is crucially contingent towards enabling appropriate and effective allocation of resources in project management practice. Mass house building projects (MHBPs) represent one of the largest and most established project-based sectors of the construction industry in most developing economies (Lu, 1999). Above all, the management skills required on these projects differ significantly from the one-off projects often encountered in the construction industry. While some success criteria may be common across project types, there is no denying the fact that some determinants of success are likely to be unique to projects of specific characteristics. Housing quality is a concept that delineates whether housing is sufficient to meet recognized housing quality standards as well as specific household needs. Housing quality is a rather more complex concept with broader social and economic meaning. It accounts for both quantitative and qualitative parameters of residential units, their immediate surroundings, and the needs of the occupants (Mohit & Ibrahim, 2010). The quantitative parameters of housing refer primarily to objective structural, material, social and economic constituents of housing products or outcomes that can be measured and that result from the performance of the housing sector. The qualitative dimension is much more subjective and difficult to measure. It represents the perceived meanings and values of factors such as the 'comfort' or 'quality of life that are afforded by different dwelling types, lifestyles, and the preferences and expectations of the inhabitants (Yuksel et al., 2010). Reports on

abandoned housing projects, late delivery and poor quality are frequently highlighted in newspapers. This may be attributed to several reasons such as unskilled construction workers, inexperienced site supervisors, substandard materials, disorganized and labour-intensive construction works, rushed construction job and huge demand for the properties. The number of complaints remains very high despite the reductions in defective works (Nandan, 2010). There is also a significant increase in breach of acts and regulations and late handing over of possession. Additionally, reports that poor communication between buyers and developers prevent the flow of necessary information on services and products; and this leaves the customers dissatisfied. Many public housing projects fail to meet house buyers' needs due to lack of knowledge about the physical aspects of housing quality and design criteria.

2.7 Factors Influencing Pro-Environmental Behaviour

Pro-environmental behaviour can be defined as all possible actions aimed at avoiding harm to and/or safeguarding the environment, either performed in public (such as, participation in environmental movements) or private domains (such as, recycling). Pro-environmental behaviour in people can reduce causes of environmental problems such as climate change, this has been demonstrated in situations where anthropogenic causes of climate change have been mitigated by change in human behaviour (Intergovernmental Panel on Climate Change [IPCC], 2018).

Pro-environmental behaviours can encourage environmental behavioural spillover. The concept 'behavioural spillover' has grown considerably plays a key role in pro-

environmental factor interventions. Spillover is where the adoption of one behaviour causes the adoption of additional, related behaviours (Nilsson et al., 2016). The related behaviour could be an intervention or not and include the spread of knowledge, attitudes, roles/identities, or behaviours in environment and other domains (Galizzi & Whitmarsh, 2019).

There are factors that motivate people to act more pro-environmentally and can be used as interventions to revert behaviours to enhance environmental benefits and reduce cost in managing the environment. These factors include self-identity, place attachment, biospheric (concern for environment), altruistic (concern for others), egoistic (concern for personal resources) and hedonic values (concern for pleasure and comfort) (Balunde et al., 2019; Bouman et al., 2018).

2.7.1 Place Attachment

Place attachment is defined as a multifaceted and complex phenomenon that involves different aspects of interconnection between people and places, includes affect, emotions, knowledge, beliefs, behaviour and actions, involves a reference to the place. It is also known as the emotional attachment that people create to specific environments, as they have a tendency to stay where they feel comfortable and safe (Alrobaee & Al-Kinani, 2019). Place attachment is also reflected in the functional attachment between people and places, and this attachment type is developed when the place is well defined so that users feel that there are sufficient capacity and sufficient

issues satisfying the requirement to meet their functional needs and support their behavioural goals better than another known alternative (Ujang, 2012).

Place attachment has been described as a complex multidimensional construct, comprising of two dimensions, place dependence (Williams & Vaske, 2003), place identity (Williams et al., 1992). These two components (place identity and place dependence) of place attachment (Williams, 2013) are correlated, but have been found to be different factors with different predictive factors and different outcomes on behaviour (Bricker & Kerstetter, 2015; Kyle et al., 2005).

2.7.2 Place Identity

Place identity which is the outcome of the self-place identification process, whereby residents perceive and conceptualize themselves through a collective identity from a perspective cantered on place (Ashforth et al., 2008). Place identity can be defined as a component of self-identity (Proshansky et al., 1983) and "a process by which, through interaction with places, people describe themselves in terms of belonging to a specific place" (Hernandez et al., 2007).

Proshansky (1978) initially introduced and defined place identity as "those dimensions of self that define the individual's personal identity in relation to the physical environment by means of a complex pattern of conscious and unconscious ideas, feelings, values, goals, preferences, skills, and behavioural tendencies relevant to a

specific environment". Place has been used to refer to the area that is built or the built environment or the physical environment (Hauge, 2007).

Four theories have been associated with place identity, they include: place identity theory, identity process theory (IPT) and social identity theory (Hauge, 2007; Qazmi, 2014) and self-categorization theory (Bernardo & Palma-Oliveira, 2012). The identity process theory (IPT) described by Breakwell (1986) has two dimensions for identity structure and two dimensions for process. The IPT structure has content dimension comprising our social (groups we belong to) and personal (our values, motives, attitudes, and emotions) identities. The other identity structure dimension is the value dimension referring to our evaluation of each of the things in the content dimension which determine their salience in the identity hierarchy. There are two processes in IPT, assimilation (accommodation) and evaluation that are used to organise the identity structure and four principles that guide these processes (Twigger-Ross et al., 2003).

Peng et al (2020) discuses two concepts of place identity: peoples place identity and place identity of a place. Place identity of a place is the place identity ascribed by people to a place is constructed to differentiate one place from others. Differences between places are attributed or perceived by inhabitants living in or outside of those places. Peoples place identity is the influence that a place imposes on an individual's identity is one of those relationships, and it constitutes part of the individual's selfhood,

The measurement of place identity can be done by subjective or objective methods, where individual rate items such as based on either a Likert scale or a 7-point scale. Typical items include “the place means a lot to me,” “I am very attached to the place,” “I identify strongly with this place,” “I have a special connection to the place and the people who live and visit there,” and so forth in a variety of ways; (Peng et al., 2020).

2.7.3 Place Dependency

Place dependence also referred to as location-dependency (Zhu et al., 2014). is a concept that reflects a functional attachment, emphasizing the importance of the place in terms of how it provides necessary features and resources for basic living activities (Williams & Vaske, 2003). It is a functional connection with a particular place or context (Alaverdov & Bari, 2021). Two dimensions of place identity have been identified (Alrobaee & Al-Kinani, 2019), they include place quality and place expectation. Place quality is the ability of the place to achieve the objectives of the people and aims to study the quality of the place to search for the best places to live and is related to this aspect of the amenities availability, the availability of open spaces and entertainment, accessibility, diversity, and proximity. Place quality is the ability of the place to achieve the objectives of the people and aims to study the quality of the place to search for the best places to live and is related to this aspect of the amenities availability, the availability of open spaces and entertainment, accessibility, diversity, and proximity (Ayatac & Turk, 2019).

Stokols and Shumaker, 1981, suggested that one's perceptions of a place are determined by how well that place fulfils one's needs. They suggest that attachment to a place develops when 'the social and physical resources within a residential environment are congruent with the salient needs of the individual.' The emphasis on home and residential environment is central to this early definition of place attachment. Place dependence is an attachment based on function. The value of a specific place depends on its ability to satisfy the needs or behavioural goals of an individual or group as compared to other place alternatives (Najafi & Kamal, 2012).

2.8 Environmental Knowledge of Residents of Housing Estates

Environmental knowledge refers to the amount of information individuals have concerning environmental issues and their ability to understand and evaluate its impact on society and the environment. Nature-based environmental education (such as visiting environmental institutions, forest schools, and conservation centres) crates environmental knowledge and connection to nature and enhances pro-environmental behaviour (Bhola et al., 2022). There exists evidence in research to link environmental knowledge and ecological behaviour in people (Dong et al., 2020). This pro-environmental behaviour or green behaviour encourages employees to be more responsible in reducing environmental problems (Bashirun & Noranee, 2020). Studies have shown that environmental knowledge has a significant effect on tourist behavioural intentions in the conservation of the environment (Najjarzadeh, 2017), with children (Al-Rabaani & Al-Shuili, 2020).) and with industrial managers (Fryxell et al., 2013). Studies have shown that consumers' environmental knowledge has a positive

effect on their environmental attitude, by encouraging them to purchase green products (Lin & Niu, 2018).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines research procedures that were used during the study. The main aspects covered here include research design, research site, target population, study sample, data collection, data analysis, legal and ethical considerations, and summary of the analytical procedures.

3.2 Research Design

The study adopted an *ex-post facto* research design, which is an after-the-fact research design in which the investigation starts after the fact has occurred without interference from the researcher (Salkind, 2010). This design was selected as appropriate for this study because the house building estates and developments already exist and environmental aspects that are being assessed by the residents have already occurred.

3.3 Research Site

The study was conducted within the four housing estates (Sunrise, Loresho, Milimani, and Town estates) in Maralal town centre. Maralal is located mostly in Kirisia division, Samburu West sub-county of Samburu County in northern Kenya. Maralal town (which is also the capital of Samburu County) lies east of the Loroghi plateau. Samburu County lies within the arid and semi-arid parts of Kenya and covers an area of 21,022.1 sq. km. It is situated in the northern part of the Great Rift Valley. Samburu is bordered by Turkana to the Northwest, Baringo to the Southwest, Marsabit to the North East, Isiolo to the East and Laikipia to the South. The County lies between latitudes 0°30 and 2°

45’ north of the equator and between longitudes 36°15’ and 38° 10’ east of the Prime Meridian as shown in Figure 1. It covers an area of roughly 21,000 km^2 (8,000 mi^2) as shown in Figure 3.1.

Figure 3.1: Map of Kenya showing location of Samburu County

The county is administratively divided into three sub-counties, 7 divisions, 39 locations and 108 sub-locations as shown in Table 3.1 (County Government of Samburu, 2018). The Figure 3.2 shows the location and extent of the three sub-counties found in

Samburu County. According to the 2019 census, the county has a population of 310,327 (KNBS, 2019).

Table 3.1: Samburu County Administrative Units

Sub County	Division	Area in (Km^2)	Number of Locations	Number of Sub-locations
Samburu Central/West	Lorroki	1,399.30	6	17
	Kirisia	1,237.70	5	18
	Malasso	1,300.30	3	11
Samburu East	Wamba	4,670.80	8	19
	Waso	5,378.90	4	10
Samburu North	Baragoi	4,024.40	7	17
	Nyiro	3,010.70	6	16
Total		**21,022.10**	**39**	**108**

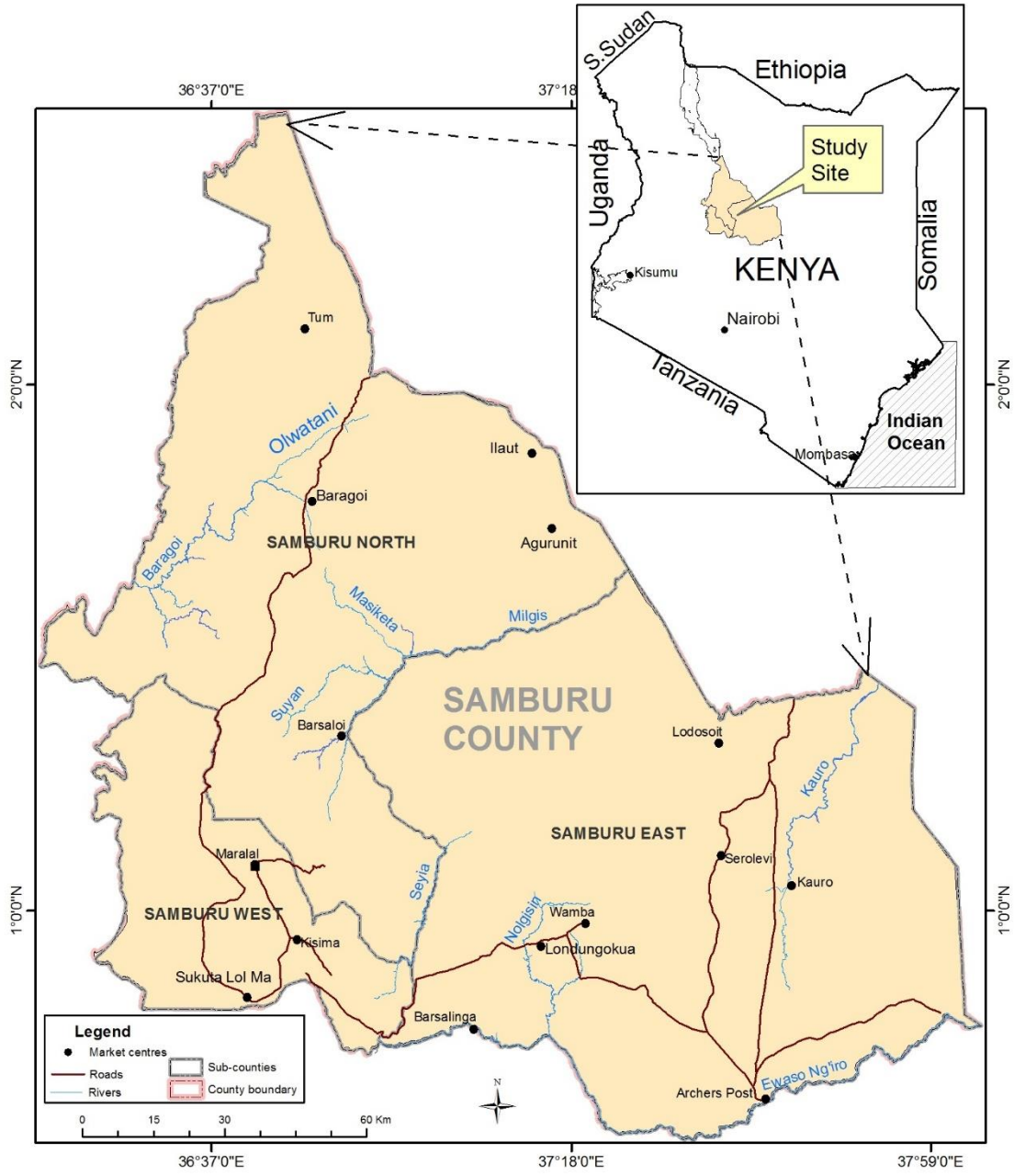

Figure 3.2: Map of Samburu County showing the location of Maralal town in relation to other towns

3.4 Target Population

The target population for this study was the households found in Samburu county, which total 65,910 (KNBS, 2019). The sampling frame consisted of all the rental and individual households found within the four (4) estates in Maralal town, which number 1547 (KNBS, 2019a). The distribution of the households within the four housing estates were as follows: Sunrise 308, Town 459, Milimani 612, and Loresho 167 (County Government of Samburu, 2018).

3.5 Study Sample

The 1547 households within the four housing units will form the sampling frame. A sample is part of the target (or accessible) population that has been procedurally selected to represent it and whose properties are studied to gain information about the whole. Sample size for this study, was determined using Yamane Taro (1967) formula. The formula is applicable mostly when dealing with a large size of the population and it is also found to be suggesting a sample size that is more representative of the population. The formula was applied as follows:

$$n = \frac{N}{1 + N(e)^2}$$

Where,

n = is the sample size

N = Population Size (N=1547)

e = Acceptable sampling error (e = 0.05, when confidence level is 95%)

Therefore $1547/[1+1547(0.05)^2]$ gave n value of 269.

The sample size based on this calculation was 269 households, which were distributed proportionally within the four (4) housing estates in Maralal town forming the strata as shown in Table 3.2:

Table 3.2: Proportional Allocation of the Study Samples to the Housing Estates

Housing Estates in Maralal Town	Households	Proportional Allocation	Sample size
Sunrise	308	308/1546*269	54
Maralal town	459	459/1546*269	80
Milimani	612	612/1546*269	106
Loresho	167	167/1546*269	29
Total	**1,547**		**269**

The stratification was aimed at providing consistent and valid data on the experiences of the households within the stratum. Lininger and Warwick (1975); Kish (1967); Kalton (1983) all suggested that survey research should include a minimum of 150 respondents, and a maximum that is dependent on the area of study and resources available for a true reflection of the factors being studied

3.5.2 Sampling Procedure

The study used the stratified random sampling method to select the 269 households that formed the study sample. The sampling frame was proportionally divided into four strata corresponding to the four housing estates in Maralal. The households were then numbered consecutively, and a *table of random numbers* was used to randomly select the households for the study.

3.6 Data Collection

Data collection component of research is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes. It is common to all fields of study including physical and social sciences, humanities, business, and management. While methods vary by discipline, the emphasis on ensuring accurate and honest collection remains the same.

3.6.1 Data Collection Instruments

A researcher-administered structured questionnaire (Tan, 2018) will be used to collect information from the household heads within the four housing estates in Maralal town. The questionnaire (Appendix B) was divided into eight (8) sections: section one (1) had questions related to the characteristics of the respondents, section two (2) had questions on the dependent variable, level of residents satisfaction to environmental services, the third (3) section had questions that were related to the first independent variable, socioeconomic conditions, the fourth (4) section had questions on residents environmental knowledge, the fifth (5) section had questions on collective action, the sixth (6) section had questions related to place identity, and the seventh (7) section was related to place dependency. The level of resident satisfaction to environmental services, was operationalized as an index, which combined the rating of all the aspects of environmental services. The household heads assessed this index using a 7-point rating scale, where 1 indicated extremely low satisfaction towards an environmental service and 7=extremely high level of satisfaction towards and environmental service.

3.6.2 Pilot Testing of Research Instruments

A pilot-test was conducted on a small sample preferably (10 %)of respondents outside the target population. According to Creswell (2014), pilot-testing involves trying out a questionnaire on a small group of individuals to get an idea of how they react to it before the final version is created. The results of the pilot test provided the researcher with information that enabled the researcher to fine-tune the questionnaire for objectivity and efficiency of the process.

3.6.3 Instrument Reliability

Instrument Reliability is defined as the extent to which an instrument consistently measures what it is supposed to measure. Reliability concerns the degree to which the scores are free from random measurement errors. The data from the pilot test was used to calculate Cronbach's alpha, which was used as an estimate of the internal consistency of the multi-item indicators by determining how items of the instrument were related to each other and to the entire instrument. A Cronbach's alpha of 0.7 was taken to be enough to confirm whether a variable was reliable (Sekaran & Bougie, 2009). Field (2009) argues that a Cronbach's alpha value equal or greater than 0.5 was regarded to be an indication of reliability. The researcher considered coefficient alpha greater than 0.7 to indicate the reliability of the research instrument.

3.6.4 Instrument Validity

The content validity was established during wide reading, discussions and deliberations with peers, and colleagues in the University. The experts were consulted to provide guidance on the content of the instruments; to ensure that all the research objectives

were addressed by the questions or information sought in the instruments. The manner of construction of the instrument was checked to ensure that the questions were not misinterpreted, and only relevant information was obtained. The findings from the pre-test study were used to improve on the instruments, thus enhancing their validity. This approach has been supported by Mutai (2000).

3.6.5 Data Collection Procedure

A letter of approval to undertake the research was obtained from Africa Nazarene University (ANU). A research permit was then obtained from National Commission for Science, Technology, and Innovation (NACOSTI) to conduct the research. The researcher requested members of the *Nyumba Kumi* initiative in the field for permission to visit the households. A list of the households maintained by the chief and *Nyumba kumi* initiative were used to randomize the sample. The enumerators were then trained and given questionnaires to interview the household heads in a face-to-face manner. The participants were first explained the purpose of the interview and their consent was sought. During the household visits the researcher made observation of the conditions of the area and took pictures of the situation on the ground, this information was used to triangulate the survey data.

3.7 Data Analysis

The collected data was analysed using the Statistical Package for the Social Sciences (IBM SPSS version 26). The descriptive and inferential statistics were used (Table 3.3). Analysis of Variance (ANOVA) was used to compare the four strata, while regression

analysis was used to determine any existing relationships between dependent and independent variables (Mugenda & Mugenda, 1999).

3.8 Legal and Ethical Considerations

Ethical research is considered as one that does not harm and gives informed consent and respects the rights of individuals being studied (Rao and Gupta, 2014). The study considered all ethical issues in each and each part of the research process. A research permit from the National Commission for Science, Technology and Innovation and other relevant ethical permits from the Chief and ”*Nyumba kumi”* initiatives were obtained.

The researcher then informed the respondents in the study that their participation was on voluntary basis and that they were free to omit answers to any question if they felt to do so (Trochim, 2006). In this case, participants consent was sought without promising them anything in return.

The researcher also assured and protected the confidentiality and identity of the respondents (Punch, 2003). This is in line with a commitment to minimizing the risks associated with research, including psychological and social risks, and maximizing the benefits that accrue to research participants. Justice is another ethical consideration that required commitment to ensure a fair distribution of the risks and benefits resulting from the research. To achieve justice, there was equal participation from numerous contributors to the research questions. Those who took on the burden of research

participation shared in the benefits of the knowledge gained (Ellis-Barton, 2016). For this reason, the findings of the study will be disseminated back to the community through local administration channels and will be shared with the scientific community through publications.

Table 3.3: Summary of Data Analysis and Statistical Tools

Objectives	Variables	Method of Data Analysis
(i) Evaluate the influence of socioeconomic factors (age, plot size and household number) on residents' environmental satisfaction of four housing estates in Maralal town	Independent variable: socio-economic Dependent: environmental Satisfaction scale (ESS)	Descriptive statistics Regression Analysis
(ii) Assess the influence of environmental knowledge on environmental satisfaction of residents of four housing estates in Maralal town,	Independent variable: knowledge Dependent variable: ESS	Descriptive statistics Regression Analysis
(iii) Determine the level of influence of collective action on residents' environmental satisfaction of four housing estates in Maralal town,	Independent variable: collective action Dependent variable: ESS	Descriptive statistics Regression Analysis
(iv) Assess the influence of place identity on the level of residents' environmental satisfaction of four housing estates in Maralal town	Independent variable: place identity Dependent variable: ESS	Descriptive statistics Regression Analysis
(v) Determine the level of influence of place dependency on environmental satisfaction of residents of four housing estates in Maralal town.	Independent variable: place dependency Dependent variable: ESS	Descriptive statistics Regression Analysis

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

4.1 Introduction

Chapter four of this thesis deals with data analysis and the findings of the study. The chapter is divided into the following sections: (i) introduction (ii) characteristics of the residents of housing estates in Maralal, (iii) Environmental Satisfaction Scale (ESS), (iv) Influence of socio-economic factors on environmental satisfaction, (v) influence of residents' environment knowledge on environmental Satisfaction, (vi) Influence of residents' collective action on environmental satisfaction, (vii) Influence of residents' place identity on environmental satisfaction, (viii) influence of residents place dependency on environmental satisfaction.

Table 4.1: Housing Estates in Maralal and study Coverage

Housing Estates	Frequency	Percent
Sunrise	54	20.0
Loresho	29	10.8
Milimani	106	39.4
Town Estates	80	29.8
Total	**269**	**100.0**

Four housing estates in Maralal town were covered in this study, they included Sunrise (20 %), Loresho (10.8 %), Milimani (39.4 %), and Town (29.8%).

4.2 Socioeconomic Characteristics of the Residents of the Housing Estates in Maralal

The socio-economic characteristic of the residents of the housing estates in Maralal covered in this study included: sex of the residents, age of the residents, level of formal education, household income, number of people living in the household, and plot size owned by the residents.

4.2.1 Sex of the Housing Residents

The sex of the respondents was noted during the interview and analysed, and the results are presented in Table 4.2.

Table 4.2: Sex Distribution of the Housing Residents

Sex	Frequency	Percent
Male	181	67.3
Female	88	32.7
Total	**269**	**100.0**

The majority (67.3 %) of the people residing in the four estates in Maralal town were male, while the females were 32.7 %. sex distribution of the residents of the housing estates

4.2.2 Age Distribution of the Residents of the Housing Estates

The residents of the housing estates were asked to indicate their year of birth, which was then used to calculate the exact age. The descriptive statistics and frequency distribution were calculated and are represented in the Table 4.3.

Table 4.3: Age Distribution of the Residents

Age Categories in Years	Frequency	Percent
20-30	58	21.6
31-40	94	34.9
41-50	90	33.5
51-60	20	7.4
61-70	5	1.9
Above 71	2	.7
Total	**269**	**100.0**

Mean 39.4±.60, Median 40, Mode 40, Std. Dev 9.96, Range 20-80

The majority (55.1 %) of the residents of the housing estates were below 40 years old, while only 10 % were above 51 years old. The average age for the respondents was (M=39.4, SD=9.96), while the minimum age was 20 and the maximum age was 80 years old.

4.2.3 Level of Formal Education Attained by the Housing Residents

The residents of the housing estates were asked to state their highest level of formal education they had attained. The information was then analysed, and the frequency distribution is presented in Table 4.4.

Table 4.4: Level of Formal Education

Formal Education Level	Frequency	Percent
Illiterate	8	3.0
Primary	50	18.6
Secondary	118	43.9
Collage	63	23.4
Graduate	25	9.3
Postgraduate	5	1.9
Total	**269**	**100.0**

The majority (78.5 %) of the resident of the housing estates in Maralal had attained the form four level of formal education, indicating a reasonable level of understanding. Only 3 % were illiterate.

4.2.4 Household Income Sources

The residents were asked to state their major sources of income and the results are stated in Table 4.5

Table 4.5: Household Income Sources (Multiple response Table)

Income Sources	Frequency	Percent
Farmer / pastoralist	102	37.9
Salaried /employed	173	64.3
Business	132	49.1
Remittances	3	1.1
Others	9	3.3

The residents of the housing estates were involved in more than one livelihood source. The livelihood source that was more common in the area was salaried employment (64.3 %).

4.2.5 Number of People Living within the Household

The number of people living in each of the households within the four housing estates was determined and the results of the descriptive statistics and frequency distribution are presented in Table 4.6

Table 4.6: Number of People Living in the House

Number	Frequency	Percent
1.00	3	1.1
2.00	29	10.8
3.00	60	22.3
4.00	71	26.4
5.00	36	13.4
6.00	29	10.8
7.00	12	4.5
8.00	16	5.9
9.00	6	2.2
10.00	6	2.2
11.00	1	.4
Total	**269**	**100.0**

Mean 4.5±.12, Median 4, Mode 4, SD 1.98, Range 1-11

The average number of people living in the household within the four housing estates was (M=4, SD=1.98). The majority (69.9 %) of the households had less than five members.

4.2.6 Plot size Owned by Estate Residents

The estate residents were asked to state the size of the plot they owned, the figures were then analysed, and the frequency distribution and descriptive statistics are shown in Table 4.7.

Table 4.7: Frequency Distribution and Descriptive Statistics of the Size of Plots Owned by Estate Residents

Land Size Categories (ha)	**Frequency**	**Percent**
0.001-0.009	12	4.5
0.01-0.09	134	50.3
0.1 -0.9	21	7.7
1 -3	41	15.2
4-6	48	17.1
Above 6	14	5.2
Total	**269**	**100.0**

Mean 1.65±1.48, Median .051, Mode 048, Std. Dev 2.42, Min.001, Max 12

The descriptive statistics (Table 4.XX) indicate that the mean plot size owned by the residents was (M=1.65, SD=2.42) and the minimum plot size was (M=.001) and the maximum was (M=12).

4.3 Environmental Satisfaction Scale

The dependent variable for this study was Environmental Satisfaction Scale (ESS), the variable was operationalized as an index, which combined five (5) dimensions that include: the physical environment, waste management practices, sustainable provision of clean water, cultural ecosystem services, government environmental projects and policies. The five domains had items that totalled to 54 items.

The residents of the housing estates subjectively scored their level of satisfaction on each of the 54 items using a 7-point scale, with 1 signifying extremely low and 7 signifying extremely high. The scores for each item were then summed up to form the five dimensions of the Environmental Satisfaction scale. The results of the satisfaction rating by the residents of the four housing estates are shown in Table 4.8.

Table 4. 8: Mean Scores for Dimensions of the Environmental Satisfaction Score

Dimensions	**Mean**	**SD**	**Alpha**
Physical Environment	4.81	1..12	
Waste Management	3.97	1.31	
Clean Water	4.56	1.28	
Cultural Ecosystem Services	4.27	1.38	
Government Project and Policies	3.84	1.48	
Environmental Satisfaction Scale(ESS)	**4.75**	**1.09**	

The mean of the environmental Satisfaction scale rating by the residents of the housing estates was (M=4.75, SD=1.09), which was classified as medium. Using this scale, the residents of Maralal housing estates were satisfied with their housing environment and

how the environment was managed. The physical environment was highly (M=4.71, SD=1.12) rated than the other factors, while government projects and policies were rated the least (M=3.84, SD= 1).

The ESS was then grouped into 6 categories and the frequency distribution was calculated and is shown in Table 4.9.

Table 4.9: Frequency Distribution of the Environmental Satisfaction Scale Categories of the Residents of the Hosing Estate

Categories	Description of the Level	Frequency	Percent
Below 1	Extremely Low	-	-
1.01-2	Very low	1	.4
2.01-3	Low	26	9.7
3.01-4	Medium	91	33.8
4.01-5	High	97	36.1
5.01-6	Very High	27	10.0
6.01-7	Extremely High	27	10.0
Total	**-**	**269**	**100.0**

Mean 4.75±.06, Median 5, Mode 5, SD 1.09, Minimum 2, Maximum 7

The frequency distribution (Table 4.9) shows that the level of high had the highest (36.1 %). A chi-square test was performed, and the results are shown in Table 4.10.

Table 4.10: Chi-square Test for the Equality of Categories for the Level of Environmental Satisfaction Scale for Housing Estate Residents in Maralal

		Observed			
Categories	**Level**	**N**	**Expected N**	**Residual**	**Statistics**
1.01-2	Very low	1	44.8	-43.8	χ^2=173.19
2.01-3	Low	26	44.8	-18.8	*df*=5
3.01-4	Medium	91	44.8	46.2	*p*<.001
4.01-5	High	97	44.8	52.2	
5.01-6	Very High	27	44.8	-17.8	
6.01-7	Extremely High	27	44.8	-17.8	
Total		**269**			

The chi-square test revealed statistical ($p < .001$) significant differences among the different categories of residents' rating of the Environmental Satisfaction Scale for their housing development estates. The category of high (4.01-5) was statistically significantly (χ^2=173.19, $df = 5$, $p < .001$) higher than the other categories, indicating that most of the households had highly rated their satisfaction of the environmental conditions and management of their housing estates. The ESS rating for the different estates were different as shown in Table 4.11.

Table 4.11: Environmental Satisfaction Scale for the Four Housing Estates in Maralal Town

Estates	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Sunrise	70	3.46	.845	.101	1.10	5.88
Loresho	66	4.36	.898	.110	2.62	6.55
Milimani	68	4.29	.384	.046	3.74	5.16
Town	65	5.10	1.310	.162	2.09	7.00
Total	269	4.75	1.09	.065	1.10	7.00

The descriptive statistics for the four housing estates (Table 4.11) show that the Town estate was highly (M=5.10, SD= 1.31) rated, while Sunrise estate was the least (3.46, SD=.845) rated. The differences were found to be statistically significant ($p<.001$) as shown in Table 4.12 and 4.13.

Table 4.12: ANOVA Table for the Mean Comparisons of the ESS

	Sum of Squares	*df*	Mean Square	*F*	*p*
Between Groups	90.838	3	30.279	36.206	.001
Within Groups	221.620	265	.836		
Total	312.458	268			

The ANOVA Table 4.12 shows statistically significant ($p<.001$) results, showing that at least one the means significantly different from the others. Mean comparisons using the Tukey HSD test were conducted and the results are shown in Table 4.13.

Table 4.13: Mean Comparisons for the Estates using Turkey HSD

	Mean Difference		
(J) Estate where you live	**(I-J)**	**Std. Error**	***p***
Sunrise-Loresho	-.89*	.156	.001
Sunrise Milimani	-.82	.155	.001
Sunrise Town Estates	-1.63	.157	.001

The mean comparison (Table 4.13) shows that Sunrise estates mean was lower than all the other estates (Loresho, Milimani and Town) and the results were statistically significant ($p<.001$).

4.4 Influence of Socio-economic factors on the Residents' Environmental Satisfaction

The first objective was to assess the influence of socio-economic characteristics on the environmental satisfaction of the housing residents living in the four estates in Maralal town.

4.4.1 Socio-economic factors of the Residents of Housing Estates in Maralal

Three independent variables were selected to represent the socioeconomic factors of the residents of Maralal housing estates, these were: plot size, age of the residents and the number of people within the households. The socio-economic factors are analysed and discussed in section 4.2.2, for the age of the residents, section 4.2.5 household number, and section 4.2.6 for the plot size.

4.4.2 Influence of Socioeconomic Factors on Residents' Environmental Satisfaction

The influence of the socio-economic factors on the environmental satisfaction of the estates residents was determined using multiple linear regression. The independent variables were plot size, age of the housing residents and household number and the environmental satisfaction scale (ESS) was the dependent variable. The results of the regression model are shown in Table 4.14.

Table 4.14: Regression Model Summary for Socio-economic Factors and the Residents' Environmental Satisfaction of the Housing Estates

R	R Square	Adjusted R Square	Std. Error of the Estimate
.358	.128	.119	1.013

The model indicates an adjusted R^2 value of .119; meaning that the independent variables age, plot size and household number explained approximately 11.9 % of the variation in the dependent variable environmental satisfaction of the residents of housing estates in Maralal, which was low. The *F* test for the regression model is shown in the ANOVA Table 4.15.

Table 4.15: ANOVA Table for the Regression Testing the Fit of the Model

	Sum of Squares	*df*	Mean Square	*F*	*p.*
Regression	40.147	3	13.382	13.023	.001
Residual	272.311	265	1.028		
Total	312.458	268			

a. Dependent Variable: environmental satisfaction scale average
b. Predictors: (Constant), household size, Plot size, Age, Income (Ksh)

The overall regression model was found to be significant (F (3, 265) = 13.02, p<.001). The regression coefficients of the model showing the *beta, t* statistics and the collinearity statics are shown in Table 4.16.

Table 4.16: Regression Coefficients for Socio-economic Factors and Environmental Satisfaction of Housing Residents

	Unstandardized Coefficients		**Standardized Coefficients**			**Collinearity Statistics**
	B	**Std. Error**	**Beta**	***t***	***p***	***VIF***
(Constant)	3.551	.272		13.059	.001	
Age	-.003	.006	-.032	-.532	.595	1.094
Plot Size	-.007	.026	-.017	-.288	.774	1.037
Household Size	.197	.033	.363	5.951	.001	1.131

The regression analysis shows that household size had statistical significant (β= 363, t= 5. 951, p < .001) influence on the residents' environmental satisfaction of their housing estates. The other two variables age and plot had no significant influence. This means that the households with higher number of people living in the household had higher rating of the environmental satisfaction.

4.5 Influence of Environmental Knowledge on Residents' Environmental Satisfaction

The second objective was to determine the influence of environmental knowledge on the residents' environmental satisfaction of the four housing estates in Maralal town.

4.5.1 Residents' Environmental Knowledge

The independent variable residents' environmental knowledge was operationalized as an index that combined subjective assessment of ten (10) items related to knowledge of environmental management, these included: solid waste collection, waste separation, solid waste reduction, waste composting, wastewater drainage system, waste aeration pools, electronic waste, hazardous wastes, air pollution, and environmental laws governing housing estates. The residents rated their knowledge of the different practices on a 7-point scale, where 1 depicted very low knowledge and 7 extremely high knowledge. The scores for each environmental management practice were added together to form the index of knowledge on environmental management. The descriptive statistics and the frequency distribution of the index of knowledge is shown in Table 4.17.

Table 4.17: Descriptive Statistics and Frequency Distribution of Residents' Environmental Management Knowledge

Categories	Frequency	Percent
0-1	2	.7
1.01-2	7	2.6
2.01-3	21	7.8
3.01-4	87	32.3
4.01-5	78	29.0
5.01-6	33	12.3
6.01-7	41	15.2
Total	**269**	**100.0**

Mean 4.44±.08, Median 4.22, Mode 3.78, SD 1.31, Minimum 1, Maximum 7

Housing residents' knowledge of environmental knowledge was ranged between 1 and 7 and had a mean of (M=4.44, SD= 1.31)

4.5.2 Influence Environmental Knowledge on Environmental Satisfaction of Residents of Housing Estates

The influence of environmental management knowledge on residents' environmental satisfaction was determined using simple linear regression. The independent variable was environmental knowledge, and the dependent variable was environmental satisfaction towards environmental satisfaction of the residents of the four housing estates. The results of the regression model summary are shown in Table 4.18,

Table 4.18: Regression Model Summary for the Relationship Between Knowledge and Environmental Satisfaction

R	R Square	Adjusted R Square	Std. Error of the Estimate
.639[a]	.409	.407	.83176

The model indicates an adjusted R^2 value of .407, meaning that the independent variable residents' knowledge explained approximately 40.7 % of the variation in the dependent variable environmental satisfaction by residents. The *F* test for the regression model is shown in the ANOVA Table 4.19.

Table 4.19: ANOVA Table for the Regression Testing the Fit of the Model

	Sum of Squares	*df*	Mean Square	*F*	*p*
Regression	127.741	1	127.741	184.644	.001
Residual	184.717	267	.692		
Total	312.458	268			

The overall regression model was found to be significant (F (1, 127.74) = 184.64, p< .001). The regression coefficients of the model showing the *beta, t* statistics and the collinearity statics are shown in Table 4.20.

Table 4.20: Regression Coefficients for Residents' Environmental Knowledge and Environmental Satisfaction

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics
	B	**Std. Error**	**Beta**	***t***	***p***	**VIF**
(Constant)	1.957	.179		10.918	.001	
Knowledge	.526	.039	.639	13.588	.001	1.000

The regression analysis shows that residents' environmental knowledge influence on environmental satisfaction was statistically significant (β= .639, t= 15.58, p < .001). this meant the higher the knowledge the higher was the residents' satisfaction on environmental management.

4.6 Influence of Collective Action on Residents' Environmental Satisfaction

The third objective was to assess the influence of collective action on the residents' environmental satisfaction in four housing estates in Maralal town.

4.6.1 Residents' Collective Action

The independent variable residents' collective action on the management of environment within the housing estates was operationalized as an index that combined the subjective rating of the residents on the following five items related to collective action on a 7-point scale, where 1 depicted very low collective action and 7 extremely

high level of collective action. The scores were added for all the items and averaged to form the index of residents' collective action and the descriptive statistics are shown in Table 4.21.

Table 4.21: Descriptive Statistics of Statements Related to Residents' Collective Action

	Statement	Mean	SD
1	Membership to neighbouring environmental group	4.23	1.82
2	Participation in environmental group activities and contribution	4.41	1.83
3	Involvement in resident group activities	4.64	1.82
4	Follow and practice the by-laws of housing estate	4.32	1.86
	Residents' Collective Action Index	**4.75**	**1.09**

The frequency distribution of the index of residents' collective action is shown in Table 4.22.

Table 4.22: Frequency Distribution of the Index of Residents' Collective Action

Categories	Frequency	Percent
1.01-2	1	.4
2.01-3	26	9.7
3.01-4	91	33.8
4.01-5	97	36.1
5.01-6	27	10.0
6.01-7	27	10.0
Total	**269**	**100.0**

Mean 4.75±.06, Median 5, Mode 5, SD 1.09, Minimum 2. Maximum 7

The frequency distribution of the residents' collective action (Table 4.22) shows the majority (69.9 %) of the residents scored between 3.01 and 5.

4.6.2 Influence of Residents' Collective Action on the Environmental Satisfaction of the Housing Estates

The influence of residents' collective action on environmental satisfaction was determined using simple linear regression. The independent variable was the residents' collective action, and the dependent variable was the residents' environmental satisfaction of the housing estate. The results of the regression model summary are shown in Table 4.23.

Table 4.23: Regression Model Summary for the Relationship Between Residents' Collective Action and Environmental Satisfaction

R	R Square	Adjusted R Square	Std. Error of the Estimate
.687[a]	.472	.471	.785

The model indicates an adjusted R^2 value of .471, meaning that the independent variable residents' collective action explained approximately 47.1 % of the variation in the dependent variable environmental satisfaction by the residents. The *F* test for the regression model is shown in the ANOVA Table 4.24

Table 4.24: ANOVA Table for the Regression Testing the Fit of the Model

	Sum of Squares	*df*	Mean Square	*F*	*p.*
Regression	147.636	1	147.636	239.160	.001
Residual	164.822	267	.617		
Total	**312.458**	**268**			

The overall regression model was found to be significant (F (1, 147.6) = 239.16, p< .001). The regression coefficients of the model showing the *beta, t* statistics and the collinearity statics are shown in Table 4.25.

Table 4.25: Regression Coefficients for Residents' Collective Action and Environmental Satisfaction

	Unstandardized Coefficients		**Standardized Coefficients**	***t***	***p***	**Collinearity Statistics**
	B	**Std. Error**	**Beta**			**VIF**
(Constant)	2.424	.130		18.64	.001	
Collective Action	.451	.029	.687	15.46	.001	1.00

The regression analysis shows that residents' collective action influences environmental satisfaction significantly (β= .687, t= 18.64, p < .001). this meant the higher the collective action the higher was the residents' satisfaction on environmental management.

4.7 Influence of Place Identity on Residents' Environmental Satisfaction

The fourth objective of this study was to determine the influence of place identity on the residents' environmental satisfaction of the housing estates in Maralal town.

4.7.1 Place Identity of the Residents of the Housing Estates

The independent variable. Residents' place identity was operationalized as an index that combined the residents rating of four statements related to place identity on a 7-point scale, where 1 depicted very low level of place identity and 7 extremely high level

of place identity. The scores were added for all the items and averaged to form the index of residents' place identity and the descriptive statistics are shown in Table 4.26

Table 4.26: Descriptive Statistics of Statements Related to Residents' Place Identity

	Statements	Mean	SD
1	I identify with the neighbourhood	4.18	1.80
2	I feel committed to this neighbourhood	4.34	1.75
3	I feel I can be myself in this neighbourhood	4.31	1.72
4	The neighbourhood is very special to me	4.54	1.91
	Residents' Place Identity Index	**4.25**	**1.70**

The frequency distribution of the index of residents' collective action is shown in Table 4.27.

Table 4.27: Frequency Distribution of the Index Residents' Place Identity

Categories	Frequency	Percent
1.01-2	23	8.6
2.01-3	48	17.8
3.01-4	109	40.5
4.01-5	9	3.3
5.01-6	11	4.1
6.01-7	69	25.7
Total	**269**	**100.0**

Mean 4.29±1.03, Median 3.75, Mode 7, SD 1.70, Minimum 2, Maximum 7

The majority (66.9 %) of housing residents rated place identity as being below 4.

4.7.2 Influence of Residents' Place Identity on the Environmental Satisfaction of the Housing Estates

The assessment of the relationship between residents' place identity and residents' environmental satisfaction was determined using bivariate linear regression. The place identity formed the independent variable, while the environmental satisfaction of the housing estates formed the dependent variable. The results of the regression model summary are shown in Table 4.28.

Table 4.28: Regression Model Summary for the Relationship Between Residents' Place Identity and Environmental Satisfaction

R	R Square	Adjusted R Square	Std. Error of the Estimate
.597[a]	.357	.354	.86777

The model indicates an adjusted R^2 value of .354, meaning that the independent variable residents' place identity explained approximately 35.4 % of the variation in the dependent variable environmental satisfaction by the residents. The *F* test for the regression model is shown in the ANOVA Table 4.29

Table 4.29: ANOVA Table for the Regression Testing the Fit of the Model

	Sum of Squares	*df*	Mean Square	*F*	*p.*
Regression	111.401	1	111.401	147.938	.001
Residual	201.057	267	.753		
Total	312.458	268			

The overall regression model was found to be significant (F (1, 267) = 147.93, p< .001). The regression coefficients of the model showing the *beta, t* statistics and the collinearity statics are shown in Table 4.30

Table 4.30: Regression Coefficients for Residents' Place Identity and Environmental Satisfaction

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics
	B	**Std. Error**	**Beta**	***t***	***p.***	***VIF***
(Constant)	2.669	.144		18.581	.001	
Place Identity	.378	.031	.597	12.163	.001	1.000

The regression analysis shows that residents' place identity influences environmental satisfaction significantly (β= .597, t= 12.16, p < .001). this meant the higher the place identity the higher was the residents' satisfaction on environmental management.

4.8 Influence of Place Dependence on Residents' Environmental Satisfaction

The fifth objective of this study was to examine the influence of residents' place dependence on the residents' environmental satisfaction of the four housing estates in Maralal town.

4.8.1 Residents' Place Dependency to the Housing Estates

The independent variable residents' place dependency to the housing estates in Maralal town was operationalized as an index that combined the residents rating of four statements related to place dependency on a 7-point scale, where 1 depicted very low level of place dependency and 7 extremely high level of place dependency. The scores

were added for all the items and averaged to form the index of residents' place dependency and the descriptive statistics are shown in Table 4.31

Table 4.31: Descriptive Statistics of Statements Related to Residents' Place Dependency

	Statements	Mean	SD
1	I cannot leave the neighbourhood	4.18	1.80
2	I prefer this neighbourhood to others	4.34	1.75
3	The neighbourhood is my favourite place to be	4.31	1.72
4	The neighbourhood is better than any other place	4.54	1.91
	Residents' Place Dependency Index	**4.25**	**1.70**

The frequency distribution of the index of residents' place dependency is shown in Table 4.32.

Table 4.32: Descriptive Statistics of Statements Related to Residents' Place Dependency to the Housing Estates

Categories	Frequency	Percent
1.01-2	22	8.2
2.01-3	50	18.6
3.01-4	110	40.9
4.01-5	16	5.9
5.01-6	10	3.7
6.01-7	61	22.7
Total	**269**	**100.0**

Mean 4.24±.10, Median 3.75, Mode 7, SD 1.66, Minimum 1.25, Maximum 7

The majority (67.7 %) of housing residents rated place identity as being below 4.

4.7.2 Influence of Residents' Place Dependency on the Environmental Satisfaction of the Housing Estates

The assessment of the relationship between residents' place dependency and residents' environmental satisfaction was determined using simple linear regression. The place dependency formed the independent variable, while the environmental satisfaction of the housing estates formed the dependent variable. The results of the regression model summary are shown in Table 4.33.

Table 4.33: Regression Model Summary for the Relationship Between Residents' Place Dependency and Environmental Satisfaction

R	R Square	Adjusted R Square	Std. Error of the Estimate
.629[a]	.395	.393	.84133

The model indicates an adjusted R^2 value of .393, meaning that the independent variable residents' place dependency explained approximately 39.3 % of the variation in the dependent variable environmental satisfaction by the residents. The *F* test for the regression model is shown in the ANOVA Table 4.34

Table 4.34: ANOVA Table for the Regression Testing the Fit of the Model

	Sum of Squares	*df*	Mean Square	*F*	*p.*
Regression	123.467	1	123.467	174.430	.001
Residual	188.991	267	.708		
Total	312.458	268			

The overall regression model was found to be significant (F (1, 267) = 174.43, p< .001). The regression coefficients of the model showing the *beta, t* statistics and the collinearity statics are shown in Table 4.35.

Table 4.35: Regression Coefficients for Residents' Place Dependency and Environmental Satisfaction

	Unstandardized Coefficients		**Standardized Coefficients**			**Collinearity Statistics**
	B	**Std. Error**	**Beta**	***t***	***p***	***VIF***
(Constant)	2.564	.141		18.241	.001	
Place Dependency	.407	.031	.629	13.207	.001	1.000

The regression analysis shows that residents' place dependency influences environmental satisfaction significantly (β= .629, t= 13.20, p < .001). this meant the higher the place dependency the higher was the residents' satisfaction on environmental management.

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the study, discussion of the results, conclusions of the study and the recommendations made.

5.2 Summary of the Study

This study aimed at assessing the influence of five independent variables: socio-economic factors, residents' environmental knowledge, residents' collective action, residents' place identity, and residents' place dependency on environmental satisfaction of residents towards four housing estates in Maralal town.

In achieving these objectives, the study used primary data which was collected using a structured questionnaire that was organized according to the key thematic areas corresponding to specific objectives of the study. The study then utilized descriptive and inferential statistics to analyse the data.

The results indicated that all the five independent variables; socio-economic factors, residents' environmental knowledge, residents collective action, residents' place identity, and residents' place dependency had statistically significant influence on the environmental satisfaction of residents towards four housing estates in Maralal town.

5.3 Discussions

The findings for this study are discussed in this section based on the specific objectives of the study as stated in section 1.4 of this thesis.

5.3.1 Influence of Socioeconomic Factors on the Residents' Environmental Satisfaction of Housing Estates

The socio-economic influence on residents' environmental satisfaction was found to vary depending on the factor. The number of people living in the household was found to have positive statistical significant influence on the residents' environmental satisfaction of the four housing estates in Maralal, while age and plot size had no effect.

Research on sociodemographic factors suggests that they do influence environmental concerns (Poortinga et al., 2019). Specifically, age was found to significantly influence residential environmental satisfaction (Zheng et al., 2021). Sociodemographic characteristics have been shown to influence four forms of community environmental satisfaction (Lin & Huang, 2018). Public's satisfaction with environmental performance significantly enhances happiness of the people (Zhao & Sun, 2020). In a study of students, scientists, and administrative and technical staff of the Swiss Federal Institute of Technology Lausanne (*École Polytechnique Fédérale de Lausanne*) to measure potential influential factors (age, gender and position) of pro-environmental behaviour, it was concluded that Female gender, age, and position (from bachelor's student, master's student, doctoral student, postdoc/senior scientist to professor) showed a significant positive correlation with positive behaviors as measured by a pro-environmental behavior scale developed for this study (Hansmann et al., 2020). the

public's satisfaction with environmental performance will significantly enhance their happiness.

In some studies, sociodemographic factors have been shown to have weak or no significant relationships with environmental concerns. The reasons for this lack of relationships are varied. Sargisson, et al. (2020) found weak relationships, which they attributed to the varied nature of the seven European countries covered in the study.

5.3.2 Influence of Residents' Environmental Knowledge on the Environmental Satisfaction of Housing Estates in Maralal Town

The environmental satisfaction of residents of housing estates in Maralal town was significantly influenced statistically by the residents' environmental knowledge. Environmental knowledge that educates and motivates citizens and prepares them to contribute to environmental cause, has been identified as one of the factors that positively influences pro-environmental behaviour (Díaz et al., 2020). Donmez-Turan, and Kiliclar (2021) concluded in their study that environmental training/knowledge influenced pro-environmental behaviour among college students. Environmental knowledge among the public ranges from very low (Arcury & Johnson, 1987) to very high (Al-Rabaani & Al-Shuili, 2020), but has been found to have a strong positive relationship with pro-environmental behaviour and environmental conservation (Bhola et al., 2022; Geiger et al., 2019).

5.3.3 Influence of Residents' Collective Action on the Environmental Satisfaction of Residents Living in Housing Estates in Maralal

The residents' environmental satisfaction of four housing estates in Maralal town was significantly influenced statistically by the residents' collective action. Collective action in form of public participation in environmental issues has been shown to be effective in implementing environmental management practices leading to satisfaction of the quality of the environment (Guo et al., 2020). Collective action in the form of social capital, where communities create opportunities for urban residents to communicate, consolidate and improve their trust bond with one another leading to pro-environmental behaviour and environmental satisfaction (Hua et al., 2021). This form of collective action has been used by Chinese urban residents to develop a system of recycling express delivery packaging waste (Hua et al., 2021).

Collective action can play a major role in improving the environment by exerting social pressure on enterprises to reduce their polluting behaviour when governments formal regulations are weak (Zhang, 2008). Higher levels collective action among communities is associated with a high level of place attachment and greater social and political involvement in environmental matters (Mesch & Manor, 1998). This involvement intends to bring people to work together to achieve desired outcomes, such as protecting the environment, social and physical features that characterise their neighbourhoods (Brown et al., 2002). Solastalgia, a term that is used to describe the mourning for a place that has been altered completely by activities such as mining

(Albrecht et al., 2007), this phenomenon tends to cause collective action that can lead people in bringing solution, advocacy or even closure of the polluting activity.

5.3.4 Influence of Residents' Place Identity on Environmental Satisfaction of Four Housing Estates in Maralal

Residents place identity was found to influence the environmental satisfaction of residents in four housing estates in Maralal town. These findings tend to agree with studies in that people tend to identify with places whose environment is good. Residents in China living near a coal mine were found to have a low satisfaction with their environment, as they related it to air pollution (Shi, 2015). Place identity and place dependency were found to be significant predictors of environmental satisfaction despite of hazardous neighbourhood (Anton & Lawrence, 2014). In Israel cities, place identity was related to the size of the city and the level of satisfaction to the housing environment (Casakin et al., 2015).

Environmental satisfaction was found to be positively associated with place identity (Ramkissoon, & Mavondo, 2015), and as individuals identify themselves more to a place a strong commitment to the place is created (Tournois & Rollero, 2020). Individuals who had high level of identification to a place were more willing to pay (WTP) for environmental restoration of their neighbourhood (Faccioli et al., 2020).

5.3.5 Influence of Residents' Place Dependency on Environmental Satisfaction of Four Housing Estates in Maralal Town

Residents' place dependency was found to significantly influence the residents' environmental satisfaction in the four housing estates located in Maralal town. Place dependency has been found to enhance psychological health, more satisfying social relationships, and greater satisfaction with one's physical environment (Prayitno et al., 2021; Tartaglia, 2012).

Residents' strong degree of dependency to a place tends to cause them to a positive influence on environmental institution, this was demonstrated by Kuo et al. (2021) who showed that place dependence directly affected place identity and both the two (place identity and place dependence) influenced environmental responsible behaviour. This was having been found to be true, as place identity and place dependency were found to be significant predictors of environmental satisfaction despite of hazardous neighbourhood (Anton & Lawrence, 2014; White et al., 2007).

5.4 Conclusions

The following conclusions were made from this study:

(i) The influence of socio-economic factors on environmental satisfaction for four housing estates in Maralal was found to be statistically significant for household size but had not for age and plot size

(ii) The influence of residents' environmental knowledge on environmental satisfaction of four housing estates in Maralal town was found to statistically significant.

(iii) Residents' collective action was found to significantly influence environmental satisfaction of residents of four housing estates in Maralal town.

(iv) Environmental satisfaction of four housing estates in Maralal town was found to be positively influenced significantly by residents' place identity.

(v) The residents' place dependency was found to significantly influence environmental satisfaction of residents in four housing estates found in Maralal town.

5.5 Recommendations

Based on the findings of the study, the following recommendation was made:

In managing the environment within the housing estates, the following factors related to the residents are critical to include in the planning process, these include environmental knowledge, collective action, place identity and place dependency of the residents. The following can be done:

(i) Through teaching the residents should be made aware of the environmental problems in the area and how they can be sorted.

(ii) The residents should come together and create a platform that they can use in providing environmental services and to solve problems affecting their estate

(iii) Planning for the estates needs to be undertaken so that the infrastructure and services can be easily provided

5.6 Recommendations for Further Research

The following recommendations for further research within the housing estates were made:

(i) Determine the influence of multi-stakeholder platforms in the enhancement of environmental management within the housing estates,

(ii) Assess the impact of anthropogenic activities on the management of the environment within the built environment.

REFERENCES

Abdullah, S., & Markandya, A. (2012). Rural electrification programmes in Kenya: Policy conclusions from a valuation study. *Energy for Sustainable Development, 16*(1), 103-110.

Adriaanse, C. (2011) On measuring and explaining neighbourhood success A behavioural economic approach. IOS Press BV Nieuwe Hemweg 6b 1013 BG Amsterdam The Netherlands

Adriaanse, C.C.M. (2007). Measuring residential satisfaction: a residential environmental satisfaction scale (RESS). *J Housing Built Environ* **22:** 287 https://doi.org/10.1007/s10901-007-9082-9

Alaverdov, E. & Bari, M.W. (2021) *Global Development of Religious Tourism*. DOI: 10.4018/978-1-7998-5792-1

Al-Rabaani, A. & Al-Shuili, A. (2020). Environmental Knowledge, Attitudes, and Behaviour among Omani Post-Basic Education Students. *European Journal of Social Sciences 60* (1): 29-38

Alrobaee, A., & Al-Kinani, (2019) Place dependence as the physical environment role function in the place attachment. IOP Conf. Series: *Materials Science and Engineering 698:* 033014 doi:10.1088/1757-899X/698/3/033014

Anton, C.E. & Lawrence, C. (2014) Home is where the heart is: The effect of place of residence on place attachment and community participation. *Journal of Environmental Psychology 40*: 451-461. http://dx.doi.org/10.1016/j.jenvp.2014.10.007 0

Arcury, T.A., & Johnson, T.P. (1987) Public Environmental Knowledge: A Statewide Survey. *The Journal of Environmental Education 18* (4): 31-37. DOI: 10.1080/00958964.1987.9942746

Ashforth, B.E.; Harrison, S.H.; Corley, K.G. (2008) Identification in organizations: An examination of four fundamental questions. *Journal of Management 34*: 325–374.

Ayataç H, Türk Ş 2019 An Assessment of Quality of Place (Qop) Research for Istanbul (ITU A|Z) 6 (1) 77-93.

Bashirun, S. N., & Noranee, S. (2020). Influence of Environmental Knowledge and Attitude on Employee Green Behaviour. *International Journal of Academic Research in Business and Social Sciences 10*(6), 937–946.

Bernardo, F., & Palma-Oliveira, J.M. (2012) Place Identity: A Central Concept in Understanding Intergroup Relationships in the Urban Context in Hernan

Bhola, M., Dr. Ram, D.K., Panda, A., Permatananda, P.A.N.K., Tenerife, J.J.L. (2022). Ecological behaviour in children is linked to environmental knowledge and "a sense of connection to nature. *Journal of Positive School Psychology 6* (3): 3202–3213

Bonaiuto, M., Aiello, A., Perugini, M., Bonnes, M., & Ercolani, A. P. (1999). Multidimensional perception of residential environment quality and neighbourhood attachment in the urban environment. *Journal of Environmental Psychology 19:* 331e352.

Bouman, T., Steg, L.& Kiers, H.A.L. (2018) Measuring Values in Environmental Research: A Test of an Environmental Portrait Value Questionnaire. *Frontiers in Psychology 9*:564. doi: 10.3389/fpsyg.2018.00564

Breakwell, G. (1986). *Coping with threatened identities*. London: Methuen.

Bricker, K.S., Kerstetter, D.L. (2015) Level of Specialization and Place Attachment: An Exploratory Study of Whitewater Recreationists. Leisure Sciences 22 (4): 233-257. DOI: 10.1080/01490409950202285

Buckley, R. M., & Kalarickal, J. (2005). Housing policy in developing countries: Conjectures and refutations. *The World Bank Research Observer*, *20*(2), 233-257.

Butu1, H.M., Bin Hashim, A.H., Ahmad, N. (2018) Influence of Place Identity and Place Dependence on Resilience towards Boko Haram Insurgency among Maiduguri Residents in Borno State, Nigeria. *IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT)* 12 (7): 12-20.

Carmi, N.; Arnon, S.; Orion, N. (2015) Transforming environmental knowledge into behaviour: The mediating role of environmental emotions. *J. Environ. Educ.* 46: 183–201.

Casakin, H. & Bernardo, F. (Eds*) The Role of Place Identity in the Perception, Understanding, and Design of Built Environments*, 35-46. Bentham Science Publishers

Casakin, H. Hernandez, B. & Ruiz, C. (2015) Place attachment and place identity in Israeli cities: The influence of city size. *Cities 42* (Part B): 224-230. https://doi.org/10.1016/j.cities.2014.07.007

Chandanachulaka, S., & Bussarangsri, A. (2013, May). Environmental Health Management in Evacuation Shelter. In *Proceeding of the 33rd Annual Meeting of the International Association for Impact Assessment the Next Generation, Alberta, Canada* (pp. 1-7).

Chen, N.C., Hall, C.M., Yu, K. & Qian, C. (2019). Environmental Satisfaction, Residential Satisfaction, and Place Attachment: The Cases of Long-Term Residents in Rural and Urban Areas in China *Sustainability 11:* 6439; doi:10.3390/su11226439

Cheserek G. J., Opata G. P. (2011) Environmental and Housing Problems of Low-Income Households in Eldoret Municipality, Kenya. *Journal of Emerging Trends in Economics and Management Sciences (JETEMS) 2* (4): 320-324

County Government of Samburu (2018). *Second County Integrated Development Plan 2018-2022*.

Creswell, J.W. (2014) *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* 4th Edition. SAGE: Los Angeles.

Cruz, S.M., & Manata. B. (2020) Measurement of Environmental Concern: A Review and Analysis. *Frontiers in Psychology 11*:363. doi: 10.3389/fpsyg.2020.00363

Culhane, D. P. (2002). The quandaries of shelter reform: An appraisal of efforts to" manage" homelessness. *Social Service Review*, *66* (3): 428-440.

De Mendonca, T.R. & Zhou, Y. (2019) Environmental Performance, Customer Satisfaction, and Profitability: A Study among Large U.S. Companies *Sustainability* 11(19): 5418; doi: 10.3390/su11195418.

Díaz, M.F., Charry, A., Sellitti, S., Ruzzante, M., Enciso, K. & Burkart, S. (2020) Psychological Factors Influencing Pro-environmental Behavior in Developing Countries: Evidence from Colombian and Nicaraguan Students. *Frontiers in Psychology 11*:580730. doi: 10.3389/fpsyg.2020.580730

Dong, X., Liu, S., Li, H., Yang, Z., Liang, S., & Deng, N. (2020). Love of nature as a mediator between connection to nature and sustainable consumption behaviour. *Journal of Cleaner Production, 242:* 118451. https://doi.org/10.1016/j.jclepro.2019.11 8451

Donmez-Turan, A., & Kiliclar, I.E. (2021) The analysis of pro-environmental behaviour based on ecological worldviews, environmental training/ knowledge, and goal frames. *Journal of Cleaner Production 279*: 123518. https://doi.org/10.1016/j.jclepro.2020.123518.

Downey, H. Threlkeld, G. Warburton, J. (2017). What is the role of place identity in older farming couples' retirement considerations? *Journal of Rural Studies* *50*: 1-11

Ellis-Barton, C. (2016). Ethical considerations in research participation virality. *Journal of Empirical Research on Human Research Ethics*, *11*(3), 281-285.

Fernández-Ballesteros, R. (2001). Environmental conditions, health, and satisfaction among the elderly: Some empirical results *Psicothema* 13 (1) 40-49

Fryxell, G.E. & Lo, C.W.H. (2013). The Influence of Environmental Knowledge and Values on Managerial Behaviours on Behalf of the Environment: An Empirical Examination of Managers in China. Journal of Business Ethics 46 (1): 45-69.

Fryxell, G.E., & Lo, C.W.H. (2003). The Influence of Environmental Knowledge and Values on Managerial Behaviours on Behalf of the Environment: An Empirical Examination of Managers in China. *Journal of Business Ethics* 46: 45–69. https://doi.org/10.1023/A:1024773012398

Galiani, S., Gertler, P. J., Undurraga, R., Cooper, R., Martínez, S., & Ross, A. (2017). Shelter from the storm: Upgrading housing infrastructure in Latin American slums. *Journal of urban economics*, *98*: 187-213.

Galizzi, M.M. & Whitmarsh, L (2019) How to Measure Behavioural Spillovers: A Methodological Review and Checklist. *Frontiers in Psychology 10:*342. doi: 10.3389/fpsyg.2019.00342

Geiger S.M, Geiger M. & Wilhelm O (2019) Environment-Specific vs. General Knowledge and Their Role in Pro-environmental Behaviour. *Frontiers of Psychology 10*:718. doi: 10.3389/fpsyg.2019.00718

Geiger, S.M., Geiger, M. & Wilhelm O. (2019) Environment-Specific vs. General Knowledge and Their Role in Pro-environmental Behaviour. Frontiers in *Psychology 10:*718. doi: 10.3389/fpsyg.2019.0071

Geng, M.M. & He, L.Y. (2021). Environmental Regulation, Environmental Awareness and Environmental Governance Satisfaction. *Sustainability 13*: 3960. https://doi.org/10.3390/ su13073960.

Government of Kenya [GOK] (2007). *Kenya Vision 2030*. Government Printer.

Government of Kenya [GOK] (2010). *Constitution of Kenya, 2010*. National Council for Law Reporting

Government of Kenya [GOK] (2016) National housing policy. Sessional paper No. 3.

Government of Kenya [GOK] (2018) 500,000 affordable homes programme. Delivery framework and policy intervention Nov 2018.

Government of Kenya [GOK] (2020). Implementation status of the big four agenda 2018/2019. Monitoring and evaluation directorate, state department for planning. National treasury and planning

Guo, S.; Wang, W.; Zhang, M. (2020). Exploring the impact of environmental regulations on happiness: New evidence from China. *Environmental Science Pollution Research 27*: 19484–19501.

Hansmann, R., Laurenti, R., Mehdi, T., Binder, C.R. (2020). Determinants of pro-environmental behavior: A comparison of university students and staff from diverse faculties at a Swiss University. Journal of Cleaner Production 268: 121864, https://doi.org/10.1016/j.jclepro.2020.121864.

Hardoy, J. E., Misra, R. P., & Mabogunje, A. L. (1978). *Shelter Provision in Developing Countries: The Influence of Standards and Criteria*. Wiley [for] the Scientific Committee on Problems of the Environment of the International Council of Scientific Unions. Harper and Row

Hauge, A.L. (2007) identity and place. A critical comparison of 3 identity theories Architectural Science Review 50 ()1: 44-51.

Hernandez, B., Hidalgo, M.C., Salazar-Laplace, M.E., & Hess, S. (2007). Place attachment and place identity in natives and non-natives. *Journal of Environmental Psychology 27*: 310-319.

Hua, Y., Dong, F & Goodman J. (2021), How to leverage the role of social capital in pro-environmental behaviour: A case study of residents' express waste recycling behaviour in China *Journal of Cleaner Production 280* (2): https://doi.org/10.1016/j.jclepro.2020.124376.

Keare, D. H., & Jimenez, E. (2003). Progressive development and affordability in the design of urban shelter projects.

Kenya Affordable Housing Programme [KAHP] (2018) Kenya affordable housing programme. Development framework guidelines.

Kenya National Bureau of Statistics [KNBS]. (2019). *2019 Kenya Population and Housing Census Volume 1: Population by County and Sub-county*. Government Printer: Nairobi

Kenya National Bureau of Statistics [KNBS]. (2019a). *2019 Kenya Population and Housing Census Volume 1V: Distribution of Population by Socio-economic Characteristics*. Government Printer: Nairobi

Kieti, R.M., Rukwaro, R.W. & Olima, W.A. (2020). Affordable Housing in Kenya: Status, Opportunities and Challenges. *Africa Habitat Review Journal Volume 14*(1): 1677-1687. http://uonjournals.uonbi.ac.ke/ojs/index.php/ahr

Krajhanzl, J. (2010) *environmental and pro-environmental behavior.* School and Health 21, 2010, Health Education: International Experiences

Krishna, I.V.M., Manickam, V., Shah, A., & Davergrave, N. (2017) *Environmental Management: Science and Engineering for Industry*. Elsevier Science.

Kumssa, A. & Mwangi, I. K. (2011). Challenges of sustainable urban development: The case of Umoja 1 residential community in Nairobi City, Kenya. In Wong & B. Yuen (Eds.), Eco-city planning, policies, and design. London and New York: Springer. https://doi.org/10.1007/978-94-007- 0383-4_9.

Kuo, H.-M.; Su, J.-Y.; Wang, C.-H.; Kiatsakared, P.; Chen, K.-Y. Place Attachment and Environmentally Responsible Behavior: The Mediating Role of Destination Psychological Ownership. Sustainability 2021, 13, 6809. https:// doi.org/10.3390/su13126809

Kurisu, K. (2015). *Pro-environmental behaviours*. Springer, Tokyo, Japan.

Kyle, G., Graefe, A., & Manning, R. (2005). Testing the dimensionality of place attachment in recreational settings. *Environment and Behaviour 37*: 153-177.

Lewicka, M. (2005) Ways to make people active: The role of place attachment, cultural capital, and neighborhood ties. *Journal of Environmental Psychology 25* (4): 381-395

Lin, S. & Huang, Y. (2018). Community environmental satisfaction: its forms and impact on migrants' happiness in urban China *Health and Quality of Life Outcomes 16:* 236 https://doi.org/10.1186/s12955-018-1061-1

Lin, S. & Niu, H. (2018) Green consumption: Environmental knowledge, environmental consciousness, social norms, and purchasing behavior. *Business Strategy and Environment 7* (8): 1679-1688. https://doi.org/10.1002/bse.2233

Lu, M. (1999). Determinants of residential satisfaction: Ordered logit vs. regression models. *Growth and change, 30*(2): 264-287.

Mannan, M. S., & Kilpatrick, D. L. (2000). The pros and cons of shelter-in-place. *Process Safety Progress, 19*(4): 210-218.

Mayo, S. K., Malpezzi, S., & Gross, D. J. (2002). Shelter strategies for the urban poor in developing countries. *The World Bank Research Observer, 1*(2): 183-203.

Mohit, M. A., Ibrahim, M., & Rashid, Y. R. (2010). Assessment of residential satisfaction in newly designed public low-cost housing in Kuala Lumpur, Malaysia. *Habitat international, 34* (1): 18-27.

Mukherjee, S.P. (2019). *A Guide to Research Methodology.* An Overview of Research Problems, Tasks and Methods. CRC Press.

Najafi, M.& Kamal, M. S (2012 The concept of place attachment in environmental psychology *Elixir Sustainable. Architecture 45:* 7637-7641

Najjarzadeh, M., Jafari, S. Jafari, N., Rajabi, N. (2017) The Structural Relationship of Environmental Attitude and Environmental Knowledge with Behavioural Intentions: The Mediating Role of Tourist Satisfaction and Perceived Benefit. *Quarterly Journal of Environmental Education and Sustainable Development Vol. 7*: (1): 127-142)

Nandan, S. (2010). Determinants of customer satisfaction on service quality: A study of railway platforms in India. *Journal of public transportation, 13*(1): 6.

Nilsson, A., Bergquist, M., and Schultz, W. P. (2016). Spillover effects in environmental behaviours, across time and context: a review and research agenda. *Environmental Education Research 3*: 1–7

Ochola, G.O. (2018) Urbanization and Environmental Stress: A Review of Impacts of Urban Development on the Environment in Kenya. *International Journal of Environmental Sciences and Natural Resources 14* (4): 1-15. DOI: 10.19080/IJESNR.2018.14.555889

Ofori, G. (2002, May). Construction industry development for disaster prevention and response. In *Proceedings of i-Rec Conference on Improving Post-Disaster Reconstruction in Developing Countries* (pp. 23-25).

Oyugi, M. O. (2005). Towards sustainable shelter provision in Africa: Kenyan experience. *Discovery and innovation*, *17*(1/2): 27.

Payne, G. (2002). Tenure and shelter in urban livelihoods. *Urban livelihoods: A people-centred approach to reducing poverty*, 151-164.

Pelletier, L.G., Louise, R., Legault, L.R. & Tuson, K.M (1996). The environmental satisfaction scale. A measure of satisfaction with environmental conditions and government environmental policies. *Environment and Behaviour 28* (1): 5-26. DOI: 10.1177/0013916596281001

Pelletier, L.G., Tuson, K.M., Green-Demers, I., Noels, K., & Beaton, A.M. (2006) Why Are You Doing Things for the Environment? The Motivation toward the Environment Scale (MTES) *Journal of Applied Social Psychology* 28 (5): 437-468.

Peng, J., Strijker, D. & Wu Q (2020) Place Identity: How Far Have We Come in Exploring Its Meanings? *Frontiers in Psychology 11*: 294.

Prayitno, G., Ashari, M. I., & Rukmi, W. I. (2021). Structural equation model with partial least square (SEM-PLS) of place dependence with land used change. *Journal of International Studies, 14(*1), 153-171. doi:10.14254/2071-8330.2021/14- 1/11

Proshansky, H. M. (1978). The city and self-identity. *Environmental Behaviour 10:* 147–169. doi: 10.1177/0013916578102002

Proshansky, H. M., & Fabian, A. K. (1987). "The development of place identity in the child," in The Built Environment and Child Development, eds C. S. Weinstein and T. G. David (New York, NY: Plenum Press), 21–40.

Proshansky, H. M., Fabian, A. K., & Kaminoff, R. (1983). Place-identity: physical world socialization of the self. *Journal of Environmental Psychology 3*: 57–83. doi: 10.1016/S02724944(83)80021-8

Qazmi, S. (2014) Sense of place and place identity *European Journal of Social Sciences Education and Research 1*(1): 306-311.

Qomariah, A. & Prabawani, B. (2020). The Effects of Environmental Knowledge, Environmental Concern, and Green Brand Image on Green Purchase Intention with Perceived Product Price and Quality as the Moderating Variable. 2020 *IOP Conference Series of Earth and Environmental Sciences* 448: 012115

Ramkissoon, H., & Mavondo, F.T. (2015) The satisfaction–place attachment relationship: Potential mediators and moderators. *Journal of Business Research 68* (12): 2593-2602. https://doi.org/10.1016/j.jbusres.2015.05.002

Rao, M., & Gupta, V. (2014). Sustainability Beyond Buildings. *Architecture Design 31*(3): 60.

Salkind, N. J. (2010). Pre-Experimental Designs. In *Encyclopaedia of Research Design*. SAGE publishing. https://doi.org/10.4135/9781412961288.n330

Sargisson, R.J, De Groot J.I.M., & and Steg, L. (2020) The Relationship Between Socio-demographics and Environmental Values Across Seven European Countries. *Frontiers in Psychology 11*:2253. doi: 10.3389/fpsyg.2020.02253

Sekaran, U. & Bougie. *M, (2009)." Research Methods for Business: A Skill Building Approach".* UK: John Wiley & Sons

Shi, X. (2015) Factors Influencing the Environmental Satisfaction of Local Residents in the Coal Mining Area, China. *Social Indicators Research 120* (1): 67–77 DOI 10.1007/s11205-014-0584-z

Shin, U. (2016) Toward a theory of environmental satisfaction and human comfort: A process-oriented and contextually sensitive theoretical framework. *Journal of Environmental Psychology. 45*: 11-21. https://doi.org/10.1016/j.jenvp.2015.11.004.

Siti Norashikin Bashirun. Shereen Noranee (2020) Influence of Environmental Knowledge and Attitude on Employee Green Behaviour 10(6): 937 – 946

Stokols, D., and Shumaker, S. A. (1981). "People in places," in Cognition, Social Behaviour, and the Environment, ed. J. H. Harvey (Hillsdale, NJ: Lawrence Erlbaum Associates), 441–488.

Strzelecka, M., Boley, B.B., Woosnam, K.M. (2017), Place attachment and empowerment: Do residents need to be attached to be empowered? *Annals of Tourism Research 66*: 61-73, https://doi.org/10.1016/j.annals.2017.06.002.

Tan, W. (2018) *Research Methods: A Practical Guide for Students and Researchers*. 1st Edition World Scientific: London.

Trochim, W. M., Cabrera, D. A., Milstein, B., Gallagher, R. S., & Leischow, S. J. (2006). Practical challenges of systems thinking and modelling in public health. *American journal of public health*, *96*(3), 538-546.

Twigger-Ross, C., Bonaiuto, M., & Breakwell, G. (2003). *Identity theories and environmental psychology*. In M. Bonnes, T. Lee, & M. Bonaiuto (Eds.), Psychological theories for environmental issues. Hants: Ashgate Publishing Company.

Ujang, N. (2012) Place Attachment and Continuity of Urban Place Identity *Social and Behavioural Sciences 49* (2) 156–167.

Van Der Werff, E & Steg L (2018) Spillover Benefits: Emphasizing Different Benefits of Environmental Behaviour and Its Effects on Spillover. *Frontiers in Psychology 9*:2347. doi: 10.3389/fpsyg.2018.02347

Veitch, J. A.; Farley, K. M. J.; Newsham, G. R. (2002) Environmental Satisfaction in Open-Plan Environments: 1. Scale Validation and Methods. Internal Report No. IRC-IR-844. DOI: https://doi.org/10.4224/20386149

Vicente-Molina, M.A., Fernández-Sáinz, A., Izagirre-Olaizola, J. (2013) Environmental knowledge and other variables affecting pro-environmental behaviour: comparison of university students from emerging and advanced countries. *Journal of Cleaner Production 61:* 130-138. https://doi.org/10.1016/j.jclepro.2013.05.015.

Warner, K., Ehrhart, C., de Sherbinin, A., Adamo, S., & Chai-Onn, T. (2009). In search of shelter. *Mapping the Effects of Climate Change on Human Migration and Displacement. Bonn: CARE*.

Wells, J. (2015). Population, settlements, and the environment: the provision of organic materials for shelter: a literature review. *Habitat International*, *19*(1), 73-90.

White, D.D., Virden, R.J., Carena J. van Riper, C.J. (2008) Effects of Place Identity, Place Dependence, and Experience-Use History on Perceptions of Recreation Impacts in a Natural Setting *Environmental Management* DOI 10.1007/s00267-008-9143-1

Williams, D.R. (2013) Beyond the community metaphor in L. Manzo & P. Davine-Wright (Eds), Place attachment: Advances in theory, methods, and applications London: Routledge.

Williams, D.R., Patterson, M.E., Roggenbuck, J.W. & Watson, A.E. (1992) Beyond the commodity metaphor: Examining emotional and symbolic attachment to place. *Leisure Sciences 14* (1):29-46. DOI: 10.1080/01490409209513155.

Williams, D.R., Vaske, J.J. (2003) The measurement of place attachment: Validity and generalizability of a psychometric approach. *For. Sci. 49*: 830–840.

Yamane, T. (1967). *Statistics: An Introductory Analysis*, 2nd Edition, New York:

Yuksel, A., Yuksel, F., & Bilim, Y. (2010). Destination attachment: Effects on customer satisfaction and cognitive, affective, and conative loyalty. *Tourism management*, *31*(2), 274-284.

Zenker, S., & Rütter, N. (2014) Is satisfaction the key? The role of citizen satisfaction, place attachment and place brand attitude on positive citizenship behaviour. 38: 11-17. https://doi.org/10.1016/j.cities.2013.12.009.

Zhang, B.; Bi, J.; Yuan, Z.; Ge, J.; Liu, B.; Bu, M. (2008) Why do firms engage in environmental management? An empirical study in China. *Journal of Cleaner Production 16:* 1036–1045.

Zhao, X. & Sun, Z. (2020) The Effect of Satisfaction with Environmental Performance on Subjective Well-Being in China: GDP as a Moderating Factor. *Sustainability 12*(5): 1745. https://doi.org/10.3390/su12051745.

Zheng, Z.; Chen, H.; Gao, J. (2021) Age Differences in the Influence of Residential Environment and Behaviour on the Life Quality of Older Adults: The Transfer from Physical-Environment to Social-Behaviour. *Int. J. Environ. Res. Public Health 18:* 895. https://doi.org/10.3390/ijerph 18030895

Zhu, X., Recker, J., Zhu, G. and Maria Santoro, F. (2014), "Exploring location-dependency in process modeling", *Business Process Management Journal*, Vol. 20 No. 6, pp. 794-815. https://doi.org/10.1108/BPMJ-06-2013-0066

APPENDICES

Appendix A: Cover Letter

Dear Participant,

RE: REQUEST FOR YOUR PARTICIPATION

My name is Dominic Obita, a Master of Science (MSc) student at Africa Nazarene University (ANU) taking a course in Environment and Natural Resources Management. I am currently conducting my field research on a topic related to environmental management of the four housing estates in Maralal town, Kenya.

This is to inform you your home was randomly selected from the 1,156 housing units found in the four estates within Maralal town to be interviewed for this study. This is a voluntary exercise, and you are free to participate or decline to do so. I would therefore kindly ask you to respond to the questions on this questionnaire. Your name and responses will not be disclosed to anyone and will be used for the purpose of my study only.

Your participation will be highly appreciated.

Yours Sincerely,

Dominic Obita

Researcher

Appendix B: Household Questionnaire

Evaluation of the Factors Influencing Environmental Satisfaction of Residents of Four Housing Estates in Maralal Town, Samburu County, Kenya.

INSTRUCTION: Please, fill in the spaces with the required responses in the spaces provided

---

NB: The provided information will only be used for academic purposes

---

Section 1: Participant Characteristics

(1) Name of Estate where you live (Sunrise, Loresho, Milimani, and Town estates)

_____

(2) Gender

Male ☐ Female ☐

(3) Age as per identity card _____

(4) Education Level

Level of formal education	tick
No Formal schooling (illiterate)	
Primary	
Secondary	
College	
Graduate	
Postgraduate	

(5) Income amount per month_____

(6) Income amount per year _____

(7) Sources of income / occupation

	Income sources/ occupation	You can tick more than one activity
	Salary /employed	
	Farmer/pastoralist	
	Business	
	Remittances	
	Others	

(8) Size of plot _____

(9) Number of rooms contained in the house _____

(10) Wall material _____ (stone, mud, wood)

(11) Type of roofing material _____ (metal, tiles, grass)

(12) Number of people in the household _____

Section 2: Physical environment (Infrastructure Development)

(i) Does the drainage system for the roads exist (Yes/No) _____?

(ii) Do roads exist leading to the four estates (Yes/No) _____?

(iii) Do road network exist within the estates (Yes/No) _____?

(iv) Type of houses:

Type of roof _____

Type of walls _____

(v) Rate your Level of satisfaction towards the infrastructure development within the estate using the 7-point rating scale as follows:

1=extremely low satisfaction, 7=extremely high satisfaction

Infrastructural Development	**Level of Satisfaction**						
	1	2	3	4	5	6	7
Roads leading to the estates							
Roads within the estates							
Drainage system of roads							
Interior of the house							
Exterior of the house							

Ventilation, air circulation							
Use of natural lighting within the house							
Aesthetics, appearance of the houses							
Houses arranged to a given pattern							
Zoning of the town and houses							
Drainage network of wastewater							
Rainwater drainage							
Size of living space							
Outside view							
Level of privacy							
Recreation facilities							
Noise insulation							
Size of living space							
Settlement resilient to disasters							

Section 3: Waste Management within the Housing estates

(i) Wastes management system exists in the estate (Yes/No) _____
(ii) Are there waste collection faculties (Yes/No) _____
(iii) Existing dump sites exist and are well managed (Yes/No) _____
(iv)Liquid waste facilities exist and are adequate (Yes/No) _____

Rate your Level of satisfaction towards waste management practices within the estate using the 7-point rating scale as follows:
1=extremely low satisfaction, 7=extremely high satisfaction

	Level of Satisfaction						
Waste Management Practices	1	2	3	4	5	6	7
Solid waste collection							
Solid waste separation							
Solid waste reduction							
Solid waste reuse							
Solid waste reduction (burning)							
Composting of wastes							
Grey water disposal (from kitchen, bathroom							
Waste aeration pools							
Wastewater drainage system							
Amount of Electronic wastes							

Amount of Medical wastes							
Level of Dust pollution							

Section 4: Sustainable Provision of Clean Water

(i) Do you collect water from roof catchment (Yes/No) _____
(ii) Maintenance of water catchment structures (Yes/No) _____
(iii) Clean water system exists from tap water (Yes/No) _____
(iv) Is the area a water sensitive community, natural water sources are scarce, and area depends on rainfall (Yes/No) _____
(v) Name the different water sources in the area:
Wells (Yes/No) _____
Boreholes (Yes/No) _____
Rivers (Yes/No) _____
Lakes (Yes/No) _____

Rate your Level of satisfaction towards sustainable provision of clean water

1=extremely low satisfaction, 7=extremely high satisfaction

	Level of Satisfaction						
Sustainable provision of clean water	1	2	3	4	5	6	7
Provision of clean water							
Roof catchment							
Storm water catchment							
Water catchment areas							
Level of water pollution							
Level of liquid waste pollution							

Section 5: Cultural Ecosystem Services

(i) How well are your cultural requirements met within the estates (Yes/No) _____
(ii) Are there any cultural or heritage structures existing in the area (Yes/No)
(iii) Name the different natural areas used by the community:
Forests (Yes/No) _____
Shrines (Yes/No) _____

Rate your Level of satisfaction towards cultural ecosystem services within the estates using the 7-point rating scale as follows:

1=extremely low satisfaction, 7=extremely high satisfaction

Cultural ecosystem services	**Level of Satisfaction**						
	1	2	3	4	5	6	7
Recreation facilities Recreation areas, gathering areas, cultural centers							
Open spaces within the estates							
Green spaces (planted with vegetation)							
Landscape features							
Public spaces design							
Aesthetic information							
Cultural heritage							
Inspiration for art and design							
Worship areas							
Scenic sports							

Section Six: Government Environmental Projects and Policies

Rate your Level of satisfaction towards government environmental projects and policies within the estates using the 7-point rating scale as follows:
1=extremely low satisfaction, 7=extremely high satisfaction

Statement		Rating scale						
		1	2	3	4	5	6	7
1	Local environmental conditions are excellent							
2	In most ways, the quality of the governments environmental programs is very good							
3	The government policies developed to deal with the environmental situation are excellent							
4	In most ways, the environmental conditions in my area are close to ideal							
5	For the most part, the programmes developed by the government have addressed the most important environmental problems							
6	In my opinion, the amount of attention given to the environment by the government has been satisfactory							
7	So far, I am content with the state of the environment in my area							

8	If I could change some aspect of the environmental condition in my area, I would change almost nothing							

Section Seven: Place identity

Rate your Level of satisfaction towards place identity within the estates using the 7-point rating scale as follows:
1=extremely low satisfaction, 7=extremely high satisfaction

Statements		Rating Scale						
		1	2	3	4	5	6	7
1	I identify with the neighbourhood							
2	I feel committed to this neighbourhood							
3	I feel I can be myself in this neighbourhood							
4	The neighbourhood is very special to me							

Section eight: Place dependence

Rate your Level of satisfaction towards place dependence within the estates using the 7-point rating scale as follows:
1=extremely low satisfaction, 7=extremely high satisfaction

Statements		Rating Scale						
		1	2	3	4	5	6	7
1	I cannot leave this neighbourhood							
2	I prefer this neighbourhood over others for what I want							
3	The neighbourhood is my favourite place to be							
4	This neighbourhood is better than any other place							

Section nine: Collective Action

Rate your level of collective action (group activity) using the 7-point rating scale as follows:
1=extremely low level of collective action, 7=extremely high level of collective action

		Level of Collective Action						
Statements		1	2	3	4	5	6	7
1	I am a member of the neighbourhood group							
2	I participate effectively in group activities and contributions related to the residential estate							
3	We have group activities related to residential							
4	I follow and practice the requirements and by-laws of the estate group							

Section ten: Residents knowledge of Environmental management

Rate your level of knowledge in environmental management using the 7-point rating scale as follows:
1=extremely low knowledge, 7=extremely high knowledge

		Level of Knowledge						
Environmental Management Knowledge		1	2	3	4	5	6	7
1	Solid waste separation							
2	Solid waste disposal							
3	Disposal of electronic waste (phones, computers							
4	Disposal of harmful substances (lead battery, others							
5	Recycling/reuse,							
6	Reduce							
7	Air pollution							
8	Water pollution							
9	Environmental laws							

Appendix C: Photos from the Field

Photo 1: Milimani estate in Maralal town, the estate is situated on a slopy area

Photo 2: Milimani estate in Maralal town, the estate has a mixture of stone houses and rental houses

Photo 3: Maralal township estate, showing storeyed residential houses and unbuilt plot area

Photo 4: Maralal township estate, showing a fenced household

Photo 5: Loresho estate

Photo 6: Sunrise estate in Maralal town, showing built plots and roads

Photo 7: Sunrise estate, showing stone and iron sheet fences surrounding the houses

Photo 8: Loresho estate in Maralal town, showing trees within the estate

Photo 9: Loresho estate

Photo 10: Milimani estate, showing dumping of solid waste on the roads

Photo 11: Milimani estate

Photo 12: Maralal township estate, near the main road to town

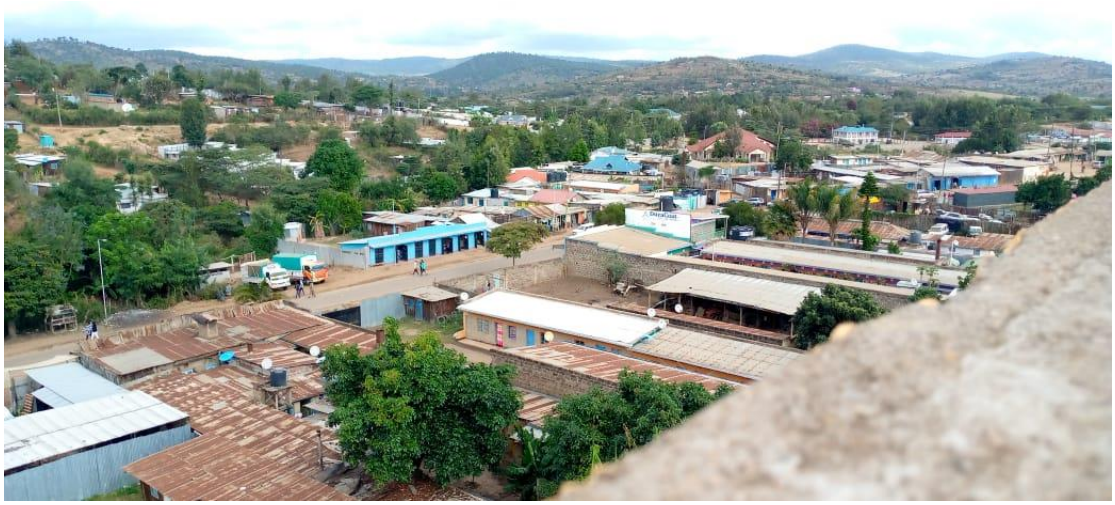

Photo 13: Maralal township estate

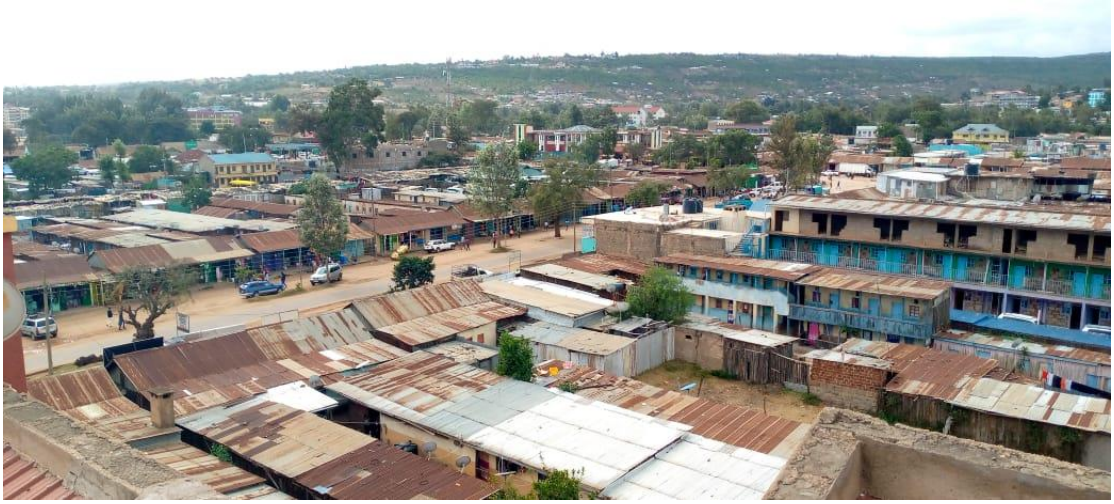

Photo 14: Maralal township estate

Appendix D: Letter of Approval from ANU

AFRICA NAZARENE
UNIVERSITY

21st February 2022

RE: TO WHOM IT MAY CONCERN

Dominic Moi Obita (16J01DMEV003) is a bonafide student at Africa Nazarene University. He has finished his course work and has defended his thesis proposal entitled: -

"An Evaluation of Client Satisfaction Towards Environmental Management Services in Four Housing Development Estates in Maralal Town, Samburu County, Kenya "

Any assistance accorded to him to facilitate data collection and finish his thesis is highly welcomed.

Rodney 2. Reed

Prof. Rodney Reed

DVC Academic & Student Affairs

CHIEF
MARALAL LOCATION
P. O. Box [illegible]-20600 MARALAL
DATE 1/03/22

Appendix E: NACOSTI Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **559367**

Date of Issue: **18/March/2022**

RESEARCH LICENSE

This is to Certify that Mr.. DOMINIC OBITA OBITA of Africa Nazarene University, has been licensed to conduct research in Samburu on the topic: "An Evaluation of Client Satisfaction Towards Environmental Management Services in Four Housing Development Estates in Maralal Town, Samburu County, Kenya " for the period ending : 18/March/2023.

License No: **NACOSTI/P/22/16429**

559367

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.